PEDESTRIAN AND BICYCLE SAFETY STUDY

Dayton Beach Shores, Volusia County

Prepared for:

RIVER TO SEA TRANSPORTATION PLANNING ORGANIZATION

Prepared By:

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July 2015

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EXECUTIVE SUMMARY

Traffic Engineering Data Solutions, Inc. (TEDS) was retained on behalf of the River to Sea Transportation Planning Organization (TPO) to provide a Qualitative Assessment on Dunlawton Avenue from Peninsula Drive to State Road A1A, and on State Road A1A from Dunlawton Avenue to the northern City limits of Daytona Beach Shores in Daytona Beach Shores, Florida.

Based on the pedestrian/bicycle crossing data, a review of crash history (18 bicycle/pedestrian crashes along entire corridor over a five-year period), feedback/input received at a meeting with representatives from the City of Daytona Beach Shores Police Department, field observations and coordination with the Florida Department of Transportation (FDOT), 16 locations were evaluated for enhanced pedestrian/bicycle safety. Recommendations for each location are summarized in the table below:

Location Number	Location on State Road A1A	Improvement	Location Number	Location on State Road A1A	Improvement
1	70' North of Broad Ave.	2, 5	9	60' North of Florida Shores Blvd.	1
2	110' North of Simpson Ave.	1	10	300' North of Beachcomber St.	1
3	70' North of Esmeralda Ave.	1	11	410' North of Sea Spray St.	1
4	350' North of Atares Ave.	1*	12	180' North of Milton Rd.	1
5	Next to Public Safety Building	4	13	80' North of Minerva Rd.	1
6	Next to Publix	3	14	180' North of Lindley Rd.	1*
7	30' North of Bellemead Dr.	2, 5	15	80' South of Browning Ave.	1
8	180' South of Oceans W. Blvd.	2, 5	16	80' South of Frazar Rd.	1

Improvement:

1 - Add new midblock crosswalk with refuge island

2 - Modify pavement markings/signage at existing crosswalk and eliminate vegetation in refuge island

3 - Add Rectangular Rapid Flashing Beacon

4 - Maintain existing crosswalk

5 - Increase refuge island size

* - additional costs anticipated due to drainage/manhole adjustments ($5,000 to $15,000)

The four traffic signals located along the study corridor at Peninsula Drive, South Atlantic Avenue, Moore Avenue and Botefuhr Avenue include crosswalks with pedestrian signal features. Based on the volumes, field review of the intersections, and crash history, no pedestrian-related improvements were recommended for the signalized intersections.

A road diet, whereby State Road A1A would be reduced from a five-lane section down to a three-lane section, was identified as a potential long-term improvement that would further the balance of vehicular and pedestrian activity along the corridor. Based on the study, it is reasonable to conclude that the roadway would function acceptably with a three-lane section both today and in the future. However, should the consideration of a road diet be explored further, detailed analyses should be conducted at the signalized intersections to better understand the lane geometry needed at each location. Based on the road diet concept, the total cost of implementing the road diet across the entire study corridor is preliminarily estimated at 12.9 million dollars.

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INTRODUCTION

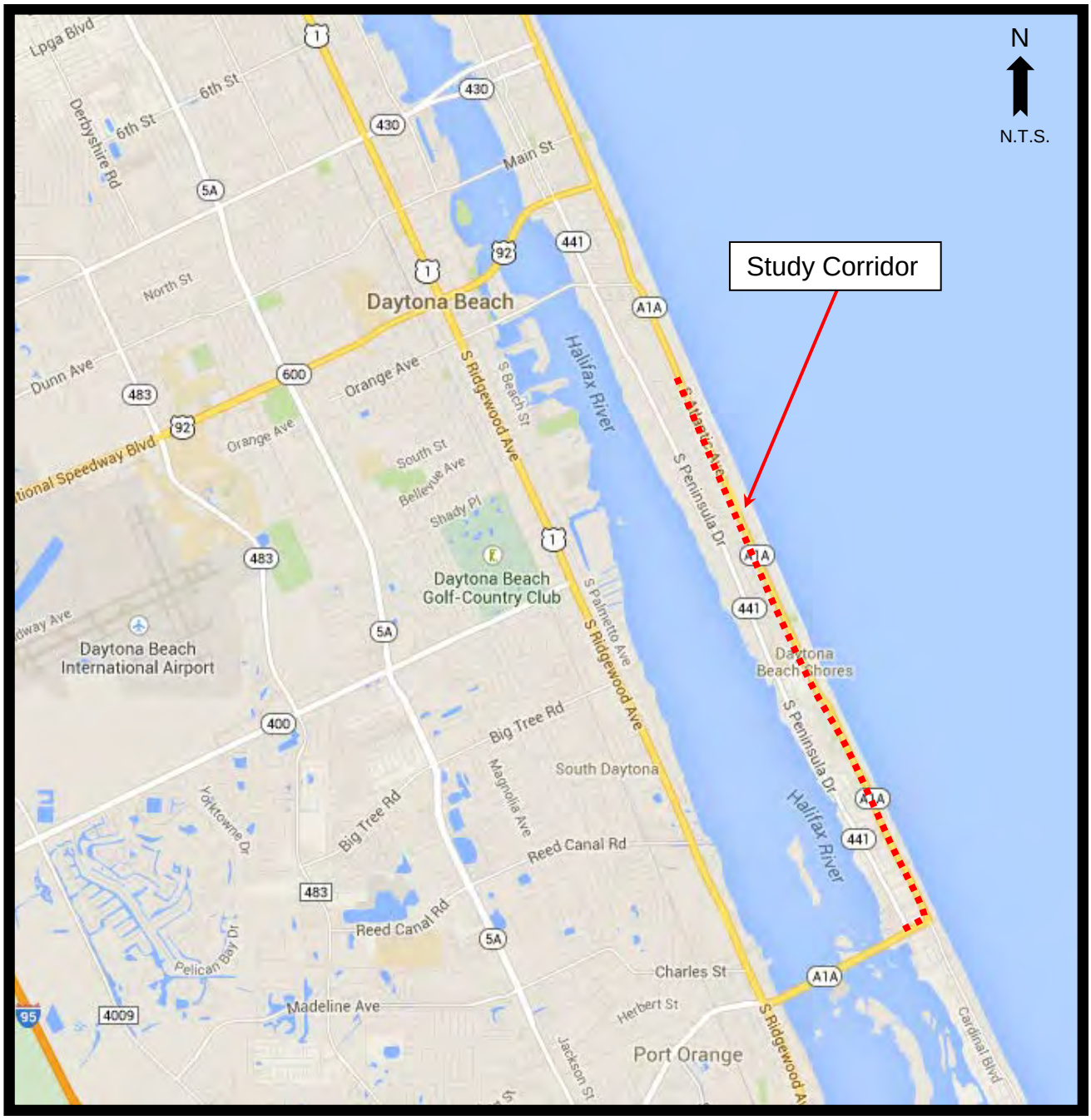
The City of Daytona Beach Shores is a beachfront community within Volusia County. Dunlawton Avenue and South Atlantic Avenue, both of which are classified as State Road A1A, serve as the transportation backbone within the City. While these two roadways carry a significant level of vehicular traffic, there is also a significant level of pedestrian/bicyclist traffic along these two roadways. Typical with most beachfront communities, the pedestrian/bicyclist traffic along these corridors is comprised of residents and guests traveling to/from the beach as well as those traveling to/from various commercial destinations.

The City has made significant investments to improve the aesthetics and walkability of the South Atlantic Avenue corridor. However, there is growing concern regarding pedestrian safety throughout the community. In response to these concerns and the desire to create a more pedestrian-friendly community, the City recently reconstructed South Atlantic Avenue south of Dunlawton Avenue to provide for improved pedestrian facilities. The focus has now shifted to north of Dunlawton Avenue.

Traffic Engineering Data Solutions, Inc. (TEDS) was retained on behalf of the River to Sea Transportation Planning Organization (TPO) to conduct a pedestrian crossing study within the City of Daytona Beach Shores. This study focuses on Dunlawton Avenue from Peninsula Drive to State Road A1A and State Road A1A from Dunlawton Avenue to the northern City limits of Daytona Beach Shores. The study corridor is shown in ***Figure 1***.

The analysis methods used in completing this study are consistent with the Manual on Uniform Traffic Control Devices (MUTCD), Manual on Uniform Traffic Studies (MUTS), Florida Department of Transportation (FDOT) District 5 guidelines / procedures, and engineering judgment. This report documents existing conditions, vehicle counts, pedestrian counts, crash analysis, qualitative assessment, and recommendations.

Figure 1
Corridor Location Map
State Road A1A



Source: Google Maps

Existing Conditions on Study Corridor

State Road A1A is an arterial that extends along the coastline of Volusia County. Within the study limits, State Road A1A includes an 800-foot section of Dunlawton Avenue from Peninsula Drive to South Atlantic Avenue. The study limits of State Road A1A then extend north along Atlantic Avenue to the northern City limits of Daytona Beach Shores (approximately 4.13 miles north of Dunlawton Avenue), for a total distance of approximately 4.29 miles.

From Peninsula Drive to State Road A1A, Dunlawton Avenue is a four-lane divided urban section (curb and gutter). From Dunlawton Avenue to the northern City limits, State Road A1A is a five-lane urban section (curb and gutter) with a continuous two-way left-turn lane. The 2013 daily volume on State Road A1A ranged from 12,500 vehicles per day (vpd) to 12,800 vpd. The posted speed limit along the corridor is 35 miles per hour (mph).

The majority of the land uses and development adjacent to the study corridor include hotels, motels, small restaurants, small retail shops, public service facilities and public recreational parks. Votran, Volusia County's public transit provider, has numerous bus stops along State Road A1A, providing service to adjacent communities such as Port Orange, Daytona Beach, and Ponce Inlet as well as to other locations within the County.

Four (4) traffic signals are located along the study corridor at Peninsula Drive, South Atlantic Avenue, Moore Avenue and Botefuhr Avenue. Each of these signals includes crosswalks with pedestrian signal features. Adjacent to the City of Daytona Beach Shores' Public Safety Building is an emergency traffic signal which also doubles as a pedestrian signal. Also, within the study limits along State Road A1A are five (5) existing midblock pedestrian crosswalks, as summarized below:

- 65 feet north of Broad Avenue (adjacent to ABC liquor store)
- Adjacent to the Daytona Beach Shores Public Safety Building (signalized)
- 500 feet south of Bellemead Drive (adjacent to Publix)
- 50 feet north of Bellemead Drive (adjacent to City of Daytona Beach Shores City Hall)
- 200 feet south of Oceans West Boulevard

Each of these midblock crosswalks includes a pedestrian refuge island.

One of the primary pedestrian attractors with the study limits is the beach. As a result, there are numerous public beach access points on State Road A1A including 16 public beach access connections for pedestrians and bicyclists, as summarized below:

- 100 feet north of White Cap Avenue
- 190 feet north of Ogden Boulevard
- At Larry Fornari, Sr., Park
- 50 feet north of Glen Myra Avenue
- 20 feet south of Atares Avenue
- 550 feet north of Atares Avenue
- Across from Bellemead Drive
- Across from Oceans West Boulevard
- Across from Ridge Road
- At Frank Rendon Park
- 550 feet north of Florida Shores Boulevard
- 80 feet south of Sea Spray Street
- 580 feet north of Sea Spray Street
- 50 feet north of Harrison Road
- Across from Browning Avenue
- 70 feet north of Frazar Road

There are also six (6) vehicular beach ramps, with the locations summarized below:

- Across from Dunlawton Avenue
- Just north of Esmeralda Avenue
- Across from Ridge Road
- Across from Florida Shores Boulevard
- Across from Minerva Road
- Across from Botefuhr Avenue

Figure 2 shows the existing conditions along the study corridor.

0 50 200

Feet

Matchline A

Bus Stop

Traffic Signal

VBA Vehicle Beach Access

PBA Pedestrian Beach Access

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RIVER TO SEA TRANSPORTATION PLANNING ORGANIZATION

FIGURE 2 (PAGE 1 OF 5)
EXISTING CONDITIONS

Bus Stop

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FIGURE 2 (PAGE 2 OF 5)
EXISTING CONDITIONS

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FIGURE 2 (PAGE 3 OF 5)
EXISTING CONDITIONS

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FIGURE 2 (PAGE 4 OF 5)
EXISTING CONDITIONS

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FIGURE 2 (PAGE 5 OF 5)
EXISTING CONDITIONS

DATA COLLECTION

Various sources of pedestrian, bicycle, and vehicular data were collected for this study including pedestrian, bicyclist, and vehicular counts which were collected on a typical summer weekend day.

Twenty-four hour bi-directional (north/south) volume counts were conducted on State Road A1A approximately 200 feet north of Sea Spray Street and 800 feet north of Atares Avenue. These counts were conducted on a Saturday during the summer. At 200 feet north of Sea Spray Street on State Road A1A the daily volume was 17,100 vehicles. The peak-hour occurred from 5:00 p.m. to 6:00 p.m. with an hourly volume of 1,309 vehicles. At 800 feet north of Atares Avenue, the daily volume was 16,400 while the peak-hour volume was 1,304 vehicles, occurring between 5:00 p.m. and 6:00 p.m.

Four (4) hours of manual turning movement counts (vehicles, pedestrians and bicycles) were collected from 10:00 a.m. to 2:00 p.m. on a Summer Saturday at the four (4) following intersections:

- Dunlawton Avenue and Peninsula Drive
- State Road A1A and Dunlawton Avenue
- State Road A1A and Moore Avenue
- State Road A1A and Botefuhr Avenue

Four-hour pedestrian/bicycle counts, from 10:00 a.m. to 2:00 p.m., were also conducted on the weekend along State Road A1A from Dunlawton Avenue to the northern City limits. Vehicle Gap Size Studies were also conducted at two locations on State Road A1A from 10:00 a.m. to 2:00 p.m. This data is discussed in subsequent sections of this study.

Turning movement count summaries, twenty-four hour bi-directional volume counts, gap study data sheets, a pedestrian/bicycle crossing location demand table, and pedestrian/bicycle count aerial diagrams can be found in ***Appendix A***.

COLLISION ANALYSIS

Pedestrian and bicyclist safety along the corridor was assessed through review of crash reports and field observations. Crash data for State Road A1A within the study limits was obtained from the University of Florida's *Signal Four Analytics* for the five-year period between January 1, 2009 and December 31, 2013. Based on a review of the data, there were 18 bicyclist or pedestrian crashes reported along the study corridor as summarized below:

- The 18 crashes resulted in two (2) fatalities, 20 injuries, and $7,200 in estimated property damage.
- Eleven (11) crashes involved pedestrians while seven (7) crashes involved bicyclists.
- Ten (10) crashes reportedly occurred as a result of careless driving.
- Four (4) crashes reportedly occurred as a result of a pedestrian failing to yield the right of way to a vehicle.
- Two (2) crashes reportedly occurred as a result of a bicyclist failing to yield the right of way to a vehicle.
- Ten (10) crashes occurred during the day and the other eight (8) occurred at night
- All 18 of the crashes occurred under dry pavement conditions.
- The only noted concentration of pedestrian/bicyclist-related crashes was at the Dunlawton Avenue/Peninsula Drive intersection where there were five (5) crashes.
- A fatality occurred just north of Simpson Avenue when a northbound motorist struck a pedestrian travelling in an unknown direction in the outside lane of State Road A1A. The crash occurred at 6:24 P.M. on a Saturday on dry pavement. The pedestrian was not within a marked crosswalk.
- A fatality occurred at Atares Avenue when a motorist making an eastbound left struck two (2) westbound pedestrians, killing one (1) of the pedestrians. The crash occurred at 12:10 P.M. on a Saturday on dry pavement. The pedestrians were not within a marked crosswalk.

A collision diagram and collision summary are provided in ***Appendix B***.

QUALATATIVE ASSESMENT

Field observations were conducted during summer weekend conditions to evaluate pedestrian/bicyclist activity along the corridor. The following items were noted with regard to the overall corridor:

- Vehicles on State Road A1A are generally traveling at or slightly above (within 5 mph) of the posted speed limit of 35 mph.
- Along the corridor, motorists on State Road A1A (both northbound and southbound) have a clear line of sight of any pedestrians located on either side of State Road A1A.
- Throughout the study corridor, State Road A1A is a five-lane section with a two-way continuous left-turn lane. Walking across State Road A1A throughout the study corridor effectively requires a two-stage crossing by first crossing one direction of traffic and then waiting within the two-way continuous turn lane for a gap in the other direction of traffic before crossing the other direction of traffic.
- Pedestrians were observed carrying chairs, toys and beach equipment across the street. Additionally, families with children were also observed crossing State Road A1A.
- Pedestrians in close proximity to a mid-block crosswalk typically utilized the crosswalk.
- Many motorists did not stop for pedestrian within a midblock crosswalk, with the exception of the crosswalk located in front of the Publix as most motorists did stop at this location. It should be noted that the midblock crosswalk at Publix includes signage a pavement markings in accordance with current FDOT standards and does not have any vegetation within the refuge island. The pavement markings include stop lines on each direction of State Road A1A located approximately 40 feet from the crosswalk.
- No evasive maneuvers were identified with regard to potential vehicular-pedestrian or bicycle conflicts, however, numerous vehicles did apply brakes slowly when passing a pedestrian staged within the two-way left-turn lane.

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MIDBLOCK PEDESTRIAN CROSSING EVALUATION

Midblock pedestrian crosswalks are utilized for the purposes of enhancing pedestrian connectivity and providing for pedestrian crossings at predictable locations in an effort to promote pedestrian/bicycle safety.

Based on the pedestrian/bicycle crossing data, feedback/input received at a meeting with representatives from the City of Daytona Beach Shores Police Department, field observations, and coordination with FDOT, 11 locations were identified for evaluating the need to provide enhanced pedestrian/bicycle safety. The locations are summarized below:

- 110 feet north of Simpson Avenue
- 70 feet north of Esmeralda Avenue
- 350 feet north of Atares Avenue
- 60 feet north of Florida Shores Blvd.
- 300 feet north of Beachcomber Street
- 410 feet north of Sea Spray Street
- 180 feet north of Milton Road
- 80 feet north of Minerva Road
- 180 feet north of Lindley Road
- 80 feet south of Browning Avenue
- 80 feet south of Frazar Road

Five (5) existing midblock crosswalks were also evaluated for relocation, removal and/or modification:

- 70 feet north of Broad Avenue (adjacent to ABC liquor store)
- Adjacent to the Daytona Beach Shores Public Safety Building (signalized)
- 500 feet south of Bellemead Drive (adjacent to Publix)
- 50 feet north of Bellemead Drive (adjacent to City of Daytona Beach Shores City Hall)
- 200 feet south of Oceans West Boulevard

An aerial photograph showing the study corridor, crossing locations and distances in between crossing locations or signals is depicted in ***Figure 3***.

0 50 200

Feet

Bus Stop

Traffic Signal

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RIVER TO SEA
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FIGURE 3 (PAGE 1 OF 5)
OVERALL IMPROVEMENT SCHEME

Bus Stop
Traffic Signal
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FIGURE 3 (PAGE 2 OF 5)
OVERALL IMPROVEMENT SCHEME

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FIGURE 3 (PAGE 3 OF 5)
OVERALL IMPROVEMENT SCHEME

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FIGURE 3 (PAGE 4 OF 5)
OVERALL IMPROVEMENT SCHEME

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FIGURE 3 (PAGE 5 OF 5)
OVERALL IMPROVEMENT SCHEME

Study Location #1

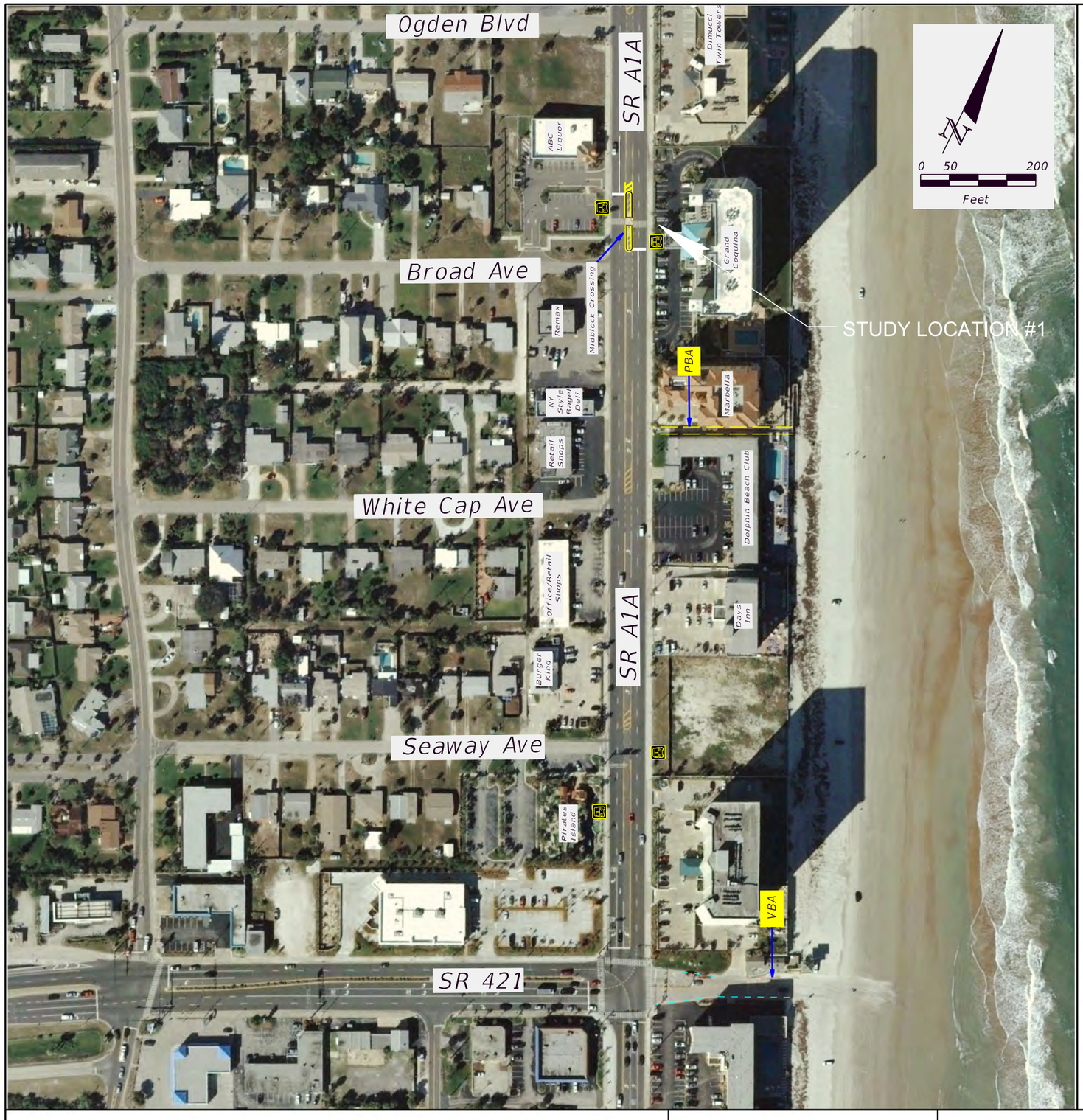
Existing Conditions

Study location #1 is on State Road A1A approximately 70 feet north of the intersection with Broad Avenue where an existing midblock pedestrian crosswalk is located with a refuge island. ***Table 1*** provides a summary of the existing conditions at the study location. Photographs in the vicinity of the study location are also provided. An aerial image showing the proximity of the study location with respect to adjacent land uses, and a zoomed in view of the study location is shown in ***Figure 4***.

The existing midblock pedestrian crossing at this location predominantly serves pedestrians/bicyclists traveling between residences on the west side of State Road A1A and the beach as well as those traveling between the ABC liquor store on the west side of State Road A1A and condominiums/hotels on the east side of State Road A1A.

Table 1
Summary of Existing Conditions
Study Location #1

Feature	Description
Main Line	• State Road A1A
Location of Crossing	• Approximately 70 feet north of Broad Avenue
Adjacent Land Uses	• Southwest: Retail shops • Southeast: Grand Coquina (condominiums) • Northwest: ABC Fine Wine & Spirits • Northeast: Di Mucci Twin Towers
Traffic Control	• State Road A1A is uncontrolled
Adjacent Signalized Intersections	• South: Dunlawton Avenue – 0.24 miles • North: Daytona Beach Shores Public Safety Building – 0.85 miles
Adjacent Crosswalks	• South: Dunlawton Avenue – 0.24 miles • North: Daytona Beach Shores Public Safety Building – 0.85 miles
State Road A1A	• Cross Section: 5-lane undivided urban section with a continuous bi-directional left-turn lane • Access: Class 6 • Posted Speed Limit: 35 mph • AADT: 12,500 vehicles per day (year 2013) • Northbound Approach Lanes: 2 through lanes, 1 left-turn lane • Southbound Approach Lanes: 2 through lanes, 1 left-turn lane • Alignment: Straight • Pedestrian Crossings: Midblock pedestrian crosswalk • Sidewalks: Both sides • Street Lighting: Both sides • Bus Stops: 820’ south (west side), 60’ south (east side), 20’ north (west side) & 950’ north (east side)



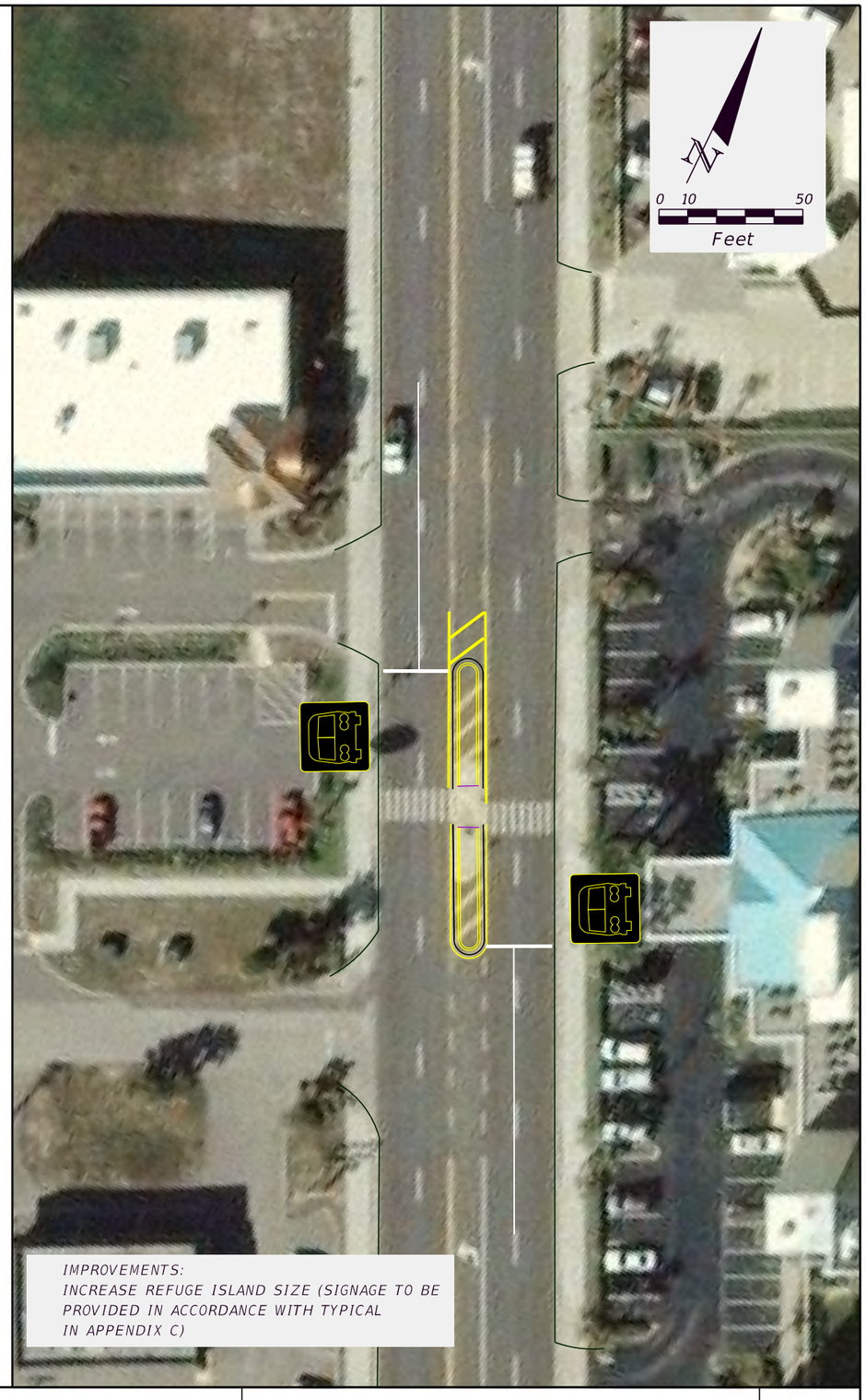


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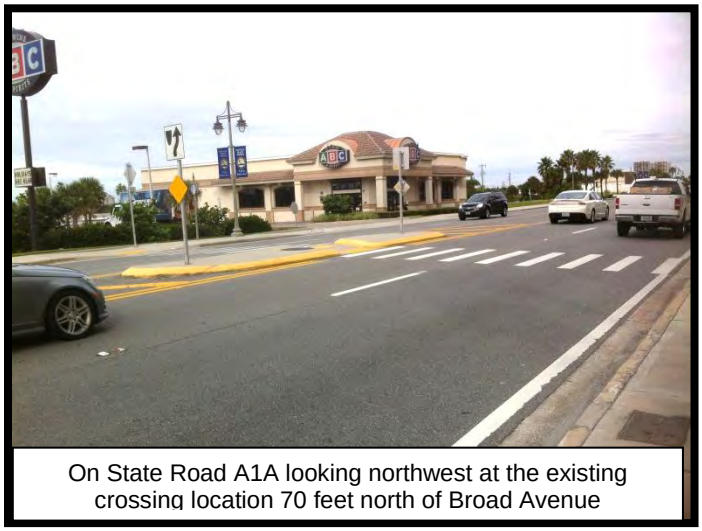
FIGURE 4
PROXIMITY AERIAL + CLOSE UP
STUDY LOCATION #1

Photographs of Study Location #1

On State Road A1A looking north at the existing crossing location 70 feet north of Broad Avenue (Bing Maps)

On State Road A1A looking south at the existing crossing location 70 feet north of Broad Avenue (Bing Maps)

On State Road A1A looking west at the existing crossing location 70 feet north of Broad Avenue

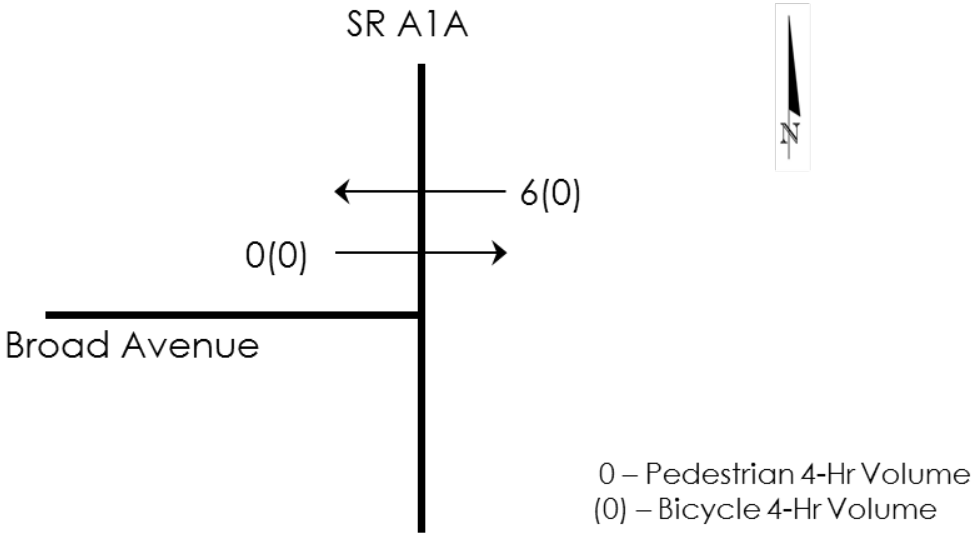


On State Road A1A looking northwest at the existing crossing location 70 feet north of Broad Avenue

On State Road A1A looking south at the existing crossing location 70 feet north of Broad Avenue (Photo: Bing Maps)

Pedestrian Volumes

Four (4) hours of pedestrian and bicycle counts, from 10:00 a.m. to 2:00 p.m., were conducted on a weekend day in the vicinity of the study location. As summarized below, over the four-hour count there were a total of six (6) pedestrians and zero (0) bicyclists that crossed State Road A1A. In addition to these peak hours, it is expected that this existing crosswalk experiences additional traffic during the evening hours.



When evaluating pedestrian safety along a corridor, it is important to understand the opportunities available for pedestrians to safely cross a roadway. For that reason, Vehicle Gap Size Studies were conducted in accordance with the procedures set forth in Chapter 8 of the Manual of Uniform Traffic Studies (MUTS) to determine the size and the number of gaps in vehicular traffic along State Road A1A. Vehicle Gap Size Studies were conducted at two (2) locations on State Road A1A:

- 380 feet north of Beachcomber Street
- 260 feet north of Cascade Terrace

These locations are representative of midblock locations in the southern and northern portions of the corridor as there is only on (1) fully operational traffic signal in the southern portion (Dunlawton Avenue) and two (2) traffic signals in the northern portion (Moore Avenue and Botefuhr Avenue). The southern portion of the corridor includes Dunlawton Avenue to Florida Shores Boulevard. The northern portion of the corridor includes Florida Shores Boulevard to Frazar Road. The two (2) gap studies were conducted on Saturday from 10:00 a.m. to 2:00 p.m., when pedestrian activity was expected to be highest. Vehicle Gap Study data sheets can be found in ***Appendix A***.

The minimum gap suitable for a pedestrian to cross a roadway is calculated based on a walking speed of 3 feet per second using the formula below:

G = (w/s) + t

G = Minimum Gap
w = width of the crosswalk
s = walking speed, 3 feet per second
t = startup time, usually 3 seconds

As conveyed in the Qualitative Assessment, many pedestrians currently cross State Road A1A utilizing a two-stage movement whereby they first cross one direction of traffic, stage in the two-way left-turn lane, and then cross the other direction of traffic. However, this movement is undesirable without any refuge island as pedestrians are effectively standing unprotected within a vehicular lane. Thus, when calculating the minimum gap suitable for crossing State Road A1A, the entire width of the roadway (60 feet) was utilized. The minimum acceptable gap for crossing State Road A1A is therefore 23 seconds.

In the southern portion of the corridor, from Dunlawton Avenue to Ridge Road, there were nine (9) gaps within a four-hour period above or equal to 23 seconds. In the northern portion of the corridor, from Richards Lane to Frazar Road, there were seven (7) gaps above or equal to 23 seconds over the four-hour count period. The pedestrian/bicyclist capacities and the number of adequate gaps are shown in ***Table 2***:

Table 2
Summary of Vehicle Gap Size Studies
State Road A1A

Location	Time (Start to End)	Number of Adequate Gaps	Available Capacity (Pedestrian + Bicyclist)
SR A1A - 260' north of Cascade Terrace	10:00 A.M. - 11:00 A.M.	6	50
	11:00 A.M. - 12:00 P.M.	3	35
	12:00 P.M. - 1:00 P.M.	1	20
	1:00 P.M. - 2:00 P.M.	0	0
Sub-total		10	105
SR A1A - 380' north of Beachcomber Street	10:00 A.M. - 11:00 A.M.	3	50
	11:00 A.M. - 12:00 P.M.	2	25
	12:00 P.M. - 1:00 P.M.	0	0
	1:00 P.M. - 2:00 P.M.	2	25
Sub-total		7	100

The results of a Vehicle Gap Size Study are typically utilized to calculate the number of pedestrians that can cross a roadway recognizing that up to five (5) pedestrians can utilize the same gap at the same time. However, based on the field observations, the majority of pedestrians crossing State Road A1A were individuals, not groups of people. Therefore, in subsequent sections of this study when evaluating pedestrian safety along the corridor, emphasis was placed on the number of available gaps over the four-hour count period.

Based on the Vehicle Gap Study for the southern portion of the corridor there were nine (9) adequate gaps between 10:00 a.m. and 2:00 p.m. as compared to the crossing volume of six (6) pedestrian/bicyclists just north of Broad Avenue. However, all six (6) pedestrians/bicyclists crossed between 11:00 a.m. and 1:00 p.m. during which there were only four (4) adequate gaps. Thus, there were not enough adequate gaps near this midblock crossing location to cross State Road A1A without the need to stage within the two-way left-turn lane.

Crossing Location	Time (Start to End)	Number of Adequate Gaps	Number of Pedestrians + Bicyclists		
			Eastbound	Westbound	Total
SR A1A - 70 feet north of Broad Avenue	10:00 A.M. - 11:00 A.M.	6	0	0	0
	11:00 A.M. - 12:00 P.M.	3	0	4	4
	12:00 P.M. - 1:00 P.M.	1	0	2	2
	1:00 P.M. - 2:00 P.M.	0	0	0	0

Collision Analysis

Crash data for State Road A1A within the study limits was obtained from University of Florida's *Signal Four Analytics* obtained for the five-year period between January 1, 2009 and December 31, 2013. Based on a review of the data, there were no bicycle or pedestrian crashes reported at this study location.

Recommendations

Based on the data collected, field observations, and engineering judgment, it is recommended that the existing midblock pedestrian crosswalk be retained on State Road A1A approximately 70 feet north of Broad Avenue for the following reasons:

- The existing crosswalk currently serves pedestrians/bicyclists traveling between the ABC liquor store on the west side of State Road A1A to/from the condominiums/hotels on the east side of State Road A1A.
- The daily traffic volume on State Road A1A is 12,500 vehicles per day (year 2013).
- The nearest alternative crossing on State Road A1A is over 300 feet in either direction.
- The proposed crossing is not within the influence area of adjacent signalized intersections.
- Adequate stopping sight distance is provided at the crossing location.
- The proposed midblock crossing location is within 100 feet north and south of bus stops.

Because a pedestrian/bicyclist needs to utilize a two-stage movement, whereby they stage in the middle of the road, and because the daily volume on State Road A1A exceeds 12,000 vpd, it is also recommended that the refuge island be retained. However, it is proposed to increase the refuge island size and modify the pavement markings and signage in the vicinity of the existing midblock crosswalk to coincide with that shown in the typical midblock pedestrian crosswalk included in ***Appendix C***. These improvements are shown in a proximity aerial and close up in ***Figure 4.*** The cost associated with increasing the refuge island size is approximately $4,500 and the signage and pavement marking modifications are estimated at approximately $5,500 per the typical cost estimate in ***Appendix C***.

Study Location #2

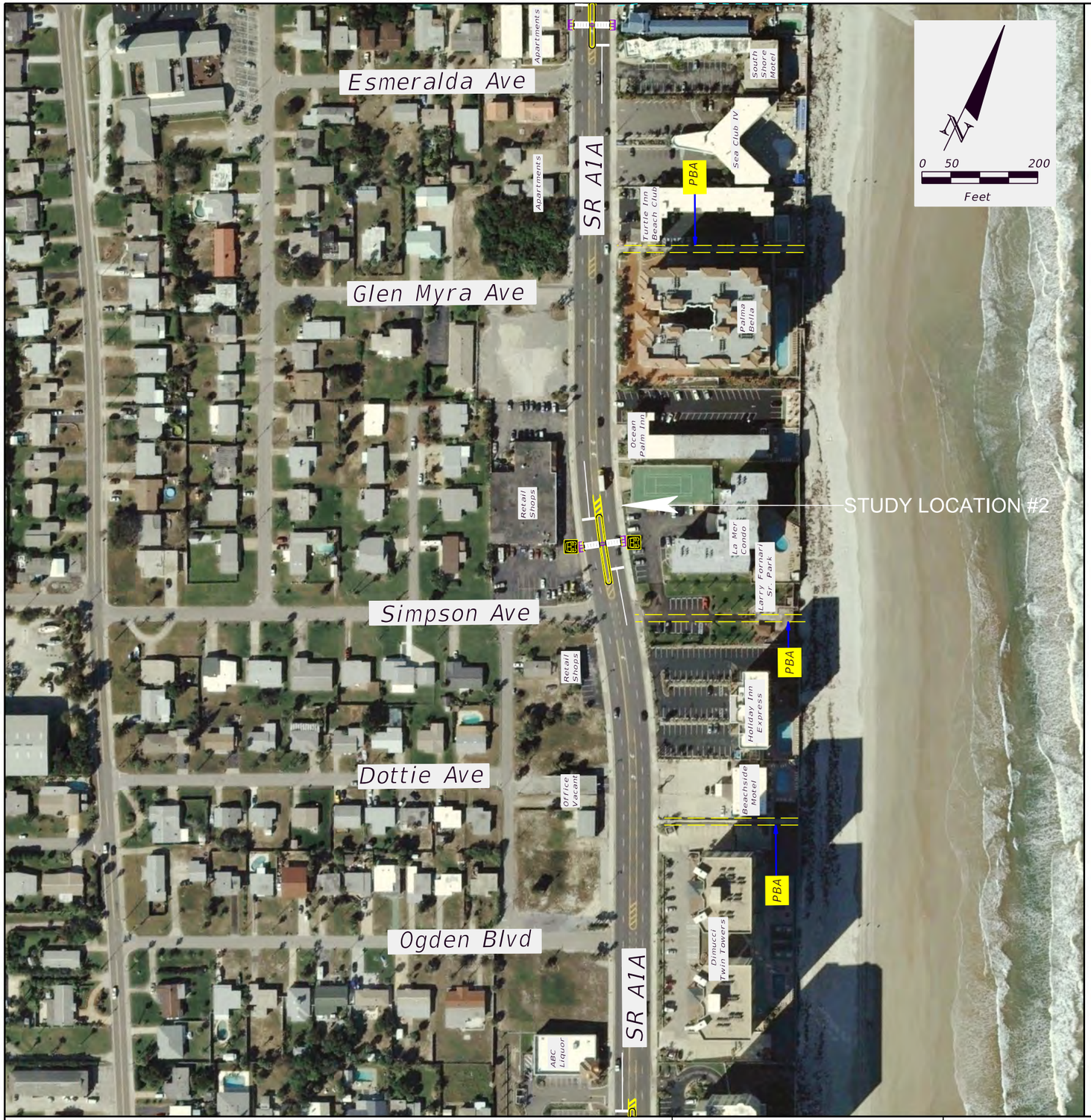
Existing Conditions

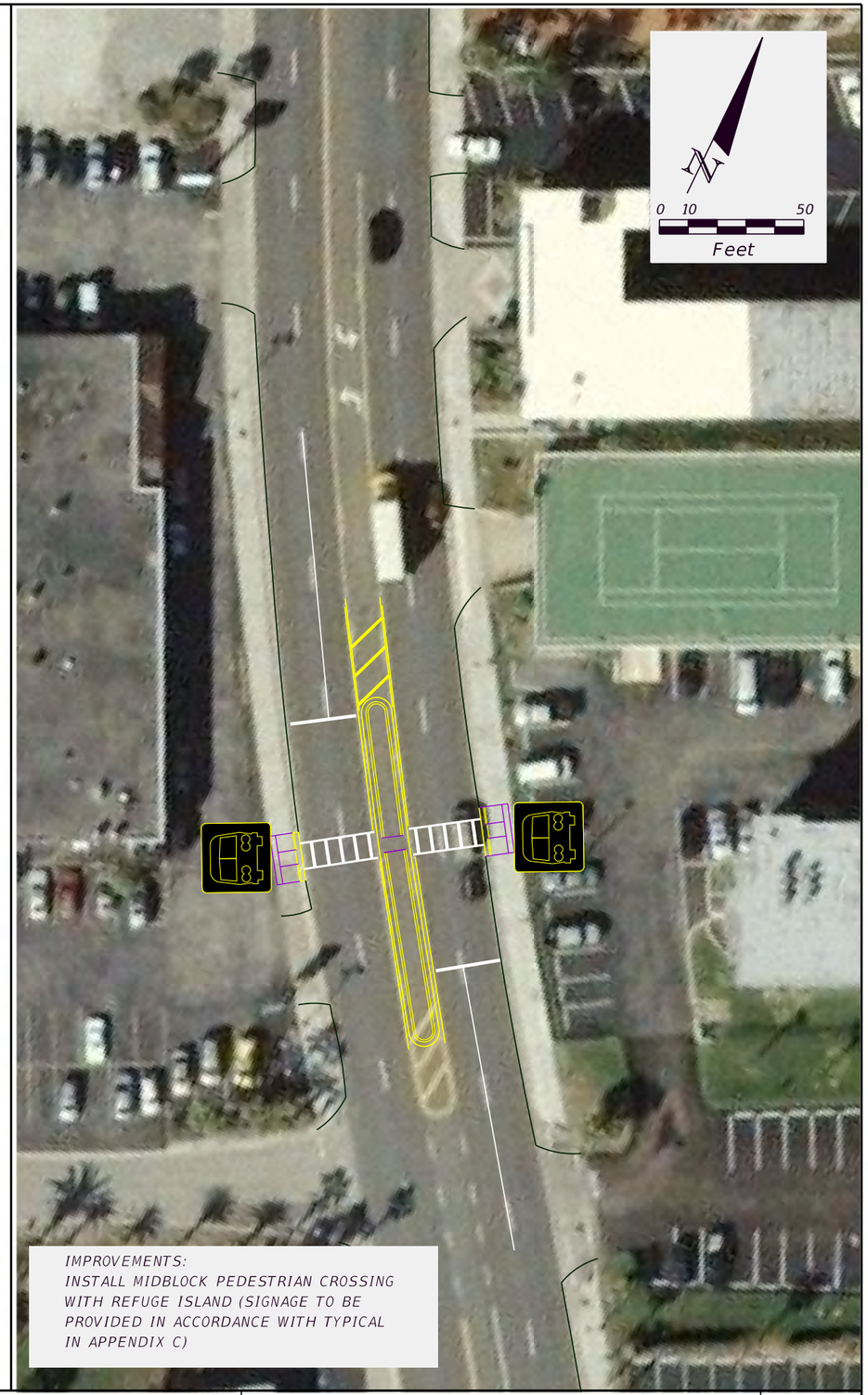
Study location #2 is on State Road A1A approximately 110 feet north of the intersection with Simpson Avenue. ***Table 3*** provides a summary of the existing conditions at the study location. Photographs in the vicinity of the study location are also provided. An aerial image showing the proximity of the study location with respect to adjacent land uses, and a zoomed in view of the study location is shown in ***Figure 5***.

A midblock pedestrian crossing at this study location would predominantly serve pedestrians/bicyclists traveling between residences and the beach via the Larry Fornari, Sr. Park. The crossing would also serve pedestrians/bicyclists traveling between retail shops, including The Cracked Egg restaurant, on the west side of State Road A1A and hotels/condominiums on the east side of State Road A1A such as the Holiday Inn Express and La Mer condominiums.

Table 3
Summary of Existing Conditions
Study Location #2

Feature	Description
Main Line	• State Road A1A
Location of Crossing	• Approximately 110 feet north of Simpson Avenue
Adjacent Land Uses	• Southwest: Retail shops • Southeast: La Mer condominiums/Larry Fornari, Sr. Park • Northwest: Retail shops/The Cracked Egg • Northeast: Ocean Palm Inn
Traffic Control	• State Road A1A is uncontrolled
Adjacent Signalized Intersections	• South: Dunlawton Avenue – 0.40 miles • North: Daytona Beach Shores Public Safety Building – 0.69 miles
Adjacent Crosswalks	• South: Just north of Broad Avenue – 0.17 miles • North: Daytona Beach Shores Public Safety Building – 0.69 miles
State Road A1A	• Cross Section: 5-lane undivided urban section with a continuous bi-directional left-turn lane • Access: Class 6 • Posted Speed Limit: 35 mph • AADT: 12,800 vehicles per day (year 2013) • Northbound Approach Lanes: 2 through lanes, 1 left-turn lane • Southbound Approach Lanes: 2 through lanes, 1 left-turn lane • Alignment: Straight • Pedestrian Crossings: None • Sidewalks: Both sides • Street Lighting: Both sides • Bus Stops: Both sides adjacent to the proposed crosswalk





Bus Stop

Traffic Signal

VBA Vehicle Beach Access

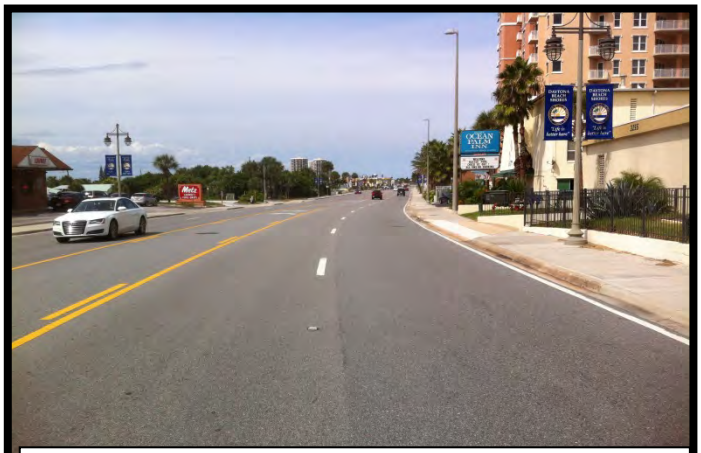
PBA Pedestrian Beach Access

Traffic Engineering Data Solutions, Inc.
80 Spring Vista Drive
DeBary, FL 32713
Phone: 386.753.0558
Fax: 386.753.0778

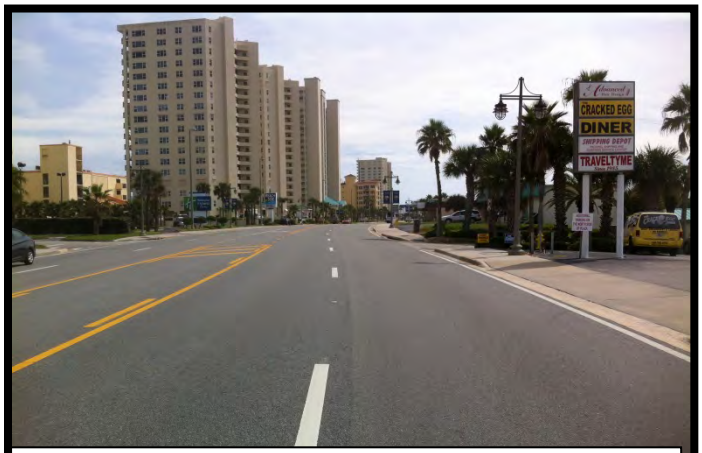
RIVER TO SEA
TRANSPORTATION
PLANNING ORGANIZATION

FIGURE 5
PROXIMITY AERIAL + CLOSE UP
STUDY LOCATION #2

Photographs of Study Location #2



On State Road A1A looking north at the study location 110 feet north of Simpson Avenue



On State Road A1A looking south at the study location 110 feet north of Simpson Avenue

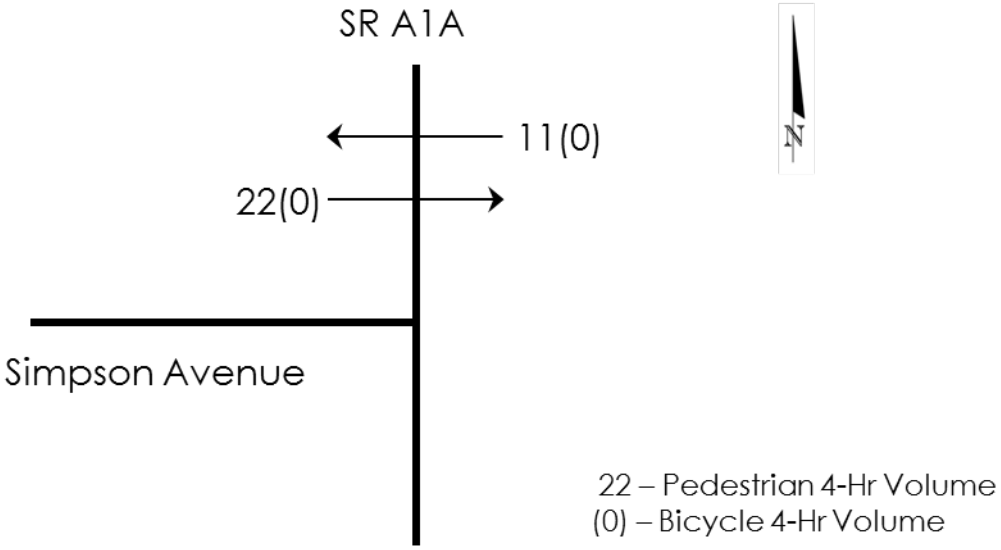
On State Road A1A looking west at the study location 110 feet north of Simpson Avenue

On State Road A1A looking northwest at the study location 110 feet north of Simpson Avenue

On State Road A1A looking south at the study location 110 feet north of Simpson Avenue (Photo: Bing Maps)

Pedestrian Volumes

Four (4) hours of pedestrian and bicycle counts, from 10:00 a.m. to 2:00 p.m., were conducted on a weekend day in the vicinity of the proposed crosswalk location. As summarized below, over the four-hour count there were a total of 33 pedestrians and zero (0) bicycles that crossed State Road A1A.



Based on the Vehicle Gap Study for the southern portion of the corridor there were nine (9) adequate gaps between 10:00 A.M. and 2:00 P.M. as compared to the crossing volume of 33 pedestrians/bicyclists. Additionally, from 1:00 P.M. to 2:00 P.M., there were zero (0) adequate gaps as compared to seven (7) pedestrians crossing State Road A1A. Thus, there were not enough adequate gaps near this study location to cross State Road A1A without the need to stage within the two-way left-turn lane.

Crossing Location	Time (Start to End)	Number of Adequate Gaps	Number of Pedestrians + Bicyclists		
			Eastbound	Westbound	Total
SR A1A - 110 feet north of Simpson Avenue	10:00 A.M. - 11:00 A.M.	6	9	1	10
	11:00 A.M. - 12:00 P.M.	3	6	3	9
	12:00 P.M. - 1:00 P.M.	1	5	2	7
	1:00 P.M. - 2:00 P.M.	0	2	5	7

Collision Analysis

Crash data for State Road A1A within the study limits was obtained from University of Florida's *Signal Four Analytics* obtained for the five-year period between January 1, 2009 and December 31, 2013. Based on a review of the data, there was one (1) pedestrian-related crash near study location #2, which reportedly involved a pedestrian traveling in an unknown direction in the outside northbound lane of State Road A1A, approximately 125 feet north of Simpson Avenue. The crash, which occurred during the night under dry pavement conditions, resulted in one (1) fatality and $2,000 in estimated property damage.

Recommendations

Based on the data collected, field observations, and engineering judgment, it is recommended that a midblock pedestrian crosswalk be installed on State Road A1A approximately 110 feet north of Simpson Avenue for the following reasons:

- There is a well-defined pattern of existing pedestrian crossings in the vicinity of the proposed crossing location (33 crossings in four hours).
- The daily traffic volume on State Road A1A is 12,800 vehicles per day (year 2013).
- The nearest alternative crossing on State Road A1A is over 300 feet in either direction.
- The proposed crossing is not within the influence area of adjacent signalized intersections.
- Adequate stopping sight distance is provided at the crossing location.
- The proposed midblock crossing location is adjacent to bus stops.

Because a pedestrian/bicyclist needs to utilize a two-stage movement, whereby they stage in the middle of the road, and because the daily volume on State Road A1A exceeds 12,000 vpd, it is also recommended that a refuge island be provided. Such an island would restrict vehicular turning movements into the southern driveway for the retail shops/The Cracked Egg restaurant on the western side of State Road A1A to a right-in/right-out only access. Alternative driveway access is also provided to the retail shops/restaurants on Simpson Avenue. These improvements are shown in proximity aerial and close up in ***Figure 5.*** The estimated cost for the installation of a midblock pedestrian crosswalk is $18,100 per the typical cost estimate in ***Appendix C***.

Study Location #3

Existing Conditions

Study location #3 is on State Road A1A approximately 70 feet north of the intersection with Esmeralda Avenue. ***Table 4*** provides a summary of the existing conditions at the study location. Photographs in the vicinity of the study location are also provided. An aerial image showing the proximity of the study location with respect to adjacent land uses, and a zoomed in view of the study location is shown in ***Figure 6.***

A midblock pedestrian crossing at this study location would predominantly serve pedestrians/bicyclists traveling between residences on the west side of State Road A1A and the beach, as a vehicle beach access is provided just north of the study location. Also, pedestrians/bicyclists would utilize this crosswalk to travel between retail shops on the west side of State Road A1A and hotels/motels on the east side of State Road A1A.

Table 4
Summary of Existing Conditions
Study Location #3

Feature	Description
Main Line	• State Road A1A
Location of Crossing	• Approximately 70 feet north of Esmeralda Avenue
Adjacent Land Uses	• Southwest: Residences • Southeast: South Shore motel • Northwest: Retail shops • Northeast: Vehicular beach access
Traffic Control	• State Road A1A is uncontrolled
Adjacent Signalized Intersections	• South: Dunlawton Avenue – 0.57 miles • North: Daytona Beach Shores Public Safety Building – 0.52 miles
Adjacent Crosswalks	• South: Just north of Broad Avenue – 0.33 miles • North: Daytona Beach Shores Public Safety Building – 0.52 miles
State Road A1A	• Cross Section: 5-lane undivided urban section with a continuous bi-directional left-turn lane • Access: Class 6 • Posted Speed Limit: 35 mph • AADT: 12,800 vehicles per day (year 2013) • Northbound Approach Lanes: 2 through lanes, 1 left-turn lane • Southbound Approach Lanes: 2 through lanes, 1 left-turn lane • Alignment: Straight • Pedestrian Crossings: None • Sidewalks: Both sides • Street Lighting: Both sides • Bus Stops: 840’ south (both sides), 70’ north (west side) & 280’ north (east side)

IMPROVEMENTS:
INSTALL MIDBLOCK PEDESTRIAN CROSSING WITH REFUGE ISLAND (SIGNAGE TO BE PROVIDED IN ACCORDANCE WITH TYPICAL IN APPENDIX C) AND INSTALL LEFT-TURN ARROW PAVEMENT MARKINGS

Bus Stop
Traffic Signal
VBA Vehicle Beach Access
PBA Pedestrian Beach Access

Traffic Engineering Data Solutions, Inc.
80 Spring Vista Drive DeBary, FL 32713
Phone: 386.753.0558 Fax: 386.753.0778

RIVER TO SEA TRANSPORTATION PLANNING ORGANIZATION

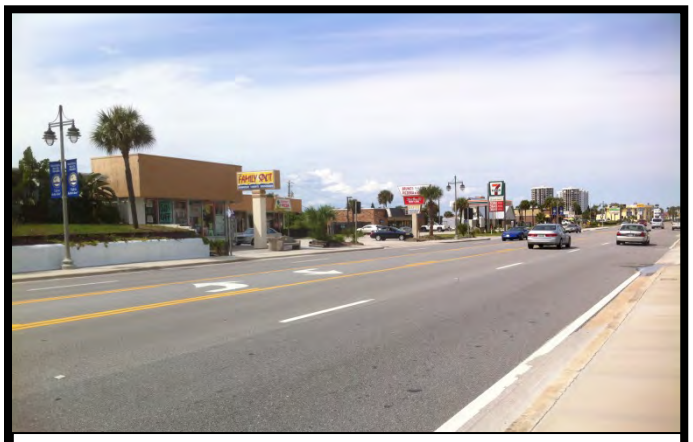
FIGURE 6
PROXIMITY AERIAL + CLOSE UP
STUDY LOCATION #3

Photographs of Study Location #3

On State Road A1A looking north at the study location 70 feet north of Esmeralda Avenue

On State Road A1A looking south at the study location 70 feet north of Esmeralda Avenue

On State Road A1A looking west at the study location 70 feet north of Esmeralda Avenue

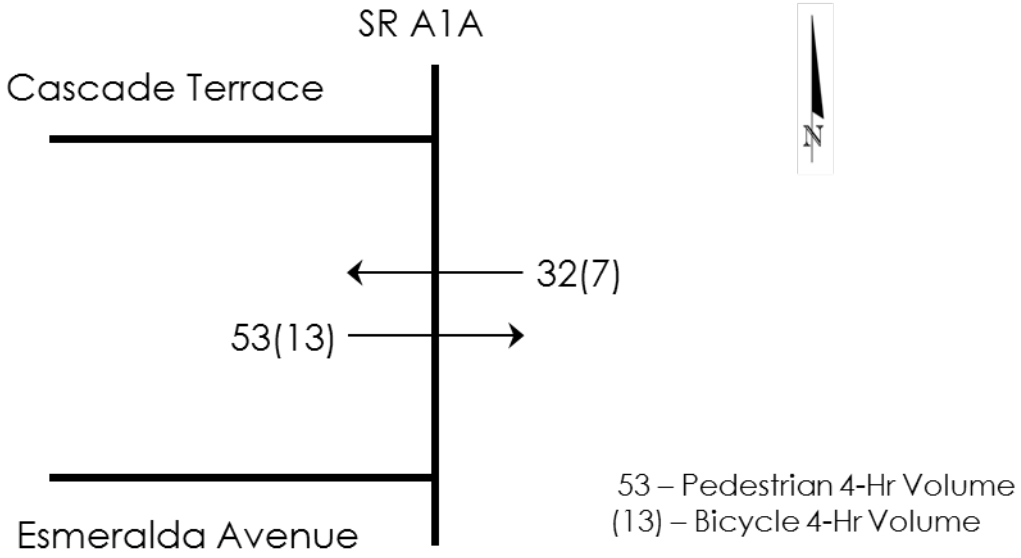


On State Road A1A looking northwest at the study location 70 feet north of Esmeralda Avenue

On State Road A1A looking south at the study location 70 feet north of Esmeralda Avenue (Photo: Bing Maps)

Pedestrian Volumes

Four (4) hours of pedestrian and bicycle counts, from 10:00 a.m. to 2:00 p.m., were conducted on a weekend day in the vicinity of the proposed crosswalk location. As summarized below, over the four-hour count there were a total of 85 pedestrians and 20 bicycles that crossed State Road A1A.



Based on the Vehicle Gap Study for the southern portion of the corridor there were nine (9) adequate gaps between 10:00 A.M. and 2:00 P.M. as compared to the crossing volume of 105 pedestrians/bicyclists. Additionally, more than 20 pedestrians/bicyclists crossed State Road A1A each hour over the four-hour count.

Crossing Location	Time (Start to End)	Number of Adequate Gaps	Number of Pedestrians + Bicyclists		
			Eastbound	Westbound	Total
SR A1A - 70 feet north of Esmeralda Avenue	10:00 A.M. - 11:00 A.M.	6	22	5	27
	11:00 A.M. - 12:00 P.M.	3	17	6	23
	12:00 P.M. - 1:00 P.M.	1	16	12	28
	1:00 P.M. - 2:00 P.M.	0	11	16	27

Collision Analysis

Crash data for State Road A1A within the study limits was obtained from University of Florida's *Signal Four Analytics* obtained for the five-year period between January 1, 2009 and December 31, 2013. Based on a review of the data, there were no pedestrian or bicycle crashes near this study location.

Recommendations

Based on the data collected, field observations, and engineering judgment, it is recommended that a midblock pedestrian crosswalk be installed on State Road A1A approximately 70 feet north of Esmeralda Avenue for the following reasons:

- There is a well-defined pattern of existing pedestrian crossings in the vicinity of the proposed crossing location (105 crossings in four hours).
- Hourly pedestrian volumes exceeded 20 pedestrians per hour for four consecutive hours.
- The daily traffic volume on State Road A1A is 12,800 vehicles per day (year 2013).
- The nearest alternative crossing on State Road A1A is over 300 feet in either direction.
- The proposed crossing is not within the influence area of adjacent signalized intersections.
- Adequate stopping sight distance is provided at the crossing location.
- The proposed midblock crossing location is within 100 feet of a bus stop.

Because a pedestrian/bicyclist needs to utilize a two-stage movement, whereby they stage in the middle of the road, and because the daily volume on State Road A1A exceeds 12,000 vpd, it is also recommended that a refuge island be provided. Such an island would not restrict vehicular driveway access. These improvements are shown in proximity aerial and close up in ***Figure 6.*** The estimated cost for the installation of a midblock pedestrian crosswalk is $18,100.

Study Location #4

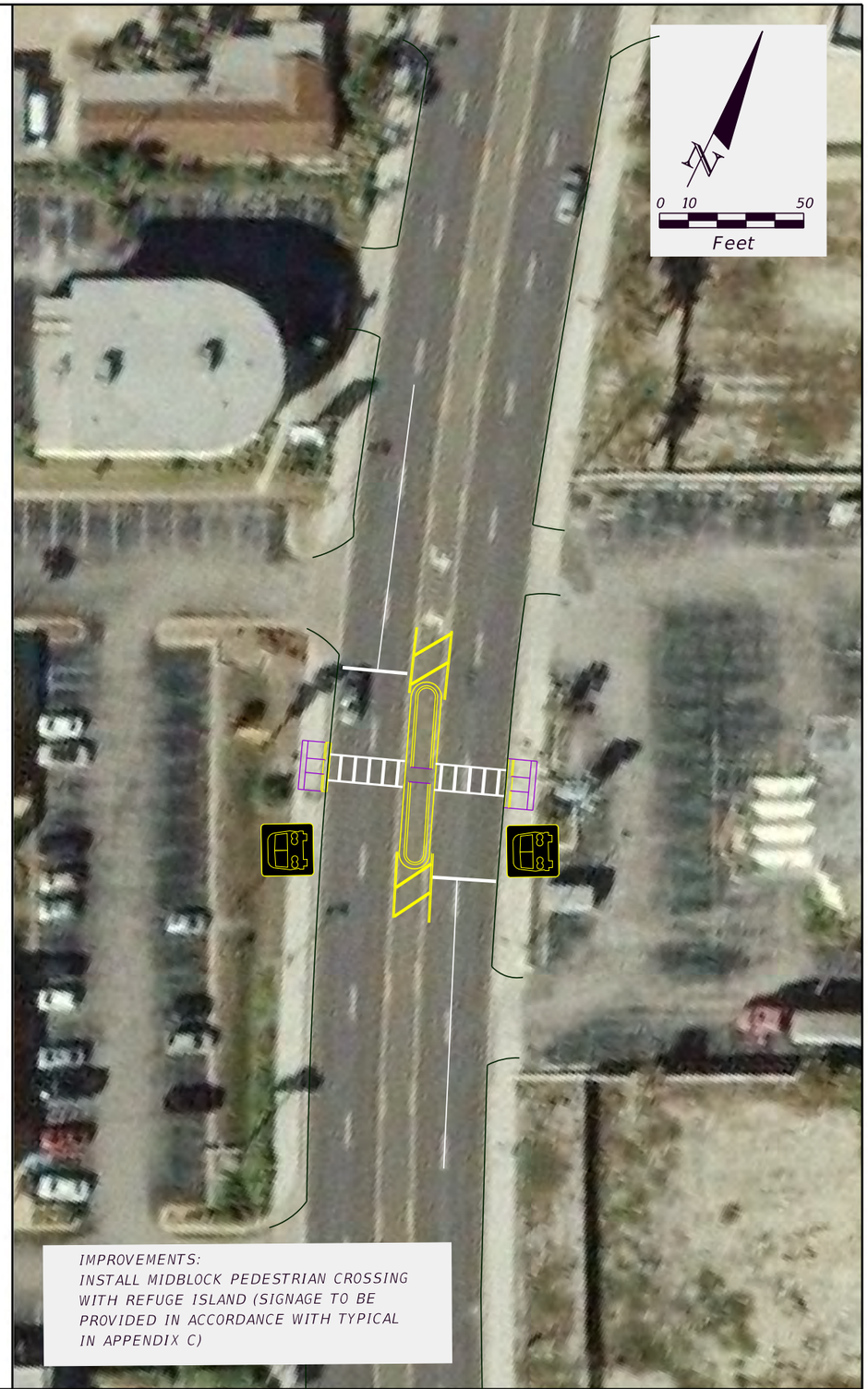
Existing Conditions

Study location #4 is on State Road A1A approximately 350 feet north of Atares Avenue. ***Table 5*** provides a summary of the existing conditions at the study location. Photographs in the vicinity of the study location are also provided. An aerial image showing the proximity of the study location with respect to adjacent land uses, and a zoomed in view of the study location is shown in ***Figure 7***.

A midblock pedestrian crossing at this study location would predominantly serve both pedestrians and bicyclists traveling between retail uses on the west side of State Road A1A, including Red Lobster, Denny's and Souvenir City, and hotels/motels on the east side of State Road A1A. Also, the crosswalk would serve guests at the Hyatt Place hotel on the east side of State Road A1A that travel to/from overflow parking on the west side of State Road A1A.

Table 5
Summary of Existing Conditions
Study Location #4

Feature	Description
Main Line	• State Road A1A
Location of Crossing	• Approximately 350 feet north of Atares Avenue
Adjacent Land Uses	• Southwest: Red Lobster/Denny's • Southeast: Hyatt Place hotel • Northwest: The Souvenir retail shop • Northeast: Hyatt Place hotel
Traffic Control	• State Road A1A is uncontrolled
Adjacent Signalized Intersections	• South: Dunlawton Avenue – 0.77 miles • North: Daytona Beach Shores Public Safety Building – 0.33 miles
Adjacent Crosswalks	• South: Just north of Broad Avenue – 0.53 miles • North: Daytona Beach Shores Public Safety Building– 0.33 miles
State Road A1A	• Cross Section: 5-lane undivided urban section with a continuous bi-directional left-turn lane • Access: Class 6 • Posted Speed Limit: 35 mph • AADT: 12,800 vehicles per day (year 2013) • Northbound Approach Lanes: 2 through lanes, 1 left-turn lane • Southbound Approach Lanes: 2 through lanes, 1 left-turn lane • Alignment: Straight • Pedestrian Crossings: None • Sidewalks: Both sides • Street Lighting: Both sides • Bus Stops: 10' south (both sides), 810' north (west side) & 820' north (east side)



Bus Stop

Traffic Signal

VBA Vehicle Beach Access

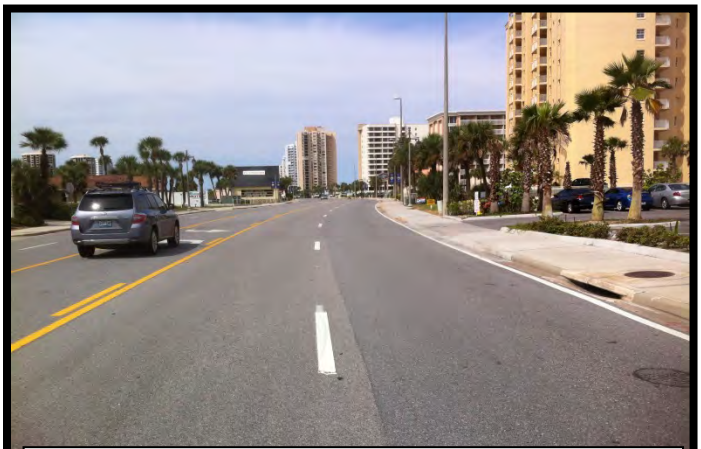
PBA Pedestrian Beach Access

Traffic Engineering Data Solutions, Inc.
80 Spring Vista Drive DeBary, FL 32713
Phone: 386.753.0558 Fax: 386.753.0778

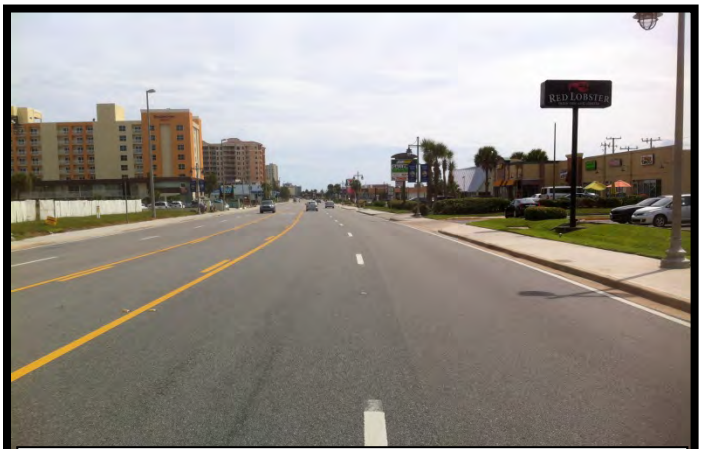
RIVER TO SEA TRANSPORTATION PLANNING ORGANIZATION

FIGURE 7
PROXIMITY AERIAL + CLOSE UP
STUDY LOCATION #4

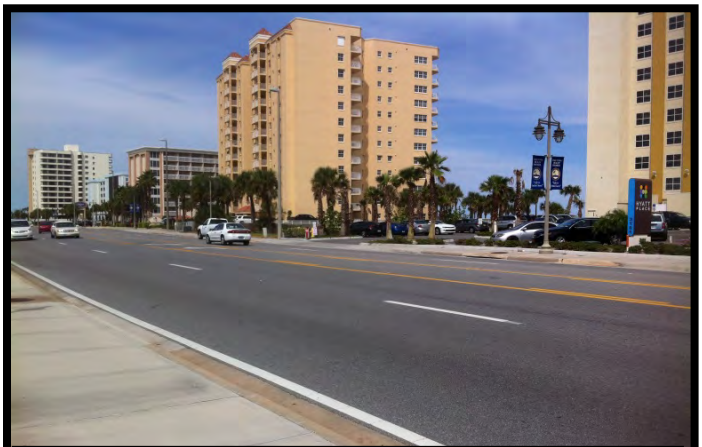
Photographs of Study Location #4



On State Road A1A looking north at the study location 350 feet north of Atares Avenue

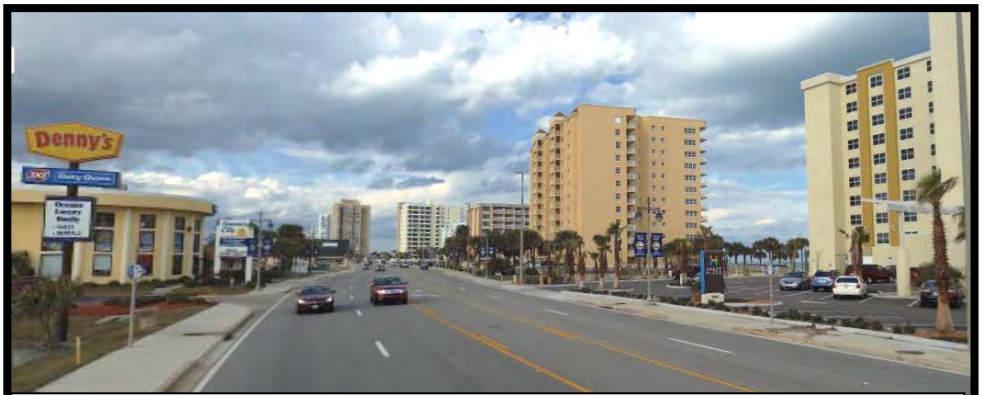


On State Road A1A looking south at study location 350 feet north of Atares Avenue



On State Road A1A looking northeast at the study location 350 feet north of Atares Avenue

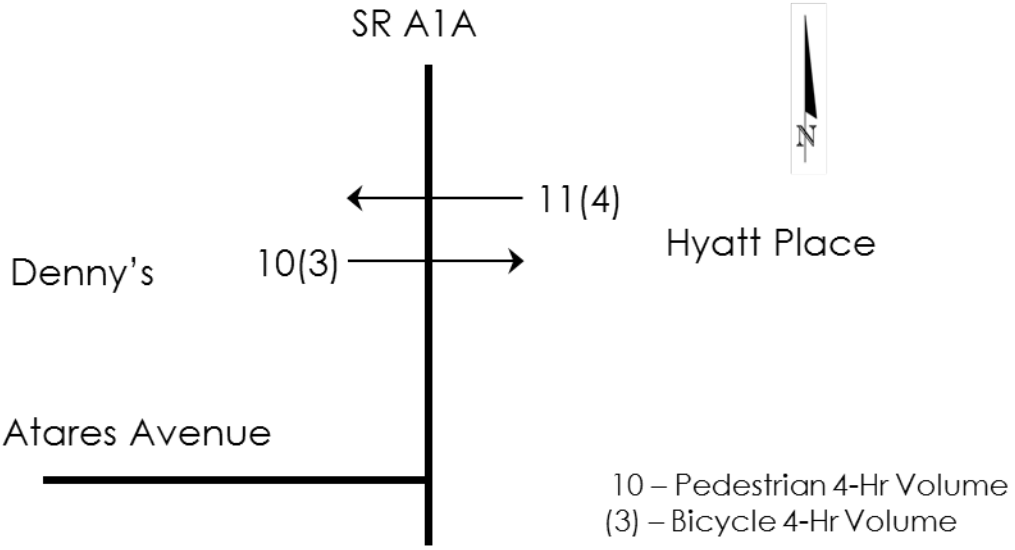
On State Road A1A looking northwest at the study location 350 feet north of Atares Avenue



On State Road A1A looking north at the study location 350 feet north of Atares Avenue (Photo: Bing Maps)

Pedestrian Volumes

Four (4) hours of pedestrian and bicycle counts, from 10:00 a.m. to 2:00 p.m., were conducted on a weekend day in the vicinity of the proposed crosswalk location. As summarized below, over the four-hour count there were a total of 21 pedestrians and seven (7) bicycles that crossed State Road A1A.



Based on the Vehicle Gap Study for the southern portion of the corridor there were nine (9) adequate gaps between 10:00 a.m. and 2:00 p.m. as compared to the crossing volume of 28 pedestrians/bicyclists. Additionally, from 1:00 p.m. to 2:00 p.m., there were zero (0) adequate gaps as compared to nine (9) pedestrians crossing State Road A1A. Thus, there were not enough adequate gaps near this study location to cross State Road A1A without the need to stage within the two-way left-turn lane.

Crossing Location	Time (Start to End)	Number of Adequate Gaps	Number of Pedestrians + Bicyclists		
			Eastbound	Westbound	Total
SR A1A - 350 feet north of Atares Avenue	10:00 A.M. - 11:00 A.M.	6	2	4	6
	11:00 A.M. - 12:00 P.M.	3	3	2	5
	12:00 P.M. - 1:00 P.M.	1	5	3	8
	1:00 P.M. - 2:00 P.M.	0	3	6	9

Collision Analysis

Crash data for State Road A1A within the study limits was obtained from University of Florida's *Signal Four Analytics* obtained for the five-year period between January 1, 2009 and December 31, 2013. Based on a review of the data, there were no bicycle or pedestrian crashes reported near this study location.

Recommendations

Based on the data collected, field observations, and engineering judgment, it is recommended that a midblock crosswalk be installed on State Road A1A approximately 350 feet north of Atares Avenue for the following reasons:

- There is a well-defined pattern of existing pedestrian crossings in the vicinity of the proposed crossing location (28 crossings in four hours).
- The daily traffic volume on State Road A1A is 12,800 vehicles per day (year 2013).
- The nearest alternative crossing on State Road A1A is over 300 feet in either direction.
- The proposed crossing is not within the influence area of adjacent signalized intersections.
- Adequate stopping sight distance is provided at the crossing location.
- The proposed midblock crossing location is within 100 feet of a bus stop.

Because a pedestrian/bicyclist needs to utilize a two-stage movement, whereby they stage in the middle of the road, and because the daily volume on State Road A1A exceeds 12,000 vpd, it is also recommended that a refuge island be provided. Such an island may restrict inbound access to the Denny's driveway on the western side of State Road A1A approximately 40 feet north of the proposed midblock crossing location, however alternative access is provided approximately 150 feet south of the proposed midblock crossing location. These improvements are shown in proximity aerial and close up in ***Figure 7.*** The estimated cost for the installation of a midblock pedestrian crosswalk is $18,100 plus additional costs associated with modifying/relocating a drainage inlet located on the west side of State Road A1A. Such costs typically range from $10,000 to $15,000.

Study Location #5

Existing Conditions

Study location #5 is on State Road A1A adjacent the City of Daytona Beach Shores Public Safety Building where an existing midblock pedestrian crosswalk is located. The crosswalk is currently signalized with activation occurring with pedestrian push-button detectors. ***Table 6*** provides a summary of the existing conditions at the study location. Photographs in the vicinity of the study location are also provided. An aerial image showing the proximity of the study location with respect to adjacent land uses, and a zoomed in view of the study location is shown in ***Figure 8***.

The existing midblock pedestrian crossing at this location predominantly serves pedestrians/bicyclists traveling between commercial uses on the west side of State Road A1A and condominiums/hotels on the east side of State Road A1A.

Table 6
Summary of Existing Conditions
Midblock Pedestrian Crossing #5

Feature	Description
Main Line	• State Road A1A
Location of Crossing	• Adjacent to Daytona Beach Shores Public Safety Building
Adjacent Land Uses	• Southwest: Commercial shops • Southeast: Sage'n'Sand motel • Northwest: Daytona Beach Shores Public Safety Building • Northeast: Ocean One condominium
Traffic Control	• Emergency traffic signal that also doubles as a pedestrian signal
Adjacent Signalized Intersections	• South: Dunlawton Avenue – 1.1 miles • North: Moore Avenue – 2.3 miles
Adjacent Crosswalks	• South: Just north of Broad Avenue – 0.85 miles • North: Adjacent to Publix – 0.15 miles
State Road A1A	• Cross Section: 5-lane undivided urban section with a continuous bi-directional left-turn lane • Access: Class 6 • Posted Speed Limit: 35 mph • AADT: 12,800 vehicles per day (year 2013) • Northbound Approach Lanes: 2 through lanes, 1 left-turn lane • Southbound Approach Lanes: 2 through lanes, 1 left-turn lane • Alignment: Straight • Pedestrian Crossings: Midblock pedestrian crossing • Sidewalks: Both Sides • Street Lighting: Both Sides • Bus Stops: 270' north (west side) & 330' north (east side)

Bus Stop

Traffic Signal

VBA Vehicle Beach Access

PBA Pedestrian Beach Access

Traffic Engineering Data Solutions, Inc.
80 Spring Vista Drive *Phone: 386.753.0558*
DeBary, FL 32713 *Fax: 386.753.0778*

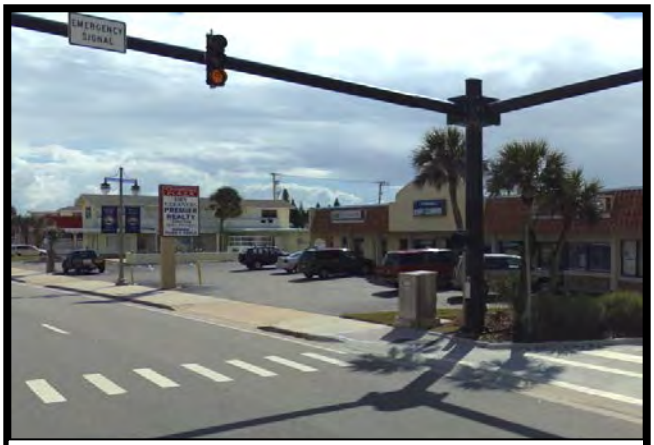
RIVER TO SEA
TRANSPORTATION
PLANNING ORGANIZATION

FIGURE 8
PROXIMITY AERIAL + CLOSE UP
STUDY LOCATION #5

Photographs of Study Location #5

On State Road A1A looking north at study location #5 (Bing Maps)

On State Road A1A looking east at the existing crossing at study location #5 (Bing Maps)

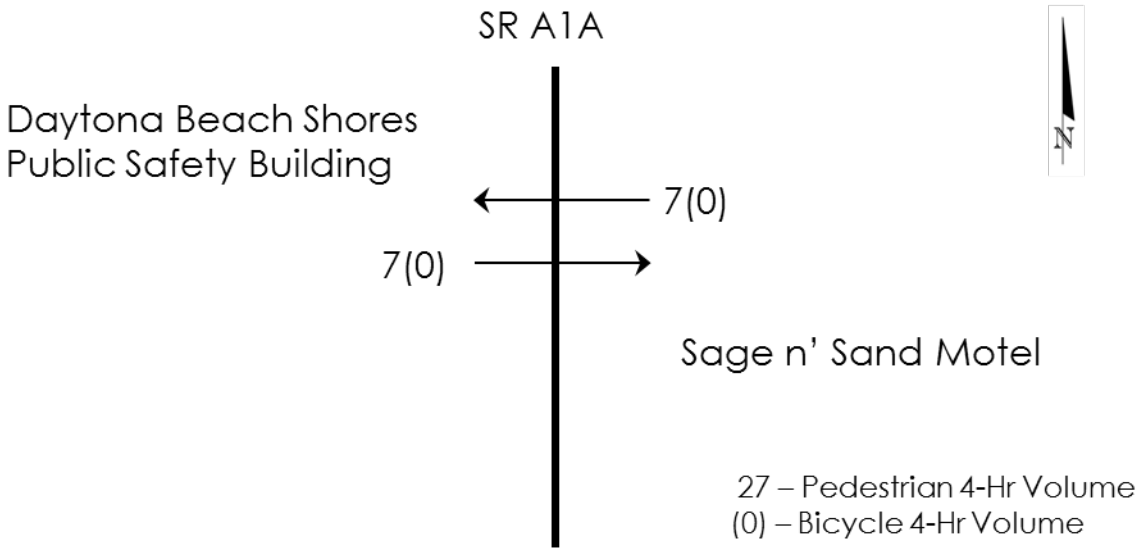


On State Road A1A looking west at existing crossing at study location #5 (Bing Maps)

On State Road A1A looking south at study location #5
(Photo: Bing Maps)

Pedestrian Volumes

Four (4) hours of pedestrian and bicycle counts, from 10:00 a.m. to 2:00 p.m., were conducted on a weekend day in the vicinity of the proposed crosswalk location. As summarized below, over the four-hour count there were a total of 14 pedestrians and zero (0) bicycles that crossed State Road A1A.



Based on the Vehicle Gap Study for the southern portion of the corridor there were nine (9) adequate gaps between 10:00 a.m. and 2:00 p.m. as compared to the crossing volume of 14 pedestrian/bicyclists. Additionally, from 1:00 p.m. to 2:00 p.m., there were zero (0) adequate gaps as compared to five (5) pedestrians/bicyclists crossing State Road A1A. Thus, there were not enough adequate gaps near this study location to cross State Road A1A without the need to stage within the two-way left-turn lane.

Crossing Location	Time (Start to End)	Number of Adequate Gaps	Number of Pedestrians + Bicyclists		
			Eastbound	Westbound	Total
SR A1A - at Public Safety Building	10:00 A.M. - 11:00 A.M.	6	5	2	7
	11:00 A.M. - 12:00 P.M.	3	1	0	1
	12:00 P.M. - 1:00 P.M.	1	0	1	1
	1:00 P.M. - 2:00 P.M.	0	1	4	5

Collision Analysis

Crash data for State Road A1A within the study limits was obtained from University of Florida's *Signal Four Analytics* obtained for the five-year period between January 1, 2009 and December 31, 2013. Based on a review of the data, there were no bicycle or pedestrian crashes reported near this study location.

Recommendations

Based on the data collected, field observations, and engineering judgment, it is recommended that the existing midblock pedestrian crosswalk be retained on State Road A1A adjacent to the Daytona Beach Shore Public Safety Building for the following reasons:

- The existing crosswalk currently serves pedestrians/bicyclists traveling between commercial uses on the west side of State Road A1A and condominiums/hotels on the east side of State Road A1A.
- The daily traffic volume on State Road A1A is 12,500 vehicles per day (year 2013).
- The nearest alternative crossing on State Road A1A is over 300 feet in either direction.
- The proposed crossing is not within the influence area of adjacent signalized intersections.
- Adequate stopping sight distance is provided at the crossing location.

Study Location #6

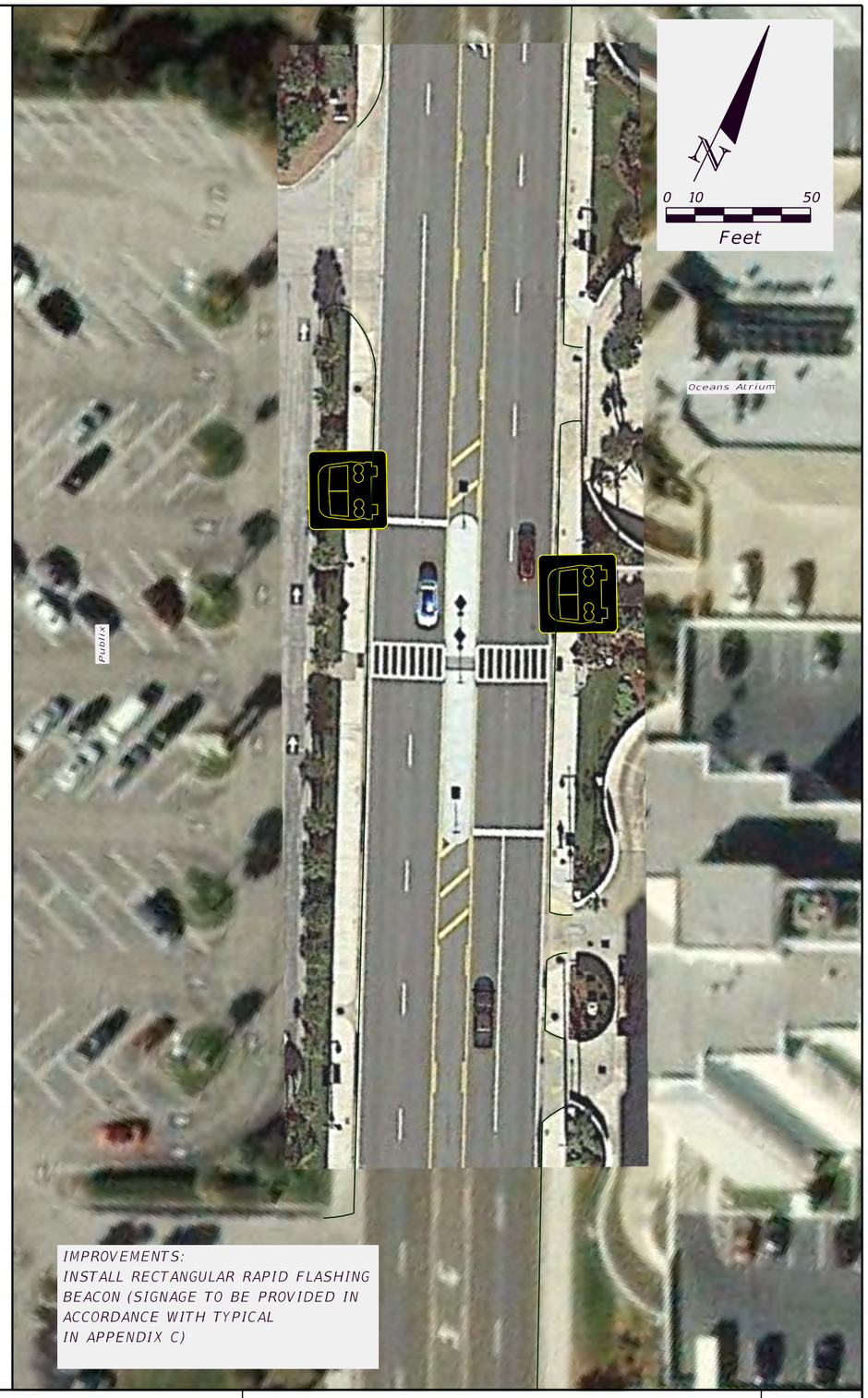
Existing Conditions

Study location #6 is on State Road A1A adjacent to the Publix development where an existing midblock pedestrian crosswalk is located with a refuge island. ***Table 7*** provides a summary of the existing conditions at the study location. Photographs in the vicinity of the study location are also provided. An aerial image showing the proximity of the study location with respect to adjacent land uses, and a zoomed in view of the study location is shown in ***Figure 9***.

The existing midblock pedestrian crossing at this location predominantly serves both pedestrians and bicyclists traveling between the Publix on the west side of State Road A1A and hotels/condominiums on the east side of State Road A1A.

Table 7
Summary of Existing Conditions
Study Location #6

Feature	Description
Main Line	• State Road A1A
Location of Crossing	• Adjacent to Publix
Adjacent Land Uses	• Southwest: Publix (under construction) • Southeast: Oceans Three condominiums • Northwest: Publix (under construction) • Northeast: Ocean Atrium condominiums
Traffic Control	• State Road A1A is uncontrolled
Adjacent Signalized Intersections	• South: Daytona Beach Shores Public Safety Building – 0.15 miles • North: Moore Avenue – 2.16 miles
Adjacent Crosswalks	• South: Daytona Beach Shores Public Safety Building – 0.15 miles • North: Just north of Bellemead Drive – 650 feet
State Road A1A	• Cross Section: 5-lane undivided urban section with a continuous bi-directional left-turn lane • Access: Class 6 • Posted Speed Limit: 35 mph • AADT: 12,800 vehicles per day (year 2013) • Northbound Approach Lanes: 2 through lanes, 1 left-turn lane • Southbound Approach Lanes: 2 through lanes, 1 left-turn lane • Alignment: Straight • Pedestrian Crossings: Midblock pedestrian crossing • Sidewalks: Both sides • Street Lighting: Both sides • Bus Stops: 530’ south (west side), 490’ south (east side), 30’ north (west side) & 10’ north (east side)



Bus Stop

Traffic Signal

VBA Vehicle Beach Access

PBA Pedestrian Beach Access

Traffic Engineering Data Solutions, Inc.
80 Spring Vista Drive DeBary, FL 32713
Phone: 386.753.0558 Fax: 386.753.0778

RIVER TO SEA TRANSPORTATION PLANNING ORGANIZATION

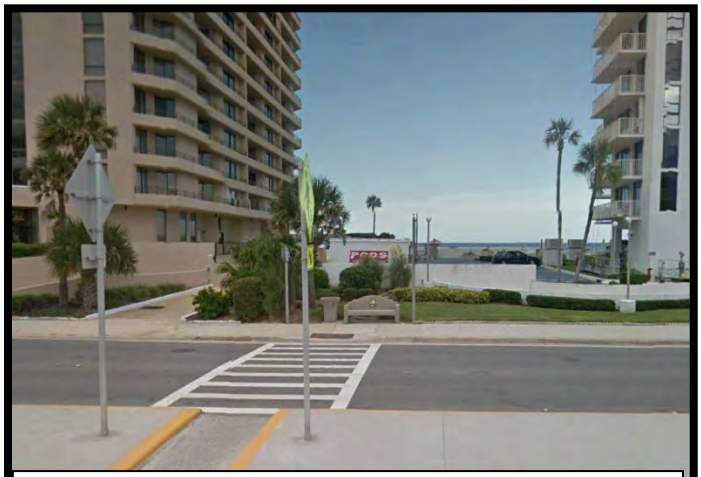
FIGURE 9
PROXIMITY AERIAL + CLOSE UP
STUDY LOCATION #6

Photographs of Study Location #6

On State Road A1A looking north at the existing crossing location adjacent to Publix (Bing Maps)

On State Road A1A looking south at the existing crossing location adjacent to Publix

On State Road A1A looking north at the existing crossing location adjacent to Publix

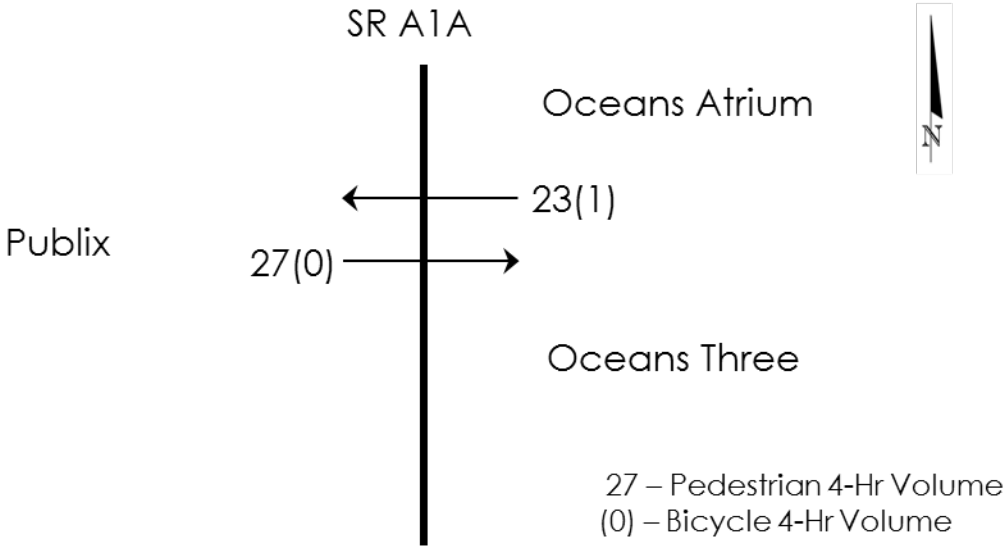


On State Road A1A looking east at the existing crossing location adjacent to Publix (Google maps)

On State Road A1A looking west at existing crossing location adjacent to Publix (Photo: Bing Maps)

Pedestrian Volumes

Four (4) hours of pedestrian and bicycle counts, from 10:00 a.m. to 2:00 p.m., were conducted on a weekend day in the vicinity of the study location. As summarized below, over the four-hour count there were a total of 50 pedestrians and one (1) bicycle that crossed State Road A1A. It is important to note that at the time of the counts, the Publix grocery store was closed for remodeling. Therefore, the pedestrian/bicyclist volumes are anticipated to increase when the store reopens.



Based on the Vehicle Gap Study for the southern portion of the corridor there were nine (9) adequate gaps between 10:00 a.m. and 2:00 p.m. as compared to the crossing volume of 51 pedestrians/bicyclists. Additionally, from 1:00 p.m. to 2:00 p.m., there were zero (0) adequate gaps as compared to nine (9) pedestrians/bicyclists crossing State Road A1A. Thus, there were not enough adequate gaps near this study location to cross State Road A1A without the need to stage within the two-way left-turn lane.

Crossing Location	Time (Start to End)	Number of Adequate Gaps	Number of Pedestrians + Bicyclists		
			Eastbound	Westbound	Total
SR A1A - adjacent to Publix	10:00 A.M. - 11:00 A.M.	6	12	6	18
	11:00 A.M. - 12:00 P.M.	3	10	8	18
	12:00 P.M. - 1:00 P.M.	1	2	4	6
	1:00 P.M. - 2:00 P.M.	0	3	6	9

Collision Analysis

Crash data for State Road A1A within the study limits was obtained from University of Florida's *Signal Four Analytics* obtained for the five-year period between January 1, 2009 and December 31, 2013. Based on a review of the data, there were no bicycle or pedestrian crashes reported near this study location.

Recommendations

Based on the data collected, field observations, and engineering judgment, it is recommended that the midblock pedestrian crosswalk and refuge island be retained on State Road A1A adjacent to the Publix grocery store for the following reasons:

- The existing pedestrian/bicyclist volumes indicate that this midblock pedestrian crosswalk is used frequently. Additionally, these volumes are expected to increase when the Publix grocery store reopens.
- The daily traffic volume on State Road A1A is 12,800 vehicles per day (year 2013).
- The nearest alternative crossing on State Road A1A is over 300 feet in either direction.
- The proposed crossing is not within the influence area of adjacent signalized intersections.
- Adequate stopping sight distance is provided at the crossing location.
- The proposed midblock crossing location is within 100 feet of bus stops.

Because of the anticipated increase in pedestrian/bicyclist activity when Publix reopens, it is recommended that a Rectangular Rapid Flashing Beacon (RRFB) be installed on the west and east sides of State Road A1A. The total cost for the installation of an RRFB is estimated at $43,000 per the typical cost estimate in ***Appendix C***. It should be noted that this includes the installation of four one-way signs, two for each direction with one placed behind the curb and the other placed within the refuge island. Additionally, this includes solar panels for powering the units, pad lighting, all posts, and push button detection.

Study Location #7

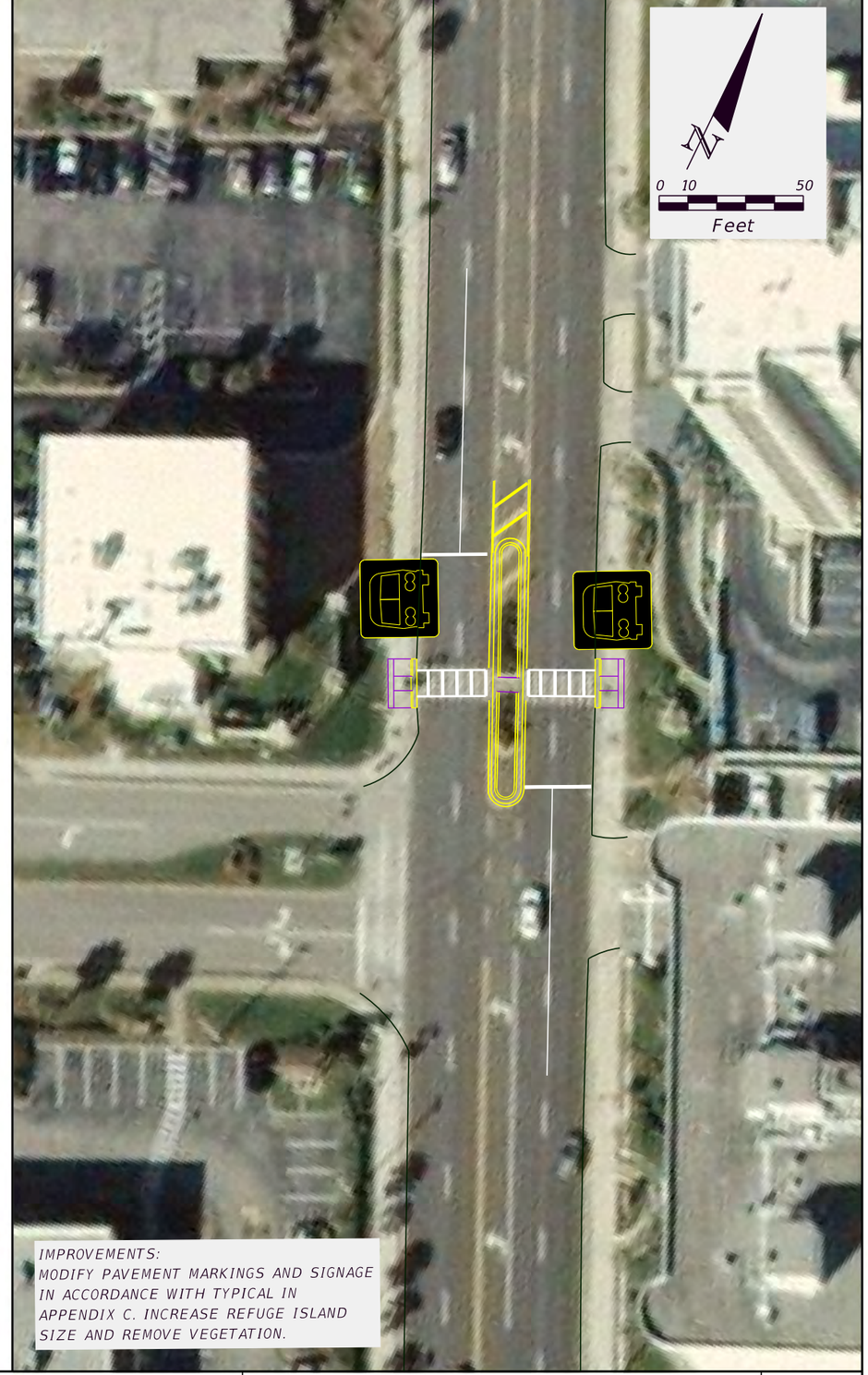
Existing Conditions

Study location #7 is on State Road A1A just north of Bellemead Drive where an existing midblock pedestrian crosswalk is located with a refuge island. ***Table 8*** provides a summary of the existing conditions at the study location. Photographs in the vicinity of the study location are also provided. An aerial image showing the proximity of the study location with respect to adjacent land uses, and a zoomed in view of the study location is shown in ***Figure 10***.

The existing midblock pedestrian crossing at this location predominantly serves pedestrians/bicyclists traveling between residences on the west side of State Road A1A and the beach, as a public beach access is provided just north of the existing crosswalk location. Also, pedestrians/bicyclists utilize this crosswalk to travel between the Walgreens on the west side of State Road A1A and condominiums on the east side of State Road A1A.

Table 8
Summary of Existing Conditions
Study Location #7

Feature	Description
Main Line	• State Road A1A
Location of Crossing	• Just north of Bellemead Drive
Adjacent Land Uses	• Southwest: Walgreens • Southeast: Oceans Four condominiums • Northwest: Daytona Beach Shores City Hall • Northeast: Oceans Five condominiums
Traffic Control	• State Road A1A is uncontrolled
Adjacent Signalized Intersections	• South: Daytona Beach Shores Public Safety Building – 0.26 miles • North: Moore Avenue – 2.04 miles
Adjacent Crosswalks	• South: Daytona Beach Shores Public Safety Building – 0.26 miles • North: Just south of Ocean West Boulevard – 0.21 miles
State Road A1A	• Cross Section: 5-lane undivided urban section with a continuous bi-directional left-turn lane • Access: Class 6 • Posted Speed Limit: 35 mph • AADT: 12,800 vehicles per day (year 2013) • Northbound Approach Lanes: 2 through lanes, 1 left-turn lane • Southbound Approach Lanes: 2 through lanes, 1 left-turn lane • Alignment: Straight • Pedestrian Crossings: Midblock pedestrian crossing • Sidewalks: Both sides • Street Lighting: Both sides • Bus Stops: 610’ south (both sides) & 20’ north (both sides)



Bus Stop

Traffic Signal

VBA Vehicle Beach Access

PBA Pedestrian Beach Access

Traffic Engineering Data Solutions, Inc.
80 Spring Vista Drive DeBary, FL 32713
Phone: 386.753.0558 Fax: 386.753.0778

RIVER TO SEA TRANSPORTATION PLANNING ORGANIZATION

FIGURE 10
PROXIMITY AERIAL + CLOSE UP
STUDY LOCATION #7

Photographs of Study Location #7

On State Road A1A looking north at the existing crossing location just north of Bellemead Drive (Bing Maps)

On State Road A1A looking south at the existing crossing location just north of Bellemead Drive (Bing Maps)

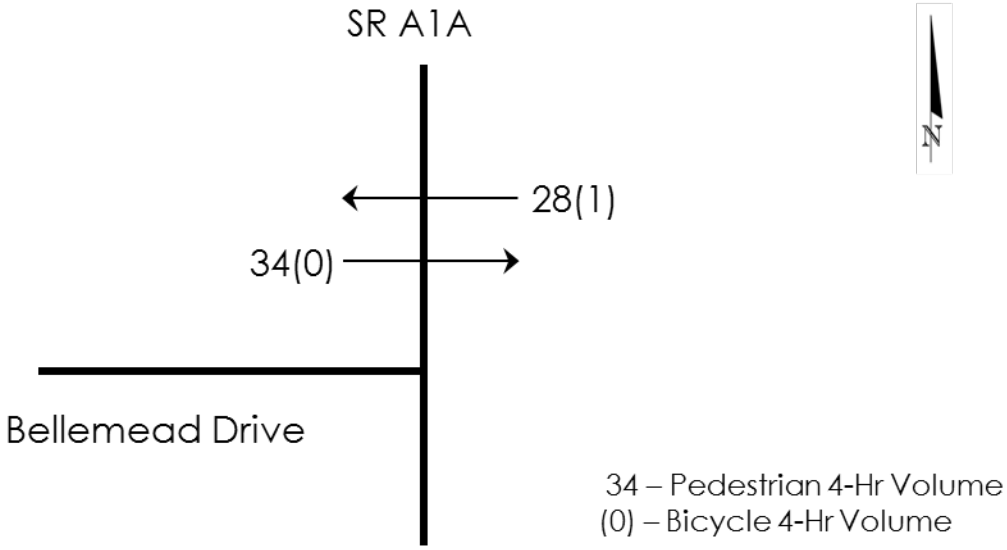
East of State Road A1A looking west at the existing crossing just north of Bellemead Drive

West of State Road A1A looking east at the existing crossing just north of Bellemead Drive

On State Road A1A looking south at existing crossing location just north of Bellemead Drive (Photo: Bing Maps)

Pedestrian Volumes

Four (4) hours of pedestrian and bicycle counts, from 10:00 a.m. to 2:00 p.m., were conducted on a weekend day in the vicinity of the study location. As summarized below, over the four-hour count there were a total of 62 pedestrians and one (1) bicycle that crossed State Road A1A.



Based on the Vehicle Gap Study for the southern portion of the corridor there were nine (9) adequate gaps between 10:00 a.m. and 2:00 p.m. as compared to the crossing volume of 62 pedestrians/bicyclists. Additionally, from 1:00 p.m. to 2:00 p.m., there were zero (0) adequate gaps as compared to 15 pedestrians/bicyclists crossing State Road A1A. Thus, there were not enough adequate gaps near this study location to cross State Road A1A without the need to stage within the two-way left-turn lane.

Crossing Location	Time (Start to End)	Number of Adequate Gaps	Number of Pedestrians + Bicyclists		
			Eastbound	Westbound	Total
SR A1A - just north of Bellemead Dr	10:00 A.M. - 11:00 A.M.	6	26	4	30
	11:00 A.M. - 12:00 P.M.	3	3	4	7
	12:00 P.M. - 1:00 P.M.	1	2	9	11
	1:00 P.M. - 2:00 P.M.	0	3	12	15

Collision Analysis

Crash data for State Road A1A within the study limits was obtained from University of Florida's *Signal Four Analytics* obtained for the five-year period between January 1, 2009 and December 31, 2013. Based on a review of the data, there were no bicycle or pedestrian crashes reported near this study location.

Recommendations

Based on the data collected, field observations, and engineering judgment, it is recommended that the midblock crosswalk be retained on State Road A1A just north of Bellemead Drive for the following reasons:

- The existing pedestrian/bicyclist volumes indicate that this midblock pedestrian crosswalk is used frequently (65 pedestrians/bicyclists over four hours).
- The daily traffic volume on State Road A1A is 12,800 vehicles per day (year 2013).
- The nearest alternative crossing on State Road A1A is over 300 feet in either direction.
- The proposed crossing is not within the influence area of adjacent signalized intersections.
- Adequate stopping sight distance is provided at the crossing location.
- The proposed midblock crossing location is within 100 feet of bus stops.

Because a pedestrian/bicyclist needs to utilize a two-stage movement, whereby they stage in the middle of the road, and because the daily volume on State Road A1A exceeds 12,000 vpd, it is also recommended that a refuge island be retained. However, it is proposed increase the refuge island size and eliminate vegetation to enhance pedestrian visibility. Such an island would not restrict vehicle driveway access. Additionally, it is proposed to modify the pavement markings and signage in the vicinity of the existing midblock crosswalk to coincide with that shown in the typical midblock pedestrian crosswalk included in ***Appendix C.*** These improvements are shown in proximity aerial and close up in ***Figure 10.*** The costs associated with signage and pavement marking modifications are estimated at approximately $5,500 per the typical cost estimate.

Study Location #8

Existing Conditions

Study location #8 is on State Road A1A approximately 180 feet south of Oceans West Boulevard where an existing midblock pedestrian crosswalk is located with a refuge island. ***Table 9*** provides a summary of the existing conditions at the study location. Photographs in the vicinity of the study location are also provided. An aerial image showing the proximity of the study location with respect to adjacent land uses, and a zoomed in view of the study location is shown in ***Figure 11***.

The existing midblock pedestrian crossing at this location predominantly serves both pedestrians and bicyclists traveling between townhomes on the west side of State Road A1A and the beach on the east side of State Road A1A as beach access is provided approximately 170 feet north of the existing crosswalk.

Table 9
Summary of Existing Conditions
Study Location #8

Feature	Description
Main Line	• State Road A1A
Location of Crossing	• Approximately 180 feet south of Oceans West Boulevard
Adjacent Land Uses	• Southwest: Townhomes • Southeast: Oceans Eight condominiums • Northwest: Townhomes • Northeast: Oceans Ten condominiums
Traffic Control	• State Road A1A is uncontrolled
Adjacent Signalized Intersections	• South: Daytona Beach Shores Public Safety Building – 0.47 miles • North: Moore Avenue – 1.84 miles
Adjacent Crosswalks	• South: Just north of Bellemead Drive – 0.20 miles • North: Moore Avenue – 1.84 miles
State Road A1A	• Cross Section: 5-lane undivided urban section with a continuous bi-directional left-turn lane • Access: Class 6 • Posted Speed Limit: 35 mph • AADT: 12,800 vehicles per day (year 2013) • Northbound Approach Lanes: 2 through lanes, 1 left-turn lane • Southbound Approach Lanes: 2 through lanes, 1 left-turn lane • Alignment: Straight • Pedestrian Crossings: Midblock pedestrian crossing • Sidewalks: Both sides • Street Lighting: Both sides • Bus Stops: 50’ south (west side), 380’ south (east side), 1,350’ north (west side) & 2,040’ north (east side)

Bus Stop

Traffic Signal

VBA Vehicle Beach Access

PBA Pedestrian Beach Access

Traffic Engineering Data Solutions, Inc.
80 Spring Vista Drive
DeBary, FL 32713
Phone: 386.753.0558
Fax: 386.753.0778

RIVER TO SEA
TRANSPORTATION
PLANNING ORGANIZATION

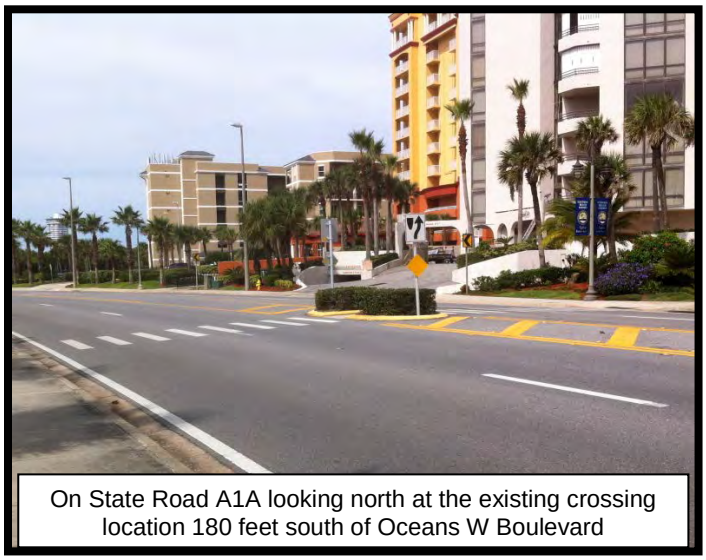
FIGURE 11
PROXIMITY AERIAL + CLOSE UP
STUDY LOCATION #8

Photographs of Study Location #8

On State Road A1A looking north at the existing crossing location 180 feet south of Oceans W Boulevard

On State Road A1A looking south at the existing crossing location 180 feet south of Oceans W Boulevard

On State Road A1A looking north at the existing crossing location 180 feet south of Oceans W Boulevard

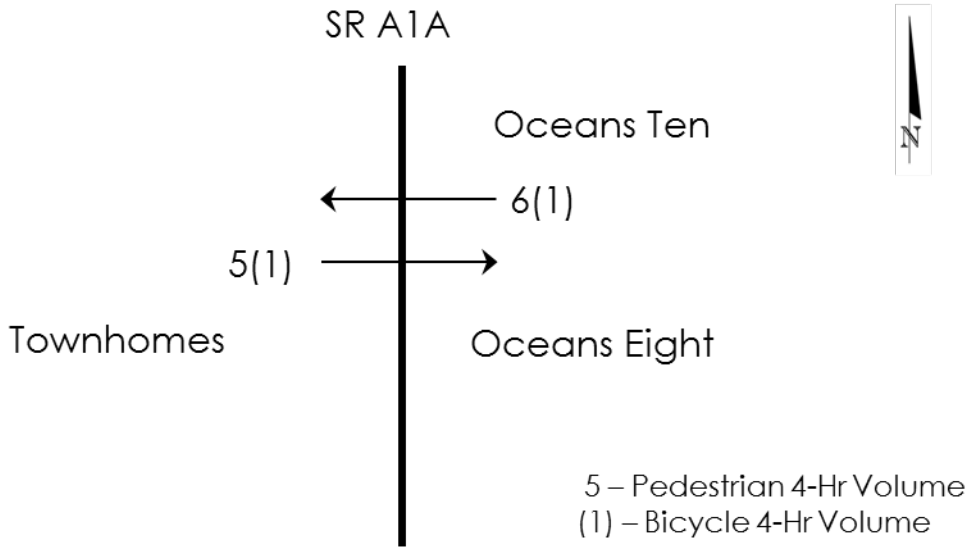


On State Road A1A looking north at the existing crossing location 180 feet south of Oceans W Boulevard

On State Road A1A looking south at existing crossing location 180 feet south of Oceans W Boulevard (Photo: Bing Maps)

Pedestrian Volumes

Four (4) hours of pedestrian and bicycle counts, from 10:00 a.m. to 2:00 p.m., were conducted on a weekend day in the vicinity of the proposed crosswalk location. As summarized below, over the four-hour count there were a total of 11 pedestrians and two (2) bicycles that crossed State Road A1A.



Based on the Vehicle Gap Study for the southern portion of the corridor there were nine (9) adequate gaps between 10:00 a.m. and 2:00 p.m. as compared to the crossing volume of 13 pedestrians/bicyclists. Thus, there were not enough adequate gaps near this study location to cross State Road A1A without the need to stage within the two-way left-turn lane.

Crossing Location	Time (Start to End)	Number of Adequate Gaps	Number of Pedestrians + Bicyclists		
			Eastbound	Westbound	Total
SR A1A - 180' south of Oceans W Blvd	10:00 A.M. - 11:00 A.M.	6	2	0	2
	11:00 A.M. - 12:00 P.M.	3	0	3	3
	12:00 P.M. - 1:00 P.M.	1	2	3	5
	1:00 P.M. - 2:00 P.M.	0	2	1	3

Collision Analysis

Crash data for State Road A1A within the study limits was obtained from University of Florida's *Signal Four Analytics* obtained for the five-year period between January 1, 2009 and December 31, 2013. Based on a review of the data, there was one (1) pedestrian-related crash which reportedly involved a vehicle striking an eastbound pedestrian on State Road A1A that was using the marked crosswalk. The vehicle at fault was trying to overtake another vehicle that was stopped at the crosswalk as the pedestrian crossed the road. The crash, which occurred during the night under dry pavement conditions, resulted in one (1) injury and no estimated property damage.

Recommendations

Based on the data collected, field observations, and engineering judgment, it is recommended that the midblock crosswalk be retained on State Road A1A approximately 180 feet south of Oceans West Boulevard for the following reasons:

- The daily traffic volume on State Road A1A is 12,800 vehicles per day (year 2013).
- The nearest alternative crossing on State Road A1A is over 300 feet in either direction.
- The proposed crossing is not within the influence area of adjacent signalized intersections.
- Adequate stopping sight distance is provided at the crossing location.
- The proposed midblock crossing location is within 500 feet of bus stops.

Because a pedestrian/bicyclist needs to utilize a two-stage movement, whereby they stage in the middle of the road, and because the daily volume on State Road A1A exceeds 12,000 vpd, it is also recommended that a refuge island be retained. However, it is proposed increase the refuge island size and eliminate vegetation to enhance pedestrian visibility. Additionally, it is proposed to modify the pavement markings and signage in the vicinity of the existing midblock crosswalk to coincide with that shown in the typical midblock pedestrian crosswalk included in ***Appendix C***. These improvements are shown in proximity aerial and close up in ***Figure 11.*** The costs associated with signage and pavement marking modifications are estimated at approximately $5,500 per the typical cost estimate.

Study Location #9

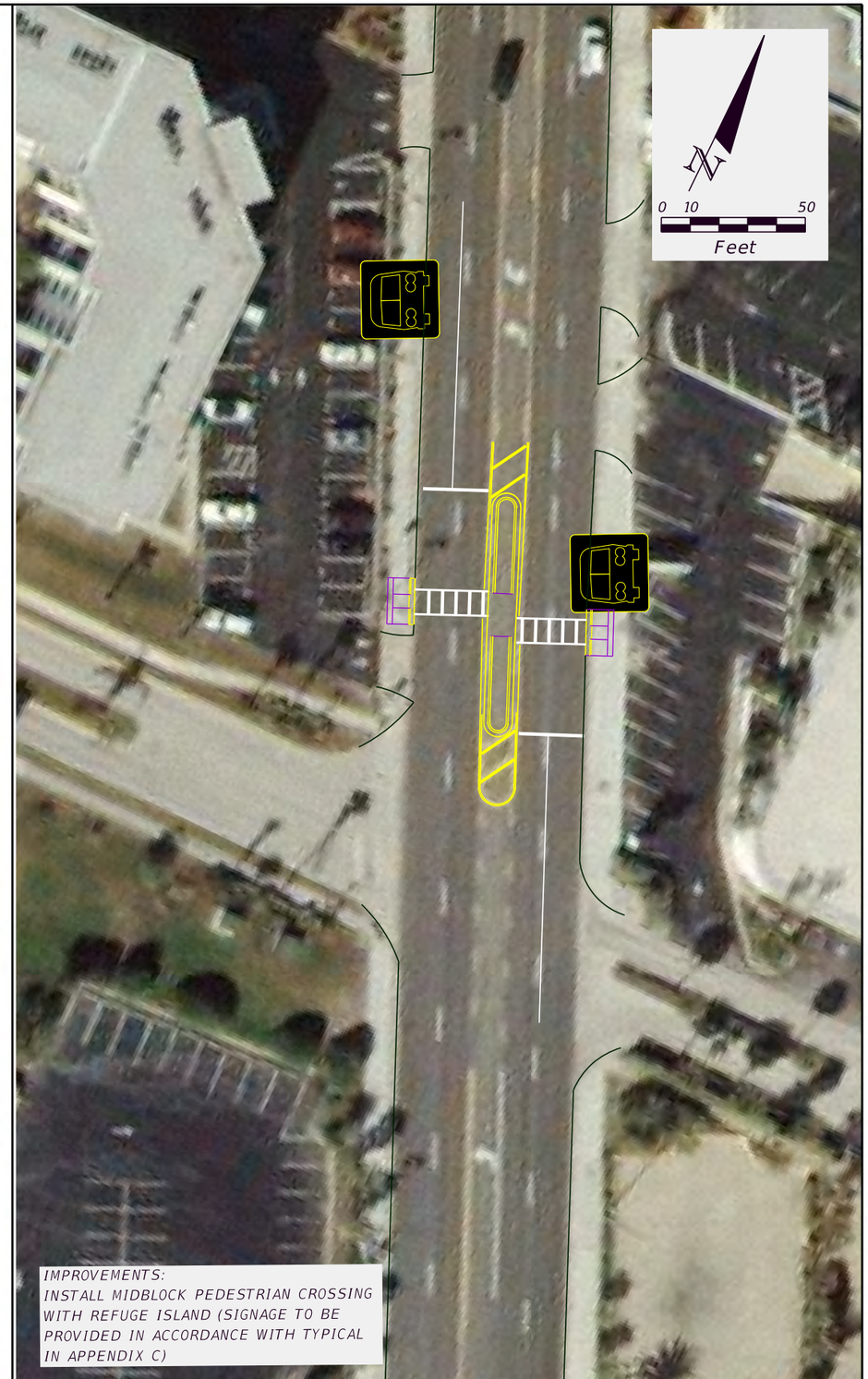
Existing Conditions

Study location #9 is on State Road A1A approximately 60 feet north of Florida Shores Boulevard. ***Table 10*** provides a summary of the existing conditions at the study location. Photographs in the vicinity of the study location are also provided. An aerial image showing the proximity of the study location with respect to adjacent land uses, and a zoomed in view of the study location is shown in ***Figure 12***.

A midblock pedestrian crossing at this study location would predominantly serve pedestrians/bicyclists traveling between residents on the west side of State Road A1A and the beach as beach access is provided east of Florida Shores Boulevard.

Table 10
Summary of Existing Conditions
Study Location #9

Feature	Description
Main Line	• State Road A1A
Location of Crossing	• Approximately 60 feet north of Florida Shores Boulevard
Adjacent Land Uses	• Southwest: Condominiums • Southeast: Peck Plaza/Top of Daytona • Northwest: Condominiums • Northeast: Peck Plaza Parking Lot
Traffic Control	• State Road A1A is uncontrolled
Adjacent Signalized Intersections	• South: Daytona Beach Shores Public Safety Building – 1.25 miles • North: Moore Avenue – 1.06 miles
Adjacent Crosswalks	• South: South of Oceans West Boulevard – 0.78 miles • North: Moore Avenue – 1.06 miles
State Road A1A	• Cross Section: 5-lane undivided urban section with a continuous bi-directional left-turn lane • Access: Class 6 • Posted Speed Limit: 35 mph • AADT: 12,800 vehicles per day (year 2013) • Northbound Approach Lanes: 2 through lanes, 1 left-turn lane • Southbound Approach Lanes: 2 through lanes, 1 left-turn lane • Alignment: Straight • Pedestrian Crossings: None • Sidewalks: Both sides • Street Lighting: Both sides • Bus Stops: 340’ south (both sides), 40’ north (west side) & 20’ north (east side)



Bus Stop

Traffic Signal

VBA Vehicle Beach Access

PBA Pedestrian Beach Access

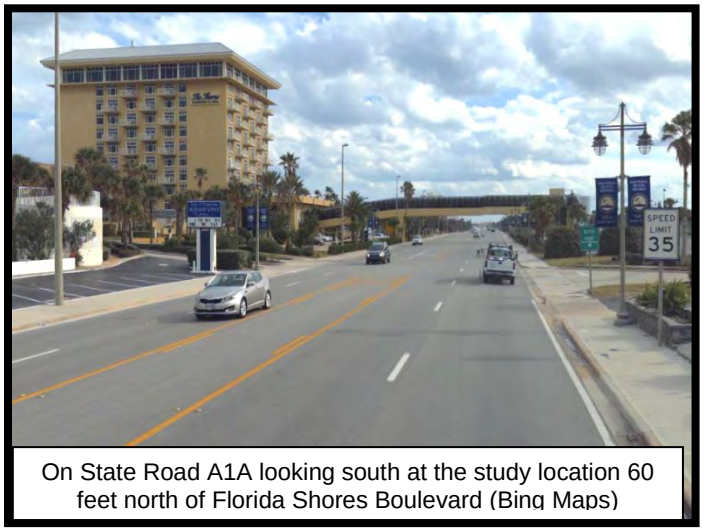
Traffic Engineering Data Solutions, Inc.
80 Spring Vista Drive DeBary, FL 32713
Phone: 386.753.0558 Fax: 386.753.0778

RIVER TO SEA TRANSPORTATION PLANNING ORGANIZATION

FIGURE 12
PROXIMITY AERIAL + CLOSE UP
STUDY LOCATION #9

Photographs of Study Location #9

On State Road A1A looking north at the study location 60 feet north of Florida Shores Boulevard



On State Road A1A looking south at the study location 60 feet north of Florida Shores Boulevard (Bing Maps)

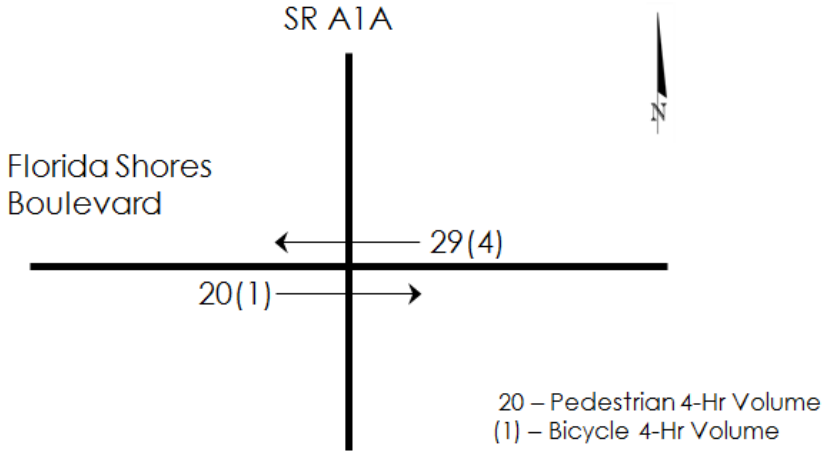
On State Road A1A looking northeast at the study location 60 feet north of Florida Shores Boulevard

On State Road A1A looking northwest at the study location 60 feet north of Florida Shores Boulevard

On State Road A1A looking north at proposed crossing location #9
(Photo: Bing Maps)

Pedestrian Volumes

Four (4) hours of pedestrian and bicycle counts, from 10:00 a.m. to 2:00 p.m., were conducted on a weekend day in the vicinity of the study location. As summarized below, over the four-hour count there were a total of 49 pedestrians and five (5) bicycles that crossed State Road A1A.



Based on the Vehicle Gap Study for the northern portion of the corridor there were seven (7) adequate gaps between 10:00 a.m. and 2:00 p.m. as compared to the crossing volume of 54 pedestrians/bicyclists. Thus, there were not enough adequate gaps near this study location to cross State Road A1A without the need to stage within the two-way left-turn lane.

Crossing Location	Time (Start to End)	Number of Adequate Gaps	Number of Pedestrians + Bicyclists		
			Eastbound	Westbound	Total
SR A1A - 60 feet north of Florida Shores Boulevard	10:00 A.M. - 11:00 A.M.	3	13	1	14
	11:00 A.M. - 12:00 P.M.	2	7	4	11
	12:00 P.M. - 1:00 P.M.	0	1	7	8
	1:00 P.M. - 2:00 P.M.	2	0	21	21

Collision Analysis

Crash data for State Road A1A within the study limits was obtained from University of Florida's *Signal Four Analytics* obtained for the five-year period between January 1, 2009 and December 31, 2013. Based on a review of the data, there was one (1) bicycle-related crash which reportedly involved a bicycle crossing Florida Shores Boulevard south to north. The bicycle was struck by an eastbound right-turning vehicle as the motorist failed to stop at the STOP sign. The crash, which occurred during the day under dry pavement conditions, resulted in one (1) injury and no estimated property damage.

Recommendations

Based on the data collected, field observations, and engineering judgment, it is recommended that a midblock pedestrian crosswalk be installed on State Road A1A approximately 60 feet north of Florida Shores Boulevard for the following reasons:

- There is a well-defined pattern of existing pedestrian crossings in the vicinity of the proposed crossing location (54 crossings in four hours).
- The daily traffic volume on State Road A1A is 12,800 vehicles per day (year 2013).
- The nearest alternative crossing on State Road A1A is over 300 feet in either direction.
- The proposed crossing is not within the influence area of adjacent signalized intersections.
- Adequate stopping sight distance is provided at the crossing location.
- The proposed midblock crossing location is within 100 feet of bus stops.

Because a pedestrian/bicyclist needs to utilize a two-stage movement, whereby they stage in the middle of the road, and because the daily volume on State Road A1A exceeds 12,000 vpd, it is also recommended that a refuge island be provided. Such an island would restrict the driveway on the western side of State Road A1A approximately 30 feet north of Florida Shores Boulevard to a right-in/out only access, however, alternative access is provided 160 feet north via another driveway. These improvements are shown in proximity aerial and close up in ***Figure 12.*** The estimated cost for the installation of a midblock pedestrian crosswalk is $18,100.

Study Location #10

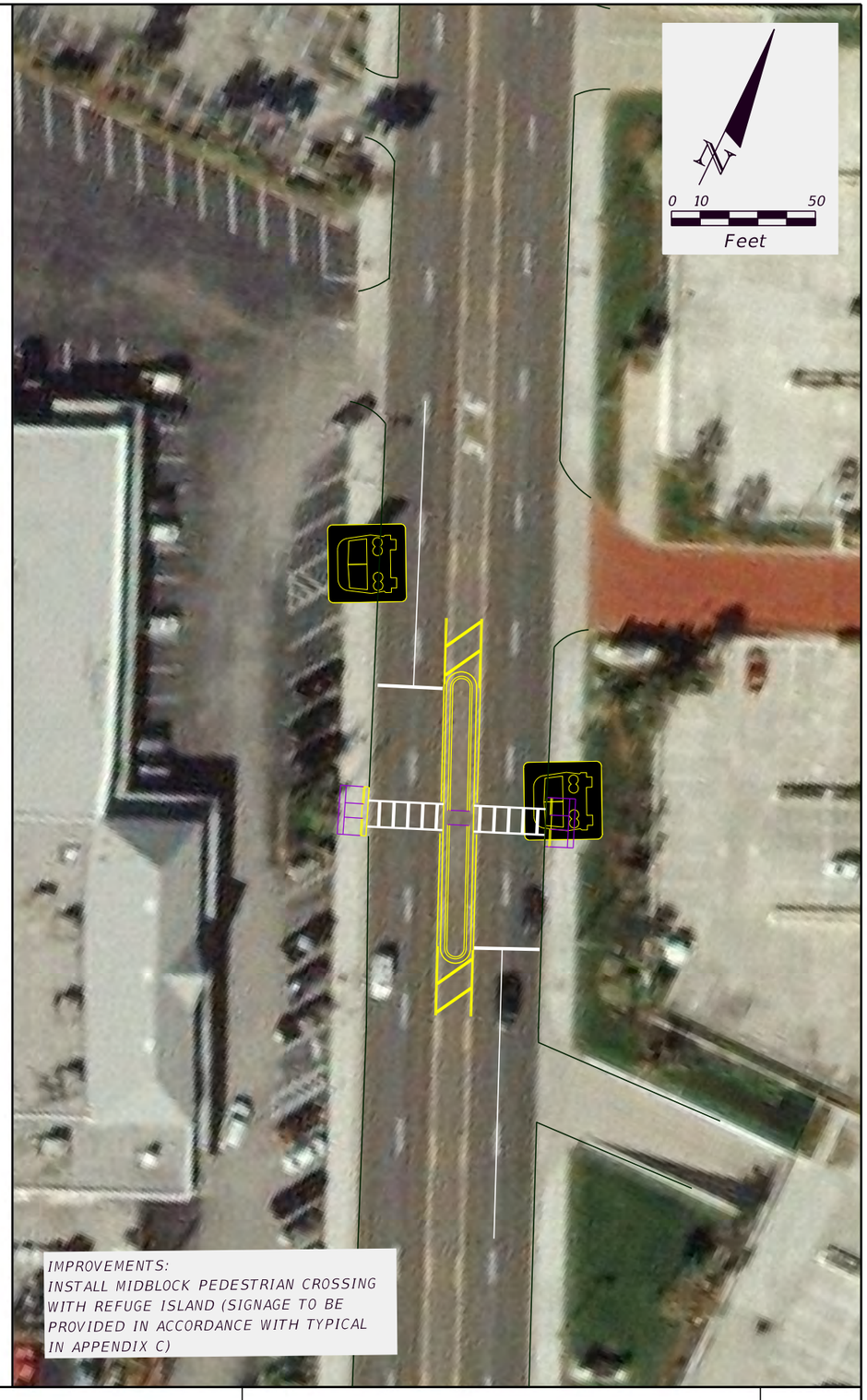
Existing Conditions

Study location #10 is on State Road A1A approximately 300 feet north of Beachcomber Street. ***Table 11*** provides a summary of the existing conditions at the study location. Photographs in the vicinity of the study location are also provided. An aerial image showing the proximity of the study location with respect to adjacent land uses and an aerial image providing a zoomed in view of the study location is also provided as ***Figure 13***.

A midblock pedestrian crossing at this study location would predominantly serve both pedestrians/bicyclists traveling from the hotels/condominiums/beach on the east side of State Road A1A to businesses/retail shops on the west side of State Road A1A.

Table 11
Summary of Existing Conditions
Study Location #10

Feature	Description
Main Line	• State Road A1A
Location of Crossing	• Approximately 300 feet north of Beachcomber Street
Adjacent Land Uses	• Southwest: Ace Hardware store • Southeast: Sherwin Condominiums • Northwest: Retail Shops • Northeast: The Peninsula Condominiums
Traffic Control	• State Road A1A is uncontrolled
Adjacent Signalized Intersections	• South: Daytona Beach Shores Public Safety Building – 1.46 miles • North: Moore Avenue – 0.85 miles
Adjacent Crosswalks	• South: South of Oceans West Boulevard – 0.99 miles • North: Moore Avenue – 0.85 miles
State Road A1A	• Cross Section: 5-lane undivided urban section with a continuous bi-directional left-turn lane • Access: Class 6 • Posted Speed Limit: 35 mph • AADT: 12,800 vehicles per day (year 2013) • Northbound Approach Lanes: 2 through lanes, 1 left-turn lane • Southbound Approach Lanes: 2 through lanes, 1 left-turn lane • Alignment: Straight • Pedestrian Crossings: None • Sidewalks: Both sides • Street Lighting: Both sides • Bus Stops: 1,120’ south (both sides), 50’ north (west side) & 20’ north (east side)



Bus Stop

Traffic Signal

VBA Vehicle Beach Access

PBA Pedestrian Beach Access

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80 Spring Vista Drive DeBary, FL 32713
Phone: 386.753.0558 Fax: 386.753.0778

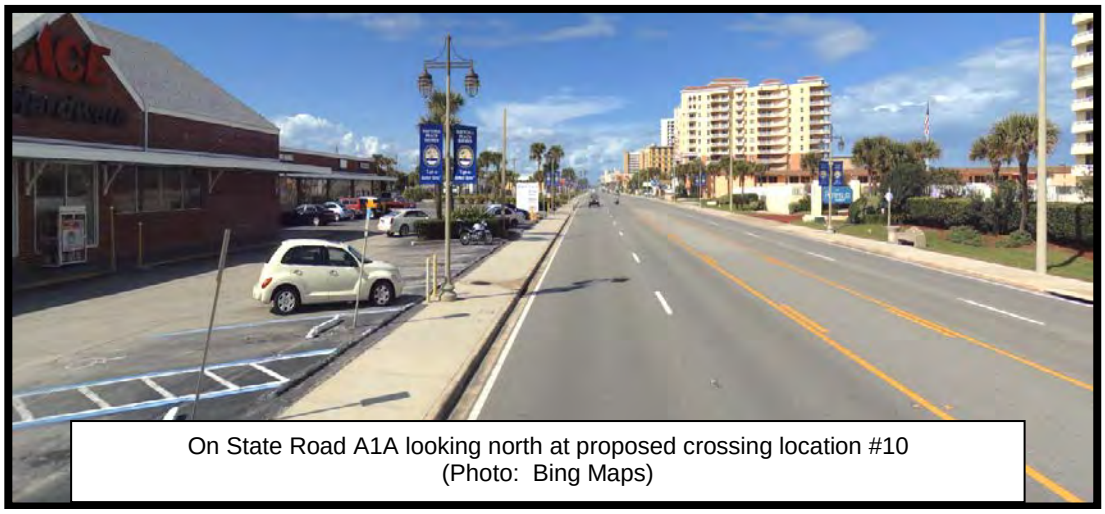
RIVER TO SEA TRANSPORTATION PLANNING ORGANIZATION

FIGURE 13
PROXIMITY AERIAL + CLOSE UP
STUDY LOCATION #10

Photographs of Study Location #10

On State Road A1A looking northeast at the proposed crossing location 300 feet north of Beachcomber Street (Bing Maps)

On State Road A1A looking southeast at the proposed crossing location 300 feet north of Beachcomber Street (Bing Maps)

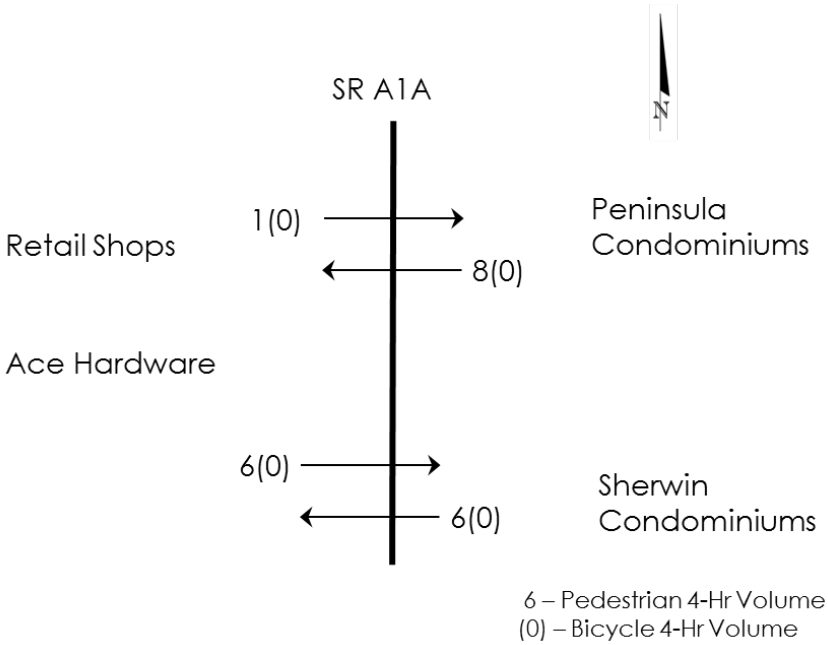


On State Road A1A looking north at proposed crossing location #10 (Photo: Bing Maps)

On State Road A1A looking south at proposed crossing location #10 (Photo: Bing Maps)

Pedestrian Volumes

Four (4) hours of pedestrian and bicycle counts, from 10:00 a.m. to 2:00 p.m., were conducted on a weekend day in the vicinity of the proposed crosswalk location. As summarized below, over the four-hour count there were a total of 21 pedestrians and zero (0) bicycles that crossed State Road A1A.



Based on the Vehicle Gap Study for the northern portion of the corridor there were seven (7) adequate gaps between 10:00 a.m. and 2:00 p.m. as compared to the crossing volume of 21 pedestrians/bicyclists. Additionally, the data indicates that from 12:00 p.m. to 1:00 p.m. there were no adequate gaps as compared to two (2) pedestrians/bicyclists crossing State Road A1A. Thus, there were not enough adequate gaps near the study location to cross State Road A1A without the need to stage within the two-way left-turn lane.

Crossing Location	Time (Start to End)	Number of Adequate Gaps	Number of Pedestrians + Bicyclists		
			Eastbound	Westbound	Total
SR A1A - 300 feet north of Beachcomber Street	10:00 A.M. - 11:00 A.M.	3	5	7	12
	11:00 A.M. - 12:00 P.M.	2	2	4	6
	12:00 P.M. - 1:00 P.M.	0	0	2	2
	1:00 P.M. - 2:00 P.M.	2	0	1	1

Collision Analysis

Crash data for State Road A1A within the study limits was obtained from University of Florida's *Signal Four Analytics* obtained for the five-year period between January 1, 2009 and December 31, 2013. Based on a review of the data, there was one (1) crash which reportedly involved a northbound pedestrian who was crossing the Peninsula Condominiums driveway on the east side of State Road A1A. The pedestrian was struck by a vehicle existing from the driveway. The crash, which occurred during the day under dry pavement conditions, resulted in one (1) injury and no estimated property damage.

Recommendations

Based on the data collected, field observations, and engineering judgment, it is recommended that a midblock pedestrian crosswalk be installed on State Road A1A approximately 300 feet north of Beachcomber Street for the following reasons:

- The daily traffic volume on State Road A1A is 12,500 vehicles per day (year 2013).
- The nearest alternative crossing on State Road A1A is over 300 feet in either direction.
- The proposed crossing is not within the influence area of adjacent signalized intersections.
- Adequate stopping sight distance is provided at the crossing location.
- The proposed midblock crossing location is within 100 feet of bus stops.

Because a pedestrian/bicyclist needs to utilize a two-stage movement, whereby they stage in the middle of the road, and because the daily volume on State Road A1A exceeds 12,000 vpd, it is also recommended that a refuge island be provided. Such an island would not affect vehicle driveway access. These improvements are shown in proximity aerial and close up in ***Figure 13.*** The estimated cost for the installation of a midblock pedestrian crosswalk is $18,100.

Study Location #11

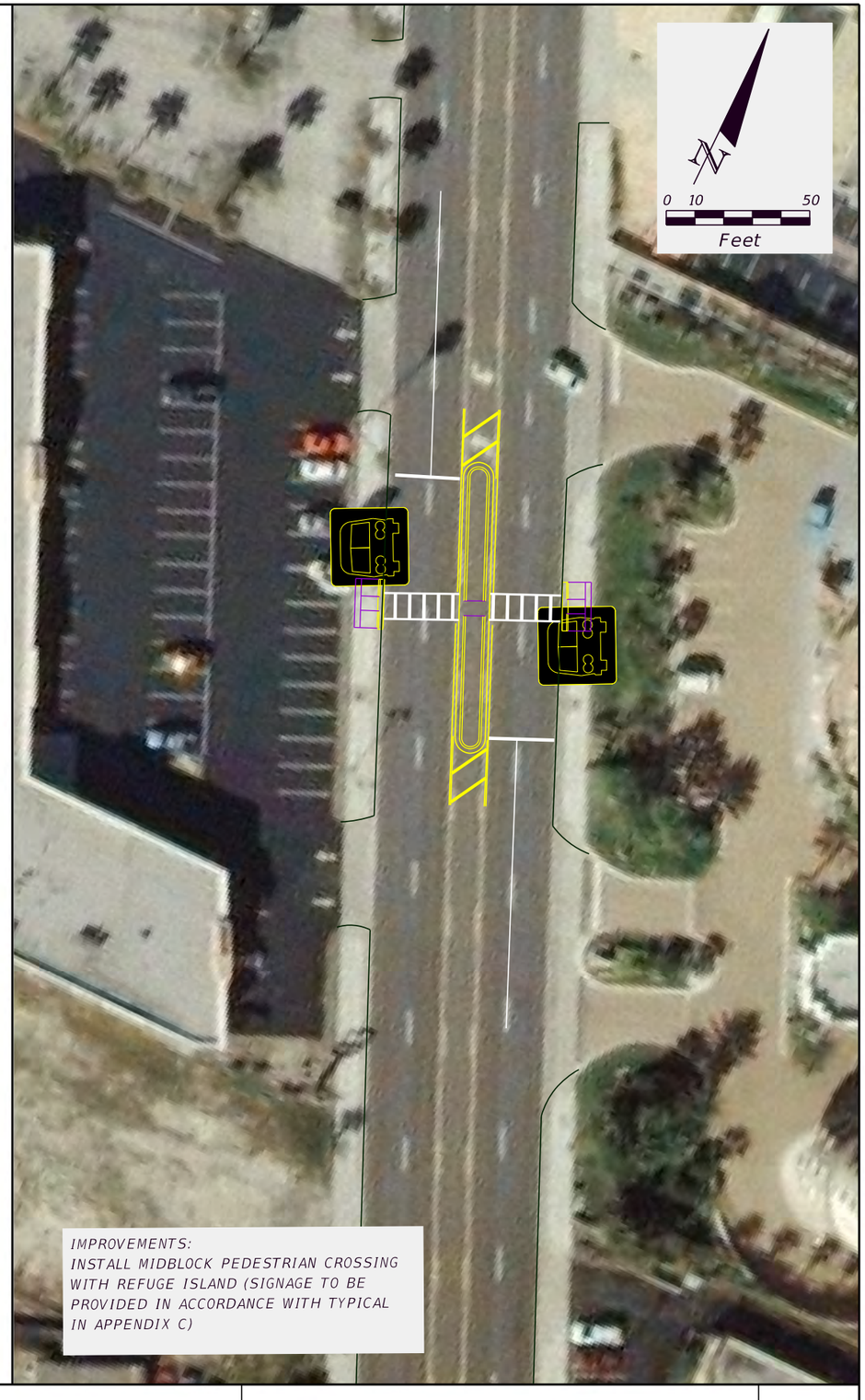
Existing Conditions

Study location #11 is on State Road A1A approximately 410 feet north of Sea Spray Street, adjacent to the Bella Vista condominiums. ***Table 12*** provides a summary of the existing conditions at the study location. Photographs in the vicinity of the study location are also provided. An aerial image showing the proximity of the study location with respect to adjacent land uses, and a zoomed in view of the study location is shown in ***Figure 14.***

A midblock pedestrian crossing at this study location would predominantly serve both pedestrians/bicyclists traveling between the retail shops on the west side of State Road A1A and hotels/condominiums, such as the Bella Vista condominiums on the east side of State Road A1A.

Table 12
Summary of Existing Conditions
Study Location #11

Feature	Description
Main Line	• State Road A1A
Location of Crossing	• Approximately 410 feet north of Sea Spray Street
Adjacent Land Uses	• Southwest: Retail shops • Southeast: Bella Vista condominiums • Northwest: Hawaiian Inn miniature golf course • Northeast: Acapulco hotel
Traffic Control	• State Road A1A is uncontrolled
Adjacent Signalized Intersections	• South: Daytona Beach Shores Public Safety Building – 1.63 miles • North: Moore Avenue – 0.88 miles
Adjacent Crosswalks	• South: South of Oceans West Boulevard – 1.15 miles • North: Moore Avenue – 0.88 miles
State Road A1A	• Cross Section: 5-lane undivided urban section with a continuous bi-directional left-turn lane • Access: Class 6 • Posted Speed Limit: 35 mph • AADT: 12,800 vehicles per day (year 2013) • Northbound Approach Lanes: 2 through lanes, 1 left-turn lane • Southbound Approach Lanes: 2 through lanes, 1 left-turn lane • Alignment: Straight • Pedestrian Crossings: None • Sidewalks: Both sides • Street Lighting: Both sides • Bus Stops: Both sides adjacent to the proposed crosswalk



Bus Stop

Traffic Signal

VBA Vehicle Beach Access

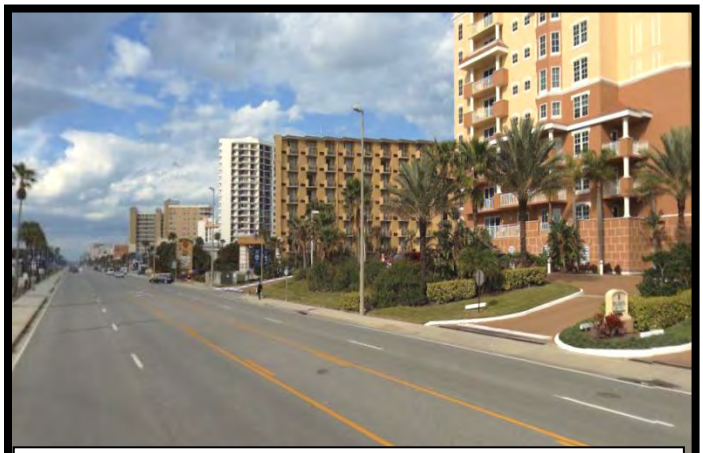
PBA Pedestrian Beach Access

Traffic Engineering Data Solutions, Inc.
80 Spring Vista Drive DeBary, FL 32713
Phone: 386.753.0558 Fax: 386.753.0778

RIVER TO SEA TRANSPORTATION PLANNING ORGANIZATION

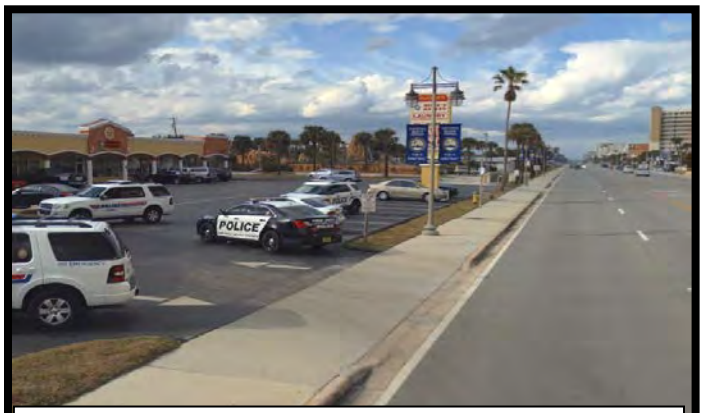
FIGURE 14
PROXIMITY AERIAL + CLOSE UP
STUDY LOCATION #11

Photographs of Study Location #11

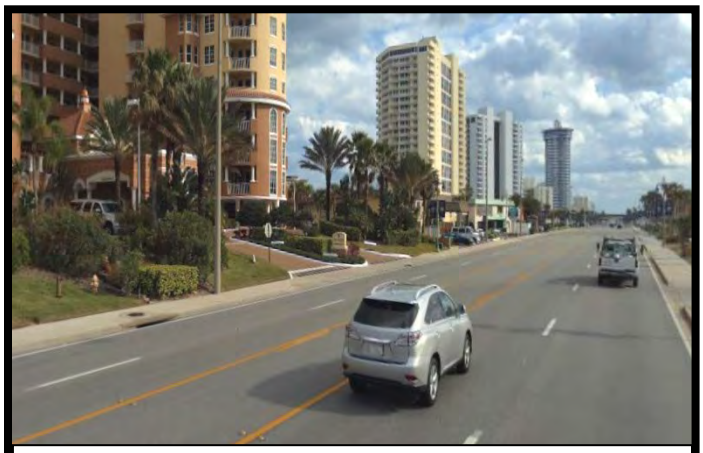


On State Road A1A looking north at the study location 410 feet north of Sea Spray Street

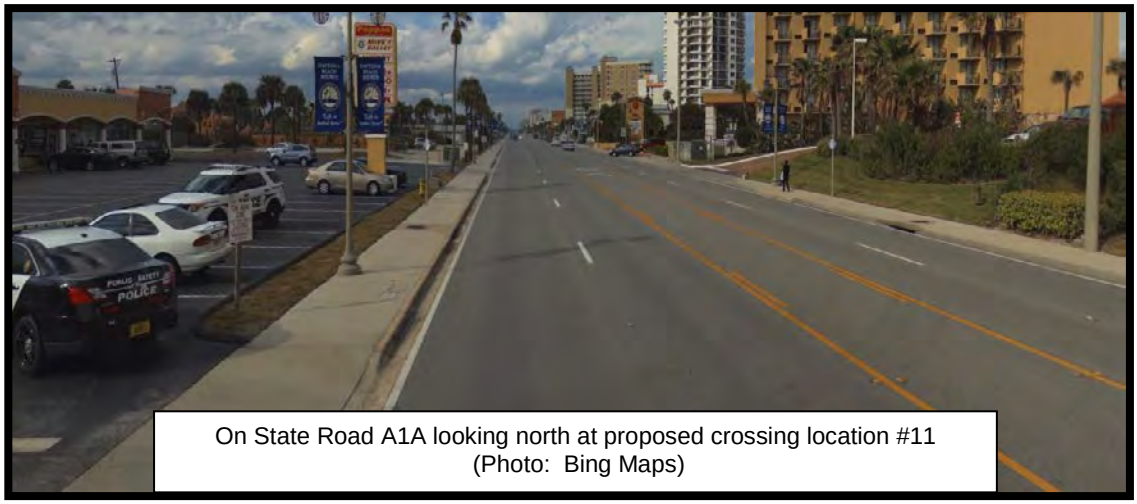
On State Road A1A looking south at the study location 410 feet north of Sea Spray Street



On State Road A1A looking northwest at the study location 410 feet north of Sea Spray Street (Bing Maps)



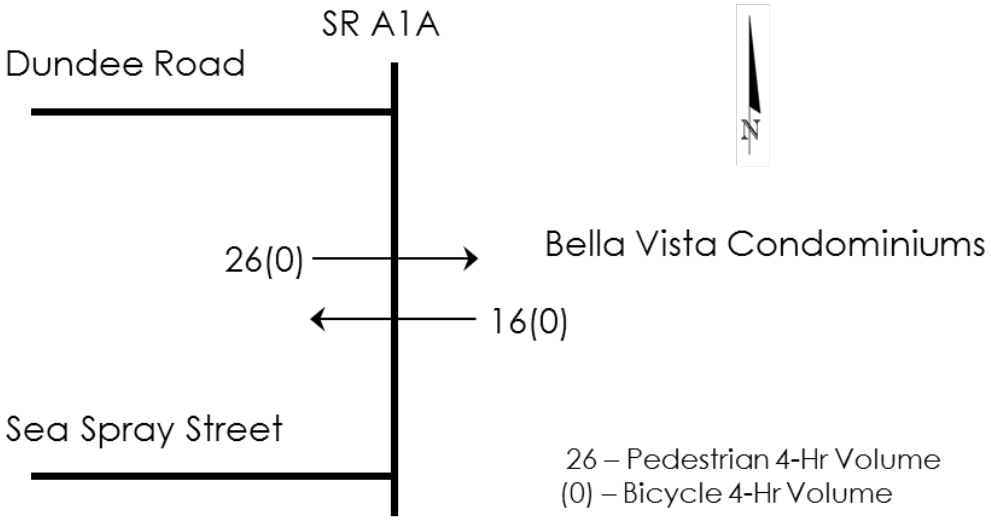
On State Road A1A looking southeast at the study location 410 feet north of Sea Spray Street (Bing Maps)



On State Road A1A looking north at proposed crossing location #11 (Photo: Bing Maps)

Pedestrian Volumes

Four (4) hours of pedestrian and bicycle counts, from 10:00 a.m. to 2:00 p.m., were conducted on a weekend day in the vicinity of the proposed crosswalk location. As summarized below, over the four-hour count there were a total of 42 pedestrians and zero (0) bicycles that crossed State Road A1A.



Based on the Vehicle Gap Study for the northern portion of the corridor there were seven (7) adequate gaps between 10:00 a.m. and 2:00 p.m. as compared to the crossing volume of 42 pedestrians/bicyclists. Thus, there were not enough adequate gaps near the study location to cross State Road A1A without the need to stage within the two-way left-turn lane.

Crossing Location	Time (Start to End)	Number of Adequate Gaps	Number of Pedestrians + Bicyclists		
			Eastbound	Westbound	Total
SR A1A - 410 feet north of Sea Spray Street	10:00 A.M. - 11:00 A.M.	3	3	8	11
	11:00 A.M. - 12:00 P.M.	2	17	5	22
	12:00 P.M. - 1:00 P.M.	0	1	1	2
	1:00 P.M. - 2:00 P.M.	2	5	2	7

Collision Analysis

Crash data for State Road A1A within the study limits was obtained from University of Florida's *Signal Four Analytics* obtained for the five-year period between January 1, 2009 and December 31, 2013. Based on a review of the data, there were no bicycle or pedestrian crashes reported near this study location.

Recommendations

Based on the data collected, field observations, and engineering judgment, it is recommended that a midblock pedestrian crosswalk be installed on State Road A1A approximately 410 feet north of Sea Spray Street for the following reasons:

- There is a well-defined pattern of existing pedestrian crossings in the vicinity of the proposed crossing location (42 crossings in four hours).
- Pedestrian volumes from 11:00 a.m. to 12:00 p.m. are over 20 pedestrians per hour (22 pedestrians).
- The daily traffic volume on State Road A1A is 12,500 vehicles per day (year 2013).
- The nearest alternative crossing on State Road A1A is over 300 feet in either direction.
- The proposed crossing is not within the influence area of adjacent signalized intersections.
- Adequate stopping sight distance is provided at the crossing location.
- The proposed midblock crossing location is adjacent to bus stops.

Because a pedestrian/bicyclist needs to utilize a two-stage movement, whereby they stage in the middle of the road, and because the daily volume on State Road A1A exceeds 12,000 vpd, it is also recommended that a refuge island be provided. Such an island would not restrict vehicle driveway access. These improvements are shown in proximity aerial and close up in ***Figure 14.*** The estimated cost for the installation of a midblock pedestrian crosswalk is $18,100.

Study Location #12

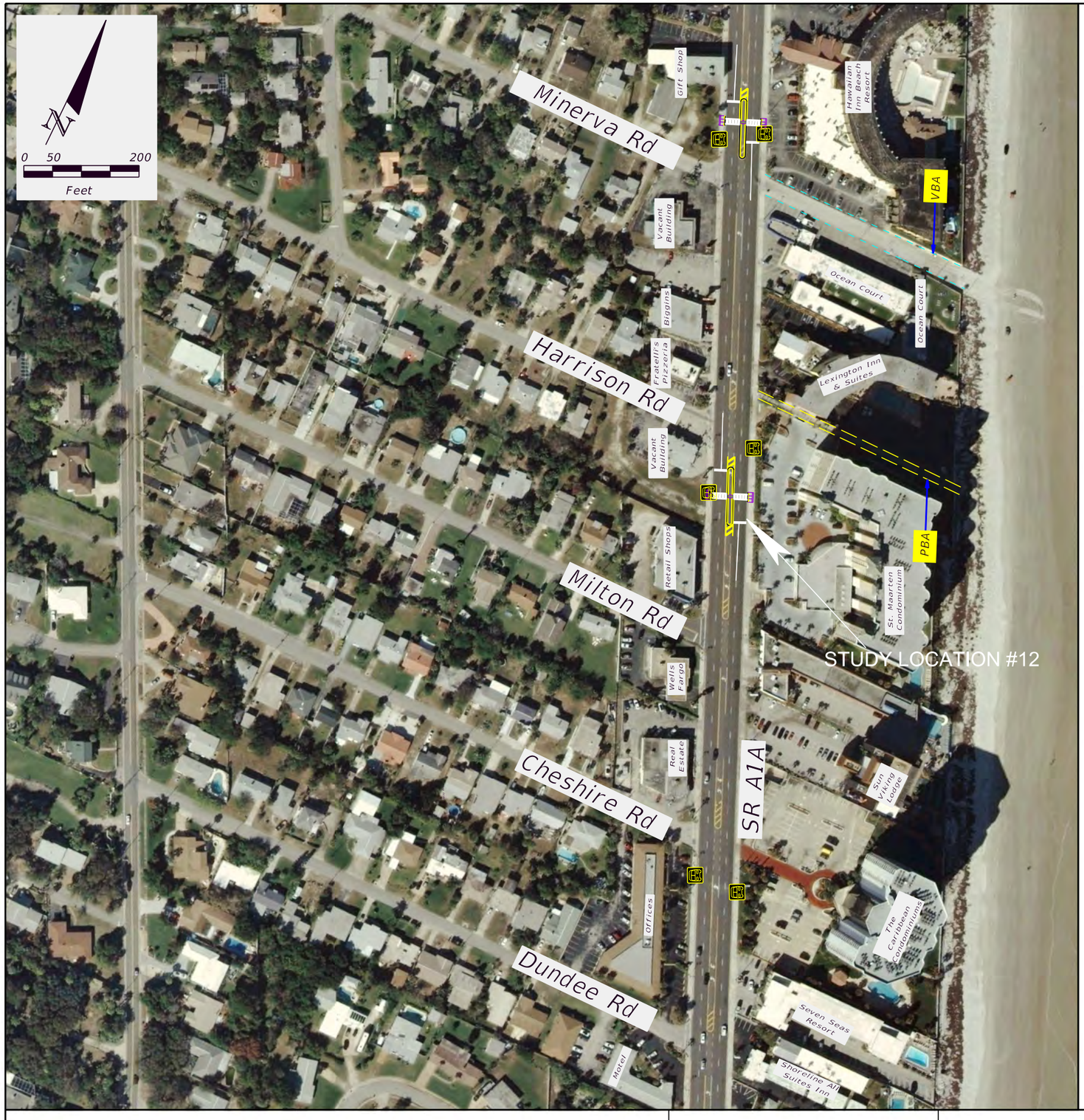
Existing Conditions

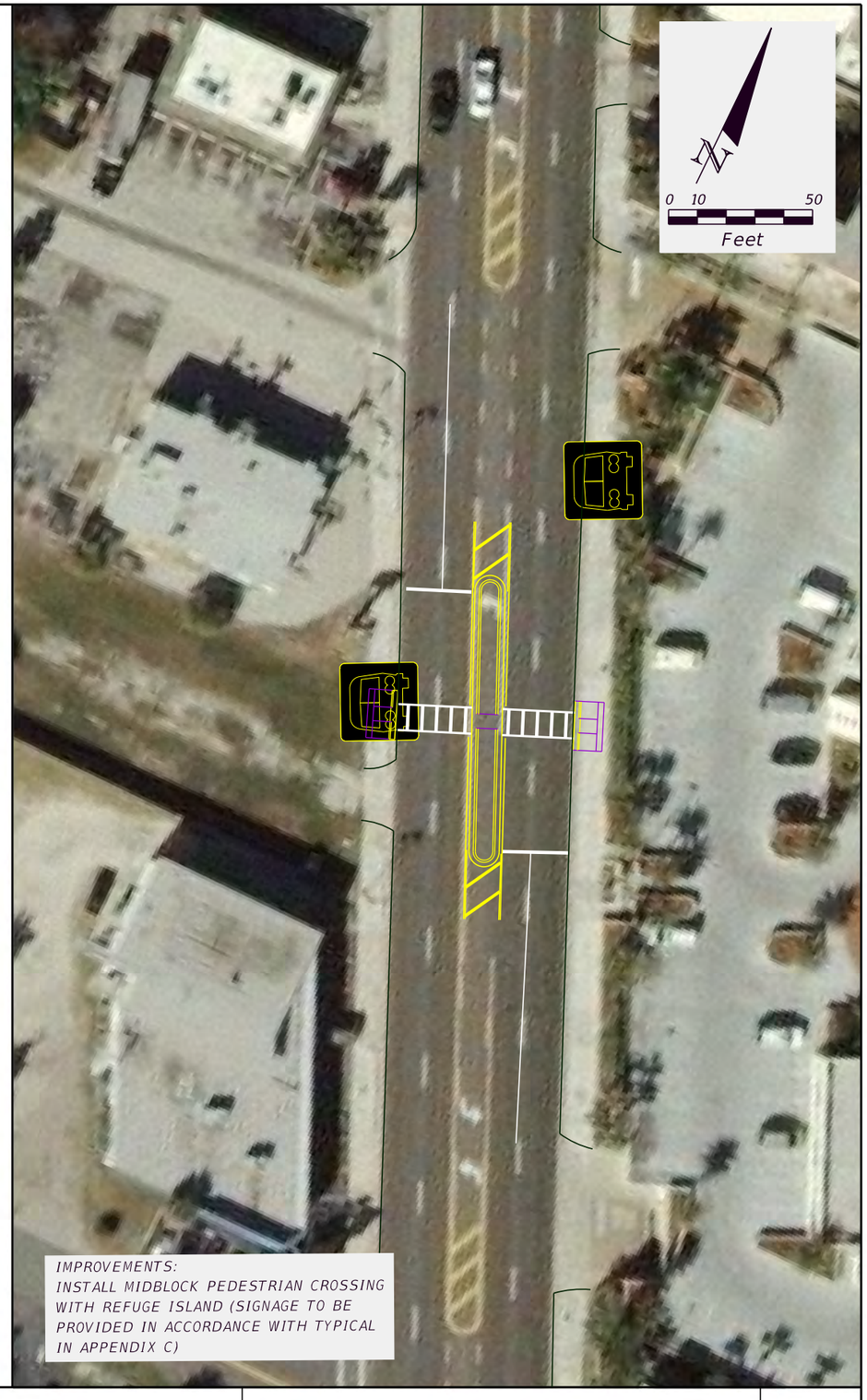
Study location #12 is on State Road A1A approximately 180 feet north of Milton Road, adjacent to the St. Marteen condominiums. ***Table 13*** provides a summary of the existing conditions at the study location. Photographs in the vicinity of the study location are also provided. An aerial image showing the proximity of the study location with respect to adjacent land uses, and a zoomed in view of the study location is shown in ***Figure 15***.

A midblock pedestrian crossing at this location would predominantly serve pedestrians traveling between the residences/retail shops on the west side of State Road A1A and hotels/condominiums like St. Marteen condominiums on the east side of State Road A1A. It should also be noted that immediately west of the proposed crossing location there is a proposed overflow parking lot for the Sun Viking Lodge (located southeast of the proposed midblock pedestrian crossing).

Table 13
Summary of Existing Conditions
Study Location #12

Feature	Description
Main Line	• State Road A1A
Location of Crossing	• Approximately 180 feet north of Milton Road
Adjacent Land Uses	• Southwest: Retail shops • Southeast: St. Marteen condominiums • Northwest: Retail shops • Northeast: St. Marteen condominiums
Traffic Control	• State Road A1A is uncontrolled
Adjacent Signalized Intersections	• South: Daytona Beach Shores Public Safety Building – 1.90 miles • North: Moore Avenue – 0.41 miles
Adjacent Crosswalks	• South: South of Oceans West Boulevard – 1.43 miles • North: Moore Avenue – 0.41 miles
State Road A1A	• Cross Section: 5-lane undivided urban section with a continuous bi-directional left-turn lane • Access: Class 6 • Posted Speed Limit: 35 mph • AADT: 12,800 vehicles per day (year 2013) • Northbound Approach Lanes: 2 through lanes, 1 left-turn lane • Southbound Approach Lanes: 2 through lanes, 1 left-turn lane • Alignment: Straight • Pedestrian Crossings: None • Sidewalks: Both sides • Street Lighting: Both sides • Bus Stops: 1,440’ south (both sides), 10’ north (west side) & 30’ north (east side)





Bus Stop

Traffic Signal

VBA Vehicle Beach Access

PBA Pedestrian Beach Access

Traffic Engineering Data Solutions, Inc.
80 Spring Vista Drive DeBary, FL 32713
Phone: 386.753.0558 Fax: 386.753.0778

RIVER TO SEA TRANSPORTATION PLANNING ORGANIZATION

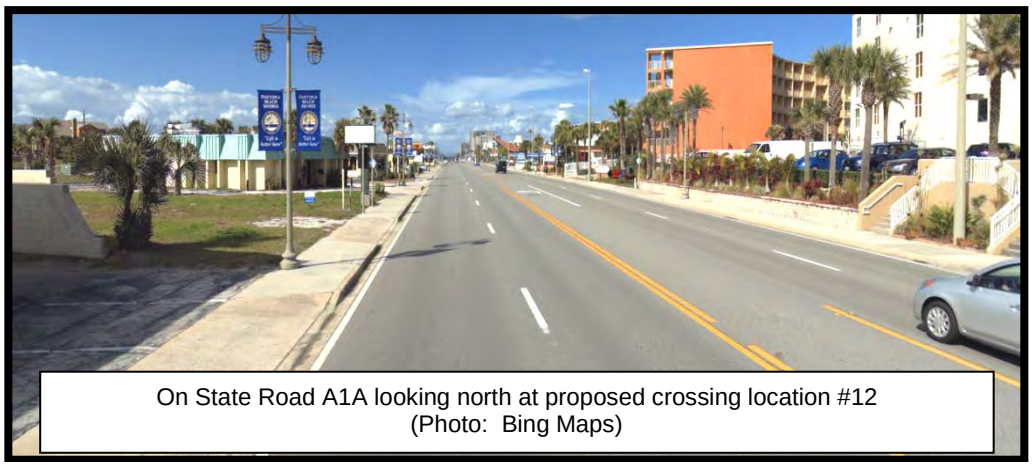
FIGURE 15
PROXIMITY AERIAL + CLOSE UP
STUDY LOCATION #12

Photographs of Study Location #12

On State Road A1A looking southeast at the study location 180 feet north of Milton Road (Bing Maps)

On State Road A1A looking northeast at the study location 180 feet north of Milton Road (Bing Maps)

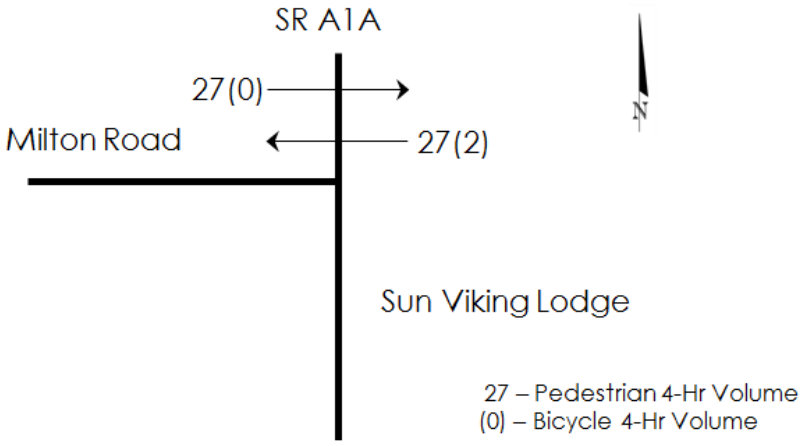
On State Road A1A looking south at proposed crossing location #12
(Photo: Bing Maps)



On State Road A1A looking north at proposed crossing location #12
(Photo: Bing Maps)

Pedestrian Volumes

Four (4) hours of pedestrian and bicycle counts, from 10:00 a.m. to 2:00 p.m., were conducted on a weekend day in the vicinity of the proposed crosswalk location. As summarized below, over the four-hour count there were a total of 54 pedestrians and two (2) bicycles that crossed State Road A1A.



Based on the Vehicle Gap Study for the northern portion of the corridor there were seven (7) adequate gaps between 10:00 a.m. and 2:00 p.m. as compared to the crossing volume of 54 pedestrians/bicyclists. Additionally, the data indicates that from 12:00 p.m. to 1:00 p.m. there were no adequate gaps as compared to 15 pedestrians/bicyclists crossing State Road A1A. Thus, there were not enough adequate gaps near the study location to cross State Road A1A without the need to stage within the two-way left-turn lane.

Crossing Location	Time (Start to End)	Number of Adequate Gaps	Number of Pedestrians + Bicyclists		
			Eastbound	Westbound	Total
SR A1A - 180 feet north of Milton Road	10:00 A.M. - 11:00 A.M.	3	6	4	10
	11:00 A.M. - 12:00 P.M.	2	6	4	10
	12:00 P.M. - 1:00 P.M.	0	10	5	15
	1:00 P.M. - 2:00 P.M.	2	5	16	21

Collision Analysis

Crash data for State Road A1A within the study limits was obtained from University of Florida's *Signal Four Analytics* obtained for the five-year period between January 1, 2009 and December 31, 2013. Based on a review of the data, there were no bicycle or pedestrian crashes reported near this study location.

Recommendations

Based on the data collected, field observations, and engineering judgment, it is recommended that a midblock pedestrian crosswalk be installed on State Road A1A approximately 180 feet north of Milton Road for the following reasons:

- There is a well-defined pattern of existing pedestrian crossings in the vicinity of the proposed crossing location (54 crossings in four hours).
- Pedestrian volumes from 1:00 p.m. to 2:00 p.m. are over 20 pedestrians/bicyclists per hour (21 pedestrians).
- The daily traffic volume on State Road A1A is 12,500 vehicles per day (year 2013).
- The nearest alternative crossing on State Road A1A is over 300 feet in either direction.
- The proposed crossing is not within the influence area of adjacent signalized intersections.
- Adequate stopping sight distance is provided at the crossing location.
- The proposed midblock crossing location is within 100 feet of bus stops.

Because a pedestrian/bicyclist needs to utilize a two-stage movement, whereby they stage in the middle of the road, and because the daily volume on State Road A1A exceeds 12,000 vpd, it is also recommended that a refuge island be provided. Such an island would restrict access for the driveway to the proposed overflow parking lot for the Sun Viking Lodge on the west side of State Road A1A, to a right-in/out only driveway. However, alternate access is provided to a parking lot via Harrison Road. These improvements are shown in proximity aerial and close up in ***Figure 15.*** The estimated cost for the installation of a midblock pedestrian crosswalk is $18,100.

Study Location #13

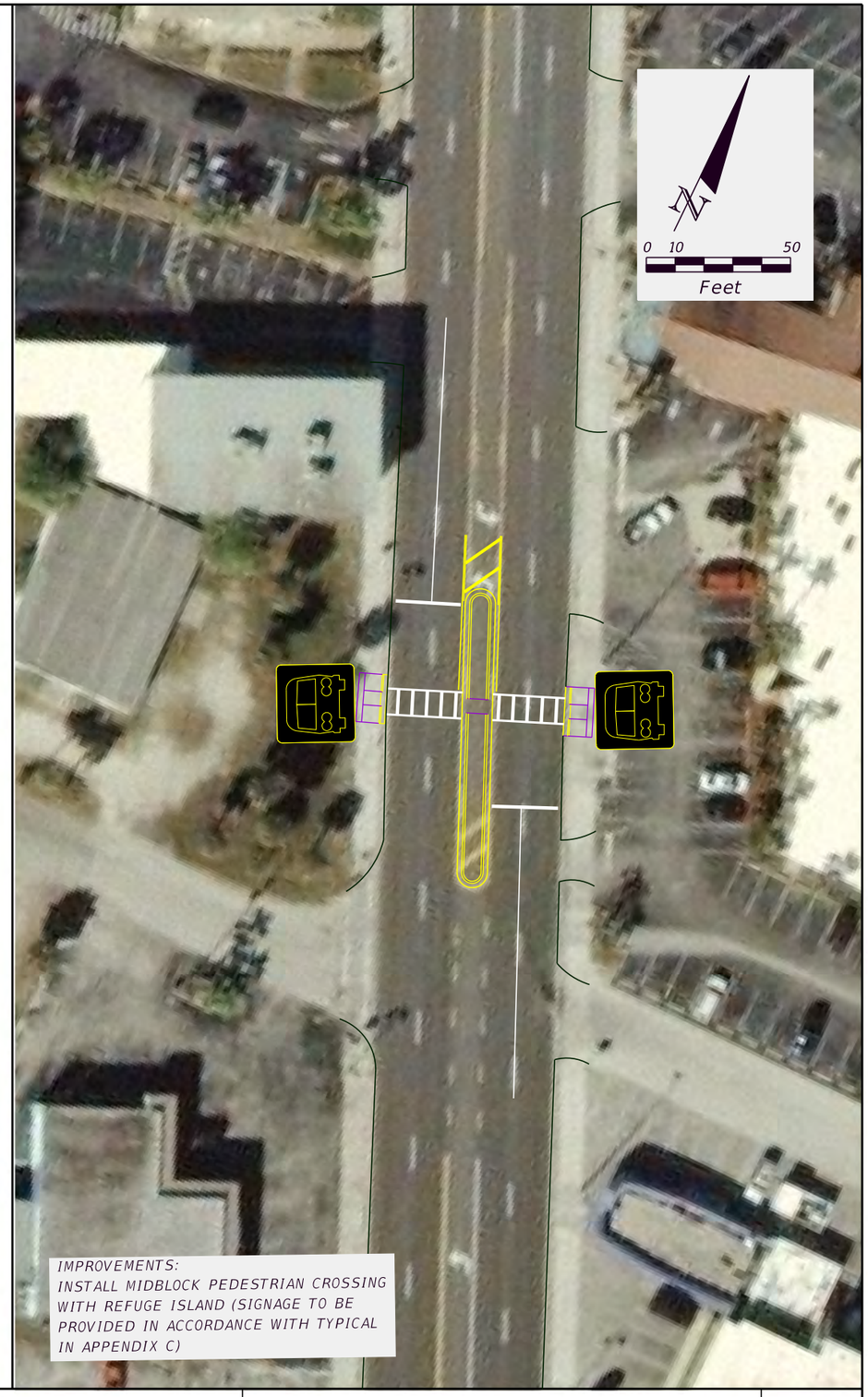
Existing Conditions

Study location #13 is on State Road A1A approximately 80 feet north of Minerva Road. ***Table 14*** provides a summary of the existing conditions at the study location. Photographs in the vicinity of the study location are also provided. An aerial image showing the proximity of the study location with respect to adjacent land uses, and a zoomed in view of the study location is shown in ***Figure 16***.

A midblock pedestrian crossing would predominantly serve pedestrians/bicyclists traveling between residences on the west side of State Road A1A and the beach, as beach access is provided just south of the study location. Also, pedestrians/bicyclists would utilize this crosswalk to travel between retail shops/businesses on the west side of State Road A1A and hotels/condominiums such as the Hawaiian Inn Beach Resort/Ocean Court motel on the east side of State Road A1A.

Table 14
Summary of Existing Conditions
Study Location #13

Feature	Description
Main Line	• State Road A1A
Location of Crossing	• Approximately 180 feet north of Minerva Road
Adjacent Land Uses	• Southwest: Vacant Building • Southeast: Ocean Court motel • Northwest: Gift Shop • Northeast: Hawaiian Inn Beach Resort
Traffic Control	• State Road A1A is uncontrolled
Adjacent Signalized Intersections	• South: Daytona Beach Shores Public Safety Building – 2.02 miles • North: Moore Avenue – 0.29 miles
Adjacent Crosswalks	• South: South of Oceans West Boulevard – 1.55 miles • North: Moore Avenue – 0.29 miles
State Road A1A	• Cross Section: 5-lane undivided urban section with a continuous bi-directional left-turn lane • Access: Class 6 • Posted Speed Limit: 35 mph • AADT: 12,800 vehicles per day (year 2013) • Northbound Approach Lanes: 2 through lanes, 1 left-turn lane • Southbound Approach Lanes: 2 through lanes, 1 left-turn lane • Alignment: Straight • Pedestrian Crossings: None • Sidewalks: Both sides • Street Lighting: Both sides • Bus Stops: Both sides adjacent to the proposed crosswalk



Bus Stop

Traffic Signal

VBA Vehicle Beach Access

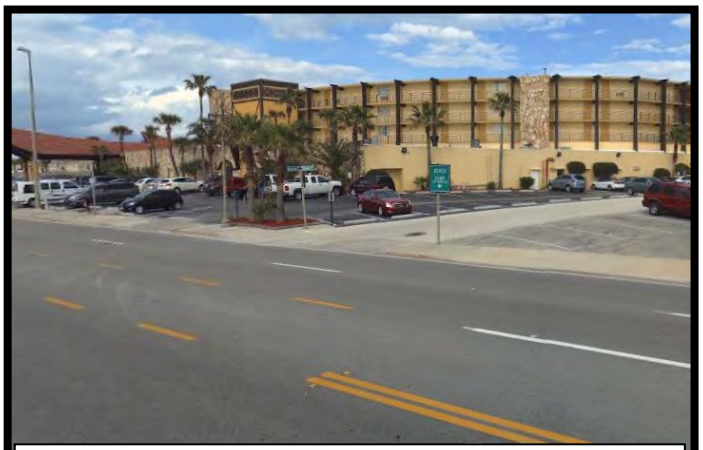
PBA Pedestrian Beach Access

Traffic Engineering Data Solutions, Inc.
80 Spring Vista Drive DeBary, FL 32713
Phone: 386.753.0558 Fax: 386.753.0778

RIVER TO SEA TRANSPORTATION PLANNING ORGANIZATION

FIGURE 16
PROXIMITY AERIAL + CLOSE UP
STUDY LOCATION #13

Photographs of Study Location #13



On State Road A1A looking northeast at the study location 80 feet north of Minerva Road (Bing Maps)

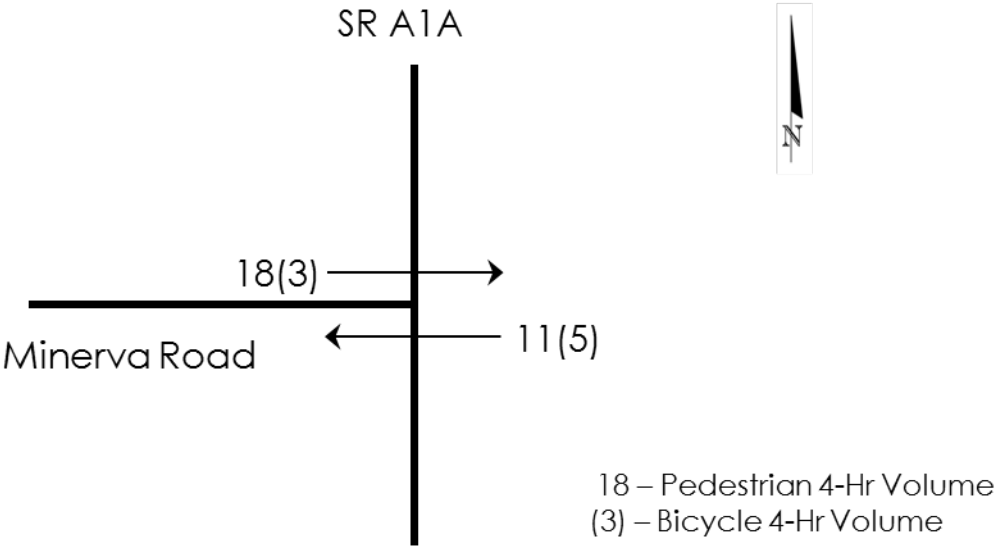
On State Road A1A looking northwest at the study location 80 feet north of Minerva Road

On State Road A1A looking south at proposed crossing location #13 (Photo: Bing Maps)

On State Road A1A looking north at proposed crossing location #13 (Photo: Bing Maps)

Pedestrian Volumes

Four (4) hours of pedestrian and bicycle counts, from 10:00 a.m. to 2:00 p.m., were conducted on a weekend day in the vicinity of the proposed crosswalk location. As summarized below, over the four-hour count there were a total of 29 pedestrians and eight (8) bicycles that crossed State Road A1A.



Based on the Vehicle Gap Study for the northern portion of the corridor there were seven (7) adequate gaps between 10:00 a.m. and 2:00 p.m. as compared to the crossing volume of 37 pedestrians/bicyclists. Additionally, the data indicates that from 12:00 p.m. to 1:00 p.m. there were no adequate gaps as compared to 13 pedestrians/bicyclists crossing State Road A1A. Thus, there were not enough adequate gaps near the study location to cross State Road A1A without the need to stage within the two-way left-turn lane.

Crossing Location	Time (Start to End)	Number of Adequate Gaps	Number of Pedestrians + Bicyclists		
			Eastbound	Westbound	Total
SR A1A - 80 feet north of Minerva Road	10:00 A.M. - 11:00 A.M.	3	4	7	11
	11:00 A.M. - 12:00 P.M.	2	6	2	8
	12:00 P.M. - 1:00 P.M.	0	8	5	13
	1:00 P.M. - 2:00 P.M.	2	3	2	5

Collision Analysis

Crash data for State Road A1A within the study limits was obtained from University of Florida's *Signal Four Analytics* obtained for the five-year period between January 1, 2009 and December 31, 2013. Based on a review of the data, there were no bicycle or pedestrian crashes reported near this study location.

Recommendations

Based on the data collected, field observations, and engineering judgment, it is recommended that a midblock pedestrian crosswalk be installed on State Road A1A approximately 80 feet north of Minerva Road for the following reasons:

- There is a well-defined pattern of existing pedestrian crossings in the vicinity of the proposed crossing location (58 crossings in four hours).
- The daily traffic volume on State Road A1A is 12,500 vehicles per day (year 2013).
- The nearest alternative crossing on State Road A1A is over 300 feet in either direction.
- The proposed crossing is not within the influence area of adjacent signalized intersections.
- Adequate stopping sight distance is provided at the crossing location.
- The proposed midblock crossing location is immediately adjacent to bus stops.

Because a pedestrian/bicyclist needs to utilize a two-stage movement, whereby they stage in the middle of the road, and because the daily volume on State Road A1A exceeds 12,000 vpd, it is also recommended that a refuge island be provided. Such an island would restrict a driveway to the east of the proposed midblock pedestrian crossing, belonging to the Hawaiian Inn Beach Resort, to a right-in/out only driveway. Alternative access to the Hawaiian Inn Beach Resort is provided on the east side of State Road A1A approximately 100 feet north of the affected driveway. These improvements are shown in proximity aerial and close up in ***Figure 16.*** The estimated cost for the installation of a midblock pedestrian crosswalk is $18,100.

Study Location #14

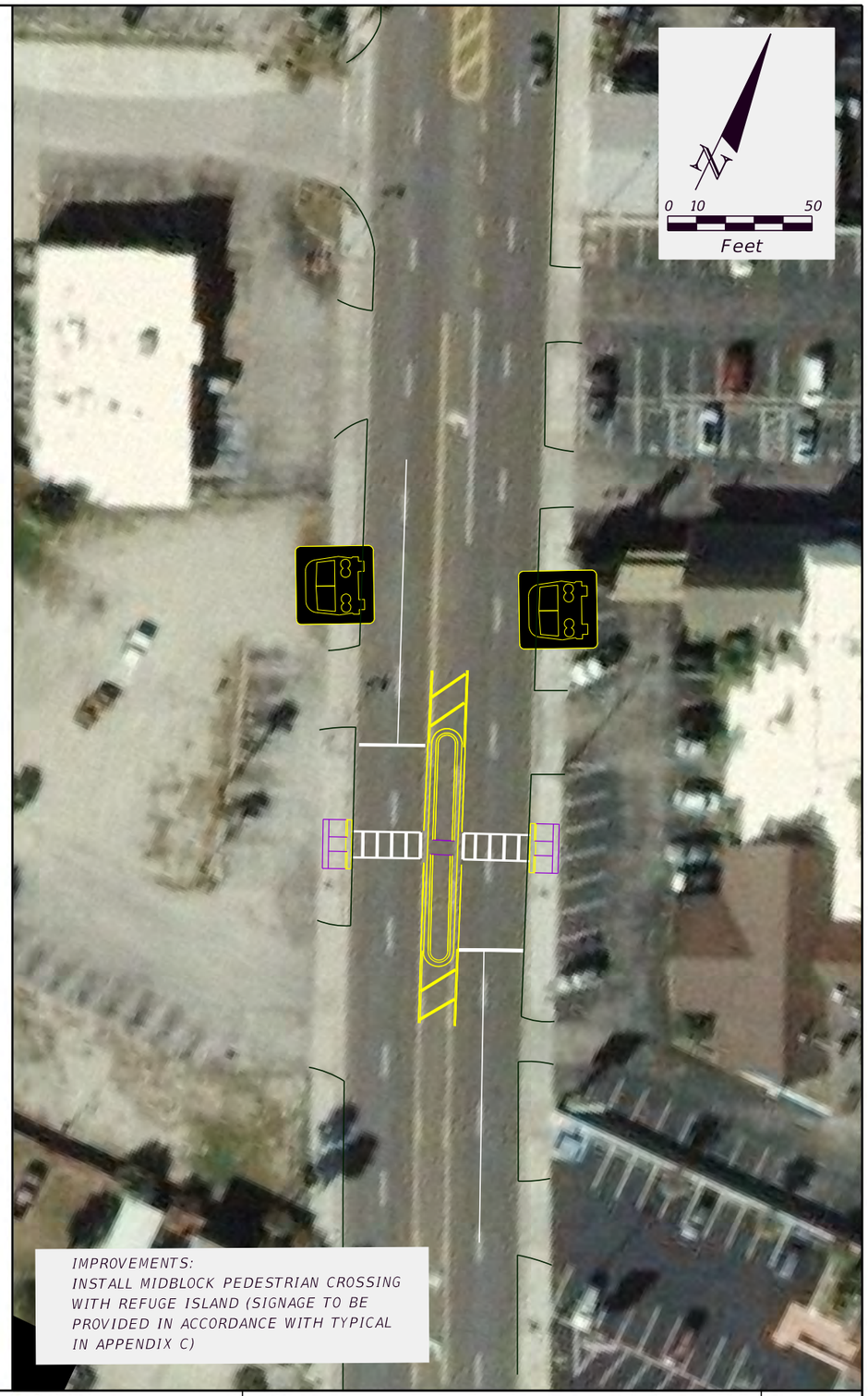
Existing Conditions

Study location #14 is on State Road A1A approximately 180 feet north of Lindley Road, adjacent to the Aku Tiki Inn. ***Table 15*** provides a summary of the existing conditions at the study location. Photographs in the vicinity of the study location are also provided. An aerial image showing the proximity of the study location with respect to adjacent land uses, and a zoomed in view of the study location is shown in ***Figure 17***.

A midblock pedestrian crossing at this study location would predominantly serve pedestrians/bicyclists traveling between residences/retail shops on the west side of State Road A1A, such as the 7/11 gas station, and resorts such as Best Western's Aku Tiki Inn on the east side of State Road A1A.

Table 15
Summary of Existing Conditions
Study Location #14

Feature	Description
Main Line	• State Road A1A
Location of Crossing	• Approximately 180 feet north of Lindley Road
Adjacent Land Uses	• Southwest: Vacant lot • Southeast: Traders Restaurant/Tropical Manor • Northwest: 7/11 gas station • Northeast: Best Western's Aku Tiki Inn
Traffic Control	• State Road A1A is uncontrolled
Adjacent Signalized Intersections	• South: Daytona Beach Shores Public Safety Building – 2.18 miles • North: Moore Avenue – 0.12 miles
Adjacent Crosswalks	• South: South of Oceans West Boulevard – 1.71 miles • North: Moore Avenue – 0.12 miles
State Road A1A	• Cross Section: 5-lane undivided urban section with a continuous bi-directional left-turn lane • Access: Class 6 • Posted Speed Limit: 35 mph • AADT: 12,800 vehicles per day (year 2013) • Northbound Approach Lanes: 2 through lanes, 1 left-turn lane • Southbound Approach Lanes: 2 through lanes, 1 left-turn lane • Alignment: Straight • Pedestrian Crossings: None • Sidewalks: Both sides • Street Lighting: Both sides • Bus Stops: 90' north (both sides) & 900' south (both sides)



Bus Stop

Traffic Signal

VBA Vehicle Beach Access

PBA Pedestrian Beach Access

Traffic Engineering Data Solutions, Inc.
80 Spring Vista Drive DeBary, FL 32713
Phone: 386.753.0558 Fax: 386.753.0778

RIVER TO SEA TRANSPORTATION PLANNING ORGANIZATION

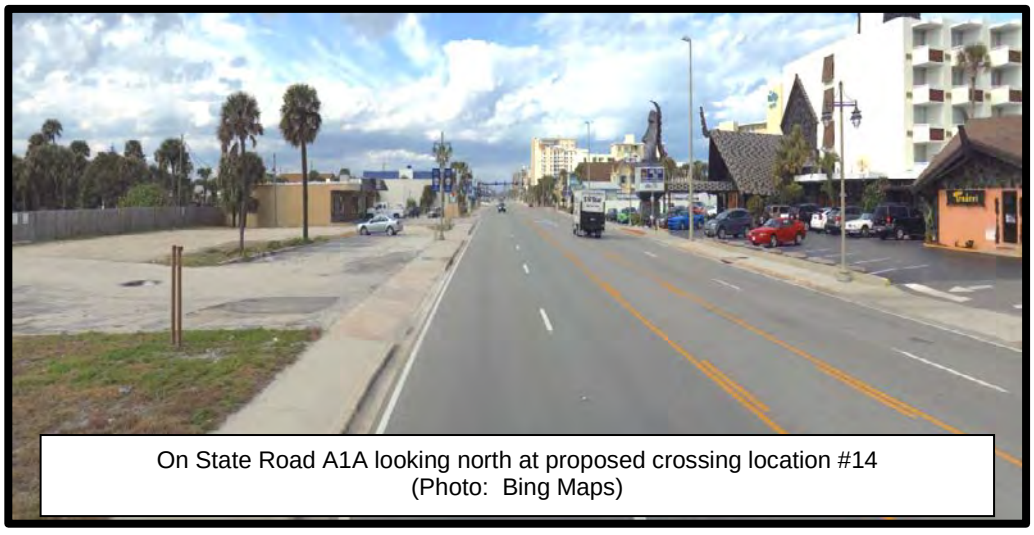
FIGURE 17
PROXIMITY AERIAL + CLOSE UP
STUDY LOCATION #14

Photographs of Study Location #14

On State Road A1A looking northeast at the study location 180 feet north of Lindley Road (Bing Maps)

On State Road A1A looking southeast at the study location 180 feet north of Lindley Road (Bing Maps)

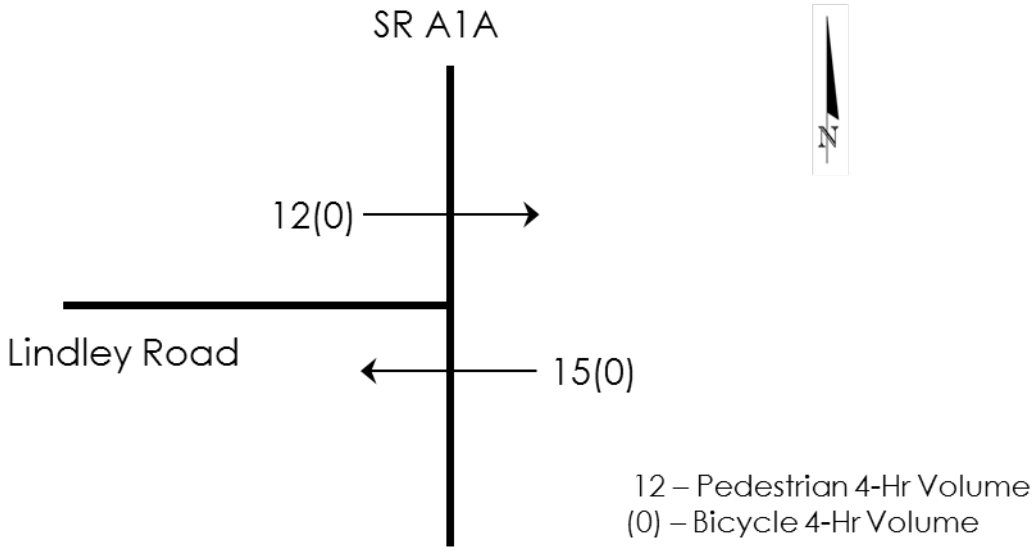
On State Road A1A looking south at proposed crossing location #14 (Photo: Bing Maps)



On State Road A1A looking north at proposed crossing location #14 (Photo: Bing Maps)

Pedestrian Volumes

Four (4) hours of pedestrian and bicycle counts, from 10:00 a.m. to 2:00 p.m., were conducted on a weekend day in the vicinity of the proposed crosswalk location. As summarized below, over the four-hour count there were a total of 27 pedestrians and zero (0) bicycles that crossed State Road A1A.



Based on the Vehicle Gap Study for the northern portion of the corridor there were seven (7) adequate gaps between 10:00 a.m. and 2:00 p.m. as compared to the crossing volume of 27 pedestrians/bicyclists. Additionally, the data indicates that from 12:00 p.m. to 1:00 p.m. there were zero (0) adequate gaps as compared to 19 pedestrians/bicyclists crossing State Road A1A. Thus, there were not enough adequate gaps near the study location to cross State Road A1A without the need to stage within the two-way left-turn lane.

Crossing Location	Time (Start to End)	Number of Adequate Gaps	Number of Pedestrians + Bicyclists		
			Eastbound	Westbound	Total
SR A1A - 180 feet north of Lindley Road	10:00 A.M. - 11:00 A.M.	3	0	0	0
	11:00 A.M. - 12:00 P.M.	2	3	5	8
	12:00 P.M. - 1:00 P.M.	0	9	10	19
	1:00 P.M. - 2:00 P.M.	2	0	0	0

Collision Analysis

Crash data for State Road A1A within the study limits was obtained from University of Florida's *Signal Four Analytics* obtained for the five-year period between January 1, 2009 and December 31, 2013. Based on a review of the data, there were no bicycle or pedestrian crashes reported near this study location.

Recommendations

Based on the data collected, field observations, and engineering judgment, it is recommended that a midblock pedestrian crosswalk be installed on State Road A1A approximately 180 feet north of Lindley Road for the following reasons:

- The daily traffic volume on State Road A1A is 12,500 vehicles per day (year 2013).
- The nearest alternative crossing on State Road A1A is over 300 feet in either direction.
- The proposed crossing is not within the influence area of adjacent signalized intersections.
- Adequate stopping sight distance is provided at the crossing location.
- The proposed midblock crossing location is within 100 feet of bus stops.

Because a pedestrian/bicyclist needs to utilize a two-stage movement, whereby they stage in the middle of the road, and because the daily volume on State Road A1A exceeds 12,000 vpd, it is also recommended that a refuge island be provided. Such an island would restrict vehicle driveway access to two (2) driveways to the east of the proposed midblock pedestrian crossing. Southbound left-turns will be restricted to the southernmost affected driveway that provides access to Traders Restaurant. The northernmost affected driveway will be restricted to right-in/out only access to Aku Tiki Inn. Alternative access is provided on the east side of State Road A1A approximately 60 feet north of the northernmost affected driveway. These improvements are shown in proximity aerial and close up in ***Figure 17.*** The estimated cost for the installation of a midblock pedestrian crosswalk is $18,100.

Study Location #15

Existing Conditions

Study location #15 is on State Road A1A approximately 80 feet south of Browning Avenue, adjacent to the Dollar General. ***Table 16*** provides a summary of the existing conditions at the study location. Photographs in the vicinity of the study location are also provided. An aerial image showing the proximity of the study location with respect to adjacent land uses, and a zoomed in view of the study location is shown in ***Figure 18***.

This midblock pedestrian crossing would predominantly serve pedestrians/bicyclists traveling between residences on the west side of State Road A1A and the beach, as a vehicle beach access is provided approximately 90 feet north of the study location. Also, pedestrians and bicyclists would utilize this crosswalk traveling between the Congo River miniature golf course and Dollar General on the west side of State Road A1A and hotels/condominiums such as the Silver Sands motel on the east side of State Road A1A.

Table 16
Summary of Existing Conditions
Study Location #15

Feature	Description
Main Line	• State Road A1A
Location of Crossing	• Approximately 80 feet south of Browning Avenue
Adjacent Land Uses	• Southwest: Dollar General/Vacant Building • Southeast: Silver Sands Motel • Northwest: Congo River miniature golf course • Northeast: Opus condominiums
Traffic Control	• State Road A1A is uncontrolled
Adjacent Signalized Intersections	• South: Moore Avenue – 0.19 miles • North: Botefuhr Avenue – 0.35 miles
Adjacent Crosswalks	• South: Moore Avenue – 0.19 miles • North: Botefuhr Avenue – 0.35 miles
State Road A1A	• Cross Section: 5-lane undivided urban section with a continuous bi-directional left-turn lane • Access: Class 6 • Posted Speed Limit: 35 mph • AADT: 12,800 vehicles per day (year 2013) • Northbound Approach Lanes: 2 through lanes, 1 left-turn lane • Southbound Approach Lanes: 2 through lanes, 1 left-turn lane • Alignment: Straight • Pedestrian Crossings: None • Sidewalks: Both sides • Street Lighting: Both sides • Bus Stops: 180’ north (west side), 60’ north (east side), 900’ south (west side) & 620’ south (east side)

Bus Stop

Traffic Signal

VBA Vehicle Beach Access

PBA Pedestrian Beach Access

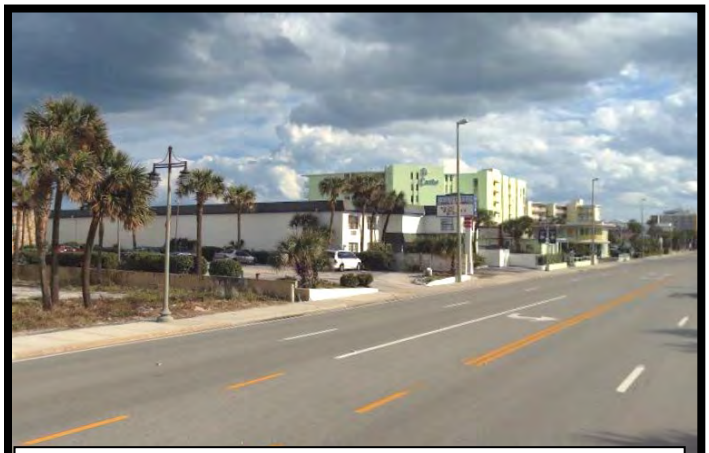
Traffic Engineering Data Solutions, Inc.
80 Spring Vista Drive
DeBary, FL 32713
Phone: 386.753.0558
Fax: 386.753.0778

RIVER TO SEA
TRANSPORTATION
PLANNING ORGANIZATION

FIGURE 18
PROXIMITY AERIAL + CLOSE UP
STUDY LOCATION #15

Photographs of Study Location #15

On State Road A1A looking northwest at the study location 80 feet south of Browning Avenue (Bing Maps)



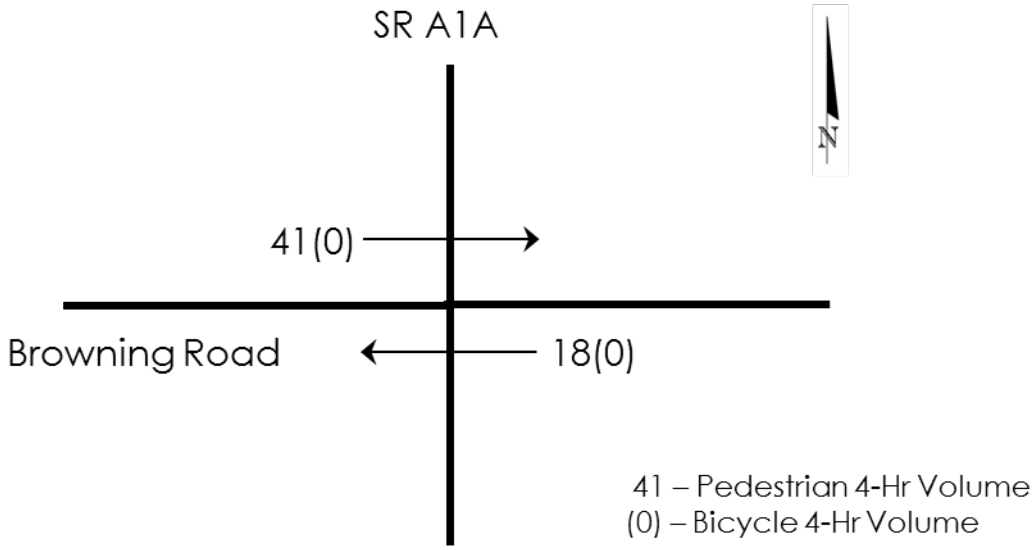
On State Road A1A looking southeast at the study location 80 feet south of Browning Avenue (Bing Maps)

On State Road A1A looking south at proposed crossing location #15 (Photo: Bing Maps)

On State Road A1A looking north at proposed crossing location #15 (Photo: Bing Maps)

Pedestrian Volumes

Four (4) hours of pedestrian and bicycle counts, from 10:00 a.m. to 2:00 p.m., were conducted on a weekend day in the vicinity of the proposed crosswalk location. As summarized below, over the four-hour count there were a total of 59 pedestrians and zero (0) bicycles that crossed State Road A1A.



Based on the Vehicle Gap Study for the northern portion of the corridor there were seven (7) adequate gaps between 10:00 a.m. and 2:00 p.m. as compared to the crossing volume of 59 pedestrians/bicyclists. Additionally, the data indicates that from 11:00 a.m. to 12:00 p.m. there were two (2) adequate gaps as compared to 21 pedestrians/bicyclists crossing State Road A1A. Thus, there were not enough adequate gaps near the study location to cross State Road A1A without the need to stage within the two-way left-turn lane.

Crossing Location	Time (Start to End)	Number of Adequate Gaps	Number of Pedestrians + Bicyclists		
			Eastbound	Westbound	Total
SR A1A - 80 feet south of Browning Avenue	10:00 A.M. - 11:00 A.M.	3	6	6	12
	11:00 A.M. - 12:00 P.M.	2	17	4	21
	12:00 P.M. - 1:00 P.M.	0	8	2	10
	1:00 P.M. - 2:00 P.M.	2	10	6	16

Collision Analysis

Crash data for State Road A1A within the study limits was obtained from University of Florida's *Signal Four Analytics* obtained for the five-year period between January 1, 2009 and December 31, 2013. Based on a review of the data, there was one (1) pedestrian-related crash which reportedly involved a northbound vehicle that struck a pedestrian crossing eastbound on State Road A1A, approximately 100 feet south of Browning Avenue. The crash, which occurred during the day under dry pavement conditions, resulted in one (1) injury and no estimated property damage.

Recommendations

Based on the data collected, field observations, and engineering judgment, it is recommended that a midblock pedestrian crosswalk be installed on State Road A1A approximately 80 feet south of Browning Avenue for the following reasons:

- There is a well-defined pattern of existing pedestrian crossings in the vicinity of the proposed crossing location (59 crossings in four hours).
- Pedestrian volumes from 11:00 a.m. to 12:00 p.m. are over 20 pedestrians per hour (21 pedestrians).
- The daily traffic volume on State Road A1A is 12,500 vehicles per day (year 2013).
- The nearest alternative crossing on State Road A1A is over 300 feet in either direction.
- The proposed crossing is not within the influence area of adjacent signalized intersections.
- Adequate stopping sight distance is provided at the crossing location.
- The proposed midblock crossing location is within 100 feet of a bus stop.

Because a pedestrian/bicyclist needs to utilize a two-stage movement, whereby they stage in the middle of the road, and because the daily volume on State Road A1A exceeds 12,000 vpd, it is also recommended that a refuge island be provided. Such an island will not restrict vehicle driveway access. These improvements are shown in proximity aerial and close up in ***Figure 18.*** The estimated cost for the installation of a midblock pedestrian crosswalk is $18,100.

Study Location #16

Existing Conditions

Study location #16 is on State Road A1A approximately 80 feet south of Frazar Road. ***Table 17*** provides a summary of the existing conditions at the study location. Photographs in the vicinity of the study location are also provided. An aerial image showing the proximity of the study location with respect to adjacent land uses, and a zoomed in view of the study location is shown in ***Figure 19***.

A midblock pedestrian crossing at this study location would predominantly serve pedestrians/bicyclists traveling between residences and apartments on the west side of State Road A1A and the beach, as a public beach access is provided 170 feet north of the proposed midblock crossing location.

Table 17
Summary of Existing Conditions
Midblock Pedestrian Crossing #16

Feature	Description
Main Line	• State Road A1A
Location of Crossing	• Approximately 80 feet south of Frazar Road
Adjacent Land Uses	• Southwest: Vacant lot/Sunoco gas station • Southeast: Vacant lot • Northwest: Apartments • Northeast: Sierra Suites
Traffic Control	• State Road A1A is uncontrolled
Adjacent Signalized Intersections	• South: Botefuhr Avenue – 0.16 miles • North: Silver Beach Avenue – 0.8 miles
Adjacent Crosswalks	• South: Botefuhr Avenue – 0.16 miles • North: Silver Beach Avenue – 0.8 miles
State Road A1A	• Cross Section: 5-lane undivided urban section with a continuous bi-directional left-turn lane • Access: Class 6 • Posted Speed Limit: 35 mph • AADT: 12,800 vehicles per day (year 2013) • Northbound Approach Lanes: 2 through lanes, 1 left-turn lane • Southbound Approach Lanes: 2 through lanes, 1 left-turn lane • Alignment: Straight • Pedestrian Crossings: None • Sidewalks: Both sides • Street Lighting: Both sides • Bus Stops: 260’ north (west side), 200’ north (east side), 1520’ south (west side) & 470’ south (east side)

Bus Stop

Traffic Signal

VBA Vehicle Beach Access

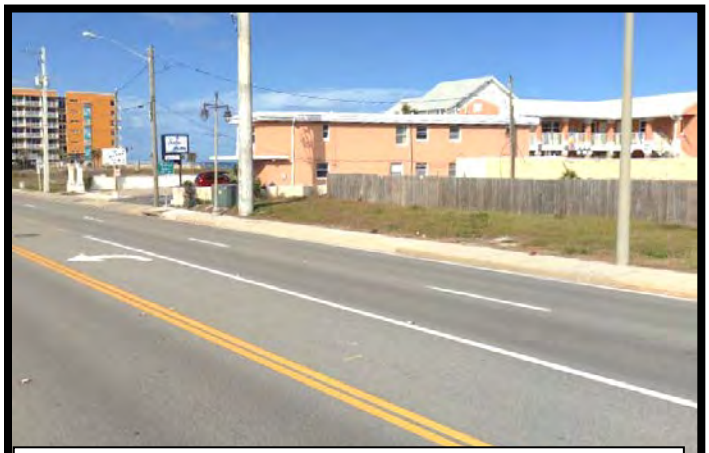
PBA Pedestrian Beach Access

Traffic Engineering Data Solutions, Inc.
80 Spring Vista Drive DeBary, FL 32713
Phone: 386.753.0558 Fax: 386.753.0778

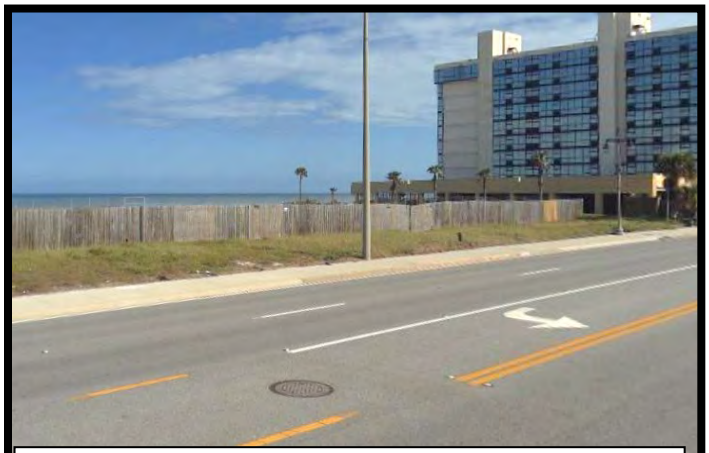
RIVER TO SEA TRANSPORTATION PLANNING ORGANIZATION

FIGURE 19
PROXIMITY AERIAL + CLOSE UP
STUDY LOCATION #16

Photographs of Study Location #16



On State Road A1A looking northeast at the study location 80 feet south of Frazar Road (Bing Maps)



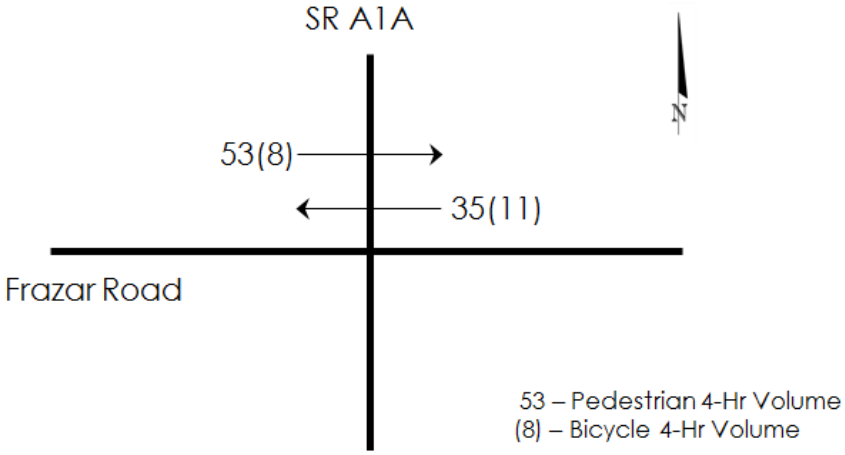
On State Road A1A looking southeast at the study location 80 feet south of Frazar Road (Bing Maps)

On State Road A1A looking south at proposed crossing location #16
(Photo: Bing Maps)

On State Road A1A looking north at proposed crossing location #16
(Photo: Bing Maps)

Pedestrian Volumes

Four (4) hours of pedestrian and bicycle counts, from 10:00 a.m. to 2:00 p.m., were conducted on a weekend day in the vicinity of the proposed crosswalk location. As summarized below, over the four-hour count there were a total of 88 pedestrians and 19 bicycles that crossed State Road A1A.



Based on the Vehicle Gap Study for the northern portion of the corridor there were seven (7) adequate gaps between 10:00 a.m. and 2:00 p.m. as compared to the crossing volume of 107 pedestrians/bicyclists, with more than 20 pedestrian/bicyclists crossing each hour. Thus, there were not enough adequate gaps near the study location to cross State Road A1A without the need to stage within the two-way left-turn lane.

Crossing Location	Time (Start to End)	Number of Adequate Gaps	Number of Pedestrians + Bicyclists		
			Eastbound	Westbound	Total
SR A1A - just north of Browning Avenue	10:00 A.M. - 11:00 A.M.	3	25	4	29
	11:00 A.M. - 12:00 P.M.	2	18	3	21
	12:00 P.M. - 1:00 P.M.	0	11	17	28
	1:00 P.M. - 2:00 P.M.	2	7	22	29

Collision Analysis

Crash data for State Road A1A within the study limits was obtained from University of Florida's *Signal Four Analytics* obtained for the five-year period between January 1, 2009 and December 31, 2013. Based on a review of the data, there were no bicycle or pedestrian crashes reported near this study location.

Recommendations

Based on the data collected, field observations, and engineering judgment, it is recommended that a midblock crosswalk be installed on State Road A1A approximately 80 feet south of Frazar Road for the following reasons:

- There is a well-defined pattern of existing pedestrian crossings in the vicinity of the proposed crossing location (107 crossings in four hours).
- Pedestrian volumes are over 20 pedestrians per hour for four consecutive hours.
- The daily traffic volume on State Road A1A is 12,500 vehicles per day (year 2013).
- The nearest alternative crossing on State Road A1A is over 300 feet in either direction.
- The proposed crossing is not within the influence area of adjacent signalized intersections.
- Adequate stopping sight distance is provided at the crossing location.
- The proposed midblock crossing location is within 300 feet of bus stops.

Because a pedestrian/bicyclist needs to utilize a two-stage movement, whereby they stage in the middle of the road, and because the daily volume on State Road A1A exceeds 12,000 vpd, it is also recommended that a refuge island be provided. Such an island will not restrict vehicle driveway access. These improvements are shown in proximity aerial and close up in ***Figure 19.*** The estimated cost for the installation of a midblock pedestrian crosswalk at this location is $18,100.

4

SIGNALIZED INTERSECTIONS

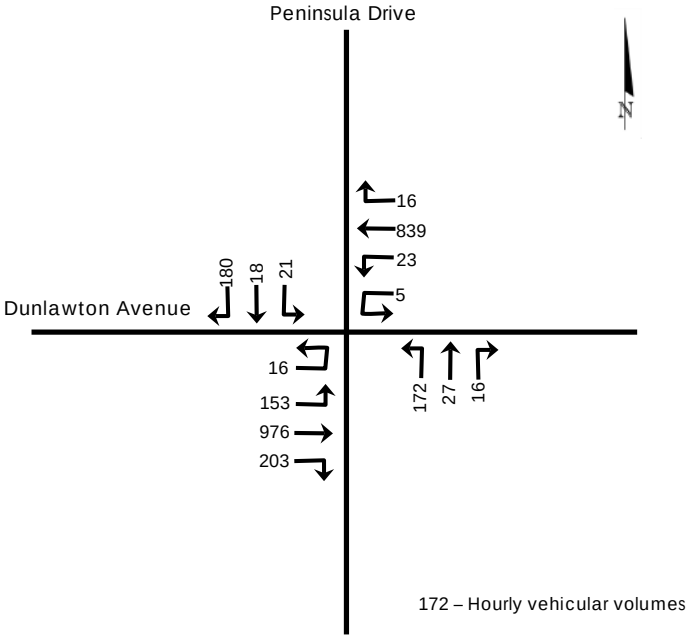
As previously conveyed, there are four (4) traffic signals located along the study corridor at Peninsula Drive, South Atlantic Avenue, Moore Avenue and Botefuhr Avenue. Each of these signals includes crosswalks with pedestrian signal features. The pedestrian features at each intersection include marked crosswalks, operational countdown pedestrian signal heads, push-button detectors, and ADA-compliant sidewalk ramps. Signal timings for each of the intersections were obtained and the Flashing Don't Walk intervals reviewed. Based on the review, the Flashing Don't Walk intervals are adequate. Following is an overview of each of the signalized intersections, including a summary of vehicular, pedestrian, and bicycle volumes as well as pedestrian/bicycle crash history:

Dunlawton Avenue and Peninsula Drive

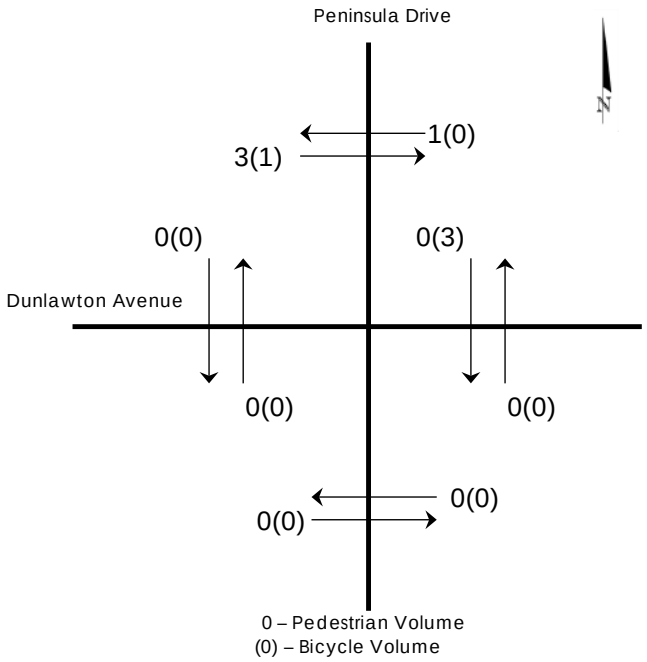
Traffic Volumes

A four-hour turning movement count was conducted at the intersection on a typical Summer Saturday. During the four (4) hours of manually collected turning movement counts, there were 10,373 vehicles and 22 pedestrians/bicyclists observed. Total traffic volumes peaked during the midday hours of 11:00 a.m. to 12:00 p.m. (2,674 vehicles). The pedestrian/bicyclist peak hour occurred between 1:00 pm. and 2:00 p.m. during which there were four (4) pedestrians and four (4) bicyclists. During the peak period of the highest pedestrian/bicyclist volumes the vehicular volumes at the intersection totaled 2,665 vehicles. The vehicular and pedestrian/bicyclist volumes during the pedestrian/bicyclist peak period are summarized below along with being shown in the Summary of Vehicle Movements in ***Appendix A.***

Vehicular Turning Movements during Pedestrian/Bicyclist Peak Hour (1:00 p.m. to 2:00 p.m.)
Dunlawton Avenue and Peninsula Drive



Pedestrian and Bicycle Counts during Pedestrian/Bicyclist Peak Hour (1:00 p.m. to 2:00 p.m.)
Dunlawton Avenue and Peninsula Drive



Collision Analysis

Crash data for State Road A1A within the study limits was obtained from University of Florida's *Signal Four Analytics* obtained for the five-year period between January 1, 2009 and December 31, 2013. Based on a review of the data, there were five pedestrian/bicyclist-related crashes reported near at the Dunlawton Avenue/Peninsula Drive intersection resulting in five (5) injuries and $1,400 in estimated property damage. One (1) of the crashes occurred at night while the other four (4) occurred during the day. Additionally, all five (5) crashes occurred on dry pavement conditions. Three (3) of the five (5) crashes were reportedly the result of a bicyclist failing to yield the right of way to vehicles. One (1) of the five (5) crashes was reportedly the result of a skateboarder failing to yield the right of way to vehicles.

One (1) of the crashes resulted from a southbound right-turning vehicle that illegally turned on a red signal indication as there is a "NO TURN ON RED" blank-out sign for southbound motorists. The motorist stuck a pedestrian within the northern crosswalk.

Another crash was the result of a southbound left-turning motorist that turned on a permissive green signal indication, striking a pedestrian legally crossing in the eastern crosswalk.

Summary

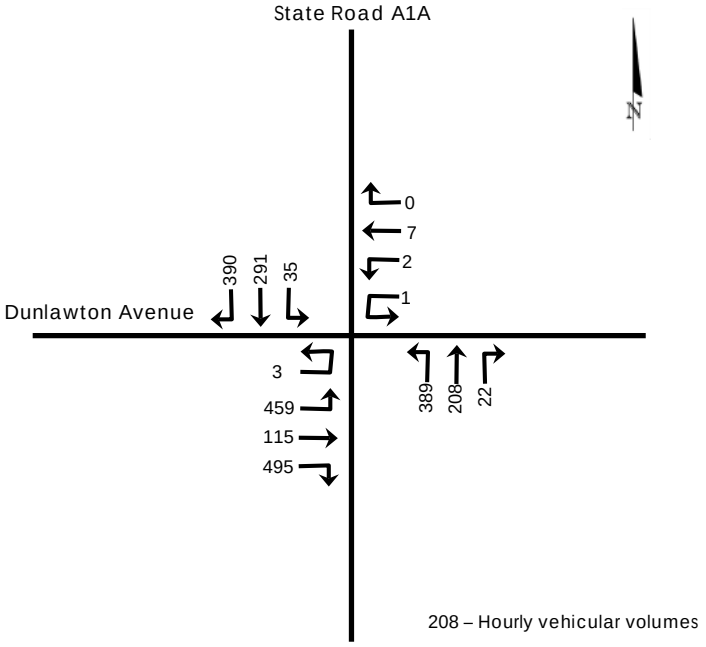
Based on the volumes, field review of the intersection, and crash history, no improvements/modifications are recommended at this intersection. It should also be noted that the intersection has a "NO TURN ON RED"

State Road A1A and Dunlawton Avenue

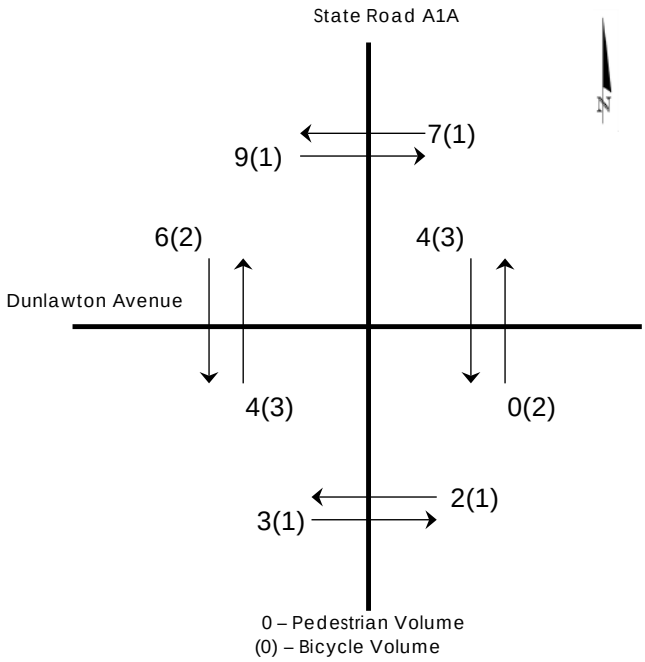
Traffic Volumes

A four-hour turning movement count was conducted at the intersection on a typical Summer Saturday. During the four (4) hours of manually collected turning movement counts, there were 9,443 vehicles and 168 pedestrians/bicyclists observed. Total traffic volumes peaked during the afternoon hours of 1:00 p.m. to 2:00 p.m. (2,473 vehicles). The pedestrian/bicyclist peak hour occurred between 12:00 p.m. and 1:00 p.m. during which there were 35 pedestrians and 14 bicyclists. During the peak period of the highest pedestrian/bicyclist volumes the vehicular volumes at the intersection totaled 2,417 vehicles. The vehicular and pedestrian/bicyclist volumes during the pedestrian/bicyclist peak period are summarized below along with being shown in the Summary of Vehicle Movements in ***Appendix A.***

Vehicular Turning Movements during Pedestrian/Bicyclist Peak Hour (12:00 p.m. to 1:00 p.m.)
State Road A1A and Dunlawton Avenue



Pedestrian and Bicycle Counts during Pedestrian/Bicyclist Peak Hour (12:00 p.m. to 1:00 p.m.)
State Road A1A and Dunlawton Avenue



Collision Analysis

Crash data for State Road A1A within the study limits was obtained from University of Florida's *Signal Four Analytics* obtained for the five-year period between January 1, 2009 and December 31, 2013. Based on a review of the data, there were no bicycle or pedestrian crashes reported at the State Road A1A/Dunlawton Avenue intersection.

Summary

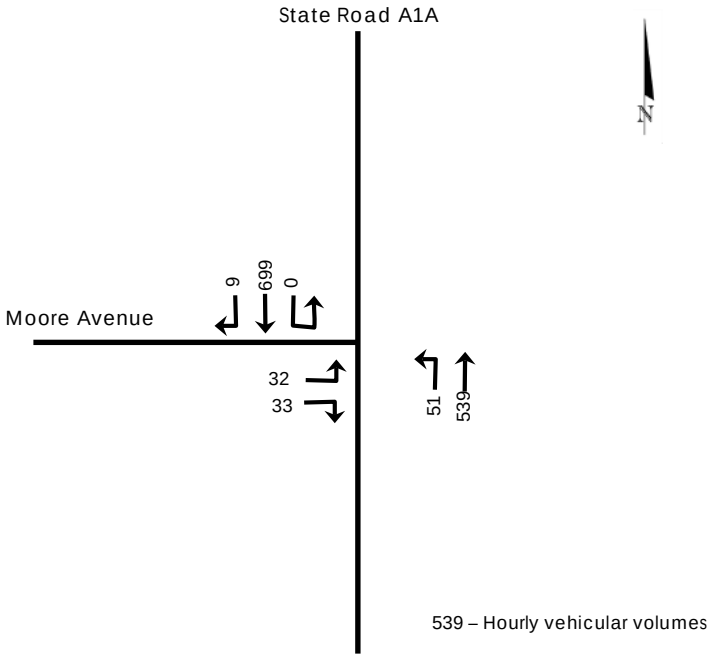
Based on the volumes, field review of the intersection, and crash history, no improvements/modifications are recommended at this intersection.

State Road A1A and Moore Avenue

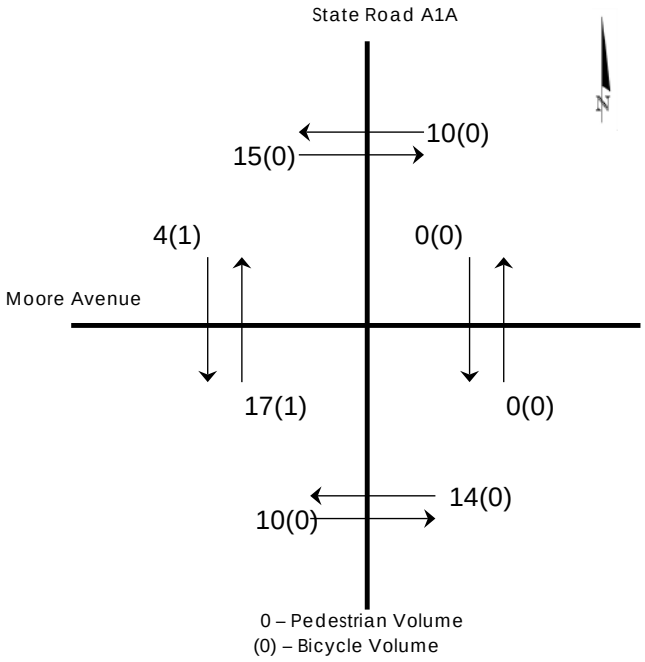
Traffic Volumes

A four-hour turning movement count was conducted at the intersection on a typical Summer Saturday. During the four (4) hours of manually collected turning movement counts, there were 5,450 vehicles and 244 pedestrians/bicyclists observed. Total traffic volumes peaked during the afternoon hours of 1:00 p.m. to 2:00 p.m. (1,450 vehicles). The pedestrian/bicyclist peak hour occurred between 12:00 p.m. and 1:00 p.m. during which there were 70 pedestrians and 2 bicyclists. During the peak period of the highest pedestrian/bicyclist volumes the vehicular volumes at the intersection totaled 1,363 vehicles. The vehicular and pedestrian/bicyclist volumes during the pedestrian/bicyclist peak period are summarized below along with being shown in the Summary of Vehicle Movements in ***Appendix A.***

Vehicular Turning Movements during Pedestrian/Bicyclist Peak Hour (12:00 p.m. to 1:00 p.m.)
State Road A1A and Moore Avenue



Pedestrian and Bicycle Counts during Pedestrian/Bicyclist Peak Hour (12:00 p.m. to 1:00 p.m.)
State Road A1A and Moore Avenue



Collision Analysis

Crash data for State Road A1A within the study limits was obtained from University of Florida's *Signal Four Analytics* obtained for the five-year period between January 1, 2009 and December 31, 2013. Based on a review of the data, there were no bicycle or pedestrian crashes reported at the State Road A1A/Moore Avenue intersection.

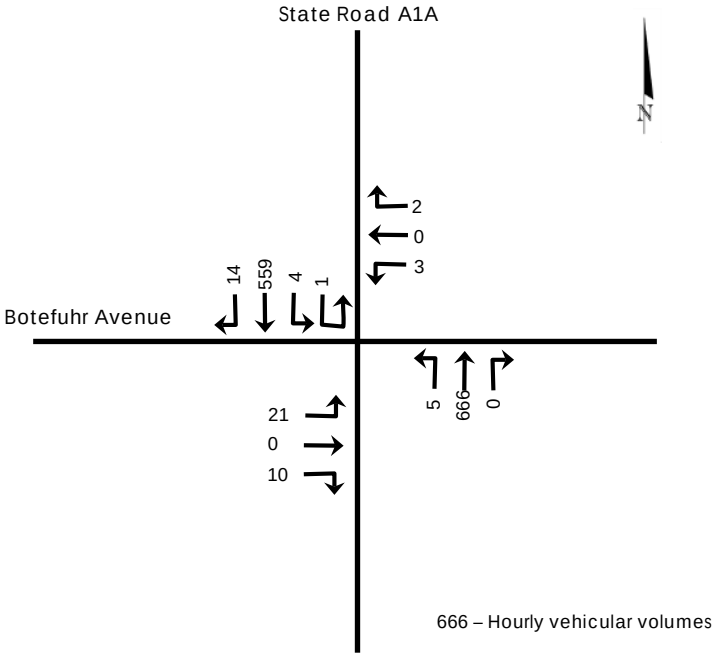
Summary

Based on the volumes, field review of the intersection, and crash history, no improvements/modifications are recommended at this intersection.

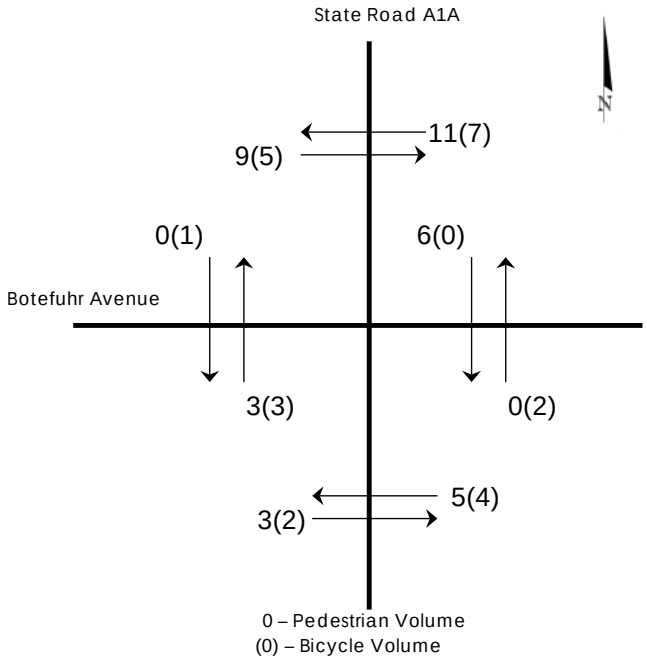
State Road A1A and Botefuhr Avenue

A four-hour turning movement count was conducted at the intersection on a typical Summer Saturday. During the four (4) hours of manually collected turning movement counts, there were 4,932 vehicles and 207 pedestrians and bicycles observed. Total traffic volumes peaked during the midday hours of 11:00 a.m. to 12:00 p.m. (1,285 vehicles), which is also the peak period of the highest pedestrian and bicycle volumes. During the pedestrian and bicycle peak hour of 11:00 a.m. to 12:00 p.m. there were 37 pedestrians and 24 bicyclists. The vehicular and pedestrian/bicyclist volumes during the pedestrian/bicyclist peak period are summarized below along with being shown in the Summary of Vehicle Movements in ***Appendix A.***

Vehicular Turning Movements during Pedestrian/Bicyclist Peak Hour (11:00 a.m. to 12:00 p.m.)
State Road A1A and Botefuhr Avenue



Pedestrian and Bicycle Counts during Pedestrian/Bicyclist Peak Hour (11:00 a.m. to 12:00 p.m.)
State Road A1A and Botefuhr Avenue



Collision Analysis

Crash data for State Road A1A within the study limits was obtained from University of Florida's *Signal Four Analytics* obtained for the five-year period between January 1, 2009 and December 31, 2013. Based on a review of the data, there was one pedestrian-related crash at the intersection which reportedly was the result of a westbound right-turning motorist striking a pedestrian in the northern crosswalk. The crash occurred in February of 2009 at 12:54 a.m. under dry pavement conditions, resulting in one (1) injury and no property damage.

Summary

Based on the volumes, field review of the intersection, and crash history, no improvements/modifications are recommended at this intersection.

5

LONG-TERM IMPROVEMENTS

The addition/modification of mid-block pedestrian crossings along State Road A1A within Daytona Beach Shores provides a short-term solution for enhancing pedestrian safety along the corridor. However, long-term improvements were also considered to understand what additional enhancements could be implemented to further the balance of vehicular and pedestrian activity. One of the primary challenges of the State Road A1A corridor is the expansive nature of pedestrian generators (hotels, condominiums, single-family residences, beach) and attractors (beach, retail shops, restaurants) along the entire corridor. As a result, pedestrians/bicyclists can be observed crossing all along the corridor as opposed to a high consolidation of crossings in select locations. Although the mid-block pedestrian crossings as previously recommended in the study are expected to provide enhanced pedestrian safety, there is still expected to be pedestrian/bicycle crossings occurring at unmarked locations along the corridor. For that reason, the City of Daytona Beach Shores needs to continue promoting a pedestrian-friendly community whereby motorists traveling within the City, especially on State Road A1A, drive with a heightened sense of awareness as it relates to increased potential for conflicts with pedestrians and bicyclists.

When considering more extensive improvements relative to enhancing pedestrian safety, consideration needs to be given to the fact that State Road A1A is an arterial roadway where vehicular capacity and operations need to be preserved. This requires the signalized intersections along the corridor, particularly at Dunlawton Avenue/South Atlantic Avenue, to be carefully considered when evaluating alternatives that may affect intersection capacity. Separately, development effectively fronts both sides of the State Road A1A corridor along the entire limits of the study corridor, thus limiting opportunities for considering improvements that require additional right-of-way. Additionally, impacts to access along the corridor need to be carefully evaluated when assessing improvement alternatives.

The City recently addressed similar challenges on South Atlantic Avenue south of Dunlawton Avenue where it was also desired to enhance pedestrian/bicycle facilities along this section of roadway. However, right-of-way limitations substantially restricted the options. Thus, after much evaluation and study, the City elected to proceed with a road diet whereby they reduced this section of roadway from five-lanes down to three lanes. They then utilized the previous pavement area for the construction of expanded sidewalks. A critical component of the road diet was ensuring that the roadway would continue to function acceptably with the reduced number of lanes. Ultimately, it was determined that the roadway would function acceptably provided the number of lanes at the Dunlawton Avenue/South Atlantic Avenue intersection were not reduced.

When considering a road diet for the section of State Road A1A north of Dunlawton Avenue, there are numerous similarities with the section south of Dunlawton Avenue including the existing section (5-lane undivided), traffic volumes, and the critical intersections. If the roadway were reduced to a three-lane segment, the capacity of the roadway would become 16,300 vehicles per day (vpd) based on generalized service volume tables contained in the Florida Department of Transportation's *2013 Quality/Level of Service Handbook*. This daily capacity translates to a peak-hour two-way capacity of 1,460 vehicles per hour (vph). It is

important to note that these capacities are based on a level of service (LOS) D standard as that is the standard the City of Daytona Beach Shores has identified in its Comprehensive Plan for all state arterials within the City. Additionally, these generalized capacities are based on an assumption that the corridor has five (5) signals per mile whereas the study corridor has only three signals over a four-mile section. By way of comparison, a three-lane roadway without any traffic signals has a generalized daily capacity of 25,400 vpd based on a LOS D standard. Thus, it is reasonable to conclude that the actual capacity of State Road A1A is higher than the generalized capacity of 16,300 vpd and 1,460 vph.

Based on 2013 traffic data as obtained from FDOT, the daily volume in year 2013 on State Road A1A between Dunlawton Avenue and Silver Beach Avenue was 12,500 to 12,800 vehicles per day, approximately 77% of the capacity. Below is a summary of the historical traffic volumes over the past five years with which it can be seen that the volume has been below the generalized capacity of 16,300. Additionally, these volumes demonstrate that traffic volume growth has been minimal, which is logical given the built-out nature of the State Road A1A corridor.

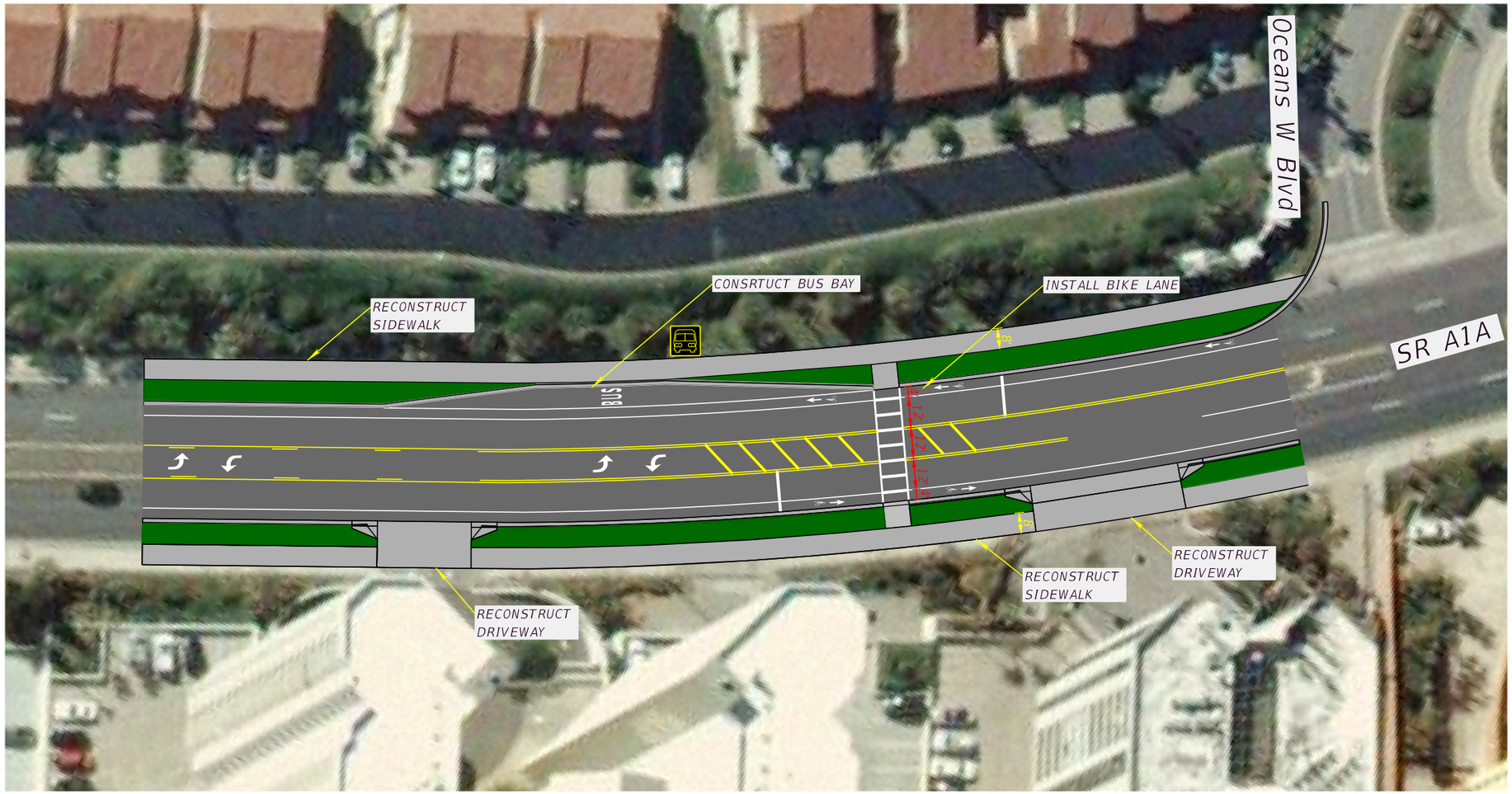
Roadway segment (S.R. A1A)	Annual Average Daily Traffic Volume (AADT)				
	2009	2010	2011	2012	2013
Dunlawton Ave. to Van Ave.	11400	10100	10700	10400	12500
Van Ave. to Florida Shores Blvd.	11800	16100	13800	11400	12800
Florida Shores Blvd. to Silver Beach Ave.	15800	15500	13700	11200	12500

In considering how the roadway would function on a summer Saturday, greater emphasis should be placed on the hourly volumes. As previously conveyed in this study, the peak-hour bi-directional volume on a summer Saturday was approximately 1,300 vehicles, which is below the 1,460 vph generalized capacity. These existing volumes are below the generalized capacity for a three-lane section, the generalized capacities are expected to be conservatively low and the corridor is effectively built-out.

Therefore, based on this analysis, it is reasonable to conclude that the roadway would function at an acceptable level of service with a three-lane section both today and in the future. However, should the consideration of a road diet be explored further, detailed analyses should be conducted at the signalized intersections to better understand the lane geometry needed at each location to provide for acceptable operations.

A conceptual improvement diagram showing the road diet typical along a section of the study corridor was developed and is provided as ***Figure 20***. This concept contemplates shifting the curb line on each side of the roadway towards the center of the roadway by eight feet, to provide for a four-foot bike lane on each side of State Road A1A. The sidewalks on each side would require reconstruction to provide appropriate tie-ins to the new curb line. Should the location of the sidewalks be maintained, then a grass or landscaped buffer could be provided between the new curb line and the existing sidewalk. As an alternative, the sidewalk could be meandered on each side of the roadway. Also, moving the curb line on each side allows for the construction of bus pullouts in each direction. Last, a critical component in determining the preferable option for implementing the road diet is impacts to the drainage system. A preliminary engineering evaluation would be necessary to better understand drainage-related considerations and costs as they can vary significantly.

Based on the improvement concept, the total cost of the road diet, including engineering, construction and CEI, is estimated at three million dollars per mile. So implementation of the road diet across the entire study corridor is preliminarily estimated at 12.9 million dollars. However, it should be noted that a five-lane section would most likely need to be maintained for a short duration immediately north of the Dunlawton Avenue intersection to accommodate the dual eastbound left-turn lanes and to provide for the appropriate transition to the southbound approach at the intersection.



0 10 50

Feet

Bus Stop

Traffic Signal

VBA Vehicle Beach Access

PBA Pedestrian Beach Access

Traffic Engineering Data Solutions, Inc.
80 Spring Vista Drive *Phone: 386.753.0558*
DeBary, FL 32713 *Fax: 386.753.0778*

RIVER TO SEA
TRANSPORTATION
PLANNING ORGANIZATION

FIGURE 20
ROAD DIET IMPROVEMENT CONCEPT

6

CONCLUSIONS

Traffic Engineering Data Solutions, Inc. (TEDS) was retained on behalf of the River to Sea Transportation Planning Organization (TPO) to conduct a pedestrian safety study on State Road A1A. The study corridor included Dunlawton Avenue from Peninsula Drive to State Road A1A, and on State Road A1A from Dunlawton Avenue to the northern City limits of Daytona Beach Shores in Daytona Beach Shores, Florida.

Based on the pedestrian/bicycle crossing data, a review of crash history (18 bicycle/pedestrian crashes along entire corridor over a five-year period), feedback/input received at a meeting with representatives from the City of Daytona Beach Shores Police Department, field observations and coordination with FDOT, 16 locations were evaluated for enhanced pedestrian/bicycle safety. Recommendations for each location are summarized in the table below:

Location Number	Location on State Road A1A	Improvement	Location Number	Location on State Road A1A	Improvement
1	70' North of Broad Ave.	2, 5	9	60' North of Florida Shores Blvd.	1
2	110' North of Simpson Ave.	1	10	300' North of Beachcomber St.	1
3	70' North of Esmeralda Ave.	1	11	410' North of Sea Spray St.	1
4	350' North of Atares Ave.	1*	12	180' North of Milton Rd.	1
5	Next to Public Safety Building	4	13	80' North of Minerva Rd.	1
6	Next to Publix	3	14	180' North of Lindley Rd.	1*
7	30' North of Bellemead Dr.	2, 5	15	80' South of Browning Ave.	1
8	180' South of Oceans W. Blvd.	2, 5	16	80' South of Frazar Rd.	1

Improvement:

1 - Add new midblock crosswalk with refuge island

2 - Modify pavement markings/signage at existing crosswalk and eliminate vegetation in refuge island

3 - Add Rectangular Rapid Flashing Beacon

4 - Maintain existing crosswalk

5 - Increase refuge island size

* - additional costs anticipated due to drainage/manhole adjustments ($5,000 to $15,000)

The four traffic signals located along the study corridor at Peninsula Drive, South Atlantic Avenue, Moore Avenue and Botefuhr Avenue include crosswalks with pedestrian signal features. Based on the volumes, field review of the intersections, and crash history, no pedestrian-related improvements were recommended for the signalized intersections.

A road diet, whereby State Road A1A would be reduced from a five-lane section down to a three-lane section, was identified as a potential long-term improvement that would further the balance of vehicular and pedestrian activity along the corridor. Based on the study, it is reasonable to conclude that the roadway would function acceptably with a three-lane section both today and in the future. However, should the consideration of a road diet be explored further, detailed analyses should be conducted at the signalized intersections to better understand the lane geometry needed at each location. Based on the road diet concept, the total cost of implementing the road diet across the entire study corridor is preliminarily estimated at 12.9 million dollars.

APPENDIX A

TRAFFIC DATA

- 24-hour counts
- 4-hour turning movement counts
- 4-hour pedestrian/bicyclist count
- Pedestrian/bicycle crossing location demand table
- Vehicle Gap Size Study

24 Hour bi-directional volume counts

Daytona Beach Shores/ State Road A1A

August 9th, 2014 (Saturday)

Site 1: N29.1865, W80.9882

Time	NB	SB	Total
1:00	64	86	**150**
2:00	37	41	**78**
3:00	31	39	**70**
4:00	26	31	**57**
5:00	34	25	**59**
6:00	56	40	**96**
7:00	102	108	**210**
8:00	221	199	**420**
9:00	363	291	**654**
10:00	454	413	**867**
11:00	483	478	**961**
12:00	512	557	**1069**
13:00	518	552	**1070**
14:00	489	511	**1000**
15:00	576	543	**1119**
16:00	554	542	**1096**
17:00	624	532	**1156**
18:00	669	635	**1304**
19:00	616	591	**1207**
20:00	583	521	**1104**
21:00	502	433	**935**
22:00	377	390	**767**
23:00	237	382	**619**
24:00	111	221	**332**
	8239	**8161**	**16400**

Site 2: N29.1623, W80.9751

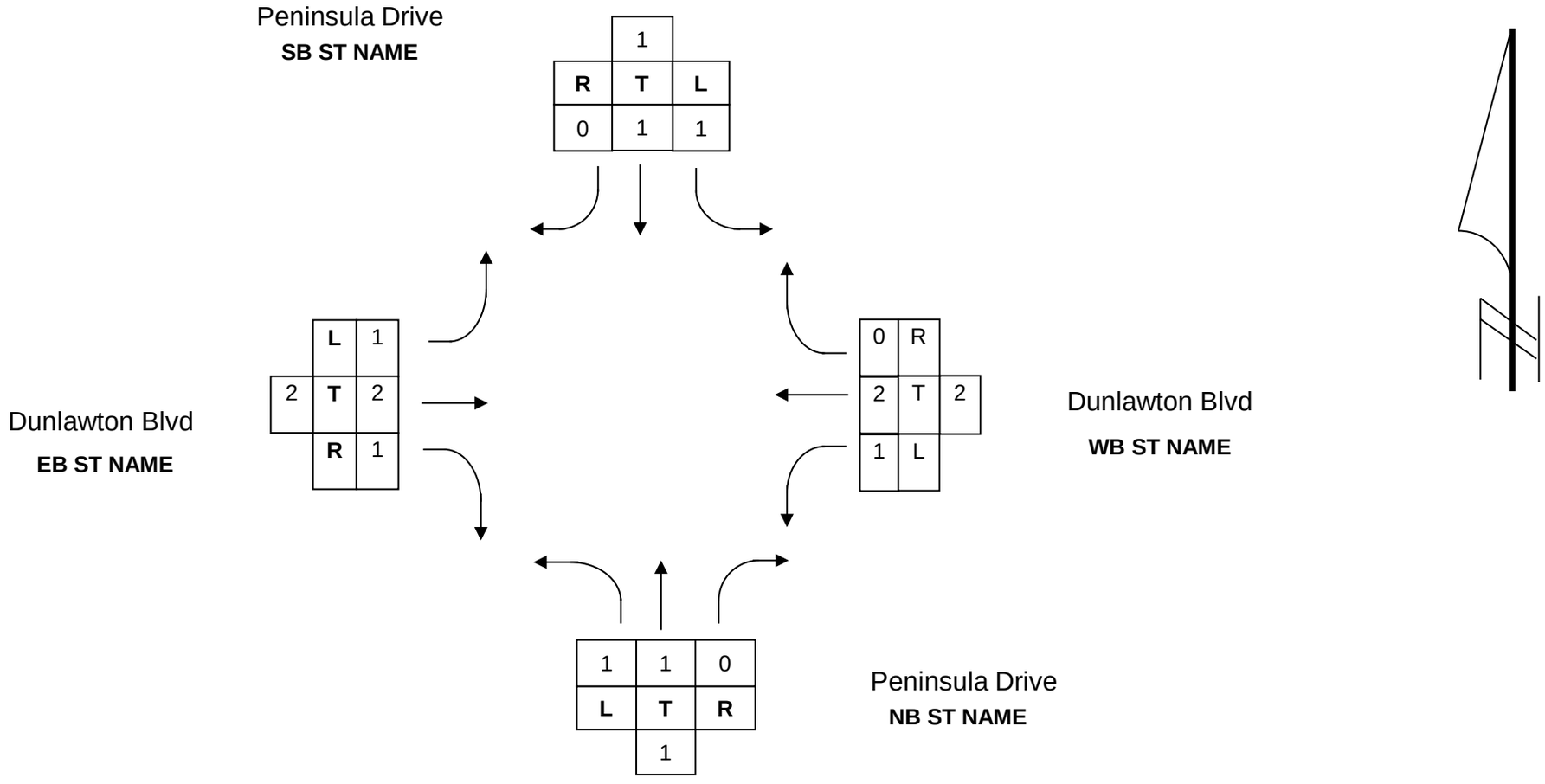
Time	NB	SB	Total
1:00	68	81	**149**
2:00	33	39	**72**
3:00	31	34	**65**
4:00	17	30	**47**
5:00	25	28	**53**
6:00	50	60	**110**
7:00	106	103	**209**
8:00	202	246	**448**
9:00	359	350	**709**
10:00	409	465	**874**
11:00	519	557	**1076**
12:00	576	573	**1149**
13:00	592	595	**1187**
14:00	553	576	**1129**
15:00	601	583	**1184**
16:00	584	590	**1174**
17:00	599	631	**1230**
18:00	650	659	**1309**
19:00	600	656	**1256**
20:00	584	491	**1075**
21:00	550	443	**993**
22:00	395	314	**709**
23:00	251	304	**555**
24:00	136	208	**344**
	8490	**8616**	**17106**

FLORIDA DEPARTMENT OF TRANSPORTATION

SUMMARY OF VEHICLE MOVEMENTS

SECTION	79180	**CITY**	Daytona Beach Shores	**COUNTY**	Volusia
STATE ROUTE	Dunlawton Blvd	**INTERSECTING ROUTE**	Peninsula Drive		
OBSERVER	HF	**DATE**	7/19/2014	**MILEPOST**	1.085
WEATHER	Sunny	**ROAD CONDITION**	Good		
REMARKS					

FORM COMPLETED BY PHF **DATE** 07/23/14



TIME	NORTHBOUND					SOUTHBOUND					TOTAL	EASTBOUND					WESTBOUND					TOTAL
BEGIN/END	**L**	**T**	**R**	**U**	**TOT**	**L**	**T**	**R**	**U**	**TOT**	**N/S**	**L**	**T**	**R**	**U**	**TOT**	**L**	**T**	**R**	**U**	**TOT**	**E/W**
10 - 11	135	25	13	0	**173**	14	29	188	0	**231**	**404**	162	968	170	4	**1304**	9	742	24	6	**781**	**2085**
11 - 12	158	19	12	0	**189**	21	24	188	0	**233**	**422**	196	1048	228	16	**1488**	13	705	27	19	**764**	**2252**
12 - 1	160	30	12	0	**202**	12	20	176	0	**208**	**410**	154	1016	236	17	**1423**	8	687	11	6	**712**	**2135**
1 - 2	172	27	16	0	**215**	21	18	180	0	**219**	**434**	153	976	203	16	**1348**	23	839	16	5	**883**	**2231**
TOTAL	**625**	**101**	**53**	**0**	**779**	**68**	**91**	**732**	**0**	**891**	**1670**	**665**	**4008**	**837**	**53**	**5563**	**53**	**2973**	**78**	**36**	**3140**	**8703**

FLORIDA DEPARTMENT OF TRANSPORTATION

PEDESTRIAN MOVEMENT SUMMARY

SECTION 79180 **CITY** Daytona Beach Shores **COUNTY** Volusia

STATE ROUTE Dunlawton Blvd **INTERSECTING ROUTE** Peninsula Drive

OBSERVER HF **DATE** 7/19/2014

REMARKS

FORM COMPLETED BY PHF **DATE** 07/23/14

Peninsula Drive
SB ST NAME

		10 - 11	11 - 12	12 - 1	1 - 2			Total
		0	2	0	1			**3**
		0	0	3	3			**6**
		0	**2**	**3**	**4**			**9**

10 - 11	0	0	**0**
11 - 12	0	0	**0**
12 - 1	0	0	**0**
1 - 2	0	0	**0**
Total	**0**	**0**	**0**

Dunlawton Blvd
EB ST NAME

Dunlawton Blvd
WB ST NAME

10 - 11	0	0	**0**
11 - 12	0	0	**0**
12 - 1	0	0	**0**
1 - 2	0	0	**0**
Total	**0**	**0**	**0**

		10 - 11	11 - 12	12 - 1	1 - 2			Total
		0	0	0	0			**0**
		0	0	0	0			**0**
		0	**0**	**0**	**0**			**0**

Peninsula Drive
NB ST NAME

FLORIDA DEPARTMENT OF TRANSPORTATION

BICYCLE MOVEMENT SUMMARY

SECTION 79180 **CITY** Daytona Beach Shores **COUNTY** Volusia

STATE ROUTE Dunlawton Blvd **INTERSECTING ROUTE** Peninsula Drive

OBSERVER HF **DATE** 7/19/2014

REMARKS

FORM COMPLETED BY PHF **DATE** 07/23/14

Peninsula Drive
SB ST NAME

		10 - 11	11 - 12	12 - 1	1 - 2			Total
		1	1	0	0			**2**
		0	2	0	1			**3**
		1	**3**	**0**	**1**			**5**

10 - 11	0	0	**0**
11 - 12	1	0	**1**
12 - 1	0	0	**0**
1 - 2	0	0	**0**
Total	**1**	**0**	**1**

Dunlawton Blvd
EB ST NAME

Dunlawton Blvd
WB ST NAME

10 - 11	0	1	**1**
11 - 12	0	0	**0**
12 - 1	1	0	**1**
1 - 2	3	0	**3**
Total	**4**	**1**	**5**

		10 - 11	11 - 12	12 - 1	1 - 2			Total
		1	0	1	0			**2**
		0	0	0	0			**0**
		1	**0**	**1**	**0**			**2**

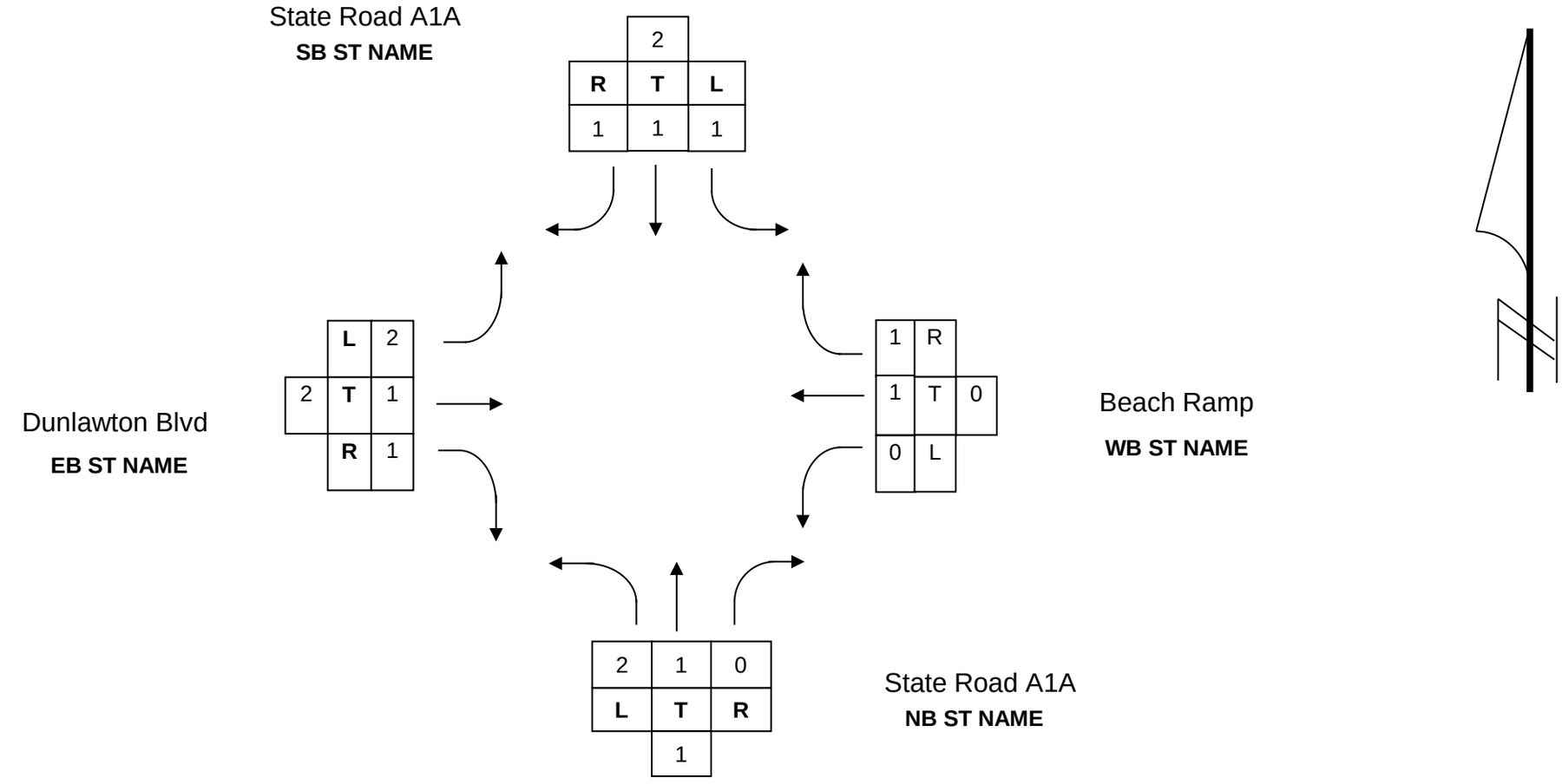
Peninsula Drive
NB ST NAME

FLORIDA DEPARTMENT OF TRANSPORTATION

SUMMARY OF VEHICLE MOVEMENTS

SECTION	79180	**CITY**	Daytona Beach Shores	**COUNTY**	Volusia
STATE ROUTE	State Road A1A	**INTERSECTING ROUTE**	Dunlawton Blvd		
OBSERVER	DM	**DATE**	7/19/2014	**MILEPOST**	1.246
WEATHER	Sunny	**ROAD CONDITION**	Good		
REMARKS					

FORM COMPLETED BY PHF **DATE** 08/01/14



TIME	NORTHBOUND					SOUTHBOUND					TOTAL	EASTBOUND					WESTBOUND					TOTAL
BEGIN/END	**L**	**T**	**R**	**U**	**TOT**	**L**	**T**	**R**	**U**	**TOT**	**N/S**	**L**	**T**	**R**	**U**	**TOT**	**L**	**T**	**R**	**U**	**TOT**	**E/W**
10 - 11	413	179	11	0	**603**	27	225	372	0	**624**	**1227**	397	101	465	12	**975**	1	5	14	0	**20**	**995**
11 - 12	368	198	13	0	**579**	27	267	368	0	**662**	**1241**	424	124	523	10	**1081**	0	6	3	0	**9**	**1090**
12 - 1	389	208	22	0	**619**	35	291	390	0	**716**	**1335**	459	115	495	3	**1072**	1	2	7	0	**10**	**1082**
1 - 2	473	234	21	0	**728**	29	245	391	0	**665**	**1393**	481	62	478	11	**1032**	13	20	15	0	**48**	**1080**
TOTAL	**1643**	**819**	**67**	**0**	**2529**	**118**	**1028**	**1521**	**0**	**2667**	**5196**	**1761**	**402**	**1961**	**36**	**4160**	**15**	**33**	**39**	**0**	**87**	**4247**

FLORIDA DEPARTMENT OF TRANSPORTATION

PEDESTRIAN MOVEMENT SUMMARY

SECTION 79180 **CITY** Daytona Beach Shores **COUNTY** Volusia
STATE ROUTE State Road A1A **INTERSECTING ROUTE** Dunlawton Blvd
OBSERVER DM **DATE** 7/19/2014

REMARKS

FORM COMPLETED BY PHF **DATE** 08/01/14

State Road A1A
SB ST NAME

		10 - 11	11 - 12	12 - 1	1 - 2			Total
		2	6	7	7			**22**
		3	7	9	8			**27**
		5	**13**	**16**	**15**			**49**

10 - 11	2	2	**4**
11 - 12	6	3	**9**
12 - 1	6	4	**10**
1 - 2	5	6	**11**
Total	**19**	**15**	**34**

Dunlawton Blvd
EB ST NAME

Beach Ramp
WB ST NAME

10 - 11	4	2	**6**
11 - 12	2	1	**3**
12 - 1	4	0	**4**
1 - 2	1	6	**7**
Total	**11**	**9**	**20**

		10 - 11	11 - 12	12 - 1	1 - 2			Total
		2	2	2	3			**9**
		0	5	3	2			**10**
		2	**7**	**5**	**5**			**19**

State Road A1A
NB ST NAME

FLORIDA DEPARTMENT OF TRANSPORTATION

BICYCLE MOVEMENT SUMMARY

SECTION 79180 **CITY** Daytona Beach Shores **COUNTY** Volusia

STATE ROUTE State Road A1A **INTERSECTING ROUTE** Dunlawton Blvd

OBSERVER DM **DATE** 7/19/2014

REMARKS

FORM COMPLETED BY PHF **DATE** 08/01/14

State Road A1A
SB ST NAME

		10 - 11	11 - 12	12 - 1	1 - 2			Total
		4	2	1	0			**7**
		0	0	1	0			**1**
		4	**2**	**2**	**0**			**8**

10 - 11	0	1	**1**
11 - 12	2	1	**3**
12 - 1	2	3	**5**
1 - 2	0	1	**1**
Total	**4**	**6**	**10**

Dunlawton Blvd
EB ST NAME

Beach Ramp
WB ST NAME

10 - 11	4	4	**8**
11 - 12	1	1	**2**
12 - 1	3	2	**5**
1 - 2	5	2	**7**
Total	**13**	**9**	**22**

		10 - 11	11 - 12	12 - 1	1 - 2			Total
		0	0	1	0			**1**
		2	1	1	1			**5**
		2	**1**	**2**	**1**			**6**

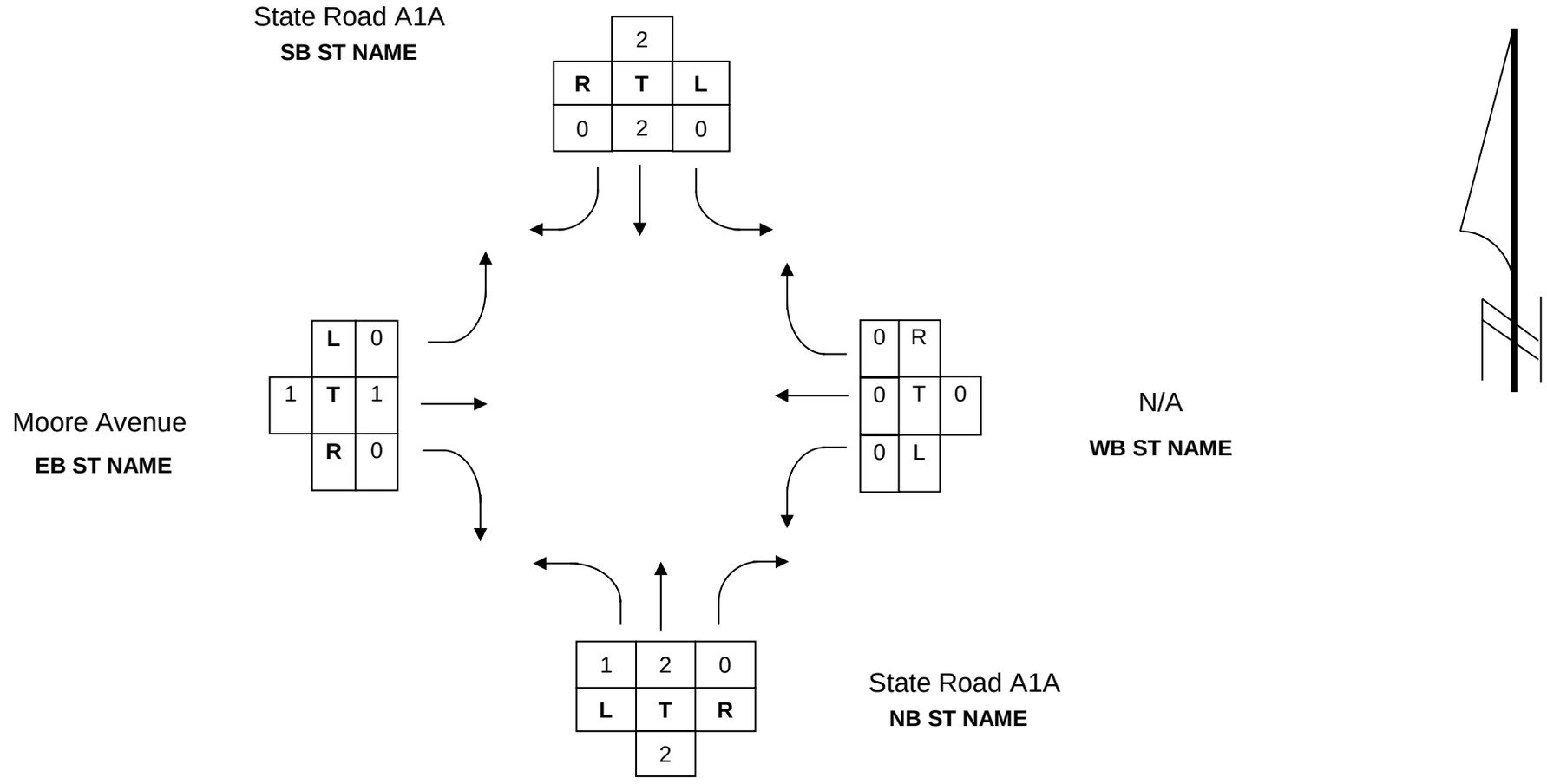
State Road A1A
NB ST NAME

FLORIDA DEPARTMENT OF TRANSPORTATION

SUMMARY OF VEHICLE MOVEMENTS

SECTION	79180	**CITY**	Daytona Beach Shores	**COUNTY**	Volusia
STATE ROUTE	State Road A1A	**INTERSECTING ROUTE**	Moore Avenue		
OBSERVER	AK	**DATE**	7/19/2014	**MILEPOST**	4.664
WEATHER	Sunny	**ROAD CONDITION**	Good		
REMARKS					

FORM COMPLETED BY PHF **DATE** 07/23/14



TIME	NORTHBOUND					SOUTHBOUND					TOTAL	EASTBOUND					WESTBOUND					TOTAL
BEGIN/END	L	T	R	U	TOT	L	T	R	U	TOT	N/S	L	T	R	U	TOT	L	T	R	U	TOT	E/W
10 - 11	62	541	0	0	**603**	0	536	33	0	**569**	**1172**	48	0	34	0	**82**	0	0	0	0	**0**	**82**
11 - 12	53	610	0	0	**663**	0	652	16	0	**668**	**1331**	21	0	31	0	**52**	0	0	0	0	**0**	**52**
12 - 1	51	539	0	0	**590**	0	699	9	0	**708**	**1298**	32	0	33	0	**65**	0	0	0	0	**0**	**65**
1 - 2	41	614	0	1	**656**	0	734	16	0	**750**	**1406**	22	0	22	0	**44**	0	0	0	0	**0**	**44**
TOTAL	**207**	**2304**	**0**	**1**	**2512**	**0**	**2621**	**74**	**0**	**2695**	**5207**	**123**	**0**	**120**	**0**	**243**	**0**	**0**	**0**	**0**	**0**	**243**

FLORIDA DEPARTMENT OF TRANSPORTATION

PEDESTRIAN MOVEMENT SUMMARY

SECTION 79180 **CITY** Daytona Beach Shores **COUNTY** Volusia
STATE ROUTE State Road A1A **INTERSECTING ROUTE** Moore Avenue
OBSERVER AK **DATE** 7/19/2014

REMARKS

FORM COMPLETED BY PHF **DATE** 07/23/14

State Road A1A
SB ST NAME

		10 - 11	11 - 12	12 - 1	1 - 2			Total
		8	20	10	11			**49**
		4	13	15	14			**46**
		12	**33**	**25**	**25**			**95**

10 - 11	7	7	**14**
11 - 12	2	5	**7**
12 - 1	4	17	**21**
1 - 2	6	2	**8**
Total	**19**	**31**	**50**

Moore Avenue
EB ST NAME

N/A
WB ST NAME

10 - 11	0	0	**0**
11 - 12	0	0	**0**
12 - 1	0	0	**0**
1 - 2	0	0	**0**
Total	**0**	**0**	**0**

		10 - 11	11 - 12	12 - 1	1 - 2			Total
		17	8	14	10			**49**
		10	10	10	9			**39**
		27	**18**	**24**	**19**			**88**

State Road A1A
NB ST NAME

FLORIDA DEPARTMENT OF TRANSPORTATION

BICYCLE MOVEMENT SUMMARY

SECTION 79180 **CITY** Daytona Beach Shores **COUNTY** Volusia

STATE ROUTE State Road A1A **INTERSECTING ROUTE** Moore Avenue

OBSERVER AK **DATE** 7/19/2014

REMARKS

FORM COMPLETED BY PHF **DATE** 07/23/14

State Road A1A
SB ST NAME

		10 - 11	11 - 12	12 - 1	1 - 2			Total
		0	0	0	0			**0**
		0	0	0	0			**0**
		0	**0**	**0**	**0**			**0**

10 - 11	4	0	**4**
11 - 12	1	1	**2**
12 - 1	1	1	**2**
1 - 2	3	0	**3**
Total	**9**	**2**	**11**

Moore Avenue
EB ST NAME

N/A
WB ST NAME

10 - 11	0	0	**0**
11 - 12	0	0	**0**
12 - 1	0	0	**0**
1 - 2	0	0	**0**
Total	**0**	**0**	**0**

		10 - 11	11 - 12	12 - 1	1 - 2			Total
		0	0	0	0			**0**
		0	0	0	0			**0**
		0	**0**	**0**	**0**			**0**

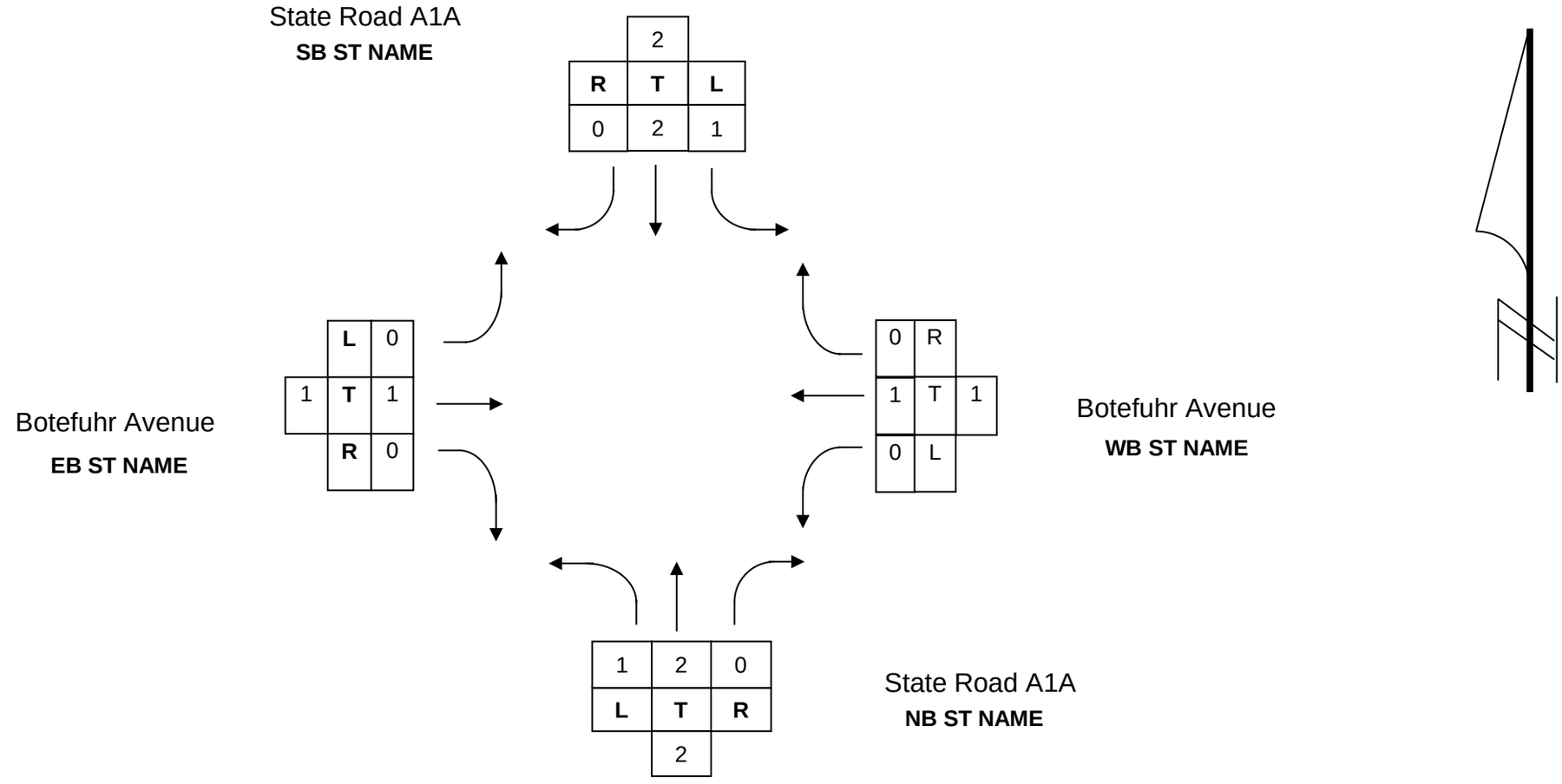
State Road A1A
NB ST NAME

FLORIDA DEPARTMENT OF TRANSPORTATION

SUMMARY OF VEHICLE MOVEMENTS

SECTION	79180	**CITY**	Daytona Beach Shores	**COUNTY**	Volusia
STATE ROUTE	State Road A1A	**INTERSECTING ROUTE**	Botefuhr Avenue		
OBSERVER	DM	**DATE**	7/20/2014	**MILEPOST**	5.194
WEATHER	Sunny	**ROAD CONDITION**	Good		
REMARKS					

FORM COMPLETED BY PHF **DATE** 08/01/14



TIME	NORTHBOUND					SOUTHBOUND					TOTAL	EASTBOUND					WESTBOUND					TOTAL
BEGIN/END	**L**	**T**	**R**	**U**	**TOT**	**L**	**T**	**R**	**U**	**TOT**	**N/S**	**L**	**T**	**R**	**U**	**TOT**	**L**	**T**	**R**	**U**	**TOT**	**E/W**
10 - 11	6	665	3	1	**675**	3	464	8	0	**475**	**1150**	31	1	14	0	**46**	3	1	9	0	**13**	**59**
11 - 12	5	666	0	0	**671**	4	559	14	1	**578**	**1249**	21	0	10	0	**31**	3	0	2	0	**5**	**36**
12 - 1	6	582	3	1	**592**	1	623	5	1	**630**	**1222**	5	0	16	0	**21**	2	0	3	0	**5**	**26**
1 - 2	11	601	0	1	**613**	6	533	9	2	**550**	**1163**	10	0	7	0	**17**	4	0	6	0	**10**	**27**
TOTAL	**28**	**2514**	**6**	**3**	**2551**	**14**	**2179**	**36**	**4**	**2233**	**4784**	**67**	**1**	**47**	**0**	**115**	**12**	**1**	**20**	**0**	**33**	**148**

FLORIDA DEPARTMENT OF TRANSPORTATION

PEDESTRIAN MOVEMENT SUMMARY

SECTION 79180 **CITY** Daytona Beach Shores **COUNTY** Volusia

STATE ROUTE State Road A1A **INTERSECTING ROUTE** Botefuhr Avenue

OBSERVER DM **DATE** 7/20/2014

REMARKS

FORM COMPLETED BY PHF **DATE** 08/01/14

State Road A1A
SB ST NAME

		10 - 11	11 - 12	12 - 1	1 - 2			Total
		13	11	0	3			**27**
		2	9	3	7			**21**
		15	**20**	**3**	**10**			**48**

10 - 11	0	1	**1**
11 - 12	0	3	**3**
12 - 1	4	5	**9**
1 - 2	0	0	**0**
Total	**4**	**9**	**13**

Botefuhr Avenue
EB ST NAME

Botefuhr Avenue
WB ST NAME

10 - 11	6	10	**16**
11 - 12	6	0	**6**
12 - 1	6	4	**10**
1 - 2	4	0	**4**
Total	**22**	**14**	**36**

		10 - 11	11 - 12	12 - 1	1 - 2			Total
		5	5	9	0			**19**
		5	3	0	3			**11**
		10	**8**	**9**	**3**			**30**

State Road A1A
NB ST NAME

FLORIDA DEPARTMENT OF TRANSPORTATION

BICYCLE MOVEMENT SUMMARY

SECTION 79180 **CITY** Daytona Beach Shores **COUNTY** Volusia

STATE ROUTE State Road A1A **INTERSECTING ROUTE** Botefuhr Avenue

OBSERVER DM **DATE** 7/20/2014

REMARKS

FORM COMPLETED BY PHF **DATE** 08/01/14

State Road A1A
SB ST NAME

		10 - 11	11 - 12	12 - 1	1 - 2			Total
		6	7	1	2			**16**
		1	5	6	4			**16**
		7	**12**	**7**	**6**			**32**

10 - 11	0	1	**1**
11 - 12	1	3	**4**
12 - 1	3	2	**5**
1 - 2	4	1	**5**
Total	**8**	**7**	**15**

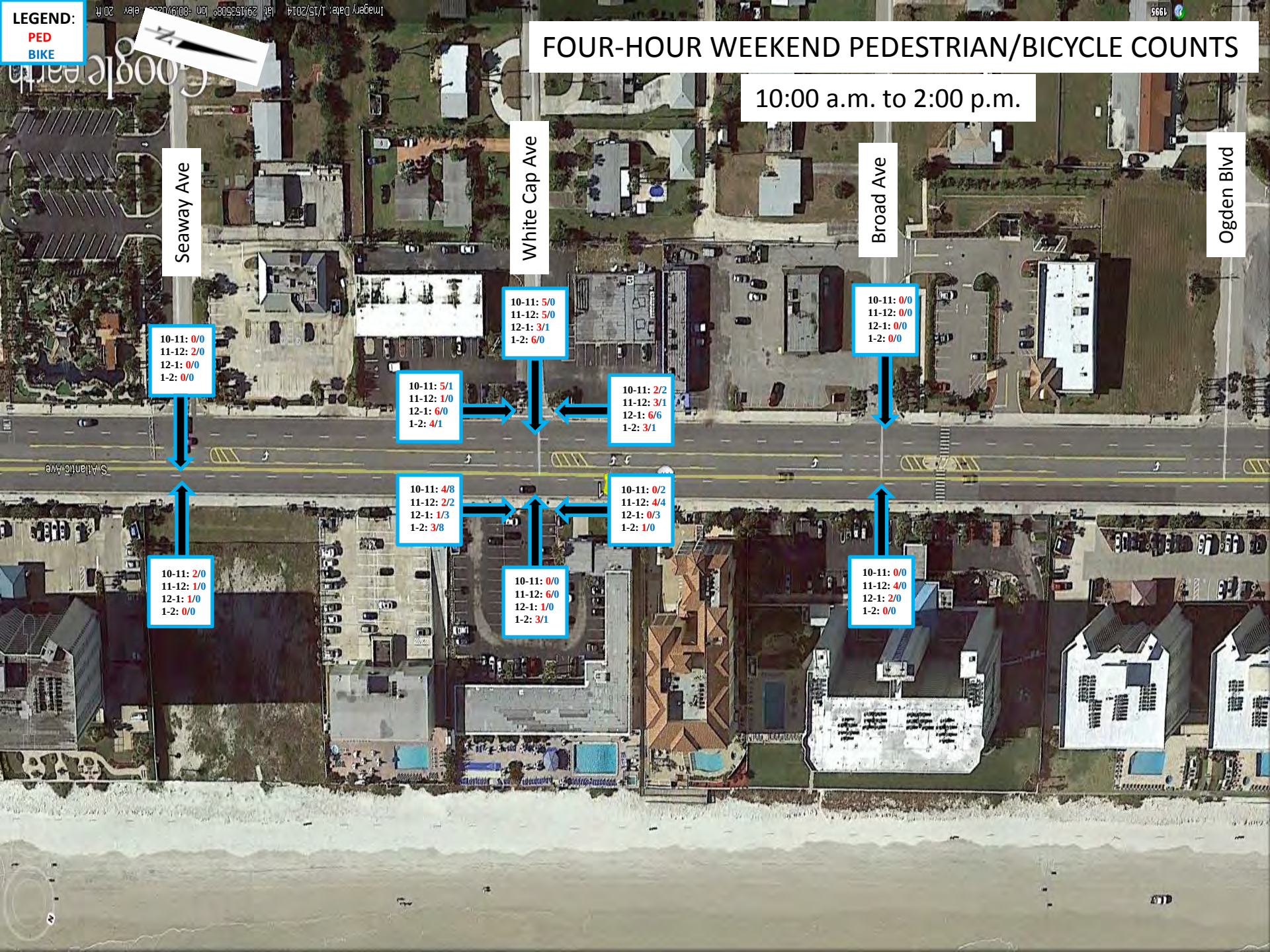
Botefuhr Avenue
EB ST NAME

Botefuhr Avenue
WB ST NAME

10 - 11	0	1	**1**
11 - 12	0	2	**2**
12 - 1	1	1	**2**
1 - 2	2	1	**3**
Total	**3**	**5**	**8**

		10 - 11	11 - 12	12 - 1	1 - 2			Total
		1	4	5	4			**14**
		2	2	1	6			**11**
		3	**6**	**6**	**10**			**25**

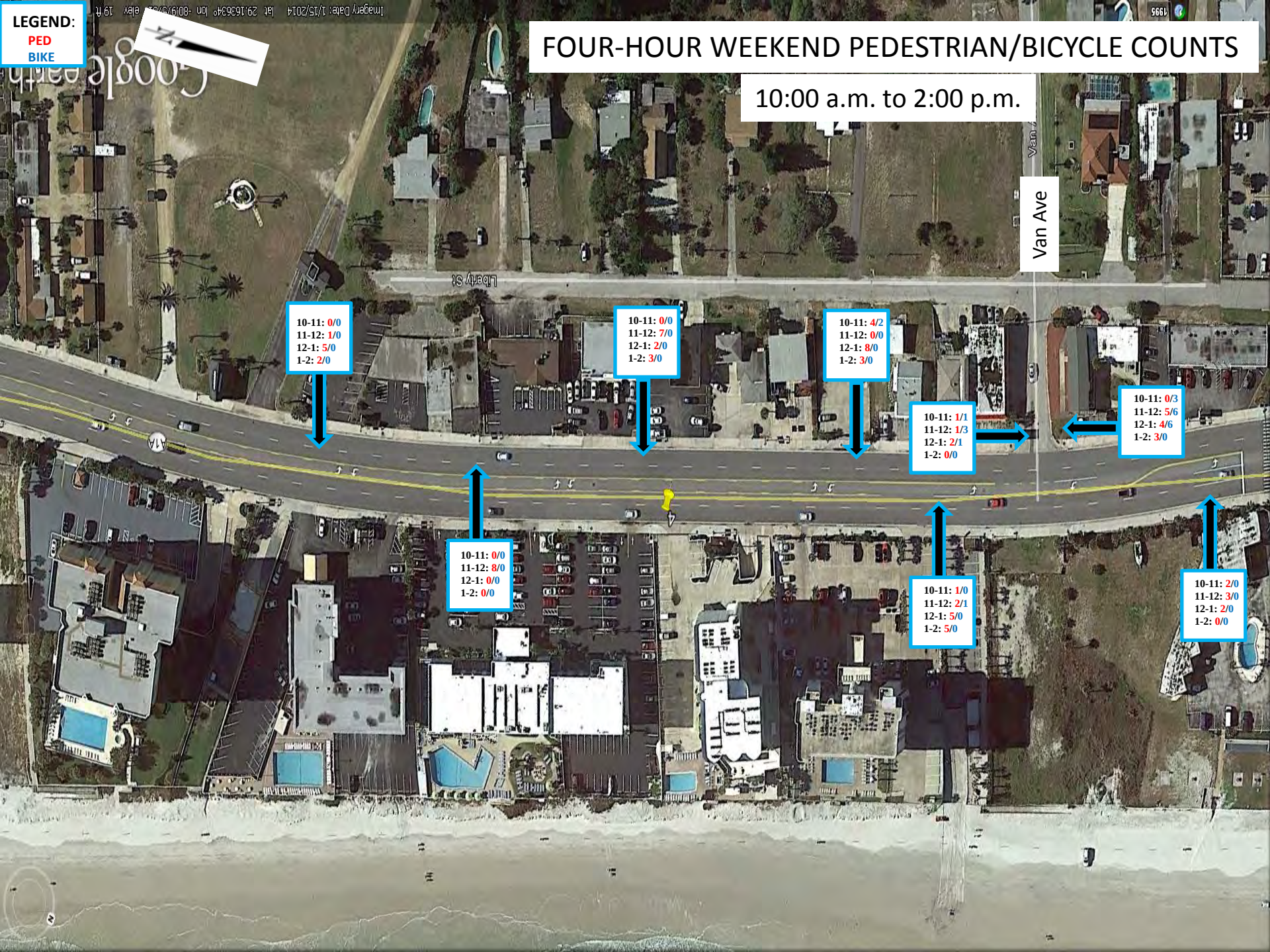
State Road A1A
NB ST NAME


LEGEND:
PED
BIKE
FOUR-HOUR WEEKEND PEDESTRIAN/BICYCLE COUNTS
10:00 a.m. to 2:00 p.m.
Seaway Ave
White Cap Ave
Broad Ave
Ogden Blvd
10-11: 0/0
11-12: 2/0
12-1: 0/0
1-2: 0/0
10-11: 5/0
11-12: 5/0
12-1: 3/1
1-2: 6/0
10-11: 5/1
11-12: 1/0
12-1: 6/0
1-2: 4/1
10-11: 2/2
11-12: 3/1
12-1: 6/6
1-2: 3/1
10-11: 0/0
11-12: 0/0
12-1: 0/0
1-2: 0/0
10-11: 4/8
11-12: 2/2
12-1: 1/3
1-2: 3/8
10-11: 0/2
11-12: 4/4
12-1: 0/3
1-2: 1/0
10-11: 2/0
11-12: 1/0
12-1: 1/0
1-2: 0/0
10-11: 0/0
11-12: 6/0
12-1: 1/0
1-2: 3/1
10-11: 0/0
11-12: 4/0
12-1: 2/0
1-2: 0/0

FOUR-HOUR WEEKEND PEDESTRIAN/BICYCLE COUNTS

10:00 a.m. to 2:00 p.m.


LEGEND:
PED
BIKE
FOUR-HOUR WEEKEND PEDESTRIAN/BICYCLE COUNTS
10:00 a.m. to 2:00 p.m.
Esmeralda Ave
Cascade Terrace
Atares Ave
S Atlantic Ave
A1A
10-11: 18/4
11-12: 16/1
12-1: 11/5
1-2: 8/3
10-11: 3/2
11-12: 4/2
12-1: 3/1
1-2: 5/3
10-11: 2/2
11-12: 4/2
12-1: 4/1
1-2: 7/3
10-11: 2/0
11-12: 1/2
12-1: 4/1
1-2: 3/0
10-11: 6/2
11-12: 5/3
12-1: 2/4
1-2: 8/0
10-11: 3/6
11-12: 0/3
12-1: 0/2
1-2: 0/4
10-11: 4/1
11-12: 6/0
12-1: 10/2
1-2: 12/4
10-11: 3/1
11-12: 2/0
12-1: 2/1
1-2: 4/2


LEGEND:
PED
BIKE
FOUR-HOUR WEEKEND PEDESTRIAN/BICYCLE COUNTS
10:00 a.m. to 2:00 p.m.
Van Ave
Liberty St
10-11: 0/0
11-12: 1/0
12-1: 5/0
1-2: 2/0
10-11: 0/0
11-12: 7/0
12-1: 2/0
1-2: 3/0
10-11: 4/2
11-12: 0/0
12-1: 8/0
1-2: 3/0
10-11: 1/1
11-12: 1/3
12-1: 2/1
1-2: 0/0
10-11: 0/3
11-12: 5/6
12-1: 4/6
1-2: 3/0
10-11: 0/0
11-12: 8/0
12-1: 0/0
1-2: 0/0
10-11: 1/0
11-12: 2/1
12-1: 5/0
1-2: 5/0
10-11: 2/0
11-12: 3/0
12-1: 2/0
1-2: 0/0

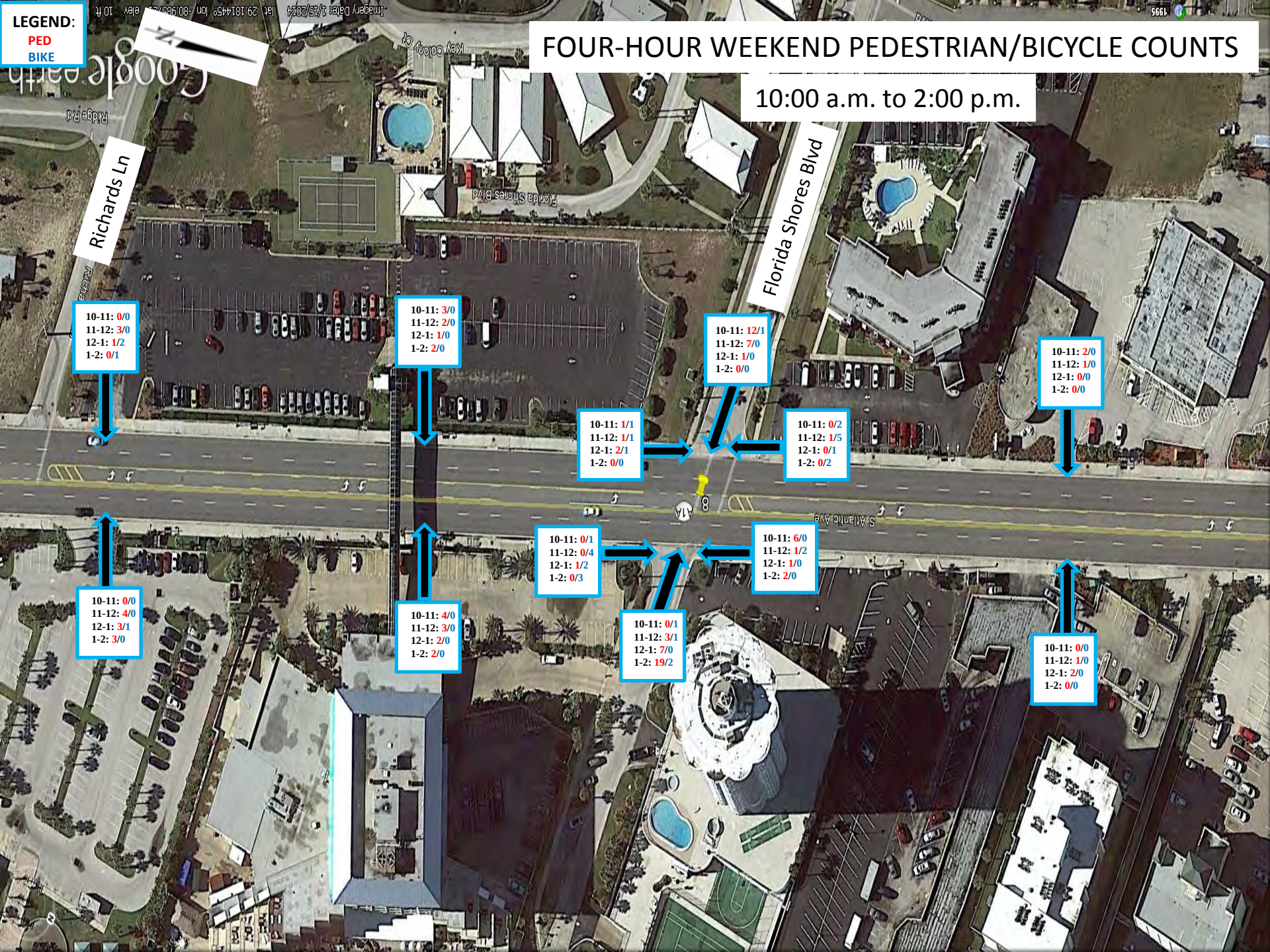

LEGEND:
PED
BIKE
FOUR-HOUR WEEKEND PEDESTRIAN/BICYCLE COUNTS
10:00 a.m. to 2:00 p.m.
Bellemeade Dr
S Atlantic Ave
A1A
10-11: 5/0
11-12: 1/0
12-1: 0/0
1-2: 1/0
10-11: 2/0
11-12: 0/0
12-1: 1/0
1-2: 4/0
10-11: 12/0
11-12: 10/0
12-1: 2/0
1-2: 3/0
10-11: 6/0
11-12: 7/1
12-1: 4/0
1-2: 6/0
10-11: 1/0
11-12: 0/1
12-1: 2/0
1-2: 1/0
10-11: 12/0
11-12: 1/1
12-1: 1/1
1-2: 6/1
10-11: 1/0
11-12: 3/1
12-1: 2/0
1-2: 1/0
10-11: 26/0
11-12: 3/0
12-1: 2/0
1-2: 3/0
10-11: 3/1
11-12: 4/0
12-1: 9/0
1-2: 12/0
10-11: 3/3
11-12: 3/5
12-1: 2/2
1-2: 2/2

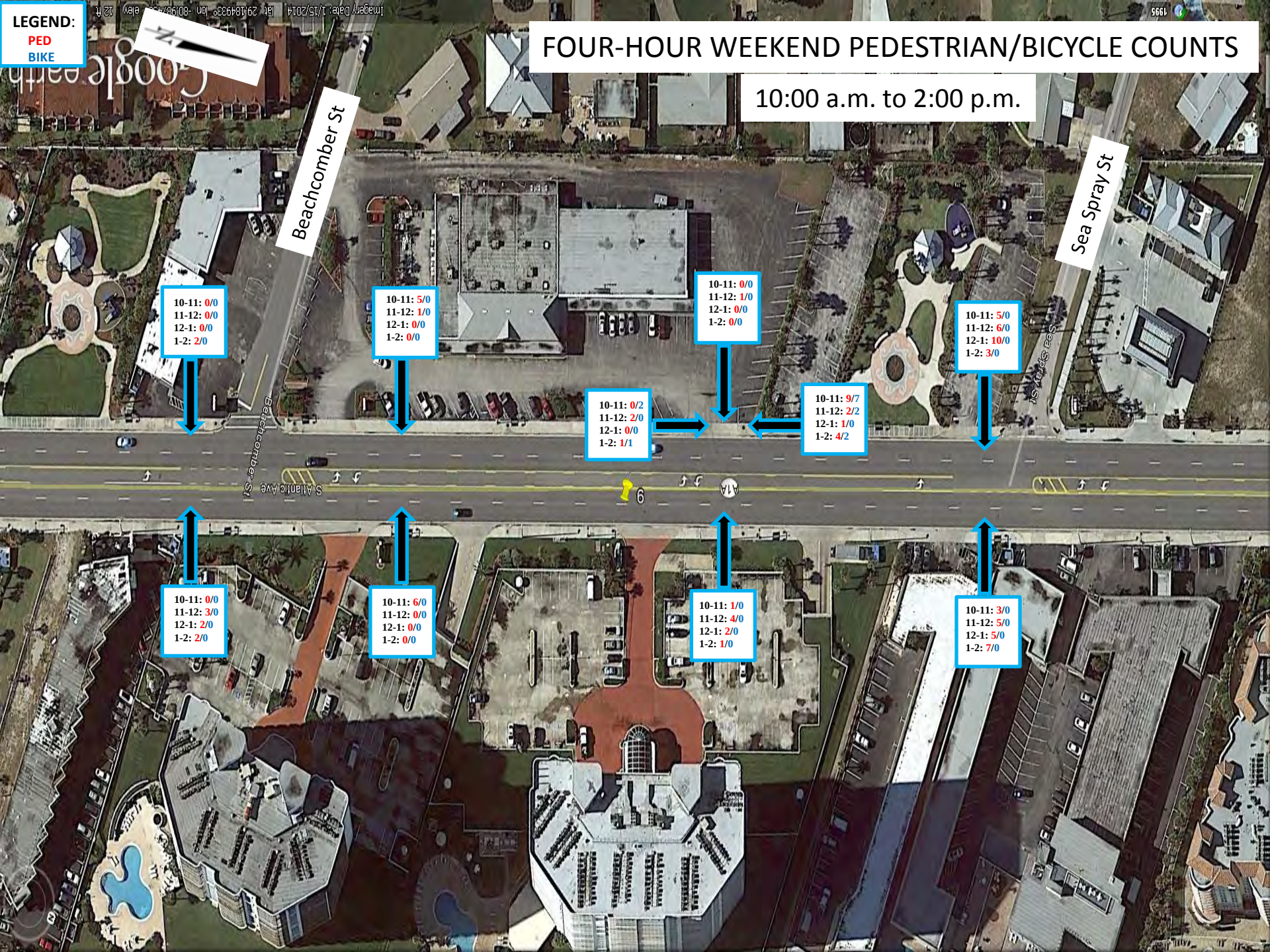

LEGEND:
PED
BIKE
FOUR-HOUR WEEKEND PEDESTRIAN/BICYCLE COUNTS
10:00 a.m. to 2:00 p.m.
Oceans W Blvd
Ridge Rd
S Atlantic Ave
10-11: 0/0
11-12: 1/0
12-1: 0/0
1-2: 0/0
10-11: 0/1
11-12: 0/0
12-1: 0/0
1-2: 0/0
10-11: 2/0
11-12: 0/0
12-1: 2/0
1-2: 1/1
10-11: 0/0
11-12: 2/3
12-1: 3/1
1-2: 0/0
10-11: 5/0
11-12: 0/1
12-1: 5/2
1-2: 0/0
10-11: 0/0
11-12: 0/0
12-1: 3/0
1-2: 2/0
10-11: 0/0
11-12: 0/0
12-1: 0/1
1-2: 2/0
10-11: 0/0
11-12: 3/0
12-1: 2/1
1-2: 1/0

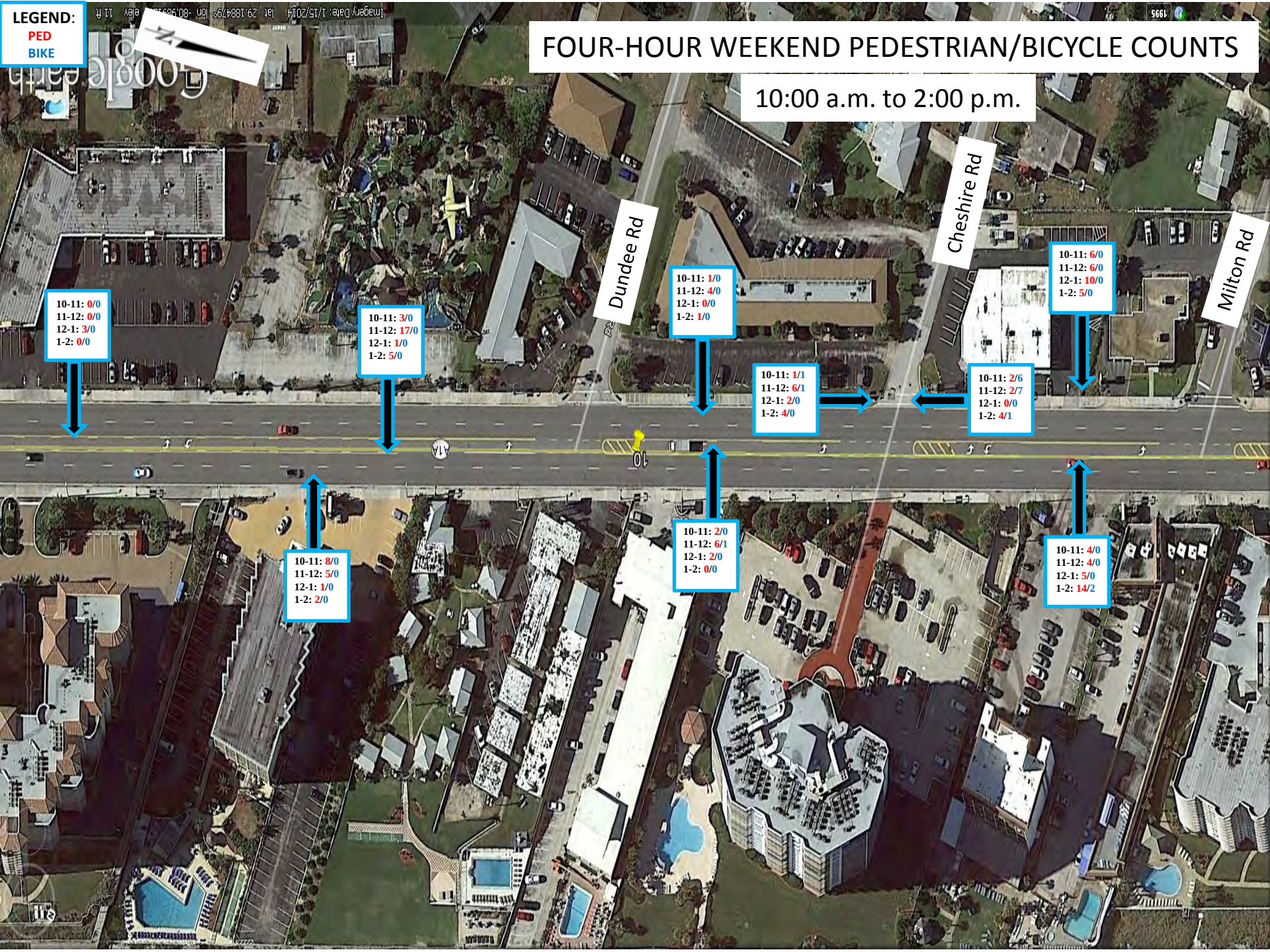

LEGEND:
PED
BIKE
FOUR-HOUR WEEKEND PEDESTRIAN/BICYCLE COUNTS
10:00 a.m. to 2:00 p.m.
Ridge Rd
Thames Ave
S Atlantic Ave
A1A
10-11: 1/0
11-12: 0/0
12-1: 0/0
1-2: 0/0

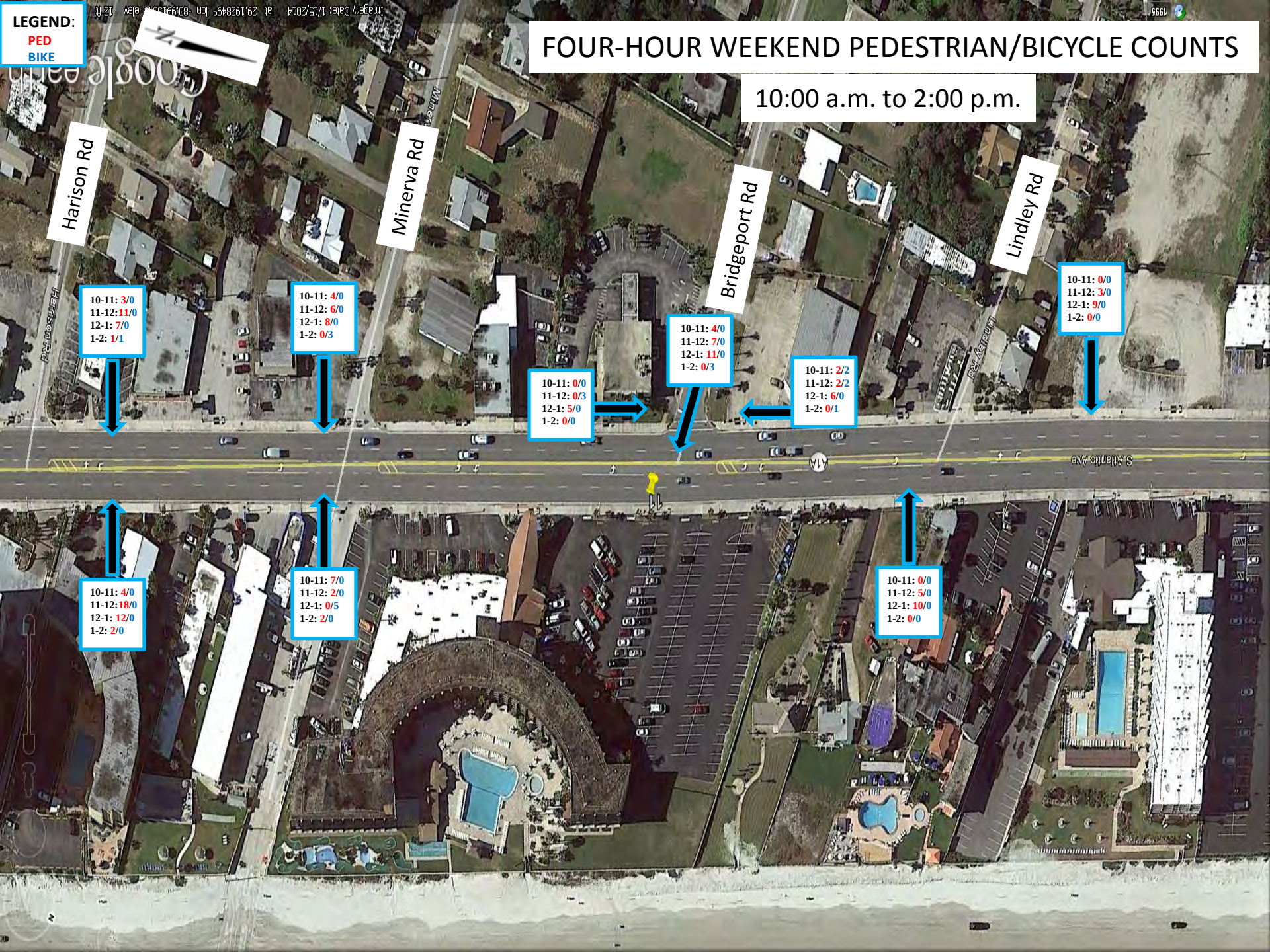
FOUR-HOUR WEEKEND PEDESTRIAN/BICYCLE COUNTS

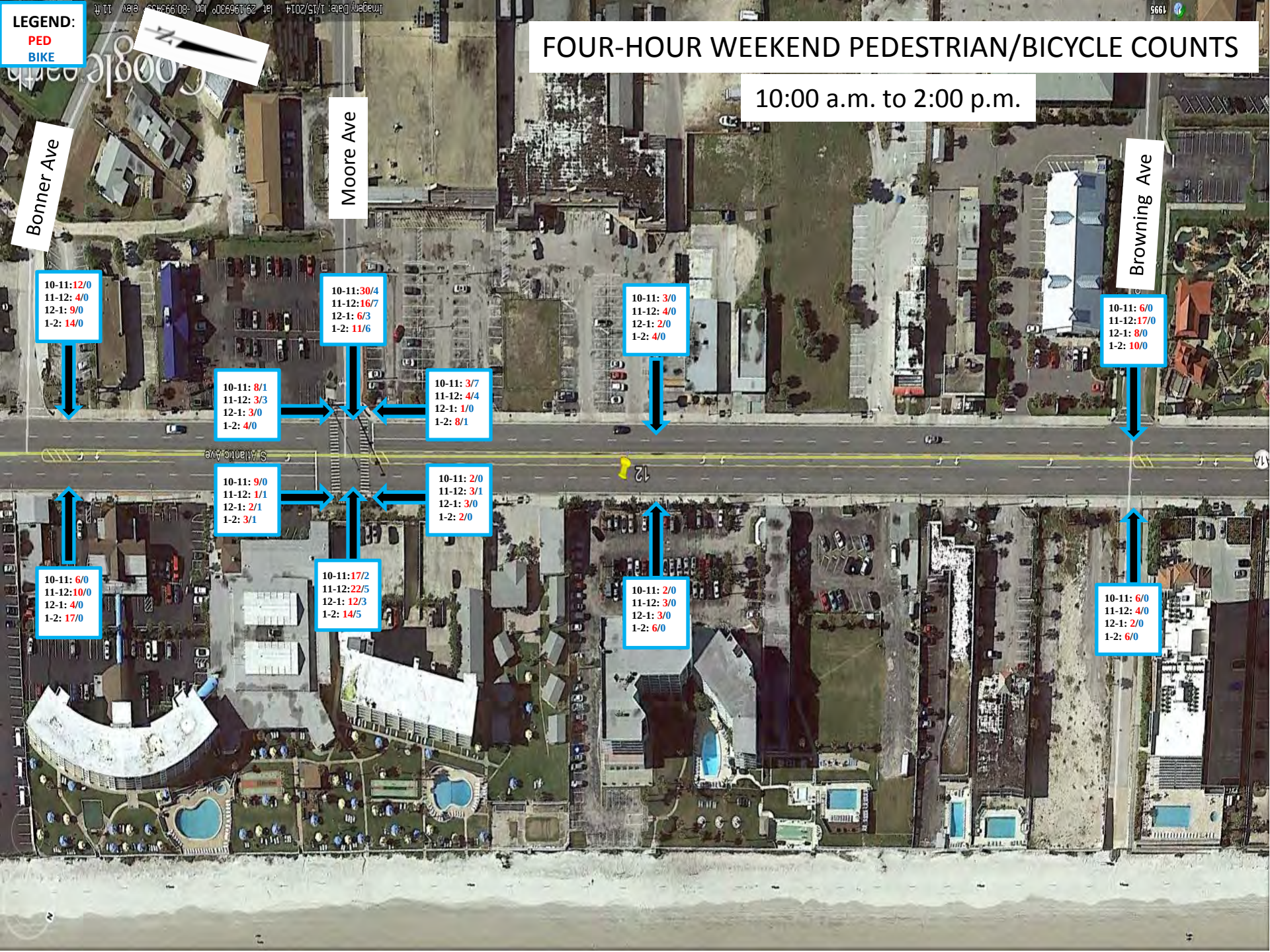
10:00 a.m. to 2:00 p.m.




LEGEND:
PED
BIKE
FOUR-HOUR WEEKEND PEDESTRIAN/BICYCLE COUNTS
10:00 a.m. to 2:00 p.m.
Beachcomber St
Sea Spray St
S Atlantic Ave
A1A
10-11: 0/0
11-12: 0/0
12-1: 0/0
1-2: 2/0
10-11: 5/0
11-12: 1/0
12-1: 0/0
1-2: 0/0
10-11: 0/0
11-12: 1/0
12-1: 0/0
1-2: 0/0
10-11: 5/0
11-12: 6/0
12-1: 10/0
1-2: 3/0
10-11: 0/2
11-12: 2/0
12-1: 0/0
1-2: 1/1
10-11: 9/7
11-12: 2/2
12-1: 1/0
1-2: 4/2
10-11: 0/0
11-12: 3/0
12-1: 2/0
1-2: 2/0
10-11: 6/0
11-12: 0/0
12-1: 0/0
1-2: 0/0
10-11: 1/0
11-12: 4/0
12-1: 2/0
1-2: 1/0
10-11: 3/0
11-12: 5/0
12-1: 5/0
1-2: 7/0


LEGEND:
PED
BIKE
FOUR-HOUR WEEKEND PEDESTRIAN/BICYCLE COUNTS
10:00 a.m. to 2:00 p.m.
Dundee Rd
Cheshire Rd
Milton Rd
10-11: 0/0
11-12: 0/0
12-1: 3/0
1-2: 0/0
10-11: 3/0
11-12: 17/0
12-1: 1/0
1-2: 5/0
10-11: 1/0
11-12: 4/0
12-1: 0/0
1-2: 1/0
10-11: 1/1
11-12: 6/1
12-1: 2/0
1-2: 4/0
10-11: 2/6
11-12: 2/7
12-1: 0/0
1-2: 4/1
10-11: 6/0
11-12: 6/0
12-1: 10/0
1-2: 5/0
10-11: 8/0
11-12: 5/0
12-1: 1/0
1-2: 2/0
10-11: 2/0
11-12: 6/1
12-1: 2/0
1-2: 0/0
10-11: 4/0
11-12: 4/0
12-1: 5/0
1-2: 14/2


LEGEND:
PED
BIKE
FOUR-HOUR WEEKEND PEDESTRIAN/BICYCLE COUNTS
10:00 a.m. to 2:00 p.m.
Harison Rd
Minerva Rd
Bridgeport Rd
Lindley Rd
10-11: 3/0
11-12: 11/0
12-1: 7/0
1-2: 1/1
10-11: 4/0
11-12: 6/0
12-1: 8/0
1-2: 0/3
10-11: 0/0
11-12: 0/3
12-1: 5/0
1-2: 0/0
10-11: 4/0
11-12: 7/0
12-1: 11/0
1-2: 0/3
10-11: 2/2
11-12: 2/2
12-1: 6/0
1-2: 0/1
10-11: 0/0
11-12: 3/0
12-1: 9/0
1-2: 0/0
10-11: 4/0
11-12: 18/0
12-1: 12/0
1-2: 2/0
10-11: 7/0
11-12: 2/0
12-1: 0/5
1-2: 2/0
10-11: 0/0
11-12: 5/0
12-1: 10/0
1-2: 0/0
S Atlantic Ave
A1A


LEGEND:
PED
BIKE
FOUR-HOUR WEEKEND PEDESTRIAN/BICYCLE COUNTS
10:00 a.m. to 2:00 p.m.
Bonner Ave
Moore Ave
Browning Ave
10-11:12/0
11-12: 4/0
12-1: 9/0
1-2: 14/0
10-11:30/4
11-12:16/7
12-1: 6/3
1-2: 11/6
10-11: 3/0
11-12: 4/0
12-1: 2/0
1-2: 4/0
10-11: 6/0
11-12:17/0
12-1: 8/0
1-2: 10/0
10-11: 8/1
11-12: 3/3
12-1: 3/0
1-2: 4/0
10-11: 3/7
11-12: 4/4
12-1: 1/0
1-2: 8/1
10-11: 9/0
11-12: 1/1
12-1: 2/1
1-2: 3/1
10-11: 2/0
11-12: 3/1
12-1: 3/0
1-2: 2/0
10-11: 6/0
11-12:10/0
12-1: 4/0
1-2: 17/0
10-11:17/2
11-12:22/5
12-1: 12/3
1-2: 14/5
10-11: 2/0
11-12: 3/0
12-1: 3/0
1-2: 6/0
10-11: 6/0
11-12: 4/0
12-1: 2/0
1-2: 6/0


LEGEND:
PED
BIKE
FOUR-HOUR WEEKEND PEDESTRIAN/BICYCLE COUNTS
10:00 a.m. to 2:00 p.m.
Grant Ave
Sunrise Blvd
Park Ave
Scruiula Ave
Frolic St
S Atlantic Ave
Boardwalk Ave
10-11: 2/0
11-12: 1/0
12-1: 1/0
1-2: 0/0
10-11: 1/0
11-12: 4/0
12-1: 2/0
1-2: 3/1
10-11: 1/0
11-12: 0/0
12-1: 2/0
1-2: 4/0
10-11: 2/5
11-12: 2/2
12-1: 8/3
1-2: 6/4
10-11: 1/4
11-12: 3/2
12-1: 7/4
1-2: 2/5
10-11: 0/3
11-12: 2/3
12-1: 1/3
1-2: 1/0
10-11: 2/3
11-12: 2/0
12-1: 0/0
1-2: 2/0
10-11: 3/0
11-12: 1/0
12-1: 0/0
1-2: 0/0
10-11: 1/0
11-12: 2/0
12-1: 1/0
1-2: 3/0
10-11: 0/0
11-12: 0/0
12-1: 1/0
1-2: 0/0


LEGEND:
PED
BIKE
FOUR-HOUR WEEKEND PEDESTRIAN/BICYCLE COUNTS
10:00 a.m. to 2:00 p.m.
Botefuhr Ave
Flamingo Ave
Rosalyn Ave
Frazar Rd
Ocean Dunes Rd
10-11: 6/0
11-12: 7/1
12-1: 9/0
1-2: 4/1
10-11: 6/0
11-12: 5/2
12-1: 6/0
1-2: 9/0
10-11: 2/1
11-12: 1/1
12-1: 2/0
1-2: 2/1
10-11: 3/0
11-12: 2/0
12-1: 2/2
1-2: 0/2
10-11: 7/3
11-12: 4/4
12-1: 2/3
1-2: 0/2
10-11: 8/4
11-12: 8/1
12-1: 1/5
1-2: 3/3
10-11: 22/3
11-12: 16/2
12-1: 9/2
1-2: 6/1
10-11: 3/1
11-12: 2/1
12-1: 12/5
1-2: 18/4
10-11: 27/5
11-12:24/4
12-1: 19/1
1-2: 8/2
10-11: 2/0
11-12: 4/2
12-1: 10/3
1-2: 19/5

Daytona Beach Shores SR A1A Crossing Location Demand					
Location #	Closest Intersection/Landmark	Total pedestrian demand	Total bicycle demand	Total pedestrian and bicycle demand	Notes
1	Broad Avenue	6	0	6	Existing midblock crossing near to ABC liquor store
2	Simpson Avenue	33	0	33	Proposed midblock crossing
3	Esmeralda Avenue	85	20	105	Proposed midblock crossing
4	Atares Avenue	21	7	28	Proposed midblock crossing
5	Next to Public Safety Building	14	0	14	Signalized midblock pedestrian crossing
6	Next to Publix	50	1	51	Existing midblock crossing; Publix is closed
7	Bellemead Drive	62	1	63	Existing midblock crossing
8	Oceans West Boulevard	11	2	13	Existing midblock crossing
9	Florida Shores Boulevard	49	5	54	Proposed midblock crossing
10	Beachcomber Street	21	0	21	Proposed midblock crossing
11	Sea Spray Street	42	0	42	Proposed midblock crossing
12	Milton Road	54	2	56	Proposed midblock crossing
13	Minerva Road	29	8	37	Proposed midblock crossing
14	Lindley Road	27	0	27	Proposed midblock crossing
15	Browning Avenue	59	0	59	Proposed midblock crossing
16	Frazar Avenue	88	19	107	Proposed midblock crossing

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION								
VEHICLE GAP SIZE STUDY								
CITY:	DAYTONA BEACH SHORES			COUNTY:	VOLUSIA			
REMARKS:	260' NORTH OF CASCADE TERRACE			DATE:	9/13/2014			
GAP SIZE	PERIOD		PERIOD		PERIOD		PERIOD	
	FROM: 10:00 A.M.		FROM: 11:00 A.M.		FROM: 12:00 P.M.		FROM: 1:00 P.M.	
	TO: 11:00 A.M.		TO: 12:00 P.M.		TO: 1:00 P.M.		TO: 2:00 P.M.	
	TALLY	TOTAL	TALLY	TOTAL	TALLY	TOTAL	TALLY	TOTAL
22	2	2	2	2				
23			1	1				
24	2	2						
25								
26	1	1						
27	1	1	2	2				
28	1	1						
29					1	1		
30								
31								
32								
33								
34								
35								
36								
37								
38								
39								
40								
41								
42								
43	1	1						
TOTAL		8		5		1		0
ADEQUATE GAPS		6		3		1		0

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION								
VEHICLE GAP SIZE STUDY								
CITY:	DAYTONA BEACH SHORES			COUNTY:	VOLUSIA			
REMARKS:	380' NORTH OF BEACHCOMBER STREET			DATE:	9/13/2014			
GAP SIZE	PERIOD		PERIOD		PERIOD		PERIOD	
	FROM: 10:00 A.M.		FROM: 11:00 A.M.		FROM: 12:00 P.M.		FROM: 1:00 P.M.	
	TO: 11:00 A.M.		TO: 12:00 P.M.		TO: 1:00 P.M.		TO: 2:00 P.M.	
	TALLY	TOTAL	TALLY	TOTAL	TALLY	TOTAL	TALLY	TOTAL
22	1	1			1	1		
23							1	1
24								
25	1	1						
26			1	1				
27								
28			1	1				
29	1	1					1	1
30								
31	1	1						
32								
33								
34								
35								
36								
37								
38								
39								
40								
41								
42								
43								
TOTAL		4		2		1		2
ADEQUATE GAPS		3		2		0		2

APPENDIX B

COLLISION DIAGRAM AND SUMMARY

FLORIDA DEPARTMENT OF TRANSPORTATION

COLLISION SUMMARY

Section: 79180 **State Road:** A1A **County:** Volusia

Intersecting route: **Milepost:** 1.085 to 5.375 **Data by:** CJW

Study period: 1/1/2009 to 12/31/2013 **Date:** 9/3/2014

NO.	DATE	DAY	TIME	FATAL	INJURY	PROPERTY DAMAGE	HARMFUL EVENT	DUI	DAY / NIGHT	WET / DRY	CONTRIBUTING CAUSE
1	05/09/09	Saturday	1:56	0	1	$100	Bicycle Collision	Yes	Night	Dry	DUI
2	02/27/09	Friday	0:54	0	1	$0	Pedestrian Collision	No	Night	Dry	Careless Driving
3	03/02/09	Monday	9:25	0	1	$0	Pedestrian Collision	No	Night	Dry	Careless Driving
4	05/14/09	Thursday	11:30	0	1	$0	Bicycle Collision	No	Day	Dry	Careless Driving
5	11/09/09	Monday	7:30	0	1	$0	Pedestrian Collision	No	Day	Dry	Careless Driving
6	12/19/09	Saturday	18:24	1	0	$2,000	Pedestrian Collision	No	Night	Dry	Pedestrian FTYRW
7	09/27/10	Monday	8:45	0	1	$0	Bicycle Collision	No	Day	Dry	FTYRW
8	10/16/10	Saturday	19:59	0	4	$1,300	Pedestrian Collision	No	Night	Dry	Pedestrian FTYRW
9	12/22/10	Wednesday	21:43	0	1	$1,000	Pedestrian Collision	No	Night	Dry	Careless Driving
10	07/28/11	Thursday	21:25	0	1	$0	Pedestrian Collision	No	Night	Dry	Careless Driving
11	08/25/11	Thursday	8:01	0	1	$0	Pedestrian Collision	No	Day	Dry	Careless Driving
12	02/03/12	Friday	10:48	0	1	$500	Bicycle Collision	No	Day	Dry	Careless Driving
13	04/09/12	Monday	19:54	0	1	$500	Pedestrian Collision	No	Night	Dry	Pedestrian FTYRW
14	05/19/12	Saturday	12:10	1	1	$500	Pedestrian Collision	No	Day	Dry	Careless Driving
15	07/02/11	Saturday	15:33	0	1	$500	Bicycle Collision	No	Day	Dry	Bicycle FTYRW
16	10/19/11	Wednesday	12:50	0	1	$500	Pedestrian Collision	No	Day	Dry	Pedestrian FTYRW
17	02/15/12	Wednesday	12:33	0	1	$300	Bicycle Collision	No	Day	Dry	Bicycle FTYRW
18	05/14/13	Tuesday	11:25	0	1	$0	Bicycle Collision	No	Day	Dry	Careless Driving
TOTAL				**2**	**20**	**$7,200**					

Total No.	Fatal	Injury	Property Damage Only	Pedestrian Collision				Bicycle Collision			
18	2	17	0	11				7			
PERCENT	11%	94%	0%	61%	0%	0%	0%	39%	0%	0%	0%

CONTRIB-CAUSE	Day	Night	PAVEMENT CONDITION			DUI	Pedestrian FTYRW	Careless Driving	FTYRW	Bicycle FTYRW	Fell Asleep
			Wet	Dry	?						
TOTAL	10	8	0	18	0	1	4	10	1	2	0
PERCENT	56%	44%	0%	100%	0%	6%	22%	56%	6%	11%	0%

0 50 200

Feet

Matchline A

COLLISION SYMBOLS

- BACKED INTO COLLISION
- PEDESTRIAN COLLISION
- FIXED OBJECT COLLISION
- PERSONAL INJURY
- FATALITY
- HEAD-ON COLLISION
- SIDE SWIPE COLLISION
- ANGLE COLLISION
- OVERTURNED VEHICLE
- LEFT TURN COLLISION
- ALL OTHER COLLISION
- BICYCLE COLLISION
- REAR END COLLISION

Traffic Engineering Data Solutions, Inc.
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RIVER TO SEA TRANSPORTATION PLANNING ORGANIZATION

COLLISION DIAGRAM
(01/01/2009 TO 12/31/2013)

PAGE NO.

COLLISION SYMBOLS

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RIVER TO SEA TRANSPORTATION PLANNING ORGANIZATION

COLLISION DIAGRAM
(01/01/2009 TO 12/31/2013)

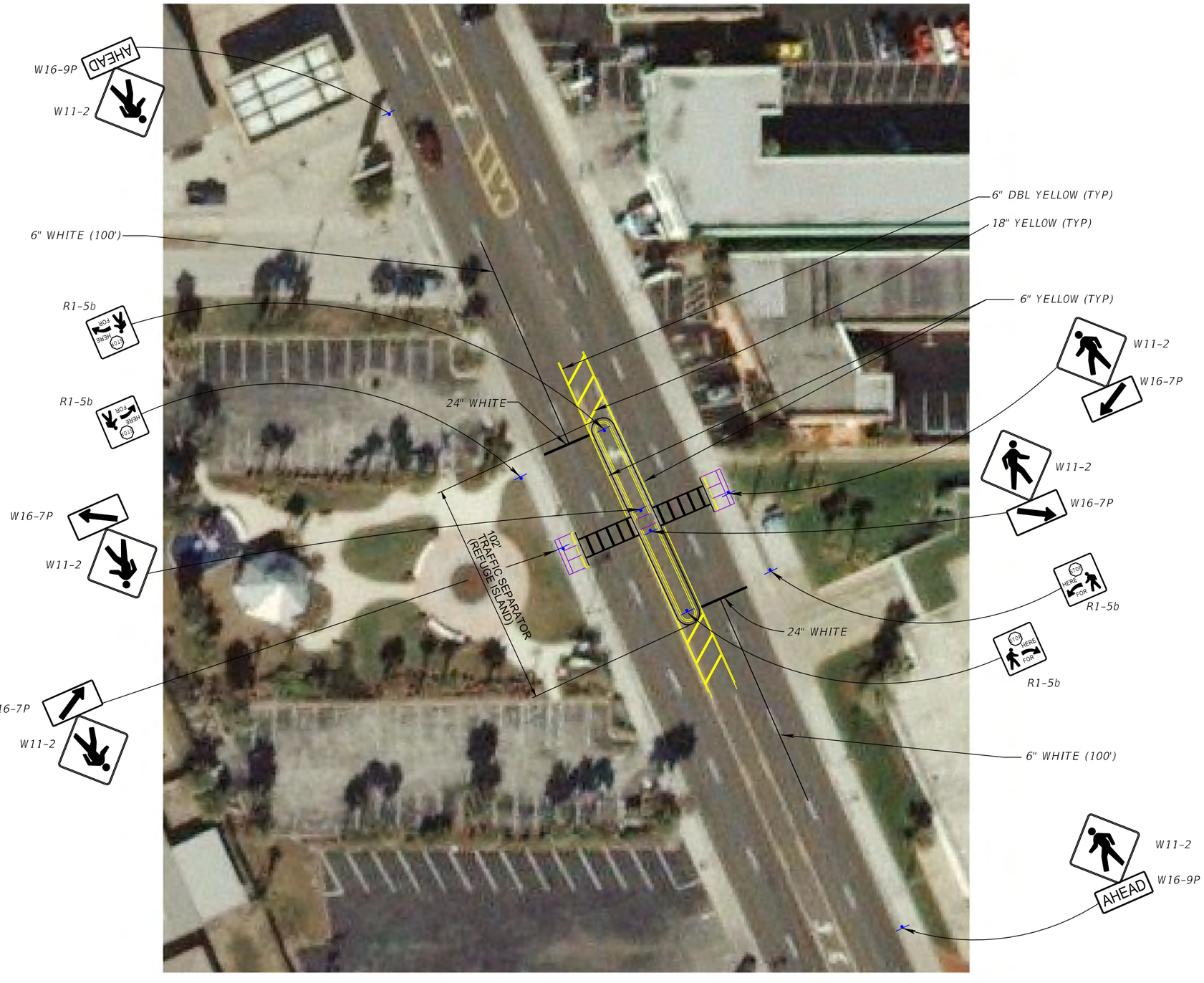
PAGE NO.

APPENDIX C

TYPICAL MIDBLOCK PEDESTRIAN CROSSWALK

&

COST ESTIMATE



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RIVER TO SEA
TRANSPORTATION
PLANNING ORGANIZATION

MIDBLOCK PEDESTRIAN CROSSWALK
WITH REFUGE ISLAND TYPICAL

SHEET NO.

LOCATION **DAYTONA SHORES BEACH**
COUNTY **VOLUSIA**
FIN. PROJ. NO.

ENGINEER'S OPINION OF PROBABLE COSTS
STATE ROAD A1A - TYPICAL MIDBLOCK PEDESTRIAN CROSSWALK

PAY ITEM	PAY ITEM DESCRIPTION	UNITS	QUANTITY	UNIT PRICE	TOTAL	TOTAL ENG/CONST/CEI COSTS
0700 1 40	SINGLE POST SIGN, INSTALL	AS	10.0	$86.69	$866.90	
				SIGNING SUBTOTAL	**$866.90**	**$1,521.41**
0527 2	DETECTABLE WARNINGS	SF	32.0	$29.12	$931.84	
0520 1 10	CONCRETE CURB & GUTTER, TYPE F	LF	40.0	$19.13	$765.20	
0522 1	CONC SIDEWALK AND DRIVEWAYS, 4" THICK	SY	30.2	$33.91	$1,024.83	
0520 70	CONCRETE TRAFFIC SEPARATOR, SP-VAR WIDT	SY	85.0	$52.69	$4,478.64	
				SIDEWALK/CONCRETE SUBTOTAL	**$7,200.51**	**$12,636.90**
0711 12 111	THERMOPLASTIC, REFURB, WHITE, SOLID, 6"	NM	0.04	$13,149.47	$498.09	
0711 11 125	THERMOPLASTIC, STD, WHITE, SOLID, 24"	LF	208.0	$3.90	$811.20	
0711 11 123	THERMOPLASTIC, STD, WHITE, SOLID, 12"	LF	96.00	$5.93	$569.28	
0711 152 11	THERMOPLASTIC, STD-OP,YELLOW, SOLID, 6"	NM	0.03	$4,333.75	$131.33	
0711 112 24	THERMOPLASTIC, STD, YELLOW, SOLID, 18"	LF	84.00	$2.98	$250.32	
				PAVEMENT MARKING SUBTOTAL	**$2,260.21**	**$3,966.67**
				SUBTOTAL	**$10,327.63**	
0101 1	MOBILIZATION(5%)				$516.38	
0102 1	MAINTENANCE OF TRAFFIC (10%)				$1,032.76	
	CONTIGENCY (20%)				$2,065.53	
	CONSTRUCTION TOTAL				**$13,942.30**	
	ENGINEERING (20%)				$2,788.46	
	CEI (10%)				$1,394.23	
				PROJECT TOTAL	**$18,124.98**	**$18,124.98**

LOCATION **DAYTONA SHORES BEACH**
COUNTY **VOLUSIA**
FIN. PROJ. NO.

ENGINEER'S OPINION OF PROBABLE COSTS
STATE ROAD A1A - Rectangular Rapid Flashing Beacon

PAY ITEM	PAY ITEM DESCRIPTION	UNITS	QUANTITY	UNIT PRICE	TOTAL
0700 1 40	SINGLE POST SIGN, INSTALL	AS	4.0	$86.69	$346.76
				SIGNING SUBTOTAL	**$346.76**
0630 2 12	CONDUIT, F& I, DIRECTIONAL BORE	LF	80.0	$14.81	$1,184.80
0654 2 21	RECT RAPID FLASH BEACON, F&I SOL, SINGLE	LF	4.0	$6,735.00	$26,940.00
				SIGNAL/SIDEWALK/CONCRETE SUBTOTAL	**$26,940.00**
				PAVEMENT MARKING SUBTOTAL	**$0.00**
				SUBTOTAL	**$27,286.76**
0101 1	MOBILIZATION(5%)				$1,364.34
0102 1	MAINTENANCE OF TRAFFIC (10%)				$2,728.68
	CONTIGENCY (10%)				$2,728.68
	CONSTRUCTION TOTAL				**$34,108.45**
	ENGINEERING (15%)				$5,116.27
	CEI (10%)				$3,410.85
				PROJECT TOTAL	**$42,635.56**