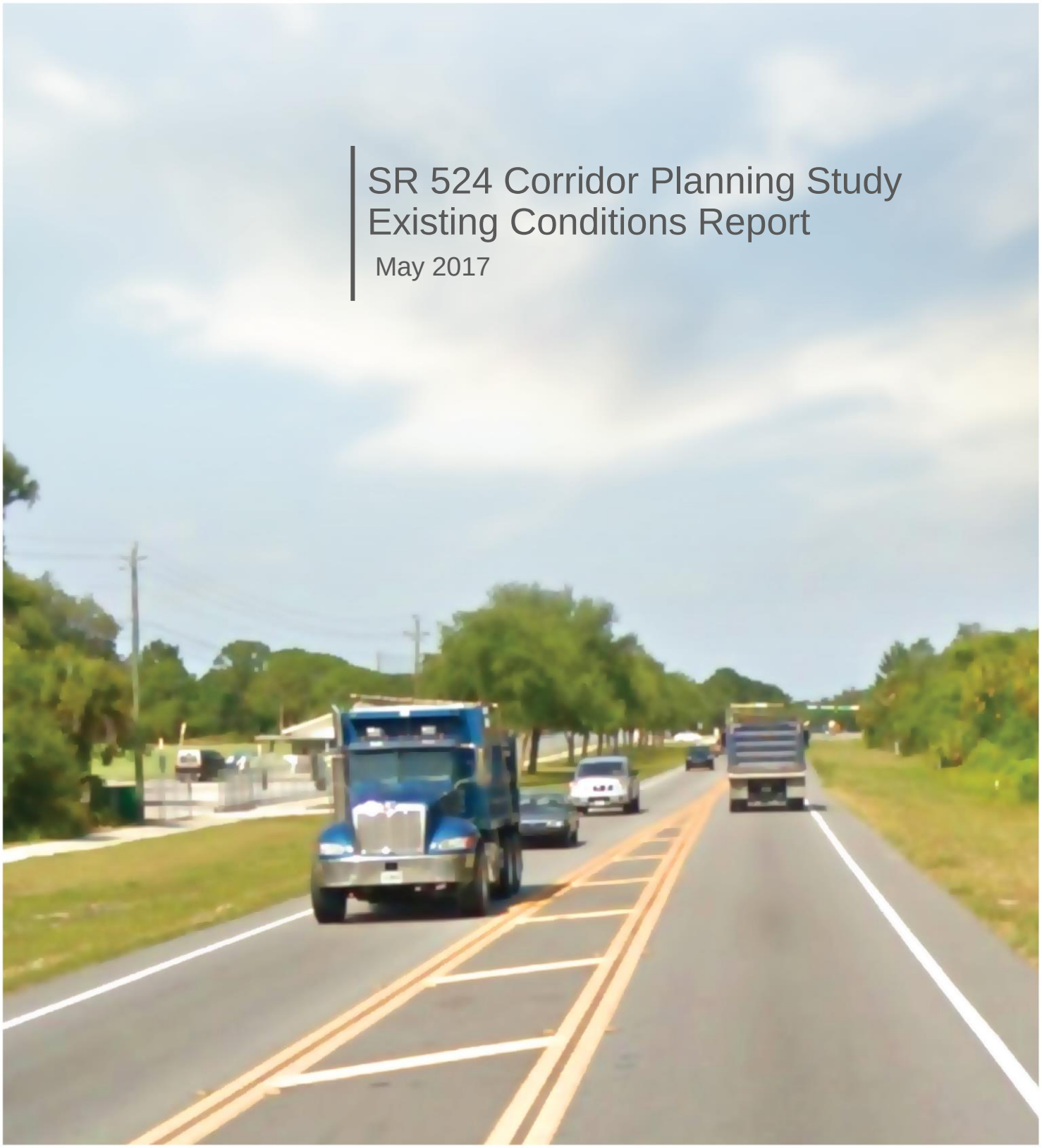
SR 524 Corridor PLANNING STUDY

SR 524 Corridor Planning Study
Existing Conditions Report

May 2017



FDOT

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Introduction

1.0 Introduction

In February 2016, the Florida Department of Transportation (FDOT) initiated a Corridor Planning Study ("the Study") to evaluate the need for potential multimodal transportation improvements along State Road (S.R.) 524 in Brevard County, Florida. As shown in Figure 1.1, the limits of the S.R. 524 Study Area extend from Friday Road South to Industry Road, a distance of approximately 3.150 miles.

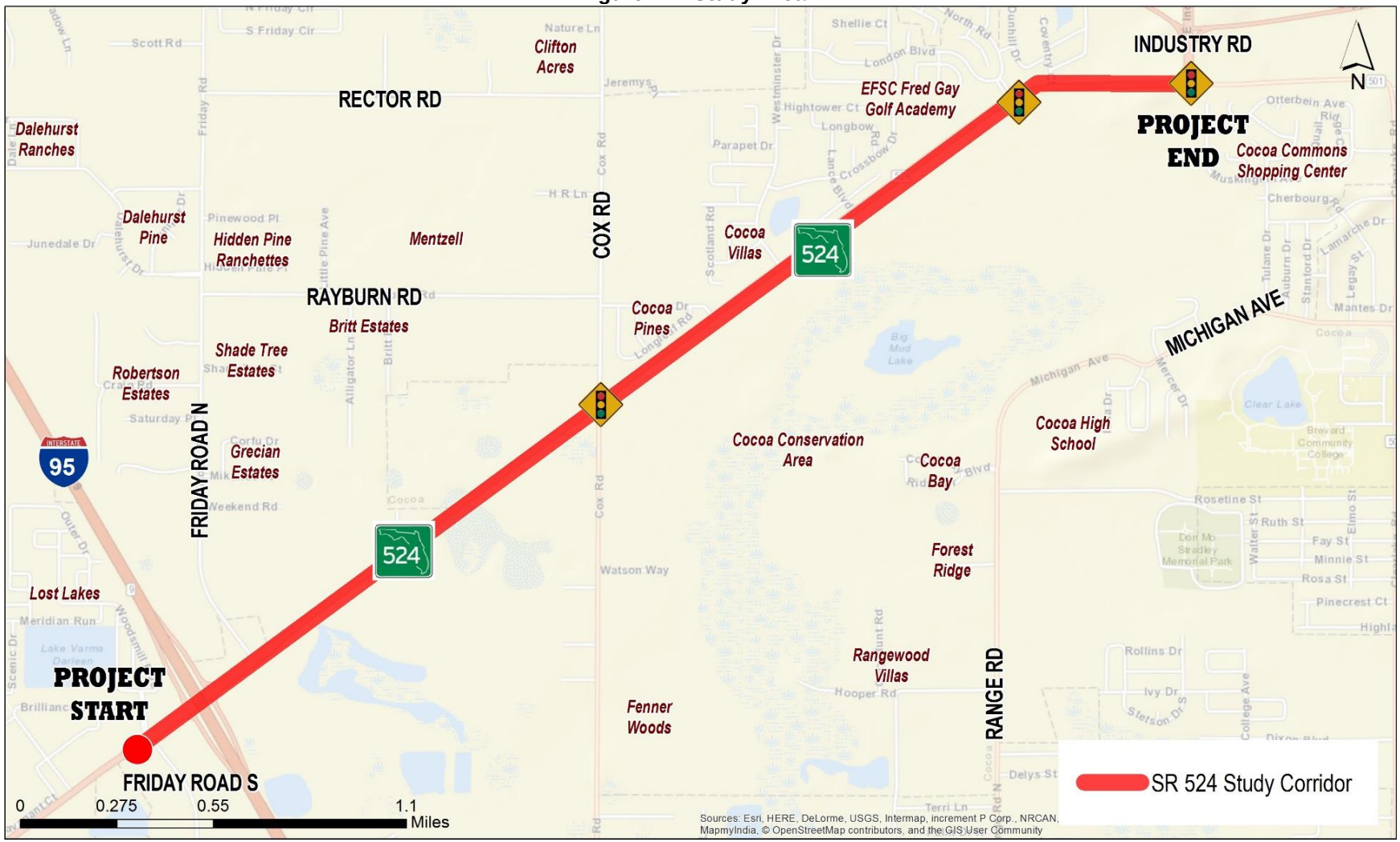
The *S.R. 524 Existing Conditions Summary Report* summarizes the existing transportation, land use, and environmental conditions within and surrounding the Study Area. This Report includes documentation of transportation characteristics, vehicular traffic conditions, land use and demographic characteristics, existing developments, and a safety analysis of the corridor. In addition, this report considers previous studies, planned and programmed improvements, as well as ongoing planning efforts by the City of Cocoa ("the City"), Brevard County ("the County"), the Space Coast TPO ("SCTPO"), and Space Coast Area Transit ("SCAT"). Listed below is a brief summary of each Section of the Report:

- **Transportation Characteristics**: This Section presents the existing roadway network, roadway cross section, intersection configurations, pedestrian and bicycle facilities, and transit service within the SR 524 Corridor.
- **Vehicular Traffic Conditions**: This Section presents existing segment level of service, intersection level of service, vehicle classification counts, access conditions, field review, and an analysis of overall travel patterns.
- **Safety Analysis**: This Section presents crash history for the intersections within the Corridor, and analyzes the Corridor as compared with statewide averages.
- **Land Use and Demographic Characteristics**: This Section presents demographic data along the Corridor, including population, housing, income, race, language, employment, and commuting patterns, and also examines existing and future land use patterns within the Study Area.
- **Environmental Conditions**: This Section presents a review of the cultural resources, parklands, recreational areas, water quality, floodplain, contaminated sites, and threatened/endangered species within the Study Area.

Several documents were reviewed as part of the development of this Report, listed below:

- Clearlake Road (SR 501) Project Development and Environment Study (2016)
- Space Coast TPO 2040 Long Range Transportation Plan (2015)
- Space Coast TPO Intelligent Transportation Systems (ITS) Master Plan (2015)
- City of Cocoa 2010-2020 Long Range Transportation Plan (2010)
- S.R. 524 and Cox Road Feasibility Study (2009)
- Wal-Mart Distribution Center: Traffic Impact Study (2016)

Figure 1.1: Study Area



Transportation Characteristics

2.0 Transportation Characteristics

This Section evaluates existing traffic operations along roadway segments and at intersections within the Study Corridor, and identifies any changes to the existing transportation network that are currently planned, programmed, or under review by FDOT, Brevard County, City of Cocoa, or Space Coast TPO.

2.1 Roadway Network

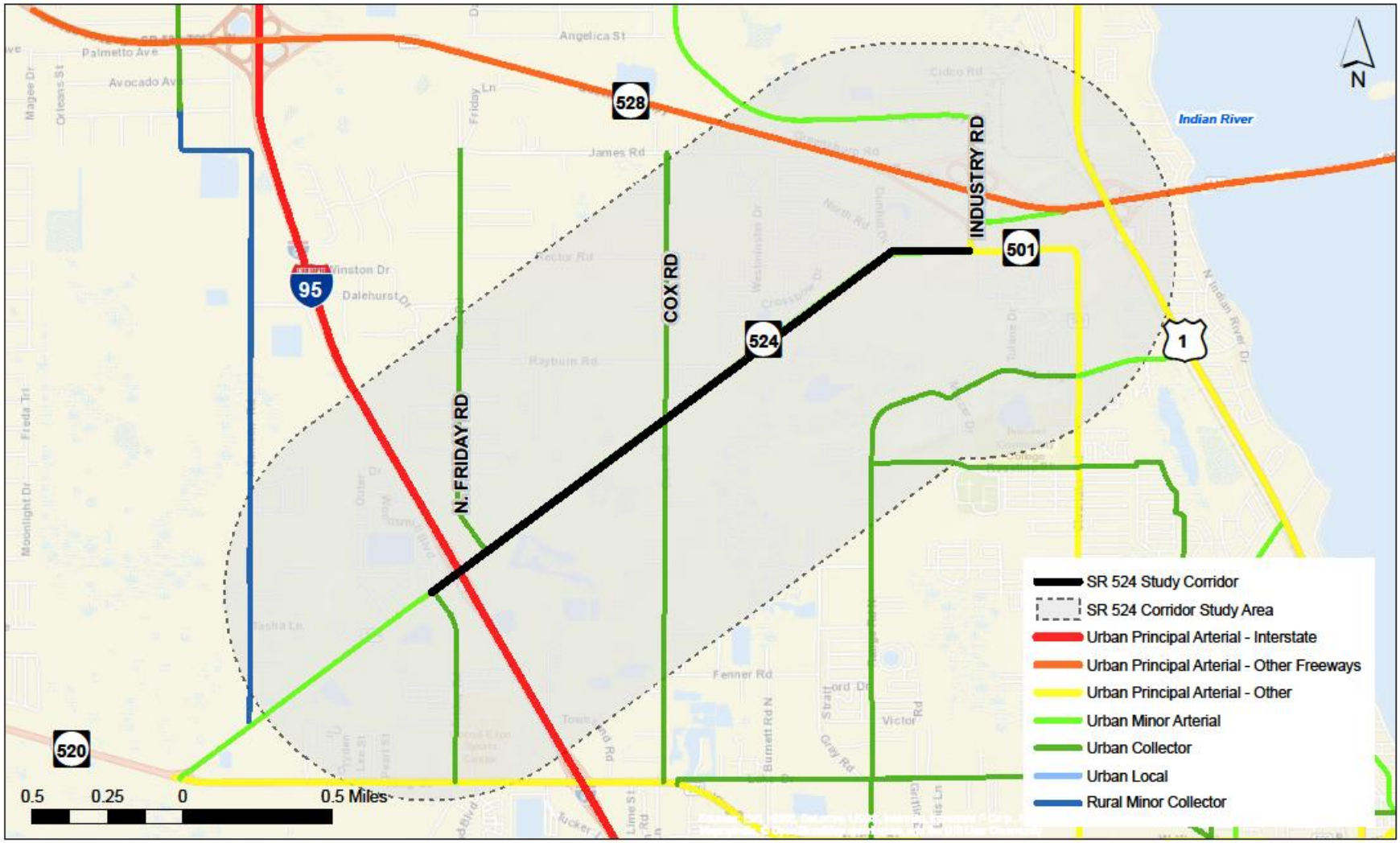
S.R. 524 is designated as an urban minor arterial and is intersected by several important roadways as listed below in Table 2.1 and shown in Figure 2.1:

Table 2.1: Roadways in Study Area by Type

Roadway	Designation	Jurisdiction	Design LOS
Interstate 95	Urban Principal Arterial	FDOT	E
S.R. 524	Urban Minor Arterial	FDOT	D
S.R. 528	Urban Principal Arterial	FDOT	D
S.R. 501	Urban Principal Arterial	FDOT	D
Industry Road	Urban Principal Arterial	Brevard County	E
Cox Road	Urban Collector	City of Cocoa	E
Friday Road North	Urban Collector	Brevard County	E
Friday Road South	Urban Collector	Brevard County	E

Source: Brevard County Property Appraiser, 2016; City of Cocoa Comprehensive Plan, 2010 (pg II-1)

Figure 2.1: Existing Roadway Network (Functional Classification)



Source: FDOT, 2016.

Planned/Programmed Facilities

The Space Coast TPO 2040 Long Range Transportation Plan (LRTP) outlines the region's growth and development through 2040, and is key in identifying transportation needs and project funding. Some notable planned, programmed, or strategic corridors from the Space Coast TPO LRTP within or affecting the S.R. 524 Study Area are listed below and in Table 2.2:

- The widening of S.R. 524 between I-95 and Industry Road is listed as a Priority I Efficient Transportation Decision Making (ETDM) screening project.
  - The S.R. 524 widening project is funded as follows: $3.24 million for PE, $4.49 million for ROW, and $22.47 for construction - all three phases will take place between 2021 and 2025.
- The widening of S.R. 501 between Michigan and Industry Road is listed as an "ETDM Screening Completed/Fully or Partially Funded" project.
  - The S.R. 501 widening project is funded as follows: $1.66 million for ROW and $6.65 million for construction – both phases taking place between 2021 and 2025.

Table 2.2: Space Coast TPO LRTP Planned/ Programmed Improvements

Period	Project Type	Facility	From	To	Description	Net Cost
2021-2035	Highway Capacity	Clearlake Road	Michigan	Industry Rd	Widen to 4 lanes	$8.3 million
		S.R. 524	I-95 Interchange (South)	Industry Rd	Widen to 4 lanes	$17.4 million
ITS Program	ITS	S.R. 501	S.R. 520	S.R. 528	ITS improvements	$559,000
Multimodal Program	Bicycle/Ped	Clearlake Rd	2600' E of E Industry Rd	King Street	Designated Bicycle Lane	$366,000
		Clearlake Rd	400' S of W King St	Range/Pluckebaum Rd	Paved Shoulder	$68,000
		Friday Road North	Highway 524	2300' S of Hwy 524	Paved Shoulder	$48,000
		Cox Rd	S.R. 524	600' N of W King Street	Sidewalk	$218,000
		La Marche Dr	Otterbein Ave	Michigan Ave	Sidewalk	$50,000
	Complete Streets	Michigan	Range	Clearlake	Complete Street	TBD
Unfunded	Transit	West Cocoa Circulator			New Fixed Route Service	$300,000
		S.R. 520 Bus Rapid Transit	S.R. 524	S.R. A1A	New Bus Rapid Transit Service	$1.5 billion

Source: Space Coast TPO 2040 LRTP, page 178.

Space Coast TPO Intelligent Transportation System (ITS) Master Plan (August 2015): The Space Coast TPO also identifies the region's ITS needs and provides a substantial amount of existing data and research on ITS facilities within the County. In the existing conditions section, the ITS Master Plan identified ITS features along S.R. 524 in two places:

- S.R. 524 between I-95 and Industry Road has a 24 singlemode (sm)/12 multimode (mm) fiber optic network, owned by FDOT.
- S.R. 524 between I-95 and Industry Road has five Arterial Dynamic Messaging Signs (ADMS) and one closed-circuit television (CCTV) owned by FDOT.

2.2 Roadway Cross Section

Using field observations, as-built plans, and straight-line diagrams, existing typical cross-sections were identified along S.R. 524. The roadway cross-sections, displayed in Figure 2.2, illustrate the dimensions of the paved roadway, grass shoulders, and the unpaved right-of-way. Existing right-of-way width along S.R. 524 is approximately 200 feet from Friday Road South to the I-95 Bridge, and approximately 105 feet under the I-95 Bridge. Existing right-of-way width along S.R. 524 is approximately 200 feet from the I-95 Bridge to London Boulevard, approximately 218 feet from London Boulevard to the Shopping Center intersection, and approximately 253 feet from the Shopping Center intersection to Industry Road.

Figure 2.2: Existing S.R. 524 Roadway Cross Sections: Friday Road South to Cox Rd.

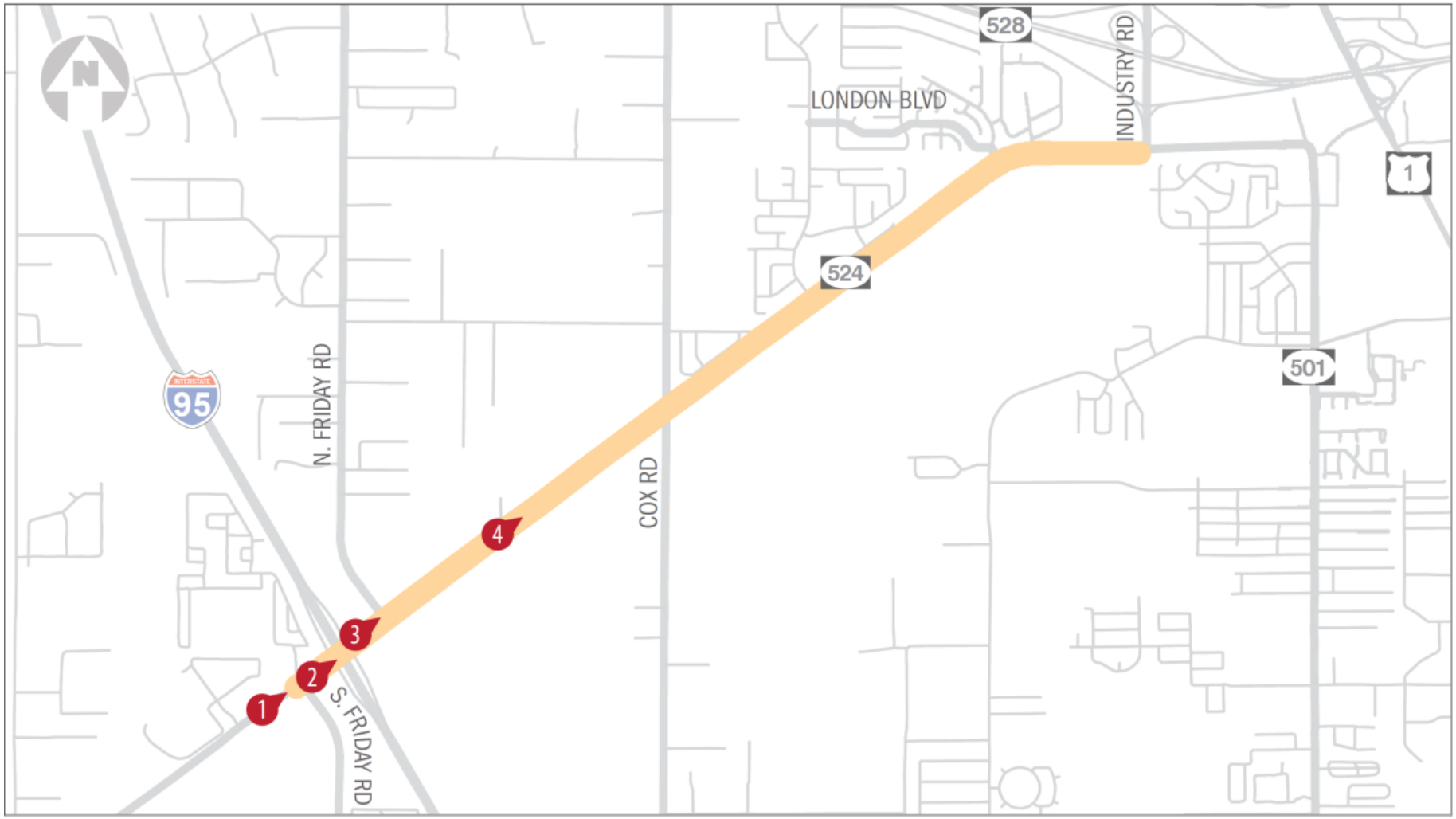
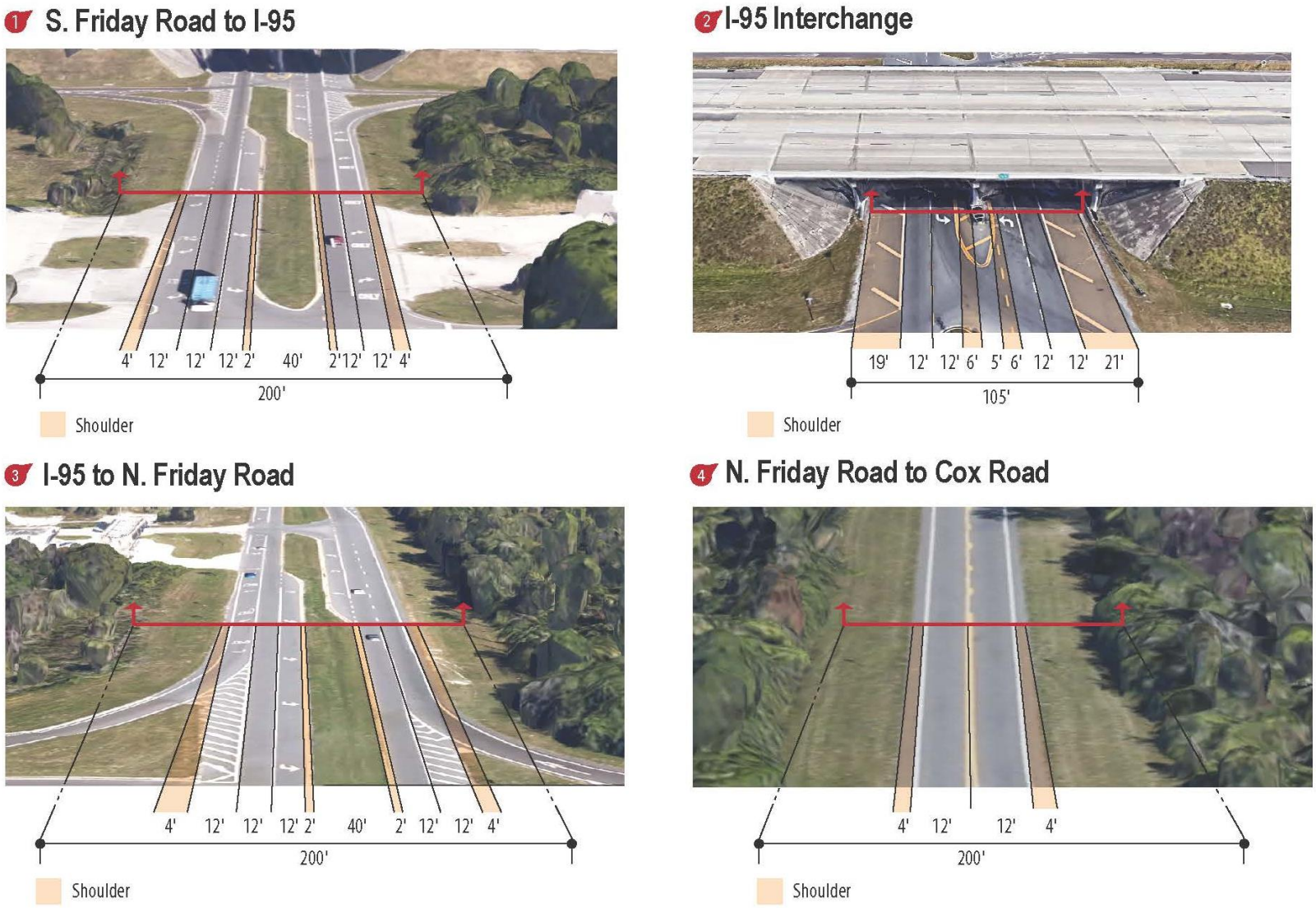


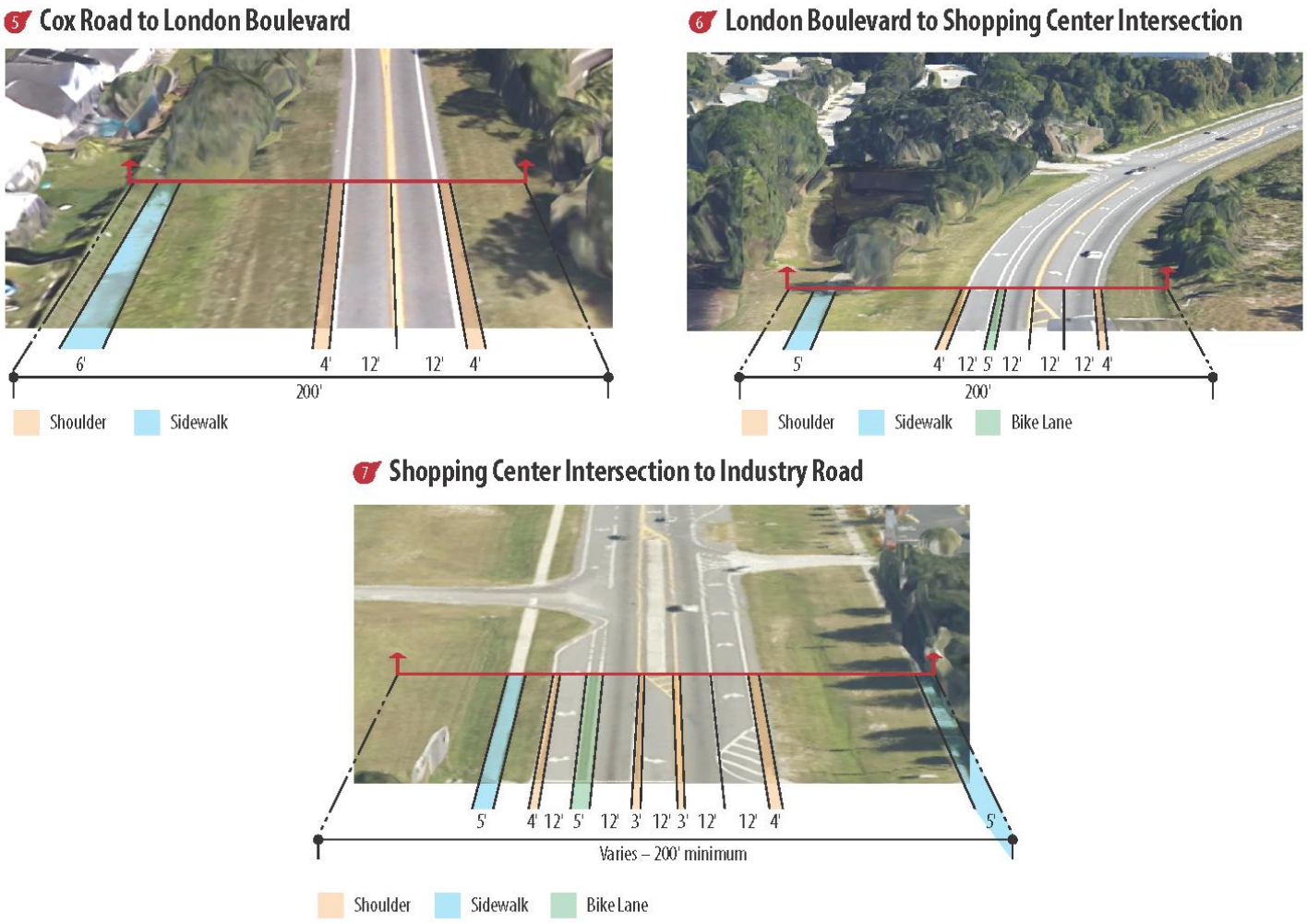
Figure 2.2 (continued): Existing S.R. 524 Roadway Cross Sections: Friday Road South to Cox Rd.



Source: FDOT, 2016.

Figure 2.3: Existing S.R. 524 Roadway Cross Sections: Cox Rd. to Industry Rd.

Figure 2.3 (continued): Existing S.R. 524 Roadway Cross Sections: Cox Rd. to Industry Rd



Source: FDOT, 2016.

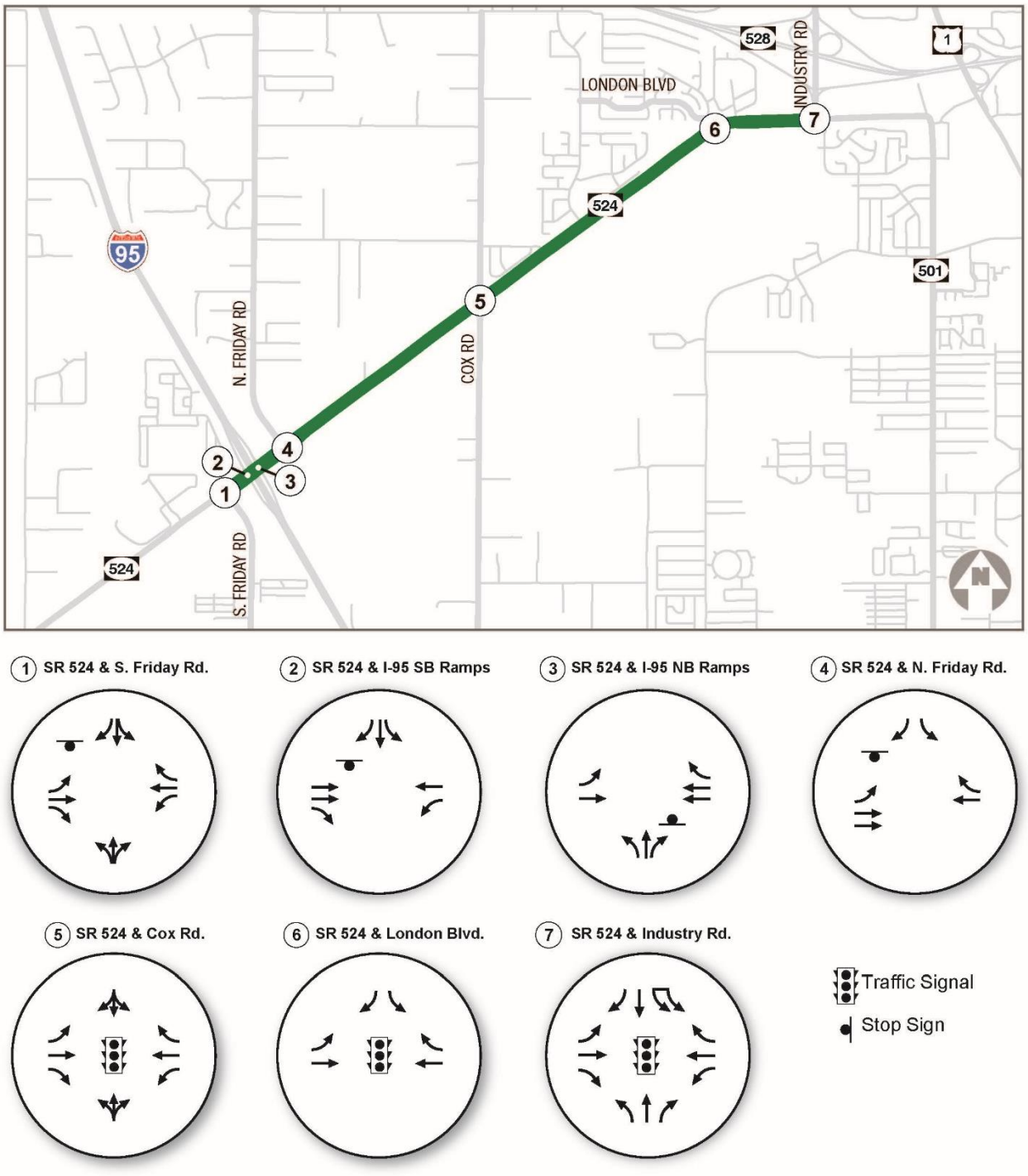
2.3 Intersection Configurations

Within the study area, there are three signalized intersections and four unsignalized intersections, listed below. Figure 2.4 identifies the existing lane configurations and traffic control at the seven major intersections along S.R. 524.

- Friday Road South (unsignalized)
- I-95 Southbound Ramp (unsignalized)
- I-95 Northbound Ramp (unsignalized)
- Friday Road North (unsignalized)
- **Cox Road (signalized)**
- **London Road (signalized)**
- **Industry Road (signalized)**

The existing Cox Road, London Road, and Industry Road intersections are signalized. There is another signalized intersection between London Road and Industry Road, which serves the entrances of the Cocoa Commons and Coventry at Cocoa shopping centers. All other intersections in the corridor are un-signalized. The raised median on S.R. 524 on the west approach of Industry Road restricts access to driveways to right-in, right-out only movements between Industry Road and the signal serving both shopping centers. All intersections west of this raised median section have full movement access.

Figure 2.4: Existing Intersection Lane Configuration and Traffic Controls



Source: VHB, 2016.

2.4 Pedestrian and Bicycle Facilities

Existing Facilities

There are limited existing pedestrian and bicycle facilities currently within the S.R. 524 Study Area. Figure 2.6 illustrates existing and future pedestrian/bicycle facilities on S.R. 524 and the surrounding road network (these facilities were observed by FDOT and Google Earth imagery). These features are also summarized in Table 2.3.

Table 2.3: Existing Pedestrian & Bicycle Facilities

Segment	Length	Pedestrian Facilities	Bicycle Facilities	Other Notes
1. Friday Rd South to Friday Road North	0.32 miles	None	None	Wide shoulder – could also be used as bicycle lane
2. Friday Road North to Cox Road	1.08 miles	None	None	Wide shoulder – could also be used as bicycle lane
2: Cox Road to Westminster Drive	0.57 miles	Sidewalk, north side only	None	Wide shoulder – could also be used as bicycle lane
3: Westminster Dr to Lance Blvd	0.23 miles	Sidewalk, north side only	None	Wide shoulder – could also be used as bicycle lane
4: Lance Blvd to London Blvd	0.49 miles	Sidewalk, north side only	None	Wide shoulder – could also be used as bicycle lane
5. London Blvd to Industry Road	0.49 miles	Sidewalk, north side only	Bicycle Lane, north side only	

Source: FDOT, 2016.

S.R. 524 – Friday Road South to Friday Road North

This is a rather small segment (0.32 miles), but nonetheless very important to the corridor and to the surrounding community as it contains the on and off ramps for I-95 north and south. This segment of roadway does not currently include any facilities for pedestrians or bicyclists, and has a posted speed limit of 45 mph. However, project stakeholders shared their concerns about the limited sight distance and frequent accidents at the I-95 interchange, particularly left turns from the southbound off ramp. The FDOT is currently conducting an Interchange Operational Analysis (IOAR) at this location to evaluate the need for signalizing the ramp terminal intersections. In addition, the Traffic Impact Analysis (TIA) conducted for the Wal-Mart site also included a recommendation to signalize the I-95 ramp terminal intersections. These improvements, if implemented, would provide better protection for bicycle and pedestrian users.

S.R. 524 – Friday Road North to Cox Road

This section of S.R. 524 is about 1.08 miles long, and the posted speed limit increases from 45 mph to 55 mph just prior to a Traffic Monitoring Station (#411) just past Friday Road North. While this stretch of the road currently lacks pedestrian and bicycle facilities, there is sufficient existing right-of-way on both sides of S.R. 524 to include both bicycle lanes and sidewalks in potential future improvements.

S.R. 524 – Cox Road to Industry Road

The north side of S.R. 524 within this segment is dominated by several large residential neighborhood tracks, a golfing facility owned by Eastern Florida State College, and other commercial land uses. There is a continuous sidewalk ranging from five to eight feet in width which starts at Cox Road and goes through the entire segment. There are six locations where bicycle lanes are provided on the north side of S.R. 524 which correspond with the right turn lanes at each intersection, starting with the shopping center traffic signal and proceeding west to Cox Road.

The majority of south side of S.R. 524 within this segment is currently undeveloped and has only a small segment of sidewalk (five feet wide), which starts right before the traffic signal at the Cocoa Commons Shopping Center and extends through the east end of the corridor at Industry Road. This segment also has a bicycle lane adjacent to the right turning lane into the shopping center.

Stakeholders reported frequent pedestrian and bicycle activity on the north side of S.R. 524, though they noted that the current posted speeds and truck traffic (e.g. heavy trucks) can be intimidating for bicyclists trying to ride this stretch of road even with the bicycle lanes.

Intersecting Roadways – Bicycle and Pedestrian Facilities

North Cox Road and S.R. 501 have existing sidewalks, but no bicycle lanes. North of S.R. 524 for around a mile, Cox Road has sidewalks on the east side of the roadway, but south of S.R. 524, Cox Road has no sidewalks. The remaining major intersecting roads which currently lack these facilities, such as Friday Road South, Friday Road North, and Cox Road, have planned bicycle or pedestrian enhancements according to the Space Coast TPO (see Figure 2.6). Most of the neighborhoods on the north side of the corridor (east of Cox Road) have an inner sidewalk network which is connected to the existing sidewalk facilities on S.R. 524. However, the sidewalks do not extend into the shopping center parking lots.

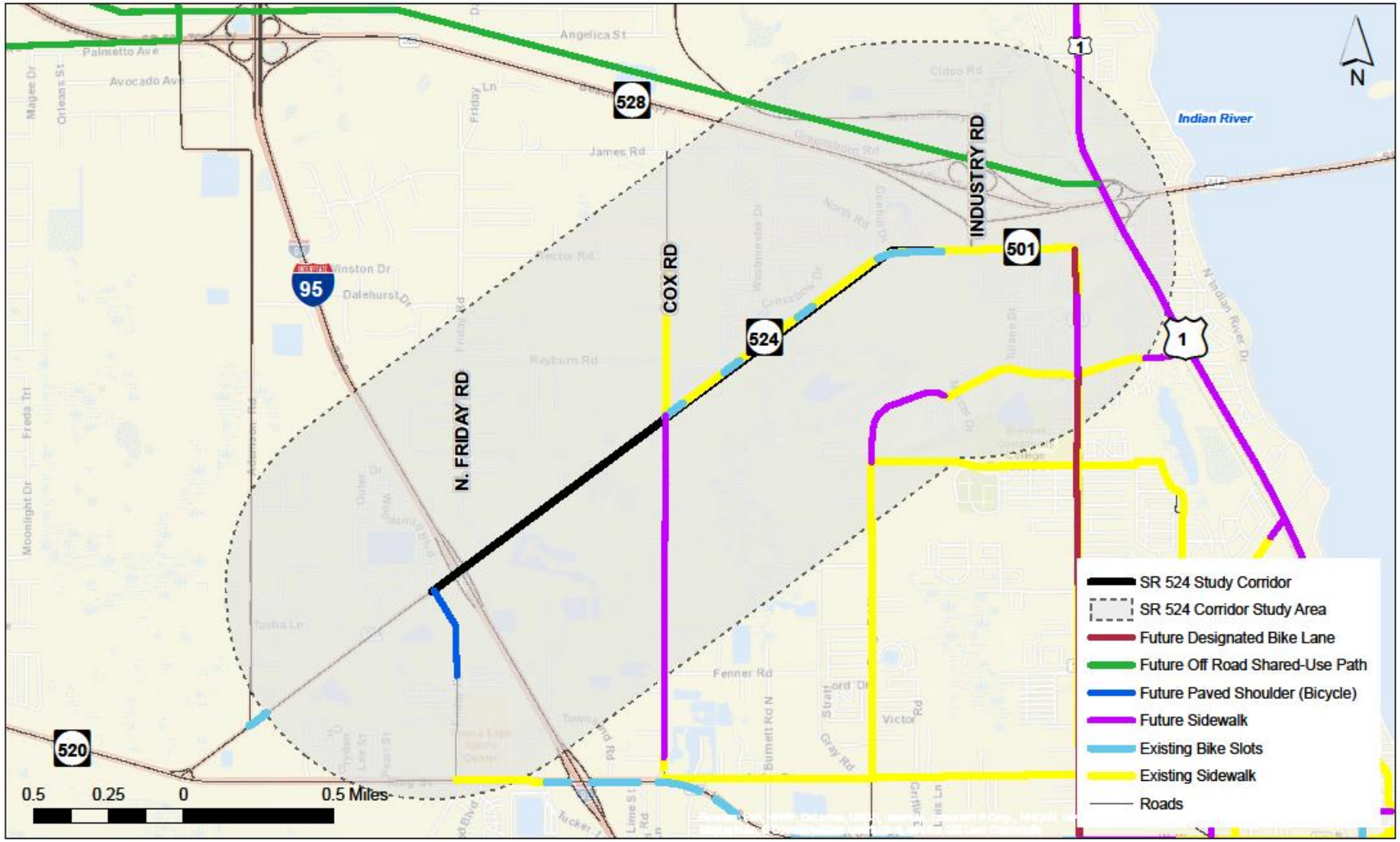
Crossing S.R. 524

There is currently only one marked connection between the north and south sides of S.R. 524 within the Study Area, which is located at the Cocoa Commons shopping center traffic signal on the east end. Since the south side of S.R. 524 is lightly developed, there are few existing connections between the south and north side. There are pedestrian refuge medians at select spots along S.R. 524 (e.g. the I-95 interchange area), but generally, the corridor has either painted medians or no medians at all. Most of the streets on the north side have marked crosswalks to ensure that drivers see pedestrians/bicyclists who are traveling east or west bound along these access points.

Planned/Programmed Facilities

The Space Coast TPO Bicycle and Pedestrian Mobility Plan establishes a planning framework, a set of project priorities, and program strategies to guide the Space Coast TPO and its partners toward development of a multimodal transportation network which complements local land use and economic development plans, and provides greater accessibility for regional and local transportation networks serving the community.

Figure 2.5: Pedestrian and Bicycle Facilities



Source: Space Coast Transportation Planning Organization, 2016.

2.5 Transit Service

Existing Service

The S.R. 524 Study Area is currently served by two Space Coast Area Transit (SCAT) bus routes – Route 6 and Route 8 (see Figure 2.7). Route 6 (Cocoa/Rockledge) connects S.R. 524 with Central/South Cocoa and Rockledge, and serves the east end of the S.R. 524 Study Area, making a loop in the Cocoa Commons (Publix) shopping center. Route 8 (West Cocoa) connects Western and Central Cocoa along S.R. 520, serving Friday Road South, just outside the S.R. 524 Study Area.

The frequency, span of service, and average daily ridership of Routes 6 and 8 are shown in Table 2.4. Route 6 has strong ridership compared to other routes in the region, but Route 8 displays very low ridership numbers. Surveys collected from riders indicated that they were not satisfied with the frequency of SCAT service.

Table 2.4: Existing Transit Service

Route	Weekday Frequency (min.)	Weekday Daily Ridership (2013)	Weekday Span of Service	Saturday Span of Service
6	30 – 60 (M-F) 60 (S)	725	5:45 am – 8:12 pm	7:15 am – 6:10 pm
8	90 – 240 (M-F)	26*	6:45 am – 5:44 pm	N/A

Source: Space Coast Area Transit TDP, 2012 (pg. 37 & pg. 112).
**Based on 10 months of ridership data available.*

Figure 2.6: SCAT Transit Routes and Stops

Source: Space Coast Transportation Planning Organization, 2016.

Planned/Programmed Transit Service

The County's transit vision includes regional multimodal and intermodal hubs, connected by roads, rail, and trails.

Local Service. The SCAT 2013-2022 Transportation Development Plan (TDP) outlines the Space Coast region's transit vision through 2022, and provides a variety of growth scenarios and proposed transit service. Using growth projections in West Cocoa and along S.R. 524, the TDP identifies a need for additional transit service in West Cocoa, also known as the *West Cocoa Circulator*. The West Cocoa Circulator, illustrated in Figure 2.8, would provide bus service along S.R. 524, S.R. 501, S.R. 520, and Friday Road South, covering a large share of the S.R. 524 Study Area. The SCAT Ten-Year TDP Operating Implementation Plan indicates the West Cocoa Circulator could begin operation as early as 2021, pending the acquisition of operating funding.

In addition to the West Cocoa Circulator, the 2013-2022 TDP also proposes three other routes potentially intersecting the Study Area:

- Service from Friday Road South to the I-95 South Interchange.
- Service beginning at S.R. 528, intersecting S.R. 524 at Friday Road South, and connecting to the Orlando International Airport.
- The "BCC Connector," would provide service from as far south as Palm Bay and as far north as Titusville.

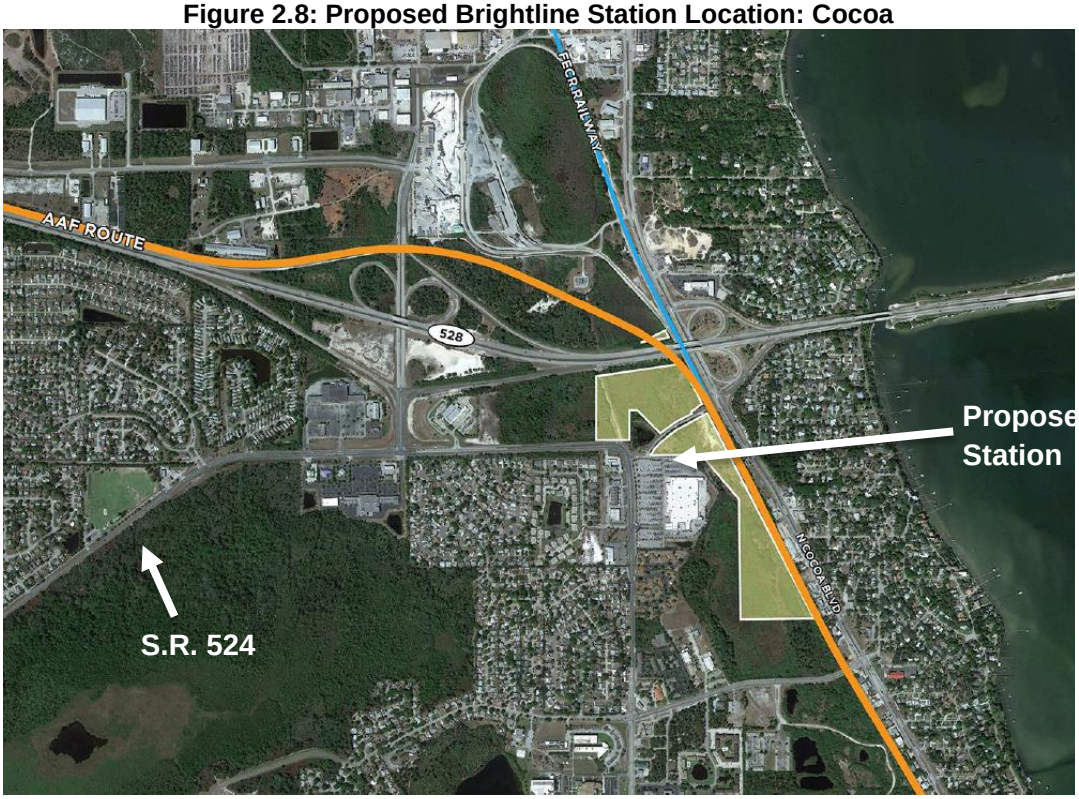
Figure 2.7: Proposed SCAT West Coast Circulator

Source: Space Coast Area Transit TDP, 2012 (pg. 202).

Regional Service. In addition to local service within the region, the 2013-2022 TDP also outlines transportation trends along the East Coast of Florida which could have a significant impact on the S.R. 524 Study Area in the future. One of the largest potential impacts to the region could come from a new Brightline intercity rail station, located just outside of the S.R. 524 Study Area. Brightline is a high-speed rail network connecting Miami to Orlando, and is currently under construction by All Aboard Florida (AAF), along the existing rail corridor owned by Florida East Coast Railway (FECR). There are four confirmed Brightline station locations under construction, located in Miami, Fort Lauderdale, West Palm Beach, and at the Orlando International Airport (MCO); however, additional stations are likely to be developed and constructed along the rail corridor. AAF is still determining the location of additional stations, through ridership analyses and discussions with regional and local agencies along the corridor.

In May 2016, the SCTPO and the Canaveral Port Authority announced their preference of S.R. 501 (Clearlake Road) as a potential Brightline station location, in a proposal to AAF, over eight other potential station sites in Brevard County.[1] The station location study criteria included available land, as well as proximity to highways and other key areas, such as Port Canaveral.[2] The proposed station location is displayed in Figure 2.9. The proposed Clearlake Road station would be developed on an 88-acre site near the railroad track southward curve, where trains would pass below S.R. 528 and begin traveling parallel with I-95 towards Miami. AAF already owns property at this curve, and FECR owns the Clearlake Road location parcel. SCTPO submitted their proposal to Brightline in May 2016 and AAF is currently working on a ridership study to determine if the Cocoa station location would be feasible.

Figure 2.8: Proposed Brightline Station Location: Cocoa



Source: http://spacecoasttpo.com/wp-content/uploads/2015/10/AAF-Route-S.R.-528-Cocoa.pdf

[1] http://spacecoasttpo.com/wp-content/uploads/2015/11/RESOLUTION-16-14-Rail-Stations-revised3.pdf
[2] http://spacecoasttpo.com/wp-content/uploads/2016/06/AAF-Station-Report-final.pdf

Vehicular Traffic Conditions

3.0 Vehicular Traffic Conditions

3.1 Overview

SR 524 bisects the City of Cocoa and unincorporated Brevard County, and is designated as an Urban Minor Arterial by FDOT. From Friday Road South to Friday Road North, SR 524 consists of two travel lanes in each direction, and from Friday Road North east to Industry Road, SR 524 consists of one travel lane in each direction.

The amount of existing (2015) daily traffic along S.R. 524 within the Study Area range from a low of 4,800 vehicles/day west of the I-95 interchanges to 15,300 vehicles/day approaching the Industry Road intersection, as seen in Table 3.1 and illustrated in Figure 3.1. FDOT GIS data indicates there are currently two portable traffic monitoring sites on S.R. 524 within the corridor, one east of East Friday Road and the other near the Eastern State College Golf Academy. There are also traffic monitoring sites in close proximity to S.R. 524 including one on each of the I-95 ramps.

Table 3.1: S.R. 524 Study Corridor AADT (2015)

Segment	AADT	Truck AADT
Friday Road South to I-95 Interchanges	4,800	307 (6.4%)
I-95 Interchanges to Cox Road	10,700	856 (8.0%)
Cox Road to Industry Road	15,300	979 (6.4%)

Source: FDOT Florida Traffic Online, 2015. http://www2.dot.state.fl.us/floridatrafficonline/viewer.html

3.2 Existing Level of Service: SR 524 Segments

Level of Service (LOS) is a qualitative measure used to analyze highway service by categorizing the amount of traffic volume compared to capacity into one of six lettered categories (A, B, C, D, E, F), ranging from free-flow traffic (LOS A) to stopped traffic (LOS F). For a Class I undivided 2-lane arterial such as SR 524, volume classifications corresponding to different LOS categories are summarized in Table 3.2, using FDOT's Generalized LOS Planning Tables (December 2012).

Table 3.2: Volume Classifications for Class I Undivided 2-Lane Arterial

AADT	LOS
Less than 16,800	LOS C
16,800-17,700	LOS D
More than 17,700	LOS E

Source: FDOT Generalized LOS Planning Tables, Table 1. Page 195.

Existing roadway segment analysis was performed for nine segments along SR 524 using 2010 segment volume data from FDOT, listed in Table 3.3.[3] The analysis indicated all of the Study Area segments are currently operating at LOS C or better in existing conditions.

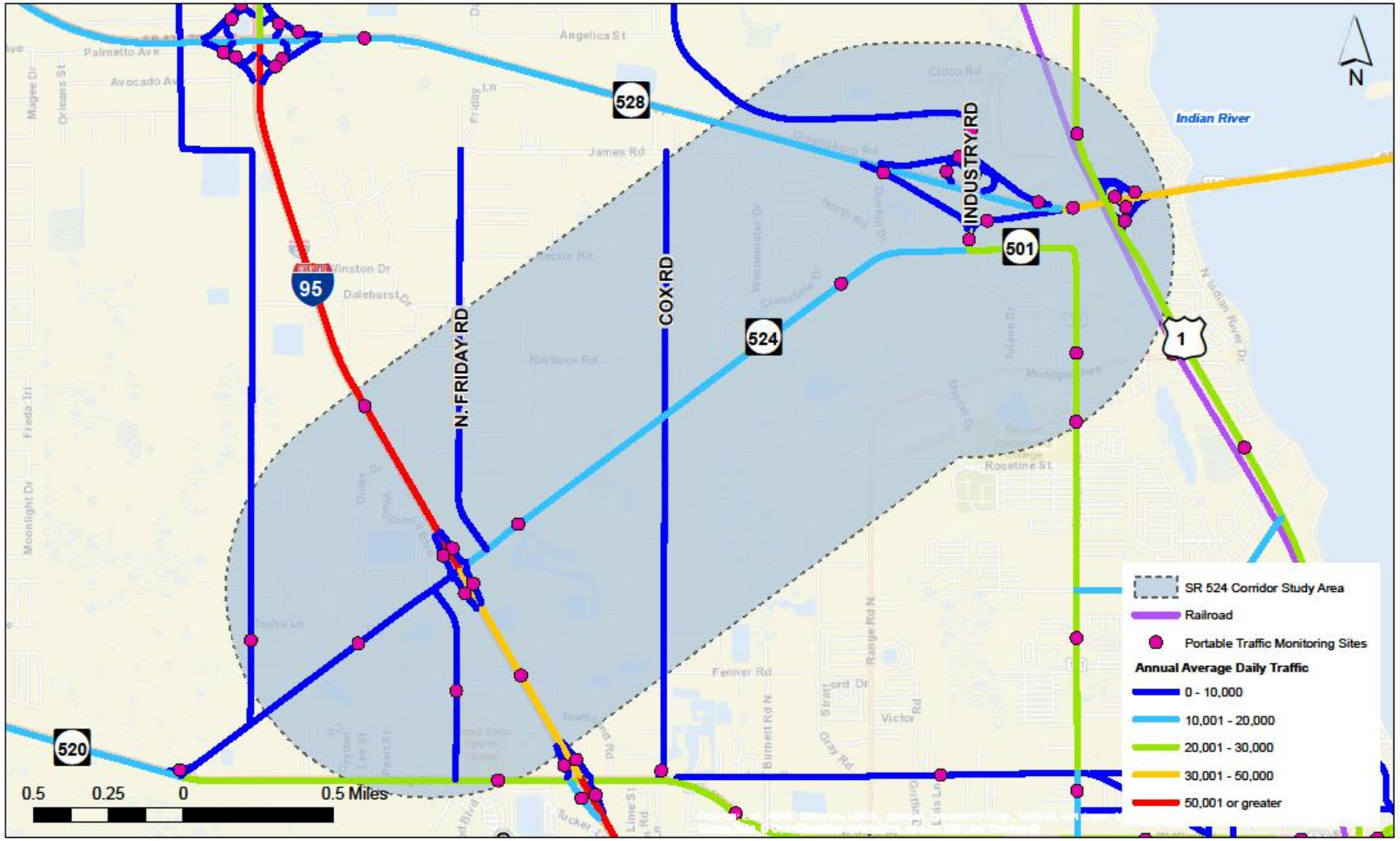
[3] While 2015 data was available for three segments in Table 3.1, only 2010 data was available for the nine study segments in Table 3.3.

Table 3.3: SR 524 Existing Segment LOS (2010)

Segment	AADT	LOS*
Friday Road South to I-95 W	8,622	LOS C
I-95 W to I-95 E	9,062	LOS C
I-95 E to Friday Road North	9,917	LOS C
Friday Road North to Cox Road	7,319	LOS C
Cox Road to Pinyon Drive	10,616	LOS C
Pinyon Drive to Westminster Drive	10,609	LOS C
Westminster Drive to London Blvd	9,277	LOS C
London Blvd to Shopping Center	14,248	LOS C
Shopping Center to Industry Road	14,420	LOS C

* LOS calculated through FDOT Generalized LOS Planning Tables, Table 1. Page 195.

Figure 3.1: Existing AADT & Traffic Monitoring Sites



Source: FDOT, 2016.

3.3 Existing Level of Service: SR 524 Intersections

In addition to segments, intersection operations were analyzed. Figures 3.2 and 3.3 present the weekday AM/PM peak hour intersection turning movement volumes for 2017. The weekday AM peak hour generally occurs from 7 to 8 AM, with the weekday PM peak hour from 4:30 to 5:30 PM.

Figure 3.2: Weekday AM Peak Hour Intersection Turning Movement Volumes (2017)

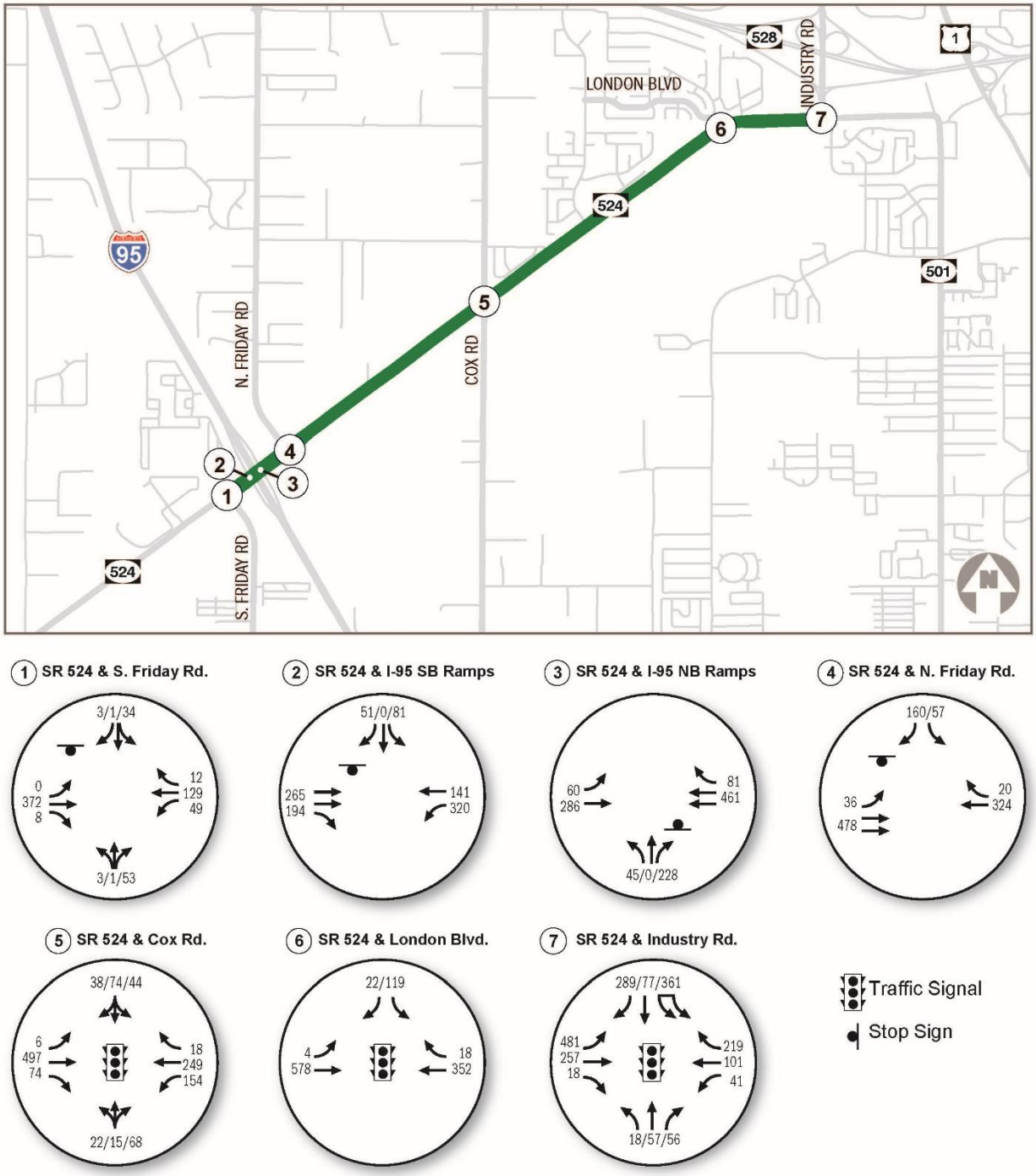
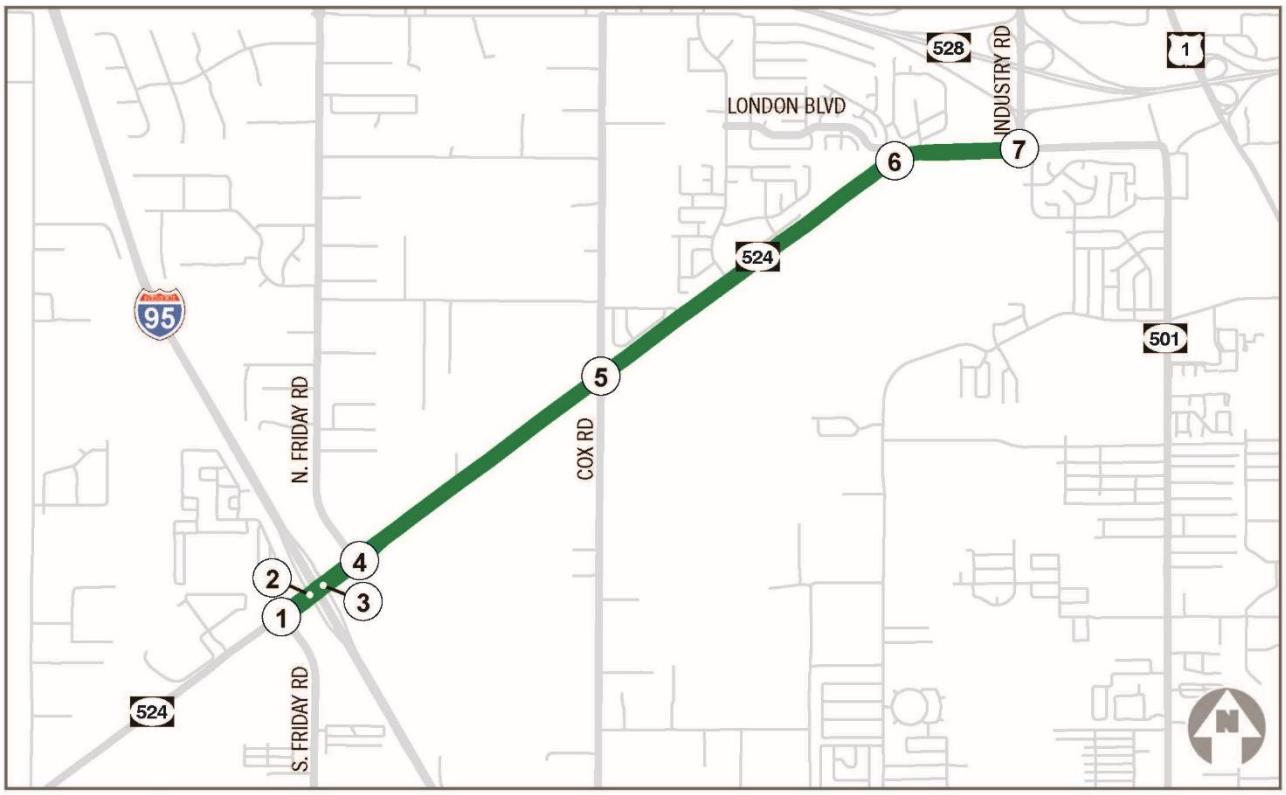
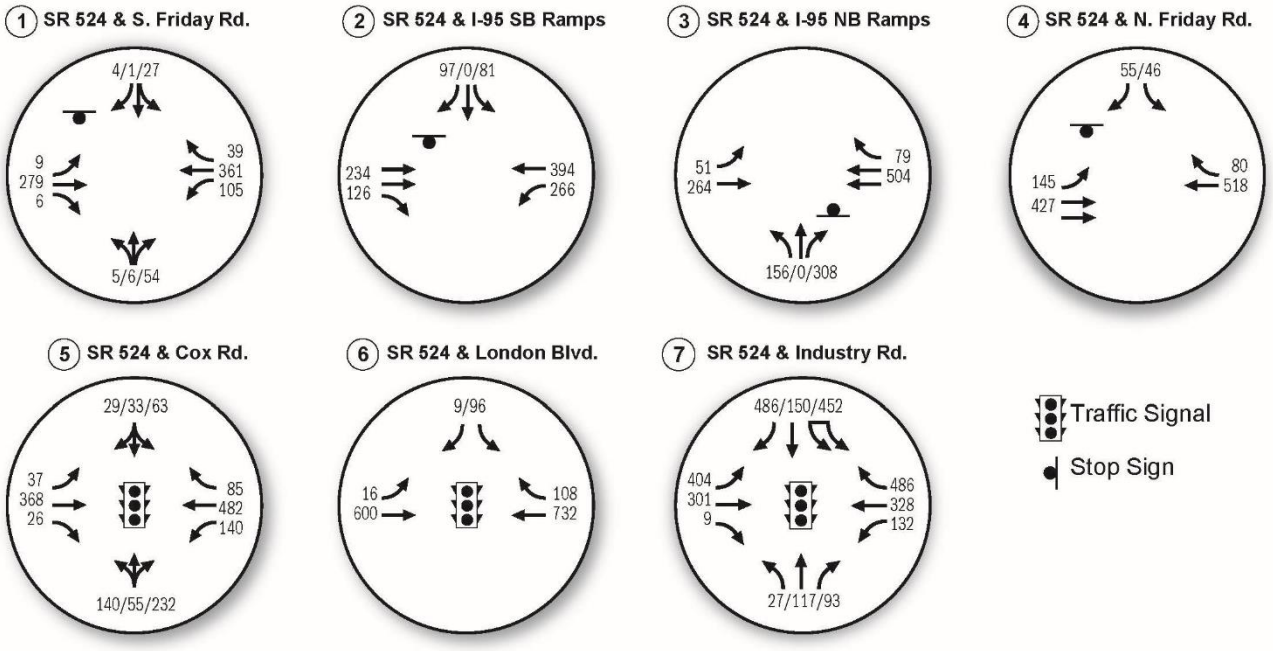


Figure 3.3: Weekday PM Peak Hour Intersection Turning Movement Volumes (2017)





Synchro Version 9.1908.56 was applied to assess intersection operations. At signalized intersections, Synchro's "Lanes, Volumes, Timings" module was used to report intersection signal delay (in seconds per vehicle), the intersection volume to capacity (v/c) ratio, and the corresponding intersection LOS. At unsignalized intersections, Synchro's "HCM Unsignalized" module was used to report the intersection's critical movement and corresponding delay, (v/c) ratio, and LOS. Turning movement data from January 2017 was used in the intersection analysis. The Synchro analysis indicated most of the Study Area intersections are currently operating at LOS C or better during weekday peak hours, with the exception of the I-95 Southbound ramp intersection, which is operating at a failing LOS during the PM Peak Hour.

Table 3.4: SR 524 Existing Intersection LOS (2017)

Intersection	Control	Peak Hour	LOS
Friday Road South	TWSC*	AM	C
		PM	D
I-95 SB Ramps	TWSC*	AM	E
		PM	F
I-95 NB Ramps	TWSC*	AM	C
		PM	C
Friday Road North	TWSC*	AM	C
		PM	C
Cox Road	Signalized	AM	B
		PM	B
London Boulevard	Signalized	AM	A
		PM	A
Industry Road	Signalized	AM	B
		PM	B

Source: Analyzed using Synchro's HCM 2000 Unsignalized Intersection Capacity Analysis & Synchro's Lanes, Volumes, Timings Methodology. *TWSC = Two-Way Stop Controlled.

3.4 Vehicle Classification Counts

Along S.R. 524, there is one portable traffic monitoring site used by FDOT since 2000, which also records vehicle classification counts. The site, Site 0411, is 0.2 miles east of the I-95 interchange along S.R. 524, and the vehicle classification data is listed below in Table 3.5. While overall AADT along the S.R. 524 corridor has generally increased in the last 5 years, the share of trucks has decreased since its record high value of 14.5 percent in 2013. Since then, the percentage of trucks on the corridor has averaged between 8.0 - 9.0 percent, with a small share of single-unit, combination, and multi-trailer trucks.

Table 3.5: Site 0411 Classification History Data

Year	AADT	Passenger Vehicles	Trucks	Single Unit Trucks	Combination Trailer Trucks	Multi Trailer Trucks
2015	10,700	92.0%	8.0%	4.0%	4.0%	0.0%
2014	10,200	91.2%	8.8%	4.0%	4.7%	0.0%
2013	10,100	85.5%	14.5%	6.0%	8.1%	0.4%
2012	9,700	90.5%	9.5%	6.3%	3.1%	0.1%
2011	9,900	90.8%	9.2%	6.8%	2.5%	0.0%
2010	10,400	90.5%	9.5%	7.1%	2.4%	0.0%

Source: FDOT, 2016.

3.5 Local Access Conditions

All intersections in the S.R. 524 study corridor have full movement access except the two unsignalized driveways serving the existing shopping centers on both sides of S.R. 524 west of Industry Road. In addition to these and the other seven major intersections, there are five added local street intersections under stop sign control along the corridor:

- Thien Thai Lane
- Pinyon Drive
- Westminster Drive
- Lance Boulevard
- Coventry Court

3.6 Field Review Observations

The only existing potential traffic conflicts in the S.R. 524 study corridor are periodic backups of traffic in the eastbound left turn lane at Industry Road, and the short weaving section for traffic from the I-95 Northbound off-ramp to turn onto northbound Friday Road North (though this is a minor movement). Crash experience in the study corridor is presented in Section 4.

3.7 Overall Travel Patterns

S.R. 524 is an important connector from Orlando to Port Canaveral. Existing posted speeds along S.R. 524 within the Study Area range from 45 to 55 miles/hour, and heavy truck traffic occurs along this stretch, coming to/from the Brevard County Central Disposal Facility (2250 Adamson Road) which is located approximately five miles away from the corridor. According to 2014 U.S. Census Data, approximately 84 percent of the Study Area's population drives alone to work, 10 percent carpool to work, and around 2 percent take transit to work, as indicated in Table 3.5.

Table 3.6: Local Resident Travel Patterns

Census Tract	Jobs	Drive Alone	Carpool	Transit
621.03	1,120	1,000 (89%)	103 (9%)	0 (0%)
621.07	39	36 (93%)	1 (1%)	0 (0%)
623.02	281	225 (80%)	28 (10%)	0 (0%)
624	1,227	998 (81%)	136 (11%)	69 (6%)
625	263	202 (77%)	32 (12%)	2 (1%)
712	69	59 (85%)	6 (9%)	0 (0%)
715	45	36 (80%)	3 (7%)	0 (0%)
Total	**3,044**	**2,555 (84%)**	**309 (10%)**	**70 (2%)**

Source: American Community Survey, 2016

Safety Analysis

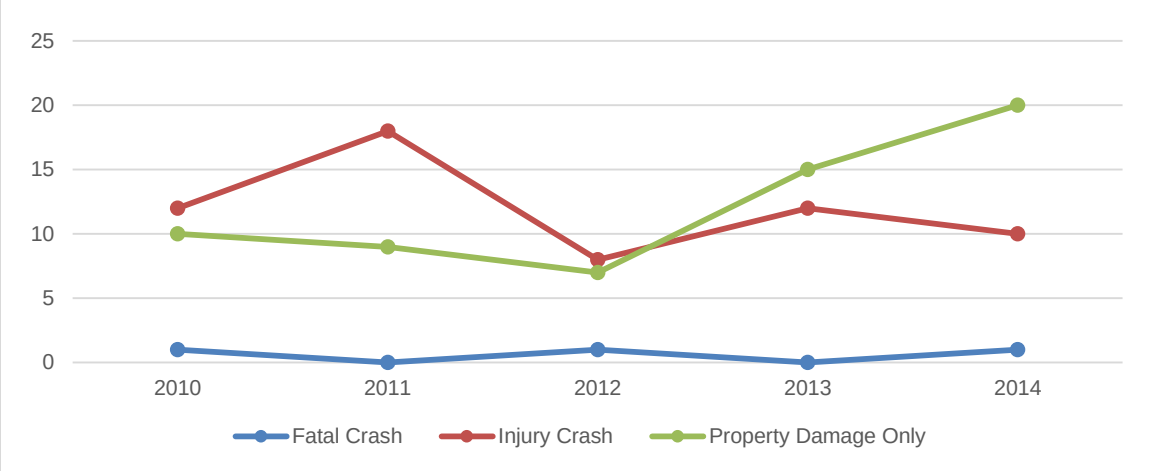
4.0 Safety Analysis

Crash data for the corridor was obtained from the FDOT Crash Analysis Reporting System (CARS) for the most recent four year period available (2010 to 2014). The data obtained from CARS was utilized to complete Table 4.1 and Figure 4.1, while the maps in Figures 4.2 and 4.3 were completed using shapefiles from the FDOT GIS online website.

4.1 Crash History

From 2010 to 2014, there were approximately 124 crashes along S.R. 524 within the Study Area. Of these crashes, three were fatal, 60 resulted in injuries and 61 only resulted in property damage. The overwhelming majority of crashes involved one or more vehicles, whereas pedestrian and bicycle involved crashes amounted to 3 percent of total crashes for this time period. Figure 4.1 displays the trend of each crash type from 2010 to 2014, and Table 4.1 indicates the crash type (users involved in the crash), the severity of the crash, and the average crash rate for each segment in the corridor. Crashes resulting in property damage have doubled from 2010 to 2014.

Figure 4.1: Crash History in Corridor (2010-2014)



Source: FDOT CAR System, 2016.

4.2 Comparison to Statewide Average

The average crash rate on S.R. 524 within the Study Area (3.78) was typically greater than the average rates recorded on comparable roads statewide (2.09). Crash rates within the I-95 interchange area (5.81) were more than triple the statewide comparable rates (2.09). Friday Road South to I-95 and London Blvd. to S.R. 501 were also segments with crash rates greatly exceeding statewide averages. Figure 4.2 illustrates where crash rates are the greatest on average in the Study Area.

Figure 4.3 depicts the locations of bicycle and pedestrian involved accidents from 2009 to 2013. There were three pedestrian crashes during this time period, near the Friday Road North intersection, between Westminster Drive and Lance Boulevard, and one at the Coventry Court intersection. A crash involving a bicycle was recorded in January 2013 in the CARS data just west of Westminster Drive at mile post 3.358; however, this data point was not present in the latest FDOT GIS file available ("Bicyclist-Involved Crash Clusters and Counts in Florida from 2009 through 2013") and was added to Figure 4.3.

Table 4.1: Crash Experience by Type (2010-2014)

Crash Location	Crashes	Impact Type						Location					
		Side Swipe	Angle	Rear End	Head-On	Other	Unknown	On-Road	Median	Shoulder	Off-Road	Outside of ROW	Unknown
Friday Road South to I-95	1	0	0	0	0	0	0	0	0	0	0	0	0
I-95 Interchange	23	1	6	2	1	8	1	10	0	2	3	0	4
I-95 to Friday Road North	12	0	2	1	1	4	0	6	0	0	0	0	2
North Friday Road to Cox Road	14	0	2	5	0	1	0	6	0	0	1	0	1
Cox Road to London Blvd	21	0	6	6	2	5	0	9	0	1	4	0	5
London Blvd. to S.R. 501	53	0	5	21	3	9	3	26	1	1	6	0	7
Total (2010-2014):	**124**	**1**	**21**	**35**	**7**	**27**	**4**	**57**	**1**	**4**	**14**	**0**	**19**

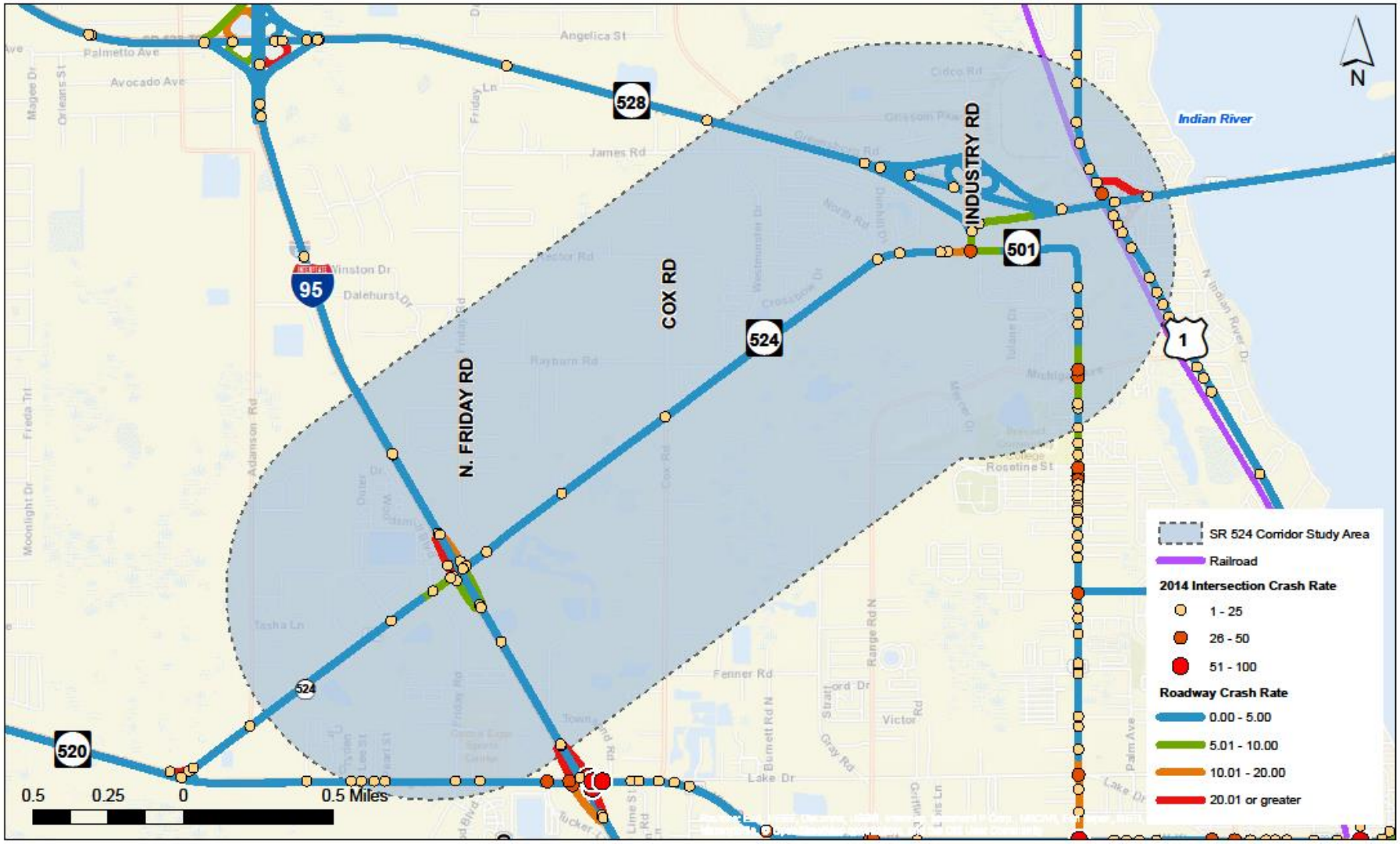
Source: FDOT CAR System, 2016.

Table 4.2: Crash Experience by Severity (2010-2014)

Crash Location	Crashes	Pedestrian Involved	Bicycle Involved	Crash Severity			*Average Crash Rate	
				Fatal	Injury	Property Damage Only	S.R. 524 Study Area	Statewide
Friday Road South to I-95	1	0	0	0	1	0	6.15	2.63
I-95 Interchange	23	0	0	1	11	11	6.98	2.25
I-95 to Friday Road North	12	1	0	0	6	6	4.30	2.63
North Friday Road to Cox Road	14	0	0	0	6	8	0.28	0.93
Cox Road to London Blvd	21	1	1	2	9	10	0.32	1.72
London Blvd. to S.R. 501	53	1	0	0	27	26	4.65	2.38
Total (2010-2014):	**124**	**3**	**1**	**3**	**60**	**61**	**3.78**	**2.09**

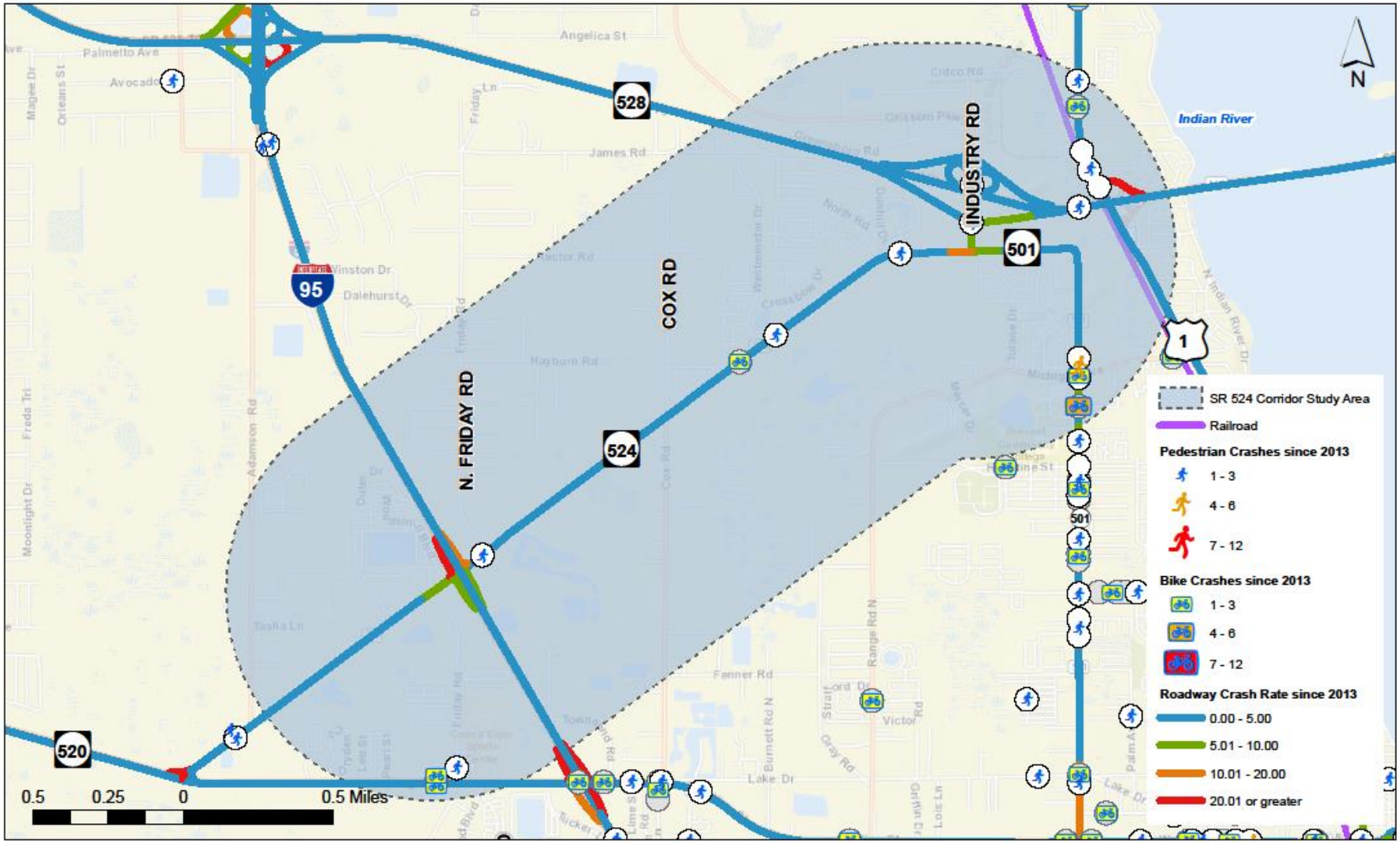
Source: FDOT CAR System, 2016.

Figure 4.2: Vehicle Crash Rate & Intersection History Map (2010-2014)



Source: FDOT, 2016.

Figure 4.3: Pedestrian and Bicycle Crash History Map (2009-2013)



Source: FDOT, 2016.

Land Use and Demographic Characteristics

5.0 Land Use and Demographic Characteristics

5.1 Overview and Study Area

This chapter presents data on existing population, housing, income, employment, and land use data within the S.R. 524 Study Area. To define the Study Area, a one mile buffer was drawn around S.R. 524 between Friday Road South and Industry Road. A map of all Census Tracts in Brevard County was overlaid, and seven of those Census Tracts were found to intersect the one mile buffer. To further narrow down the Study Area, the seven Census Tracts were clipped to include only the portions within one mile of the S.R. 524 centerline, listed in Table 5.1. The final Study Area totals 12.2 square miles. The location of the Census Tracts and one mile buffer is displayed in Figure 5.1.

Table 5.1: Study Area

Census Tract	Total Area of Census Tracts (sq miles)	Total Area of Census Tracts within Study Area (sq miles)
621.03	14.298	4.642
621.07	7.327	0.239
623.02	1.423	0.365
624	6.191	3.135
625	13.455	2.377
712	111.045	1.283
715	4.307	0.159
Total	**158.046**	**12.200**

Source: U.S. Census American Community Survey, 2014.

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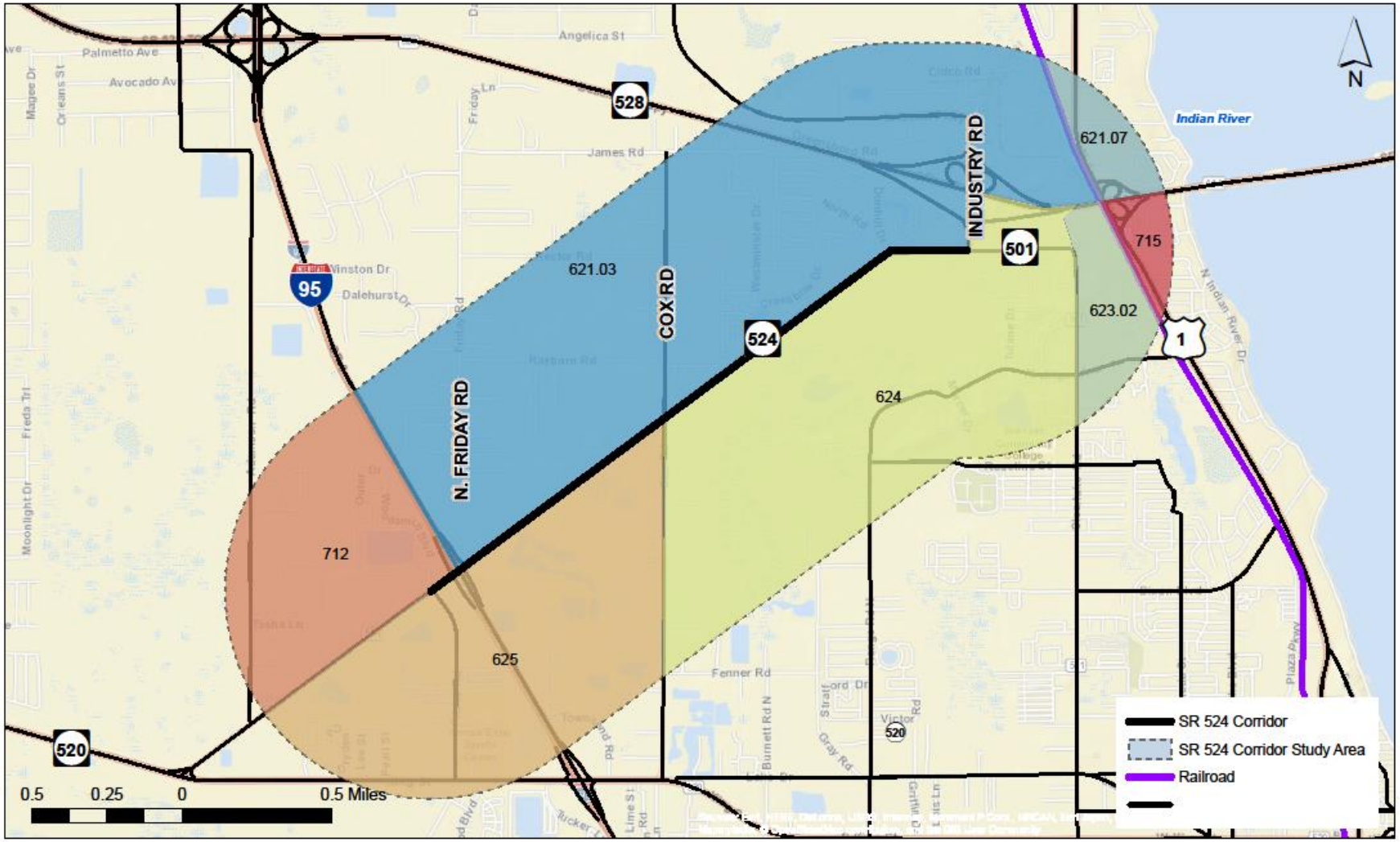
Figure 5.1: S.R. 524 Study Area



Source: U.S. Census American Community Survey, 2014.

5.1 Demographic Characteristics

Population & Housing

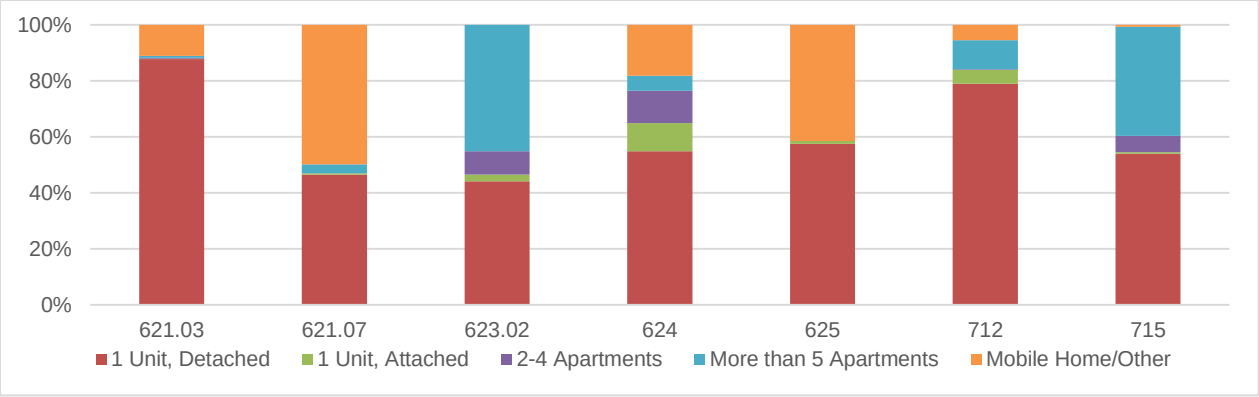
The S.R. 524 Study Area bisects the City of Cocoa (to the south of S.R. 524) and unincorporated Brevard County (to the north of S.R. 524). According to the 2014 Census data, there are an estimated 7,666 residents and 2,969 households within the Study Area (Table 5.2). Of the Study Area households, approximately 69 percent are owner-occupied, on par with County and State averages. The average median home value within the Study Area is $130,242, significantly lower than both the County and State averages. The majority of housing types are detached single-family homes, while other areas have a higher share of multi-family housing or other types (Table 5.3). However, one distinguishing characteristic of the Study Area is the significantly large share of mobile homes (as high as 49.9 percent in Census Tract 621.07 and averaging 18.1 percent), as compared with the County and State averages (7.3 and 8.4 percent, respectively).

Table 5.2: Population and Household by Census Tract

Census Tract	Population	Households	Owner-Occupied	Median Home Value	Mobile Home
621.03	2,541	952	894 (94%)	$148,200	11.0%
621.07	94	41	32 (77%)	$75,800	49.9%
623.02	813	341	119 (35%)	$61,300	0.0%
624	3,150	1,222	739 (60%)	$69,800	18.2%
625	809	308	214 (70%)	$110,800	41.2%
712	163	60	47 (79%)	$180,300	5.5%
715	97	46	32 (70%)	$265,500	0.7%
Study Area Total	**7,666**	**2,969**	**2,077 (69%)**	**$130,242**	**18.1%**
County Total	**548,891**	**221,582**	**160,380 (72%)**	**$148,200**	**7.3%**
State Total	**19,361,792**	**7,217,508**	**4,772,944 (66%)**	**$165,200**	**8.4%**

Source: U.S. Census American Community Survey, 2014.

Table 5.3: Housing Type by Census Tract



Source: U.S. Census American Community Survey, 2014.

Income, Race, and Language

Census data on income, race, and limited English proficiency within the S.R. 524 Study Area is summarized in Table 5.4. According to the 2015 Census, a significant number of households in the Study Area were classified as "low-income," with rates as high as 41.0 percent in Census Tract 623.02 and averages of approximately 20.7 percent across the Study Area. The share of residents considered "minority" according to the Census, 19.4 percent, was within the County and State averages of 16.8 and 23.8 percent, and the share of residents considered "limited English proficient," 1.4 percent, was within both the County and State average.

Table 5.4: Income, Race, and Language by Census Tract

Census Tract	Share of Study Area Residents Considered "Low-Income"	Share of Study Area Residents Considered "Minority"	Share of Study Area Residents Considered "Limited English Proficient"
621.03	9.3%	10.1%	1.3%
621.07	17.2%	4.5%	0.0%
623.02	41.0%	34.8%	0.5%
624	31.2%	24.0%	5.3%
625	29.9%	39.8%	1.1%
712	6.0%	13.0%	0.8%
715	10.5%	9.6%	0.6%
Study Area Average	**20.7%**	**19.4%**	**1.4%**
County Average	**14.0%**	**16.8%**	**1.6%**
State Average	**16.7%**	**23.8%**	**6.8%**

Source: U.S. Census American Community Survey, 2014.

Employment and Commuting

There are an estimated 3,044 employed residents in the Study Area, averaging a median income of $46,795. When analyzing Study Area jobs by occupation in Table 5.5, there is a higher share of Service jobs and Production/Transportation/Material Moving jobs, both slightly higher than the County and State averages. The Study Area also has a lower share of Management/Business/Science/Arts jobs, but there is a relatively equal distribution of averages for Sales/Office and Natural Resource/Construction/Maintenance jobs. When analyzing Study Area jobs by industry in Table 5.6, there is an overall consistency of job types and industries in Brevard County and the State of Florida.

Table 5.5: Occupation by Census Tract

Census Tract	Management, Business, Science, Arts	Service	Sales/Office	Natural Resource, Construction, Maintenance	Production, Transportation, Material Moving
621.03	37.9%	13.5%	27.6%	10.9%	10.2%
621.07	30.0%	22.6%	21.6%	7.3%	18.6%
623.02	29.3%	29.4%	24.1%	2.6%	14.8%
624	13.5%	28.7%	25.8%	20.6%	11.3%
625	30.2%	24.2%	24.9%	10.4%	10.3%
712	42.9%	14.5%	26.7%	7.2%	8.8%
715	40.7%	22.8%	26.9%	4.6%	5.1%
Study Area Total	**32.1%**	**22.2%**	**25.4%**	**9.1%**	**11.3%**
County Total	**36.9%**	**19.7%**	**25.6%**	**8.4%**	**9.3%**
State Total	**33.8%**	**20.7%**	**27.5%**	**9.0%**	**9.0%**

Source: U.S. Census American Community Survey, 2014.

Table 5.6: Industry by Census Tract

Census Tract	Agriculture, Forestry, Fishing, Hunting, Mining	Construction	Manufacturing	Wholesale Trade	Retail Trade	Transportation, Warehousing, and Utilities	Information	Finance, Insurance, Real Estate, Rental, Leasing	Professional, Scientific, Management, Administrative	Education Services, Health Care, Social Assistance	Arts, Entertainment, Recreation, Accommodation, Food Services	Other Services	Public Administration
621.03	0.0	8.7	12.7	1.3	8.7	4.4	1.8	3.7	13.9	27.6	7.7	2.1	7.4
621.07	0.5	8.7	13.4	2.7	15.1	1.7	0.7	7.6	13.3	19.2	15.2	0.0	2.0
623.02	0.0	0.0	5.2	1.1	10.9	4.2	1.7	0.7	22.3	25.5	6.4	14.1	7.7
624	0.4	13.2	5.9	1.9	16.4	2.6	0.3	2.4	8.7	15.8	20.3	7.5	4.5
625	0.0	11.1	5.5	3.3	15.7	1.2	2.2	3.0	13.8	18.4	9.1	12.9	3.7
712	0.3	6.3	10.0	1.8	10.2	4.2	2.4	8.3	11.4	19.6	7.8	6.5	11.2
715	0.0	4.4	7.4	2.8	12.6	7.9	0.9	8.5	13.9	27.4	9.0	3.6	1.6
Study Area Total	**0.2**	**7.5**	**8.6**	**2.1**	**12.8**	**3.7**	**1.4**	**4.9**	**13.9**	**21.9**	**10.8**	**6.7**	**5.4**
County Total	**0.4**	**6.1**	**10.7**	**2.0**	**13.4**	**3.9**	**1.7**	**5.2**	**13.5**	**21.5**	**10.4**	**5.1**	**6.1**
State Total	**1.1**	**6.5**	**5.3**	**2.9**	**13.4**	**5.0**	**2.0**	**7.6**	**12.6**	**21.4**	**12.0**	**5.4**	**4.8**

Source: U.S. Census American Community Survey, 2014.

In terms of commuting patterns displayed in Table 5.7, the Study Area is consistent with typical patterns of Brevard County and the State, with the vast majority of workers driving alone (between 75-90%), a small number of workers carpooling (between 8-12%), and a smaller number using transit or alternative modes of transportation (less than 3-5%).

Table 5.7: Jobs, Industry, and Travel Time by Census Tract

Census Tract	Total Workers above 16	Median Income	Travel Time to Work	Workers Who Drive Alone	Workers Who Carpooled
621.03	1,120	$53,627	26.8	89%	9%
621.07	39	$50,037	20.3	93%	15%
623.02	281	$21,042	22.0	80%	10%
624	1,227	$30,345	22.8	81%	11%
625	263	$35,646	19.0	77%	12%
712	69	$74,937	29.6	85%	9%
715	45	$62,935	20.9	80%	7%
Study Area Total	**3,044**	**$46,795**	**23.1**	**84%**	**10%**
County Total	**223,352**	**$43,281**	**24.1**	**82%**	**9%**
State Total	**8,228,557**	**$42,433**	**26.1**	**80%**	**10%**

Source: U.S. Census American Community Survey, 2014.

5.2 Existing and Future Land Use in the Corridor

The S.R. 524 Study Area covers 12.2 square miles and 4,688 parcels of land, listed in Table 5.8. Existing and future land uses for each parcel are illustrated in Figure 5.2 and 5.3, and are further described in the following sections. As Brevard County grows between today and 2040, the makeup of land uses in the S.R. 524 Study Area is expected to change as new development occurs. The Study Area Future Land Use Map is illustrated in Figure 5.4. Though the major land uses in the Study Area are projected to remain the same, the proportions of the land uses will change with new industrial/commercial developments and new residential developments. Brevard County has zoned the majority of currently vacant sites as either low-density residential (5 units/acre maximum) or medium-density residential (12 units/acre maximum), with a larger share zoned low-density. The location of future commercial and industrial land uses remain clustered near existing commercial and industrial development, to the west/east ends of the Study Area.

Table 5.8: Existing Land Use by Type

Land Use Type	Total Parcels	Total Area (sq miles)	Vacant Parcels
Single-Family Residential	3,979 (85%)	4.642 (38%)	315
Vacant	483 (10%)	0.239 (2%)	-
Industrial	134 (3%)	0.365 (3%)	66
Commercial	51 (1%)	3.135 (26%)	67
Multi-Family Residential	0 (0.0%)	0	17
Institutional	30 (1%)	2.377 (19%)	2
Agricultural	11 (0.2%)	1.283 (11%)	0
Recreation	1 (0.0%)	0.159 (1%)	0
Other	0 (0.0%)	0	16
Total	**4,688**	**12.200**	**483**

Source: Brevard County Property Appraiser, 2016.

Residential Land Uses and Demographics

Developed residential land uses make up the majority of existing land uses amongst all available parcels within the S.R. 524 Study Area, at 85 percent of the parcels and 38 percent of the land area. Most of these residential sites are located in subdivisions on the north side of S.R. 524 between Friday Road South and Industry Road.

Vacant Land Uses

Vacant land uses make up the second largest share of the S.R. 524 Study Area in terms of parcels, summarized in Table 5.9. Vacant land uses account for 10 percent of the total parcels, but only 2 percent of the land area, indicating the majority of the vacant parcels are small. Of the 483 vacant parcels, the majority (315 parcels or 65.2 percent) are zoned “Single-Family Residential” and lie adjacent to existing residential land uses north of S.R. 524 between Friday Road South and Industry Road. There are 67 vacant commercial parcels in the Study Area (13.9 percent), averaging 2.4 acres each, and 66 vacant industrial parcels (13.7 percent), averaging 1.2 acres each. Based on current development patterns and the size of vacant parcels versus available area, the Study Area is expected to continue adding single-family residential units, stabilizing its presence as a residential area within Brevard County.

Table 5.9: Existing Vacant Parcels in Study Area

Land Use Type	Vacant Parcels	Median Parcel Size
Single-Family Residential	315	0.3 acres
Commercial	67	2.4 acres
Industrial	66	1.2 acres
Multi-Family Residential	17	4.8 acres
City Owned	8	14.8 acres
Other	7	29.2 acres
Institutional	2	5.2 acres
County Owned	1	17.4 acres
Total	**483**	

Source: Brevard County Property Appraiser, 2016.

Industrial Land Uses

Industrial land uses make up the third largest share in the Study Area, with 134 parcels and 2.9 percent of the total amount. The majority of these industrial land uses are located in the northeast quadrant of the S.R. 524 Study Area, along S.R. 524 between S.R. 528 and US 1. The largest industrial parcel in the Study Area is Rinker Materials Corporation, who owns an asphalt/concrete plant on a 24.1 acre parcel just north of the S.R. 528 and Industry Road intersection. Other large industrial parcels are located directly north of the Rinker site, including a large mineral processing and refinery plant (16.8 acres), a crane and rigging machine shop (21.0 acres), and a small warehousing distribution and trucking terminal (5.2 acres). Many of the remaining industrial land uses are situated along Cox Road, south of the Study Area.

An important future land use feature to be considered is the planned development of a 270 acre Wal-Mart Distribution Center located along S.R. 524 southwest of the Cox Road intersection. The industrial parcel is currently owned by the Canaveral Port Authority, and is likely to change not only the land use makeup of the Study area, but also the vision and traffic conditions.

Commercial Land Uses

Commercial (including retail/office) land uses make up just over 1 percent of the parcels in the Study Area, but 26 percent of the land area, totaling 51 parcels. The size of most commercial parcels in the Study Area is significantly larger than that of any other land use. The largest concentration of commercial land uses is located along Friday Road South, Cox Road, and west of Industry Road as it transitions into S.R. 501.

The majority of occupied commercial parcels directly adjacent to S.R. 524 within the Study Area are gas stations, hotels/motels, fast-food restaurants, and other small businesses. The east end of the Study Area serves two primary shopping centers: Cocoa Commons on the south side (including Publix, PNC Bank, 7-Eleven, BP, Cocoa Veterinary Hospital, Pinch-a-Penny, Anytime Fitness, H&R Block, Beef O' Brady's, and Subway, and Sally Beauty Supply) and Coventry at Cocoa on the north side (CVS Pharmacy, McDonalds, and Great Wall Chinese). Just past the eastern end of the S.R. 524 as it turns into S.R.

501, there are larger establishments such as Wal-Mart, but also some pockets of smaller convenience uses, auto shops, and professional offices closer to U.S. Highway 1 (U.S. 1).

Institutional Land Uses

Institutional land uses make up less than one percent of the Study Area, with only 30 parcels, but cover 19 percent of the land area, indicating they are each large parcels. The majority of the institutional land uses are located south or southeast of S.R. 524, clustered towards the eastern end of the Study Area. The most notable institutional land uses within the Study Area are religious organizations, Eastern Florida State College (0.15 sq miles), Cocoa High School (0.14 sq miles), Florida Power & Light (0.11 sq miles), and the U.S. Postal Service. In addition, the Florida East Coast Railway owns several parcels between Industry Road and US 1 in the northeast quadrant of the Study Area, currently being considered as a future Brightline Station (0.02 acres).

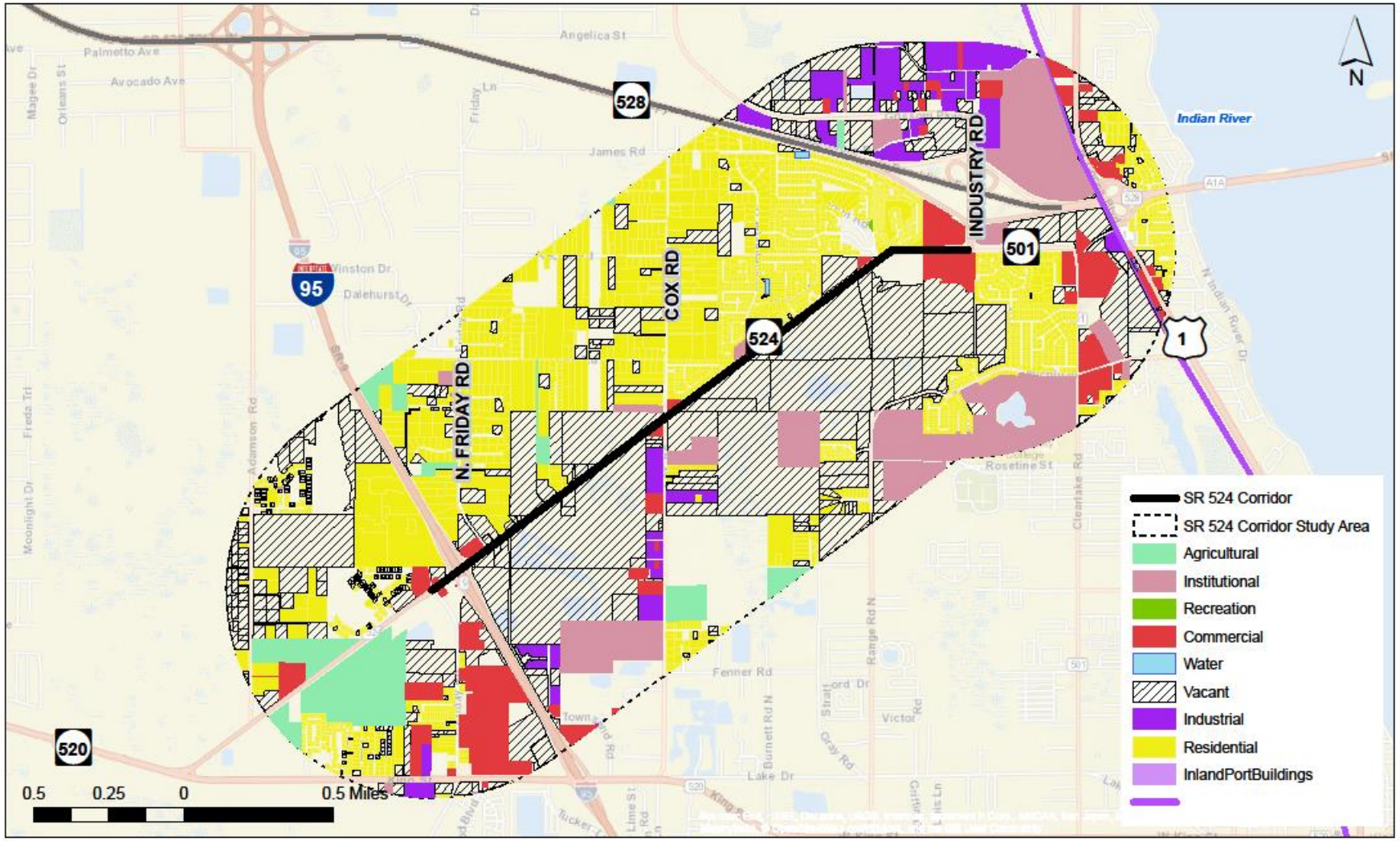
Agricultural Land Uses

Agricultural land uses make up less than one percent of the Study Area, with 11 parcels covering 1.28 sq miles (11 percent of land area).

Recreational Land Uses

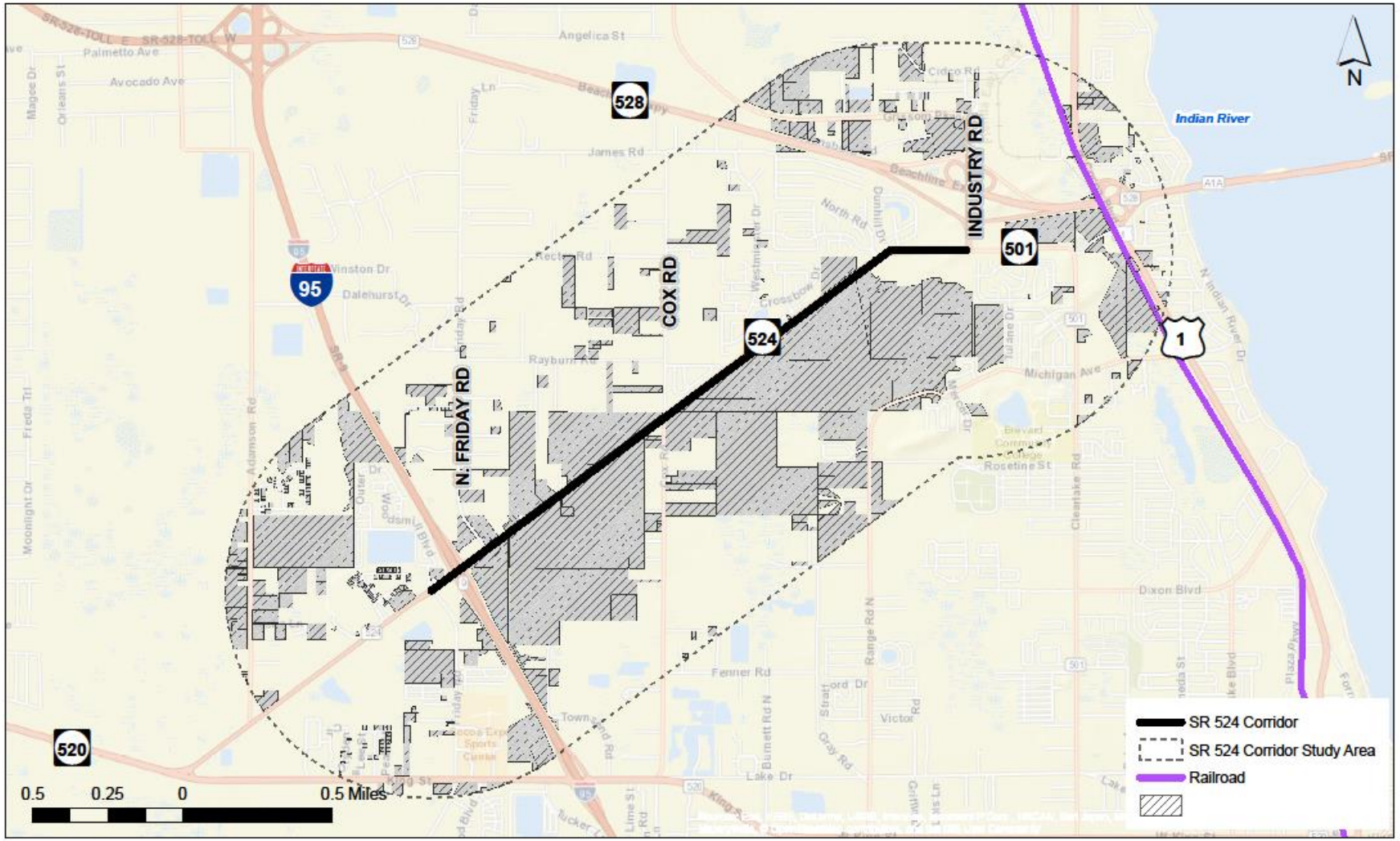
There are three recreational parcels within the Study Area: the Eastern Florida State College, the Fred Gray Golf Academy, and the Juny Ruiz Martinez Park. The Cocoa Expo Sports Center is located just outside the Study Area to the south, and is considered a commercial property by the Brevard County Property Appraisers Office (BCPAO).

Figure 5.2: Existing Land Use



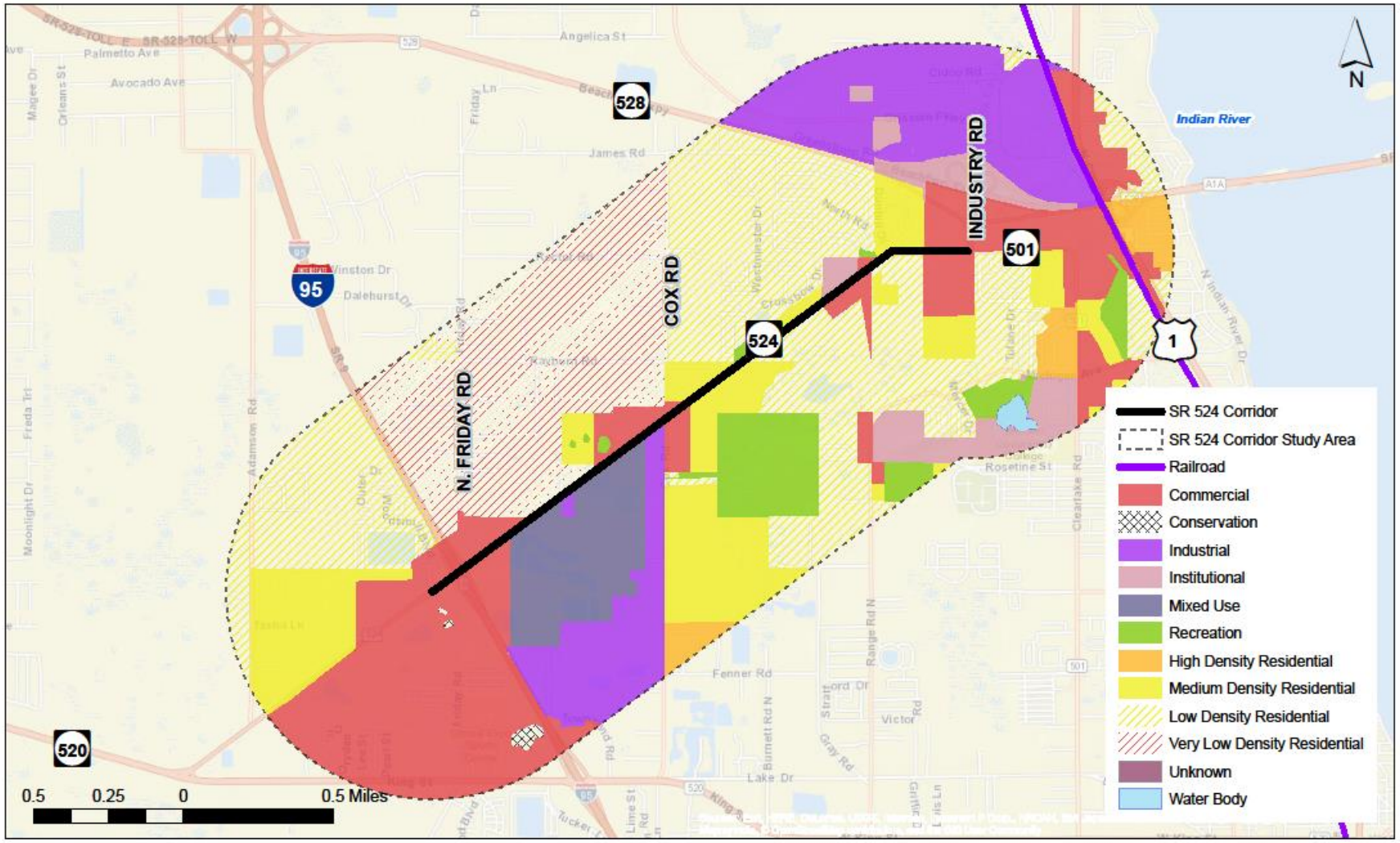
Source: Brevard County Property Appraiser, 2016.

Figure 5.3: Vacant Parcels within the Study Area



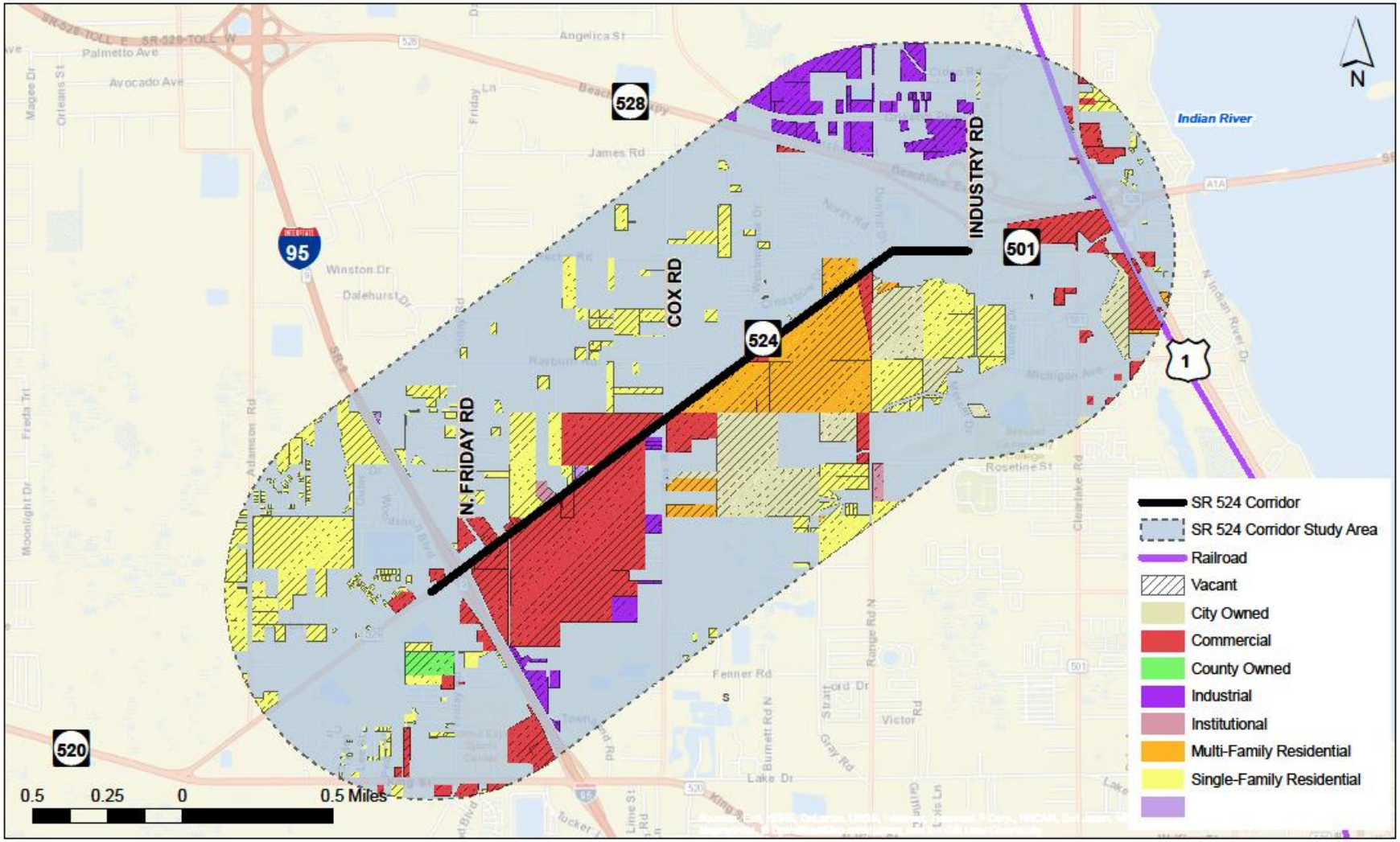
Source: Brevard County Property Appraiser, 2016.

Figure 5.4: Future Land Use



Source: Brevard County (2016) and East Central Florida Regional Planning Council (2011)

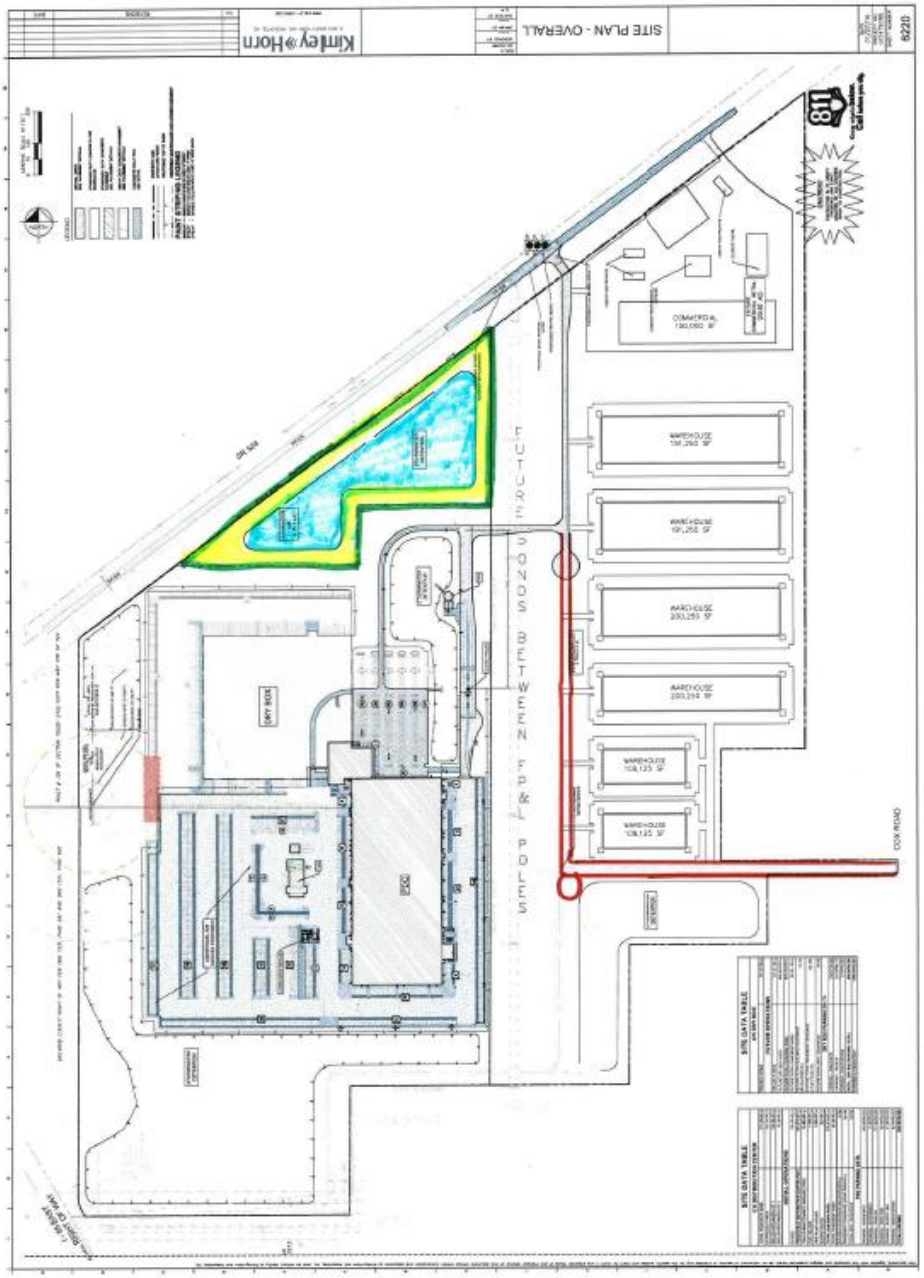
Figure 5.5: Future Zoning of Vacant Parcels within the Study Area



Source: Brevard County Property Appraiser, 2016

The largest factor that will affect future land use in the Study Area is the proposed Wal-Mart Distribution Center, proposed to take up the entirety of the vacant block of parcels south of S.R. 524, between Friday Road North and Cox Road. Wal-Mart's plan is to construct 460,000 square feet of refrigerated warehouse/distribution space to service the Central Florida market. The current proposed site plan is depicted in Figure 5.6.

Figure 5.6: Proposed Wal-Mart Distribution Center Site Plan



Source: Canaveral Port Authority, TIGER Grant Application, 2016.

Environmental Conditions

6.0 Environmental Conditions

6.1 Introduction

This Section provides an overview of the various cultural and environmentally sensitive resources within the SR 524 Study Area. The existing environmental conditions were identified and reviewed using Geographical Information Systems (GIS). Base line data reported in this section provides the basis upon which more detailed environmental assessments will be conducted in subsequent project development phases. The Florida Department of Transportation's (FDOT) Project Development and Environment (PD&E) Manual, as well as federal and state regulations, provides the basis for identifying these resources. The remainder of this Section summarizes the following topics:

- Cultural Resources
- Parks and Recreational Areas
- Waters of the US
- Water Quality
- 100-Year Floodplain
- Contaminated Sites
- Threatened and Endangered Species

6.2 Cultural Resources

Cultural resources are defined by the National Historic Preservation Act (NHPA) of 1966 and governed by federal and state regulations. Section 106 of the NHPA provides a general process for cultural resource assessments and requires that historic and archaeological resources to be considered in project planning for federally funded or permitted projects. Cultural resources or "historic properties" include any "prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in the *National Register of Historic Places (NRHP)*." The *NRHP* places high importance on its listed resources, giving them higher priority for preservation.

A desktop evaluation of cultural resources was performed to identify cultural resource potential and previously recorded historic properties, which are listed, or may be eligible for listing, in the *National Register of Historic Places* (*NRHP*).

Florida Master Site File Review

The Florida Master Site File (FMSF) database, updated in July 2016, was reviewed to identify previously recorded resources within the one mile buffer of the S.R. 524 Study Area. Each resource type identified within the Study Area is discussed below.

No archaeological sites or historic resources are determined eligible, or considered potentially eligible, for listing in the NRHP within the one mile buffer of the Study Area. Table 6.1 summarizes the resources found within the Study Area through this desktop review.

Table 6.1: Summary of Cultural Resources

Cultural Resources	Study Area
SHPO Structures	46
SHPO Bridges	1
SHPO Resource Groups	0
SHPO Cemeteries	0
Archaeological Sites	0
SHPO Surveys	25

Source: FMSF, Bureau of Historic Preservation (2016).

The Florida Division of Historical Resources created the GIS data evaluated by the State Historic Preservation Office (SHPO) including structures, bridges, cemeteries, and resource groups (historic districts, designed historic landscapes, linear resources/sites, and building complexes). This analysis reviewed the SHPO evaluation and included sites or areas which are eligible or potentially eligible for listing in the NRHP, as well as areas not yet evaluated or have insufficient information.

No bridges, cemeteries, resource groups, or archeological sites are present within the Study Area. As indicated in Figure 6.1, several SHPO surveys were conducted within the Study Area:

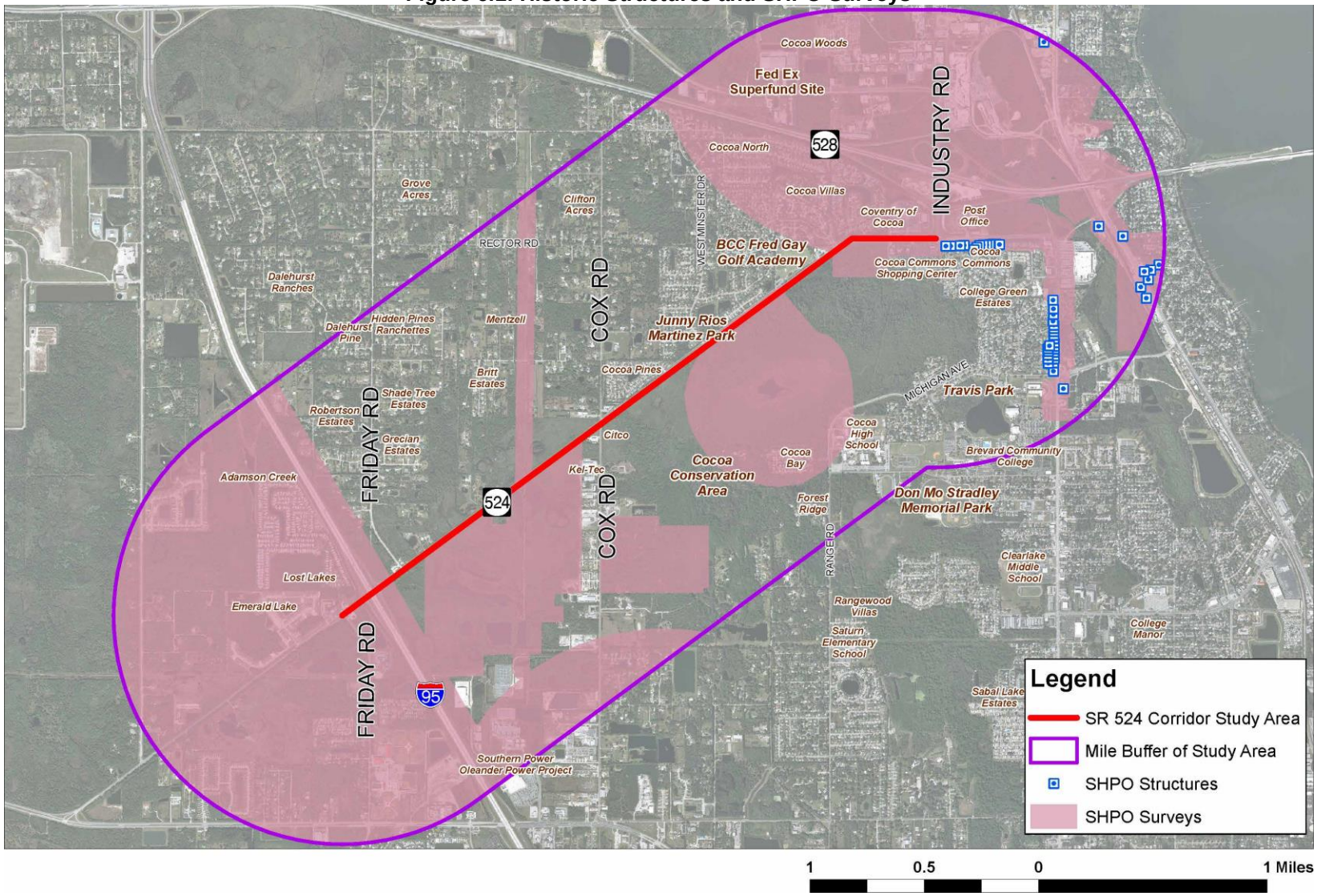
- Archaeological assessment of six selected areas in Brevard County: A first generation model
- Historic Properties Survey within the City of Cocoa, Florida
- Cultural Resource Assessment Survey (CRAS) of the proposed buccaneer gas pipeline, Florida [volume 1: final report of findings; volume 2: appendices]
- Intensive CRAS of the Brevard Crossing DRI Brevard County, Florida
- CRAS of the proposed Florida Gas Transmission staging area
- CRAS of S.R. 5 (US 1) from Barnes Boulevard to Cidco Road, Brevard County, Florida
- Archaeological reconnaissance survey of the Mud Lake restoration area, Brevard County, Florida
- Survey and evaluation of historic properties within the one-mile area of potential effect of the proposed Cocoa telecommunications site, Brevard County, Florida
- Cultural Resources Reconnaissance Survey of the Cidco Road Tower Site
- CRAS for the Interstate 95 PD&E study from State Road 514 to State Road 50, Brevard County, Florida
- Archaeological Survey of the proposed Treetop Condominiums, Brevard County, Florida
- CRAS of the Hammons parcel Brevard County, Florida
- CRAS of the S.R. 528/S.R. 524 and S.R. 528/US 1 interchange reconstruction: Addendum to CRAS of the S.R. 528 PD&E study from S.R. 520 to Port Canaveral's Terminal B interchange in Orange and Brevard County, Florida
- CRAS of the Santa Barbara development property, Brevard County, Florida
- CRAS of the Clearlake Cove development tract, Brevard County, Florida
- CRAS for the S.R. 528 PD&E study from S.R. 520 to the Port Canaveral Terminal B interchange, Orange and Brevard County, Florida
- Archaeological Survey of the Adamson Road/Huang parcel, Brevard County, Florida

- Cultural Resource Reconnaissance Survey of the Emerald Lake tract, Brevard County, Florida
- Archaeological Survey of the Adamson Road Phase II development (Fleckinger parcel), Brevard County, Florida
- Archaeological Survey of the Adamson Road Phase II development (Reis el Bara parcel), Brevard County, Florida
- Archeological Reconnaissance Survey of the Santa Barbara preserve project, Brevard County, Florida
- Historic Structures Assessment Survey US 1 from Rosa l. Jones Drive to Pine Street and US 1 from Pine Street to Cidco Road, Brevard County, Florida
- Cultural Resource Assessment Report for the All Aboard Florida passenger rail project from Orlando to West Palm Beach
- Technical Memorandum: CRAS of eight proposed ponds in support of the improvements to Clearlake Road (S.R. 501), Brevard County, Florida
- CRAS of Clearlake Road (S.R. 501) from Michigan Avenue to Industry Road, Brevard County, Florida

Historic Structures

The FMSF database indicates 46 historic structures have been recorded within the one mile buffer of the study area. As depicted on Figure 6.1, the historic structures are clustered in three areas east of the Study Area: Cocoa Commons, College Green Estates, and Carleton Terrace. None of these structures were considered eligible for *NRHP*.

Figure 6.1: Historic Structures and SHPO Surveys



Source: FMSF Database, updated July 2016.

6.3 Parklands and Recreational Areas

Section 4(f) of the U.S. Transportation Act of 1966 limits the taking of publicly owned parks, recreational areas, wildlife and waterfowl refuges, or public/private historical sites by FHWA/DOT agencies, unless *"there is no feasible and prudent avoidance alternative to the use of land; and the action includes all possible planning to minimize harm to the property resulting from such use; or the Administration determines that the use of the property will have a* ***de minimis*** *impact."*

In addition, Section 6(f) of the Land and Water Conservation Act of 1972 provides protection of public lands that were purchased with funds from this program. Potential Section 4(f) properties are protected when federal funds are used to advance transportation improvements, while Section 6(f) properties are protected regardless of funding source. Parklands and recreational areas that were reviewed for protection include:

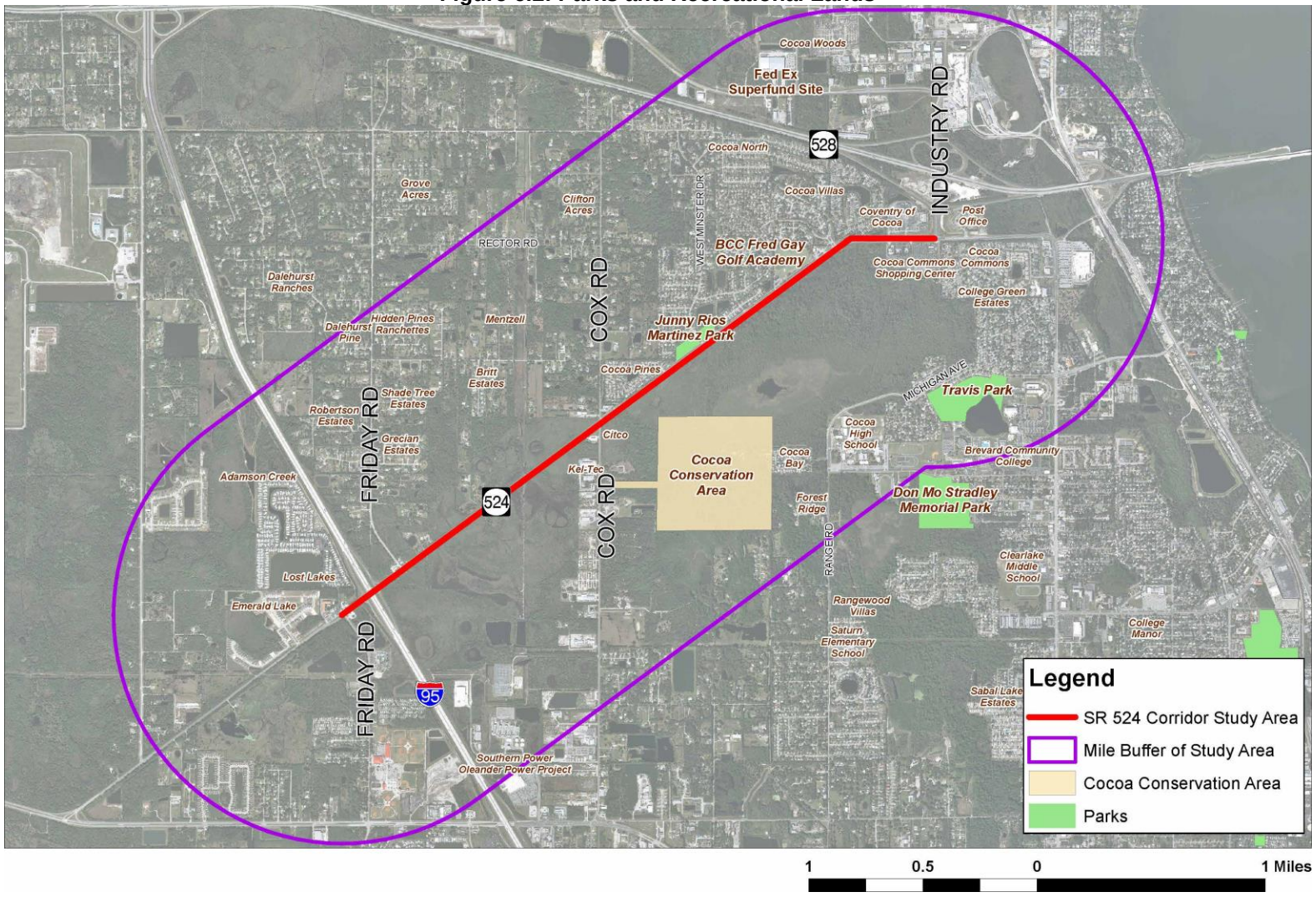
- Areas of Critical Concern
- Conservation Lands
- Existing Trails
- Florida Managed Areas
- Florida Forever Lands
- Greenways Project
- Hiking Trail Opportunities
- Parks
- Park Boundaries
- Scenic Byways
- State Park Management Zones
- State Parks

The Florida Natural Areas Inventory (FNAI) GIS database depicts three local park and recreational lands within the study area (see Figure 6.2): Travis Park, Junny Rios Martinez Park, and the Cocoa Conservation Area (see Table 6.2). The Study Area does not contain any Florida Scenic Highways and Byways, planned greenway projects, state parks, Florida Forever Lands, or Areas of Critical Concern.

Table 6.2: Park and Recreational Properties

Name	Owner/Manager	Acreage
Travis Park	City of Cocoa	26.32
Cocoa Conservation Area	City of Cocoa	164.37
Junny Rios Martinez Park	Brevard County	5.98

Figure 6.2: Parks and Recreational Lands



Source: FMSF Database, updated July 2016.

6.4 Waters of the US

The U.S. Fish and Wildlife Service's (FWS) National Wetland Inventory (NWI) database was consulted to identify wetland and surface waters occurring within the Study Area (Figure 6.3). Several large wetland communities were identified within the Study Area and classified as freshwater emergent, freshwater forested, and freshwater ponds. These classifications are based on substrate material, vegetation, and flooding regime. Table 6.3 summarizes the waters of the US within the one mile buffer of the Study Area.

Table 6.3: Summary of Waters in the US

Waters of the US	Study Area
Wetlands	269 (1,462.32 acres)
Freshwater Ponds	102 (143.95 acres)
Freshwater Emergent	106 (570.73 acres)
Freshwater Forested	61 (747.64 acres)

Source: USFWS National Wetlands Inventory, 2014

6.5 Water Quality

Water quality is also protected under the Clean Water Act of 1972. Potential environmental effects of the proposed project include impacts on water quality. To determine poor water quality within the study area, the GIS analysis included a review of the verified Impaired Waters in the State of Florida. These are water bodies that fail to attain any of its designated uses and/or meet the minimum criteria for surface waters established in the Surface Water Quality Standards (Section 62-302, F.A.C.) and the Impaired Waters Rule (Section 62-303, F.A.C.). Outstanding Florida Waters (OFW) are waters designated worthy of special protection because of their natural attributes.

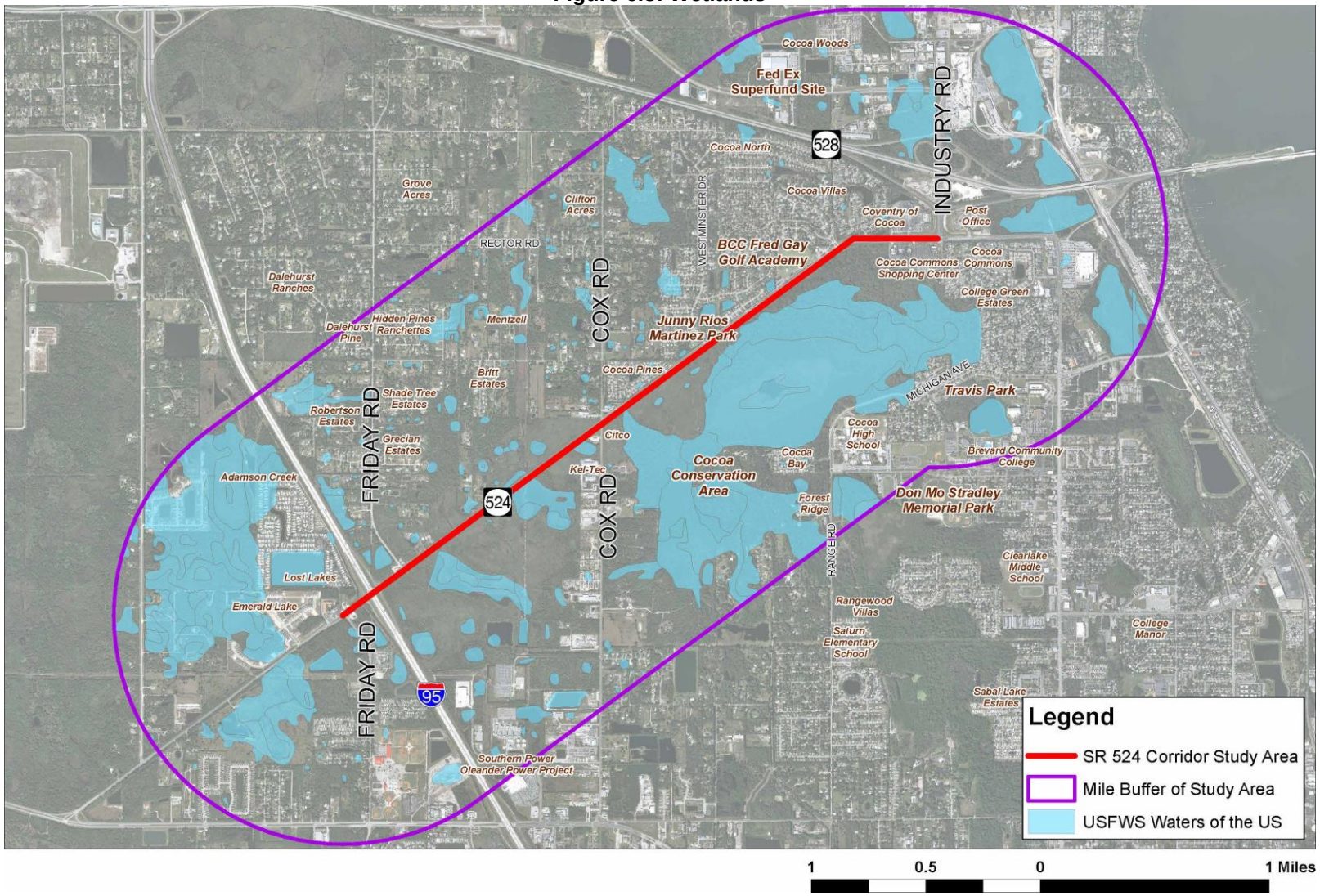
Table 6.4 summarizes the impaired wetlands within the one mile buffer of the Study Area. These wetlands, illustrated on Figure 6.4, are located within the Upper St. Johns River Basin verified by the FDEP in October 2014 for containing fecal coliform, dissolved oxygen, and mercury in fish tissue. No OFWs occur within the study area.

Table 6.4: Summary of Impaired and Outstanding Waters

Water Quality Designation	Within Study Area
Impaired Waters	546.51 acres
Outstanding Florida Waters	0 acres

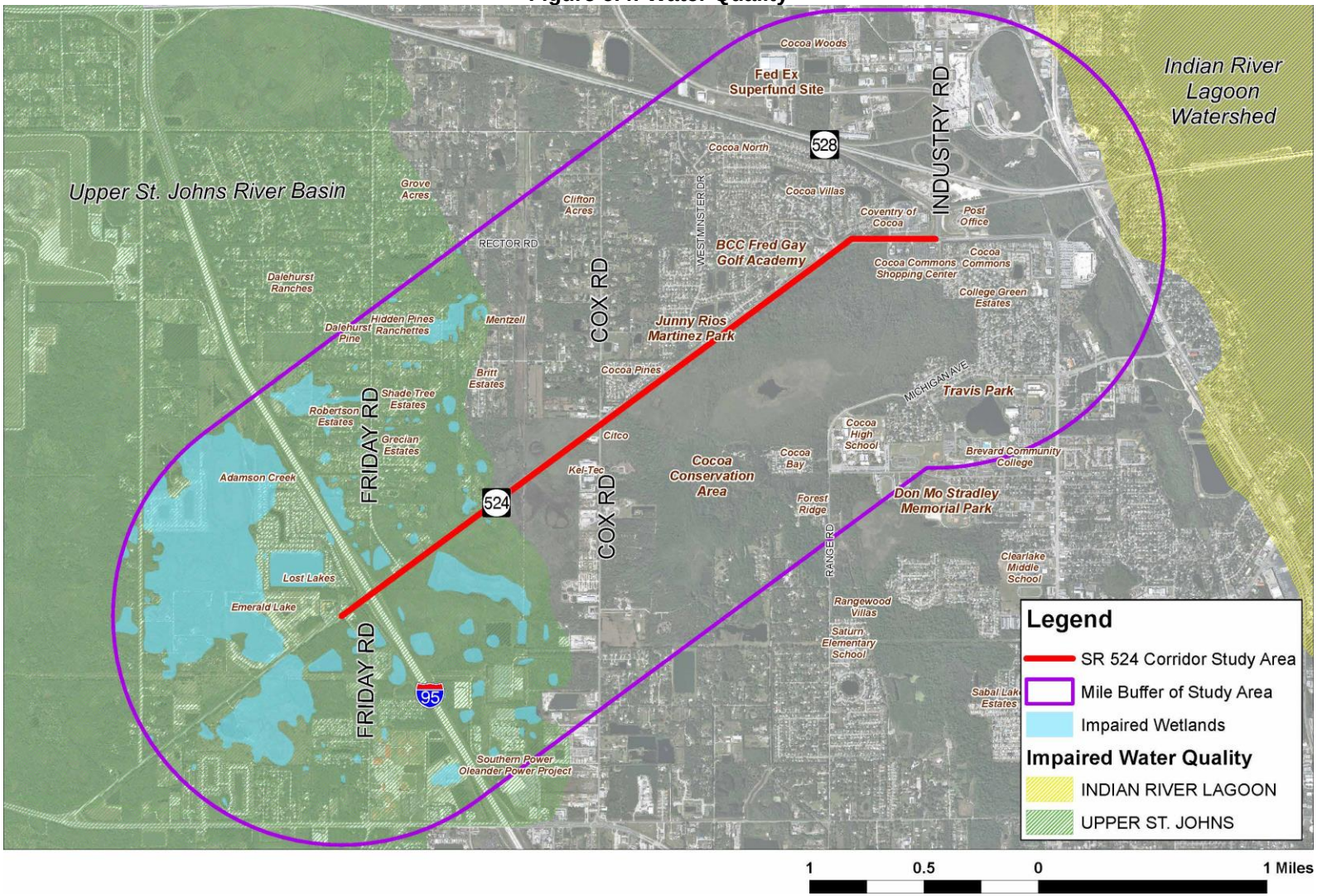
Source: Florida Department of Environmental Protection, 2012

Figure 6.3: Wetlands



Source: USFWS National Wetlands Inventory October 2014**.**

Figure 6.4: Water Quality



Source: USFWS National Wetlands Inventory October 2014**.**

6.6 100-Year Floodplain

Floodplains and floodways are protected by Executive Order 11988, "Floodplain Management", USDOT Order 5650.2, "Floodplain Management and Protection", and Federal-Aid Policy Guide 23 CFR 650A. The regulations are intended to avoid or minimize highway encroachments within the 100-year floodplains, and to avoid supporting land use development potentially impacting the floodplain values.

To identify 100-year floodplain regions within the Study Area, a GIS review was conducted using the Florida Digital Flood Insurance Rate Maps (DFIRM) – May 2016. The DFIRM data is used by the Federal Emergency Management Agency (FEMA) to designate the Special Flood Hazard Areas (SFHAs).The primary risk classification for SFHAs used is the one-percent-annual-chance flood event, or 100-year floodplain. The flood zone designations depicting 100-year floodplain include flood zones A, AE, and AH. Zone A is an approximate method of analysis, Zone AE is determined by detailed methods of analysis using base flood elevations, and Zone AH is annual chance shallow flooding with a constant water-surface elevation where average depths are between one and three feet. According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM), the entire study area is designated as part of the 100-year floodplain including Type A and AE zones (Figure 6.5). Potential impacts to floodplains will be assessed further as part of the next phase of project development.

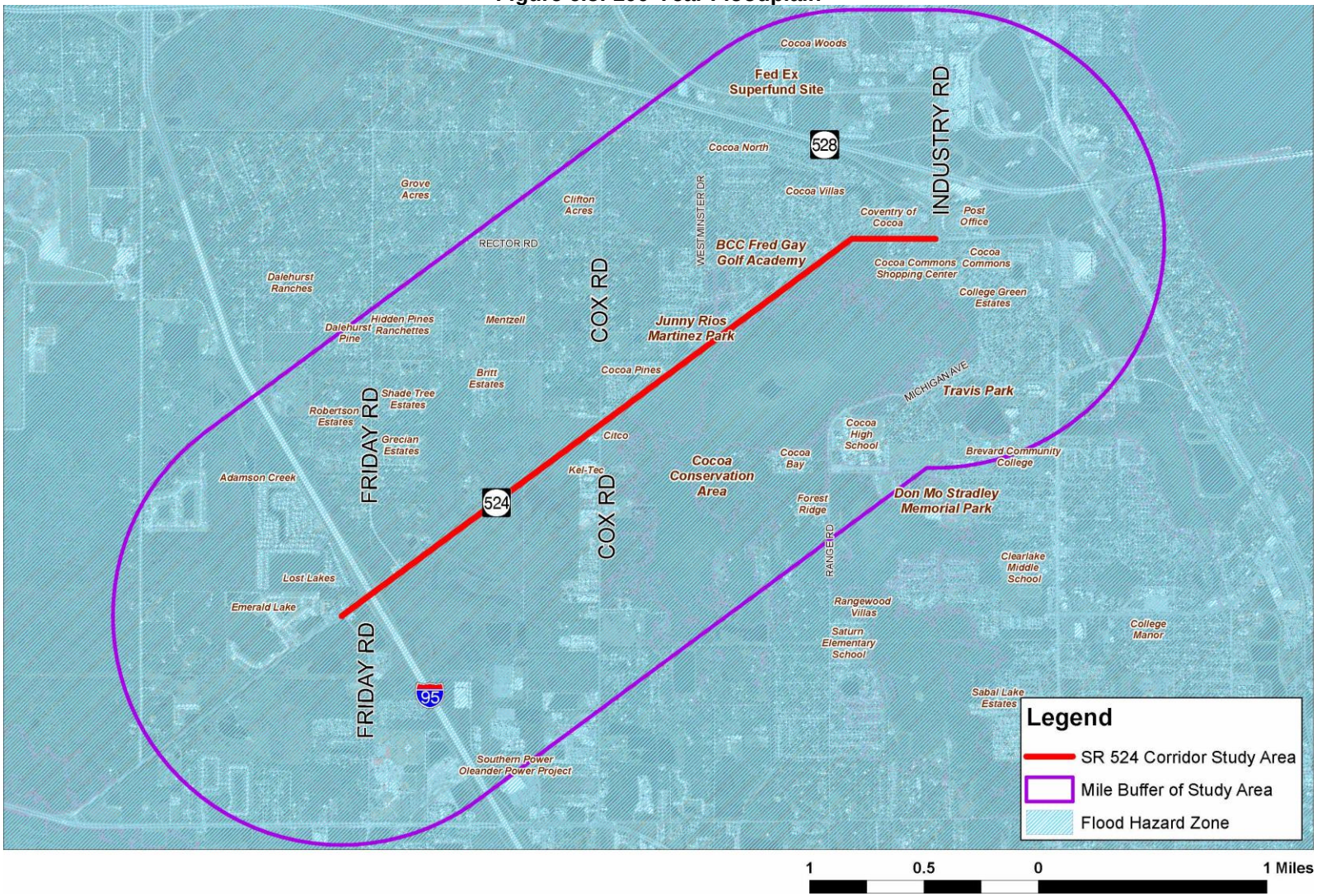
6.7 Contaminated Sites

A contamination screening generally follows the Federal Highway Administration's Technical Advisory T 6640.8A, dated October 30, 1987, and the FDOT's Project Development and Environmental Manual, Part 2, Chapter 22, dated January 2008. Contamination screening of the study area will help to determine the potential for contamination from adjacent facilities, sites, or places. The GIS review for the S.R. 524 Study Area identified facilities, sites, or places subject to environmental regulation or of environmental interest via the following environmental programs:

- Federal National Priorities List (NPL) (Superfund)
- Resource Conservation and Recovery Act (RCRA) Large Quantity Generators (LQGs)
- Florida Department of Environmental Protection (FDEP) Site Investigation Sites (SIS) Bureau of Waste Cleanup, Division of Waste Management. - none
- FDEP Compliance/Enforcement Tracking System (COMET)
- FDEP Storage Tank & Petroleum Contamination/Cleanup Monitoring (STCM)
- FDEP Hazardous Waste (HAZARD) - none
- FDEP Fuel Facility Registry
- State and Local Brownfield Sites Databases - none
- State and Local Solid Waste Disposal Site Inventories
- EPA Clean Energy Department Emissions & Generation Resource Integrated Database

Within the study area, 33 contaminated/cleanup sites were identified, consisting of petroleum cleanup sites. Tables 6.5 through 6.11 list Federal and State NPL Superfund Site, Solid Waste Facilities, Fuel Facilities, STCM, COMET, and RCRA LQGs. Figures 6.6 and 6.7 presents the Contaminated and Potentially Contaminated sites within the study area. No FDEP SIS sites, Hazardous Waste, or Brownfield sites exist within the Study Area. Highlighted sites are those adjacent to SR 524 within the Study Area.

Figure 6.5: 100-Year Floodplain



Source: FEMA FGDL Database, May 2016

Table 6.5: National Priority List (NPL) Superfund Sites

Site	Address	City
Fed Ex Cocoa	3155 Grissom Parkway	Cocoa Beach

Source: US EPA FGDL Database, March 2016

Table 6.6: Resource Conservation and Recovery Act Large Quantity Generators

Site	Address	City
Beyel Brothers Inc	1435 Cox Rd	Cocoa
Beyel Brothers Inc	550 Cidco Rd	Cocoa
Braden Kitchens Inc	515 Industry Rd S	Cocoa
Brevard Community College	1519 Clearlake Rd	Cocoa
Brevard County Cocoa High School	2000 Tiger Trail	Cocoa
Brevard Robotics Inc	1485 Cox Rd	Cocoa
Camping World Inc	4700 King St	Cocoa
Cemex Construction Materials Florida LLC	3345 E Industry Rd	Cocoa
Climatrol Inc	529 S Industry Rd	Cocoa
Cocoa Auto Salvage	810 S Industry Rd	Cocoa
City of Cocoa	28400 East SR 520	Cocoa
CSC Holding Corp	605 Townsend Rd	Cocoa
CVS Pharmacy #4280	2324 State Road #524	Cocoa
Diamond Back Airboats	4125 Pine Tree Pl	Cocoa
Diamondback Manufacturing, LLC	1060 Cox Road	Cocoa
Federal Express Ground	3155 Grissom Pkwy	Cocoa
Florida Dep HWCS 0957 #092	2409 North Cocoa Boulevard	Cocoa
Florida Dep HWCS Site H055 #168	529 Industry Rd S	Cocoa
Florida East Coast Railway LLC	3321 Beau Geste Rd	Cocoa
Florida Spill Response Corp	605 Townsend Rd # A	Cocoa
FPL Brevard Substation	880 Cox Rd	Cocoa
FPL City Point Substation	3303 Beau Geste Rd	Cocoa
Hess Corporation	1600 Clearlake Rd	Cocoa
Huntley Jiffy Food Stores #526	1990 Michigan Ave	Cocoa
J B Airboats	4105 Pine Tree Pl	Cocoa
Larrys Pollution Solutions LLC	730 Cidco Rd	Cocoa
Mobil Oil Corp Ss #Cn8	5555 SR 524	Cocoa
Newlube Environmental Services Inc	771 Industry Rd S	Cocoa
Oleander Power Project, LP	555 Townsend Road	Cocoa
Portable Air	555 Industry Rd S	Cocoa
Procter & Gamble - Vacant Lot	Corner Of Jimbo Rd & Satellite Rd	Cocoa
Recovery Corporation of Florida	755 Industry Rd S	Cocoa
Skippers III Inc	2409 North Cocoa Blvd	Cocoa
Sloan Construction Co Inc	800 Industry Rd S	Cocoa

Table 6.6: Resource Conservation and Recovery Act Large Quantity Generators (Continued)

Site	Address	City
Sloan Construction Co Inc	110 Greensboro Road	Cocoa
Space Exploration Technologies Inc	550 Cidco Rd #1	Cocoa
Sunoco Service Station #08754277	5000 W SR 520	Cocoa
Sunset Wire & Cable Inc	518 Industry Rd S	Cocoa
W & J Construction Corp	700 Cox Rd	Cocoa
Wal-Mart #0174-03	2800 Clearlake Rd	Cocoa
Watson Paving Inc	1445 Cox Rd	Cocoa
Zippy Mart Fl516	4875 W Hwy 520	Cocoa
Zippy Mart Fl522	4900 SR 524	Cocoa

Source: FDEP FGDL Database, June 2016

Table 6.7: FDEP Compliance/Enforcement Tracking System

Site	Address	City
Scala, Steven	SR 520	Cocoa
Oleander Power Plant (Erp)	555 Townsend Road	Cocoa
Brown, Donnie And Robin	2565 Fairfield Drive	Cocoa
Nugent, Steven	4915 Shade Tree St.	Cocoa
Rust, William & Pat (Erp)	2655 Cox Road	Cocoa
Harrison, John And Doreen	4300 Rector Road	Cocoa
Hart, James	4955 Shade Tree Street	Cocoa
Fackler, Darin L (ERP)	4280 Rayburn	Cocoa
Jones, Edward (ERP)	Adamson Road	Cocoa
Michael Grove	4135 Rayburn Rd. (Activity Location)	Cocoa
Smith, Stacie M (ERP)	1151 Gary Hunt Rd	Cocoa
Chamberlin, Yvette (ERP)	P.O. Box 237462	Cocoa
Smith, Brandon (ERP)	1956 Quail Ridge Court, #1804	Cocoa
Crescini, Bruce (ERP)	1375 Friday Road	Cocoa
Wood, Christina (ERP)	2905 Plaza Way	Melbourne
My Place Realty (ERP)	501 W. King Street	Cocoa
Clark, Rosita (ERP)	1229 Holmes Street	Cocoa
ERA Showcase Properties & Investments (ERP)	835 Executive Lane, Suite 110	Rockledge
Habenicht, Karl (ERP)	P.O. Box 954	Sharpes
Yates, Linda (ERP)	5032 Fleetwood Place	Cocoa
Rd Development/Pear St Lot 17 (ERP)	Lot 17 Pearl St	Cocoa

Table 6.7: FDEP Compliance/Enforcement Tracking System (Continued)

Site	Address	City
Morato, Jose (ERP)	P.O. Box 320694	Cocoa Beach
Moslemian, Davood & Shahrzad (ERP)	Pearl Street	Cocoa
Lebida, Roger & Susan (ERP)	Lot 16 Pearl	Cocoa
Re/Max Aerospace Realty (ERP)	1311 S. US Highway 1	Rockledge
Atkinson, Renee (ERP)	755 Adamson Road	Cocoa
Rd Development/Lot 14 (ERP)	Lot 14 Pearl Street	Cocoa
Stephenson, William H. (ERP)	2540 Fairfield Drive	Cocoa
Messer Construction Corp (ERP)	4131 Rector Road	Cocoa
Glenn, Amos J. (ERP)	2527 Stratford Drive	Cocoa

Source: FDEP FGDL Database, June 2016

Table 6.8: Fuel Facilities (Potential Contamination)

Site	Address	City
Sunshine Food Mart #45	402 High Point Drive, Suite 101	Cocoa
Sunoco #0611-6792	10 Industrial Hwy, Building G N Loop Rd	Cocoa
Sunrise Food Mart #62	380 Commerce Pkwy	Cocoa
Cocoa Mobil	21 W Fee Ave	Cocoa
Sunrise Food Mart #88	380 Commerce Pkwy	Cocoa
Hess #09479	1 Hess Plaza	Cocoa
Sunshine Food Mart #121	402 High Point Drive	Cocoa
Sunrise Food #83	380 Commerce Pkwy	Cocoa
Kwik Stop	5000 W Sr 520	Cocoa
Sunrise Food Mart #118	380 Commerce Pkwy	Cocoa
Sunshine Food Mart #347	402 Highpoint Dr	Cocoa

Source: FDEP GeoData Directories for Fuel Facilities, October 2014

Table 6.9: Solid Waste Facilities

Site	Address	City
RMD Americas of Florida, LLC	550 Cideo Road	Cocoa
Progressive Recycling	520 Cidco Road	Cocoa
Cocoa Expo Sports Center	500 Friday Road	Cocoa

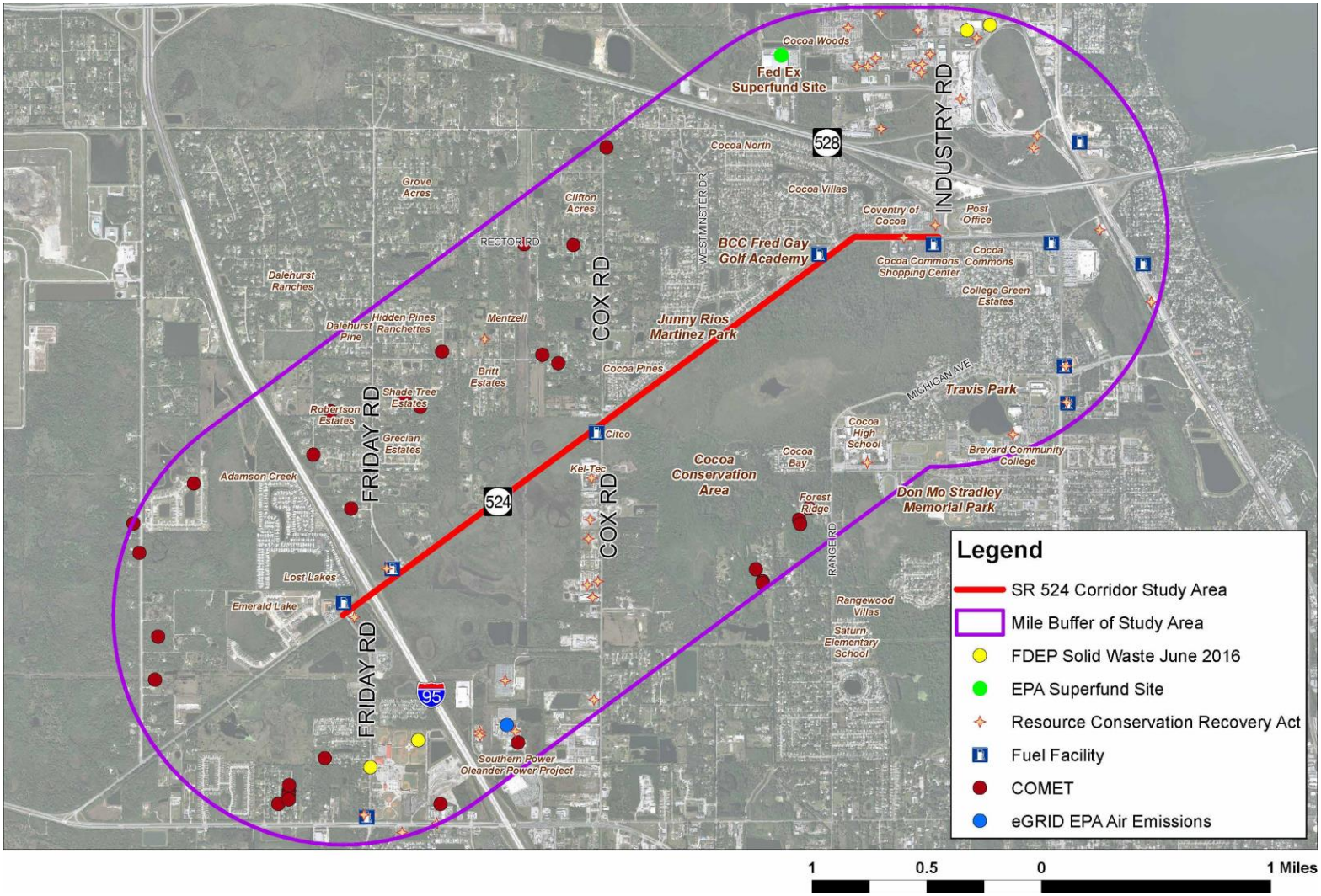
Source: FDEP FGDL Database, June 2016

Table 6.10: EPA Emissions & Generation Resource Integrated Database

Site	Address	City
Southern Power Oleander Power Project	605 Townsend Road	Cocoa

Source: EPA Clean Energy Department, 2012

Figure 6.6: Fuel and Potential Contaminated Sites



Source: FEMA FGDL Database, May 2016.

Table 6.11: FDEP Storage Tank & Petroleum Contamination/Cleanup Monitoring

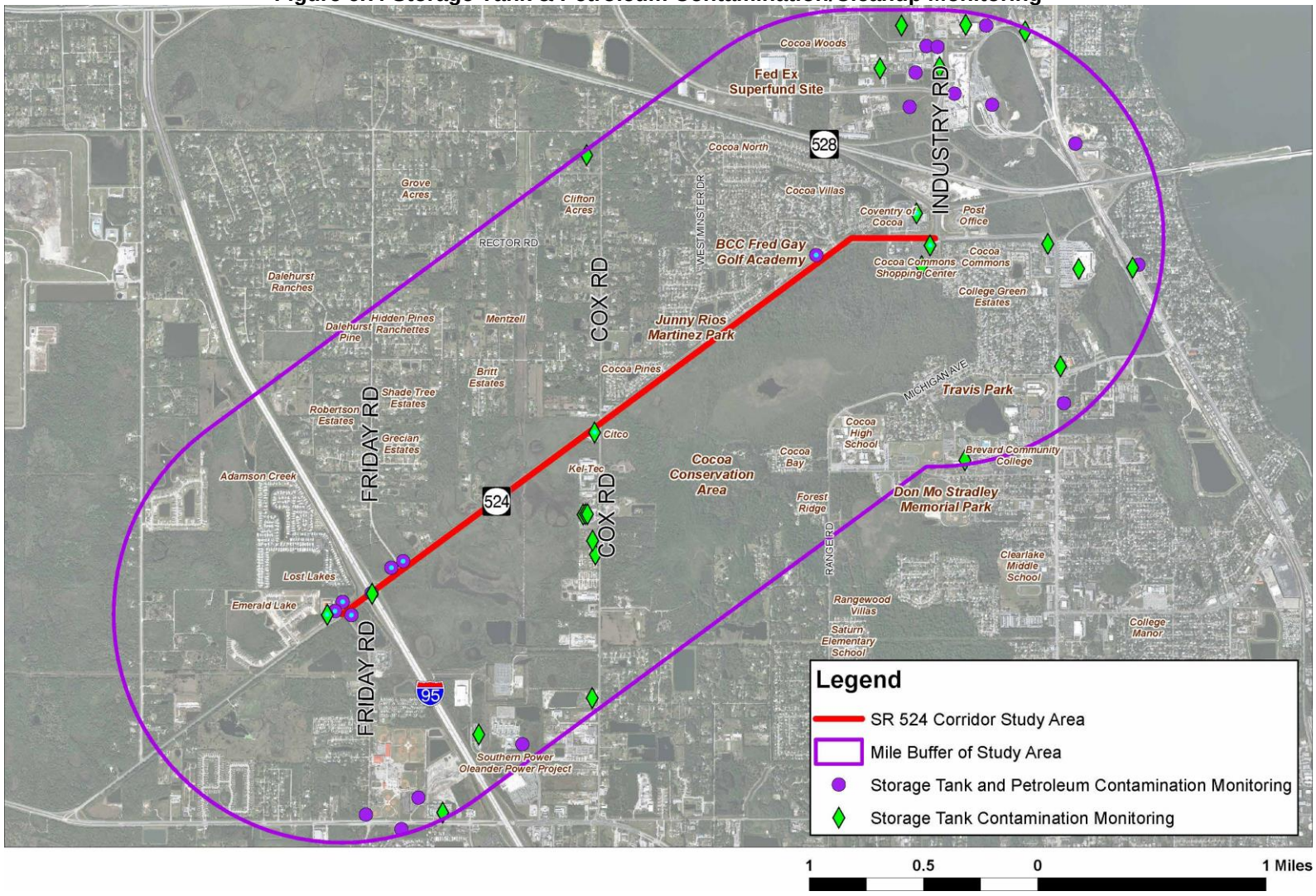
Site	Address	City
Florida Spill Response Corp	605 Townsend Rd	Cocoa
Wal-Mart Supercenter #174	2700 Clearlake Rd	Cocoa
60 Minute Cleaners	2300 Hwy 524 #102	Cocoa
Beyel Bros Inc	1435 Cox Rd	Cocoa
Brevard Ohio Corp	5580 SR 524	Cocoa
Cemex - Cocoa / City Point	3345 E Industry Rd	Cocoa
Central Sand Co	3360 E Industrial Rd	Cocoa
Church On The Way	4680 S King St	Cocoa
Climatrol Inc	529 S Industry Rd	Cocoa
Danella Construction	717 Industry Rd S	Cocoa
Division Of Forestry	4800 W Hwy 520	Cocoa
FL East Coast Railway	3325 N US Hwy 1	Cocoa
FL Rentals	2600 Cox Rd	Cocoa
Goodson Paving Inc	630 Cidco Rd	Cocoa
National Car Rental System	2705 N Cocoa Blvd	Cocoa
Poinsett Charter Service	4500 Pine Cone Pl	Cocoa
Publix Super Market	2301 SR 524 #150	Cocoa
Schenck Co Of Cocoa	603 Cidco Rd	Cocoa
Scott Property	581 E Industry Rd	Cocoa
Tarmac FL Inc-Glover Oil Co Inc	445 Cidco Rd	Cocoa
W & J Construction Corp	700 Cox Rd	Cocoa
Watson Paving Inc	1445 Cox Rd	Cocoa
Watson Paving-Glover Oil Co	1450 Cox Rd	Cocoa
Beyel Brothers Inc	550 Cidco Rd	Cocoa
Container Recovery Corp	520 Cidco Rd	Cocoa
Oleander Cocoa Power Plt	555 Townsend Rd	Cocoa
7-Eleven Store #37235	2201 Hwy 524	Cocoa
Chevron #47061	I 95 & SR 524	Cocoa
Days Inn	5600 Hwy 524	Cocoa
Kwik Stop	5000 W Hwy 520	Cocoa
Mobil #02-Cn8	5555 Hwy 524	Cocoa
Speedway #6591	1600 Clearlake Rd	Cocoa
Sunoco #0611-6792	3500 SR 524	Cocoa
Sunrise Food Mart #118	5550 Hwy 524	Cocoa
Sunrise Food Mart #62	4301 Hwy 524	Cocoa
Sunrise Food Mart #83	2700 N US 1	Cocoa
Sunrise Food Mart #88	1990 Michigan Ave	Cocoa
Sunshine Food Mart #121	1907 Hwy 524	Cocoa

Table 6.11: FDEP Storage Tank & Petroleum Contamination/Cleanup Monitoring (Continued)

Site	Address	City
Sunshine Food Mart #347	3230 N Cocoa Blvd	Cocoa
Sunshine Food Mart #45	4900 Hwy 524	Cocoa
Zippy Mart #516	4875 W Hwy 520	Cocoa
Brevard Community College	1519 Clearlake Rd	Cocoa

Source: FDEP GeoData Directories for Fuel Facilities, October 2014

Figure 6.7: Storage Tank & Petroleum Contamination/Cleanup Monitoring



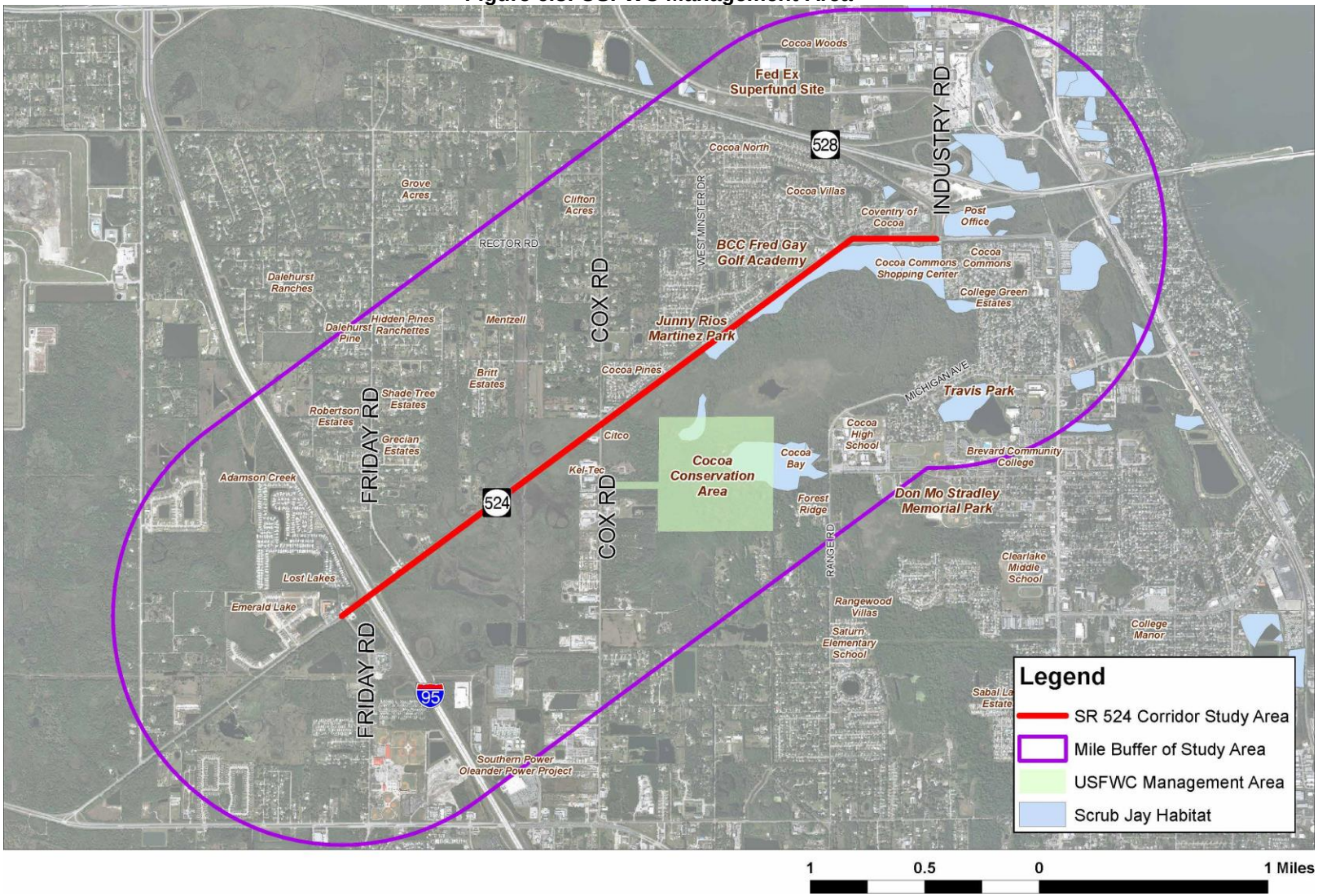
Source: FEMA FGDL Database, May 2016.

6.8 Threatened and Endangered Species

A review of the available GIS and published information from both FWS and Florida Fish and Wildlife Conservation Commission (FFWCC) was performed to identify any potential for threatened or endangered species to occur within the Study Area (Figure 6.8).

Several federally listed species were found to have the potential to occur within the study area. The entire study area is located within the Woodstork (*Mycteria americana*) Core Foraging Area and Snail Kite Consultation Area. Tracts of suitable or restorable habitat for the Florida scrub jay (*Aphelocoma coeruluscens*) occur within the study area and the FWS lists the red-cockaded woodpecker (*Picoides borealis*), Audobon's Crested Caracara (*Polyborus plancus audubonii*), and the Eastern indigo snake (*Dymarchon corais couperi*) as having the potential to occur. The state listed gopher tortoise (*Gopherus polyphemus*) has been documented to occur within the study area. No eagle nests occur within the one mile buffer. The FWS lists Carter's mustard (*Warea carteri*) as having the potential to occur. The Cocoa Conservation Area is listed as a FWC Wildlife Management Area.

Figure 6.8: USFWC Management Area



Source: FEMA FGDL Database, May 2016.

Conclusion

7.0 Conclusion

The *State Road (S.R.) 524 Corridor Existing Conditions Summary Report* summarizes existing conditions within and surrounding the S.R. 524 Study Area, extending from Friday Road South to Industry Road. The following summarizes the key findings from each Section:

- **Transportation Characteristics**
  - S.R. 524 is a critical traffic corridor in the Brevard County and Space Coast region, connecting I-95, S.R. 520, S.R. 528, US 1, and Cape Canaveral.
  - The vast majority of the existing 3.1 mile corridor is a two-lane undivided cross-section. There are twelve (12) intersections along the Corridor, as follows:
    - Three are signalized (Cox Road, London Road, and Industry Road)
    - Four are stop-controlled (Friday Road South, I-95 SB, I-95 NB, and Friday Road North)
    - Five are local stop-controlled (Thien Thai Lane, Pinyon Drive, Westminster Drive, Lance Boulevard, and Coventry Court)
  - There are limited pedestrian and bicycle facilities along the Corridor, and limited transit access through SCAT Routes 6 and 8.
- **Vehicular Traffic Conditions**
  - Across the Study Area, the highest traffic volume occurs between Cox Road and Industry Road (15,300 AADT in 2015).
  - All of the Study Area segments are currently operating at LOS C or better.
  - Most of the Study Area intersections are currently operating at LOS C or better during weekday peak hours, with the exception of the I-95 Southbound ramp intersection, which is operating at a failing LOS during the PM Peak Hour.
- **Safety Analysis**
  - From 2010 to 2014, there were 124 crashes in the Study Area. The average crash rate was greater than comparable roads statewide overall, and more than triple statewide comparable rates at the I-95 interchange area.
  - There were three bicycle/pedestrian accidents from 2009 to 2013.
- **Land Use and Demographic Characteristics**
  - There are approximately 7,666 residents and 2,969 households within one mile of the S.R. 524 Corridor. A significant amount of households can be considered “low-income” within the Study Area, but the share of minority or limited English proficient households were within regional and state averages.
  - The vast majority (85 percent) of parcels in the Study Area are zoned single-family residential, followed by a significant share of vacant parcels (10 percent).
  - The majority of vacant parcels in the Study Area are zoned single-family residential, commercial, and industrial.
- **Environmental Conditions**
  - Based on the results of GIS based desktop review of the natural and physical environmental resources adjacent to or in the vicinity of the corridor, key features to be considered during future planning phases include: cultural resources, wetlands, water quality and floodplains, potential contaminated sites, and listed species habitat.
  - The resource conditions are identified based upon a desktop review of readily available state and regional data for these resources, consistent with the FDOT Environmental Screening Tool datasets. In subsequent project development

phases, more detailed analyses will be conducted in accordance with the appropriate chapters of the PD&E Manual.

Appendix

8.0 Appendix: Synchro Outputs

HCM 2010 TWSC
1: W. Friday Rd & SR 524

SR 524 Corridor Study
2017 Existing AM Peak

Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations													
Traffic Vol, veh/h	0	372	8	8	41	129	12	3	1	53	34	1	3
Future Vol, veh/h	0	372	8	8	41	129	12	3	1	53	34	1	3
Conflicting Peds, #/hr	1	0	0	0	0	0	2	0	0	2	0	0	5
Sign Control	Free	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	-	None	-	-	None	-	-	None
Storage Length	120	-	275	-	400	-	0	-	-	-	-	-	220
Veh in Median Storage, #	-	0	-	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	13	0	0	4	24	10	0	0	3	0	0	0
Mvmt Flow	0	372	8	8	41	129	12	3	1	53	34	1	3

Major/Minor	Major1			Major2				Minor1			Minor2		
Conflicting Flow All	142	0	0	295	404	0	0	639	653	406	667	653	147
Stage 1	-	-	-	-	-	-	-	404	404	-	231	249	-
Stage 2	-	-	-	-	-	-	-	235	249	-	436	404	-
Critical Hdwy	4.1	-	-	-	4.14	-	-	7.1	6.5	6.23	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	-	2.236	-	-	3.5	4	3.327	3.5	4	3.3
Pot Cap-1 Maneuver	1453	-	-	-	1144	-	-	392	389	643	375	389	905
Stage 1	-	-	-	-	-	-	-	627	603	-	776	704	-
Stage 2	-	-	-	-	-	-	-	773	704	-	603	603	-
Platoon blocked, %		-	-			-	-						
Mov Cap-1 Maneuver	1446	-	-	~ -6	~ -6	-	-	388	388	642	339	388	899
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	388	388	-	339	388	-
Stage 1	-	-	-	-	-	-	-	627	603	-	775	703	-
Stage 2	-	-	-	-	-	-	-	765	703	-	547	603	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0		11.5	16.3
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	614	1446	-	-	+	-	-	340	899
HCM Lane V/C Ratio	0.101	-	-	-	-	-	-	0.112	0.004
HCM Control Delay (s)	11.5	0	-	-	-	-	-	16.9	9
HCM Lane LOS	B	A	-	-	-	-	-	C	A
HCM 95th %tile Q(veh)	0.3	0	-	-	-	-	-	0.4	0

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection												
Int Delay, s/veh	6.2											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↱	↰	↑					↰		↱
Traffic Vol, veh/h	0	265	194	320	141	0	0	0	0	81	0	51
Future Vol, veh/h	0	265	194	320	141	0	0	0	0	81	0	51
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	Yield	-	-	None	-	-	None	-	-	Free
Storage Length	175	-	0	0	-	-	-	-	-	0	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	265	194	320	141	0	0	0	0	81	0	51

Major/Minor	Major1			Major2						Minor2		
Conflicting Flow All	-	0	0	288	0	0				993	-	-
Stage 1	-	-	-	-	-	-				849	-	-
Stage 2	-	-	-	-	-	-				144	-	-
Critical Hdwy	-	-	-	4.13	-	-				6.63	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-				5.43	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-				5.83	-	-
Follow-up Hdwy	-	-	-	2.219	-	-				3.519	-	-
Pot Cap-1 Maneuver	0	-	-	1272	-	0				257	0	0
Stage 1	0	-	-	-	-	0				418	0	0
Stage 2	0	-	-	-	-	0				869	0	0
Platoon blocked, %		-	-		-							
Mov Cap-1 Maneuver	-	-	-	1272	-	-				187	0	-
Mov Cap-2 Maneuver	-	-	-	-	-	-				187	0	-
Stage 1	-	-	-	-	-	-				304	0	-
Stage 2	-	-	-	-	-	-				869	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	6.2	41.1
HCM LOS			E

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	1272	-	187	-
HCM Lane V/C Ratio	-	-	0.273	-	0.471	-
HCM Control Delay (s)	-	-	8.9	-	41.1	0
HCM Lane LOS	-	-	A	-	E	A
HCM 95th %tile Q(veh)	-	-	1.1	-	2.5	-

Intersection												
Int Delay, s/veh	1.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	60	286	0	0	461	81	45	0	228	0	0	0
Future Vol, veh/h	60	286	0	0	461	81	45	0	228	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	Yield	-	-	Free	-	-	None
Storage Length	0	-	-	475	-	0	0	-	80	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	16965	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	60	286	0	0	461	81	45	0	228	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	501	0	-	-	-	0	692	-	-
Stage 1	-	-	-	-	-	-	441	-	-
Stage 2	-	-	-	-	-	-	251	-	-
Critical Hdwy	4.13	-	-	-	-	-	6.63	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	5.43	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.83	-	-
Follow-up Hdwy	2.219	-	-	-	-	-	3.519	-	-
Pot Cap-1 Maneuver	1061	-	0	0	-	-	394	0	0
Stage 1	-	-	0	0	-	-	648	0	0
Stage 2	-	-	0	0	-	-	768	0	0
Platoon blocked, %		-			-	-			
Mov Cap-1 Maneuver	1061	-	-	-	-	-	370	0	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	370	0	-
Stage 1	-	-	-	-	-	-	608	0	-
Stage 2	-	-	-	-	-	-	768	0	-

Approach	EB	WB	NB
HCM Control Delay, s	1.5	0	16.2
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	WBT	WBR
Capacity (veh/h)	370	-	1061	-	-	-
HCM Lane V/C Ratio	0.132	-	0.061	-	-	-
HCM Control Delay (s)	16.2	0	8.6	-	-	-
HCM Lane LOS	C	A	A	-	-	-
HCM 95th %tile Q(veh)	0.5	-	0.2	-	-	-

Intersection	
Int Delay, s/veh	3.2

Movement	EBU	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations							
Traffic Vol, veh/h	4	32	478	324	20	57	160
Future Vol, veh/h	4	32	478	324	20	57	160
Conflicting Peds, #/hr	0	0	0	0	0	0	11
Sign Control	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	-	None	-	None	-	None
Storage Length	-	350	-	-	350	0	-
Veh in Median Storage, #	-	-	0	0	-	0	-
Grade, %	-	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92
Heavy Vehicles, %	0	5	8	9	11	2	0
Mvmt Flow	4	32	478	324	20	57	160

Major/Minor	Major1			Major2		Minor2	
Conflicting Flow All	352	352	0	-	0	690	363
Stage 1	-	-	-	-	-	352	-
Stage 2	-	-	-	-	-	338	-
Critical Hdwy	-	4.175	-	-	-	6.63	6.2
Critical Hdwy Stg 1	-	-	-	-	-	5.43	-
Critical Hdwy Stg 2	-	-	-	-	-	5.83	-
Follow-up Hdwy	-	2.2475	-	-	-	3.519	3.3
Pot Cap-1 Maneuver	-	1186	-	-	-	395	686
Stage 1	-	-	-	-	-	711	-
Stage 2	-	-	-	-	-	695	-
Platoon blocked, %			-	-	-		
Mov Cap-1 Maneuver	~ -9	~ -9	-	-	-	395	679
Mov Cap-2 Maneuver	-	-	-	-	-	395	-
Stage 1	-	-	-	-	-	711	-
Stage 2	-	-	-	-	-	695	-

Approach	EB	WB	SB
HCM Control Delay, s		0	15.7
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	+	-	-	-	571
HCM Lane V/C Ratio	-	-	-	-	0.413
HCM Control Delay (s)	-	-	-	-	15.7
HCM Lane LOS	-	-	-	-	C
HCM 95th %tile Q(veh)	-	-	-	-	2.1

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

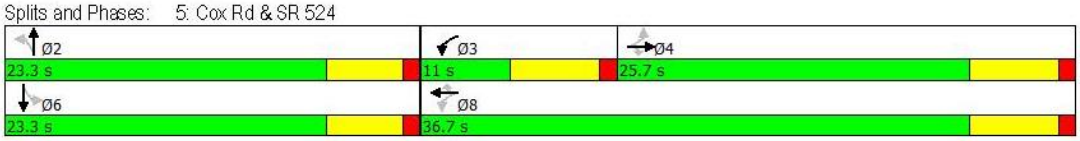
Lanes, Volumes, Timings
5: Cox Rd & SR 524

SR 524 Corridor Study
2016 Existing AM Peak

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	497	74	154	249	18	22	15	68	44	74	38
Future Volume (vph)	6	497	74	154	249	18	22	15	68	44	74	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		300	200		300	0		0	0		0
Storage Lanes	1		1	1		1	0		0	0		0
Taper Length (ft)	50			50			50			50		
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	0	1684	0	0	1776	0
Flt Permitted	0.605			0.288				0.913			0.881	
Satd. Flow (perm)	1127	1863	1583	536	1863	1583	0	1553	0	0	1587	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			151			42		68			28	
Link Speed (mph)		55			55			45			45	
Link Distance (ft)		5722			6754			1094			1090	
Travel Time (s)		70.9			83.7			16.6			16.5	
Lane Group Flow (vph)	6	497	74	154	249	18	0	105	0	0	156	0
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4		4	8		8	2			6		
Total Split (s)	25.7	25.7	25.7	11.0	36.7	36.7	23.3	23.3		23.3	23.3	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0		5.3			5.3	
Act Effct Green (s)	23.1	23.1	23.1	29.5	31.3	31.3		10.2			10.2	
Actuated g/C Ratio	0.49	0.49	0.49	0.62	0.66	0.66		0.22			0.22	
v/c Ratio	0.01	0.55	0.09	0.33	0.20	0.02		0.27			0.43	
Control Delay	11.3	17.5	0.6	7.4	6.0	1.0		10.4			19.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0			0.0	
Total Delay	11.3	17.5	0.6	7.4	6.0	1.0		10.4			19.4	
LOS	B	B	A	A	A	A		B			B	
Approach Delay		15.3			6.3			10.4			19.4	
Approach LOS		B			A			B			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 47.4			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.55			
Intersection Signal Delay: 12.4		Intersection LOS: B	
Intersection Capacity Utilization 62.1%		ICU Level of Service B	
Analysis Period (min) 60			

Splits and Phases: 5: Cox Rd & SR 524



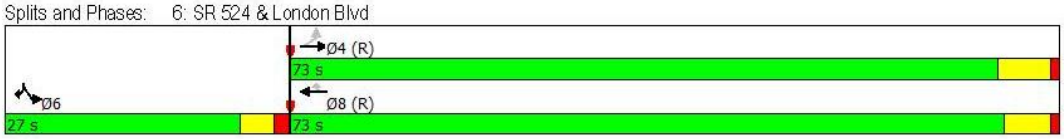
Lanes, Volumes, Timings
6: SR 524 & London Blvd

SR 524 Corridor Study
2016 Existing AM Peak

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	4	567	345	18	117	22
Future Volume (vph)	4	567	345	18	117	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300			400	0	0
Storage Lanes	1			1	1	1
Taper Length (ft)	50				50	
Satd. Flow (prot)	1805	1776	1759	1615	1805	1553
Flt Permitted	0.554				0.950	
Satd. Flow (perm)	1042	1776	1759	1584	1805	1553
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				18		22
Link Speed (mph)		55	45		30	
Link Distance (ft)		6754	426		449	
Travel Time (s)		83.7	6.5		10.2	
Lane Group Flow (vph)	4	567	345	18	117	22
Turn Type	Perm	NA	NA	Perm	Prot	Prot
Protected Phases		4	8		6	6
Permitted Phases	4			8		
Total Split (s)	73.0	73.0	73.0	73.0	27.0	27.0
Total Lost Time (s)	6.0	6.0	5.3	5.3	4.7	4.7
Act Effct Green (s)	77.0	77.0	77.7	77.7	12.3	12.3
Actuated g/C Ratio	0.77	0.77	0.78	0.78	0.12	0.12
v/c Ratio	0.00	0.42	0.25	0.01	0.53	0.10
Control Delay	3.2	5.3	3.3	0.4	49.6	16.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.2	5.3	3.3	0.4	49.6	16.0
LOS	A	A	A	A	D	B
Approach Delay		5.3	3.2		44.3	
Approach LOS		A	A		D	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 78 (78%), Referenced to phase 4:EBTL and 8:WBT, Start of Green			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.53			
Intersection Signal Delay: 9.6		Intersection LOS: A	
Intersection Capacity Utilization 47.1%		ICU Level of Service A	
Analysis Period (min) 60			

Splits and Phases: 6: SR 524 & London Blvd



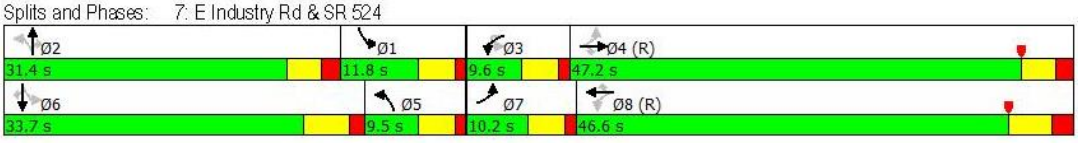
Lanes, Volumes, Timings
7: E Industry Rd & SR 524

SR 524 Corridor Study
2016 Existing AM Peak

Lane Group	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	472	252	18	1	39	99	215	18	56	55	361	77
Future Volume (vph)	472	252	18	1	39	99	215	18	56	55	361	77
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	400		325		475		0	250		250	0	
Storage Lanes	1		1		1		1	1		1	2	
Taper Length (ft)	50				50			50			50	
Satd. Flow (prot)	1656	1863	1615	0	1805	1792	1553	1805	1827	1615	3367	1900
Flt Permitted	0.630				0.603			0.707			0.720	
Satd. Flow (perm)	1098	1863	1571	0	1146	1792	1553	1343	1827	1592	2552	1900
Right Turn on Red			Yes				Yes			Yes		
Satd. Flow (RTOR)			120				215			133		
Link Speed (mph)		45				40			45			45
Link Distance (ft)		728				962			606			679
Travel Time (s)		11.0				16.4			9.2			10.3
Lane Group Flow (vph)	472	252	18	0	40	99	215	18	56	55	361	77
Turn Type	pm+pt	NA	Perm	custom	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA
Protected Phases	7	4			3	8		5	2		1	6
Permitted Phases	4		4	3	8		8	2		2	6	
Total Split (s)	10.2	47.2	47.2	9.6	9.6	46.6	46.6	9.5	31.4	31.4	11.8	33.7
Total Lost Time (s)	4.5	5.0	5.0		4.5	6.2	6.2	4.5	5.0	5.0	4.5	5.7
Act Effct Green (s)	71.4	64.2	64.2		54.4	46.6	46.6	12.3	7.6	7.6	19.4	14.3
Actuated g/C Ratio	0.71	0.64	0.64		0.54	0.47	0.47	0.12	0.08	0.08	0.19	0.14
v/c Ratio	0.53	0.21	0.02		0.06	0.12	0.26	0.09	0.41	0.23	0.63	0.28
Control Delay	8.7	9.9	0.1		8.2	20.1	4.5	30.6	52.6	2.2	42.1	40.8
Queue Delay	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.7	9.9	0.1		8.2	20.1	4.5	30.6	52.6	2.2	42.1	40.8
LOS	A	A	A		A	C	A	C	D	A	D	D
Approach Delay		8.9				9.3			28.0			29.6
Approach LOS		A				A			C			C

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 0 (0%), Referenced to phase 4:EBTL and 8:WBTL, Start of Yellow			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.63			
Intersection Signal Delay: 18.0		Intersection LOS: B	
Intersection Capacity Utilization 61.6%		ICU Level of Service B	
Analysis Period (min) 60			

Splits and Phases: 7: E Industry Rd & SR 524



Intersection	
Int Delay, s/veh	1.7

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations														
Traffic Vol, veh/h	1	8	279	6	10	95	361	39	5	6	54	27	1	4
Future Vol, veh/h	1	8	279	6	10	95	361	39	5	6	54	27	1	4
Conflicting Peds, #/hr	0	1	0	0	3	3	0	7	3	0	3	8	0	5
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	-	None	-	-	-	None	-	-	None	-	-	None
Storage Length	-	120	-	275	-	400	-	0	-	-	-	-	-	220
Veh in Median Storage, #	-	-	0	-	-	-	0	-	-	0	-	-	0	-
Grade, %	-	-	0	-	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	13	0	0	2	4	0	11	0	5	0	0	0
Mvmt Flow	1	8	279	6	10	95	361	39	5	6	54	27	1	4

Major/Minor	Major1				Major2				Minor1			Minor2		
Conflicting Flow All	286	399	0	0	221	306	0	0	928	954	314	967	954	404
Stage 1	-	-	-	-	-	-	-	-	324	326	-	606	628	-
Stage 2	-	-	-	-	-	-	-	-	604	628	-	361	326	-
Critical Hdwy	-	4.1	-	-	-	4.12	-	-	7.21	6.5	6.25	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	6.21	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	6.21	5.5	-	6.1	5.5	-
Follow-up Hdwy	-	2.2	-	-	-	2.218	-	-	3.599	4	3.345	3.5	4	3.3
Pot Cap-1 Maneuver	-	1171	-	-	-	1255	-	-	239	261	719	236	261	651
Stage 1	-	-	-	-	-	-	-	-	670	652	-	487	479	-
Stage 2	-	-	-	-	-	-	-	-	470	479	-	662	652	-
Platoon blocked, %			-	-			-	-						
Mov Cap-1 Maneuver	~ -9	~ -9	-	-	~ -11	~ -11	-	-	235	259	711	209	259	644
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	235	259	-	209	259	-
Stage 1	-	-	-	-	-	-	-	-	670	650	-	487	476	-
Stage 2	-	-	-	-	-	-	-	-	464	476	-	597	650	-

Approach	EB	WB	NB	SB
HCM Control Delay, s			12.7	23.2
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	540	+	-	-	+	-	-	210	644
HCM Lane V/C Ratio	0.131	-	-	-	-	-	-	0.145	0.007
HCM Control Delay (s)	12.7	-	-	-	-	-	-	25	10.6
HCM Lane LOS	B	-	-	-	-	-	-	D	B
HCM 95th %tile Q(veh)	0.5	-	-	-	-	-	-	0.5	0

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	7.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↱	↰	↑					↰		↱
Traffic Vol, veh/h	0	234	126	266	394	0	0	0	0	97	0	81
Future Vol, veh/h	0	234	126	266	394	0	0	0	0	97	0	81
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	Yield	-	-	None	-	-	None	-	-	Free
Storage Length	175	-	0	0	-	-	-	-	-	0	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	-	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	234	126	266	394	0	0	0	0	97	0	81

Major/Minor	Major1			Major2						Minor2		
Conflicting Flow All	-	0	0	254	0	0				1134	-	-
Stage 1	-	-	-	-	-	-				1007	-	-
Stage 2	-	-	-	-	-	-				127	-	-
Critical Hdwy	-	-	-	4.13	-	-				6.63	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-				5.43	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-				5.83	-	-
Follow-up Hdwy	-	-	-	2.219	-	-				3.519	-	-
Pot Cap-1 Maneuver	0	-	-	1310	-	0				210	0	0
Stage 1	0	-	-	-	-	0				352	0	0
Stage 2	0	-	-	-	-	0				886	0	0
Platoon blocked, %		-	-		-							
Mov Cap-1 Maneuver	-	-	-	1310	-	-				164	0	-
Mov Cap-2 Maneuver	-	-	-	-	-	-				164	0	-
Stage 1	-	-	-	-	-	-				274	0	-
Stage 2	-	-	-	-	-	-				886	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0	3.4	64.3
HCM LOS			F

Minor Lane/Major Mvmt	EBT	EBR	WBL	WBT	SBLn1	SBLn2
Capacity (veh/h)	-	-	1310	-	164	-
HCM Lane V/C Ratio	-	-	0.221	-	0.643	-
HCM Control Delay (s)	-	-	8.5	-	64.3	0
HCM Lane LOS	-	-	A	-	F	A
HCM 95th %tile Q(veh)	-	-	0.8	-	4.7	-

Intersection	
Int Delay, s/veh	3.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	51	264	0	0	504	79	156	0	308	0	0	0
Future Vol, veh/h	51	264	0	0	504	79	156	0	308	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	Yield	-	-	Free	-	-	None
Storage Length	0	-	-	475	-	0	0	-	80	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	16965	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	51	264	0	0	504	79	156	0	308	0	0	0

Major/Minor	Major1			Major2			Minor1		
Conflicting Flow All	548	0	-	-	-	0	672	-	-
Stage 1	-	-	-	-	-	-	398	-	-
Stage 2	-	-	-	-	-	-	274	-	-
Critical Hdwy	4.13	-	-	-	-	-	6.63	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	5.43	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	5.83	-	-
Follow-up Hdwy	2.219	-	-	-	-	-	3.519	-	-
Pot Cap-1 Maneuver	1020	-	0	0	-	-	405	0	0
Stage 1	-	-	0	0	-	-	678	0	0
Stage 2	-	-	0	0	-	-	748	0	0
Platoon blocked, %		-			-	-			
Mov Cap-1 Maneuver	1020	-	-	-	-	-	383	0	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	383	0	-
Stage 1	-	-	-	-	-	-	641	0	-
Stage 2	-	-	-	-	-	-	748	0	-

Approach	EB	WB	NB
HCM Control Delay, s	1.4	0	21.8
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	WBT	WBR
Capacity (veh/h)	383	-	1020	-	-	-
HCM Lane V/C Ratio	0.443	-	0.054	-	-	-
HCM Control Delay (s)	21.8	0	8.7	-	-	-
HCM Lane LOS	C	A	A	-	-	-
HCM 95th %tile Q(veh)	2.3	-	0.2	-	-	-

Intersection	
Int Delay, s/veh	1.7

Movement	EBU	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations							
Traffic Vol, veh/h	15	130	427	518	80	46	55
Future Vol, veh/h	15	130	427	518	80	46	55
Conflicting Peds, #/hr	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	-	None	-	None	-	None
Storage Length	-	350	-	-	350	0	-
Veh in Median Storage, #	-	-	0	0	-	0	-
Grade, %	-	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92
Heavy Vehicles, %	0	6	0	1	0	0	1
Mvmt Flow	15	130	427	518	80	46	55

Major/Minor	Major1			Major2		Minor2	
Conflicting Flow All	563	563	0	-	0	1110	563
Stage 1	-	-	-	-	-	563	-
Stage 2	-	-	-	-	-	547	-
Critical Hdwy	-	4.19	-	-	-	6.6	6.215
Critical Hdwy Stg 1	-	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	-	5.8	-
Follow-up Hdwy	-	2.257	-	-	-	3.5	3.3095
Pot Cap-1 Maneuver	-	983	-	-	-	220	527
Stage 1	-	-	-	-	-	574	-
Stage 2	-	-	-	-	-	549	-
Platoon blocked, %			-	-	-		
Mov Cap-1 Maneuver	~ -10	~ -10	-	-	-	220	527
Mov Cap-2 Maneuver	-	-	-	-	-	220	-
Stage 1	-	-	-	-	-	574	-
Stage 2	-	-	-	-	-	549	-

Approach	EB	WB	SB
HCM Control Delay, s		0	21.9
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	+	-	-	-	322
HCM Lane V/C Ratio	-	-	-	-	0.341
HCM Control Delay (s)	-	-	-	-	21.9
HCM Lane LOS	-	-	-	-	C
HCM 95th %tile Q(veh)	-	-	-	-	1.5

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

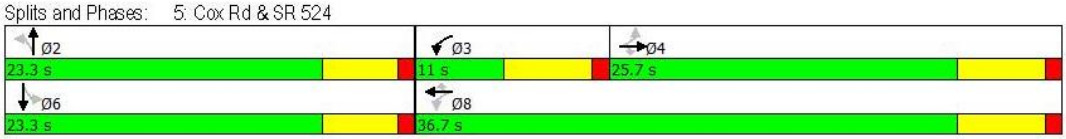
Lanes, Volumes, Timings
5: Cox Rd & SR 524

SR 524 Corridor Study
2016 Existing PM Peak

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	34	360	22	124	495	83	83	42	155	44	31	23
Future Volume (vph)	34	360	22	124	495	83	83	42	155	44	31	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		300	200		300	0		0	0		0
Storage Lanes	1		1	1		1	0		0	0		0
Taper Length (ft)	50			50			50			50		
Satd. Flow (prot)	1805	1827	1615	1770	1863	1615	0	1712	0	0	1799	0
Flt Permitted	0.482			0.338				0.865			0.767	
Satd. Flow (perm)	916	1827	1615	630	1863	1615	0	1504	0	0	1411	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			151			83		106			23	
Link Speed (mph)		55			55			45			45	
Link Distance (ft)		5722			6754			604			1090	
Travel Time (s)		70.9			83.7			9.2			16.5	
Lane Group Flow (vph)	34	360	22	124	495	83	0	280	0	0	98	0
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4		4	8		8	2			6		
Total Split (s)	25.7	25.7	25.7	11.0	36.7	36.7	23.3	23.3		23.3	23.3	
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0		5.3			5.3	
Act Effct Green (s)	15.6	15.6	15.6	23.9	23.9	23.9		11.8			11.8	
Actuated g/C Ratio	0.33	0.33	0.33	0.50	0.50	0.50		0.25			0.25	
v/c Ratio	0.11	0.60	0.03	0.28	0.53	0.10		0.62			0.27	
Control Delay	14.6	20.1	0.1	8.5	10.8	2.4		17.6			14.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0			0.0	
Total Delay	14.6	20.1	0.1	8.5	10.8	2.4		17.6			14.7	
LOS	B	C	A	A	B	A		B			B	
Approach Delay		18.6			9.4			17.6			14.7	
Approach LOS		B			A			B			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 47.6			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.62			
Intersection Signal Delay: 13.8		Intersection LOS: B	
Intersection Capacity Utilization 67.3%		ICU Level of Service C	
Analysis Period (min) 60			

Splits and Phases: 5: Cox Rd & SR 524



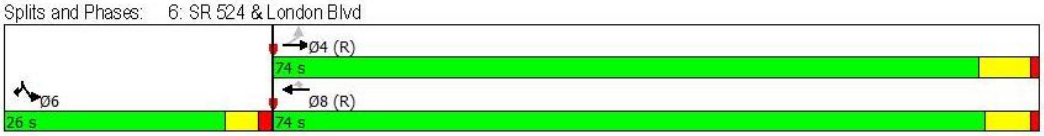
Lanes, Volumes, Timings
6: SR 524 & London Blvd

SR 524 Corridor Study
2016 Existing PM Peak

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	16	588	718	106	94	9
Future Volume (vph)	16	588	718	106	94	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300			400	0	0
Storage Lanes	1			1	1	1
Taper Length (ft)	50				50	
Satd. Flow (prot)	1805	1827	1863	1615	1805	1583
Flt Permitted	0.355				0.950	
Satd. Flow (perm)	673	1827	1863	1584	1780	1583
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				106		9
Link Speed (mph)		55	45		30	
Link Distance (ft)		6754	426		449	
Travel Time (s)		83.7	6.5		10.2	
Lane Group Flow (vph)	16	588	718	106	94	9
Turn Type	Perm	NA	NA	Perm	Prot	Prot
Protected Phases		4	8		6	6
Permitted Phases	4			8		
Total Split (s)	74.0	74.0	74.0	74.0	26.0	26.0
Total Lost Time (s)	6.0	6.0	5.3	5.3	4.7	4.7
Act Effct Green (s)	82.0	82.0	82.5	82.5	11.5	11.5
Actuated g/C Ratio	0.82	0.82	0.82	0.82	0.12	0.12
v/c Ratio	0.03	0.39	0.47	0.08	0.46	0.05
Control Delay	3.1	4.3	4.1	0.3	48.4	20.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.1	4.3	4.1	0.3	48.4	20.8
LOS	A	A	A	A	D	C
Approach Delay		4.3	3.6		46.0	
Approach LOS		A	A		D	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 88 (88%), Referenced to phase 4:EBTL and 8:WBT, Start of Green			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.47			
Intersection Signal Delay: 6.7		Intersection LOS: A	
Intersection Capacity Utilization 54.5%		ICU Level of Service A	
Analysis Period (min) 60			

Splits and Phases: 6: SR 524 & London Blvd



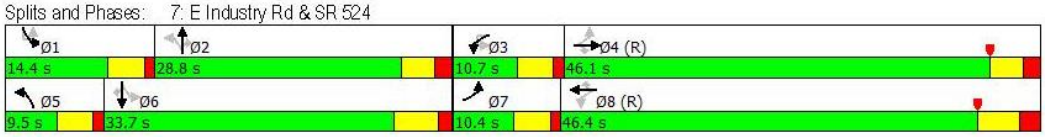
Lanes, Volumes, Timings
7: E Industry Rd & SR 524

SR 524 Corridor Study
2016 Existing PM Peak

Lane Group	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Traffic Volume (vph)	396	295	9	1	128	322	476	26	115	91	2	441
Future Volume (vph)	396	295	9	1	128	322	476	26	115	91	2	441
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	400		325		475		0	250		250		0
Storage Lanes	1		1		1		1	1		1		2
Taper Length (ft)	50				50			50				50
Satd. Flow (prot)	1641	1863	1615	0	1805	1863	1599	1805	1863	1615	0	3400
Flt Permitted	0.361				0.580			0.663				0.460
Satd. Flow (perm)	622	1863	1562	0	1100	1863	1576	1255	1863	1583	0	1642
Right Turn on Red			Yes				Yes			Yes		
Satd. Flow (RTOR)			177				476			182		
Link Speed (mph)		45				40			45			
Link Distance (ft)		728				737			606			
Travel Time (s)		11.0				12.6			9.2			
Lane Group Flow (vph)	396	295	9	0	129	322	476	26	115	91	0	443
Turn Type	pm+pt	NA	Perm	custom	pm+pt	NA	Perm	pm+pt	NA	Perm	custom	pm+pt
Protected Phases	7	4			3	8		5	2			1
Permitted Phases	4		4	3	8		8	2		2	1	6
Total Split (s)	10.4	46.1	46.1	10.7	10.7	46.4	46.4	9.5	28.8	28.8	14.4	14.4
Total Lost Time (s)	4.5	5.0	5.0		4.5	6.2	6.2	4.5	5.0	5.0		4.5
Act Effct Green (s)	59.3	45.5	45.5		44.2	33.8	33.8	17.2	10.2	10.2		31.7
Actuated g/C Ratio	0.59	0.46	0.46		0.44	0.34	0.34	0.17	0.10	0.10		0.32
v/c Ratio	0.70	0.35	0.01		0.24	0.51	0.56	0.10	0.61	0.28		0.55
Control Delay	20.1	20.7	0.0		12.9	32.4	5.8	23.1	56.5	2.2		28.7
Queue Delay	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0		0.0
Total Delay	20.1	20.7	0.0		12.9	32.4	5.8	23.1	56.5	2.2		28.7
LOS	C	C	A		B	C	A	C	E	A		C
Approach Delay		20.1				16.0			31.4			
Approach LOS		C				B			C			

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Offset: 96 (96%), Referenced to phase 4:EBTL and 8:WBTL, Start of Yellow			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.70			
Intersection Signal Delay: 19.5		Intersection LOS: B	
Intersection Capacity Utilization 90.0%		ICU Level of Service E	
Analysis Period (min) 60			

Splits and Phases: 7: E Industry Rd & SR 524



DISTRICT 5

719 S. Woodland Blvd.
DeLand, FL 32720