

Pedestrian Study

Qualitative Assessment
Pedestrian Volume Count

SR 15/600 (US 17/92)
Between Catalina Drive and Debarry Drive

VOLUSIA COUNTY
SECTION 79040
MP 2.912 to MP 2.968

Prepared for:

**THE FLORIDA DEPARTMENT OF TRANSPORTATION
DISTRICT 5 TRAFFIC OPERATIONS**

719 South Woodland Boulevard
DeLand, Florida 32720



Districtwide Community Traffic Safety Program

Financial Project No. 237995-1-32-09

Contract Number: C-8T80

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Task Work Order No.: 15.5

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TABLE OF CONTENTS

EXECUTIVE SUMMARY	1
1. INTRODUCTION	2
2. EXISTING CONDITIONS	3
Pedestrian Volumes	4
Collision Data	4
3. PEDESTRIAN OPERATIONS	6
4. PEDESTRIAN CROSSING ANALYSIS	8
5. RECOMMENDATIONS	9

APPENDIX

FIGURES and TABLES

FIGURES

Figure 1-Project Location Map.....	2
Figure 2-Condition Diagram and 4-Hour Pedestrian Crossing Volume.....	5
Figure 3-Conceptual Improvement Diagram.....	10

TABLES

Table 1-Summary of Existing Conditions.....	3
Table 2-Pedestrian/Bicycle Movement Summary (4 Hours)	4

EXECUTIVE SUMMARY

Faller, Davis & Associates, Inc. (FDA) conducted a pedestrian study on SR 15/600 (US 17/92) between Catalina Drive and DeBary Drive in DeBary, Volusia County, Florida. Based on the results of the analysis, field observations, and engineering judgment, the following recommendations and conclusions were developed:

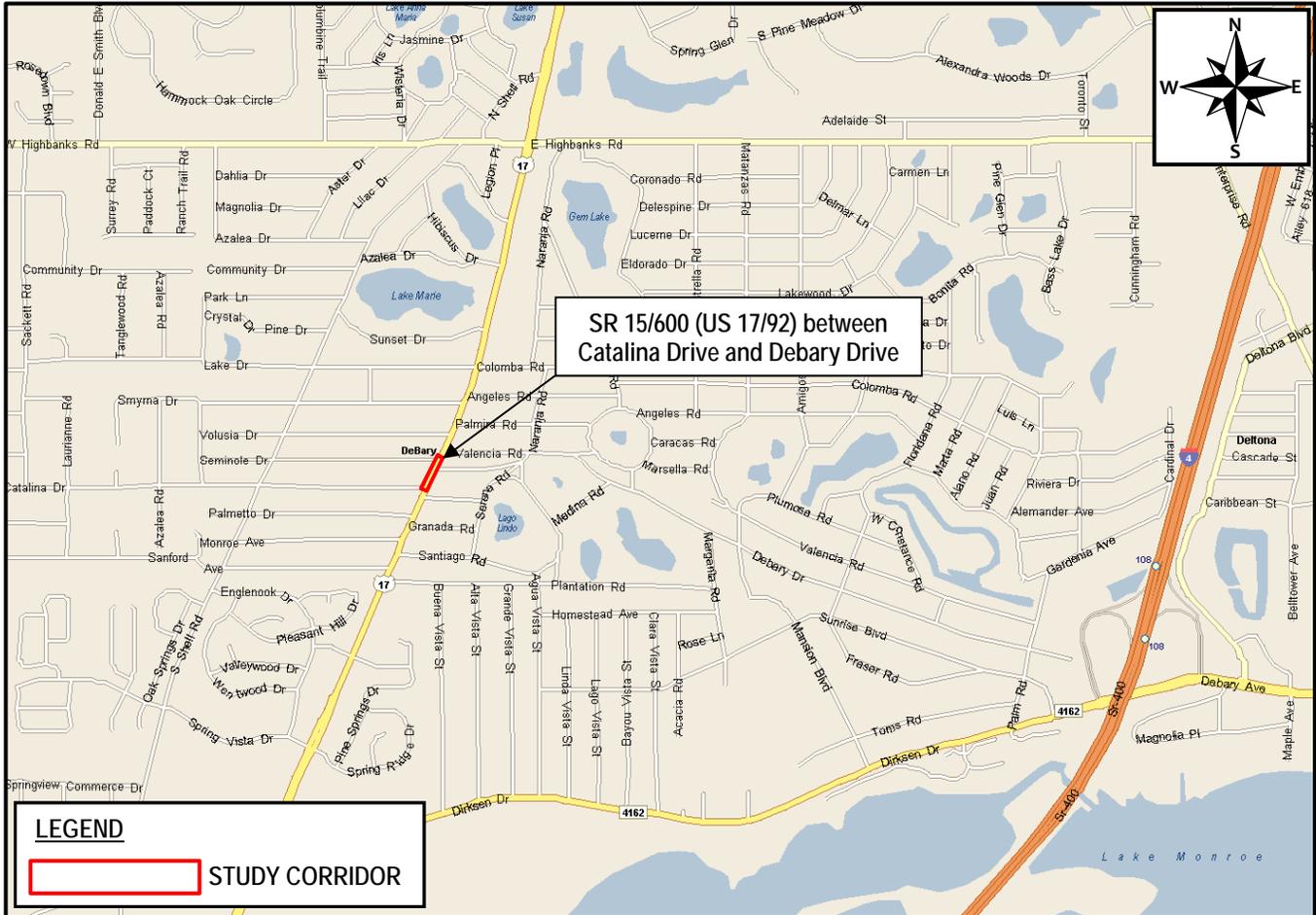
1. A mid-block crosswalk should be installed between Catalina Drive and DeBary Drive.
 - a. Install crosswalk signing and pavement markings per Index 17346, Sheet 10, Scheme 2.
 - b. Construct curb ramps to accommodate the installation of the mid-block crossing.
 - c. Construct a pedestrian refuge island within the two-way left turn lane.

Additional recommendations are included at the end of the report.

1. INTRODUCTION

The Florida Department of Transportation has retained FDA to perform a pedestrian study on SR 15/600 (US 17/92) between Catalina Drive and DeBary Drive in DeBary, Volusia County, Florida. The analysis methods used in conducting this study are consistent with those set forth in the Manual on Uniform Traffic Control Devices (MUTCD 2009), the Manual on Uniform Traffic Studies (MUTS 2000), the Traffic Engineering Manual (TEM 2014), and FDOT District 5 guidelines and procedures.

Figure 1-Project Location Map



2. EXISTING CONDITIONS

SR 15/600 (US 17/92) between Catalina Drive and DeBary Drive is located in DeBary, Volusia County, Florida. Significant features for the arterial are summarized below:

Table 1-Summary of Existing Conditions

Feature	Description
Project Limits	<ul style="list-style-type: none"> • US 17/92 between Catalina Drive and DeBary Drive
Area Location	<ul style="list-style-type: none"> • The study corridor is located approximately 2.3 miles south of CR 4146 (Saxon Boulevard).
SR 15/600 (US 17/92)	<ul style="list-style-type: none"> • The corridor consists of 4 foot wide unmarked bicycle lanes, two northbound through lanes (12 foot wide outside; 11 foot wide inside), two southbound through lanes (13 foot wide outside, 11 foot wide inside), and an 12 foot wide painted median. • There is a closed drainage system throughout the corridor. • The posted speed limit on US 17/92 is 40 mph throughout the study limits.
Signalized Intersections	<ul style="list-style-type: none"> • There are no signalized intersections within the study corridor.
Pedestrian Generators	<ul style="list-style-type: none"> • DeBary Community Park • Post Office • Residences • Businesses • Votran bus stop located approximately 500 feet north of the study limits
Sidewalks	<ul style="list-style-type: none"> • Five foot wide sidewalks are located on the east and west sides of the study corridor.
Street Lighting	<ul style="list-style-type: none"> • There is decorative street lighting along both sides of US 17/92 throughout the study corridor.
Other Distinct Features	<ul style="list-style-type: none"> • DeBary Community Park facilities include a children's splash park.

Pedestrian Volumes

A four-hour pedestrian/bicycle count was conducted within the corridor on Friday, July 25th, from 11:00 AM to 3:00 PM. The count included recording pedestrians and bicyclists traveling along and crossing US 17/92. Table 2 summarizes the counts for the entire corridor.

Table 2-Pedestrian/Bicycle Movement Summary (4 Hours)

Statistic	Traveling on West Side of US 17/92	Traveling on East Side of US 17/92	Total	Crossing US 17/92
Total Pedestrian Movements	4	13	17	2
Pedestrian Movements per Hour (PMpH)	1	3	4	1
Corridor Length (mi)	0.056	0.056	0.056	0.056
Number of 300 foot long sections	1	1	1	1
PMpH per 300 foot section	1	3	4	1
Total Bicycle Movements	3	0	3	0
Bicycle Movements per Hour (BMpH)	1	0	1	0
Corridor Length (mi)	0.056	0.056	0.056	0.056
Number of 300 foot long sections	1	1	1	1
BMpH per 300 foot section	1	0	1	0
Total Pedestrian and Bicycle Movements	7	13	20	2
Pedestrian/Bicycle Movements per Hour (PBMpH)	2	3	5	1
PBMpH per 300 foot section	2	3	5	1

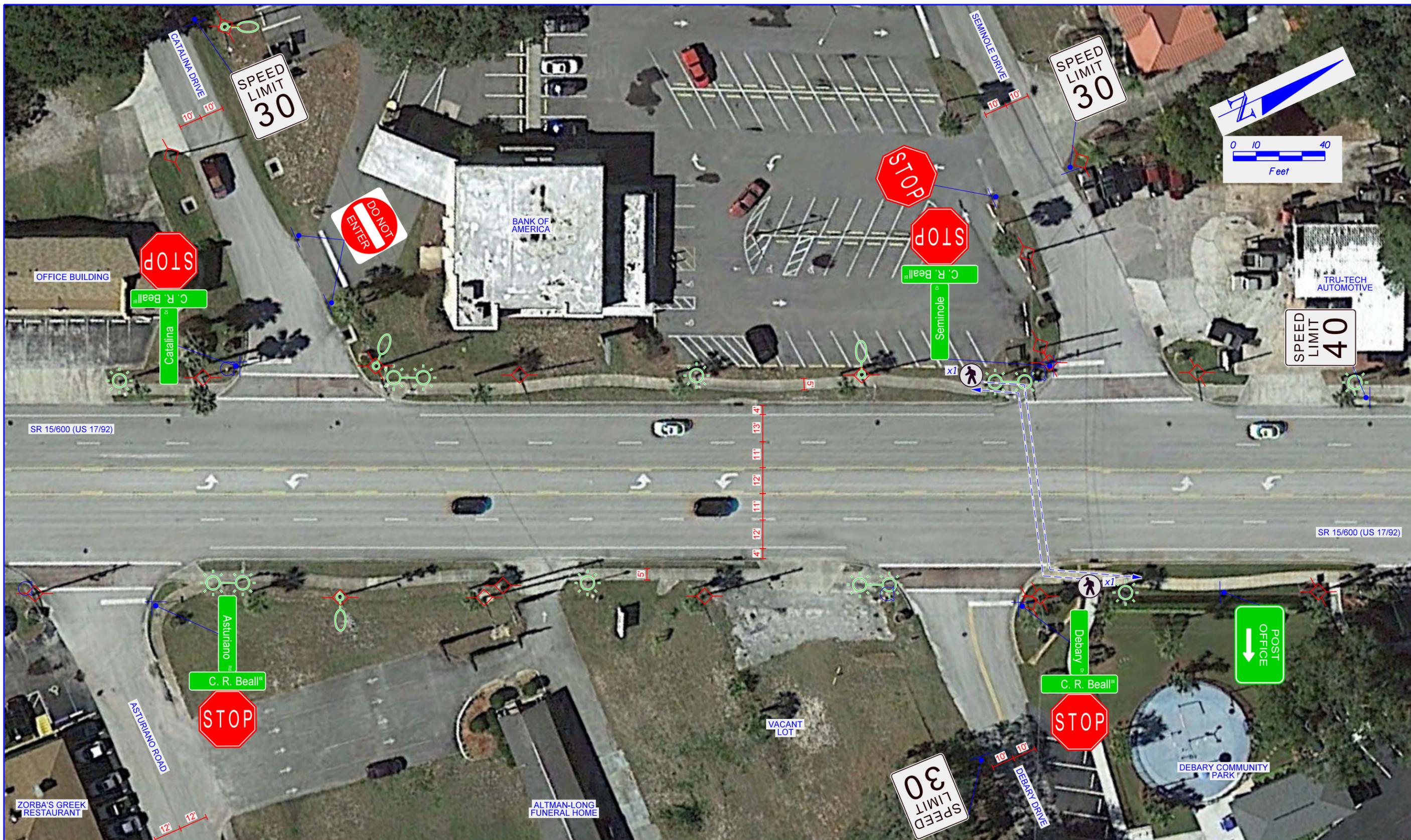
Note: A 300-foot long section was selected based on the Plans Preparation Manual (PPM) criteria that alternative crossing locations must be at least 300 feet from mid-block crosswalks.

Four-hour pedestrian/bicycle count summaries are included in the appendix of the report. The pedestrian/bicycle crossing locations are shown in detail in Figure 2.

Collision Data

Pedestrian and bicycle safety along the corridor are assessed through review of crash reports, identification of significant crash trends, then correlation to field conditions. Following are the observations relating to the safety of the corridor:

A review of FDOT Collision Analysis Reporting System (CARS) and Signal Four Analytics data found that no pedestrian or bicycle-related collisions were reported within the project corridor in the five year period ending December 2013. As such, a collision analysis was not included as part of this report.



<ul style="list-style-type: none"> CONTROLLER CABINET TRAFFIC SIGNAL POLE SIGNAL HEAD SIGN 	<ul style="list-style-type: none"> S/W SIDEWALK POWER POLE LIGHT POLE HYDRANT 	<ul style="list-style-type: none"> DITCH BOTTOM INLET MANHOLE TREE/SHRUB DRAINAGE INLET 	<ul style="list-style-type: none"> FENCE BENCH OBSERVED PED MOVEMENT x3 4 HR PED VOLUME 	<p>FALLER, DAVIS, & ASSOCIATES, INC. 258 SOUTHHALL LANE SUITE 210 MAITLAND, FL 32751</p>	<p>FIGURE 2 - CONDITION DIAGRAM AND 4-HR PEDESTRIAN CROSSING VOLUME DISTRICTWIDE COMMUNITY TRAFFIC SAFETY PROGRAM</p>	<p>PAGE NO. 5</p>
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3. PEDESTRIAN OPERATIONS

The US 17/92 corridor was reviewed by a registered professional engineer from 11:30 AM to 1:00 PM on August 6th, 2014 (typical weekday) and from 10:45 to 11:30 AM on August 9th, 2014 (Saturday), to evaluate pedestrian and bicycle operations. The field reviews were conducted in fair weather conditions.

- US 17/92 is a four lane arterial roadway divided by a painted median within the study limits. The alignment within the study corridor is straight and level.
- Per count station 790007 located north of the study corridor, traffic volumes on US 17/92 are moderate with an Average Annual Daily Traffic of 21,500 vehicles per day. Heavy vehicles comprise 4.6% of the traffic on US 17/92.
 - The count station indicated that traffic volumes on US 17/92 are moderate within the study corridor from 11:00 AM to 3:00 PM, averaging 699 vehicles per hour (vph) northbound and 628 vph southbound.
- Catalina Drive is a stop controlled T-intersection located on the south end of the project corridor. The west approach of the intersection has a stamped asphalt crosswalk with longitudinal pavement marking lines on both edges of the stamped asphalt. The markings are in good condition. The existing curb ramps are designed for north/south pedestrian crossings only. There are no sidewalks along Catalina Drive.
- Debarry Drive is a stop controlled T-intersection located on the north end of the project corridor. The east approach of the intersection has a stamped asphalt crosswalk with longitudinal pavement marking lines on both edges of the stamped asphalt. The markings are in good condition. The existing curb ramps are designed for north/south pedestrian crossings only. There is sidewalk along the north side of Debarry Drive. This sidewalk provides a connection between the sidewalk along the east side of US 17/92 and Debarry Community Park.
 - Seminole Drive approaches US 17/92 from the west and is offset from Debarry Drive by approximately 80 feet. The curb ramp on the south side of Seminole Drive aligns with the curb ramp on the north side of Debarry Drive.
- Debarry Community Park is located on the east side of US 17/92 at Debarry Drive. Park facilities include a splash pad, pavilion, and open field.
 - During both field reviews, all patrons of DeBarry Community Park were observed to arrive via motor vehicle. Available parking spaces were noted to be approximately 50 percent occupied.
- Based on the pedestrian/bicycle counts conducted within the corridor, there were a total of 5 PBMpH traveling along US 17/92 per 300 foot long section.
- During the 4-hour count period, 22 pedestrian/bicyclist movements were observed traveling within the study corridor; of those, 2 pedestrian/bicyclist movements were across US 17/92.
- A majority of the pedestrian/bicyclist trips appeared to be pass-by trips, with none of them originating or ending at Debarry Community Park.

- All pedestrians and one bicyclist traveling along US 17/92 were observed to walk or ride on the sidewalk. Two bicyclists utilized the bicycle lane, and no pedestrians were observed to walk along the painted median.
- Both of the pedestrians that crossed US 17/92 during the pedestrian count completed their movement at Debary Drive. The pedestrians crossed utilizing the curb ramps on the north side of Debary Drive and the south side of Seminole Drive. No conflicts were observed with these crossings.
 - One pedestrian crossing occurred between 11:30 and 11:45 AM and originated on the west side of US 17/92 at Catalina Drive. After crossing, the pedestrian continued north along the east side of US 17/92 to the bus stop.
 - One pedestrian crossing occurred between 1:30 and 1:45 PM and originated on the east side of US 17/92, north of the study section. After crossing, the pedestrian continued south along the west side of US 17/92.
- US 17/92 was crossed by the reviewer multiple times during the weekday and Saturday field reviews. The following observations were made:
 - Other than the reviewer, no other pedestrians were observed to cross US 17/92.
 - No pedestrian/bicyclists conflicts were observed during the field reviews. However, the potential for pedestrian conflicts exists due to moderate traffic volumes, numerous side streets and driveways, and the lack of a median on US 17/92. Additionally, when DeBary Community Park is operating at capacity there is the potential that the Bank of America parking lot could serve as overflow parking. In these instances, increased pedestrian crossings across US 17/92 could occur.
 - Lines of sight along US 17/92 to crossing pedestrians were observed to be clear.
 - Some gaps were available in US 17/92 traffic; however, northbound and southbound gaps do not always occur at the same time. As a result, most crossings were completed in two stages: crossing the near side travel lanes to the painted median and waiting for a gap in traffic, then completing the crossing across the far side travel lanes. During several of the crossings, northbound left turning motorists entered the two-way left turn lane and completed left turning movements behind the observer to access Seminole Drive.

4. PEDESTRIAN CROSSING ANALYSIS

Pedestrian Mid-block Crossing

Based on the potential for pedestrian conflicts and the potential for increased pedestrian volumes related to DeBary Community Park, a mid-block pedestrian crossing should be considered between Catalina Drive and DeBary Drive.

Section 3.8 of the TEM defines the procedure and criteria for the installation of mid-block crosswalks and pedestrian crossing treatments on state roadways. The following factors should be considered when evaluating the need for a mid-block crosswalk:

- Proximity to significant generators
- Pedestrian demand
- Pedestrian-vehicle crash history
- Distance between crossing locations

The following criteria were reviewed to determine if the location between Catalina Drive and DeBary Drive would meet the requirements for a mid-block crossing:

Pedestrian Demand

- Within the corridor there is a well-defined spatial pattern of pedestrian generators and attractors; however, minimal flow (across a roadway) was observed between them.
- The minimum of 20 pedestrians per hour or 60 pedestrians during a 4-hour period are not being met. Two pedestrians crossed US 17/92 during the count period.
- Pedestrian crossing volumes to and from DeBary Community Park may increase if a mid-block pedestrian crossing is installed.

Location Characteristics

- The minimum vehicular volume of 2,000 Average Daily Traffic along the roadway segment is met.
- The distance to the nearest intersection or crossing location is greater than 300 feet.
- The spacing between adjacent intersections is approximately 280 feet.
- The proposed location is outside the influence area of adjacent signalized intersections.

For any proposed mid-block crosswalk, the location must be conducive to providing a minimum level of pedestrian safety. The following conditions should be satisfied under existing conditions, or, if not, should be achieved in conjunction with any implementation of the proposed marked crosswalk:

Safety Considerations

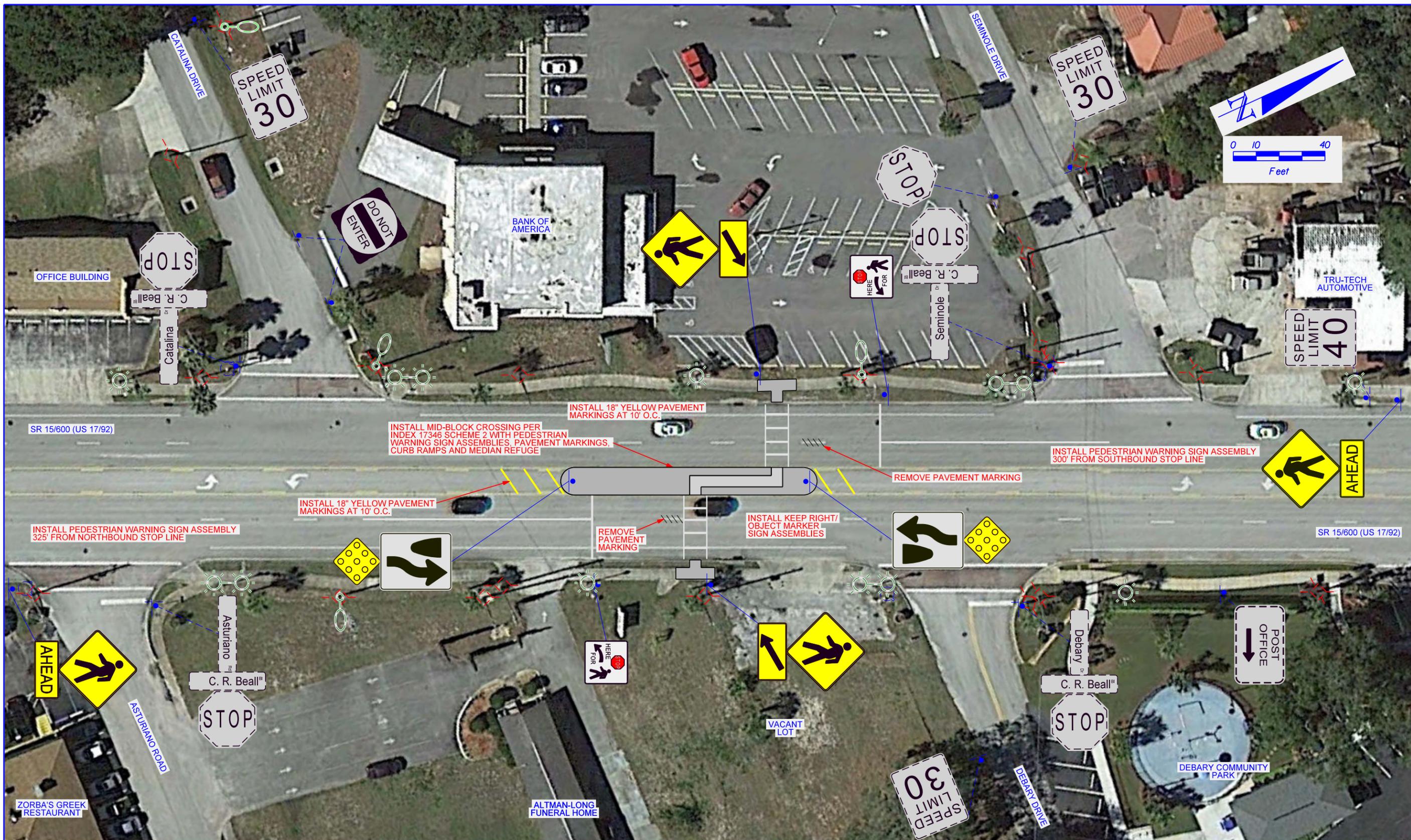
- The stopping sight distance to the proposed mid-block crossing location was noted to meet or exceed the stopping sight distance of 305 feet for 40 mph.
- There are existing sidewalks connecting the crosswalk to established pedestrian generators and attractors.
- There is existing street lighting along US 17/92 adjacent to the proposed mid-block location.
- An existing bus stop is located approximately 500 feet north of the proposed mid-block location.
- With the installation of the mid-block crosswalk, the need for a raised pedestrian refuge area was considered to allow for a two-stage crossing. A majority of the pedestrian crossings were conducted in two stages due to northbound and southbound gaps in US 17/92 traffic not being simultaneous.

5. RECOMMENDATIONS

Based on the results of the analysis, field observations, and engineering judgment, the following recommendations were developed:

1. A mid-block crosswalk should be installed between Catalina Drive and Debary Drive.
 - a. Install crosswalk signing and pavement markings per Index 17346, Sheet 10, Scheme 2.
 - b. Construct curb ramps to accommodate the installation of the mid-block crossing.
 - c. Construct a pedestrian refuge island within the two-way left turn lane.
 - d. Install KEEP RIGHT/Object Marker sign assemblies on the north and south ends of the pedestrian refuge island.

A conceptual improvement diagram has been developed to further depict the recommended improvements and is included on the following page.



	CONTROLLER CABINET		S/W SIDEWALK		DITCH BOTTOM INLET		FENCE
	TRAFFIC SIGNAL POLE		POWER POLE		MANHOLE		BENCH
	SIGNAL HEAD		LIGHT POLE		MITERED END SECTION		OBSERVED PED MOVEMENT
	SIGN		HYDRANT		DRAINAGE INLET		x3 4 HR PED VOLUME

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FIGURE 3
 CONCEPTUAL IMPROVEMENT DIAGRAM
 DISTRICTWIDE COMMUNITY
 TRAFFIC SAFETY PROGRAM

APPENDIX

US 17/92 Typical Section Photographs



Looking north along US 17/92 within the project corridor



Looking south along US 17/92 within the project corridor

Pedestrian/Bicycle Counts

Pedestrian/Bicycle Movement Summary
 Section: 79040
 Mile Post: From 2.912 to 2.968
 Date: July 25th, 2014

State Road: SR 15/600 (US 17/92)
 Observer: KLC
 Time: 11:00 AM-3:00 PM
 Weather: Fair



From MP 2.912 to MP 2.968

Time	0				0				Crossing from the West Heading East	Crossing from the East Heading West	Time	0				0				Crossing from the West Heading East	Crossing from the East Heading West				
	0		0		0		0					0		0		0									
	Ped	Bike	Ped	Bike	Ped	Bike	Ped	Bike	Ped	Bike		Ped	Bike	Ped	Bike	Ped	Bike	Ped	Bike	Ped	Bike				
11:00-11:15	0	0	0	0	0	0	0	0	0	0	0	0	13:00-13:15	1	0	0	0	1	0	0	0	0	0	0	0
11:15-11:30	0	0	0	0	0	0	0	0	0	0	0	0	13:15-13:30	0	0	0	0	0	0	0	0	0	0	0	0
11:30-11:45	1	0	0	1	1	0	0	0	1	0	0	0	13:30-13:45	0	0	1	1	0	0	1	0	0	0	1	0
11:45-12:00	0	0	1	0	0	0	4	0	0	0	0	0	13:45-14:00	0	0	0	0	0	0	2	0	0	0	0	0
12:00-12:15	0	0	0	1	0	0	0	0	0	0	0	0	14:00-14:15	0	0	0	0	0	0	0	0	0	0	0	0
12:15-12:30	0	0	0	0	0	0	0	0	0	0	0	0	14:15-14:30	0	0	0	0	0	0	0	0	0	0	0	0
12:30-12:45	0	0	0	0	0	0	0	0	0	0	0	0	14:30-14:45	0	0	0	0	0	0	0	0	0	0	0	0
12:45-13:00	0	0	0	0	1	0	1	0	0	0	0	0	14:45-15:00	0	0	0	0	2	0	0	0	0	0	0	0
Subtotal	1	0	1	2	2	0	5	0	1	0	0	0	Subtotal	1	0	1	1	3	0	3	0	0	0	1	0
Total	1		3		2		5		1		0		Total	1		2		3		3		0		1	