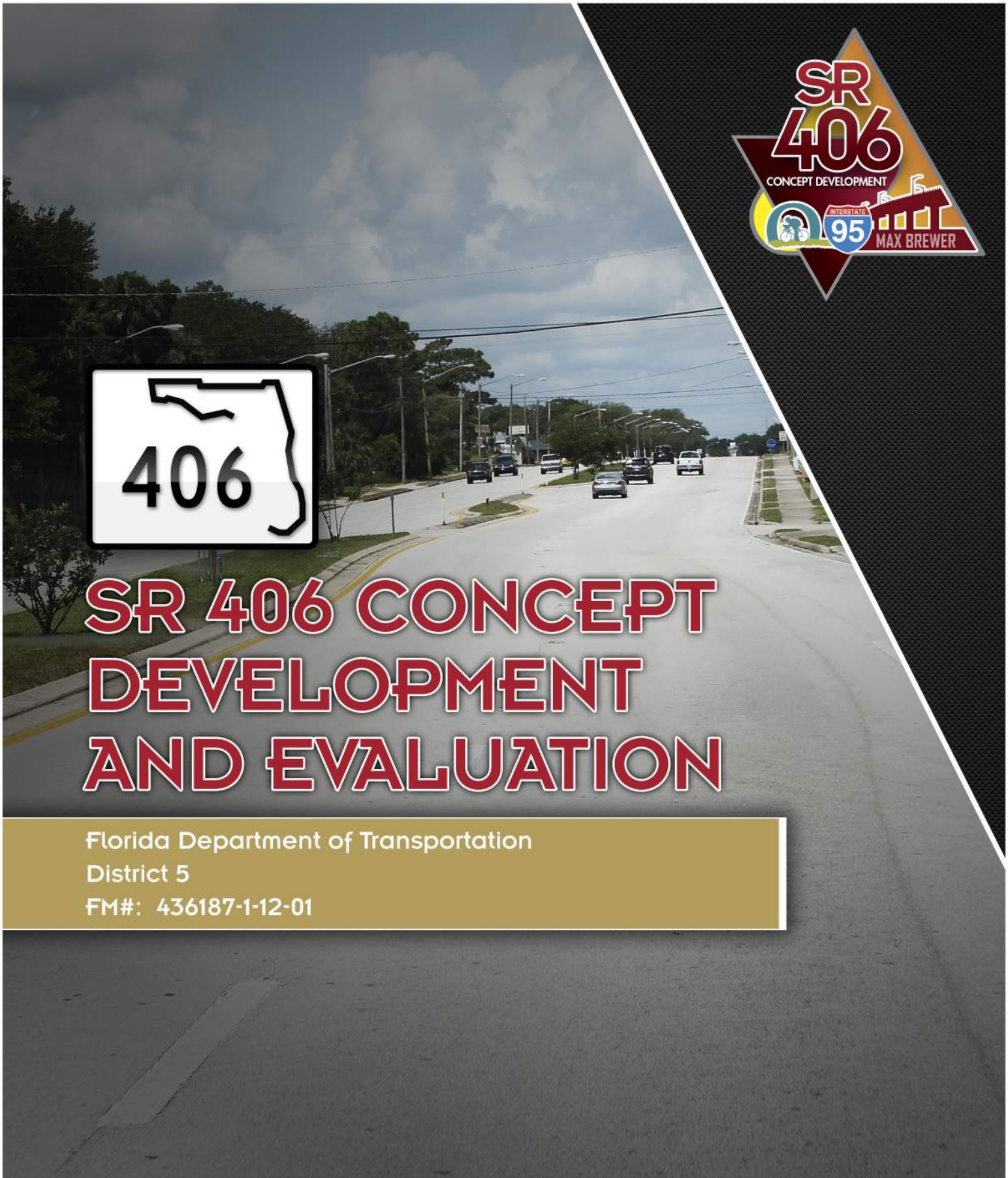

SR 406 CONCEPT DEVELOPMENT AND EVALUATION

Florida Department of Transportation
District 5
FM#: 436187-1-12-01

FDOT

Existing Conditions Report

December 2017

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1 Introduction

1.1 Report Purpose

The purpose of this Existing Conditions Report is to identify all existing plans, amenities, and physical features that the corridor currently provides. This report will evaluate these existing conditions and identify issues and opportunities that will be analyzed further in the alternatives phase of the project.

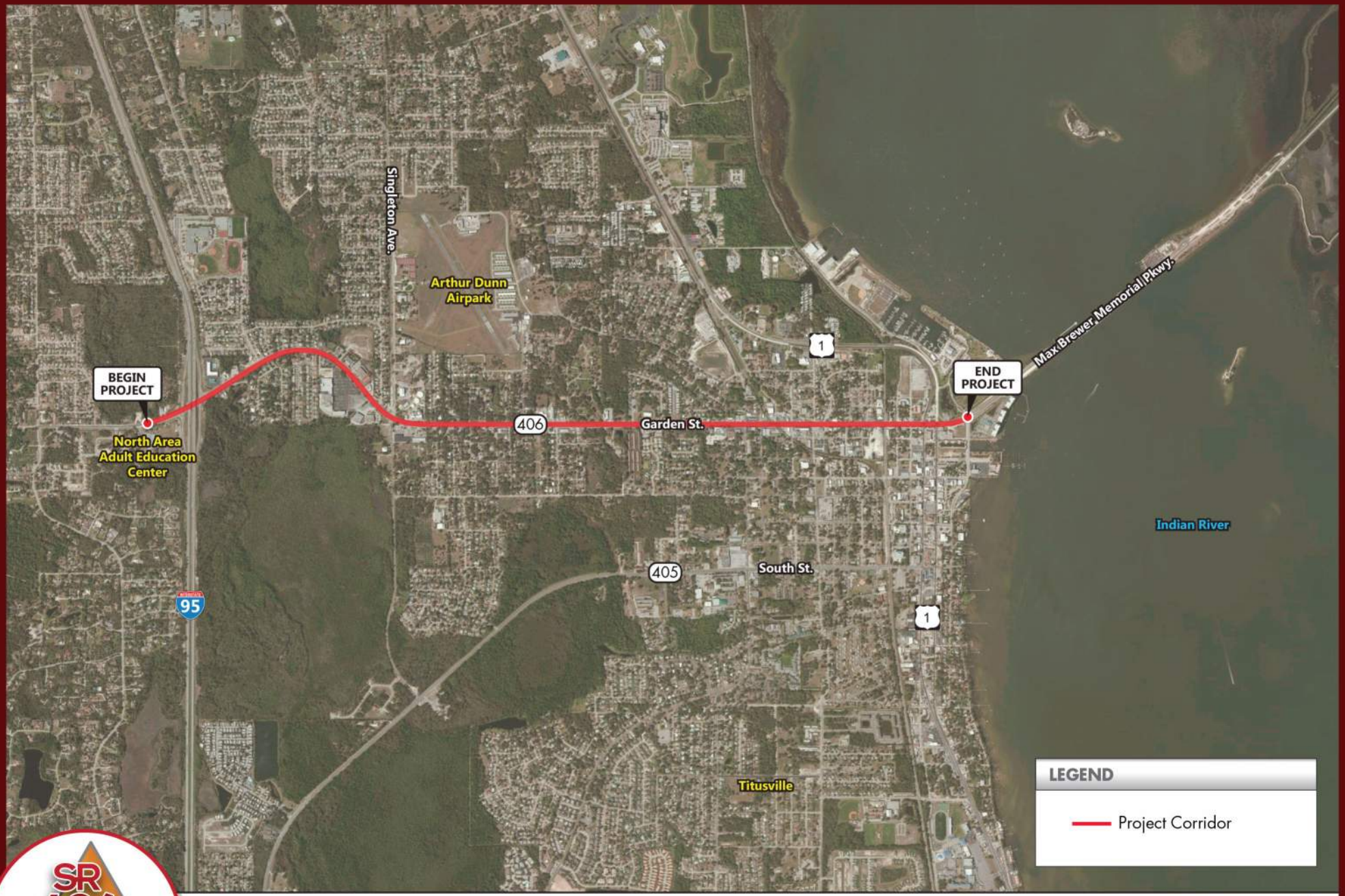
In December 2017, Florida Department of Transportation (FDOT) updated the Existing Conditions Report previously published in May 2015. This report provides an update to the existing plans, physical features, traffic, and amenities that may have changed since the last update.

1.2 Project Background and Purpose

In January 2015, the Florida Department of Transportation began a Corridor Planning Study for SR 406 (Garden Street) from the North Area Adult Education Center (NAAEC) to Indian River Avenue in Titusville, Florida. Figure 1 illustrates the Study Area. A Corridor Planning Study is a high-level evaluation of safety, environmental and geometric concerns along a transportation corridor where needs, possible improvement options and planning level cost estimates are identified. The purpose of the study was to develop a multimodal design-driven vision, rather than a model-driven vision to determine how best to meet the needs of the current and future end users of the corridor, and to establish a long-term plan to guide evolution of the corridor. Multimodal corridor projects are essential to network efficiency, safety, and livability within the context of future transportation needs.

This project was requested by the City of Titusville to coordinate the development of a future vision for the SR 406 (Garden Street) corridor that will establish a multimodal approach to addressing future transportation needs. The Corridor Planning Study involved a community-based evaluation to determine how best to meet the needs of current and future users. It then established a long-term plan to guide the evolution of the corridor that appropriately correlates the balance between land use and transportation planning. This project was coordinated with local and regional agency partners, such as the Space Coast Transportation Planning Organization (SCTPO), Brevard County, the City of Titusville, Space Coast Area Transit (SCAT), Titusville Community Redevelopment Area (CRA) and Florida East Coast (FEC) Railway to develop potential solutions that establish a more multimodal urban environment utilizing a context-sensitive approach. As part of the analysis, previous studies, improvement plans, as well as an inventory of existing traffic, pedestrian and bicycle, and transit conditions and facilities were evaluated. This process combined planning and engineering efforts to develop a range of potential improvement strategies. The Corridor Planning Study concluded in September 2016.

In July 2017, the project process continued with the start of the Concept Development and Evaluation Study. This study builds upon what was started in the Corridor Planning Study by further evaluating the alternatives identified, creating concept plans, and identifying and evaluating impacts. This study will continue the public and stakeholder involvement effort that was previously established by continuing to engage the Project Visioning Team throughout the process as well as holding a public meeting to receive local input.



SR 406 Concept Development & Evaluation

NORTH AREA ADULT EDUCATION CENTER TO INDIAN RIVER AVENUE

FIGURE 1
Study Area Location Map

2

Existing Conditions

2.1 Introduction to the Corridor

The SR 406 (Garden Street) Study Area consists of an approximately 3-mile long segment spanning from the NAAEC, just west of I-95 to Indian River Avenue within the City of Titusville in Brevard County, Florida. This Corridor can be characterized as an urbanized, 4-lane divided section with primarily residential and commercial development throughout the Study Area.

2.2 Summary of Transportation Plans

A review of various transportation plans was performed to understand planned improvements throughout the Study Area. During this exercise, the following documents were reviewed:

- Space Coast Transportation Planning Organization's (SCTPO) 2040 Long Range Transportation Plan;
- SCTPO Transportation Improvement Plan;
- SCTPO Bicycle & Pedestrian Mobility Plan;
- FDOT Five Year Work Program;
- Space Coast Area Transit's Transit Development Plan; and
- City of Titusville Comprehensive Plan.

SCTPO 2040 Long Range Transportation Plan (LRTP)

The SCTPO 2040 LRTP identifies a multimodal range of improvements for Brevard County through 2040. The LRTP identifies a section of SR 406 (Garden Street) from Park Avenue to US 1 SB (Hopkins Avenue) in which to add sharrows and 'Bike May Use Full Lane' (BMUFL) signage with an estimated cost of $109,000.

SCTPO Transportation Improvement Plan (TIP) FY 2018-FY 2022

The TIP is a priority list of federal and state funded projects that have been scheduled for implementation by the SCTPO. The TIP includes financially feasible multimodal projects that were previously adopted by state and local officials, and transportation agencies funded through FY 2022. This plan was updated in July 2017. A resurfacing project is funded for SR 406 (Garden Street) from East of Petty Circle to US 1 NB (Washington Avenue) with an estimated cost of $2 million.

SCTPO Bicycle & Pedestrian Mobility Plan

The SCTPO Bicycle & Pedestrian Mobility Plan, published in 2013, documents future improvements to the bicycle/pedestrian network within Brevard County. It is a synthesis of prior plans, regional projects and local plans which identifies short and long-term improvements that address gaps or deficiencies in the bicycle/pedestrian network. After review of the priority project list, one project was identified along SR 406 (Garden Street) in the

Study Area. The identified project is to install a Designated Bike Lane on SR 406 (Garden Street) from 600' west of Park Avenue to US 1 NB (Washington Avenue). Funding is currently not available for this improvement.

FDOT Five-Year Work Program FY 2018-FY 2022

Each year, FDOT develops the Five-Year Work Program in accordance with Section 339.135, Florida Statutes. The plan reviewed was updated in December 2017. The Five-Year Work Program is an ongoing process that is used to forecast the funds needed for upcoming transportation system improvements scheduled for the next five years. The development of this Work Program involves extensive coordination with local governments, including Metropolitan Planning Organizations and other city and county officials. After review of the programmed improvements, there was one project identified in the Five-Year Work Program, a resurfacing project from west of Forrell Avenue North to US 1 NB (Washington Avenue). This project was also identified in the SCTPO TIP and is funded for construction in FY 2018/19.

Space Coast Area Transit 2013-2022 Transit Development Plan

The Space Coast Area Transit (SCAT) 2013-2022 Transit Development Plan (TDP) documents future transit improvements throughout Brevard County for a ten-year window. Transit improvements can include new routes, expanded hours of operation, or increased frequencies. The SCAT TDP identified several improvements to the routes running through the Study Area. All these improvements are noted as unfunded. These improvements are summarized by implementation year below.

Year 2018

- Create a new route from Titusville to Cocoa via Grissom Parkway (documented in TDP as Alternative 3). The route would approach the corridor via Park Avenue and end at SR 406 (Garden Street).

Year 2019

- Increase weekday frequency to 30 minutes on Route 2
- Increase Saturday frequency to 30 minutes on Route 2
- Start Sunday service on Route 2

Year 2020

- Extend service on Weekdays and Saturdays to 9 PM on Route 2

Year 2022

- Create a new route that connects Downtown Titusville to Canaveral National Seashore. This is documented in the TDP as Alternative 21: Canaveral National Seashore. The route would begin at SR 405 and move north/south along US 1 before connecting east to Canaveral National Seashore along SR 406 (Garden Street).

City of Titusville Comprehensive Plan Policies

The City of Titusville Comprehensive Plan, adopted in 1988 and last revised in April of 2014, has adopted multiple Comprehensive Plan Objectives and Policies that focus on multi-modal transportation options. Some of these include complete streets, street beautification and a system-wide multimodal transportation network master plan. The Comprehensive Plan primarily focuses on the US 1 corridor at the eastern end of the Study Area.

Objective 1.13 of the Future Land Use Element identifies policies and strategies concerning land uses along the US 1 corridor. The City of Titusville has also adopted policies that the 2006 US 1 Corridor Master Plan recommended regarding strengthening and encouraging a pedestrian-friendly, mixed-use district along US 1, that can include, but is not limited to high density residential, retail, and public realm areas, and that is intended to contain urban elements of increased density, intensity and height.

2.2.1 Local Small Area Plans and Community Redevelopment Areas

The Community Redevelopment Agency (CRA) program was created in Florida in 1969 to help communities revitalize downtown areas. The Florida Legislature established criteria to allow and encourage CRA redevelopment and revitalization activities when certain conditions exist, including but not limited to the presence of substandard or inadequate structures, higher crime rates than surrounding areas, inadequate infrastructure, insufficient roadways, deterioration of sites or other improvements, and inadequate parking.

The northern boundary of the Downtown Titusville CRA is Buffalo Road. The CRA encompasses land from Buffalo Road in the north, to Grace Street in the south, and lands from the Indian River Lagoon in the east to the FEC rail road in the west. The CRA has accomplished many projects and plans within the Study Area. While these plans and projects primarily serve the US 1 corridor, the SR 406 (Garden Street) Study Area is affected due the land areas in the eastern portion of the Study Area which are within the CRA, specifically the land designated as Downtown Mixed-Use.

A 2006 Downtown Master Plan led to the development of a Downtown Mixed-Use Smart Code for the CRA which was adopted in 2010. These standards were revised in 2013 and were intended to encourage mixed-use buildings for infill development and new public facilities, while maintaining the historic character of the community.

In 2014, a Community Redevelopment Plan update was created to "develop a plan for coordinated growth in the Downtown CRA" and to create a downtown area with a vibrant mixed-use town center environment. The FY 2018/2022 Five-Year Capital Improvement Plan, published in the 2017 CRA Adopted Budget, does not identify any projects for the SR 406 (Garden Street) corridor.

2.2.2 Developments of Regional Impact

Information on Developments of Regional Impact (DRIs) was collected from the Florida Department of Economic Opportunity (DEO), Regional Planning Councils, and county governments. There are no DRIs located within one mile of the Study Area.

2.2.3 Related Traffic Studies

A safety study was performed at the intersection of SR 406 (Garden Street) and US 1 one-way pair intersections in February 2017 to evaluate the operations and safety of the intersections. Due to the high angle crash history, many short- and mid-term improvements were recommended to help reduce crashes along the corridor. Combining both intersections into one with an elongated roundabout was identified as a long-term improvement. This was considered long-term due to the significant right of way needed for such a facility.

2.3 Land Use

Land use data was compiled from the Brevard County Property Appraiser parcel data and Florida DOT District Five Generalized Land Use Data generated in 2015. This data was used to conduct an inventory of existing land uses around the Study Area.

2.3.1 Existing Land Use

Residential uses are the predominant existing land uses for the Study Area. Over one third of the land within a ¼ mile of the Study Area currently is classified residential. The next highest percentage of land use is retail, with approximately 14 percent of the existing land use. The majority of this area has road frontage along the corridor. Over 11 percent of the land within a ¼ mile of the Study Area is currently vacant. Figure 2 depicts the existing land uses.

2.3.2 Future Land Use

The Future Land Uses (FLUs) assigned to the Study Area, Figure 3, are generally consistent with the existing land uses along, and adjacent to the corridor.

All of the land adjacent to the eastern half of the corridor is designated as Downtown Mixed-Use. The City of Titusville specifies that the Downtown Mixed-Use FLU is permitted to have a maximum density of 20 dwelling units per acre and a maximum intensity of 5.0 Floor Area Ratio (FAR). The FAR is the ratio of a buildings total floor area (Gross Floor Area) to the size of the parcel that it is built on, and is generated by dividing the building area by the parcel area. The Downtown Mixed-Use FLU was established by the City of Titusville to "pursue the renewal of Downtown Titusville as the center of professional, governmental, financial and unique retail and redevelop blighted areas." The purpose is to enhance the visual attractiveness of downtown, utilize the waterfront, encourage and promote pedestrian spaces, and emphasize development and redevelopment east of US 1 that uses the waterfront as an amenity.

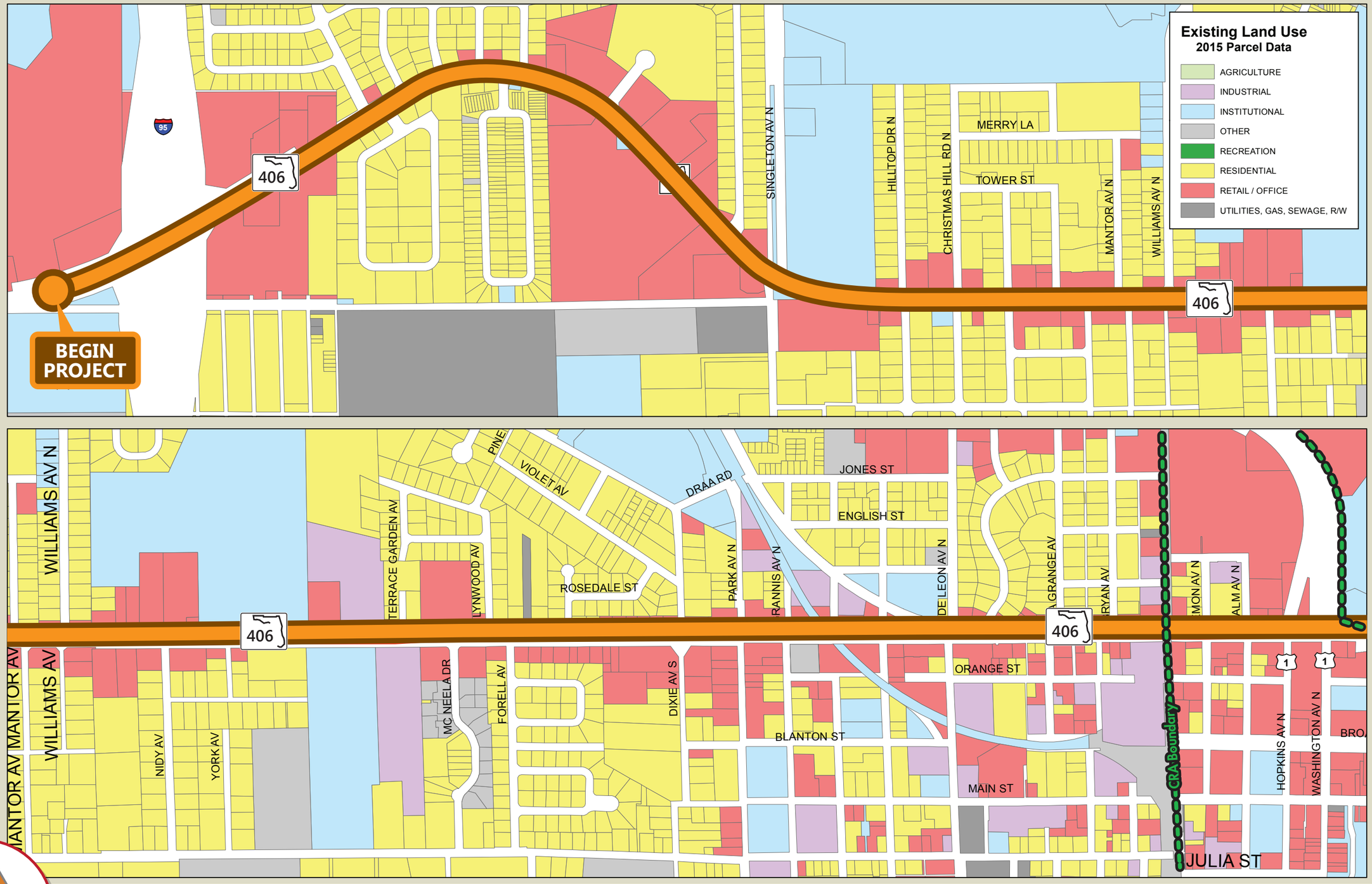
Moving to the western half of the western terminus, the primary land use transitions to commercial designations, with maximum intensities of 1.0 FAR. Commercial Low (C-L) and Commercial High (C-H) FLUs are adjacent to the Study Area. Both of these commercial FLUs have the same siting criteria, including locations along an arterial or collector, and compatibility with adjacent land uses, as well as the same maximum intensity; the difference, however is the intended user. C-H areas can include automotive-oriented businesses to provide commercial services to the community and region, while C-L areas are intended to be oriented towards neighborhood needs and convenience factors.

Other land uses adjacent to the Study Area consist of Educational, Residential and Public, which includes the Arthur Dunn Airpark.

The majority of the land that is near, but not adjacent to the Study Area is designated as residential. Most of the land is shown as Residential-Low, which allows a maximum of 5 dwelling units per acre. Neighborhoods of Residential Medium, 10 dwelling units per acre, and Residential High, 15 dwelling units per acre, also exist in close proximity to the Study Area.

The land south of the eastern portion of the Study Area near the SR 406 (Garden Street)/US 1 intersection, is designated as Industrial and Urban Mixed Use. The Industrial FLU provides for a maximum intensity of 1.0 FAR,

and is intended to be master planned to share infrastructure and to be clustered in limited areas for the purpose of maximizing employment centers and convenient access. The Urban Mixed-Use FLU allows a maximum density of 15 dwelling units per acre and a maximum intensity of 1.0 FAR. This FLU was established to "focus private and public efforts on redevelopment of blighted structures and maintenance of the built environment" as well as to "encourage a mix of uses including but not limited to high density residential, retail, and public realm areas (pavilions, amphitheaters, and similar open gathering areas) that contain urban elements of increased density, intensity and height."



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NORTH AREA ADULT EDUCATION CENTER TO INDIAN RIVER AVENUE

FIGURE 2
Existing Land Use Map

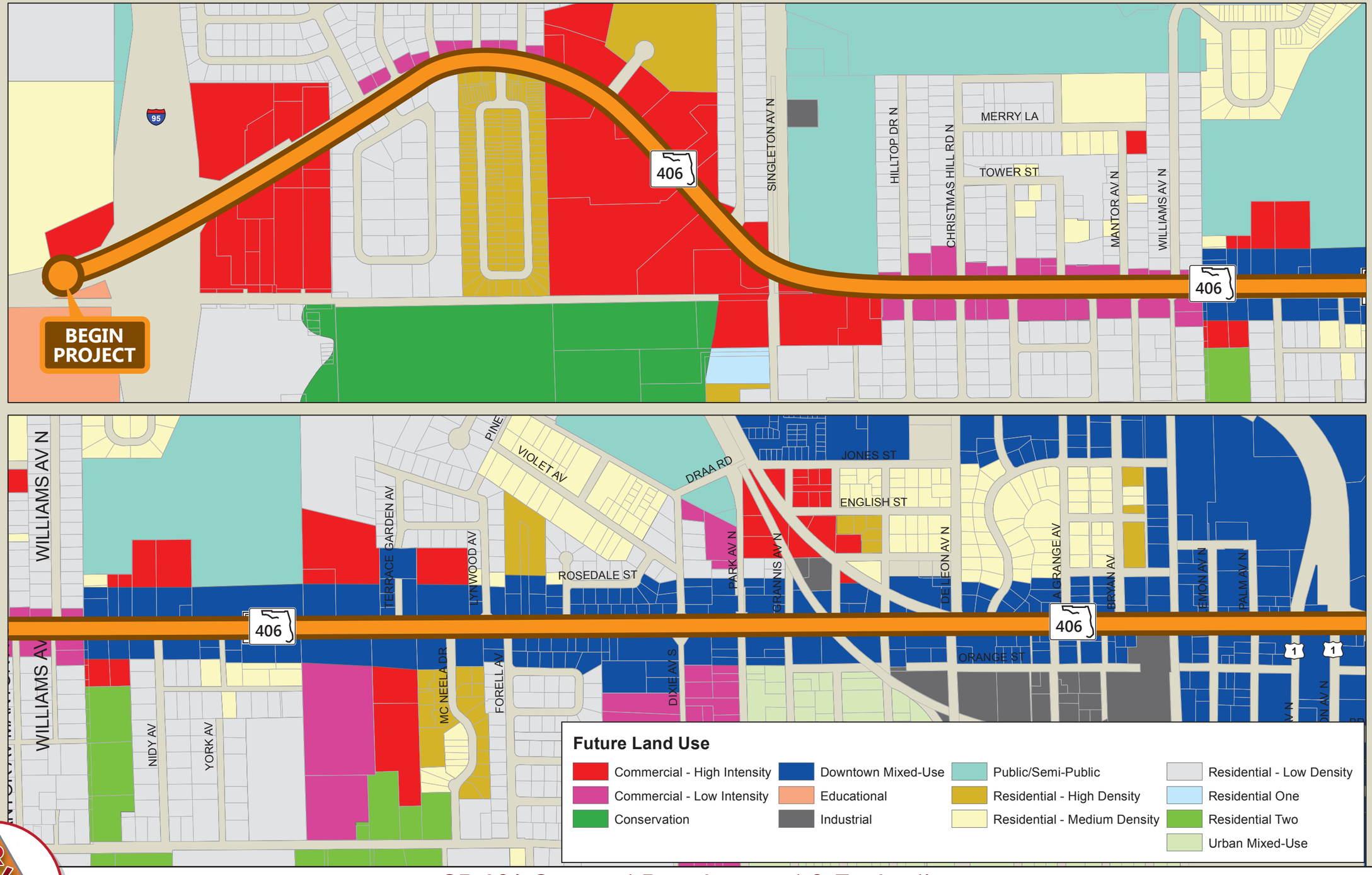

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FIGURE 3
Future Land Use Map

2.4 Existing Physical Features

The existing physical features were collected through field inspection and design/construction plans obtained from FDOT and the affected jurisdictions. The features evaluated include utilities, lighting, pedestrian and bicycle facility, and parking locations. Existing features of the SR 406 (Garden Street) corridor that do not meet current design standards are considered deficient and may be recommended for continued monitoring, rehabilitation, or upgrading.

2.4.1 Roadway Classification, Jurisdiction, and Posted Speed

SR 406 (Garden Street) from the NAAEC North Area Adult Education Center to US 1 NB (Washington Avenue) is classified as an "urban principal arterial other" and owned and maintained by the Florida Department of Transportation. It's roadway ID is 70002000. The Study Area extends the entire length of the state maintained length from mile post (MP) 0 to MP 2.949. The roadway ID for the section of SR 406 (Garden Street) from US 1 NB (Washington Avenue) to Indian River Avenue is 70160001. This section of roadway is within MP 0 to 0.332 and is owned by FDOT but considered "active off the State Highway System (SHS)".

The posted speed limit on SR 406 (Garden Street) from the NAAEC to east of Maiden Lane is 40 mph, and it transitions to 30 mph for the remainder of the corridor to US 1 NB (Washington Avenue). The posted speed from US 1 NB (Washington Avenue) to Indian River Avenue is 30 mph.

2.4.2 Right of Way

The roadway right of way (R/W) has been inventoried for the roadway corridors within the Study Area using FDOT R/W maps. Table 1 illustrates the available R/W for the Study Area roadway segment.

Table 1: Right of Way Summary

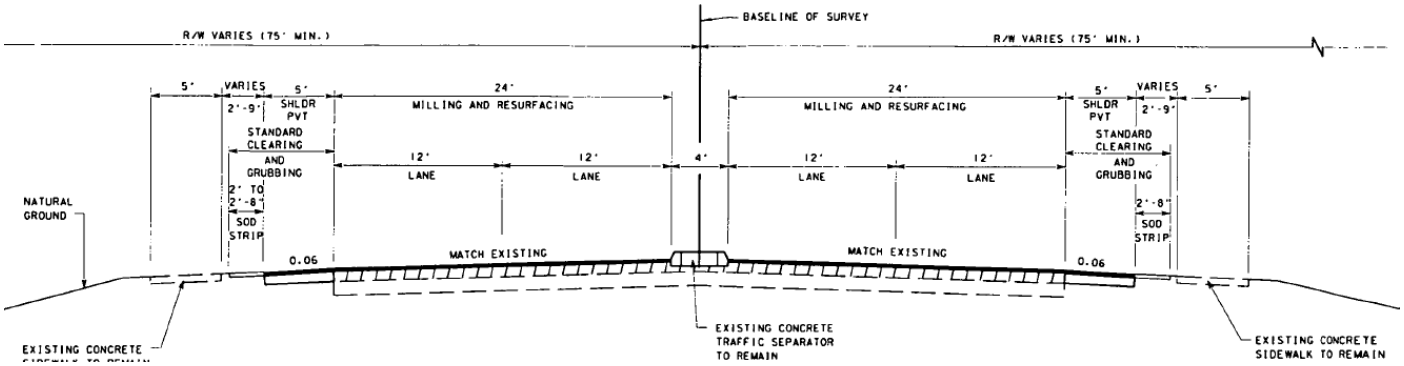
Roadway	Roadway ID	From	To	R/W Width (Feet)
SR 406 (Garden Street)	70002000	North Area Adult Education Center	East of I-95	150-200
SR 406 (Garden Street)	70002000	East of I-95	Dixie Avenue	100
SR 406 (Garden Street)	70002000	Dixie Avenue	US 1 SB (Hopkins Street)	80
SR 406 (Garden Street)	70002000	US 1 SB (Hopkins Street)	US 1 NB (Washington Avenue)	74
SR 406 (Garden Street)	70160001	US 1 NB (Washington Avenue)	Indian River Avenue	100-200

Source: FDOT R/W Maps

2.4.3 Typical Section

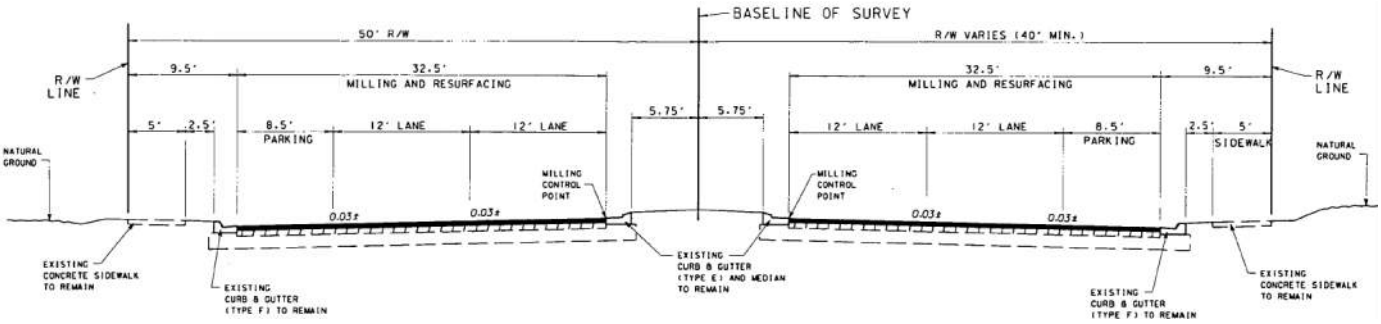
The typical sections found within the Study Area are illustrated below. Figure 4, Figure 5, Figure 6 and Figure 7 are taken from the Final As-Built Plan provided by FDOT for a Milling and Resurfacing project along the corridor, Financial Project ID 237632-1-52-01.

Figure 4: North Area Adult Education Center to I-95



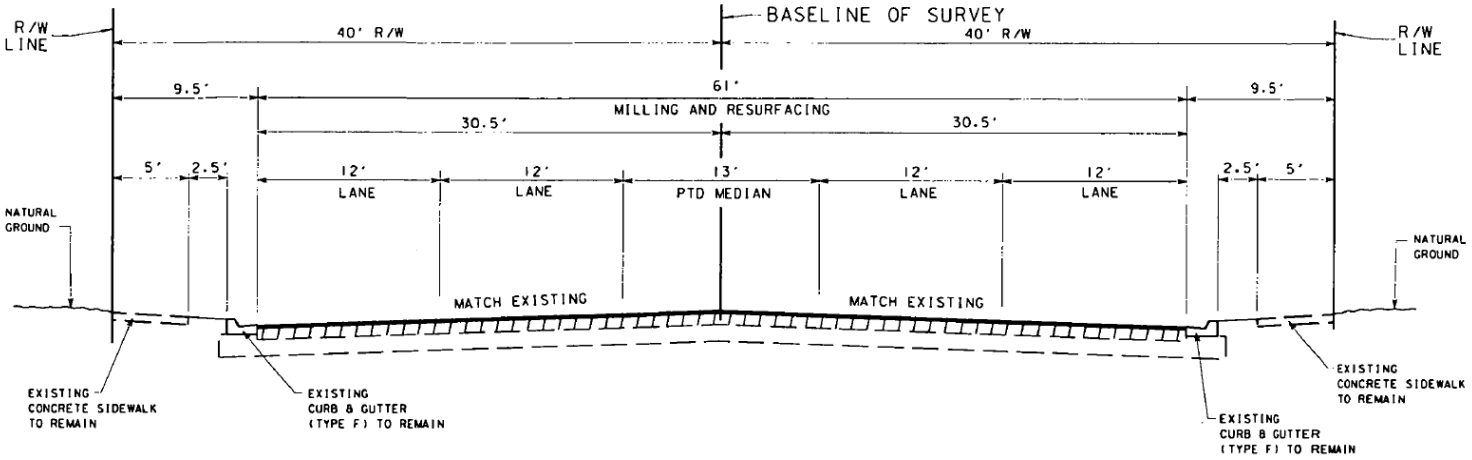
The exceptions to this typical section exist at the old entrance of the NAAEC with the addition of a westbound left turn lane into the education center. In the eastbound direction fronting the NAAEC, the travel lane transitions from one to two lanes and the concrete separator median is not present directly in front of the NAAEC.

Figure 5: I-95 to Dixie Avenue



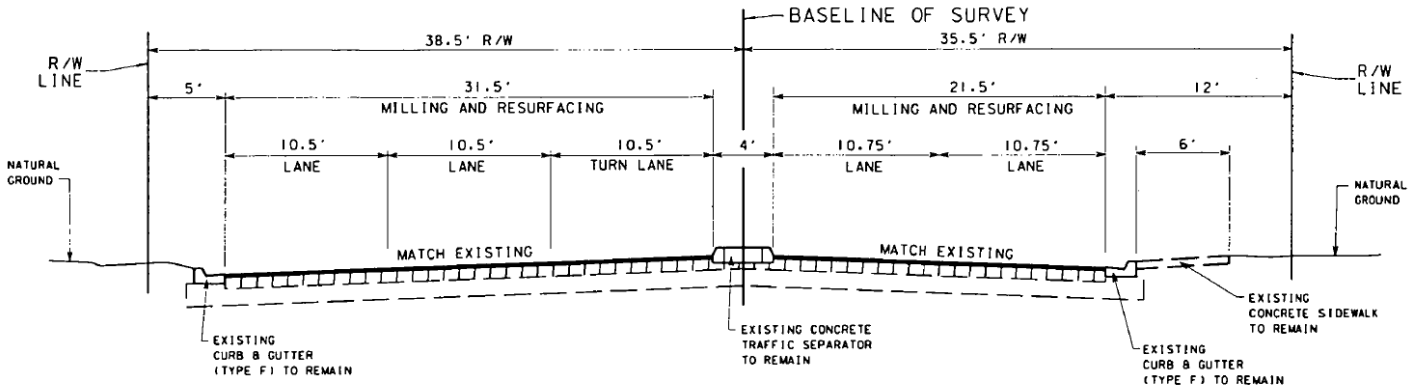
There are slight exceptions to the typical section located throughout this section. The majority of the median type is raised grass median, however there is also concrete traffic separators located with left turn lanes, as well as, angled traffic separators used in areas of closely spaced median openings. The parking lane is not provided throughout the entire corridor, but is sporadically spaced throughout. The outside lane is 20.5 feet wide when there is no parking.

Figure 6: Dixie Avenue to US 1 SB (Hopkins Avenue)



The only exception for this typical section is located between Palm Avenue and US 1 Southbound where the median is striped closed.

Figure 7: US 1 SB (Hopkins Avenue) to US 1 NB (Washington Avenue)



2.4.4 Access Management

FDOT classifies access on state roadways using a seven-tier access management system established in Chapter 14-97, Administrative Rules of the Department of Transportation, State Highway System Access Management Classification System and Standards (Rule 14-97). The classification system ranges from Access Class 1, reserved for limited access freeways, to Access Class 7, assigned to lower priority state highways in areas that are already highly urbanized. This classification system assigns standards for driveway connections, spacing, median opening spacing, and signal spacing.

Table 2 shows the approximate limits for Access Class categories and corresponding posted speed limits (MPH) for the Study Area. The spacing standards for each Access Class as per FDOT are shown in Table 3. These Access Classes and posted speeds dictate the allowable spacing of signalized intersections, pedestrian crossing opportunities and local street connections for the corridor. The most restrictive Access Class (1) is for limited access roadways and allows for no signalized intersections or driveways. The least restrictive Access Class (7) allows signalized intersections at 1,320-foot (1/4-mile) spacing.

Table 2: FDOT Access Management Classifications and Posted Speeds

Roadway	Limits	Access Class	Posted Speed
SR 406 (Garden Street)	North Area Adult Education Center (MP 0.000) to CR 405/Park Avenue (MP 2.265)	5	40
SR 406 (Garden Street)	CR 405/Park Avenue (MP 2.265) to E of Maiden lane (MP 2.670)	6	40
SR 406 (Garden Street)	E of Maiden Lane (MP 2.670) to US 1 NB (Washington Avenue) (MP 2.949)	6	30

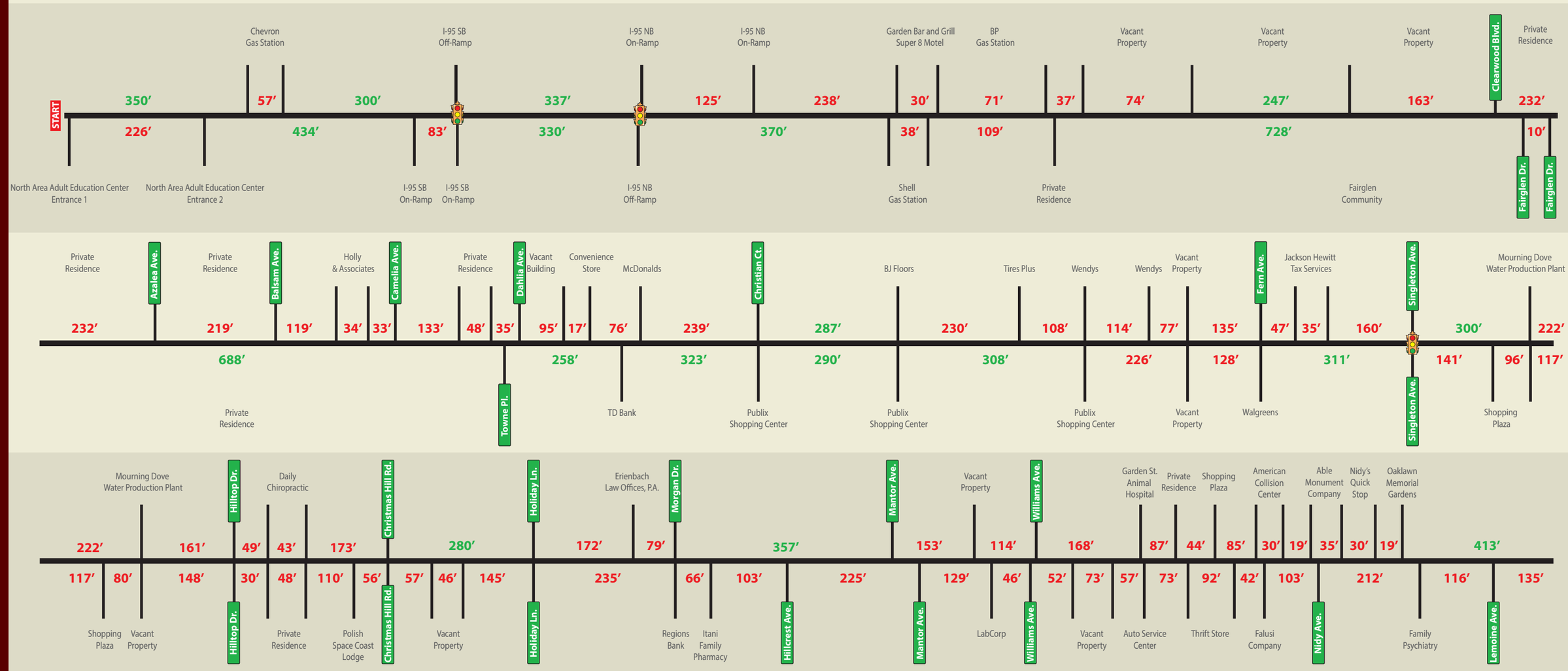
Source: FDOT Straight Line Diagram

Table 3: Access Class Spacing Standards

FDOT Access Management Class	Minimum Connection Spacing (feet)	Minimum Median Opening Spacing (feet)		Minimum Signal Spacing (feet)
		Directional	Full	
Class 5	440/245[1]	660	2,640/1,320[1]	2,640/1,320[1]
Class 6	440/245[1]	NA	NA	1,320

Source: Section 14-97.003, Florida Administrative Code
[1] Greater than 45 MPH / Less than or equal to 45 MPH
Note: For Class 1 roadways, no signalized intersections or driveways are allowed

Figure 8 through Figure 13 illustrate the existing access management and indicate whether or not the median, connection, and signal spacing are currently satisfying access management standards.



LEGEND

000 - Meets Access Management Standards

000 - Does Not Meet Access Management Standards

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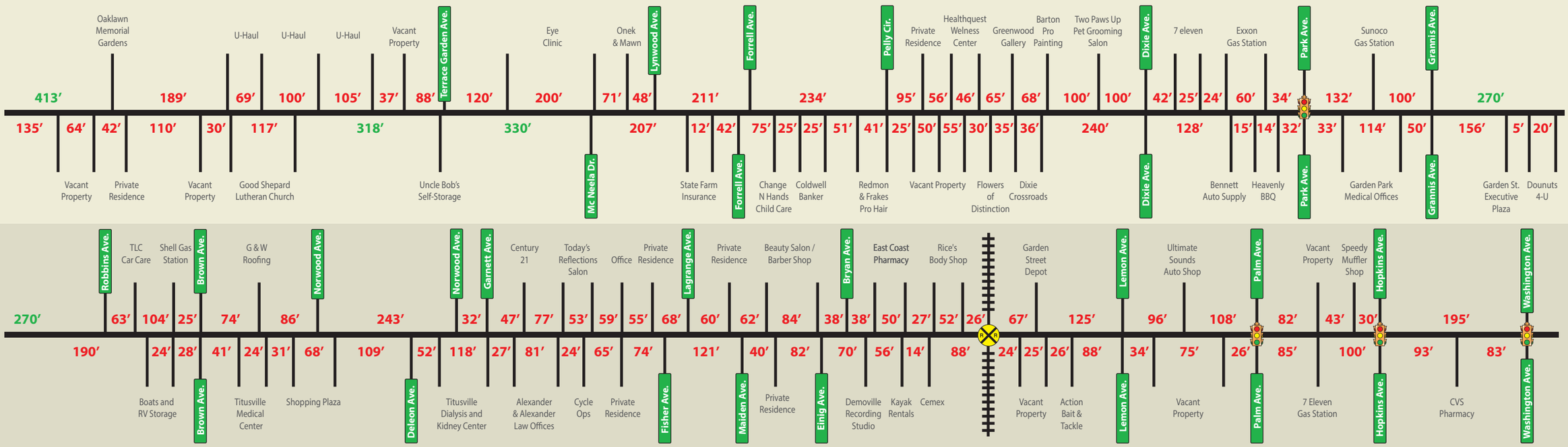
FIGURE 8
Connection Spacing



LEGEND

000 - Meets Access Management Standards

000 - Does Not Meet Access Management Standards

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FIGURE 9
Connection Spacing

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FIGURE 10

Access Management - Signalized Intersection and Median Spacing

LEGEND

- Full Median Opening
- Directional Median Opening
- Signalized Intersection
- 000 - Meets Access Management Standards
- 000 - Does Not Meet Access Management Standards

Christian Ct.
Fern Ave.
Singleton Ave.
Hilltop Dr.
Christmas Rd.
Holiday Ln.
Morgan Dr.
Manlor Ave.
Williams Ave.
690′
4356′
766′
406
6706′
Garden St.
836′
335′
314′
289′
215′
163′
89′
224′
222′
432′
Hillcrest Ave.
Manlor Ave.

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FIGURE 11
Access Management - Signalized Intersection and Median Spacing

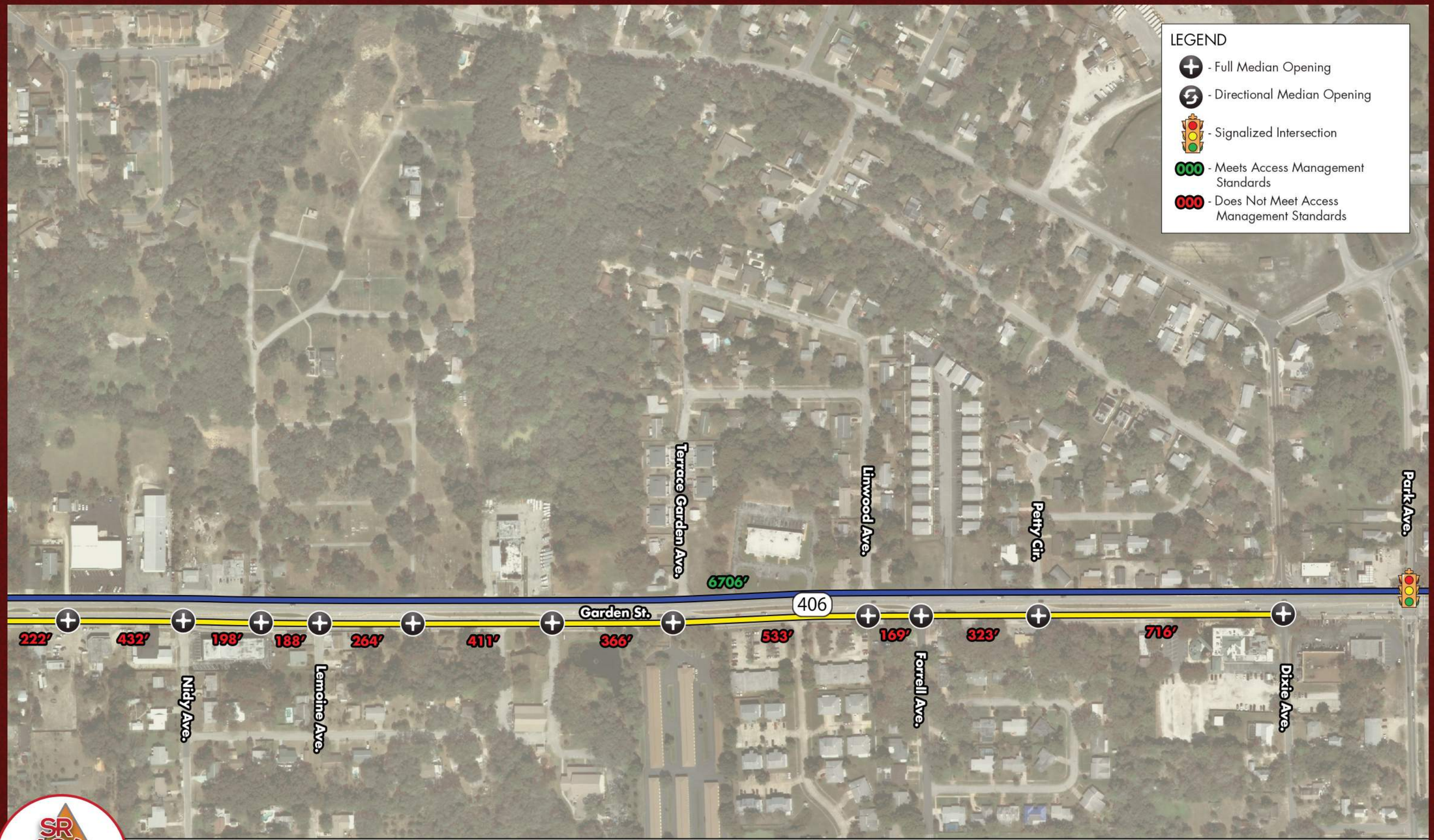

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FIGURE 12
Access Management - Signalized Intersection and Median Spacing

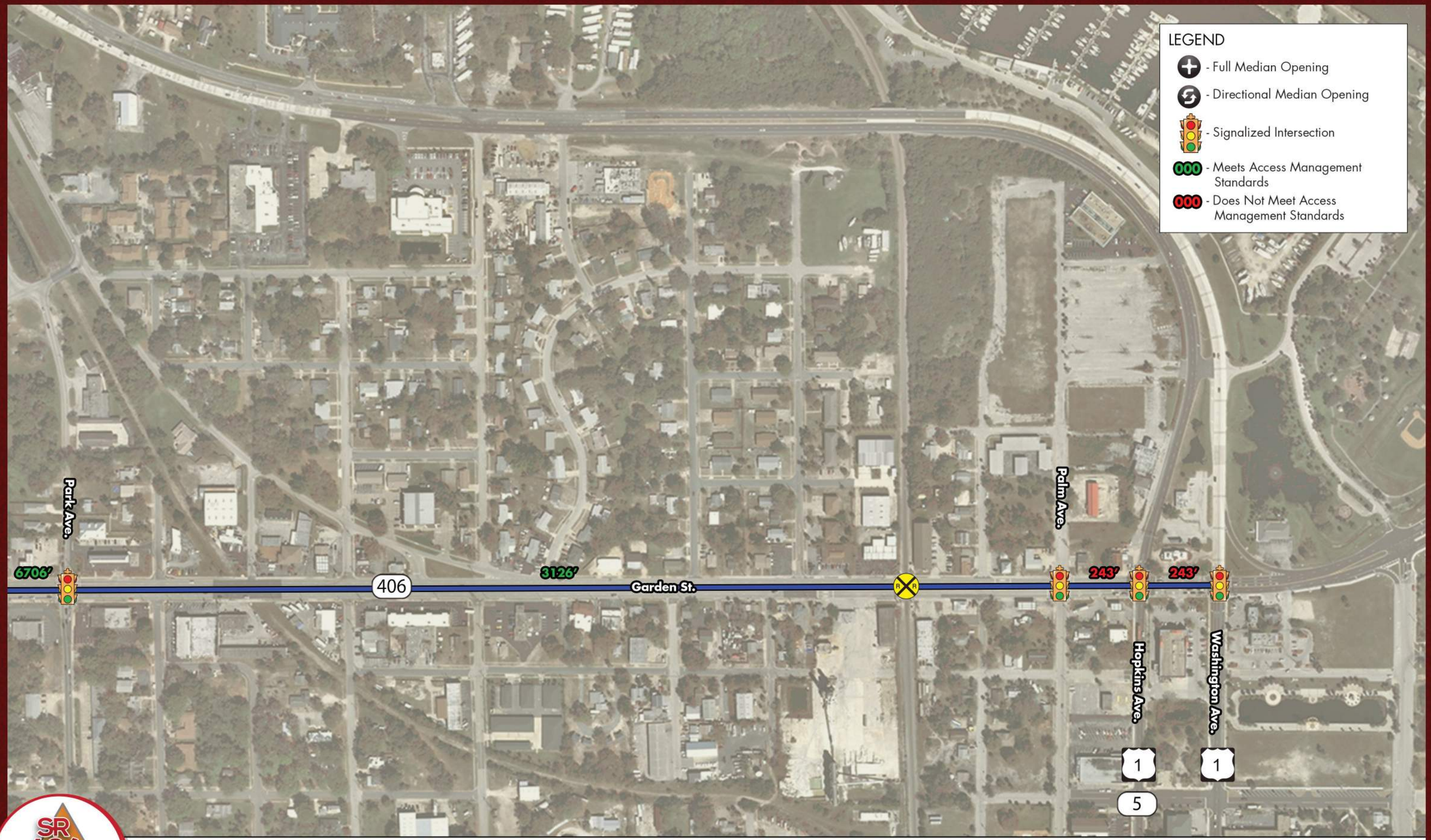

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FIGURE 13
Access Management - Signalized Intersection and Median Spacing

2.4.5 Existing Intersection Geometry

Figure 14 provides the year 2017 intersection geometry for all the following signalized intersections in the Study Area:

- SR 406 (Garden Street) / I-95 Southbound Ramps
- SR 406 (Garden Street) / I-95 Northbound Ramps
- SR 406 (Garden Street) / Singleton Avenue
- SR 406 (Garden Street) / Park Avenue
- SR 406 (Garden Street) / Palm Avenue
- SR 406 (Garden Street) / US 1 SB (Hopkins Avenue)
- SR 406 (Garden Street) / US 1 NB (Washington Avenue)

2.4.6 Parking

Approximately 1,950 linear feet of on-street parking bays are provided along the eastbound side of the corridor while 850 linear feet of parking is provided along the westbound side. All available parking throughout the Study Area is located between I-95 and Dixie Avenue due to right of way constraints east of Dixie Avenue. Figure 14 illustrates the on-street parking locations.

2.4.7 Lighting

Street lighting is provided along both sides of the corridor with the exception of the areas just east and west of the I-95 interchange area. The overhead cantilever lighting is either self-contained or mounted to existing power poles. Lighting was installed at the interchange in 2016, but the areas just east and west of the interchange still lack lighting. These unlit areas extend approximately 500 feet east and west from the new lighting at the interchange. Specific lighting locations are illustrated on Figure 14.

West

East

LEGEND

- Signalized Intersection
- Stop-Controlled Intersection
- Intersection Lane Geometry
- On-Street Parking Areas
- Street Lighting

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FIGURE 14
Existing Intersection Geometry, Parking, and Lighting Facilities

2.4.8 Utilities

A Sunshine One Call ticket was processed in August 2017 to identify a list of potential utility providers within the corridor. A 500-foot buffer was applied around the Study Area to identify the utility companies located adjacent to the corridor as well. Table 4 presents the utility companies/agencies that have facilities located within the Study Area. The full information obtained on utilities is provided in Appendix F.

Table 4: Utility Agencies and Contact Information

Utility Company	Notes
Florida City Gas *Bock Kreinhagen* *(321) 638-3424*	3-inch steel pipe runs from west of the Study Area along the south side of SR 406 (Garden Street) to Hilltop Drive where it continues south out of the Study Area. This pipe branches off and crosses between Dahlia Avenue and Fern Avenue, as well as running both north and south along the west side of Singleton. 3-inch pipe can also be found crossing SR 406 (Garden Street) on the east side of Brown Avenue. 1 inch steel pipe crosses SR 406 (Garden Street) on the west side of Hilltop Drive and Christmas Hill Road both ending up heading east and west along Tropic Street. 1.25-inch steel can be found along the north side of SR 406 (Garden Street) between Hilltop Drive and Christmas Hill Road, and also crossing SR 406 (Garden Street) on the west side of Forrell Avenue. 4-inch polyethylene pipe runs along the west side of Park Avenue crossing over SR 406 (Garden Street).
CenturyLink *George McElvain* *(303) 992-9931*	No Information Provided
Florida Power & Light *Joel Bray* *(954) 581-3088*	Utilities can be found along the north side of SR 406 (Garden Street). Off of this main utility line, many other utility lines cross over SR 406 (Garden Street) including two between I-95 and Clarewood Boulevard, one east of Balsam Avenue, one between Balsam Avenue and Camela Avenue, one east of Camela Avenue, and one east of Dahlia Avenue. A utility runs along the west side of Singleton Avenue crossing over SR 406 (Garden Street). There are also crossings at and east of Williams Avenue, east of Lemoine Avenue, east of Pamela Street, east of Petty Circle, and one crossing over on the west side of Dixie Avenue. Park Avenue, Deleon Avenue, just west of Lemon Avenue, and Palm Avenue also carry utilities that cross over SR 406 (Garden Street).
CenturyLink *George McElvain* *(303) 992-9931*	No Information Provided
AT&T Distribution *Bryan Coughlin* *(954) 249-0558*	Underground duct bank can be found from the east end of the Study Area along the north side of SR 406 (Garden Street) until Singleton Avenue where it crosses over to the south side, terminating at Hilltop Drive. It is also located from Dixie Avenue to Brown Avenue along the south side of SR 406. Aerial cable can be found along the south side of SR 406 (Garden Street) from east of Singleton Avenue to west of Dixie Avenue. It then picks back up at Park Avenue and Einig Avenue. It is also found on the north side of SR 406 (Garden Street) from Hilltop Drive to Williams Avenue. Another segment on the north is located from between Terrace Garden Avenue to west of Dixie Avenue. Buried cable can be found along both the north and the south sides of SR 406 (Garden Street). The northern segment commences west of Clarewood Boulevard and terminates east of Azalea Avenue. The southern segment terminates east of Camelia Avenue. It is also located on the north and south of SR 406 from Dahlia Avenue to Christian Court. Another segment of buried cable is on the north side of SR 406 (Garden Street) from Williams Avenue to west of Nidy

	Avenue. The final segment along the north side is from Garnet Avenue between Lagrange Avenue and Bryan Avenue. Underground duct banks cross SR 406 at Singleton Avenue, Hilltop Drive, Dixie Avenue, and Brown Avenue. Underground cables cross at Towne Place, Christmas Hill Road, Williams Avenue, Terrace Garden Avenue, between Terrace Garden Avenue and McNeala Drive, Mcneala Drive, east of Lynwood Avenue, east of Forrell Avenue, Dixie Avenue, and Hopkins Avenue. Aerial cables cross SR 406 at Park Avenue, Grannis Avenue, Deleon Avenue, Palm Avenue, and Hopkins Avenue.
MCI (Verizon) *Dean Boyers* *(469) 886-4238*	Underground utilities can be found within the railroad right of way coming from south of the Study Area crossing over SR 406 (Garden Street) west of Lemon Avenue then heading north of the Study Area. The utilities split off at SR 406 (Garden Street) and head along the north side ending at the bridge.
Transcore *Tushar Patel* *(386) 943-5315*	Utilities can be found along the north side of SR 406 (Garden Street) from I-95 to US 1 SB (Hopkins Avenue). They also parallel I-95 on the west side crossing SR 406 near the southbound ramps. There are also utilities that cross SR 406 (Garden Street) coming from south of the study area along the west side of Singleton Avenue and US 1 SB (Hopkins Avenue) both ending at SR 406 (Garden Street).
City of Titusville *Jimmy Gager* *(321) 567-3883*	No Information Provided
Spectrum *Paul Rymer* *(321) 757-6451*	Underground fiber optic cables can be found just east of the northbound I-95 ramps along the north side of SR 406 (Garden Street). It can also be found just east of Fairglen Drive along the south side of SR 406 (Garden Street), as well as from Hilltop Drive to Mantor Avenue along the north side of the roadway. Another segment is from Lynwood Avenue to Petty Circle along the north side of SR 406 (Garden Street). Overhead fiber optic cables can be found starting east of I-95 along the north side of SR 406 (Garden Street) to Singleton Avenue where it stops, then picks back up east of Hilltop Drive to Christmas Hills Road. It can also be found along the north side of the roadway from Mantor Avenue to west of Indian River Avenue. Overhead fiber optics cross SR 406 (Garden Street) east of the northbound ramps of I-95, east of Dahlia Avenue, at Singleton Avenue, at Williams Drive, at Terrace Garden Avenue, east of Petty Circle, at Grannis Avenue, at Brown Avenue, at Deleon Avenue, east of Garnet Avenue, at and east of Bryan Avenue, west of Lemon Avenue, at Palm Avenue, at US 1 SB (Hopkins Avenue), and east of US 1 NB (Washington Avenue). Underground fiber optics cross SR 406 (Garden Street) west of Fairglen Drive, at Towne Place, at Christmas Hills Road, at Holiday Lane, at Mantor Avenue, and at Park Avenue.
Level 3 Communications LLC *Michael Nunez* *(877) 366-8344 Ext: 2*	Underground utilities can be found within the railroad right of way coming from south of the Study Area crossing over SR 406 (Garden Street) west of Lemon Avenue then heading north of the Study Area.
Sprint Nextel *Mark Caldwell* *(407) 422-6670*	Utility company representatives specified that Sprint is only in the FEC railroad right of way. No other information was provided.
Tower Cloud, INC *James Davis* *(904) 813-2063*	No Information Provided
Crown Castle *David Antol* *(724) 416-2180*	No Information Provided

Source: Sunshine 811. Data was aggregated to reflect Study Area section limits.

2.4.9 Drainage

The general stormwater conveyance system that serves the SR 406 (Garden Street) corridor is curb and gutter along the roadway with storm pipes that direct runoff from the roadway either to wetlands, a stormwater management facility, or directly to an outfall. The curb and gutter typical section transitions to an open swale system just east of I-95 and continues to North Area Adult Education Center; the western limit of the Study Area. SR 406 (Garden Street) is generally depicted as flat terrain along the corridor however elevations decrease as the corridor approaches Indian River Avenue; the eastern limit of the Study Area. The United States Geological Survey (USGS) maps indicate a high point approximately at Christmas Hill Road. The roadway elevation is approximately 48 National Geodetic Vertical Datum (NGVD) at this point and reduces to 28 NGVD at the western limit of the Study Area and 2 NGVD at the eastern limit. There are other local low points to facilitate drainage within the closed system. The site is in the Upper St. Johns River Basin and the North Indian River Lagoon Basin. Ultimately, the stormwater runoff from the SR 406 (Garden Street) corridor flows to the St. Johns River, west of the Study Area, and the Indian River, east of the Study Area.

Floodplain

As shown in Figure 15, according to the Federal Emergency Management Agency (FEMA) Federal Insurance Rate Maps (FIRMS) for Brevard County (community panels 12009C0205G and 12009C0210G dated March 2014) SR 406 (Garden Street) has a small portion of the roadway within Floodplain Zone X. This zone has areas of 0.2% annual chance of flood; areas of 1% chance of flood with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance of flood. The area in Zone X is located near US 1 to the eastern limit of the Study Area. This area is also adjacent to a Floodplain Zone AE, where the base flood elevations have been determined (1.7 NAVD). Any fill placed in this area between the Seasonal Highwater Level (SHWL) and the floodplain elevation will require floodplain compensation. No net encroachment into the floodplain is allowed between the SHWL and the floodplain elevation.

Existing Drainage Conditions

Stormwater runoff from the SR 406 (Garden Street) corridor flows to the St. Johns River, west of the Study Area, and the Indian River, east of the Study Area. The roadway runoff is conveyed to a curb and gutter system that provides drainage for the SR 406 (Garden Street) corridor. Along the corridor there are curb inlets and catch basins that are connected to a storm sewer system directing runoff to wetlands, a stormwater management facility, or directly to an outfall.

The detailed existing drainage conditions in the corridor improvement areas are described below. These were obtained from field observation, aerial review, general topography review, as-builts provided by FDOT and adjacent permits. The roadway itself does not have a permit with the St. Johns River Water Management District (SJRWMD). As-builts for the entire extent of the roadway were not available. Therefore, some existing storm sewer pipe and ponds were not located. The overall drainage pattern is shown in Figure 16. Permit research and field notes are provided in Appendix D.

There are four known discharge locations that provide an outfall to the SR 406 (Garden Street) corridor. The first outfall is located at the Publix parking lot west of Singleton Avenue. From the SJRWMD permit 120490-2 for St. Johns Plaza Publix (Transfer), an inlet on SR 406 (Garden Street) gutter connects to stormsewer pipes underneath the Publix parking lot that discharge to a wetland system. This system ultimately outfalls to the St. Johns River. The stormsewer system on SR 406 (Garden Street) from approximately Clarewood Boulevard to Christmas Hill Road drains to this location. See the Drainage Map & Field Notes SR 406 & Singleton Avenue figure found in Appendix D.

The second outfall is located at Nidy Avenue. The stormsewer system on SR 406 (Garden Street) from approximately Christmas Hill Road to Lemoine Avenue drains to this location. This system drains south on Nidy Avenue to Tropic Street where it outfalls to a wetland. From SJRWMD permit 102787-1 for SR 405 SR 50 to SR 5, the wetland system outfalls to the St. Johns River.

The third outfall is located at Forrell Avenue. The stormsewer system on SR 406 (Garden Street) from approximately Lemoine Avenue to Petty Circle drains to this location. This system drains south on Forrell Avenue to a ditch located east of Forrell Avenue between South Lilac Circle and North Eden Circle. The ditch is connected to a stormsewer system on Main Street that outfalls east to the Indian River.

The forth outfall is located on Orange Street. The stormsewer system from SR 406 (Garden Street) between Hopkins Avenue and Washington Avenue discharges to Space Park pond, a wet detention pond on Orange Street before outfalling east in a 60-inch concrete storm sewer pipe along Orange Street to the Indian River. It is unclear how much of the SR 406 (Garden Street) stormsewer system is connected to this outfall. See Drainage Map & Field Notes SR 406 & US 1 figure in Appendix D.

Intersection of SR 406 (Garden Street) and Singleton Avenue

As shown in the Drainage Map & Field Notes SR 406 & Singleton Avenue figure in Appendix D, all the drainage in the vicinity of this intersection consists of a curb and gutter section draining to curb inlets.

The stormwater from Singleton Avenue flows toward the intersection of SR 406 (Garden Street) and Singleton Avenue. There are several median inlets on SR 406 (Garden Street) west and east of the intersection. The eastbound lanes have a superelevation towards the median in this area. Stormwater runoff mainly flows northeast across the intersection, however it is a large intersection with inlets at all corners.

From as-built review, it appears that offsite runoff from the shopping center located to the east of the SR 406 (Garden Street) and Singleton Avenue intersection, south of SR 406 (Garden Street) is draining to the SR 406 (Garden Street) stormsewer system.

Intersection of SR 406 (Garden Street) and US 1

As shown in the Drainage Map & Field Notes SR 406 & US 1 figure in Appendix D. All the drainage in the vicinity of this intersection consists of a curb and gutter section draining to curb inlets. From SJRWMD permits 34976-1 (CVS) and 56330-3 (Titusville Downtown Stormwater Park), the conveyance of stormwater runoff in this area is as follows:

The storm sewer system on SR 406 (Garden Street) flows east along SR 406 (Garden Street) and then south along US 1 NB (Washington Avenue). It discharges to the Space Park pond on Orange Street. In the past, this pond has been an alum injection treatment system, before outfalling east in a 60-inch concrete storm sewer pipe along Orange Avenue to the Indian River. It is unclear if this pond is still an alum treatment system. The existing pond is shown in the Drainage Map & Field Notes SR 406 & US 1 figure in Appendix D.

St. Johns River Water Management District Criteria

Proposed improvements to SR 406 (Garden Street) will be subject to the St. Johns River Water Management District (SJRWMD) criteria that are current at the time of the improvement. In addition, the FDOT Drainage Manual requires that roadway projects' stormwater management facilities comply with Chapter 14-86 of the Florida Administrative Code regarding water quality, rate and volume.

The site is in the Upper St. Johns River Basin and the North Indian River Lagoon Basin, which are hydraulically open basins that are impaired for nutrients.

Stormwater may need to be treated prior to its discharge to the respective water bodies and adequate erosion and turbidity barriers will be used during the proposed construction activities.

For the portion of the roadway in the Upper St. Johns River Basin, there is special criteria. A system may not result in an increase in the amount of water being diverted from the Upper St. Johns River Hydrologic Basin into coastal receiving waters. For stormwater detention systems, the post-development peak rate of discharge will not exceed the existing peak rate of discharge generated by the 10-year and 25-year storm events. On-site storage and outlet capacity should be designed for the 25-year storm. Outlet capacity design should be checked and further refined, if necessary, for the 10-year storm.

If treatment volumes are required, and wet detention systems are used, the project will need to provide storage for the water quality volume equal to 1-inch of runoff detention over the drainage area, or 2.5-inches times the percentage of impervious (excluding water bodies), whichever is greater. Additional water quality treatment volume and permanent pool volume are required because the Upper St. Johns River and North Indian River are Class III. Water quality classifications are arranged in order of the degree of protection required, with Class I water having generally the most stringent water quality criteria and Class V the least. Class III designation necessitates that the waterbody remained viable for fish consumption; as well as recreation, propagation and maintenance of a healthy, well-balanced population of fish and wildlife.

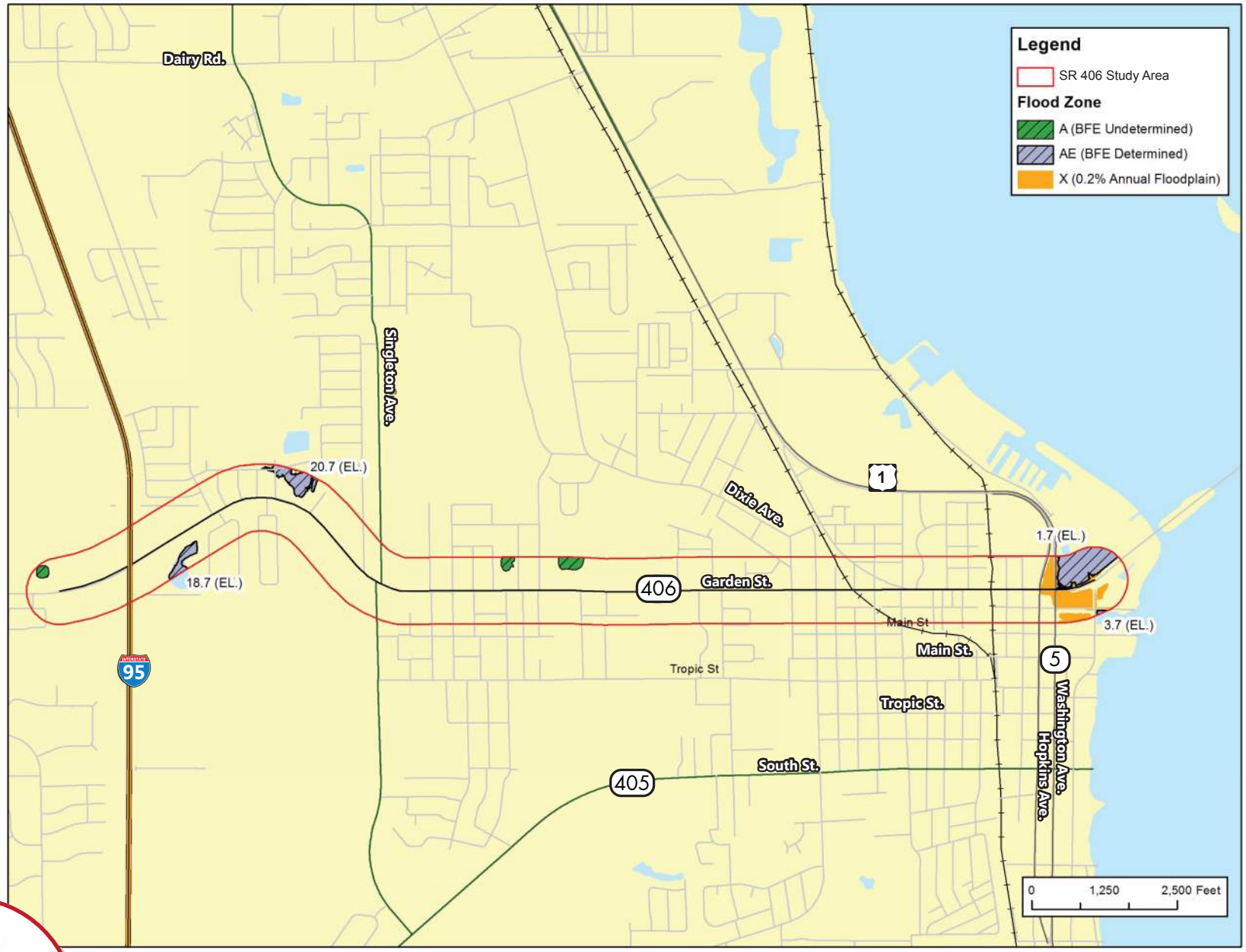

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FIGURE 15
Floodplains Map

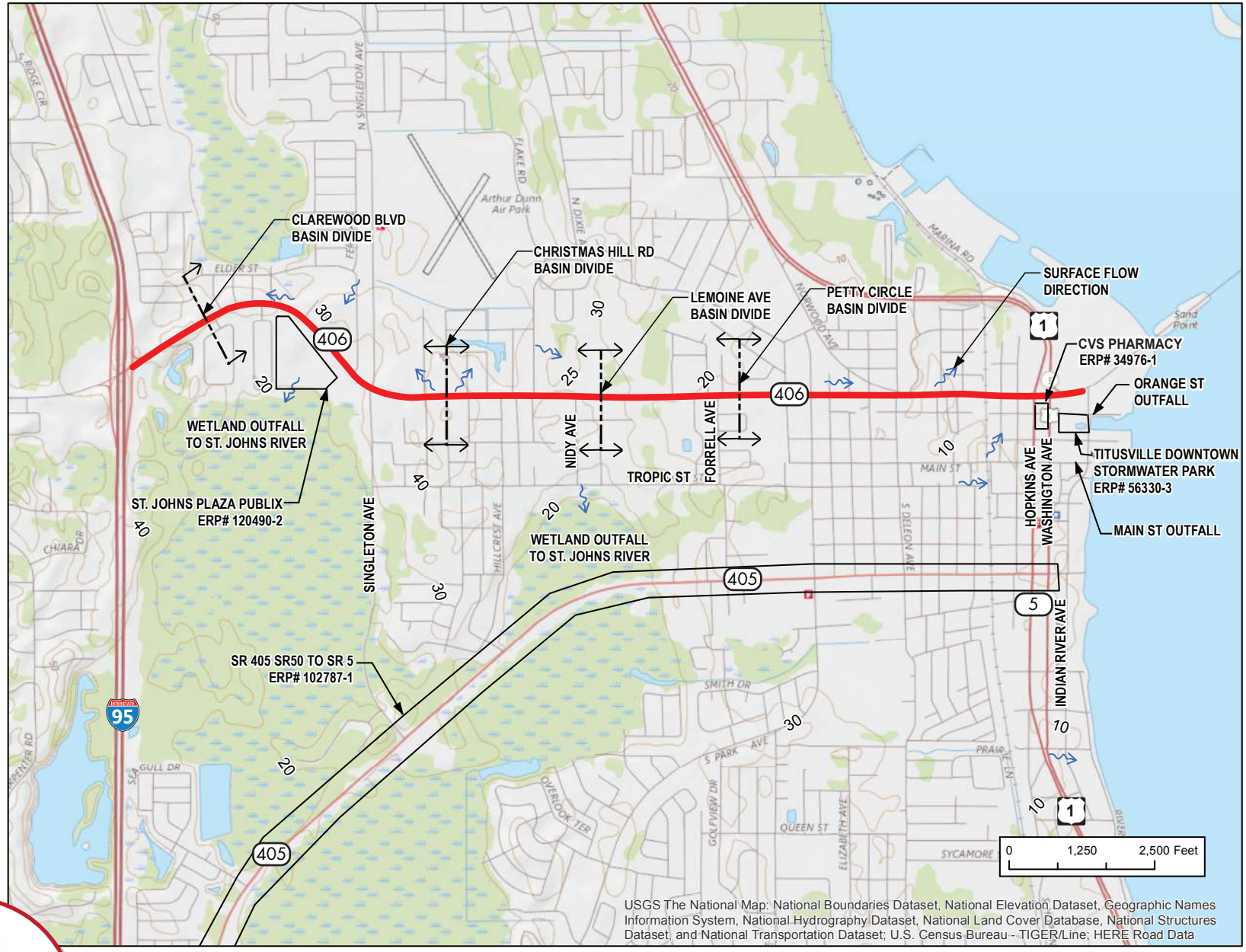

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FIGURE 16
USGS Drainage Map

2.4.10 Soils

Soil conditions were inventoried within the Study Area using data provided by the National Resources Conservation Service. Seventeen soil units, including open water occur within the corridor and are represented on Figure 17. However, given the level of urbanization, most of the soils have been disturbed and reworked during development.

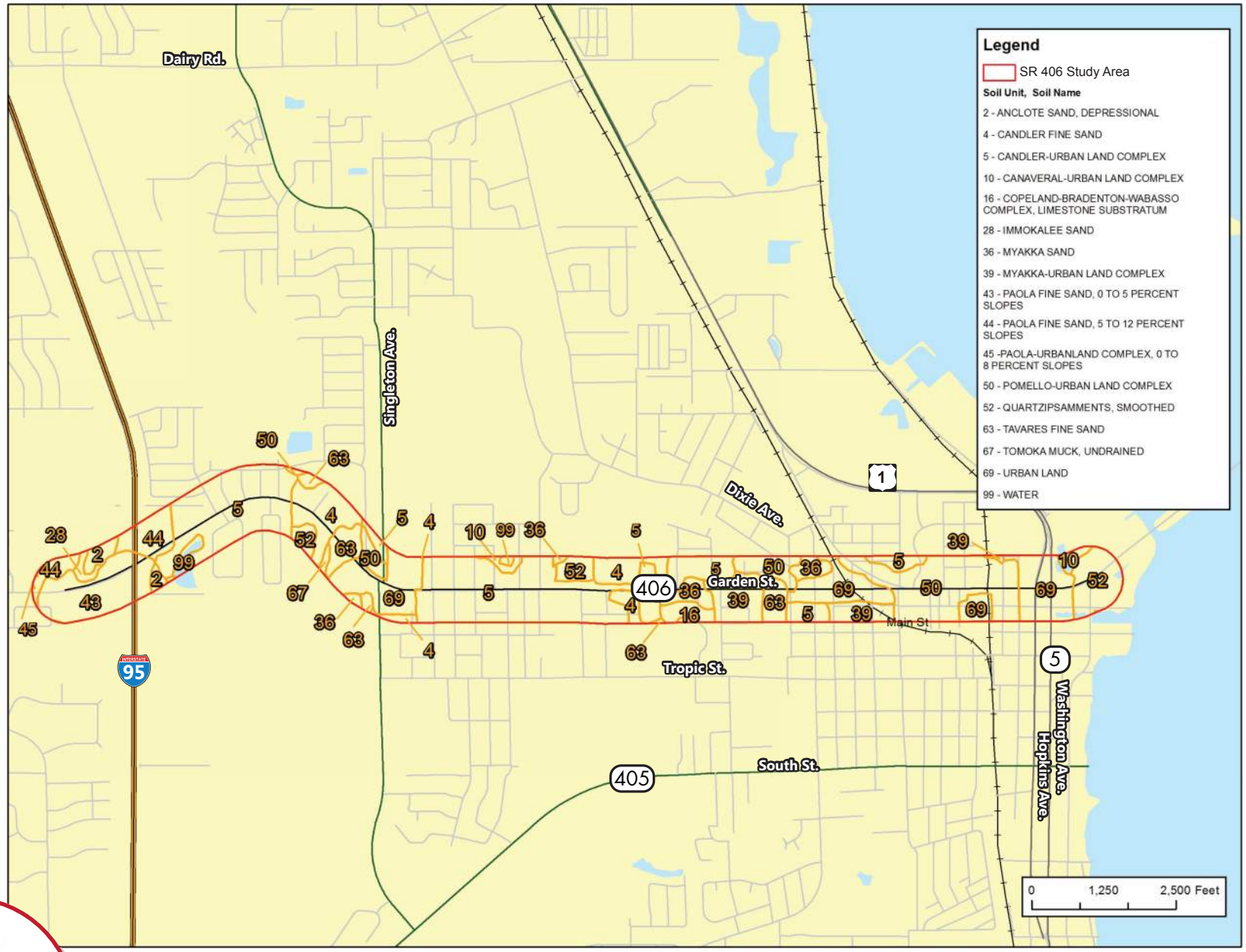

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FIGURE 17
Soils Map

2.4.11 Bicycle and Pedestrian Infrastructure

Bicycle and pedestrian connectivity plays an important role within the Study Area given the number of commercial and institutional uses along the corridor. This section details the existing bicycle and pedestrian network in the Study Area.

Bicycle Lanes

Designated bicycle facilities are present from just west of I-95 southbound ramps to just east of the I-95 northbound ramps. Paved shoulders are provided for a short segment between the NAAEC and the start of the bike lanes just west of I-95 and from the bike lane just east of I-95 for approximately 400 feet east. Figure 18 illustrates the existing designated bicycle facilities.

Sidewalks

Sidewalks are provided on both sides of SR 406 (Garden Street) for the entire length of the Study Area with exception to the north side of the corridor between US 1 SB (Hopkins Avenue) and US 1 NB (Washington Avenue) and within the channelizing island at Norwood Avenue. The gaps in sidewalk coverage are shown in Figure 18.

Crosswalks

Marked crosswalks with pedestrian signals are provided at all approaches of the signalized intersections along SR 406 (Garden Street) in the Study Area with the exception of the east and west approach at both I-95 ramps. There is one midblock crosswalk and several unsignalized marked crosswalks located throughout the corridor. Marked crosswalks within the Study Area are presented in Figure 18.

Trails

There are two trail segments within the Study Area, the East Central Regional Rail Trail – Titusville Segment and the Downtown Connector Trail. These two segments will comprise the Florida Coast-to-Coast Connector Trail and the Space Coast Loop Trail. The Florida Coast-to-Coast Connector Trail includes a number of regional trail systems that together provide a 250-mile multiuse trail from Florida's west coast (St. Petersburg area) to Florida's east coast (Space Coast).

The East Central Florida Regional Rail Trail – Titusville Segment (shown in Figure 18) crosses SR 406 diagonally (northwest) between N Grannis Avenue and N Robbins Avenue with a pedestrian overpass which was funded in the City of Titusville Capital Improvement Plan. This trail connects to an existing segment of the East Central Florida Regional Rail Trail (ECFRRT) to the northwest and to the Downtown Connector Trail to the east.

The Downtown Titusville Trail, illustrated in Figure 18, crosses both US 1 NB (Washington Avenue) and US 1 SB (Hopkins Avenue) at the Main Street intersections across the southern leg. The Downtown Titusville Trail connects to the East Central Florida Regional Rail Trail to the northwest and the Future Space Coast Trail to the east. These trails are all part of the Coast-to-Coast trail network connecting St. Petersburg to the Space Coast.

Parallel Bicycle and Pedestrian Routes

There are no parallel bicycle and pedestrian routes within close proximity to the SR 406 (Garden Street) Study Area.

School Bus Routes

There is one public school with bus service and one school bus compound located adjacent to the Study Area:

- **Astronaut High School** is located approximately 0.3 miles north of the Study Area just east of I-95. The school is in a highly residential area with small local roads. School buses travel along and across SR 406 (Garden Street) to stops east and south of the Study Area. Clearwood Boulevard, providing access from SR 406 (Garden Street) to the high school, is the heaviest utilized cross street.
- **North Brevard County School Bus Compound** is located approximately 0.3 miles north of the SR 406 (Garden Street) /Park Avenue intersection. This Compound houses and services all the school buses for north Brevard County. The main entrance to this compound is accessed via Park Avenue. Therefore, school buses will utilize the SR 406 (Garden Street) /Park Avenue to access SR 406 (Garden Street) or to travel through it.

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FIGURE 18
Existing Bike Lanes, Sidewalk Gaps, Marked Crosswalks & Proposed Trails

2.4.12 Transit Service and Infrastructure

Existing transit service in the Study Area is operated by Space Coast Area Transit (SCAT). This sub-section discusses these services.

Overview of SCAT

SCAT provides transit service within Brevard County, featuring 19 local fixed bus routes. SCAT also provides paratransit service and commuter assistance vanpools. The existing SCAT transit service types found within the Study Area are described below in more detail.

Fixed-route – Regular local bus service providing frequent stops typically spaced every two blocks.

Paratransit Service - The paratransit program provides service for eligible individuals who are not able to use the regular fixed-route bus service because of a disability or other limitations. Paratransit service is subsidized depending on the type of trip through one of the following: the Americans with Disabilities Act (ADA) program, the Transportation Disadvantaged (TD) program, or a negotiated agency contract.

Commuter Assistance Vanpools - The vanpool program provides vehicles that are purchased by the Brevard County Commission with support from federal capital grants. These vehicles are then provided to a third party, vRide, who then lease these vehicles to commuters. The leasing rate includes all maintenance, insurance, and administration costs.

The paratransit service and the commuter assistance vanpool programs are available on a case-by-case basis by request.

SCAT Transit Service

SCAT fixed-routes located along or intersecting with the SR 406 (Garden Street) Study Area include:

- *Route 2 (Titusville)* – This route serves as a local circulator for Titusville, operating in a counter-clockwise loop around the City. Within the Study Area, Route 2 provides service in the westbound direction along SR 406 (Garden Street) from Park Avenue to the Publix Shopping Center just west of Singleton Avenue.
- *Route 5 (Titusville/Mims)* – This route connects Titusville with Mims. Within the Study Area, this route crosses SR 406 (Garden Street) at US 1 NB (Washington Avenue) and serves SR 406 (Garden Street) as it moves east before turning south onto US 1 (Hopkins Avenue).

There are no transit centers located within the Study Area. Figure 19 shows the transit route alignments serving the Study Area. SCAT service in the Study Area is provided on weekdays and Saturdays, with service not provided on select major holidays. Table 5 presents the span of service, frequency, and ridership for Routes 2 and 5.

Table 5: SCAT Study Area Route Summary

Route	Route Description	Span of Service	Service Frequency	Flag Stop Route?	October 2016 – August 2017 Total Ridership
2	Titusville	6:55 AM to 7:55 PM* Monday – Friday	60 Min	No	82,807
		9:00 AM to 5:55 PM Saturday	60 Min		
5	Titusville/Mims	8:00 AM to 4:55 PM Monday – Friday	60 Min	Yes	44,089
		8:00 AM to 4:55 PM Saturday	60 Min		

Source: SCAT Posted Timetables (Effective 08/01/2017), FY 2017 ridership provided by SCAT
*Note: Limited Service for Route 2 extends north on US 1 for the first and last 3 runs of the day for weekday service and at 1 PM and 5 PM on Saturday

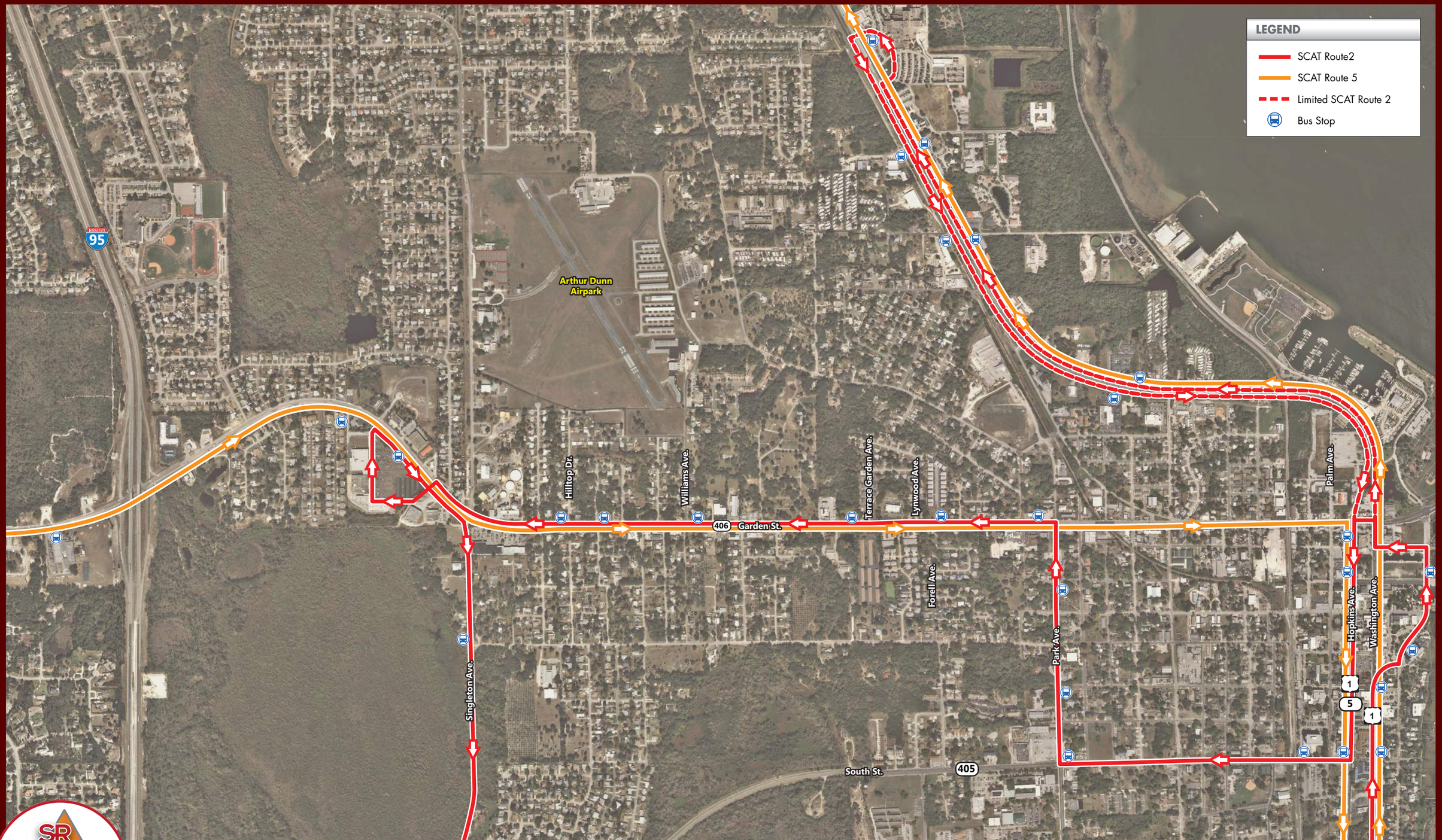

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FIGURE 19
Transit Routes & Facilities

2.5 Existing Traffic Conditions

2.5.1 Existing Traffic Volumes

Traffic counts were conducted in August 2017 at the following Study Area locations:

24-hr Continuous Volume (Tube) Count Locations

- West of I-95
- East of I-95
- East of Singleton Ave
- East of Park Avenue
- West of US 1 SB (Hopkins Avenue)
- Between US 1 NB (Washington Avenue) and US 1 SB (Hopkins Avenue)
- East of US 1 NB (Washington Avenue)

Existing roadway 24-Hour bi-directional volume counts were collected at the above-mentioned locations and weekday turning movement counts were collected at the Study Area intersections during the AM (7:00 – 9:00 AM) and PM (4:00 – 6:00 PM) peak hours.

Intersection Turning Movement Counts

- SR 406 (Garden Street) /I-95 Southbound Ramp
- SR 406 (Garden Street) /I-95 Northbound Ramp
- SR 406 (Garden Street) /Singleton Avenue
- SR 406 (Garden Street) /Park Avenue
- SR 406 (Garden Street) /Palm Avenue
- SR 406 (Garden Street) /US 1 SB (Hopkins Avenue)
- SR 406 (Garden Street) /US 1 NB (Washington Avenue)

All traffic count data collected was adjusted utilizing the latest (2016) FDOT axle (where applicable) and seasonal adjustment factors for Brevard County to provide 2017 annual average conditions. All collected traffic counts and seasonal factors are provided in Appendix A. Existing 2017 volumes are illustrated in Figure 20 and Figure 21.

2.5.2 Year 2017 Level of Service Analysis

Existing 2017 operational analysis was conducted to determine the Level of Service (LOS) for the roadway segments and the Study Area intersections. Peak hour peak direction volumes along the different segments were compared against the latest Generalized Peak Hour Directional Service Volumes Tables from the 2012 FDOT Quality/Level of Service Handbook to obtain the arterial LOS. The LOS for the Study Area intersections were determined using the procedures as outlined in the Transportation Research Board's (TRB) – Highway Capacity Manual (HCM 2000) using Synchro Software (version 8.0).

Roadway Operational Analysis

According to FDOT, SR 406 (Garden Street) in the Study Area is classified as an "urban principal arterial other" and has an adopted LOS "D". The generalized peak hour directional service volumes for the LOS letters "A" through "F" were obtained from the 2012 FDOT Quality/Level of Service Handbook and compared with volumes collected from the 24-hour bi-directional tube counts after seasonal and axle adjustments were applied to create average annual daily traffic for SR 406 (Garden Street) in the Study Area. A summary of the LOS analysis for the study roadways is included in Table 6.

Table 6: Existing Roadway Level of Service

Roadway/Segment	Daily		AM Peak			PM Peak		
	AADT	LOS	Volume	Pk. Dr.	LOS	Volume	Pk. Dr.	LOS
SR 406 (Garden Street)								
North Area Adult Education Center to I-95	7,300	D	390	EB	C	390	WB	C
I-95 to Singleton Avenue	16,000	C	680	EB	C	690	WB	C
Singleton Avenue to Park Avenue	16,000	C	660	EB	C	760	WB	C
Park Avenue to Palm Avenue	14,000	C	610	EB	C	750	EB	C
Palm Avenue to US 1 SB (Hopkins Avenue)	10,000	C	390	EB	C	470	WB	C
US 1 Southbound to US 1 NB (Washington Avenue)	9,900	C	440	EB	C	600	WB	C
US 1 NB (Washington Avenue) to Indian River Avenue	7,000	C	600	EB	C	680	EB	C

2012 FDOT Quality/Level of Service Handbook Tables
AM and PM Peak Volumes and LOS are based off of Peak Direction
AADT = Data Collected * Seasonal Factor (1.06) * Axle Factor (0.99)

As shown in Table 6, the SR 406 (Garden Street) corridor currently operate within acceptable LOS standards. The existing arterial LOS conditions are illustrated in Figure 20.

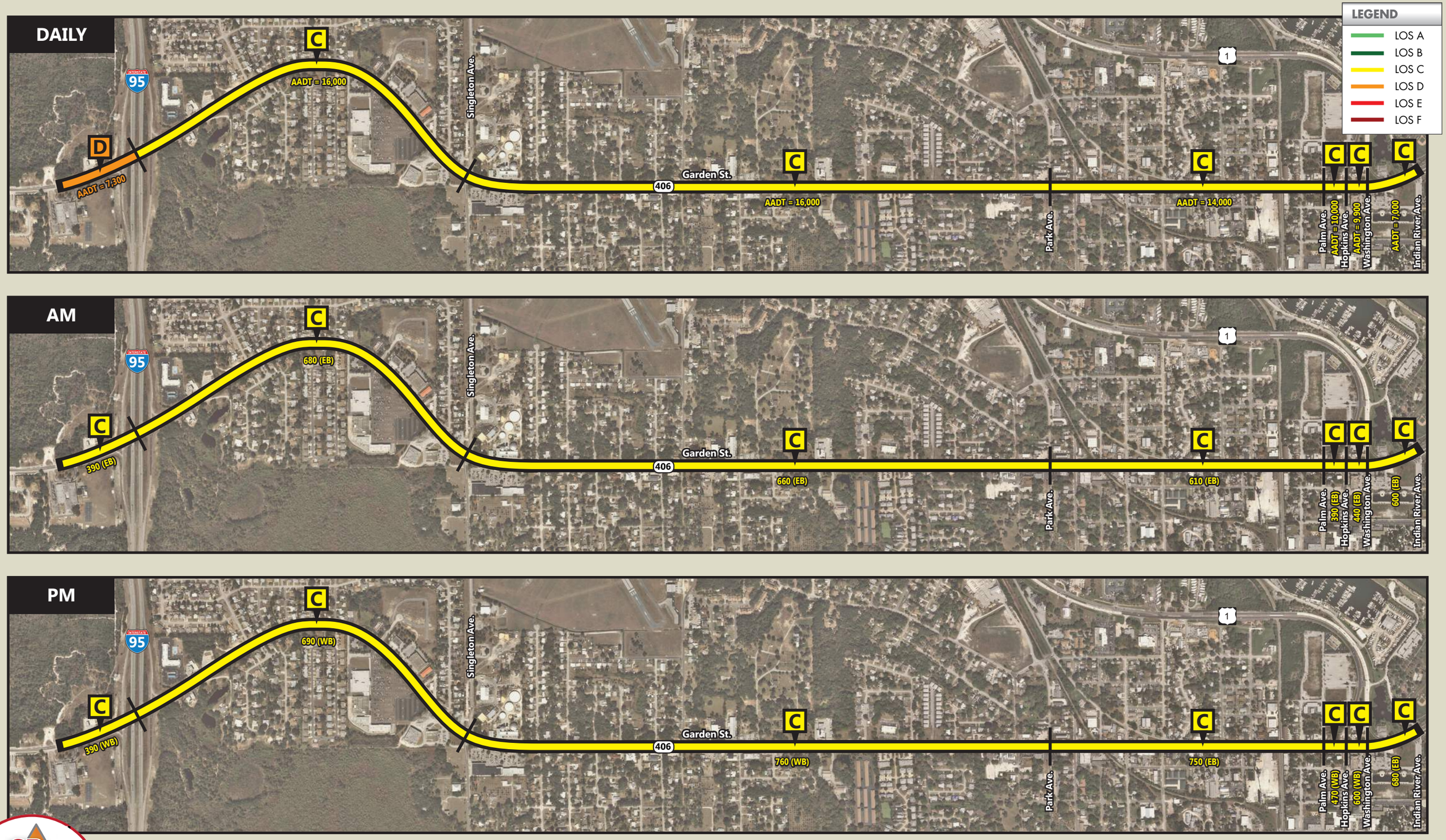

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FIGURE 20
Existing 2017 Roadway Operations

Intersection Operational Analysis

The Year 2017 intersection LOS is obtained by applying the seasonally adjusted TMCs to the existing intersection geometry. Existing signal timings were obtained from the City of Titusville and were utilized at all signalized intersections along the corridor. According to the HCM 2010, for signalized intersections, an average control delay per vehicle from 55 seconds up to 80 seconds is considered to be a LOS E condition. Beyond 80 seconds is considered to be a LOS F condition. As for unsignalized intersections, between 35 and 50 seconds is a LOS E conditions while anything about 50 seconds is LOS F. A summary of the LOS analysis for the study intersections is included in Table 7.

Table 7: Existing Intersection Level of Service

Intersection	Control	AM Peak		PM Peak	
		Delay	LOS	Delay	LOS
SR 406 (Garden Street)/I-95 SB Ramps	Signalized	11.0	B	8.8	A
SR 406 (Garden Street)/I-95 NB Ramps	Signalized	12.3	B	13.0	B
SR 406 (Garden Street)/Singleton Avenue	Signalized	27.4	C	33.4	C
SR 406 (Garden Street)/Park Avenue	Signalized	16.9	B	16.4	B
SR 406 (Garden Street)/Palm Avenue	Signalized	3.4	A	4.6	A
SR 406 (Garden Street)/US 1 SB (Hopkins Avenue)	Signalized	13.0	B	13.0	B
SR 406 (Garden Street)/US 1 NB (Washington Avenue)	Signalized	8.8	A	9.9	A

As seen in Table 7, the SR 406 (Garden Street) corridor currently operates under acceptable LOS conditions during the AM and PM peak hours. The existing intersection LOS conditions are graphically displayed in Figure 21. The Synchro Summary Sheets are provided in Appendix B.

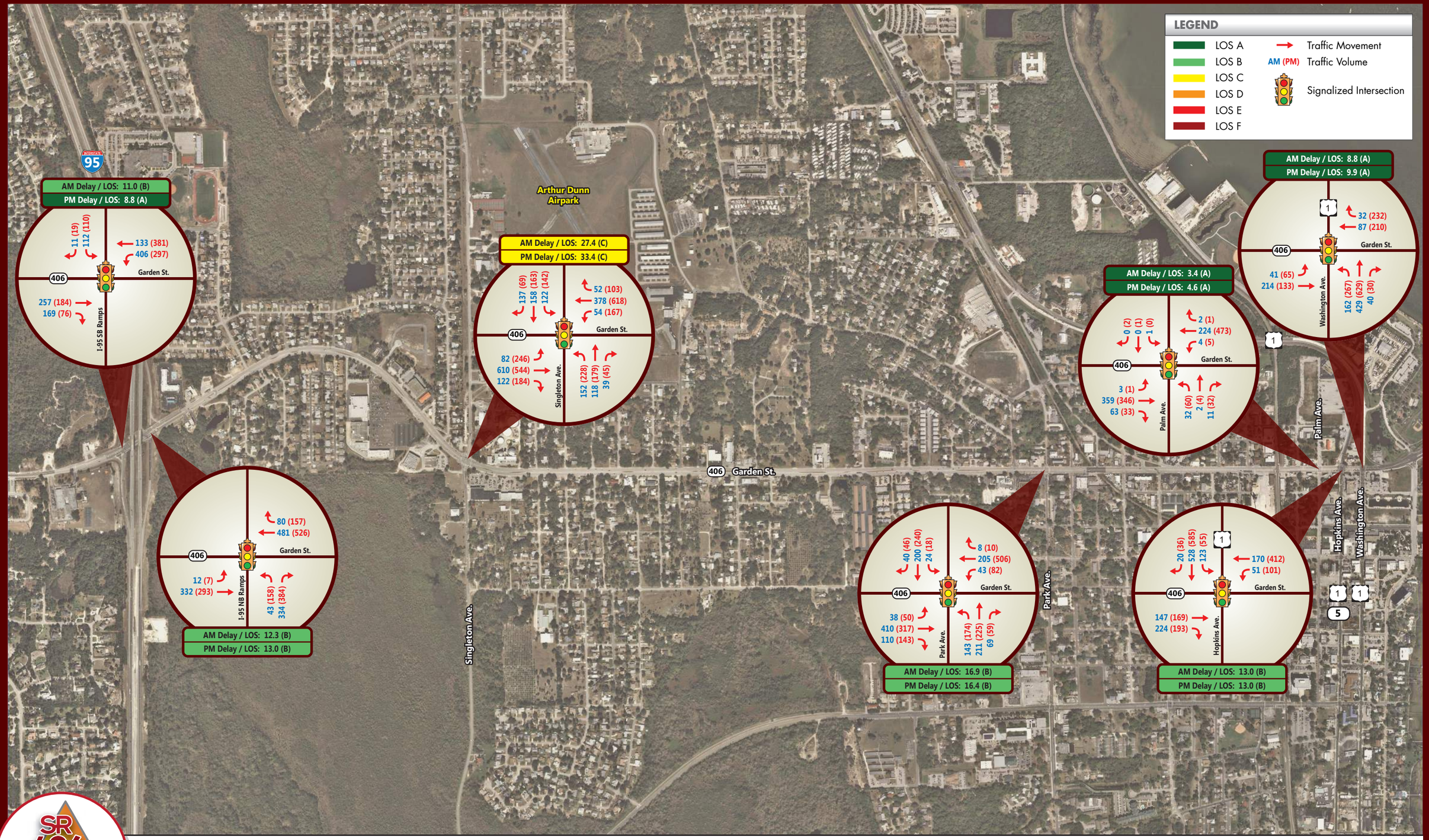

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FIGURE 21
Existing 2017 Intersection Operations

2.6 Safety and Crash Analysis

2.6.1 Total Crashes

Crash Data was obtained from Signal Four Analytics for the previous five years (January 01, 2011 to December 31, 2015) along SR 406 (Garden Street) from west of I-95 Southbound Ramp to U.S. 1 Northbound. A total of 476 crashes, including 201 injuries, were reported over the five-year period along SR 406 (Garden Street) within the Study Area limits, as illustrated by Table 8.

Table 8: Crash Data Summary

Year	Total Number of Crashes	Number of Injury Crashes	Total Number of Injuries	Number of Fatal Crashes	Total Number of Fatalities	Number of Night Crashes	Number of Wet Crashes
2011	65	18	26	0	0	12	4
2012	96	26	39	0	0	17	13
2013	104	31	48	0	0	12	8
2014	115	31	44	0	0	15	15
2015	96	28	44	0	0	11	12
2011-2015	476	134	201	0	0	67	52
Average	***95.2***	***26.8***	***40.2***	***0***	***0***	***13.4***	***10.4***
Percent	***-***	***28.20%***	***-***	***0.00%***	***-***	***14.10%***	***10.90%***

Table 9 summarizes the number of crashes by harmful event along the SR 406 (Garden Street) corridor. The predominant crash types were angle (22.1%), rear-end (18.3%), and left turn crashes (10.9%).

Table 9: Crash Data Summary by Harmful Event

Crash Type	2011	2012	2013	2014	2015	2011-2015	Average per Year	Percent
Angle	14	21	24	28	18	105	**21**	**22.10%**
Rear End	17	8	15	19	28	87	**17.4**	**18.30%**
Left Turn	9	8	11	16	8	52	**10.4**	**10.90%**
Animal	0	1	0	0	0	1	**0.2**	**0.20%**
Rollover	0	2	0	1	0	3	**0.6**	**0.60%**
Off Road	4	10	5	8	1	28	**5.6**	**5.90%**
Head On	0	1	1	2	2	6	**1.2**	**1.30%**
Right Turn	2	0	0	0	4	6	**1.2**	**1.30%**
Bicycle	0	1	2	1	1	5	**1**	**1.10%**
Sideswipe	8	9	3	12	9	41	**8.2**	**8.60%**
Pedestrian	0	1	1	0	0	2	**0.4**	**0.40%**
Other	11	34	42	28	25	140	**28**	**30.30%**
Total	***65***	***96***	***104***	***115***	***96***	***476***	**-**	***100.00%***

Segment crash rates in crashes per million vehicle-miles traveled were calculated for the SR 406 (Garden Street) corridor in order to compare the actual crash rate of the corridor to the statewide average crash rate for similar facilities during the study period. The FDOT average crash rate statistics used in the comparison were extracted from the FDOT Crash Analysis Reporting System (CARS). Each transition in crash rate category or AADT requires a break in the segment crash rate calculation, resulting in five (5) distinct segments for which an individual crash rate was calculated and compared to the statewide average for the corresponding crash rate category. Table 10 presents the roadway segments of SR 406 (Garden Street) (from the NAAEC to I-95 and from US 1 SB (Hopkins Avenue) to US 1 NB (Washington Avenue)) that experienced an average crash rate higher than the average crash rate for similar locations through FDOT's state wide average. The length of the two segments, from US 1 SB (Hopkins Avenue) to US 1 NB (Washington Avenue) and US 1 NB (Washington Avenue) to Indian River Avenue, is 0.161 and 0.120 respectively. The short segment lengths imply a higher per-mile concentration of crashes compared to the statewide average crash rate. All segments, with the exception of the NAAEC to I-95, are above the statewide average crash rate for their respective categories. These rates will be noted as the planning process continues to advance alternatives. Crashes are summarized by type and location in Figure 22.

Table 10: Crash Data Rate

From/To	Number [1] of Crashes	Length (miles)	AADT[4]	ACR[2]	Crash Rate Category	AVG[3]	High Crash Segment?
Roadway: SR 406 (Garden Street) Roadway ID: 70002000 Milepost: 0.000 to 2.949							
North Area Adult Education Center to I-95	6	0.16	7,300	2.81	Urban 2-3 ln 2 way Divided Rsd	5.85	NO
I-95 to Singleton Avenue	126	0.87	16,000	4.96	Urban 4-5 ln 2 way Divided Rsd	3.12	YES
Singleton Avenue to Park Avenue	144	1.26	16,000	3.91	Urban 4-5 ln 2 way Divided Rsd	3.12	YES
Park Avenue to Palm Avenue	81	0.59	14,000	5.37	Urban 4-5 ln 2 way Divided Pvd	4.70	YES
Palm Avenue to US 1 Southbound	8	0.05	10,000	8.77	Urban 4-5 ln 2 way Divided Pvd	4.70	YES
US 1 Southbound to US 1 Northbound	46	0.05	9,900	50.92	Urban 4-5 ln 2 way Divided Rsd	3.12	YES
US 1 Northbound to Indian River Avenue	65	0.12	7,000	42.40	Urban 4-5 ln 2 way Divided Rsd	3.12	YES

Notes:
1- Number of crashes from January 1, 2011 to December 31, 2015.
2- Average Crash Rate = (N*1,000,000)/(365*Y*AADT*L), where N = number of crashes, Y = number of years, AADT = Annual Average Daily Traffic, and L = Length of the segment in miles.
3- AVG = Statewide Average Crash Rate for Corresponding Category.
4- Data obtained from existing traffic conditions section.
5- Segments are defined as including the 'from' intersection, but not including the 'to' intersection.

2.6.2 Bicycle and Pedestrian Crashes

A total of seven crashes involving bicycles and pedestrians have occurred in the Study Area of SR 406 (Garden Street) corridor five of which involved bicycles and the other two involved pedestrians. The first pedestrian crash occurred between Hilltop Drive and Singleton Avenue, while the other occurred at the Dixie Avenue intersection. Both incidents occurred during clear and dry daytime conditions. Two bicycle crashes occurred at the Dixie Avenue intersection as well as two at the Christian Court intersection. The final one occurred at the Lemoine Avenue intersection. Three of these crashes took place during clear and dry daytime conditions, and one during clear and dry nighttime conditions. The final incident occurred during rainy weather conditions and a wet surface.

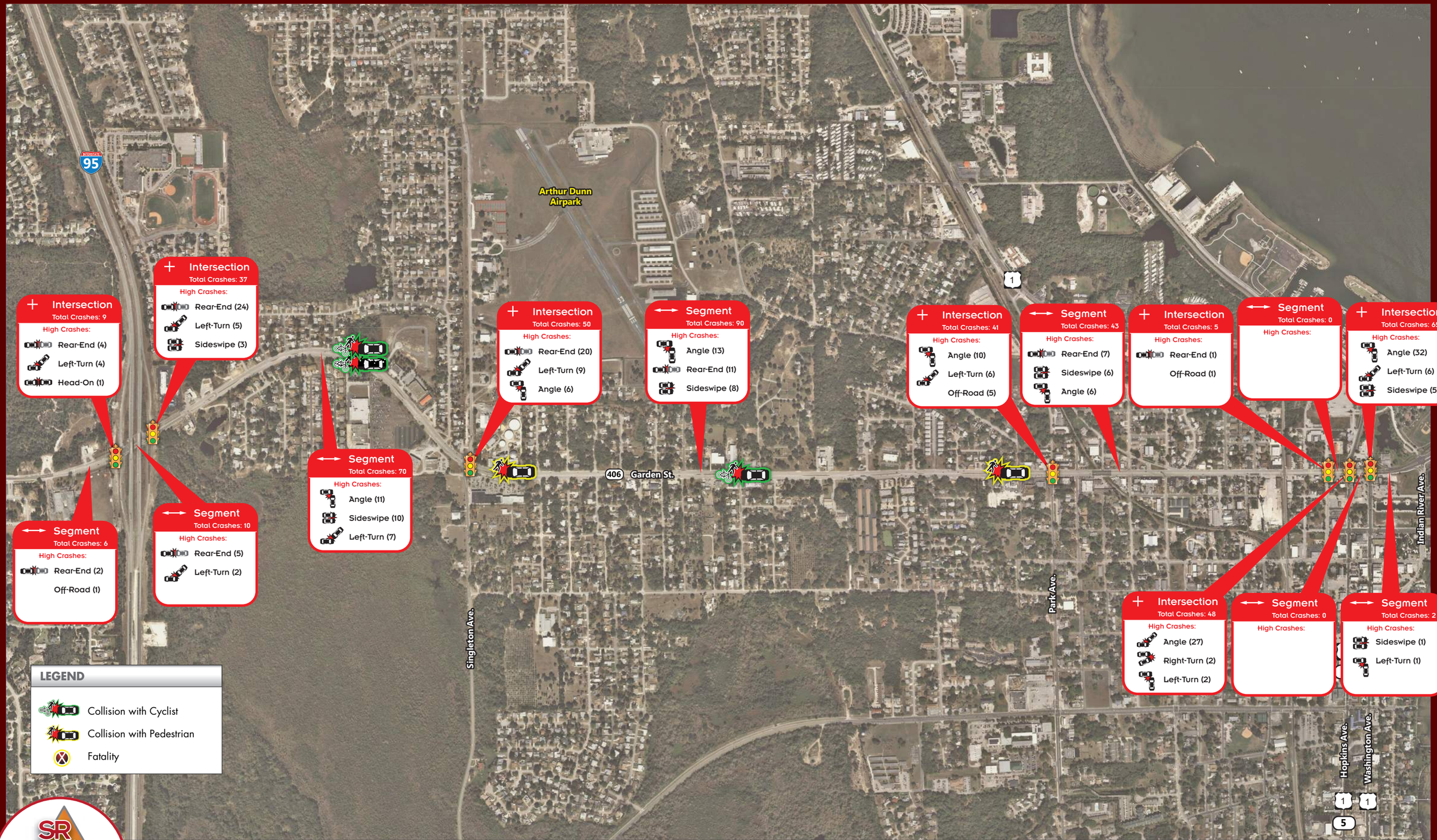

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FIGURE 22
2011-2015 Crash Type and Location

2.7 Environmental Character

The existing environmental information for the Study Area was extracted from Geographical Information System (GIS) datasets maintained by the Florida Geographic Data Library (FGDL). For purposes of this environmental analysis, a buffer of 500 feet was used for the Study Area.
The following were examined as part of this review:

- Cultural Resources
- Social Resources
- Population Characteristics
- Socioeconomic Data
- Major Employers and Activity Centers
- Threatened and Endangered Species
- Wetlands
- Floodplains
- Contamination

2.7.1 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 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)."*

Archaeological sites or historic resources that are listed, determined eligible, or considered potentially eligible by the State Historic Preservation Office (SHPO) for listing in the NRHP are listed Table 11 These sites along with other state recorded sites and survey locations are graphically depicted in Figure 23.

Table 11: Summary of Cultural Resources

Cultural Resources	Within Study Area
SHPO Structures	30
SHPO Bridges	0
SHPO Resource Groups	2
National Register (Site, District, Building)	0
Archaeological Sites	0
SHPO Surveys	6

Source: FGDL, ETDM

According to the Florida Master Site File (FMSF), no known sites or structures eligible for listing on the NHRP are located within the Study Area. However, 30 FMSF historic standing structures are present, five of which have not been evaluated. These include 127, 124, and 132 Dixie Avenue S, and 112 and 802 Orange Street. Additional resource evaluation may be required for these structures should they be affected by the project. The two historic resource groups are linear resources associated with the Florida East Coast Railroad and U.S. Highway 1/Cocoa Boulevard.

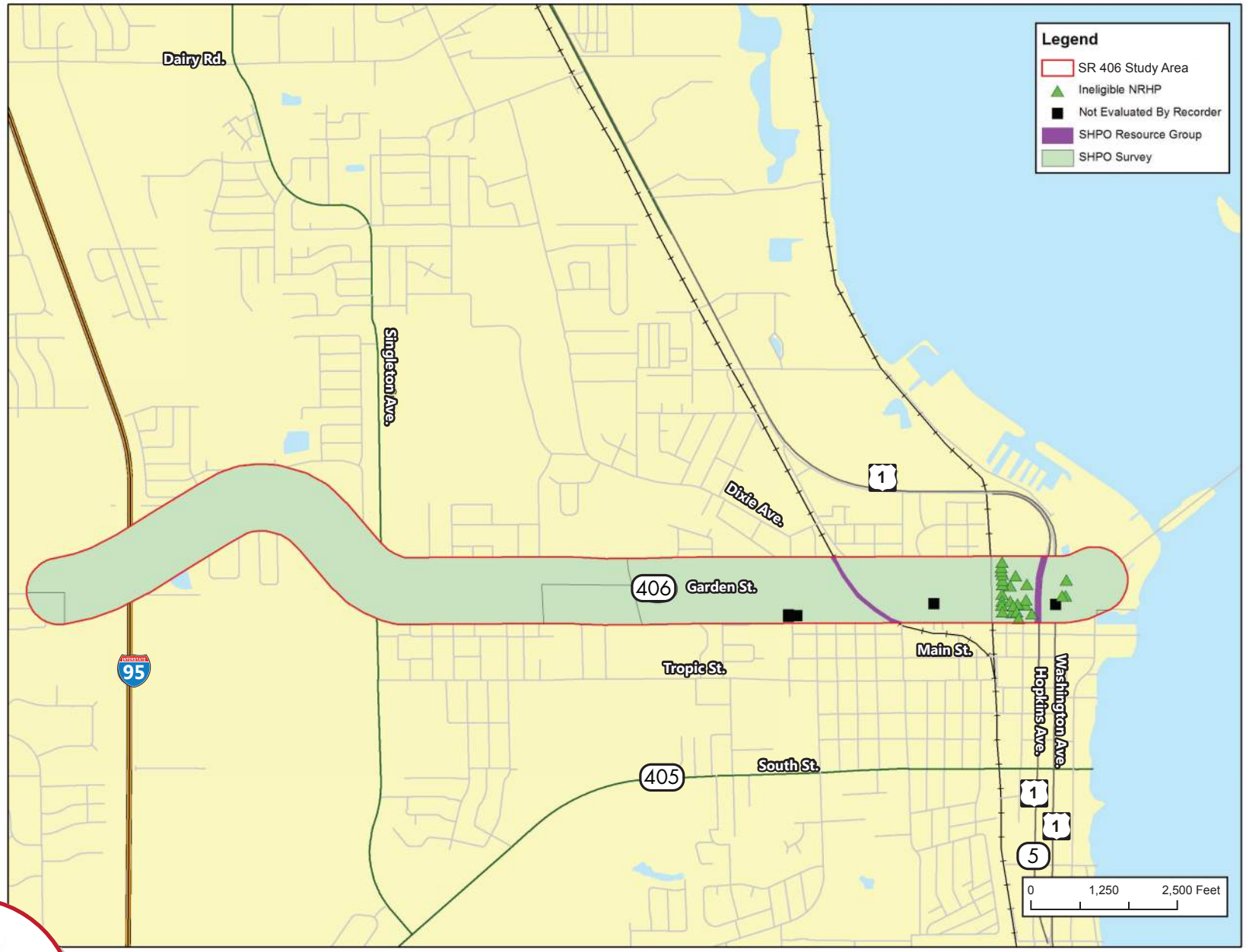

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FIGURE 23
Cultural Resources Map

2.7.2 Social Resources

Any public or private social resources that were considered relevant to the Study Area were considered. Table 12 below summarizes the public facilities within the Study Area. Figure 24 graphically displays the results of the social resource evaluation.

Table 12: Summary of Public Facilities

Social Resources	Within Study Area
FDEM Places of Worship	0
Florida Marine Facilities	1
Cemeteries	1
Community Centers	3
Cultural Centers	0
Fire Stations	0
Government Buildings	0
Health Care Facilities	11
Homeowner and Condominium Associations	1
Parks	2
Religious Centers	4
Schools	1
Social Service Facilities	0
Veteran Facilities	0

Source: FGDL, ETDM

The Study Area is adjacent to Sand Point Park and Space View Park along the eastern extents of the project. These parks are protected under the Department of Transportation Act (DOT Act) of 1966, Section 4(f), which limits the use of public land. Space View Park contains the existing Marine Facility and is considered a nature park with a dock/pier. Sand Point Park is a neighborhood and athletic/recreational park. The Study Area also intersects part of the Indian River Lagoon National Scenic Byway. The Indian River Lagoon National Scenic Byway received its recognition in 2000 for its outstanding scenic, historic, cultural, natural, recreational and archeological qualities. Oaklawn Memorial Gardens Cemetery is located north of SR 406 (Garden Street) in the central portion of the corridor. Any construction activities adjacent to the cemetery may require ground-penetrating radar (GPR) to ensure there is no disturbance to past activity. Eleven health care facilities found within the corridor include ten doctor's offices and one clinic. There is also one listed school near the western edge of the corridor, which is now an adult education center.

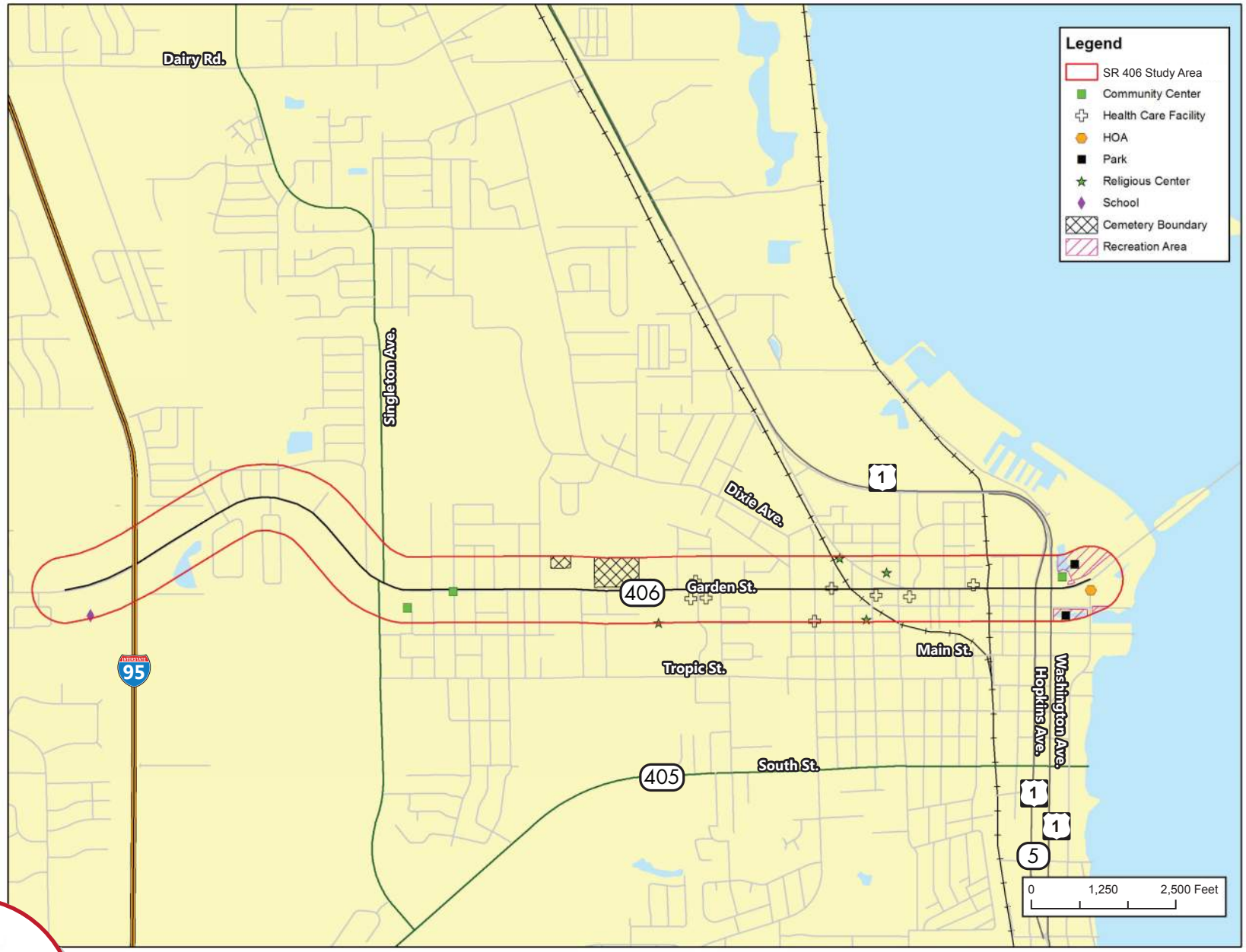

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FIGURE 24
Public Facilities Map

2.7.3 Population Characteristics

An overview of the corridor population and demographics data collected for the US Census 2010 and the American Community Survey are provided in Table 13. The data presented reflects an analysis based on abutting Census Tracts. The area abutting the SR 406 (Garden Street) corridor consists of a population density of approximately 3.04 persons per acre and a housing density of 1.39 households per acre. Average household size is approximately 2.44 persons per household and the median age is 45 years old.

Table 13: Population Characteristics

Population Characteristics	Study Area Data
Total Population	3,535
Population Density (Persons per Acre)	3.04
Total Households	1,422
Average Household Size	2.44
Household Density (Households per Acre)	1.39
Median Age	45
Population Over 65	17.7%
Male	46.5%
Female	53.5%

2.7.4 Socioeconomic Data

Table 14 provides an overview of the socioeconomic characteristics obtained from the US Census 2010 and American Community Survey. In the SR 406 (Garden Street) Study Area, the median household income is $40,907, and 24.3 percent of the households are below the poverty line. Forty-seven and two-tenths percent of the 1,822 total housing units are owner-occupied, and 30.8 percent are renter-occupied. The remaining 22.0 percent of housing units in the Study Area are vacant. Eleven and two-tenths percent of the households have no vehicle available and 38.4 percent have only one vehicle available. The majority of the population, 75.4 percent, in the Study Area identifies as white only, and 20.8 percent identify themselves as black or African American. Given the statistics for those below the poverty line and those identifying as minorities, environmental justice issues will need to be evaluated. Figure 25 and Figure 26 illustrate the median household incomes for the Study Area, as well as, the percentage of zero car households.

Table 14: Socioeconomic Characteristics

Socioeconomic Characteristics	Study Area Data
Median Household Income	$40,907
Households Below Poverty Level	24.3%
Total Housing Units	1,822
Owner-Occupied	47.2%
Renter-Occupied	30.8%
Vacant	22.0%
Households with No Vehicle	11.2%
Households with 1 Vehicle	38.4%
Total Population	3,535
White	75.4%
Hispanic or Latino	4.7%
Not Hispanic or Latino	70.7%
Black of African American	20.8%
Asian	0.0%
Other	3.8%

2.7.5 Major Employers and Activity Centers

Publix Supermarket is the largest employer in the Study Area, employing 349 persons. The other companies that are among the top five largest employers along the SR 406 (Garden Street) corridor include Dixie Crossroads, Kelsey's Pizza, Walgreen's and Oaklawn Memorial Gardens.

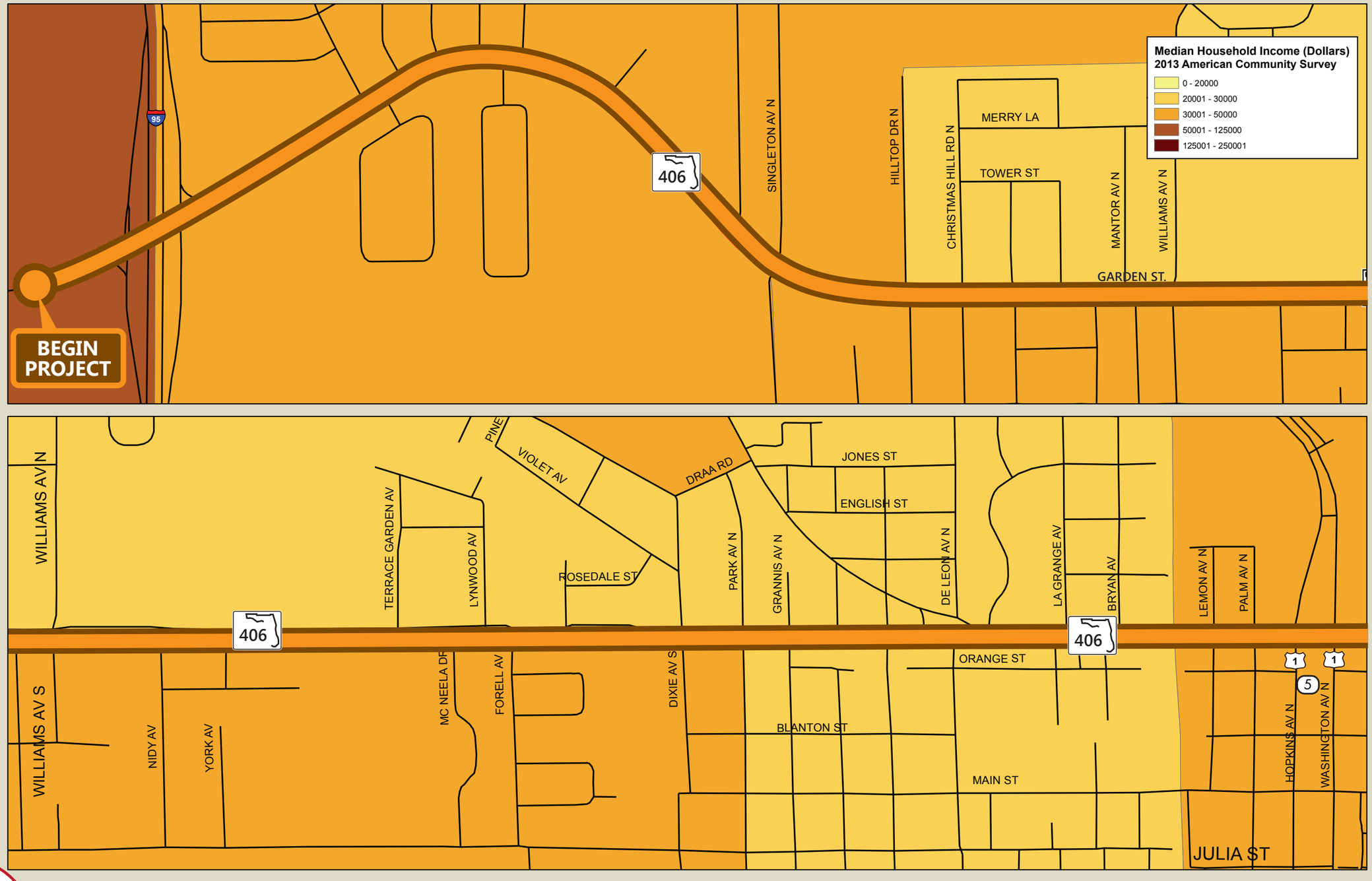

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FIGURE 25
Median Household Income Map

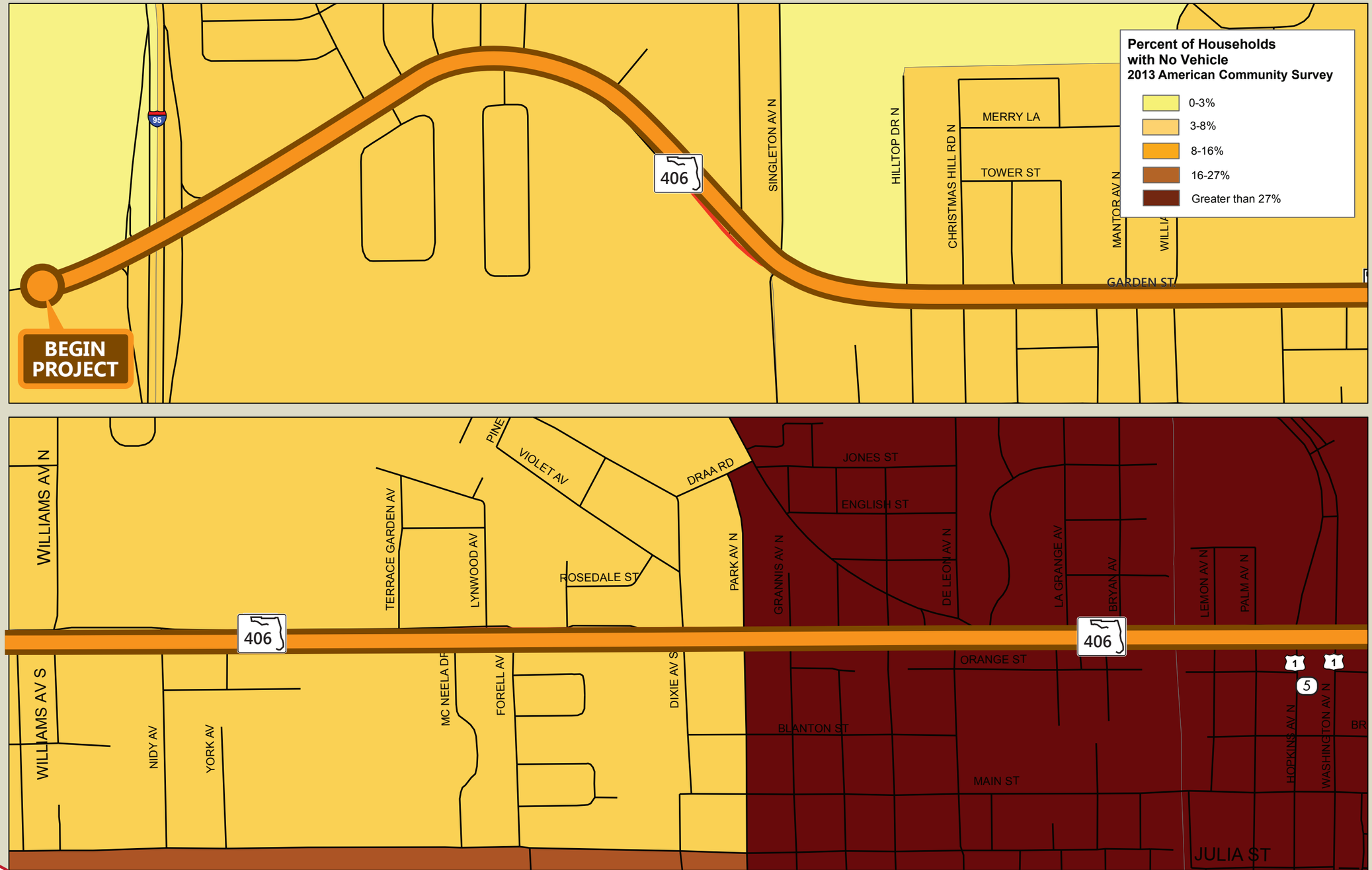

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FIGURE 26
Households With No Vehicles Map

2.7.6 Threatened and Endangered Species

Reviews of the Florida Natural Areas Inventory (FNAI) and GIS data from the US Fish and Wildlife Service (USFWS) and Florida Fish and Wildlife Conservation Commission (FWC) identified critical habitat/habitat richness and/or consultation areas for threatened or endangered species. Consultation areas identified by USFWS encompass all areas where populations are known to exist. These threatened and endangered species consultation areas and/or critical habitats are summarized in Table 15 and shown in Figure 27. It must be noted that the existing roadway is located within low quality habitat with limited habitat richness due to the developed nature of the area. However, several areas within the Study Area are known to have moderate species richness containing three to five species. The highest likelihood for protected species is along the west side. Two areas contain environmentally sensitive lands. The first is located north of SR 406 (Garden Street), just west of Interstate 95. The second is located south of SR 406 (Garden Street), just east of Interstate 95.

Table 15: Summary of Wildlife and Habitat

Wildlife and Habitat	Abutting Buffer	Study Area	Habitat Within Study Area
Wood Stork Core Foraging Areas	Yes	Yes	Yes
Red-cockaded Woodpecker Consultation Areas	No	No	Minimal
Crested Caracara Consultation Area	Yes	Yes	Minimal
Florida Scrub Jay Consultation Area	Yes	Yes	No
Atlantic Salt Marsh Snake	Yes	Yes	No
Snail Kite Consultation Area	Yes	Yes	No
Piping Plover Consultation Area	Yes	Yes	No

Source: US Fish and Wildlife Service (USFWS), 2011; Florida Natural Areas Inventory (FNAI), 2009.

Vacant parcels within the Study Area may contain habitat suitable for the gopher tortoise (*Gopherus Polyphemus*), a State Threatened species. If gopher tortoise burrows are found onsite, the appropriate permits will need to be obtained from FWC to relocate the tortoises to an approved offsite recipient area prior to construction activities. No permit will be required if all burrows can be avoided by a 25-foot radius. Furthermore, onsite wetlands, ponds, and swales may also provide intermittent habitat for wading and colonial birds that may utilize these areas for nesting and foraging.

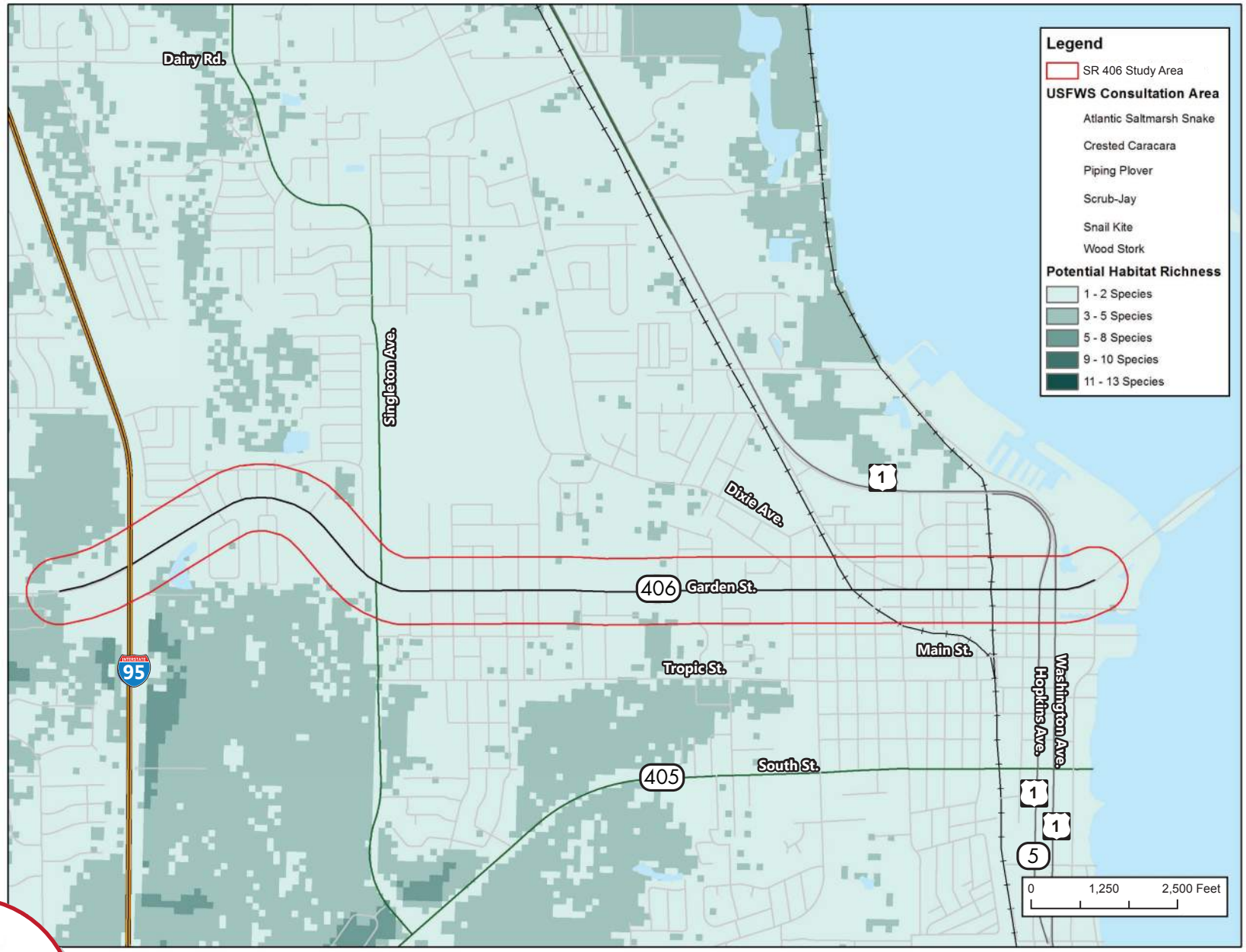

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FIGURE 27
Wildlife & Habitat Map

2.7.7 Wetlands

The wetlands analysis used 2009 GIS data available from the SJRWMD. The data shows that one (1) mixed scrub-shrub wetland is located within the central southwest portion of the Study Area. This wetland is located behind an existing shopping center and will not be impacted by the project. "Other surface waters", which include ponds and drainage swales/ditches are also present within the area. Figure 28 illustrates the wetland and surface water system locations as presented in the data; however, drainage swales and ditches are not depicted.

2.7.8 Contamination

Contaminated sites within the Study Area were identified using data from the Florida Department of Health (FDOH) and the Florida Department of Environmental Protection (FDEP). Table 16 summarizes the areas that have the potential for contamination and Figure 29 illustrates the location of these sites. It must be noted that the facilities shown are regulated facilities which have the potential for contamination or environmental concern, but are not necessarily contaminated.

Table 16: Summary of Contamination Analysis

Analysis Type	Within Study Area
Brownfield Location Boundaries	0
Biomedical Waste	25
Hazardous Waste Facilities	21
Petroleum Contamination Monitoring Sites	21
Storage Tank Contamination Monitoring (STCM)	21
US EPA Resource Conservation and Recovery Act (RCA) Regulated Facilities	20
Toxic Release Inventory Sites	1
Waste Cleanup Responsible Party Sites - Open	1

As shown in the figure, the Study Area contains "potential" hazards and risk sites which include 21 hazardous waste facilities and 25 sites with the potential for biomedical waste. The Study Area contains eight facilities being monitored for petroleum contamination with work underway, ten facilities which have been closed, and three facilities that require no cleanup. No offsite contamination notices have been issued by FDEP within the Study Area. All sites being monitored are within regulation and there were no hazardous contamination sites found. One active cleanup site located at 2935 Garden Street (SR 406) is currently open and associated with potential groundwater contamination classified as a moderate level of concern. Furthermore, while not listed in the existing data, railway data shows that contaminants may also be associated with rail lines and spurs. Work in these areas may warrant further investigation.

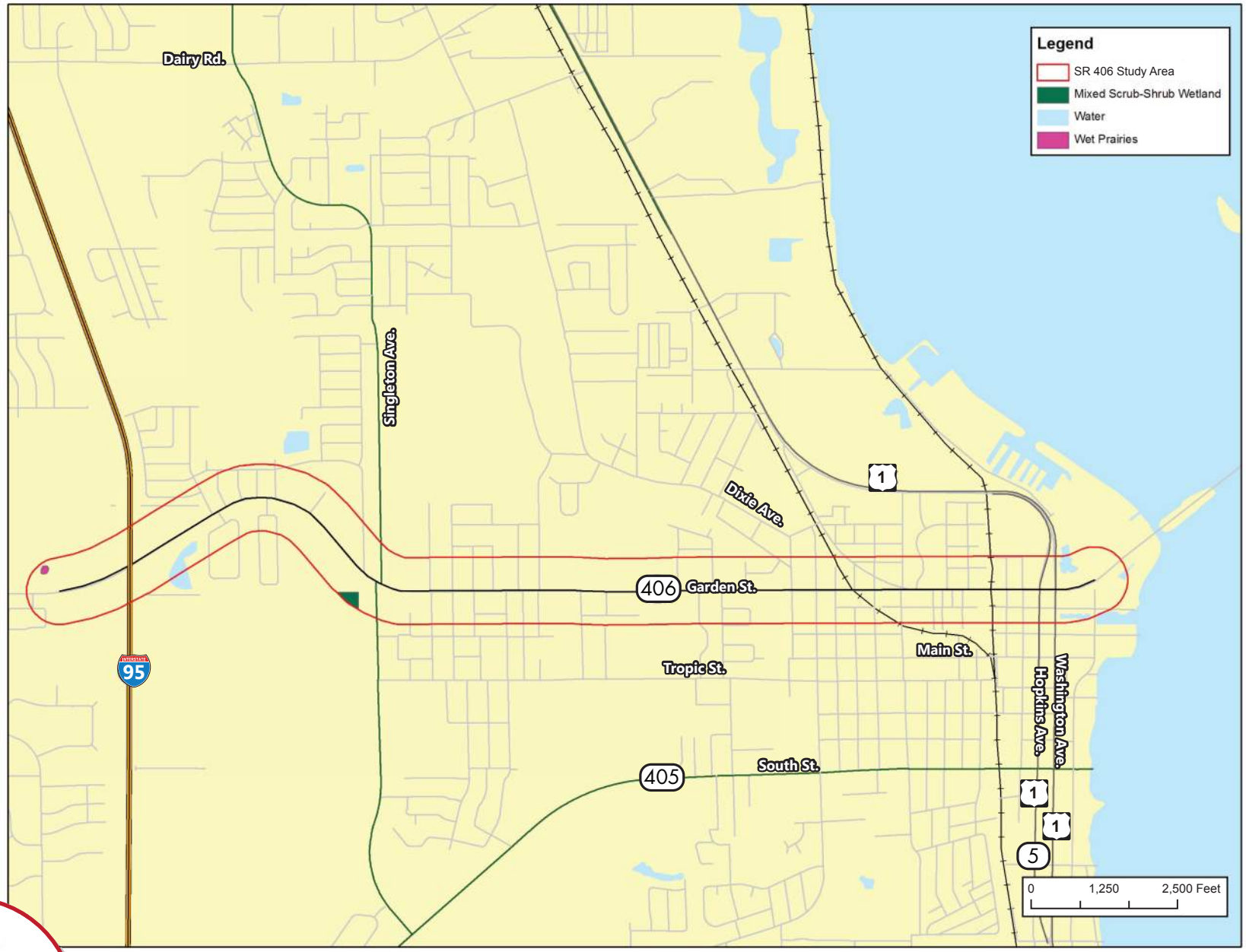

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FIGURE 28
Wetlands Map

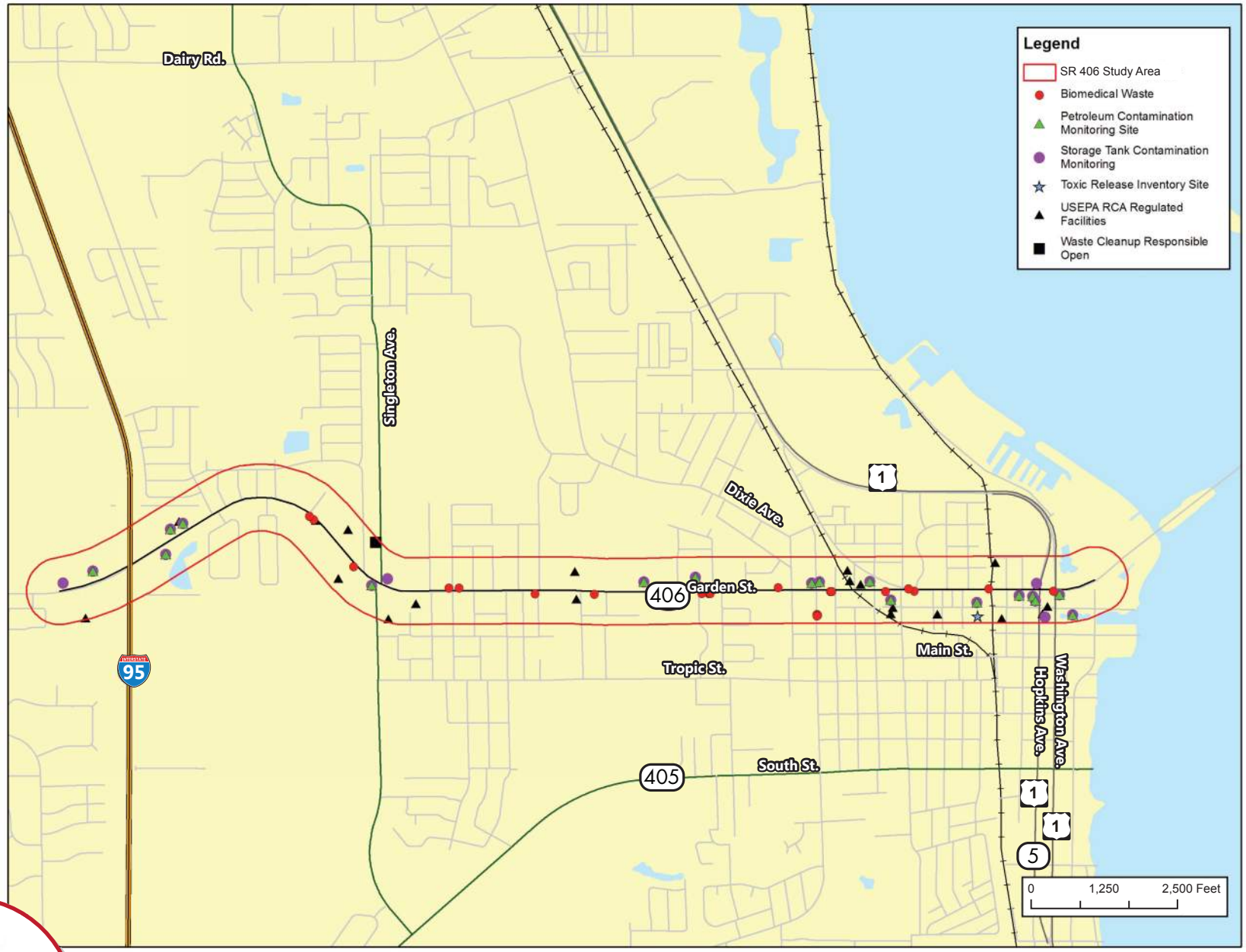

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FIGURE 29
Contamination Map

3

Issues and Opportunities

The assessment of existing conditions is developed to provide a more-comprehensive understanding of the Study Area, and to provide a solid foundation to support the next phases of the planning process. This involves an extensive due diligence process to collect the appropriate available data from a variety of sources, to inventory physical features of the roadway and surrounding land uses, assess current operating conditions, and review safety characteristics. This process also provides an opportunity for the Study Team to develop a feel for the community and its socio-cultural characteristics, to identify natural features, and to document other unique attributes.

This section is intended to summarize the issues identified along the corridor to be evaluated during the study, as well as opportunities to consider in the development of potential improvement strategies. During the data collection and existing conditions inventory process, elements within the corridor that were found to be deficient were noted appropriately as summarized in this section. Wherever possible, other aspects of the corridor that represent potential opportunities to support future enhancements were also documented. In addition, the current local agency transportation plans were scoured to identify planned and programmed improvements within the Study Area or nearby, as these can represent additional opportunities to combine or coordinate efforts in the future.

3.1 Existing Physical Features

The following issues and opportunities identified are directly related to the physical features of the roadway and its accompanying facilities. These items will be reviewed and discussed as part of the public engagement process, starting with the Project Visioning Team in the early stages of the project. Through the discussions that come from this interaction, additional items may be identified for consideration as part of the planning process to identify a range of potential improvement strategies.

3.1.1 Existing Typical Section

Due to the variation in on-street parking and median treatments, there are inconsistent lane widths throughout the SR 406 (Garden Street) corridor within the Study Area. There are segments that contain up to 20-foot wide right-hand travel lanes that may be repurposed for additional facilities on the corridor. Figure 30 illustrates an example of the inconsistent lane widths.

Figure 30: Inconsistent Lane Widths

3.1.2 Access Management

There are a high number of driveways that have direct access to SR 406 (Garden Street) due to the designated land uses surrounding the corridor. Locations with multiple driveways to individual parcels have been identified as well. There may be opportunities to condense driveway access without restricting business access or circulation. There are locations of older (not utilized), or unutilized driveways as illustrated by Figure 31 below.

Figure 31: Location with Multiple Driveways

Multiple full access medians are present throughout the length of the corridor within the Study Area. There are currently locations that do not provide adequate storage for left turn refuge from the side streets within the median, causing cars to block a portion of the travel lane in order to make a left turn on to SR 406 (Garden Street).

3.1.3 Parking Facilities

There is sporadic on-street parking provided on SR 406 (Garden Street), in multiple locations adjacent to large parking lots. These on-street parking spaces are generally not utilized. This provides an opportunity to reutilize pavement if needed. Figure 33 is an example of existing unutilized/underutilized on-street parking.

Figure 32: Unutilized On-Street Parking

3.1.4 Bicycle and Pedestrian Infrastructure

There are gaps in sidewalk coverage along the SR 406 (Garden Street) corridor within the channelizing island at Norwood Avenue and between US 1 NB (Washington Avenue) and US 1 SB (Hopkins Avenue). Figure 34 illustrates the gap at Norwood Avenue. No bicycle facilities are provided except for the existing bike lanes in the vicinity of the I-95 interchange.

Figure 33: Sidewalk Gap at Norwood Avenue

3.2 Transit Service and Infrastructure

There are six bus stops on SR 406 (Garden Street) within the Study Area offering minimal amenities, most with only a bus stop sign and a bus schedule as shown in Figure 35. Two of the six bus stops do have wooden benches; however no shelters are provided at any bus stop location within the Study Area. All bus stops are located in areas where there is existing sidewalk. However, all of them lack landing pads which provide a connection from the sidewalk to the bus doors. Landing pads are especially helpful for wheelchair users and the elderly that have difficulty navigating the grass buffer when entering/exiting the bus.

Figure 34: Existing Transit Amenities

3.2.1 Transit-Dependent Population

After review of the average household income and the no car household maps there is an opportunity to identify potential areas along the corridor that would benefit from providing or upgrading the existing transit amenities and/or service. This may also involve upgrades to the existing bicycle and pedestrian network to serve these transit dependent neighborhoods.

3.3 Existing Traffic Conditions

Analysis of the existing traffic volumes and LOS revealed that the traffic volumes are between 20%-40% of the maximum service volume on SR 406 (Garden Street) within the Study Area. This provides a potential opportunity to reworking existing roadway while keeping capacity issues to a minimum.

3.4 Crash Analysis and Safety

All segments, with the exception of the NAAEC to I-95, are above the statewide average crash rate for their respective categories. These segments will be analyzed to determine any potential solutions to identify contributing factors of these crashes.

3.5 Summary of Transportation Plans

Any potential alternatives will be developed with consideration for programmed improvement plans and / projects identified throughout the review of the following transportation plans:

- The FDOT Five Year Work Program identifies a resurfacing along SR 406 (Garden Street) from Petty Circle to US 1 NB (Washington Avenue) which is funded for construction FY 2018. This project moved forward with an alternative provided in the SR 406 (Garden Street) Corridor Planning Study to remove the signal at Palm Avenue.

- The SCTPO 2040 LRTP identifies a multimodal range of improvements for Brevard County through 2040. The LRTP identifies a section of SR 406 (Garden Street) from Park Avenue to US 1 in which to add sharrows and 'Bike May Use Full Lane' (BMUFL) signage.
- The SCTPO Bicycle & Pedestrian Mobility Plan identifies the installation of a Designated Bike Lane on SR 406 (Garden Street) from 600' west of Park Avenue to US 1 NB (Washington Avenue). This project is unfunded.

3.6 Conclusion

The issues and opportunities that were identified in this report will guide the project by providing a foundation upon which to develop the purpose and need. These will be analyzed and discussed in greater detail as the planning process proceeds and potential improvement alternatives are identified.