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Sprinkle CONSULTING
Active Transportation Planners+Engineers

Bicycle Plan for St. Augustine, FL

DECEMBER 2011

Contents

Executive Summary: 3
1. Vision and Goals 5
Vision 6
Goals and Objectives 6
2. Summary of Public Input 9
3. Wayfinding Signage Protocol 13
4. Route Summaries 16
Route 1: West Side 24
Route 1X: West Side Express 36
Route 2: Downtown to Vilano Beach 40
Route 2X: Downtown to Vilano Beach Express 50
Route 3: Lincolnville to Uptown 53
Route 4: Downtown to St. Augustine Beach 56
Route 4X: Downtown to St. Augustine Beach Express 70
Route 5: Old City 73
Route 5X: Old City Express 77
Route 6: South Side 79
Route 6X: South Side Express 83
Route 8: Downtown to West Augustine Park 85
Spur Routes 89
5. Bike Parking 96
Short Term Bicycle Parking 96
Long Term Bicycle Parking 97
Event Bicycle Parking 98
Bike Parking Inventory and Recommendations 98
6. Bicycle Crash Analysis 100
Distribution of Crashes 100
Appendices
Summary Table of Improvement Costs and Maintaining Agencies A-1

Detailed Facilities Costs..... B-1

Map: Maintaining Agencies for Roadways with Recommended Bike Routes C-1

Simplified Map of Recommended Improvements D-1

Bicycle Parking Site Recommendations E-1

Executive Summary:

This Bicycle Plan for the City of St. Augustine recommends a series of steps to improve the viability and practicality of bicycling in St. Augustine. These steps include development of a network of bicycle routes, improvement of bicycle parking, and developing countermeasures to observed bicycle safety issues in the City. The plan outlines objectives to achieve these steps by the time of the City's 450th Anniversary celebration in 2015.

The network development portion of this this Plan identifies a network of routes in and around the City of St. Augustine, most of which are favorable to use by bicyclists in their existing condition, and which if identified and promoted as a cohesive network serving important community destinations could increase viability of bicycling as a mode of choice for travel in St. Augustine. The plan also includes recommended improvements of various types which would enhance the bicycle-friendly character the roadways of the network. The improvements include vigilant maintenance, installation of Shared Lane Markings, Bike lanes (including "buffered" bike lanes which feature greater separation from motorized traffic), warning signs and construction of a very short pathway connection. The plan recommends a protocol for wayfinding signage to guide travel upon and increase awareness of the network.

The recommended network of bicycle routes totals just over 50 miles, including approximately 17 miles of roadway maintained by the City of St. Augustine, 10 miles maintained by St. Johns County, and 22 miles maintained by the Florida Department of Transportation.

The distribution of primary recommendations is shown in table E1. More detailed recommendations for the routes are described in Chapter 3.

Table E1: Summary of recommended improvements by type and mileage

Improvement type	Miles
1. Maintenance only	17.7
2. Shared Lane Markings	14.6
3. Buffer Existing bike lanes	11.9
4. New bike lanes	3.5
5. Add Shoulders	2.1
6.SHARE THE ROAD Signs	0.9
7. Shared Use Path	*50 ft.

Chapter 5 of the plan makes recommendations and identifies locations for improved bicycle parking in and around St. Augustine, totaling over 600 potential parking spaces, and also recommends the inclusion of bicycle parking at all improved Sunshine Bus stops.

Chapter 6 of the plan includes an analysis of bicycle crash reports in St. Augustine and identifies common contributing factors of those crashes, for which possible countermeasures could be developed. The common crash factors include riding bicycles on the sidewalk (which is against forbidden on City streets under the St. Augustine Code of Ordinances), riding bicycles against traffic

(both in the street or on the sidewalk) and riding without lights in non-daylight hours.

Appendices to the plan detail the recommended locations for bicycle parking and include a cost estimate for realization of the plan's recommended improvements and installation of the wayfinding signage. The total estimate costs for the network improvements is $890,137, while the total estimated cost for the wayfinding signage is $148,309. Estimated costs for all bicycle parking improvements is estimated to be $93,600. These combine for a total estimated cost of $1,132,047.

1. Vision and Goals

As America's oldest city, St. Augustine has been an established community since long before private motor vehicles became the dominant mode of transportation in the United States. Over several centuries, residents of and visitors to St. Augustine got around on foot or by horse-drawn carriages, and travel by these modes was likely convenient and appropriate to the compact character of the city's and its street network. In more recent history, however, the introduction of automobiles and trucks on roadways passing through the city on major federal and state highways has made getting around "the old fashioned way" challenging in many ways. Slow moving vehicles such as horse-drawn carriages and bicycles struggle to claim their place in heavy streams of faster, heavier vehicles, leading to stress and safety concerns for those who wish to travel by these modes. Within the city's neighborhoods, the compact grids of local streets provide numerous opportunities for local mobility by non-motorized modes, but longer trips between the various parts of the city can be frustrated by the presence of more heavily travelled roadways. The limited number of links between the city and the beaches and communities to its east increases the challenge of non-motorized travel as a means of exploring all that St Augustine has to offer. Fear of conflicts or crashes may lead some people to decide that travel by means other than automobile may not be worth the trouble.

Against this context of challenge, however, there is also abundant opportunity for bicycling in St. Augustine. As a centuries old, compact, "European-style" city, distances to be travelled around St. Augustine are very appropriate to bicycling. As the crow flies, it is just less than seven miles from the County Office buildings at the intersection of US 1 and Lewis Speedway to St. Augustine Beach, near the intersection of Pope Road and County Road A1A. The Plaza de la Constitucion sits almost exactly halfway between these two points, leaving the center of the city approximately three and one half miles from its farthest corners, a distance well below the average five-mile distance of the average recreational bike ride in the United States. Focusing on the densest core of the city, it is less than four miles from the intersection of State Road 16 and US 1 to the intersection of State Road A1A and Anastasia Park Road; it is approximately four miles from the intersection of State Road 207 and US 1, winding through the city, and out to Vilano Beach. Residents and visitors expect that there will be options other than automotive travel when in St. Augustine. Whether they get around by carriage, trolley, or rented scooter, or walk the length of the Spanish quarter, people understand St. Augustine to be a place where they are going to get out of the car and get around by different means.

This bicycle plan has been developed with regard to addressing these challenges so that the opportunities may be realized. The challenges are real, but the opportunities are likely greater. This plan is a preliminary step towards achieving a future for St. Augustine in which bicycling is a viable and preferred option for travel. The recommendations contained within this plan outline measurable objectives and tangible goals which will provide a practical basis for realizing the Vision.

Vision

As the City reaches its 450th anniversary, St Augustine will be a place where residents and visitors alike can get around safely on bicycles between its many important and historic community destinations.

Goals and Objectives

Network Development

Goal: Enhance and promote bicycling in St. Augustine by implementing a system of routes which highlights bicycle friendly roadways that connect important community destinations.

Objectives

- By 2012, publish a map showing the routes identified in this plan and describing safe bicycling habits, and develop other educational and promotional materials and programs to increase public awareness of bicycling opportunities and the rules of the road.
- By 2013, implement recommended improvements and install wayfinding signage for 33% of route mileage identified in this plan, including half of those State Road miles which fall on Routes 1, 2, and 4.
- By 2014, implement recommended improvements and install wayfinding signage for 66% of route mileage identified in this plan, including all of those State Road miles which fall on Routes 1, 2, and 4.
- By 2015, implement recommended improvements and install wayfinding signage for 100% of route mileage identified in this plan.
- Establish policies to include bicycle accommodation as a routine consideration in all roadway projects.
- Develop strategies to secure funding from multiple sources to assist with the implementation of the infrastructure recommendations of this plan.

Bicycle Parking

Goal: Enhance the viability and practicality of bicycle travel by providing secure and plentiful bicycle parking at or near community destinations across St. Augustine.

Objectives

- By 2012, publish a map showing existing bike parking locations, identify funding strategies for development of new bike parking, and develop land development policies to encourage or require bicycle parking in redevelopment projects.
- By 2013, install 33% of new recommended bike parking and improve existing parking as opportunities arise.
- By 2014, install 66% of new recommended bike parking and improve existing parking as opportunities arise.
- By 2015 install 100% of new recommended bike parking and improve existing parking as opportunities arise.

- Update land development and other applicable codes to include bicycle parking provisions where appropriate.
- Develop strategies to secure funding from multiple sources to assist with the implementation of the parking recommendations of this plan.

Crash Countermeasures

Goal: Enhance the safety of bicycling in St. Augustine by implementing countermeasures in response to common crash types and contributing factors.

Objectives

- Develop education awareness crash countermeasures.
- Identify enforcement countermeasures.
- Develop strategies to secure funding from multiple sources to assist with the implementation countermeasure programs.

2. Summary of Public Input

This project involved two levels of engagement with stakeholders and the public. A steering committee was convened, which included representatives of the North Florida TPO, The City of St. Augustine, and St. Johns County, as well as bicycle interest groups and other concerned entities. This group met three times, once on November 9, 2010, again on March 15, 2011, and finally on June 1, 2011. This committee reviewed the project scope, provided input on potential routes and destinations and provided feedback on the plan's recommendations.

In addition to this stakeholder group, two rounds of public meetings were held. The first round consisted of two meetings held on January 22, 2001. The first was in the morning, held at the Farmers' Market at the St. Augustine Amphitheatre. The second was held in the afternoon near the St. Johns County Visitors' Center at the north end of Cordova Street. Participants at these events were asked to identify routes they were already riding or thought would be good bike routes, to identify destinations that would be important to identify with the wayfinding system, and to identify points in St. Augustine that presented challenges to bicycling. Parallel response forms and information were also made available on the North Florida TPO website. All told, 65 people signed in at the two meetings and another 12 responded via telephone or email after the meeting. Over 50 maps were returned and processed into "votes" for particular potential routes.

This public response was incorporated into a map, which was shared with the project steering committee at its March meeting and formed the basis for the preliminary route network which was subsequently reviewed by the consultant team to determine suitability and recommendations for inclusion on the bike route system.

The map in Figure 2.1 summarizes the results of public input for identification of routes, destinations and challenges to bicycling.

After the draft route recommendations, bicycle parking recommendations, and safety analysis were developed, they were presented at a public meeting on May 26, 2011 at St. Augustine City Hall. Fifty-six people signed in as attending that meeting.

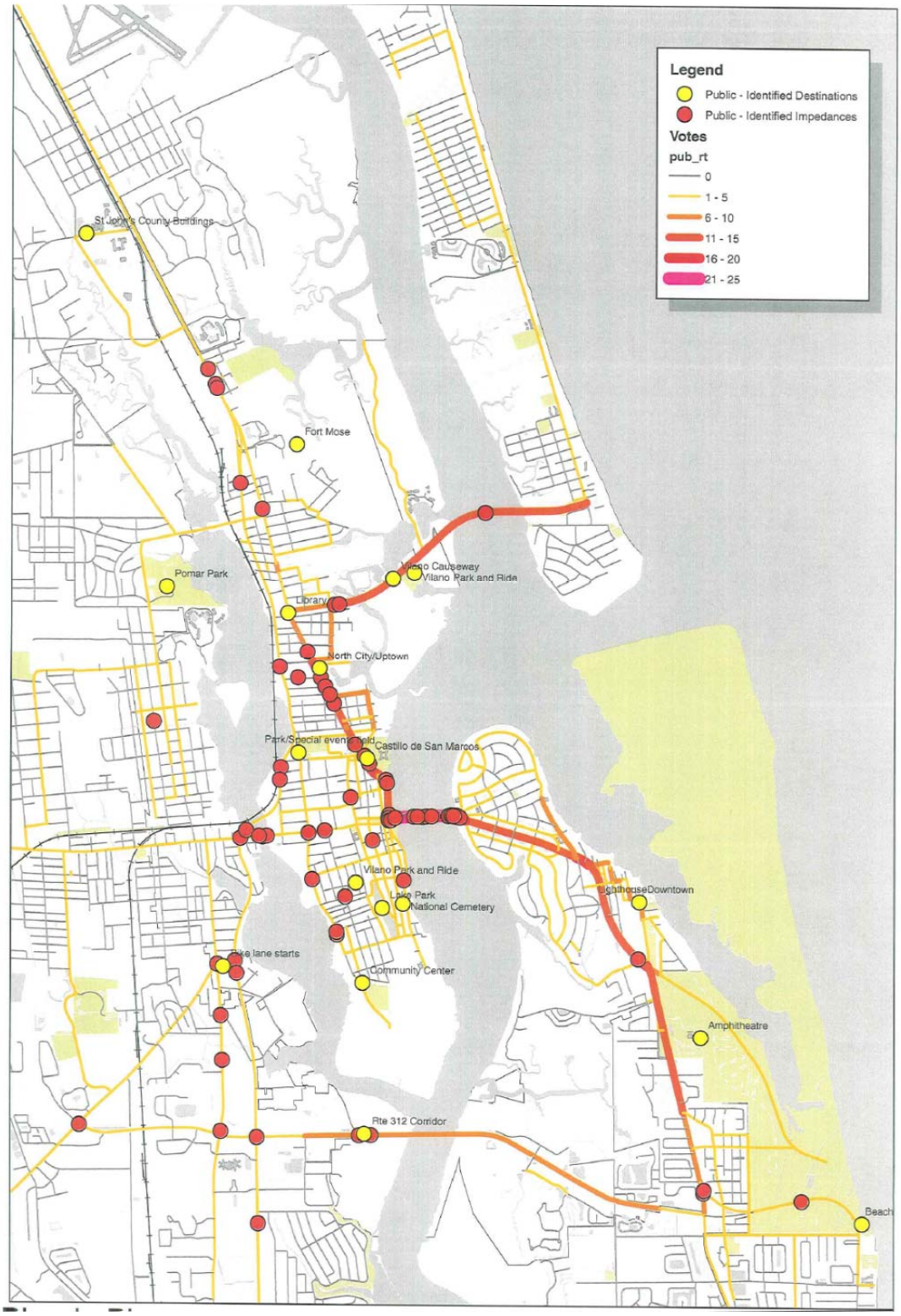


Figure 2.1: Summ

Table 2.1 below lists 37 examples of impedances to bicycling which were both located and described in the public comment process. They are drawn from both the map exercise and the written response forms. There are over 50

additional impedance points located but not described in the map exercise as well as some described points which did not specify a location clearly.

Location and Comment	Route #
Anastasia Boulevard: needs a bike lane	4X
Avenida Menendez: traffic	2X, 5X
Avenida Menendez @ Bridge of Lions: going south is a challenge	2x, 5X
Avenida Menendez: drains slant down	2X
Avenida Menendez: narrow and dangerous	2X
Avenida Menenzez: dangerous, I ride on the sidewalk.	2X
Bridge of Lions: no bike lanes	4
Bridge of the Lions: approaches are dangerous	4
CR A1A: no bike lane, fast traffic	4X
King Strret: sidewalk is preferable	8
King Street: needs bike lanes	8
May Street: Bike lane narrows	2X
May Street: needs bike lanes	2X
Old Moultrie: bike lanes needed	6
Riberia Street: bumpy with potholes	3
Riberia: avoid, badly maintained	3
S Castillo Drive: is narrow and dangerous	2X
S Castillo: no bike lanes on	2X
S. Dixie: bike lanes needed	1
San Marco Ave, north of SR 16: bike lane please	1
San Marco Ave: narrow, people aren't looking for bikes	1, 2X
San Marco: repave	1, 2X
San Marco: rough road	1, 2X
South Dixie: is narrow, with ruts	1
Spring Street: narrow	1
SR 207 @ US 1: crossing Rte 1!!!!!!!!!!!!!1	1X
SR 312: no marked lane	N/A
SR A1A @ CR A1A: merge across bike lane	4X
SR A1A @ Red Cox: very dangerous crossing	4
US 1 @ SR 312: no bike lanes, very narrow	1
US 1 (Ponce de Leon Blvd) @ Lemon St: no lane or shoulder	1X
US 1, just north of Fort Mose Trail: bad to north, high speed	1
US 1, just north of Fort Mose Trail: very rough road, chunks of concrete by beauty shop	1
US 1: between SR 5A and SR 16, Shoulder dies	1
US 1: has bike lanes but scary	1X
US 1: Rt 1 in general	1X
Vilano Causeway: bike lanes needed on	2

Table 2.1: Publicly Identified Impedances to Bicycling in the project study area.

The column on the right indicates which numbered route described in this study covers or closely parallels the named point. Recommendations in this report may not always result in the exact facility requested from the public but cover the impedance points very well. Of the points listed in this table, only Old Moultrie Road is not on recommended routes. Old Moultrie extends off of Route #1, but does not connect to a named destination.

3. Wayfinding Signage Protocol

The Recommended signage protocol is derived from Section 9B.20, "Bicycle Guide Signs", of the *Manual on Uniform Traffic Control Devices*. Bicycle Route Guide Signs (D1-1c, D1-2c, or D1-3c) should be installed in advance of all route junctions on the system. These signs include a directional arrow (on the extreme left for left and ahead arrows, on the extreme right for right arrows), then a bicycle symbol, the destination name, and a mileage distance numeral. Each sign location may display up to four destinations using stacked D1-1c signs or multiple destination (D1-2c, D1-3c) signs as appropriate. These signs are intended for use by bicyclists, and as such are permitted to be smaller than signs intended for motorists. According to the MUTCD, the D1-xc series is either 6, 12, or 18 inches high, depending on whether there are 1, 2, or 3 destinations listed. A 4 destination sign would be a custom sign 24 inches high.

A **supplemental network identity plaque**, such as the St. Augustine Coat of Arms against a green background (shown in Figure 3.1), should be placed above each sign cluster to help promote the total bike route network. The Coat of Arms emblem is shown here as an example of a local "branding" or thematic c unifier that will help promote awareness of the system. As several of the routes described in this report extend beyond the limits of the City of St. Augustine, the county and city should coordinate to devise a final signage plaque that is suitable for use across the whole system. Final signage design coordination of the network identity plaque could also be made with local advocacy organizations that may have an interest in promoting or sponsoring development of the system.

Figure 3.1: Example of Network Identity Plaque

On each sign cluster, choices must be made about which destinations to include and the sequence in which to list them. First, signs should always include the terminal destinations of the continuing and intersecting routes, and then the closest interim destinations as space allows. Then, once the destinations for a particular location have been selected, they should be sorted by direction (ahead, then left, then right), then by distance (nearest to farthest). The hierarchies for destination selection and destination display are summarized below.

Hierarchy for Selection of Destinations at Route Turns and Junctions

1.Terminal Destinations (nearest to farthest)
- 1a. Continuing Route
- 1b. Intersecting Route

2. Interim Destinations (on all routes; nearest to farthest)

Hierarchy for Display of Destinations at Route Turns and Junctions

1. Destinations Ahead (nearest to farthest)
2. Destinations to Left (nearest to farthest)

3. Destinations to Right (nearest to farthest)

At any given location, editorial discretion may warrant altering the selection hierarchy depending upon the relative importance of interim locations. At longer distances, general or collective destinations may also be used to describe terminal destinations and devolve into more specific destinations on approach. For example, signs leading north may identify the "County Offices" as the terminal destination, but at the end may differentiate the directions for the Administration Center, the Judicial Center, and the Sherriff's Office. Similarly, signs that point toward "St. Augustine Beach" from Downtown may point toward the Ocean Pier and Pope Road Park as the route nears the beach.

Distances of less than 2 miles should be displayed in 1/10 mile increments; distances of 2 miles or greater should be displayed rounded to the nearest half-mile. An example sign assemblage is shown in Figure 3.2.

Figure 3.2: Example of Destination/Route Sign Cluster

Route confirmation signs could also be placed on the departures from junction points, at route turns that do not include intersections with other routes, and at ¼ mile intervals along straight stretches of road. These signs could consist of the network identity plaque, the Alternative Bike Route Guide Sign (D11-1c) showing the terminal destination of the continuing route, and directional arrow plaques as appropriate. An example route confirmation sign assemblage is shown in Figure 3.3.

Figure 3.3: Example of Confirmation Sign Cluster

Figure 3.4 shows potential sign assemblages for sample locations north of downtown St. Augustine.

Figure 3.3: Sample Sign Assemblages for Route Intersection and Route Confirmation Locations

It is estimated that the total network as described in Chapter 4 will require approximately 445 total sign assemblages, about evenly split between the intersection and confirmation types.

4. Route Summaries

The bicycle routes described in this section are designed to provide broad mobility around the City and serve important community destinations. They have been designed to balance desires for direct travel and for a comfortable bicycling experience. The total proposed network consists of 50.6 miles of roadway.

The primary routes stay off of major arterials, such as US 1, State Road A1A and State Road 312 as much as possible, except when those are the sole direct routes. Alternate “express” routes have been identified, and recommendations for improvement will be made with regard to them, for the benefit of those bicyclists who wish to travel these more direct routes. Improvements are recommended for these express routes, but the wayfinding directions will favor travel via the primary routes. An overview map of the Route Network is shown in Figure 4.1, and a closeup of Downtown St. Augustine is shown in Figure 4.2.

Figure 4.1: Recommended Bicycle Route Network

Figure 4.2: Recommended Bicycle Route Network (Downtown and Vicinity)

The numbered routes are as follows (predominantly north-south routes are odd numbered; predominantly east-west routes are even numbered):

- 1: West Side, from Flagler Hospital to the County Office Complex
- 1x: West Side express, using US 1 continuously
- 2: Downtown to Vilano Beach
- 2x: Downtown to Vilano Beach express, using SR A1A continuously
- 3: Lincolnville to Uptown, from Eddie Vickers Park to Cincinnati Avenue
- 4: Downtown to St. Augustine Beach
- 4x: Downtown to St. Augustine Beach, using SR A1A continuously
- 5: Old City, Eddie Vickers Park to City Hall
- 5x: Old City Express via Marine Street
- 6: South Side
- 6x South Side Express
- 8: Downtown to West Augustine Park

The identified routes are shown in Figure 4.3 for the entire study area and Figure 4.4 for the downtown area and vicinity. Routes 2 and 3 each have interim routings pending significant improvements to portions of the primary route; these interim sections are labeled as 2 Temp and 3 Temp on the maps. Numerous “local connection routes” have also been identified. These provide connections between the numbered routes or provide links to destinations which are not located on a continuous route.

Figure 4.3: Individual Bicycle Routes

Figure 4.4: Individual Bicycle Routes (Downtown and Vicinity)

Facility recommendations. The route summaries include a range of recommendations in addition to wayfinding signage. Recommendations include spot repairs and maintenance of existing roadways, widening of existing shoulders, specific warning signage and construction of one very limited pathway segment. Two pavement marking changes are recommended quite extensively, however: the SHARED LANE MARKING and the buffered bike lanes. The SHARED LANE MARKING is a standard marking described in section 9C.07 of the *Manual on Uniform Traffic Control Devices*. They are recommended in this report for roadways which are too narrow for bike lanes and also too narrow for a bicycle and motor vehicles to travel side by side in the same traffic lane. They have been shown to aid bicyclists in positioning themselves laterally within the lane and in relation to parked cars, to encourage safe passing of bicyclists by motorists and to reduce wrong way riding (which is a common problem in St. Augustine, as it is in many communities across the United States). The SHARED LANE MARKING is shown in Figure 4.5.

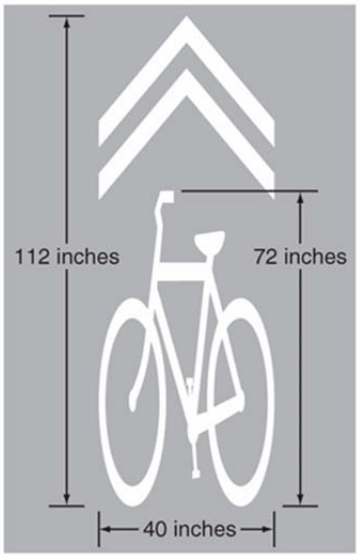


Figure 4.5: SHARED LANE MARKING from *MUTCD*

SHARED LANE MARKINGS are recommended on over 15 miles of roadway in the routes described below. This includes four locations where SHARED LANE MARKINGS are recommended to be considered on roadways with speed limits greater than 35 miles per hour. The *MUTCD*'s guidance on SHARED LANE MARKINGS states "Shared lane markings should not be placed on roadways that have a speed Limit above 35 miles per hour." This is not a standard and therefore not an outright prohibition. Florida DOT's *Plans Preparation Manual*, however, has a statement that SHARED LANE MARKINGS shall be limited to roadways with a speed limit of 35 miles per hour or less. So while not in violation of an MUTCD standard, installation of a SHARED LANE MARKING on a roadway with a 35 mile per hour speed limit would be contrary to MUTCD guidance and current FDOT design practice. The recommendations for these roadways are contingent upon FDOT approval of their inclusion in ongoing research on the application of SHARED LANE MARKINGS on higher speed roadways.

The buffered bike lane is a variation on the traditional bike lane, but instead of being separated by a single white stripe, the bike lane is separated by two lines marked with a chevron pattern between them. An example is shown in Figure 4.6 In most cases in this study buffered bike lanes are recommended for consideration on four- lane roadways with existing four foot bike lanes adjacent to 12-foot wide traffic lanes. In these situations, space for a two foot wide buffer could be found by reducing the traffic lane width to 11 feet.

Figure 4.6: Example of a buffered bike lane.

Interagency coordination. The roadways included on the routes described below fall under the operational jurisdiction of The City of St. Augustine, St. Johns County, and Florida DOT. While each of these parties has been included in the development of these recommendations, the ultimate implementation of any recommendations in this report will be dependent upon the approval of the agency responsible for each roadway. Continuing coordination and dialogue between these agencies will be necessary to achieve the Goals and Objectives of this document.

Route 1: West Side

Length: 7 miles

Destinations Served: Flagler Hospital, Joe Pomar Jr. Park, St. Johns County Office Complex

Intersecting Routes: Spur to 1X, 8, and several spurs

Sequence (west to east or south to north):

- From Flagler Hospital, west on Health Park Boulevard to State Road 5/US 1
- North on State Road 5 /US 1 to Old Dixie Highway
- West on Old Dixie Highway to South Dixie Highway
- North on South Dixie Highway to Pellicer Lane
- North on Pellicer Lane, across King Street, becomes Palmer Street, to Fred Waters Way
- West on Fred Waters Way to Spring Street
- North on Spring Street to Cervantes Avenue
- East on Cervantes Avenue to Masters Drive
- North on Masters Drive to State Road 16
- East on State Road 16 to State Road 5A*
- North on State Road 5A to State Road5/US1*
    - *Southbound sequence is State Road 5/US1 to State Road 16
- North on State Road 5/US1 to San Sebastian View
- West on San Sebastian View to County Office Complex

Segment and Intersection Comments:

Health Park Boulevard, from Flagler Hospital to State Road 5/US 1: 0.3 miles
Health Park Boulevard is a roadway providing access to Flagler Hospital and nearby medical offices from State Road 5/ US1. It has no bike lanes; however, with its low speed limit (25 mph), it should provide adequate accommodation to most bicyclists. It provides the primary route of access to Flagler Hospital, a key community destination and employment center.

State Road 5/ US1, from Health Park Boulevard to Old Dixie Highway: 0.7 miles
Northbound from Health Park Boulevard to the intersection with State Road 312, State Road 5 features bike lanes which twice are (rightly) positioned to the left of right turn lanes serving entry to large parking areas associated with the hospital complex, and these zones are properly signed with R4-4 (BEGIN RIGHT TURN LANE YIELD TO BIKES). On approach to the intersection with State Road 312, the outer lane becomes a drop lane (transitions into a right turn lane), and the bike lane is again (rightly) positioned to the left of a right turn lane, but the transition area, while correctly marked for a drop lane/bike lane interaction according to FDOT Standard Drawing 17346 (13 of 14), also is incorrectly signed with a R4-4 sign. The

northbound bike lanes have two more stretches that run adjacent to tight turn lanes north of State Road 312. This sequence of bike lanes alongside right turn lanes on a six lane (four lanes north of State Road 312), 45 mph roadway may be uncomfortable for many bicyclists, but it is a properly marked facility. The comfort of bicyclists may be increased by buffering the bike lane with a two-foot buffer strip between a four foot wide bike lane and 11-foot wide through lanes.

Recommendations:

- ✓ Remove R4-4 sign on northbound approach to intersection with State Road 312.
- ✓ Buffer bike lanes with a two-foot wide buffer stripe between the bike lane and the adjacent through lanes.

Intersection of State Road 5/US 1 and State Road 312

The existing shoulders along State Road 312 are kept to the right of right turn only lanes and should be marked in accordance with FDOT Standard Drawing 17346 (12 of 14).

Recommendations:

- ✓ Re-mark shoulders on State Road 312 to be to the left of right turn lanes.

Old Dixie Highway, from State Road 5/US 1 to Old Moultrie Road: 0.3 miles

Old Dixie Highway is a two lane roadway with a posted speed limit of 35 miles per hour. It has an open shouldered cross section. It was observed to have very little traffic during the afternoon rush hour on the day of the field review. It may well be comfortable for many bicyclists. Future widened shoulders could further improve conditions for bicycling.

Figure 4.7: Widened shoulders would make Old Dixie Highway even more comfortable for bicyclists.

Recommendations:

- ✓ Prioritize Old Dixie Highway for widened shoulders to better accommodate bicycling.

Old Dixie Highway, from Old Moultire Road to SR 207: 0.2 miles

Old Dixie Highway is a two lane roadway with a posted speed limit of 35 miles per hour. It has a curb and gutter cross section. Between Old Dixie Highway and State Road 207, it was observed to have heavy traffic during the afternoon rush hour on the day of the field review. It provides a reasonably direct connection on for this western north-south route, but is probably the most constrained section of the route. It would benefit from SHARED LANE MARKINGS to reinforce riding in the lane by bicyclists. Review of the parcel maps on the St. Johns county Property Appraisers website indicate that there is right of-way available along both sides of the roadway, but probably not enough to allow for construction of a parallel pathway facility, and aerial imagery suggests that there is considerable encroachment on the right of way from adjacent properties.

Figure 4.8: Shared Lane Markings will reinforce bicyclists' right to claim the lane on South Dixie Highway.

Due to the heavier traffic on this portion of Old Dixie Highway, it is recommended that THE SHARED LANE MARKINGS be supplemented with R4-11 (Bicycle may use Full Lane) to reinforce the rightful position of bicycles in the lane. This sign could also be supplemented with a real-time flashing yellow beacon, actuated by a roadside push button to be pressed by bicyclists as they enter this constrained section.

Recommendations:

- ✓ Apply SHARED LANE MARKINGS signs and R4-11 signs throughout.
- ✓ Consider real-time activated flashing beacons to enhance sign visibility when bicyclists are present.

Intersection of State Road 207 and Old Dixie Highway

Those looking to turn left from this intersection may either move into the left turn lane as it diverges out of through lane or continue in the through lane and position themselves in the intersecting shoulder of State Road 207 when they reach the far side of the intersection. It was noted during the field review that there is an accumulation of dried and hardened spilled concrete in the eastbound bike lane of State Road 207 at this intersection. Repair of this situation should be

Figure 4.9: Accumulated concrete makes for a rough surface in the bike lane at the intersection of SR 207 and S. Dixie Highway.

prioritized by the agency responsible for maintenance of this roadway.

Recommendations:

- ✓ Remove accumulated dried concrete from eastbound State Road 207 bike lane.

South Dixie Highway from SR 207 to Pellicer Lane: 0.7 miles

North of State Road 207, the roadway primarily has a curb and gutter cross section, but with intermittent stretches of open shoulder as well. This section has a more residential character, and apparently lower traffic volumes, than south of State Road 207, so bicyclists should be more comfortable here. SHARED LANE MARKINGS would also help encourage bicyclists to ride in the lane and reinforce their likely presence to motorists. These markings may also be supplemented with R4-11 (BICYCLE MAY USE FULL LANE) signs if long queues of cars and courtesy problems between card and bicycles become an issue.

Recommendations:

- ✓ Apply SHARED LANE MARKINGS signs throughout.

Pellicer Lane, across King Street, becomes Palmer Street, to Fred Waters Way*: 0.4 miles*

Pellicer Lane is a two-lane roadway with a posted speed limit of 35 miles per hour and an intermittent curb-and-gutter cross section. It does see some cut-through traffic from King Street but is the most direct north-south alternative to US 1 on the west side of town, and will direct bicyclists to one of the few crossings of the railroad tracks north of King Street. The pavement condition is very rough in spots and should be prioritized for patching and/or resurfacing by the agency responsible for maintenance. It was also noted that there are numerous palm fronds and other plants that hang into the outer edges of the roadway along Pellicer Lane. Maintenance crews should routinely trim vegetation that encroaches into the roadway from adjacent properties. SHARED LANE MARKINGS could encourage bicyclists to ride in the lane and remind motorists of their likely presence.

North of King Street, the roadway changes to Palmer Street, also two lanes with curb and gutter and a speed limit of 35 miles per hour. This section would also benefit from the installation of SHARED LANE MARKINGS, between the intersection with King Street and Fred Waters Way.

Recommendations:

- ✓ Apply SHARED LANE MARKINGS throughout.
- ✓ Prioritize pavement patching and/or resurfacing for Pellicer Lane south of King Street.

- ✓ Trim and regularly maintain branches, palm fronds and other vegetative encroachments along Pellicer Lane.

Fred Waters Way, from Palmer Street to Spring Street: 0.1 miles

Fred Waters Way is a local street which is not even marked with a centerline stripe. It should be very comfortable to most bicyclists. It has areas of rough pavement and uneven patchwork along its edges. It should be prioritized for pavement repair and/or resurfacing.

Figure 4.10: The pavement at the edges of Fred Waters Way is very rough.

Recommendations:

- ✓ Prioritize pavement patching and/or resurfacing for Fred Waters Way.

Spring Street, from Fred Waters Way to Cervantes Avenue: 1.2 miles

Spring Street is a local street with a posted speed limit of 20 miles per hour, and is not marked with a centerline stripe. It should be very a very comfortable corridor for most bicyclists. It was noted to have several spots of rough pavement; if designated as a bike route, it should be prioritized for pavement repair and/or resurfacing. In front of the house at #89 Spring Street the roots of a very large oak tree have caused some buckling of the pavement. It would be prudent to repair this condition as much as feasible and to stripe off that portion of the road which remains rough so that bicyclists may be alerted to avoid it (as allowed for in Section 9C.06 of the *MUTCD,* shown in Figure 4.11.)

To

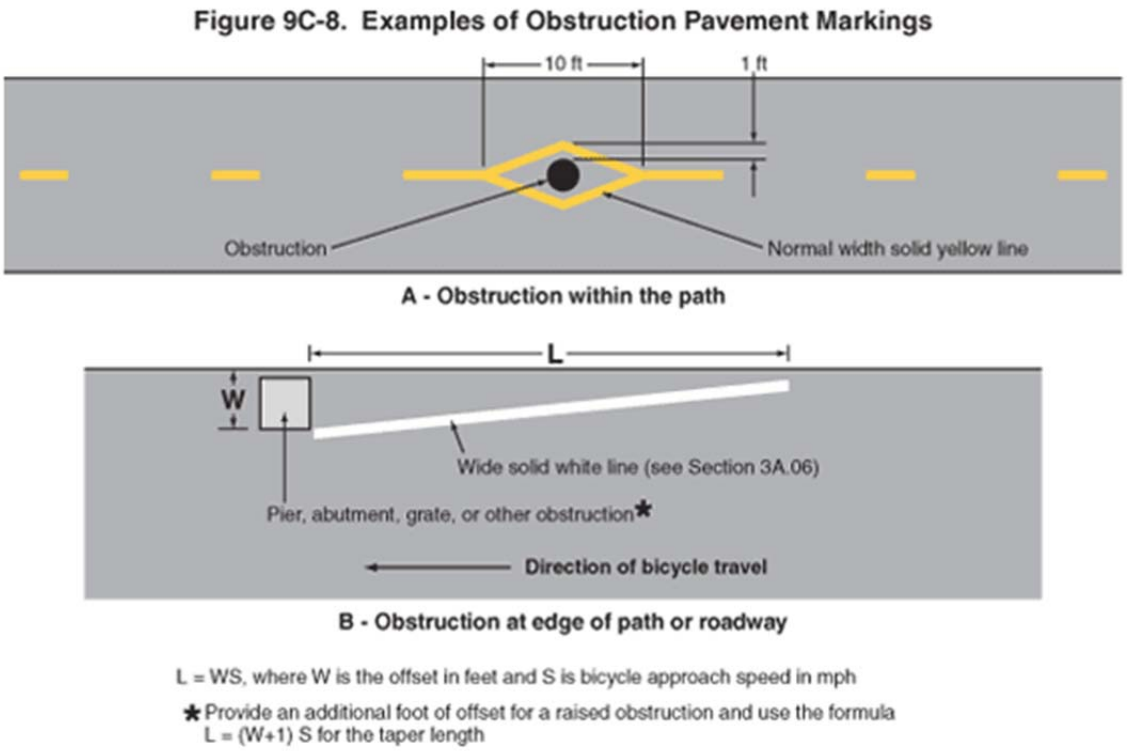


Figure 4.11: Obstruction striping details from AASHTO *Guide for the Development of Bicycle Facilities.*

further improve bicycling mobility along Spring Street, consideration should be given to changing the priority at the Alice Way and Charles Street intersections requiring these side streets to stop instead of Spring Street. If this were done, bicyclists (and motorists) traveling along Spring Street would not be required to stop at these intersections. It has been noted that the City has had some complaints of speeding along Spring Street and requests for speed humps. Traffic calming measures, including speed humps, can make the roadway more accommodating to bicycle travel. Speed tables, provided they are designed with bicycle friendly profiles, or divided to leave gaps for bicycle travel, may be appropriate. Re-orienting the STOP signs should not adversely affect the desired traffic calming efforts. In fact, the Florida *Greenbook* discourages the use of STOP signs as traffic calming measures, as they tend to increase midblock speeds as drivers try to make up for lost time.

Recommendations:

- ✓ Prioritize pavement patching and/or resurfacing for Spring Street.
- ✓ Repair and/or stripe off the pavement disturbed by tree roots in front of #89 Spring Street.
- ✓ Change priority at the Alice Way and Charles Street intersections.

Cervantes Street, from Spring Street to Masters Drive: 0.1 miles

Cervantes Street is a local street and should be comfortable to most bicyclists.

Masters Drive, from Cervantes Street to State Road 16: 0.4 miles

Masters Drive is a two lane roadway with a posted speed limit of 25 miles per hour and an intermittent curb and gutter cross section. It is currently marked with 2.5-foot wide shoulders which are not sufficient to accommodate bicycles. The total width of the pavement is 27.5 feet, which would be sufficient for 3.5 foot shoulders adjacent to 10 foot lanes. Shoulders in areas without curb and gutter could be widened somewhat, but are presently close to roadside swales, so a full survey would be needed to determine how much additional shoulder is possible. If re-striping or shoulder widening are not ultimately feasible, Shared Lanes Markings would help position bicyclists in the lanes on this north-south alternative to US 1 that provides access to Joe Pomar, Jr. Park. Numerous areas of rough pavement were observed along Masters Drive, so this segment should be prioritized for pavement repair and/or resurfacing by the responsible agency.

Figure 4.12: Widened shoulders would improve bicycling on Masters Drive.

Recommendations:

- ✓ Consider re-striping for wider shoulders adjacent to 10 foot lanes, and widen shoulders where possible.
- ✓ Prioritize pavement patching and/or resurfacing for Masters Drive.
- ✓ Install interim SHARED LANE MARKINGS until the shoulders are widened.

Intersection of Masters Drive and State Road 16

As this is a "T" intersection, and only has proposed route segments on two approaches, the primary left turn of concern is for cyclists turning from westbound State Road 16 onto southbound Masters Drive. Experienced bicyclists may feel comfortable crossing two lanes of through traffic to get to the left turn lane, but less confident bicyclists may not. There is a signal head facing the commercial driveway opposite Masters Drive, however, so those bicyclists who are not comfortable moving to the left turn lane may pull up at this driveway and position themselves to proceed southbound on the green signal. The signal detector sensitivity should be reviewed to determine if a call button or improved loop detector is needed to actuate this north-facing signal for bicyclists. While turns westbound on State

Road 16 from northbound Masters Drive would be leaving the bike route system, it is worth noting that they should be relatively easy, with bicyclists either entering the left turn lane as it diverges from the through lane.

Recommendations:

- ✓ Review signal detection to ensure that a bicyclists waiting at the commercial driveway on the north side of the intersection would receive a green signal if no motor vehicles were present. Install a push button or improved loop detector (with detection zone marked) if necessary.

State Road 16, from Masters Drive to State Road 5: 0.7 miles

State Road16 has three distinct cross sections in this brief segment. Between Masters Drive and Lewis Speedway it is four lanes wide with a two-way center left turn lane; from Lewis Speedway to State Road 5/ US 1, it is a four lane, divided, roadway, with bike lanes shoulders; both of these sections have posted speed limits of 40 miles per hour. Between State Road 5 and State Road 5A, it is two lanes wide with a speed limit of 35 miles per hour.

The section between Masters and Lewis Speedway is 59 feet wide across its five lanes. This is not enough space to re-stripe for bike lanes. SHARED LANE MARKINGS would help position bicyclists in the outside lane. (N.B. The posted speed limit is 40 miles per hour, which is above the limit for use of SHARED LANE MARKINGS allowed for in FDOT's PPM. Application of Shared Lane Markings would be experimental for this high speed location and would require coordination with and approval from FDOT.) If SHARED LANE MARKINGS are not employed, SHARE THE ROAD (W11-1 with W16-1P) or BICYCLES MAY USE FULL LANE (R4-11) signs may also alert motorists to the presence of bicycle on this roadway.

The section between Lewis Speedway and State Road 5/ US 1 already includes bike lanes. These could be enhanced by re-striping with two-foot buffers between the bike lane and the travel lanes. This would likely require reduction of the travel lanes to 11 feet wide, installation of a two-foot wide buffer stripe and a four-foot wide bike lane.

On the eastbound approach to the railroad tracks, the bike lane ends suddenly, forcing bicyclists out into the flow of traffic. There should be room in the roadway to continue the bike lane across the railroad tracks and through to the intersection with State Road 5. The outside lane eastbound is a drop lane, and the bike lane should be striped according to FDOT Standard Drawing 17346 (13 of 14), and a bike lane or shoulder slot should be positioned to the right of the rightmost through lane at the intersection.

The section between the State Road 5 and State Road 5A (known locally as Picolata Road) is 26 feet wide across its 2 lanes. It could be marked with SHARED LANE MARKINGS or with 3 foot shoulders adjacent to 10 foot lanes.

Recommendations:

- ✓ Consider SHARED LANE MARKINGS between Masters Drive and Lewis Speedway, if experimental high speed location is cleared by FDOT.
- ✓ Re-stripe to allow buffered bike lanes between Lewis Speedway and State Road 5.
- ✓ Continue the bike lanes between the railroad tracks and State Road 5.
- ✓ Apply SHARED LANE MARKINGS on Picolata Road.

Intersection of State Road 16 and State Road 5/ US 1

Eastbound through movements will be assisted by the marking of a proper bike lane in association with the eastbound drop/right turn lane.

Recommendations:

- ✓ Mark bike lanes as appropriate between the railroad tracks and the intersection, for the eastbound approach and westbound departure of State Road 16.

State Road 5A, from State Road 16 to State Road 5/ US 1: 0.5 Miles

This section of State Road 5A is two lane roadway with a speed limit of 25 miles per hour. It measure 30 feet across, and so could be re-striped to include four foot wide bike lanes adjacent to 11 foot wide travel lanes.

Recommendations:

- ✓ Mark with four-foot bike lanes.

Intersection of State Road 5A and State Road 5/US 1

Bicyclists looking to turn left at this intersection may encounter some stress as it involves negotiating numerous free-flowing crossover lanes. Bicyclists looking to go from northbound State Road 5A onto southbound State Road 5 (effectively a U-turn) will be travelling in a single through lane, and so will need to claim the lane and turn into the crossover lane.

Bike lanes could be marked continuously through the interchange area for northbound State Road 5A (including to the left of the right turn lane at Bella Vista boulevard), and on the northbound State Road 5A to southbound State Road 5 crossover lane. Widened shoulders could be added on the north and

southbound lanes of State Road 5 and on the southbound State Road 5 to southbound State Road 5A crossover lane. (These latter movements could also be marked with SHARED LANE MARKINGS in the immediate future).

Recommendations:

- ✓ Mark bike lanes on State Road 5A northbound and the crossover lane from State Road 5A to southbound State Road 5.
- ✓ Apply SHARED LANE MARKINGS on State Road 5 northbound and southbound, and on the crossover from southbound State Road 5 to southbound State Road 5A. Prioritize these movements for construction of additional shoulders.

State Road 5/ US 1, from State Road 16 to State Road 5A: 0.6 miles

Bicyclists travelling southbound (and some travelling northbound) along Bike Route #1 may prefer the more direct path of travel offered by following US 1 between State Road 16 and State Road 5A. Sticking to the convention used elsewhere in this report, the opportunities of this segment will be described from south to north, but it is likely that the route will be marked for southbound travel only.

North of State Road 1, State road 5 is a four lane, divided roadway flanked by parking lanes in each direction. The pavement is 30 feet wide in each direction, with six foot wide parking lanes adjacent to 12 foot wide travel lanes. The posted speed limit is 45 miles per hour. Unless a parking study shows that parking can be removed, there is not sufficient room for bike lanes within this cross section. SHARED LANE MARKINGS should be considered this section. (N.B. The posted speed limit is 45 miles per hour, which is above the limit for use of SHARED LANE MARKINGS allowed for in FDOT's PPM. Application of Shared Lane Markings would be experimental for this high speed location and would require coordination with and approval from FDOT.) If SHARED LANE MARKINGS are not employed, SHARE THE ROAD (W11-1 with W16-1P) or BICYCLES MAY USE FULL LANE (R4-11) signs may also alert motorists to the presence of bicycle on this roadway.

About 500 feet north of the intersection with Fairbanks Street, the parking lanes end and sidewalk ends, and the roadside changes to an open shouldered cross section. A widened shoulder could be constructed for both northbound and southbound travel. Until such construction is implemented, however, SHARED LANE MARKINGS would also be helpful through this section.

Recommendations:

- ✓ Consider SHARED LANE MARKINGS Throughout
- ✓ Prioritize for construction of shoulders between Fairbanks Street and State Road 5A.

State Road 5/ US 1 from State Road 5A to San Sebastian View: 0.6 miles

Rambla Street are very rough.

State Road 5/ US 1 remains a four lane divided highway north of the intersection with State Road 5A. It is lined with shoulders through most of this section, except at the extreme south end. Shoulders could be added northbound between the merge with State Road 5 and Rambla Street, and they should also be added or widened in from the point opposite Isla Drive all the way through the series of crossovers with State Road 5A. Areas of northbound shoulder between State Road 5A and Fort Mose Trail are asphalt pavement adjacent to a concrete roadway, and were observed to be very rough in places. The southbound shoulder was also experienced to be rough throughout. The northbound shoulders between Rambla Street and Fort Mose Trail should be repaired at the earliest opportunity, and the remaining shoulders in this section should be prioritized for maintenance work to smooth the surface in order to better accommodate bicycles. There was considerable debris observed on the northbound shoulder north of Fort Mose Trail; all shoulders in this section should be prioritized for regular sweeping and spot-checking for large debris.

North of Rambla Street, the existing shoulders could be reconfigured as buffered bike lanes by inserting a two-foot wide buffer stripe on the left side of the existing six-foot wide shoulder, leaving a four-foot wide bike lane

Recommendations:

- ✓ Widen shoulders south of Rambla Street northbound and south of Isla Drive southbound.
- ✓ Repair northbound shoulder between Rambla Street and Fort Mose Trail at earliest opportunity.
- ✓ Prioritize pavement repair and smoothing all southbound shoulders.
- ✓ Prioritize for routine sweeping and debris removal.
- ✓ Re-configure the existing shoulder into a four foot wide designated bike lane, separated by a two foot wide buffer stripe.

Intersection of State Road 5/ US 1 and Fort Mose Trail

Bicyclists looking to turn left into Fort Mose Trail from southbound State Road 5 may position themselves in the left turn lane by moving across two through lanes. Many bicyclists may be uncomfortable with this maneuver, however, and may be better accommodated by a small paved area adjacent to the shoulder where they could position themselves for a perpendicular crossing to the left

turn lane. If constructed before the shoulder widening recommended for this section, then it should be reconstructed outside the widened shoulder at the appropriate time.

Recommendations:

- ✓ Install a paved area to facilitate perpendicular crossing to the southbound left turn lane from the southbound shoulder.

Intersection of State Road 5/ US 1 and San Sebastian View

The northbound shoulder and southbound shoulder are each currently marked to the right edge of the roadway, even after the addition of the right-turn-only lanes into Ponce Island Drive and San Sebastian View. This should be re-marked in accordance with FDOT Standard Drawing 17346, (13 of 14). The bike lane on eastbound San Sebastian View is similarly situated to the right of a right turn lane and should also be corrected.

Recommendations:

- ✓ Re-mark intersection to properly position shoulders and bike lanes with respect to right turn lanes on northbound, southbound and eastbound approaches.

San Sebastian View, from State Road 5/ US 1 to County Office Complex: 0.8 miles

San Sebastian View is a recently reconstructed two lane roadway and already includes bike lanes. It should be a very comfortable place to ride for many bicyclists.

Route 1X: West Side Express

Length: 3.3 miles, from Old Dixie Highway to State Road 15, 0.6 miles from San Sebastian View to Lewis Speedway.

Destinations Served: St Johns County Main Library, St. Johns County Judicial Center

Intersecting Routes: 1, 8, 3 (via spurs), several spurs

Sequence (west to east or south to north):

- From Old Dixie Highway, north on State Road 5/ US 1, to State Road 16
- From San Sebastian View, north on State Road 5/ US 1 to Lewis Speedway

Route 1X is a more direct route up the west side of town and may be preferred by some more experienced bicyclists who are comfortable riding in traffic on busier roadways. It cuts about ½ mile off of the trip between Old Dixie Highway and State Road 16 and also travels closer to Downtown St. Augustine and points east, which can be accessed via intersecting routes.

Segment and Intersection Comments:

State Road 5/ US 1, from Old Dixie Highway to State Road 16: 3.3 miles.

From Old Dixie Highway to the intersection with State Road 207, State Road 5 is a four lane divided highway with bike lanes on both sides and a speed limit of 45 miles per hour. This should be a reasonably comfortable place for many bicyclists, but others may wish for more separation from motor vehicles. The existing lane widths could reconfigured to include two foot wide buffers between the bike lanes and 11 foot wide travel lanes.

North of State Road 207 the roadway changes to include 6 foot parking lanes adjacent to twelve foot travel lanes (30 feet total pavement width). Unless a parking study can show that parking spaces can be removed, SHARED LANE MARKINGS should be considered to reinforce the rightful positioning of bicyclists in the right hand lane. (N.B. The posted speed limit is 45 miles per hour, which is above the limit for use of SHARED LANE MARKINGS allowed for in FDOT's PPM. Application of Shared Lane Markings would be experimental for this high speed location and would require coordination with and approval from FDOT.) If SHARED LANE MARKINGS are not employed, SHARE THE ROAD (W11-1 with W16-1P) or BICYCLES MAY USE FULL LANE (R4-11) signs may also alert motorists to the presence of bicycle on this roadway.

There is a section on the southbound side (about 6/10 of a mile long), between the bridge over the San Sebastian River and Cincinnati Street, where the roadway has an open shoulder. There is also a much shorter section (1/10 of a mile) on the northbound side, between the bridge and Malaga Street. It would be helpful to bicyclists for paved shoulders to be added to these sections, even if not as marked bike

lanes due to their asymmetrical positioning. These widenings would also complement the project already underway to replace the bridge over the San Sebastian River. When completed this project will include 5 foot wide shoulders/bike lanes. While this brief stretch will end up with between stretches without bike lanes (albeit perhaps with SHARED LANE MARKINGS), it will make crossing the bridge less stressful for bicyclists. When the bridge project is complete, it will be important to install SHARE THE ROAD (W11-1 with W16-1P) sign assemblies where the shoulder ends, to alert all users that bicycle traffic will be returning to the main traffic lanes.

Recommendations:

- ✓ South of State Road 207, reconfigure lanes to allow for marking of a two-foot wide buffer between the shoulder and an 11-foot wide outer lane.
- ✓ Consider SHARED LANE MARKINGS in the outer lanes between State Road 207 and State Road 16.
- ✓ Consider adding paved shoulders northbound between the Sebastian River Bridge and Malaga Street, and southbound between the Sebastian River Bridge and Cincinnati Street.
- ✓ Install SHARE THE ROAD sign assemblies at the ends of the reconstructed bridge ove r the San Sebastian River.

Intersection of State Road 5/ US 1 and State Road 207

Bicyclists looking to turn left on westbound State Road 207 to from Northbound State Road 5A can move across two through lanes to the left turn lane. If they are not comfortable making such a maneuver they can continue through the intersection and then position themselves in the driveway of the marina under construction, which is situated opposite the approach of State Road 207, in the northeast corner of the intersection. It is not clear what the ultimate status of the parcel is. A signal head and detectors are currently installed on this westbound approach. As a bicyclist could well be at this location by himself, a BICYCLE DETECTOR PAVEMENT MARKING (as shown in Section 9C.05 of the MUTCD, reproduced in Figure 4.14) over the detection zone off the westbound through lane would help bicyclists looking to go west actuate the signal.

Figure 4.14: Bicycle Detector Pavement Marking from *MUTCD*

Recommendations:

- ✓ Install a signal facing east (into the marina driveway) for bicyclists wishing to proceed eastbound on State Road 207; include detection hardware and pavement markings that facilitate actuation by bicyclists.

State Road 5/ US 1, from San Sebastian View to Lewis Speedway 0.6 miles.

State Road 5 north of San Sebastian View is a four lane, divided roadway with five foot wide shoulder adjacent to 12 foot wide general purpose lanes. The speed limit is 45 miles per hour. Given these higher speeds and the heavier traffic associated with this being a primary route out of town to the north, many bicyclists may appreciate additional separation from the motor vehicle traffic. Buffered bike lanes should be considered here in order to maximize separation for bicyclists. A two foot wide buffer could be placed between a four foot shoulder and an 11 foot wide outside lane to achieve better separation and increase bicyclist comfort.

Recommendations:

- ✓ Re-stripe the roadway to include a four foot wide shoulder, separated by a two foot wide buffer from an 11 foot wide outside lanes.

Intersection of State Road 5/ US 1 and Maralinda Drive

The shoulder on the northbound side is kept on the right hand side of the road as a right turn lane is introduced to accommodate traffic turning onto Maralinda Drive. This intersection should be re-marked to allow configuration of a bike lane to the left of the right turn lanes, in accordance with Florida DOT standard drawings and the *Manual on Uniform Traffic Control Devices.*

Figure 4.15: Maralinda Drive is one of several places where bike lanes need to be re-configured with respect to right turn lanes.

Recommendations:

- ✓ Re-mark northbound shoulders and right turn lanes on approach to Maralinda Drive.

Route 2: Downtown to Vilano Beach

Length: 3.4 miles

Destinations Served: Plaza de la Constitucion, Government Yard, Flagler College, Redoubt Park, St. Johns County Visitors Center, Castillo de San Marcos, Vilano Boat Ramp Park Vilano Nature Greenway, Vilano Beach Oceanfront Park.

Intersecting Routes: 4, 5, 8, 3, 2X and several spurs

Sequence (west to east or south to north):

- From Plaza de la Constitucion, north on St. George Street, to Cathedral Place
- West on Cathedral Place to Cordova Street
- North on Cordova Street to Orange Street
- West on Orange Street to Cordova Street*
- North on Cordova Street to West Castillo Drive*
- East on West Castillo drive to State Road A1A/ State Road 5A*
    - *Southbound sequence is:
        - South on State Road A1A to Orange Street
        - West on Orange Street to Cordova Street
- North on State Road A1A/ State Road 5A to Myrtle Avenue
- East on Myrtle Avenue to Magnolia Avenue
- North on Magnolia Avenue to State Road A1A
- East on State Road A1A to Coastal Highway
- South on Coastal Highway to Vilano Road
- East on Vilano Road to Vilano Beach Ocean Front Park

Route #2 provides access between Downtown, the Spanish Quarter, the Nelmar and Magnolia Terrace Neighborhoods, Vilano Beach, and points north along State Road A1A along the coast.

Segment and Intersection Comments:

St. George Street, from Plaza de la Constitucion to State Road 5A (Cathedral Place): 75 feet

St. George Street is a two-lane roadway and should be fairly easy to negotiate for most bicyclists. However due to its situation in a highly congested area, SHARED LANE MARKING may help reinforce bicyclists rightful positioning in the roadway.

Recommendations:

- ✓ Install SHARED LANE MARKINGS.

Intersection of St George Street and State Road 5A (Cathedral Place)

Bicyclists looking to turn left from northbound St. George Street to westbound State Road 5A should face little difficulty as they are turning onto a one way street at a signalized intersection, and are not faced with any oncoming through traffic. Those travelling westbound on State Road 5A may position themselves in the left lane or may pull off into the area of the St. George Street Pedestrian Mall on the north side of the street. Additional accommodation for bicyclists wishing to proceed south on St. George could include a regular traffic signal (alternatively a signal with bicycle shaped displays, but this would require a request to experiment from FHWA). To reduce the potential for conflicts with motorists, the left turn from the south approach should be displayed prior to releasing the bicyclists from the north. Quadripole detector loops and the BICYCLE DETECTION SYMBOL should be placed on the southbound bicycle approach.

Recommendations:

- ✓ Bicycle signal for southbound movement from pedestrian mall to St. George Street, with phase leading left turn signal for northbound traffic.

State Road 5A (Cathedral Place) from St. George Street to Cordova Street: 400 feet.

This portion of State Road 5A is two lane, one way (westbound) roadway with parking lanes on both sides. SHARED LANE MARKINGS should be applied (in both lanes) to help position bicyclists, especially with respect to the parked cars (and their door swing area) along the right side of the roadway. SHARED LANE MARKINGS should be placed in both lanes as there is potential for bicyclist to use either lane.

Recommendations:

- ✓ Install SHARED LANE MARKINGS.

Figure 4.16: Certain types of drain inlet grates could catch narrow bicycle wheels.

Intersection of State Road 5A and Cordova Street

Bicyclists tuning left onto Cordova Street should position themselves in the left lane in advance of the intersection. Given the low speed in this area, most bicyclists should be able to accomplish this. Those uncomfortable moving over to

the left lane may pull over into the existing areas forward of the last marked parking spaces on the right to position themselves for a perpendicular crossing to the left lane. In either case the turn should be easy as the only other movement (southbound Cordova Street) is under Stop control and there is no opposing through traffic. As Cathedral Place is a one way street, there are no left turns from southbound Cordova Street.

For bicyclists turning right onto northbound Cordova Street, there is a grate over drain ainlet positioned just off the northeast corner with slots aligned parallel to the path of travel of right turning traffic. This grate should be rotated 90 degrees or replaced with grate having a more bicycle friendly pattern of openings.

Recommendations:

- ✓ Rotate or replace the grate over the drain inlet near the northeast corner.

Cordova Street from State Road 5A (Cathedral Place) to Orange Street: 0.4 miles.

Cordova Street is a narrow two lane road with no center line stripe and a posted speed limit of 20 miles per hour. It should be a comfortable place to ride for many bicyclists, certainly more so than State Road A1A, the nearest parallel north-west continuous parallel route through downtown. It is, however, still very congested and SHARED LANE MARKINGS may help reinforce bicyclists' rightful position in the street.

There were numerous uneven inlet and utility lid openings which should be smoothed out. The pavement is also rough in spots. This street should be prioritized for pavement repair and resurfacing. The existing pavement has been overlain repeatedly and is now considerably higher than the gutter pane at many locations. Resurfacing should include pavement milling to allow a smooth transition between the roadway surface and the gutter pan.

There are also numerous inlets with longitudinal slots parallel to the path of travel which should wither be rotated 90 degrees or replaced with a more bicycle friendly substitute. All inlets should be carefully reviewed but the consultants took note of problematic inlets at the following locations:

- o Just off the northeast corner of the intersection with Cathedral Place;
- o On the northbound side, just north of Cathedral Place, to the right of where the double yellow centerline ends;
- o Southbound at both of the driveway entries for the Flagler College building, between Cathedral Place and Treasury Street;
- o Off the southwest corner of the intersection with Carrera Street; and
- o At the northeast corner of the intersection with Saragossa Street.

Recommendations:

- ✓ Rotate or replace the grates over the drain inlet at numerous locations.
- ✓ Prioritize for pavement repair and resurfacing.
- ✓ Apply SHARED LANE MARKINGS.

Orange Street from Cordova Street to Cordova Street: 150 feet.

The northbound bike route is routed west on Orange Street from Cordova Street for approximately 150 feet to where Cordova Street continues northbound. Orange Street is a two lane roadway but, as this is a highly congested area, SHARED LANE MARKINGS may assist in reminding motorists of bicyclists' rightful position in the roadway.

Recommendations:

- ✓ Apply SHARED LANE MARKINGS.

Cordova Street, from Orange Street to West Castillo Drive: 0.2 miles

Cordova Street is a two lane roadway with a posted speed limit of 15 miles per hour. Nevertheless, as it is prone to congestion due to its proximity to the St. Johns County Visitor Center and the St. Augustine Historic Downtown Parking Facility, it should be marked with SHARED LANE MARKINGS to reinforce bicyclists' rightful position in the roadway.

Recommendations:

- ✓ Apply SHARED LANE MARKINGS.

West Castillo Drive from Cordova Street to State Road A1A: 0.1 miles

West Castillo Drive is a two lane roadway with a 25 mile per hour speed limit. It should be comfortable for most bicyclists, however because it passes through a congested area due to its proximity to St. Augustine's Historic Downtown and the St. Johns County Visitor Center, it would likely be helpful to have SHARED LANE MARKINGS on the roadway to reinforce the rightful positioning of bicyclists in the roadway.

Recommendations:

- ✓ Apply SHARED LANE MARKINGS.

Intersection of Castillo Drive and State Road A1A

Bicyclists looking to turn left from any of the approaches to this intersection should find no particular difficulty. The left turn lane on eastbound West Castillo Drive diverges out of a single through lane and the signal has a protected left phase (opposing traffic comes from the driveway of the Ripley's Believe It or Not museum). Bicyclists looking to turn left from northbound State Road A1A will need to cross from a through lane into a drop lane (through lane that becomes a left turn only lane); bicyclists uncomfortable with this maneuver can pull to the head of the outbound queue of the Ripley's Museum driveway and reposition themselves to cross westbound when the signal changes. Signal hardware phasing should be reviewed to ensure that a bicyclist will actuate the signal if waiting alone at this position, and if a loop detector is present, the detection zone should be marked with a symbol identifying the best place for bicyclists to wait.

Recommendations:

- ✓ Review signal phasing and detection hardware to ensure that bicyclists can actuate the signal if waiting in the outbound lane of the Ripley's Museum driveway; mark detection zone on the driveway to position bicyclists for actuation.

Orange Street from Cordova Street to State Road A1A: 400 feet

This section of Orange Street is a low speed roadway but in a highly congested area at the north end of St. Augustine's historic downtown. SHARED LANE MARKINGS will reinforce the rightful position of bicyclists in the roadway. There are areas of rough pavement, and so this section should be prioritized for both pavement repair and resurfacing.

Recommendations:

- ✓ Apply SHARED LANE MARKINGS.
- ✓ Prioritize for pavement repair and resurfacing.

State Road A1A from Orange Street to West Castillo Drive: 0.1 miles

State Road A1A is four lanes wide in this section, and lined with curb and gutter. The lanes already appear to be quite narrow, so re-striping for bike lanes or shoulders is not a possibility for this section. SHARED LANE MARKINGS would help reinforce the rightful position of bicyclists in the roadway.

Recommendations:

- ✓ Apply SHARED LANE MARKINGS.

State Road A1A, from West Castillo Drive to Myrtle Avenue: 0.5 miles

State Road A1A is two lane roadway with parking lanes marked on both sides. Unless a parking study confirms that parking can be removed, there is not sufficient space for bike lanes. While the speed limit is 25 miles per hour, it can become very congested, which slows traffic but can also feel intimidating for many bicyclists. SHARED LANE MARKINGS should be applied to reinforce the rightful position of bicycles in the roadway and position bicycles away from the door swing zone of cars parked along the roadway.

Recommendations:

- ✓ Apply SHARED LANE MARKINGS.

Myrtle Avenue from State Road A1A to Magnolia Avenue: 0.1 miles

Myrtle Avenue is a narrow local street and should be comfortable for most bicyclists. It has some areas of rough pavement and there are spots along the north side of the street where palm fronds and other plant material hang into the roadway. The street should be prioritized for pavement repair and resurfacing and routine maintenance trimming of roadside plants should be scheduled.

Recommendations:

- ✓ Prioritize for pavement repair or resurfacing.
- ✓ Schedule routine trimming of roadside plants to keep outer portions of roadway clear.

Magnolia Avenue from Myrtle Avenue to State Road A1A:

Magnolia Avenue is a local street, but may have periods of heavier traffic due its proximity to the Fountain of Youth tourist attraction, which fronts the almost the entire east side of the street. It has some spots of rough pavement and considerable leaf debris from the large oak trees that line the street. Magnolia Avenue should be prioritized for pavement repair and resurfacing and routine sweeping should be scheduled to minimize debris accumulation. Consideration should be given to providing priority along Magnolia at Ballard Avenue and Williams Street. Additionally, mini-circles could be considered as a future improvement at Dufferin Street. These changes

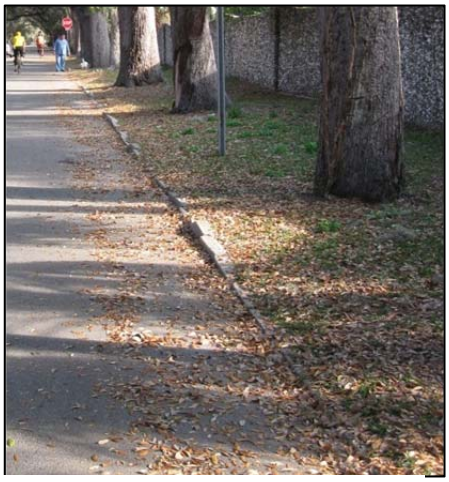


Figure 4.17: Leaf debris accumulates along Magnolia Avenue.

would allow for bicyclists using this route to do so without having to stop three times along this 0.3 mile section.

Recommendations:

- ✓ Prioritize for pavement repair or resurfacing.
- ✓ Schedule routine sweeping to remove leaves and other.
- ✓ Provide priority to Magnolia Avenue at intersections.

State Road A1A from Magnolia Avenue to Coastal Highway: 1.6 miles

This section of State Road A1A is broken into three distinct segments all of which are two lanes across: May Street, the Vilano Causeway, and the Francis and Mary Usina Memorial Bridge. May Street is lined with granite curbs, while the causeway and the bridge each have shoulders. The posted speed limits are 30 mile per hour on May Street, 40 miles per hour on Vilano Causeway, and 45 miles per Hour on the bridge.

May Street is presently marked with three foot wide shoulders, which is very narrow for bicycle use when adjacent to a granite curb with no gutter pan; as noted above, this also leads to the shoulder space being interrupted by gutter pan at the re-constructed corner radii at Magnolia Avenue. The total width of the May Street is 29 feet, which would allow restriping to 14 foot lanes. SHARED LANE MARKINGS should be installed along this section of roadway.

At the far east end of May Street, about 325 feet east of Magnolia Avenue, there is a drain inlet on the south side of the street around which the pavement of the shoulder drops considerably. This potential hazard should be marked with striping so that bicyclists do not ride into the depression.

Figure 4.18: The already narrow shoulders of May Street are interrupted by pavement dropping toward an inlet.

On the westbound side as the road transitions from the causeway to May Street the westbound shoulder pinches down to a very narrow width. This section should be restriped to provide a continuous shoulder suitable for use by bicyclists.

The shoulders of the causeway section are currently 5 feet wide and adjacent to 12 foot lanes. These should provide a good bicycling experience for most bicyclists, especially if designated as bike lanes. The eastbound shoulder is kept to the right of the right turn only lane introduced for the entrance to Vilano Boat Ramp Park. It should be re-striped to comply with FDOT standard index drawings. Some accumulation of sand and other debris was observed on the shoulders across the

causeway section. This area should be prioritized for debris removal to ensure that the full width of the shoulder remains available for use as a bicycle facility.

As the westbound shoulder comes off the bridge onto the causeway it is interrupted by the introduction of a right turn only lane into Harbor Drive. This short section is lined with curb-and-gutter and a sidewalk, and so widening to accommodate both the shoulder and the turn lane is unlikely. A SHARED LANE MARKING could be applied on the left side of this right turn lane, indicating that through bicyclist may maintain their path of travel, or a dashed bike lane could be marked on the left side of this turn lane for a similar result. The acceleration lane west of Harbor Drive should be reviewed to determine if this further interruption of the shoulder is necessary.

Figure 4.19: Possible treatment to provide continuity through constrained area at Harbor Drive

On the bridge, existing 10 foot wide shoulders provide nice space for bicyclists. A two foot wide buffer striping pattern next to a seven foot wide bike lane and a one foot wide buffer to the side barrier would help position riders in a more comfortable position with respect to the motor vehicle traffic and the side of the bridge. Railings atop the concrete barrier would also be appropriate for a bike route, to a height of at least 54", per the AASHTO bridge standards.

There is a sidewalk on the north side of the bridge. In the center of the span a sign is posted that advises bicyclists to yield to pedestrians. Such signs would be more effective at either end of the bridge and perhaps could be clarified to specify that this is required of bicyclists on the sidewalk.

There are several wide expansion joints between bridge sections. These could be treacherous to ride over with some types of wheels. It may be possible to fill these joints in the shoulder areas with rubber "flange filler" strips, as are sometimes used at railroad crossings.

Figure 4.20: Expansion joints make for a rough crossing onto the Usina Bridge.

The westbound shoulder remains to the right of right turn lane that is added on approach to the intersection with Coastal Highway. This should be re-marked to comply with Florida DOT Standard Index drawings.

Recommendations:

- ✓ Install SHARED LANE MARKINGS on May Street.

- ✓ Stripe around the depressed drain inlet on the south side of May Street, 325 feet east of
- ✓ Magnolia Avenue.
- ✓ Designate shoulders on the causeway as bike lanes.
- ✓ Prioritize causeway for debris removal.
- ✓ Re-mark eastbound shoulders and right turn lanes on approach to Vilano Boat Ramp Park.
- ✓ Consider SHARED LANE MARKINGS or dashed bike lanes to allow shoulder continuity across westbound right turn lane into Harbor Drive.
- ✓ Mark buffered bike lanes within the shoulders on the bridge, add railings to the side barriers on the bridge.
- ✓ Re-word signs to read "YIELD TO PEDS ON SIDEWALK" and move to ends of bridge.
- ✓ Consider a flexible filler material for joints between bridge sections.
- ✓ Re-mark eastbound shoulder and right turn lane on approach to Coastal Highway.

Coastal Highway from SR 16 to Vilano Road: 600 feet

Coastal Highway south of State Road 16 is a two lane roadway with angled parking along the west side. It was newly paved at the time of the field visit and should be very comfortable for most bicyclists. The parcel on the east side of the street is under redevelopment into a shopping center and supermarket. It may become considerably congested upon completion of the development.

Figure 4.21: Slot drains around inlets could catch a bicycle wheel.

The stormwater inlets along this portion of Coastal Highway (as well as all those along intersecting Vilano Road) all feature small slot drains around the main inlet. These run longitudinally, several feet out from the curb, about where bicyclists will likely be riding. These slots are slightly recessed relative to the roadway surface, and could prove treacherous for bicyclists, especially those using high-pressure narrow tires. These should be marked as obstructions with white striping. SHARED LANE MARKINGS on this roadway could assist bicyclists in claiming a position in the roadway that is clear of these obstructions to travel along the right side of the road; these will also keep bicyclists back from the bumpers of cars parked in the angle spaces along the west side of the roadway.

Recommendations:

- ✓ Mark around the longitudinal slot drains at all curb inlets.

- ✓ Install SHARED LANE MARKINGS to position bicyclists away from the slot drains.

Vilano Road from Coastal Highway to Vilano Beach Park: 500 feet

Vilano Road is a two lane road that ends at the Vilano Beach Oceanfront Park Pavilion. It features angle parking along the south side. It should have low volumes and low speeds, leaving it relatively comfortable for bicyclists, but the roadway may become congested on weekends and other times of high beach use. There are slot drains in places similar to those described on Coastal Highway above. These should be marked around and SHARED LANE MARKINGS should also be considered to keep bicyclists toward the center of the lanes, away from the slot drains and the backs of parked cars.

Recommendations:

- ✓ Mark around the longitudinal slot drains at all curb inlets.
- ✓ Install SHARED LANE MARKINGS to position bicyclists away from the slot drains.

Route 2X: Downtown to Vilano Beach Express

Length: From Plaza de la Constitucion to West Castillo Drive, 0.7 miles; from Myrtle Street to May Street, 0.5 miles.

Destinations Served: Plaza de la Constitucion, Castillo de San Marcos, Davenport Park

Intersecting Routes: 2, 4, 5X

Sequence (west to east or south to north):

- From Plaza de la Constitucion, east on King Street to State Road A1A
- North on State Road A1A to West Castillo Drive
- West Castillo Drive to Myrtle Street (see Route 2)
- From Myrtle Street, north on State Road A1A to May Street
- East on May street to Magnolia Avenue

Route 2X is a more direct route up the east side of town and may be preferred by some more experienced bicyclists who are comfortable riding in traffic on busier roadways. It involves fewer turns and trims about 700 feet from the trip between the Plaza and the intersection of State Road A1A and West Castillo Drive, and may also be more convenient for those bicyclists riding through town from points east and continuing north. The section between Myrtle Street and May Street is actually longer than the route described in Route 2, but will help make connections to continuing routes going north.

Segment and Intersection Comments:

King Street, from St. George Street to State Road A1A (Avenida Menendez): 600 feet

This section of King Street is a one-way (eastbound) roadway with on-street parking on both sides of the street. The right lane is for through traffic (continuing to the Bridge of the Lions and State Road A1A southbound) and right turns onto Avenida Menendez, while the left lane is for left turns onto State Road A1A North. Unless on-street parking is removed, there is no room in the existing cross section for bike lanes. SHARED LANE MARKINGS could be installed, potentially in both lanes, to reinforce the proper position of bicycles in the roadway and clear of the door swing zone of cars parked along the right hand side of the roadway.

Recommendations:

- ✓ Install SHARED LANE MARKINGS to reinforce riding in the roadway and position bicyclists away from parked cars.
- ✓

State Road A1A, (Avenida Menendez and Castillo Drive) from King Street to West Castillo Drive: 0.5 miles

Between King Street and the bend that changes the road from Avenida Menendez into South Castillo Drive), State Road A1A is a four lane, divided roadway with each side configured to include six foot parking lanes (used as a horse carriage loading zone northbound) adjacent to twelve foot travel lanes (30 feet total pavement width). Unless a parking study can show that parking spaces can be removed, SHARED LANE MARKINGS should be applied to reinforce the rightful positioning of bicyclists in the right hand lane and position them clear of the door swing zone of the parked cars.

Figure 4.22: Roadway space along Avenida Menendez is already claimed for multiple uses and unlikely to change.

After rounding the bend and becoming south Castillo Drive State Road A1A is a four lane, undivided roadway across the frontage of the Castillo de San Marcos and all the way to the intersection with West Castillo Drive. SHARED LANE MARKINGS should also be installed in this portion to reinforce the rightful position of bicycles in the right hand lanes.

Recommendations:

- ✓ Install SHARED LANE MARKINGS to reinforce riding in the roadway and position bicyclists away from parked cars.

State Road A1A, (San Marco Avenue) from Myrtle Avenue to May Street to West Castillo Drive: 0.5 miles.

San Marco Avenue is a two lane roadway with a posted speed limit of 25 miles per hour. There are six-foot wide parking lanes adjacent to the travel lanes throughout. Unless a parking study can show that parking spaces can be removed and bike lanes installed, SHARED LANE MARKINGS should be applied to reinforce the rightful positioning of bicyclists in the right hand lane and position them clear of the door swing zone of the parked cars.

Recommendations:

- ✓ Install SHARED LANE MARKINGS to reinforce riding in the roadway and position bicyclists away from parked cars.

State Road A1A (May Street), from San Marco Avenue to Magnolia Avenue: 0.23 miles

May Street is presently marked with three foot wide shoulders, which is very narrow for bicycle use when adjacent to a granite curb with no gutter pan; as noted above, this also leads to the shoulder space being interrupted by gutter pan at the re-constructed corner radii at Magnolia Avenue. The total width of the May Street is 29 feet, which would allow restriping to 14 foot lanes. SHARED LANE MARKINGS should be installed along this section of roadway.

Recommendations:

- ✓ Install SHARED LANE MARKINGS.

Route 3: Lincolnville to Uptown

Length: 1.9 miles

Destinations Served: Eddie Vickers Park, Willie Galimore Community Center, Twine Park, Ketterlinus Gym, Francis Field, Swing Park, Events Field

Intersecting Routes: 5, 8, 1x (via spurs), 2, and several spurs

Sequence (west to east or south to north):

- From Eddie Vickers Park, north on Riberia Street, across King Street, to Grove Avenue
- East on Grove Avenue to Loring Street
- North on Loring Street to Cincinnati Avenue
- East on Cincinnati Street to State Road A1A/ State Road 5A

Route 3 provides a north-south route on the main peninsula of the city, providing access to and from the Lincolnville and Uptown neighborhoods, and while also providing access to Vilano and points north for the west for any travelers wishing to avoid downtown altogether.

Segment and Intersection Comments:

Riberia Street from Eddie Vickers Park to Grove Avenue: 1.5 miles

Heading north from Eddie Vickers Park, Riberia Street is a narrow but low speed roadway that should be amenable to most bicyclists. Many participants in the public workshops reported using it as they road through this part of town and numerous bicyclists were observed on the day of the field review. However, there is a considerable amount of truck traffic serving industrial parcels and marinas along the west side of the street. The pavement condition is also very poor, as noted both by the consultants and numerous participants at the public workshops. Together these circumstances create condition that cannot currently be recommended for a bike route. Riberia Street is slated for resurfacing soon however, and with a new surface the roadway should be very well suited to serve as a bike route despite the heavy, but slow moving, truck traffic.

Figure 4.23: Riberia Street offers plenty of room but the condition of the roadway presents challenges.

The pavement condition along Riberia Street is so consistently poor that spot repairs would not make a considerable impact. Until the resurfacing is complete, it is recommended that Martin Luther King

Avenue be identified as an interim alternate route between Cerro Street and La Quinta Place.

North of King Street, Riberia Street is a two lane roadway with no centerline stripe and parallel parking along the southbound side. It should be a very comfortable street for bicycling. SHARED LANE MARKINGS could help bicyclist position themselves away from the door swing zone of the cars parked along the west side of the street.

Near the northeast corner of the intersection with Valencia Street there is a drainage inlet grate with slots running parallel to Riberia Street. This should be replaced by a grate with rectangular openings, as is could be in the path of travel of bicycles on Valencia Street as well. The inlets at the corner radii at the intersection with Carrera Street also have slots which could catch the wheel of a turning bicycle and should also be replaced.

A manhole cover in the center of Riberia Street at the intersection with Grove Avenue has long radial slots which could catch a thin bicycle tire; this should also be replaced.

Recommendations:

- ✓ Designate Martin Luther King Avenue as an interim alternate route.
- ✓ Designate Riberia Street as a bike route upon resurfacing.
- ✓ Apply SHARED LANE MARKINGS where on street parking spaces are marked.
- ✓ Replace inlet grates at Valencia and Carrera Streets, replace manhole cover at Grove Avenue.

Intersection of Riberia Street and West Castillo Drive

Due to the proximity of this intersection with State Road 5/ US 1 (just over 100 feet), bicyclists proceeding through this intersection may have some difficulty finding a gap to cross due to queuing westbound cars on West Castillo Drive. Northbound bicyclists will also be unable to see right turning vehicles coming off of northbound State Road 5 onto eastbound West Castillo Drive. Pavement markings should be considered to supplement the DO NOT BLOCK INTERSECTION signs at this location (often a hatched out box painted on the pavement). These markings should extend 10 feet in advance of the curb return for Riberia Street.

Recommendations:

- ✓ Mark intersection pavement across Castillo at Riberia.

Grove Avenue from Riberia Street to Loring Street: 225 feet

Grove Avenue is a local two lane street with no centerline stripe and a posted speed limit of 20 miles per hour. It should be very comfortable for all bicyclists. It has some patches in of rough pavement and this section should be prioritized for pavement repair and resurfacing.

Recommendations:

- ✓ Prioritize for pavement repair or resurfacing.

Loring Street from Grove Avenue to Cincinnati Avenue: 750 feet

Loring Street is a narrow local street with no centerline stripe. It should be comfortable for most bicyclists. There are a few locations where palm fronds and other plant materials hang into the roadway and there are also a few rough spots in the pavement. Loring Street should be prioritized for pavement repair and for routine trimming of roadside plants should be scheduled.

Figure 4.24: Loring Street is already recognized by bicyclists as a comfortable route choice.

The road falls somewhat steeply as it meets the gutter pans along Rohde Avenue. This may be addressed with a resurfacing project.

Recommendations:

- ✓ Prioritize for pavement repair or resurfacing.
- ✓ Schedule routine trimming of roadside plants to keep outer portions of roadway clear.

Cincinnati Avenue from Loring Street to State Road A1A: 900 feet

Cincinnati Avenue is a neighborhood street with a posted speed limit of 25 miles per hour. It should be comfortable for most bicyclists. As on street parking is allowed on both sides, SHARED LANE MARKINGS may help position bicyclists away from the door swing zone. Consideration should be given to removing the stop control for Cincinnati Avenue at 1st Street.

Recommendations:

- ✓ Install SHARED LANE MARKINGS to position bicyclists away from parked cars.
- ✓ Consider removing Stop control at 1st Street.

Route 4: Downtown to St. Augustine Beach

Length: 4.8 Miles

Destinations Served: Plaza de la Constitucion, Bridge of the Lions, Lighthouse Park, Red Cox Recreation Facility, Hamilton Upchurch Neighborhood Park, St. Augustine Amphitheatre, Pope Road Park, St. Johns County Ocean Pier.

Intersecting Routes:2, 8, 5, 5X, 2 X, and numerous spurs.

Sequence (west to east or south to north):

- From Plaza de la Constitucion, east on King Street to Avenida Menendez
- Across Avenida Menendez to SR A1A (Bridge of the Lions) to Dolphin Drive (South loop) or St. Augustine Boulevard (North loop)
- South loop:
    - South on Dolphin Drive to Arricola Avenue
    - East on Arricola Drive to Matanzas Boulevard
    - South on Matanzas Boulevard to Coquina Avenue
    - South on Coquina Avenue to Old Quarry Road
    - East on Old Quarry Road to SR A1A (Anastasia Boulevard)
- North loop (described east to west, from intersection of Old Quarry Road and State Road A1A)
    - North on Red Cox Drive to Carver Street
    - West on Carver Street to Lighthouse Avenue
    - North on Lighthouse Avenue to White Street
    - West on White Street to Magnolia Drive
    - North of Magnolia Drive to Ocean Way
    - West on Ocean Way to State Road A1A (Anastasia Boulevard)
    - West on State Road A1A to Comares Avenue
    - North on Comares Avenue to Flagler Boulevard
    - West on Flagler Boulevard to Gerado Street
    - North on Gerado Street to Oglethorpe Boulevard
    - West on Oglethorpe Boulevard to St. Augustine Boulevard
    - South on St. Augustine Boulevard to State Road A1A (Bridge of the Lions)
- South on State Road A1A to Old Beach Road
- South on Old Beach Road to Salamanca Street
- East on Salamanca Street to Santander Street
- South on Santander Street to Pope Road
- East on Pope Road to County Road A1A
- South on County Road A1A to St. Johns County Ocean Pier

Route #4 connects downtown to St. Augustine Beach, and Anastasia State Park, as well as the Davis Shores and Lighthouse Park neighborhoods It is sequenced with both a south loop, selected to be easiest for travel out form downtown, and a north loop for travel into downtown. These loops minimize the occasion for crossing State Road A1A in each direction, but provide reasonably convenient parallel access to commercial areas along State Road A1A and full access to destinations on both sides.

Segment and Intersection Comments:

King Street, from St. George Street to Avenida Menendez: 600 Feet

See narrative for Route 2X above

State Road A1A (Bridge of the Lions) from Avenida Menendez to Dolphin Drive: 0.4 miles

State Road A1A across the Bridge of the Lions is a two-lane roadway with a posted speed limit of 30 miles per hour. The bridge deck is approximately 22 feet across, leaving no room for shoulder of any kind to accommodate bicycle travel. Newly installed SHARE THE ROAD SIGNS reinforce the rightful place of bicyclists in the roadway across the bridge. As the bridge is far too narrow for the lane to be shared safely by a bicyclist and a motor vehicle side-by-side, SHARED LANE MARKINGS should be installed to help position bicyclists away from the face of the curb. SHARED LANE MARKINGS should be supplemented by R4-11 ("Bicycles may use full lane") signs to help remind motorists of bicyclists' right to ride this vehicular way as they feel comfortable.

Figure 4.25: SHARED LANE MARKINGS will further reinforce the message of the new SHARE THE ROAD signs. "Bicycles May use Full Lane" signs will also be more clear.

Even with SHARED LANE MARKINGS and supporting regulatory signage, many bicyclists may feel very intimidated claiming the lane on this bridge which is more than 2,000 feet across, especially as they work to climb the steep grade of the approaches to the draw bridge deck. These bicyclists should be provided opportunities to access the sidewalk to cross the bridge, where a R9-6 (BIKE YIELD TO PEDS) sign should be installed. (Section 24-107 of the St. Augustine Code of Ordinances prohibits riding bicycles on the sidewalks of streets and lanes within the City Limits,

Figure 4.26: Some bicyclists will feel comfortable traversing the bridge in the roadway.

however Florida DOT has observed that the City does not have the ability to regulate sidewalk riding along state roads.)

As the bridge approaches meet the deck of the draw bridge, there are gaps at the edges of the roadway which facilitate the opening and closing of the bridge. These gaps can be treacherous for bicyclists and have been appropriately shielded with plastic delineator posts. SHARED LANE MARKINGS will further reinforce to bicyclists that the preferred riding position is away from the curb by several feet.

Figure 4.27: Some bicyclists will only be comfortable traversing the bridge on the sidewalk.

Recommendations:

- ✓ Install SHARED LANE MARKINGS to reinforce riding in the roadway and position bicyclists away from the curb and the gaps at the side of the bridge deck.
- ✓ Replace existing SHARE THE ROAD (W11-1 with W16-1P) sign assemblies with BICYCLES MAY USE FULL LANE (R4-11) signs
- ✓ Install BIKE YIELD TO PEDS sign on sidewalk.

Dolphin Drive, from State Road A1A to Arricola Avenue: 350 feet

Dolphin Drive is a neighborhood street with no centerline stripe marked. It should be comfortable for most bicyclists. The pavement was observed to be in good condition, but if this becomes a bike route, it should be prioritized for maintenance and repair should any issues arise. It should also be checked regularly for debris accumulation.

Recommendations:

- ✓ Prioritize for pavement maintenance and debris clearance.

Figure 4.28: Uneven pavement is found along the edges of Arricola Avenue.

Arricola Avenue, from Dolphin Drive to Matanzas Boulevard: 0.4 miles

Arricola Avenue is a neighborhood street with no centerline stripe. It should be comfortable for most bicyclists, and as it runs parallel to Anastasia Boulevard, should provide good access to many businesses while also providing a low-stress bicycling environment.

The pavement along Arricola Avenue is rough in some places, including numerous trenches cut and re-filled to provide access to utilities under the roadway. It also appears that the roadway may have been re-surfaced without milling the existing pavement, leaving a sizable lip at the edge of pavement where it meets the gutter pan, which could be problematic for the bicyclists who ride near the edge of the roadway. This road should be prioritized for pavement repair and resurfacing, and this lip removed upon resurfacing.

Traffic along Arricola Avenue is required to stop at Zorayda Avenue and Arredondo Avenue. Consideration should be given to reversing the priority at these intersections to reduce the number of required stops for bicyclists travelling along Arricola. Such changes would require a traffic study and input from the residents of the neighborhood.

Recommendations:

- ✓ Prioritize for pavement maintenance and resurfacing.
- ✓ At next resurfacing, mill pavement so that finished surface is flush with gutter pan at edge.
- ✓ Consider reversing Stop control priority at Zorayda and Arredondo Avenues.

Matanzas Boulevard from Arricola Avenue to Coquina Avenue: 450 feet

Matanzas Boulevard is a neighborhood street with no centerline stripe. It should be comfortable for most bicyclists.

The pavement along Matanzas Boulevard is rough in places and there are spots where the top level of pavement sits substantially higher than the gutter pan, leaving a lip between the edge of pavement and the gutter pan. The road should be prioritized for pavement repair and resurfacing, and the existing pavement should be milled prior to resurfacing to allow the new surface to meet flush with the gutter pan.

There are drain inlets on both sides of the street in just north of the intersection with Coquina Avenue which have slots running parallel to the roadway, which could trap a narrow bicycle wheel. These grates should be replaced with a more bicycle friendly design.

Recommendations:

- ✓ Prioritize for pavement maintenance and resurfacing.
- ✓ At next resurfacing, mill pavement so that finished surface is flush with gutter pan at edge.
- ✓ Replace the drain inlet grates north of Coquina Avenue.

Coquina Avenue, from Matanzas Boulevard to Old Quarry Road: 0.8 miles.

Coquina Avenue is a neighborhood street with no centerline stripe. It should be comfortable for most bicyclists, providing a low-stress bicycling environment. A basketball goal oriented to the street at one of the homes along Coquina Avenue is testimony to its low traffic volumes.

The pavement along Coquina Avenue is very rough throughout this section, including numerous trenches cut and re-filled to provide access to utilities under the roadway. It also appears that the roadway may have been re-surfaced without milling the existing pavement, leaving a sizable lip at the edge of pavement. This road should be prioritized for pavement repair and resurfacing, and this lip removed upon resurfacing.

Figure 4.29: Numerous indicators point to Coquina Avenue being a comfortable environment.

There are numerous drain inlets on both sides of the street along Coquina Avenue which have slots running parallel to the roadway, which could trap a narrow bicycle wheel. These grates should be replaced with a more bicycle friendly design.

A semicircular driveway has been added to the home at 245 Coquina Avenue, and in lieu of cutting the curb, concrete ramps have been extended in to the roadway. These could catch a bicyclist who is travelling close to the edge and should be marked off with striping or removed.

Figure 4.30: Several grates along Coquina Avenue could catch narrow bicycle wheels.

Recommendations:

- ✓ Prioritize for pavement maintenance and resurfacing.
- ✓ At next resurfacing, mill pavement so that finished surface is flush with gutter pan at edge.
- ✓ Replace the drain inlet grates throughout.
- ✓ Mark off or remove driveway ramps at 245 Coquina.

Old Quarry Road, from Coquina Avenue to State Road A1A: 0.3 miles.

Old Quarry Road is a neighborhood street with no centerline stripe. The roadway is very narrow—less than 20 feet wide. There are tree and utility poles very close to the edge of the roadway. This section is also subject to more motor vehicle traffic as it is an outlet to SR A1A from the neighborhood and is the location of parking lots for the St. Augustine Alligator Farm. SHARED LANE MARKINGS and/or R4-11, BICYCLES MAY USE FULL LANE, signs may help bicyclists claim their rightful position in the roadway and keep them off the edge the roadway (and thus away from trees and poles). Edge striping may also help guide bicyclists away from the obstructions near the edge of the roadway.

Recommendations:

- ✓ Install SHARED LANE MARKINGS.

Intersection of Old Quarry Road and State Road A1A.

The intersection of Old Quarry Road and State Road A1A is a location where cyclists have been observed crossing State Road A1A from Old Quarry Road to access the rec center on the east side of State Road A1A. Bicycle and pedestrian crossings at this location are problematic because sight distances are limited, particularly to the south, and there is no refuge island in the center of State Road A1A (the existing traffic separator is not wide enough to be considered a refuge island; six feet is required).

Figure 4.31: A potential mid-block crossing treatment near the intersection of SR A1A, Old Quarry and Red Cox would have to be placed south of the intersection to ensure visibility in both directions.

To provide access to the rec center from Old Quarry Road, consideration should be given to installing a midblock crossing of State Road A1A. While a full bike/pedestrian crossing study would be required, including mapping of origins and destinations, it appears that a crossing of State Road A1A just north of the curve may be a viable method of providing for this crossing movement. Each turn lane could be shortened slightly to make room for a full width median island. Pedestrians entering the travel lanes from either the sidewalk or the median would be visible to motorists from more than 305 feet away (stopping sight distance for a 40 mph roadway). Equally important is that any pedestrians or bicyclists making this crossing would be able to see approaching cars from more than 505 feet way, the amount of time it would take for a pedestrian to cross 30 feet from the curb to a median island. This would require widening the sidewalk on the east side of State Road A1A to comply with shared use path standards. Additionally, installation of a rapid rectangular flashing beacon could be considered for this crossing location.

Recommendations:

- ✓ Investigate a mid block crossing treatment.

State Road A1A, from Old Quarry Road to Old Beach Road: 0.9 miles.

State Road A1A is a four lane roadway with a two-way center left turn lane and a posted speed limit of 40 miles per hour. There are designated bike lanes on both sides of the road. Currently the bike lanes are four feet wide and adjacent to 12-foot wide travel lanes. If these travel lanes were reduced to eleven feet wide, then a two-foot wide buffer could be installed between the outside lane and the bike lane, which may have the effect of attracting a broader range of bicyclists.

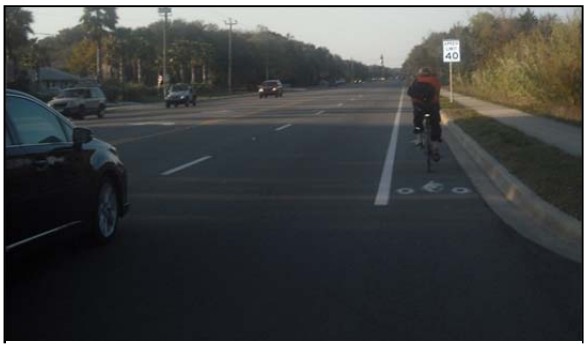


Figure 4.32: Existing bike lanes along A1A may be enjoyed by more bicyclists if enhanced with a two-foot buffer stripe.

Recommendations:

- ✓ Install 2-foot wide buffers between the existing bike lane and travel lanes narrowed to 11 feet each.

Old Beach Road, from State Road A1A to Salamanca Street: 0.2 miles

Old Beach Road is a narrow neighborhood street with no centerline stripe. It should be comfortable for many bicyclists, but may be subject to increased traffic as it is a connection from State Road A1A into a residential neighborhood. The current roadway is only 20 feet wide, with an open shouldered cross section. It may be possible to widen the shoulders of the roadway to better accommodate bicycling. The existing edge of pavement shows signs of raveling in places, and the roadway should be prioritized for pavement repair and/or resurfacing.

Recommendations:

- ✓ Prioritize for pavement maintenance and resurfacing.
- ✓ Consider widening shoulders to accommodate bicycle travel.

Salamanca Street from Old Beach Road to Santander Street: 0.2 miles

Salamanca Street is a very narrow neighborhood street with no centerline stripe. Although the roadway surface itself is approximately 16 feet wide, the traffic volumes are likely so low that they there are minimal conflicts with motor vehicles. It should be a very comfortable street for most bicyclists.

There was considerable debris along the sides of Salamanca Street including leaf litter, as well as overhanging branches and limbs. The pavement was rough in some spots. This roadway should be prioritized for pavement repair and also for trimming of encroaching vegetation and debris removal.

Recommendations:

- ✓ Prioritize for pavement repair and/or resurfacing.
- ✓ Prioritize for vegetation trimming and debris removal.

Santander Street from Salamanca Street to Pope Road: 0.4 miles

Santander Street is a very neighborhood street with no centerline street with no centerline stripe and a posted speed limit of 20 miles per hour. It should be a very comfortable street for most bicyclists, and was reported as a popular route for many area bicyclists in the public involvement phase of this study. There is considerable leaf debris and overhanging vegetation along both sides of the street. The pavement is also rough in some places. Santander Street should be prioritized for trimming of vegetation, debris removal, and pavement repair and/or resurfacing.

Figure 4.33: Leaf debris is heavily accumulated along the edges of Santander Street.

Recommendations:

- ✓ Prioritize for vegetation trimming and debris removal.

Intersection of Santander Street and County Road A1A

Santander Street does not officially intersect with County Road A1A as it connects from the north. This connection has been closed to motor vehicles, but appears to still be used as a neighborhood cut-through for bicyclists connecting to Santander Street to the south, or riding out County Road A1A on the to the beach. A small pathway, still closed to motor vehicles, could help officially connect this north approach, creating a full four-way intersection for bicyclists. The pathway could be blocked with a bollard on the centerline and posted with R5-3 signs (NO MOTOR

Figure 4.34: An unofficial cut-through path already exists to allow continuing travel along Santander Street at CR A1A.

VEHICLES). W11-1 (BICYCLE WARNING) signs should also be placed along County Road A1A in advance of and at this intersection.

Recommendations:

- ✓ Construct a short pathway to connect non-motorized traffic from Santander Street at County Road A1A.

Pope Road between Santander Street and County Road A1A: 0.75 miles.

Pope Road is a two lane roadway with a posted speed limit of 25 miles per hour. There is an eight foot wide pathway along the north side of the road, which is likely used by many bicyclists. Many bicyclists will also feel comfortable riding in the road, and may prefer the road if the pathway is occupied by pedestrians and other users. An assembly of W11-1 (BICYCLE WARNING) and W16-1 (SHARE THE ROAD) will reinforce to motorists that bicyclists may use either facility.

Pope road has an open-shouldered cross section, and a widened shoulder would be a possible first recommendation for such a road in most circumstances. Given the proximity of the pathway on the north side and the drainage swale on the south side of the road, grading to accommodate shoulders may be challenging and expensive. The existing shoulders are very rough in places, so the roadway should be prioritized for pavement repair and ultimate resurfacing.

The 25 mile per hour speed limit is reinforced at numerous places with text markings on the pavement, suggesting that there may be a speeding problem along this roadway. Additional traffic calming measures may also be considered, provided that they make provisions for accommodating bicyclists.

Recommendations:

- ✓ Install SHARE THE ROAD (Bicycle) sign assemblies.
- ✓ Prioritize for pavement repair and/or resurfacing.
- ✓ Consider traffic calming to keep motorists at or below posted speed limit.

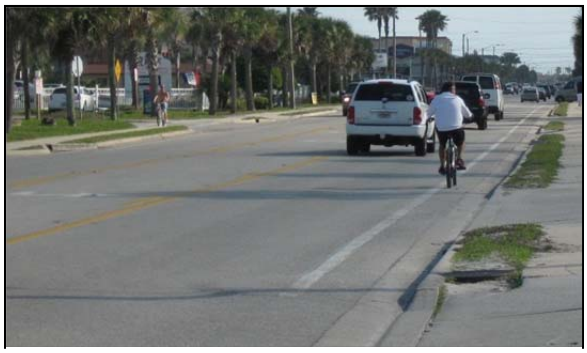


Figure 4.35: Existing shoulders are very narrow on CR A1A south of Pope Road.

County Road A1A from Pope Road to County Ocean Pier: 750 feet.

County Road A1A (A1A Beach Boulevard) is a two lane road with a two-way center left turn lane and a posted speed limit of 30 miles per hour. In the first 500 feet south of Pope Road, County Road A1A has open shoulders, between three and four feet wide, obscured in places in by heavy deposits of sands. This segment should be prioritized for debris removal and pavement maintenance. South of there (about at the driveway of the St. Augustine Beach front Resort on the east side) the existing lanes are 12 feet wide and flanked by two-foot wide shoulders (within a curb-and-gutter cross section). These dimensions could be modified to provide a three foot wide shoulder adjacent to 11 foot shoulder (wider shoulders could also be considered.) While the objective of this study is to help people get from St. Augustine to County Pier (which is only another 250 feet down the road) it is worth noting that this configuration continues through St. Augustine Beach for at least a mile (dimensions not field verified), and the recommendation for wider shoulders could also apply down the length of the beachfront corridor.

Recommendations:

- ✓ Prioritize for debris removal and pavement repair in open shouldered section.
- ✓ Re-stripe for at least three-foot wide shoulders in curb and gutter section.

North Loop

This alternate routing of Route 4 provides access to several destinations on the north side of State Road A1A, including the Hamilton Upchurch Park, and Lighthouse Park. It also allows travellers heading in to town to avoid crossing or turning left across State Rad A1A. This north loop is about 4% longer than the south loop (8,900 feet versus 8,500 feet), and also requires traveling along State Road A1A for approximately 500 feet between Ocean Way and Comares Avenue.

Red Cox Drive, from State Road A1A to Carver Street: 0.4 miles

Red Cox Drive is a local neighborhood street, but is subject to some traffic due to is proximity to State Road A1A and the presence of multiple destinations, including the Hamilton Upchurch Skate Park, R.B. Hunt School and its athletic fields, the St. Augustine Lighthouse Museum and Lighthouse Park. It has no centerline stripe. There are some areas of rough pavement along the edge of the roadwy: the road should be prioritized for pavement repair and/or resurfacing. Along the frontage of the soccer and baseball fields is a gravel parking area. On the day of the field review (a midweek afternoon in February) there were a considerable number of cars parked, and many of them were positioned very close to (or overhanging) the roadway. SHARED LANE MARKINGS could be installed to encourage bicyclist to position themselves away from the edge of pavement, increasing their visibility to vehicles backing out from the parking area into the street. Wheel stops could also be installed in the parking area, at least 20 feet from

the edge of pavement, which may encourage motorists to pull all the way off the street when parking.

Recommendations:

- ✓ Install SHARED LANE MARKINGS to position bicyclists away from parked cars.
- ✓ Prioritize for pavement repair and/or resurfacing.

Carver Street, from Red Cox Drive to Lighthouse Avenue: 240 feet

Carver Street is a local neighborhood street with no centerline stripe. It should be comfortable for most bicyclists. Its pavement is rough in places, so it should be prioritized for pavement repair and/or resurfacing.

Recommendations:

- ✓ Prioritize for pavement repair and/or resurfacing.

Lighthouse Avenue, from Carver Street to White Street: 600 feet

Carver Street is a local neighborhood street with no centerline stripe. It should be comfortable for most bicyclists. Its pavement is rough in places, so it should be prioritized for pavement repair and/or resurfacing.

Recommendations:

- ✓ Prioritize for pavement repair and/or resurfacing.

Lighthouse Avenue, from Carver Street to White Street: 600 feet

Lighthouse Avenue is a local neighborhood street with no centerline stripe and a posted speed limit of 20 miles per hour. It should be comfortable for most bicyclists. Its pavement is rough in places, so it should be prioritized for pavement repair and/or resurfacing.

Recommendations:

- ✓ Prioritize for pavement repair and/or resurfacing.

White Street, from Lighthouse Avenue to Magnolia Drive: 400 feet

White Street is a local neighborhood street with no centerline stripe. It should be comfortable for most bicyclists. Its pavement is rough in places, so it should be prioritized for pavement repair and/or resurfacing.

Recommendations:

- ✓ Prioritize for pavement repair and/or resurfacing.

Magnolia Drive, from White Street to Ocean Way: 550 feet

Magnolia Drive is a local neighborhood street with no centerline stripe. It should be comfortable for most bicyclists. Its pavement is rough in places, so it should be prioritized for pavement repair and/or resurfacing.

Recommendations:

- ✓ Prioritize for pavement repair and/or resurfacing.

Ocean Way, from Magnolia Drive to State Road A1A: 450 feet

Ocean Way is a local neighborhood street with no centerline stripe. It should be comfortable for most bicyclists. Its pavement is rough in places including a long seam where some utility work took place, so it should be prioritized for pavement repair and/or resurfacing.

Recommendations:

- ✓ Prioritize for pavement repair and/or resurfacing.

State Road A1A, from Ocean Way to Comares Avenue: 500 feet

State Road A1A is the primary route into St. Augustine from the southeast. As such, it is subject to higher traffic volumes which many bicyclists may find uncomfortable. At this location it is a four lane divided roadway with room for parking lanes on each side. On the northbound side, between Ocean Way and Comares Avenue, there are no parking spaces marked due to the presence of commercial driveways on the adjacent parcels. There is an area about 60 feet long on the southbound side, in front of the Sleep Inn hotel where parking is designated. If these southbound spaces were removed, bike lanes could be installed for 500 feet in order to facilitate continuing travel along the bike route. The parking areas are six feet wide where

Figure 4.36: Conversion of a short section of parking lane to a buffered bike lane would provide continuity for the bike route linking the North Davis Shores and Lighthouse Park neighborhoods.

marked, which is more than adequate space for a designated bike lane separated by a two foot wide buffer stripe.

Recommendations:

- ✓ Remove parking spaces in southbound shoulder just east of Comares Avenue.
- ✓ Designate four foot bike lanes, separated by two foot wide buffer stripes, in the shoulders of both sides of the roadway between Comares Avenue and Ocean Way.

Comares Avenue, between State Road A1A and Flagler Boulevard: 750 feet

Comares Avenue is a neighborhood street with a posted speed limit of 25 miles per hour and no centerline stripe. It is the location of several commercial establishments including a marina and the Conch House restaurant, and so is subject to some heavy traffic. The roadway is very wide, over 40 feet, and on street parking is common. The roadway surface is very rough in places and should be prioritized for pavement repair and/or resurfacing.

Due to the presence of commercial traffic and on-street parking, SHARED LANE MARKINGS could help reinforce the rightful place of bicyclists in the roadway and position them away from the door swing zone of parked cars. They should be centered about 11 feet away from the edge of the pavement in order to keep bicyclists clear of car doors.

Recommendations:

- ✓ Prioritize for pavement repair and/or resurfacing.
- ✓ Install SHARED LANE MARKINGS, centered 11 feet form edge of pavement.

Flagler Boulevard for Comares Avenue to Gerado Street: 0.5 miles

Flagler Boulevard is a local neighborhood street with a posted speed limit of 25 miles per hour, which closely parallels the commercial district along Anastasia Boulevard. The pavement is very bumpy in places and should be prioritized for repair and/or resurfacing. There are drainage inlet grates at most intersections with long slots that could catch the wheel of a bicycle turning on or off of Flagler Boulevard. These grates should be replaced with a type of a more bicycle friendly design.

Vehicles travelling along Flagler Boulevard are required to stop at Mantanzas Boulevard, Arredondo Avenue, and Zorayda Avenue. Consideration should be given to changing the priority at Mantanzas Boulevard and Zorayda Avenue. Such changes would require a traffic study and input from the residents of the neighborhood.

Recommendations:

- ✓ Prioritize for pavement repair and/or resurfacing.
- ✓ Rotate or replace the grates over the drain inlets at numerous locations.
- ✓ Consider changing priority at Mantanzas Boulevard and Zorayda Avenue.

Gerado Street, from Flagler Boulevard to Oglethorpe Boulevard: 300 feet

Gerado Street is a local neighborhood street with no centerline stripe. It should be comfortable for most bicyclists. Its pavement is rough in places, so it should be prioritized for pavement repair and/or resurfacing.

Recommendations:

- ✓ Prioritize for pavement repair and/or resurfacing.

Oglethorpe Boulevard, from Gerado Street to Saint Augustine Boulevard: 500 feet

Oglethorpe Boulevard is a local neighborhood street with no centerline stripe and a posted speed limit of 20 miles per hour. It should be comfortable for most bicyclists. Its pavement is rough in places, so it should be prioritized for pavement repair and/or resurfacing.

Recommendations:

- ✓ Prioritize for pavement repair and/or resurfacing.

Saint Augustine Boulevard, from Oglethorpe Boulevard to State Road A1A: 150 feet

Saint Augustine Boulevard is a local neighborhood street with no centerline stripe and a posted speed limit of 25 miles per hour. It should be comfortable for most bicyclists. Its pavement is rough in places, so it should be prioritized for pavement repair and/or resurfacing.

Recommendations:

- ✓ Prioritize for pavement repair and/or resurfacing.

Route 4X: Downtown to St. Augustine Beach Express

Length: Dolphin Drive to Old Quarry Road, 1.4 miles; Old Beach Road to Pope Road, 1.5 miles

Destinations Served: Hamilton Upchurch Neighborhood Park, Pope Road Park.

Intersecting Routes: 2

Sequence (west to east or south to north):

- From east end of Bridge of the Lions, east on State Road A1A to Old Quarry Road
- From Old Beach Road, South on State Road A1A to County Road A1A
- East on County Road A1A to Pope Road

Route 4X will provide a more direct option to head out of town to the south, for those bicyclists who are comfortable operating on busier roads and with less separation from motor vehicle traffic. This route also provides direct access to the business district along Anastasia Boulevard. The section between the Bridge of the Lions and Old Quarry Road is about ¼ mile shorter than the primary route between the same two points described in Route 4. The route between Old Beach Road and Pope Road is about 600 feet shorter than the route between the same two points using local streets described in Route 4.

Segment and Intersection Comments:

State Road A1A, from Dolphin Drive to Old Quarry Road: 1.4 miles:

State Road A1A is a four lane, divided roadway with a posted speed limit of 40 miles per hour. It is the principal route out of town to the southeast and is subject to heavy traffic volumes. Each side of the roadway includes two 13 foot wide travel lanes and a 6 foot wide parking lane. Unless the city considers removing parking from this section, there is not ample space for a bike lane on this corridor. SHARED LANE MARKINGS should be considered here to reinforce the rightful position of bicyclists in the roadway and position them away from the door swing zone of cars parked along the road. SHARED LANE MARKINGS have also been shown to move bicyclists off of the sidewalk, which has been observed as a conflict at least one local business. (N.B. The posted speed limit is 40 miles per hour, which is above the limit for use of SHARED LANE MARKINGS allowed for in FDOT's PPM. Application of SHARED LANE MARKINGS would be experimental for this high speed location and would require

Figure 4.37: Conflicts between pedestrians and bicyclists on the sidewalk may be reduced by installation of SHARED LANE MARKINGS.

coordination with and approval from FDOT.) If SHARED LANE MARKINGS are not employed, SHARE THE ROAD (W11-1 with W16-1P) or BICYCLES MAY USE FULL LANE (R4-11) signs may also alert motorists to the presence of bicycle on this roadway.

It is recommended that bike lanes be installed in the short section between Comares Avenue and Ocean Way, which overlaps the north loop of Route #4, as described above. This would require the removal of about 60 feet of parking marked on the road in front of the Sleep Inn hotel (which has its own off-street parking lot and likely little need for on-street spaces) on the southbound side of the road. There are no parking spaces marked on the northbound side of the road. This bike lane will help facilitate continuity of Route # 4 in this short stretch. Given the six foot width of the parking area, this bike lane could be four feet wide and separated form traffic by a two foot wide buffer stripe.

Recommendations:

- ✓ Consider SHARED LANE MARKINGS.
- ✓ Remove parking and install a four foot bike lane separated by a two foot buffer between Comares Avenue and Ocean Way.

State Road A1A, from Old Beach Road to County Road A1A (Old A1A:) 0.5 miles

State Road A1A is a four lane roadway with a two-way center left turn lane and a posted speed limit of 40 miles per hour. There are designated bike lanes on both sides of the road. Currently the bike lanes are four feet wide and adjacent to 12 foot wide travel lanes. If these travel lanes were reduced to eleven feet wide, then a two foot wide buffer could be installed between the outside lane and the bike lane, which may have the effect of attracting a broader range of bicyclists. (This configuration could also continue past the intersection with Old A1A to the intersection with State Road 312.)

Recommendations:

- ✓ Install 2-foot wide buffers between the existing bike lane and travel lanes narrowed to 11 feet each.

County Road A1A (Old A1A) from State Road A1A to A1A Beach Boulevard: 0.3 miles

Old A1A is a short two lane connecting roadway, which allows access between State Road A1A Beach Boulevard while avoiding the large intersection at State Road 312. It has an open shouldered cross section but only limited stretches of actual paved shoulder. Additional paved shoulders should be built to include bike lanes and better accommodate bicycle travel.

Recommendations:

- ✓ Build paved shoulder to provide bike lanes.

County Road A1A (A1A Beach Boulevard) from Old A1A to Pope Road: 0.7 miles

A1A Beach Boulevard is a two lane undivided with a posted speed limit of 45 miles per hour (reduces to 35 mph on approach to Pope Road). The pavement is roadway is 34 feet wide, configured with two 12 foot wide lanes and two five foot wide shoulders. While using this shoulder should be comfortable for many bicyclists, even more may enjoy a buffered bike lane four feet wide, separated by two foot wide buffer, adjacent to 11 foot wide general purpose lanes. It was also noted that the existing shoulders are rough in places, and subject to sand deposition as the road runs adjacent to the beach at the east end. This roadway should be prioritized for pavement repair and debris removal.

Figure 4.38: Windblown sand accumulates quickly on the shoulders of CR A1A.

Recommendations:

- ✓ Re-stripe roadway to include 4 foot bike lanes separated by a two foot buffer stripe, adjacent to 11 foot wide lanes.
- ✓ Prioritize for pavement repair and debris removal.

Route 5: Old City

Length: 1.25 miles

Destinations Served: Eddie Vickers Park, Gallimore Community Center, Maria Sanchez Lake, City Hall, Government Yard

Intersecting Routes: 3, 5X, 8, 2

Sequence (west to east or south to north):

- Sequence (west to east or south to north):
- From Eddie Vickers Park, east on Cerro Street to Oneida Street
- North on Oneida Street to Duero Street
- East on Duero Street to Washington Street
- North on Washington Street to South Street
- East on South Street to St. George Street
- North on St. George Street to Cordova Street
- North on Cordova Street to Cathedral Place

Route 5 extends through the Lincolnville and Old City Neighborhoods, providing a connection between two major parks—Eddie Vickers Park with its pool, recreational fields and community garden, and Maria Sanchez Lake Park—and City Hall, the Spanish Quarter and bike routes extending to the north and east.

Segment and Intersection Comments:

Cerro Street, from Riberia Street to Oneida Street: 950 feet

Cerro Street is a local neighborhood street with no centerline stripe. It should be comfortable for most bicyclists.

Oneida Street, from Cerro Street to Duero Street: 550 feet

Oneida street is a local neighborhood street with no centerline stripe and should be comfortable for most bicyclists. The pavement is very rough in locations and a considerable amount of leaf debris was observed on the street on the day of the field review. The roadway should be prioritized for pavement repair and regular debris removal should be scheduled.

There are two large oak trees in front of the house at 180 Oneida Street. The roots of these trees have caused some buckling of the pavement. The disturbed pavement is marked with yellow reflective pavement markers, which are very difficult to see in the shade of the trees. The disturbed pavement areas should be marked off with retro reflective white striping.

Recommendations:

- ✓ Prioritize for pavement repair or resurfacing.
- ✓ Schedule routine debris removal.
- ✓ Mark off the pavement disturbed by tree roots in front of 180 Oneida Street with white striping.

Duero Street from Oneida Street to Washington Street: 300 feet

Duero Street is a local neighborhood street and should be comfortable for most bicyclists. There are palm fronds and other vegetation hanging over the edge of the roadway at some locations. Regular trimming should be scheduled to minimize vegetative encroachments less than eight feet high.

Recommendations:

- ✓ Schedule routine trimming of overhanging palms and other plants to keep eight feet of vertical clearance over the edge of the roadway.

Washington Street from Duero Street to South Street: 600 feet

Washington Street is a local neighborhood street and should be comfortable for most bicyclists. There are palm fronds and other vegetation hanging over the edge of the roadway at some locations. Regular trimming should be scheduled to minimize vegetative encroachments less than eight feet high.

Recommendations:

- ✓ Schedule routine trimming of overhanging palms and other plants to keep eight feet of vertical clearance over the edge of the roadway.

South Street, from Washington Street to St. George Street: 350 feet

South Street has a posted speed limit of 25 miles per hour and should be comfortable for most bicyclists. The pavement condition is generally good, except for a rough joint where the roadway meets the bridge over the outlet of Maria Sanchez Lake.

Recommendations:

- ✓ Smooth the joints to the deck of the bridge over the lake outflow.

St. George Street, from South Street to Cordova Street: 550 feet

St. George Street has no centerline stripe and has a posted speed limit of 25 miles per hour. It should be very comfortable for most bicyclists.

Cordova Street, from St. George Street to Cathedral Place: 0.6 miles

Figure 4.39: Speed hump on Cordova Street is difficult to see in the shade.

Between St. George Street and St. Francis Street (along the bank of Maria Sanchez Lake), Cordova Street is a very narrow local street with a posted speed limit of 20 miles per hour and an open shoulder. It should be comfortable for most bicyclists. There are some locations on the west side of the road, typically near drainage structures, where the shoulder pavement is eroded and could be a concern if a cyclist (or motorist) left the roadway. These shoulder areas should be stabilized to reduce this risk. There are palms and other plants that occasionally hang into the roadway along this stretch; the plants should be trimmed back away from the roadside. A speed hump has been constructed across the roadway about midway up this block. The white pavement markings that highlight its presence are faded and it is consequently very difficult to see. These markings should be refreshed so that bicyclists are not surprised by the speed hump and thrown from their bicycles. The pavement is a little rough in spots, so the roadway should be prioritized for pavement repair and resurfacing.

North of St. Francis Street, the roadway widens to allow on-street parking is allowed one side of the street (west side between St. Francis Street and Bridge Street, east side between Bridge Street and King Street. SHARED LANE MARKINGS may be considered to help position bicyclists away from the door swing area of cars parked in these spaces. There is also a water valve lid in the roadway just south of Bridge Street which should be re-set so that it is flush with the pavement.

Figure 4.40: One way section of Cordova Street creates a discontinuity of bike route between Old City and Spanish Quarter.

Between King Street and Cathedral Place, Cordova Street is one way southbound. The possibility of an elevated bike lane was considered on the sidewalk areas on the east side of the street to facilitate connectivity with Bike Route #2, which connects to the Spanish Quarter, Vilano Beach and points north. However, this would have required the City to relocate the sidewalk further into the plaza and

provide appropriate northbound signals for the bicyclists, and was ultimately determined to be infeasible.

Consideration could also be given to allowing bicyclists to travel south through this intersection. This would require modifying the striping on the interior of the intersection, the installation of an EXCEPT FOR BIKES plaque next to the RIGHT TURN ONLY (R3-5) SIGNS and modification to the signal timing.

Recommendations:

- ✓ Re-apply the pavement markings on the speed hump between St. George Street and St. Francis Street.
- ✓ Schedule routine trimming of overhanging palms and other plants to the edge of the roadway clear.
- ✓ Stabilize shoulders along Maria Sanchez Lake.
- ✓ Prioritize for pavement repair and resurfacing.
- ✓ Re-set water valve lid south of Bridge Street so that it is flush with the pavement.
- ✓ Apply SHARED LANE MARKINGS between St. Francis Street and King Street.

Intersection of Cordova Street and King Street

Bicyclists turning left from southbound Cordova Street should be able to move to the left turn lane as it diverges out of the only through lane on approach to this intersection. The current lane markings feed left turns onto eastbound King Street into the left lane, which may be uncomfortable for some bicyclists if there are also heavy oncoming right turns from Northbound Cordova Street or the signal phasing allows continuous through movement along king street at any time during the green phase for King Street.

Currently neither northbound nor southbound through movements are allowed on Cordova Street at this intersection. Through movements for bicycles here would make it easier for bicyclists to continue north along Route 2 or come from Route 2 south onto Route 5. A northbound through movement could be facilitated with an elevated bike lane in the sidewalk area of Government Yard as described above. This would also require a leading-phase, bikes-only through signal and some clarifying signage directed at northbound Cordova Street. Southbound through movements would also require some modification of the gore area at the center of the intersection which currently forces turns for all Cordova Street movements. These possibilities were considered but determined to be infeasible.

Route 5X: Old City Express

Length: 0.75 miles

Destinations Served: Maria Sanchez Lake, St. Augustine National Cemetery, St. Augustine Municipal Marina, Bridge of the Lions

Intersecting Routes: 5, spurs , 4, 8

Sequence (west to east or south to north):

- East on South Street, from St. George Street to Marine Street
- North on Marine Street to Avenida Menendez
- North on Avenida Menendez to State Road A1A/ State Rad 5A

Route 5X provides access through the Old City neighborhood along its east side, bypassing some of the Downtown congestion. It is has more automotive traffic than Cordova Street and so may be more suitable for more road-savvy bicyclists.

Segment and Intersection Comments:

South Street, from St. George Street to Marine Street: 400 feet

South Street is a narrow low volume, low speed street and should be comfortable for most bicyclists to ride on. There a numerous overhanging palms and other plants, especially along the north side of the street. These should be trimmed regularly so that they do not encroach upon the path of travel of bicyclists toward the outside of the road.

Recommendations:

- ✓ Schedule routine trimming of overhanging palms and other plants to the edge of the roadway.

Marine Street, from South Street to Avenida Menendez: 0.3 miles

Marine Street is a narrow street with no centerline stripe and a posted speed limit of 20 miles per hour. The National Cemetery and the National Guard Headquarters are both located on Marine Street, and it is likely subject to more motor vehicle traffic than the surrounding neighborhood street. There are patches of rough pavements and occasional utility access lids that are not flush with the surrounding pavement. Marine Street should be prioritized for pavement repair and resurfacing, and access lids should be made flush.

- ✓ Prioritize for pavement repair and resurfacing.
- ✓ Re-set water utility lids so that they are flush with the pavement.

Avenida Menendez, from Marine Street to State Road A1A: 0.3 miles

Avenida Menendez is a two-lane roadway with parallel parking spaces marked on both sides of the street. Due to its proximity to the center of town and the parking spaces, it may feel more congested and be experienced as a somewhat challenging environment for bicyclists. SHARED LANE MARKINGS would help reinforce the rightful presence of bicyclists in the roadway and also help position them away from the door swing zones of cars parked along the roadway.

Figure 4.41: On-street parking and congestion may make Avenida Menendez challenging for some bicyclists.

Recommendations:

- ✓ Apply SHARED LANE MARKINGS.

Route 6: South Side

Length: 4.7 miles

Destinations Served: Flagler Hospital, Ron Parker Park

Intersecting Routes: Spurs, 1, 6X, 4

Sequence (west to east or south to north):

- From State Road 207, west on State Road 312 to Plantation Island Drive
- South, then east, on Plantation Island Drive to Mizell Road
- South on Mizell Road to Pope Road
- East on Pope Road to Santander Street

Route #6 is an east/west route across the south side of town, connecting State Road 207 and the Flagler Hospital area with Anastasia State Park and St. Augustine Beach.

Segment and Intersection Comments:

State Road 312, from State Road 207 to Plantation Island Drive: 2.5 miles

State Road 312 is a four lane, divided highway with a posted speed limit of 45 miles per hour. The roadway currently has shoulders wide enough to be designated as bike lanes. Due to the speed and volume of traffic on this roadway, however, many bicyclists may still be uncomfortable riding along State Road 312. Throughout most of the segment, each side of the roadway includes two twelve foot wide travel lanes adjacent to either four foot wide or five foot wide shoulders (depending on whether a specific section has curb-and-gutter or is open shouldered). The shoulders do change in some places. There is a bridge over railroad tracks between SR 207 and Lakeside Avenue, upon which the shoulders widen to 7 feet. Between Old Moultrie Road and US 1, the roadway narrows somewhat so that the shoulders are only two feet wide. The bridge over the Matanzas River currently includes seven foot wide shoulders, which are marked with diagonal striping.

The roadway could be re-striped to create buffered bike lanes (set apart by at least a two foot buffer) adjacent to 11 foot wide travel lanes in all but the section between Old Moultrie Road and State Road 5/US1. It is also possible that this narrower section could be re-striped so that it includes 4-foot wide bike lanes adjacent to 11 foot wide travel lanes. If this re-striping between Old

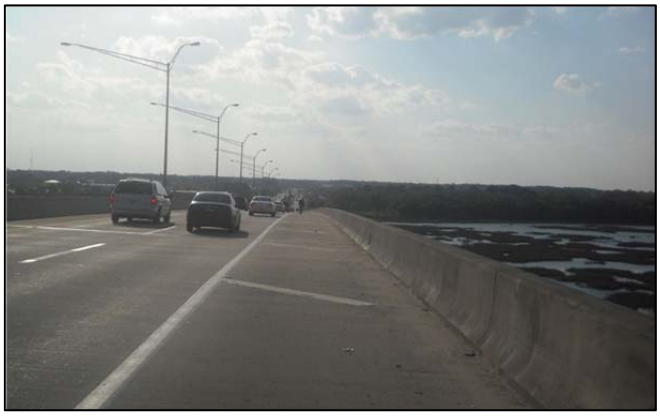


Figure 4.42: Opportunities for buffered bike lanes are found along SR 312, including on the deck of the Matanzas River Bridge.

Moultrie and US is possible, then SHARED LANE

MARKINGS should be applied through this constrained section.

The shoulders on the Matanzas River bridge should marked as buffered bike lanes.

The existing shoulders are improperly marked (to serve as bike lanes) through several of the intersections along this section, as they stay on the right side of the roadway, even as right turn only lanes are introduced. This condition is present on the eastbound approaches to the intersections with Tingle Court and CBL Drive, the shopping center entrance (Chili's restaurant) immediately east of State Road 5/ US 1, Sgt. Tutten Drive and Plantation Island Drive; and on the westbound approaches to State Road 207, and State Road 5/ US 1. These shoulders should be re-marked in accordance with Florida DOT Standard Index sheets. The shoulders narrow significantly or completely disappear at several locations including on the eastbound approaches to Old Moultrie Road and State Road 5, and on the westbound approach to Old Moultrie Road. These approaches should be marked with SHARED LANE MARKINGS to provide for some continuity of bicycle travel guidance through these constrained sections.

Figure 4.43: Shoulders are improperly marked to the right of right-turn only lanes at several locations along SR 312.

Recommendations:

- ✓ Mark existing shoulder as bike lanes.
- ✓ Buffer bike lanes with a two-foot wide buffer stripe between the bike lane and the adjacent through lanes through most of the segment.
- ✓ Consider re-striping between old Moultrie and Stare Road 5/US 1 to include bike lanes.
- ✓ Re-stripe as needed at intersections to place the bike lane to the left of the right turn only lanes.
- ✓ Install SHARED LANE MARKINGS where cross section is too narrow for bike lanes

Plantation Island Drive, from SR 312 to Mizell Road: 0.7 miles

Plantation Island Drive is a two lane roadway, along which are situated many commercial and office parcels as well as retirement community and condominium complex. The speed limit is not posted, and so is presumed to be 25 miles per hour. The roadway is 24 feet across, and is lined with curb-and-gutter over its entire length. There are some rough patches of pavement near the entry drive for the Allegro Retirement Community (1101 Plantation Island Drive), which should be repaired at the earliest opportunity, but overall the roadway should work well as it is for most bicyclists.

Recommendations:

- ✓ Prioritize for pavement repair.

Mizell Road, from Plantation Island Drive to Pope Road: 0.1 miles

Mizell Road is a two lane roadway with a posted speed limit of 30 miles per hour. Between Plantation Island Drive and Pope Road it has an open shouldered cross section it has an open shouldered cross section. It probably functions well for most bicyclists in its present condition, but widened shoulders would certainly improve bicycle accommodation.

Recommendations:

- ✓ Prioritize for widened shoulders.

Pope Road from Mizell Road to Santander Street: 0.75 miles.

Between Mizell Road and State Road A1A, Pope Road is two lanes wide with a posted speed limit of 25 mile per hour. The road is 22 feet wide with an open shouldered cross section. The pavement is rough in a few places, especially near the entry drive for the Coquina Lakes condominiums. Widened shoulders and pavement repairs would improve bicycle accommodations on this roadway, but the roadway likely accommodates most bicyclists in its present condition.

Recommendations:

- ✓ Prioritize for widened shoulders.
- ✓ Prioritize for pavement repair.

Pope Road, between SR A1A and Santander Street Beach Road: 0.6 miles

Pope Road is a two lane roadway with a posted speed limit of 25 miles per hour. There is an eight foot wide pathway along the north side of the road, which is likely used by many bicyclists. Many bicyclists will also feel comfortable riding in the road, and may prefer the road if the pathway is occupied by pedestrians and other users. An assembly of W11-1 (BICYCLE WARNING) and W16-1 (SHARE THE ROAD) will reinforce to motorists that bicyclists may use either facility.

Pope road has an open-shouldered cross section, and a widened shoulder would be a possible first recommendation for such a road in most circumstances. Given the proximity of the pathway on the

north side grading to accommodate shoulders may be challenging and expensive. The existing shoulders are very rough in places, so the roadway should be prioritized for pavement repair and ultimate resurfacing.

The 25 mile per hour speed limit is reinforced at numerous places with text markings on the pavement, suggesting that there may be a speeding problem along this roadway. Additional traffic calming measures may also be considered, provided that they make provisions for accommodating bicyclists.

Recommendations:

- ✓ Install SHARE THE ROAD (Bicycle) sign assemblies.
- ✓ Prioritize for pavement repair and/or resurfacing.
- ✓ Consider traffic calming to keep motorists at or below posted speed limit.

Route 6X: South Side Express

Length: 1.25 miles

Destinations Served: Flagler Hospital, St. Augustine Beach

Intersecting Routes: Spurs, 6, 4, 4X

Sequence (west to east or south to north):

- From Plantation Island Drive, west on SR 312 to SR A1A
- Continue west on CR A1A to Santander Street.

Route #6x is an east/west route express route that allows a more direct connection from via SR 312 between Flagler Hospital and St. Augustine Beach. This may be preferable to more experienced bicyclists who are comfortable riding on multi-lane, divided roadways.

Segment and Intersection Comments:

State Road 312, from Plantation Island Drive to State Road A1A:1 mile

State Road 312 is a four lane, divided highway with a posted speed limit of 45 miles per hour. The roadway currently has shoulders wide enough to be designated as bike lanes. Due to the speed and volume of traffic on this roadway, however, many bicyclists may still be uncomfortable riding along State Road 312. Throughout the segment, each side of the roadway includes two twelve foot wide travel lanes adjacent to either five foot wide shoulders

The roadway could be re-striped to create buffered bike lanes (set apart by at least a two foot buffer) adjacent to 11 foot wide travel lanes .

The existing shoulders are improperly marked (to serve as bike lanes) through both of the intersections along this section, at Mizell Road and at State Road A1A, as they stay on the right side of the roadway, even as right turn only lanes are introduced. These shoulders should be re-marked in accordance with Florida DOT Standard Index sheets.

Recommendations:

- ✓ Mark existing shoulder as bike lanes.
- ✓ Buffer bike lanes with a two-foot wide buffer stripe between the bike lane and the adjacent through lanes.
- ✓ Re-mark intersections so that bike lanes are properly positioned to the left of right-turn-only lanes.

County Road A1A, from State Road A1A to Santander Street: 25 miles

In the short stretch between State Road A1A and Santander Street, County Road A1A transitions from being a four lane, divided roadway to a two lane undivided roadway. The roadway has is a four lane divided highway with marked bike lanes between State Road A1A and Old Beach Road, and narrows to two lanes (with bike lanes)east of Old Beach Road. The bike lanes east of old beach are already effectively buffered by a diagonally striped area between the travel lanes and the bike lane as the road winds through a broad turn and narrows to two lanes. All present configurations are likely adequate to accommodate bicyclists who would choose this route over Pope Road to the south.

Route 8: Downtown to West Augustine Park

Length: 2.5 miles

Destinations Served: West Augustine Park, Solomon Calhoun Community Center, St. Augustine Little League Park, Chase Field, Gary Lee Park, Post Office, Parque de Menendez, City Hall, Government Yard, Plaza de la Constitucion,

Intersecting Routes: 1, 1X, 3, 2, 5, 4, spurs

Sequence (west to east or south to north):

- From West Augustine Park, North on Duval Street to West King Street
- East on West King Street to St. George Street

Route 8 provides access between West Augustine and Downtown, linking neighborhoods west of Downtown to the Spanish Quarter, the Old City, and bike routes extending to points east and north.

Segment and Intersection Comments:

Duval Street, from West Augustine Park to West King Street: 0.8 miles

Duval Street is a local neighborhood street with no centerline stripe and a posted speed limit of 25 miles per hour. It should be a very comfortable roadway for most bicyclists, however there are some indications that it may be subject to frequent speeding by motor vehicles and heavy cut through traffic. At the north end of the street, near the intersection with King Street, there are text markings on the pavement reinforcing the 25 mile per hour speed limit. It appears to be the primary north-south route through this neighborhood, and connects King Street to State Road 207 via West Augustine Park and Osceola Elementary Road, subjecting it to automotive cut-through traffic.

The roadway provides an important direct link for bicyclists as well, and so is appropriate to be signed as a bike route. Given the likely speeding issues and cut through problems, additional traffic calming measures would assist in making the roadways more bike friendly. Speed tables, provided they are designed with bicycle friendly profiles, or divided to leave gaps for bicycle travel, may be appropriate.

St Johns County has a project underway to convert Duval Street into a one-way northbound street with a bike lane, pairing it with a redesigned St Johns Street (one block west) which would be a one way southbound street, also with a bike lane. This modification will be very accommodating of bicycle travel.

Recommendations:

- ✓ Complete the planned Duval/St. Johns Street Bike Lanes.
- ✓ Consider additional traffic calming approaches such as bicycle-compatible speed tables.

King Street from St. Johns Street to St. George Street: 1.6 miles

Between St. Johns Street and Whitney Street, King Street is a two lane, open shouldered roadway with a posted speed limit of 35 miles per hour. The roadway appears to have been recently resurfaced, establishing a total "new" roadway width of 28 feet. The roadsides are lined with white edge stripes adjacent to twelve-foot wide lanes, leaving narrow shoulders—1.5-2 feet wide—outside the lines. The edge stripes are of an "audible and vibratory pavement marking" type that includes thermoplastic extruded over "audible bumps" (discs 2.5 inches in diameter and 0.45 inches thick) to create an audible warning when cars pass over the line. The narrowness of the shoulders and the vibratory edge lines combine to create a very difficult situation for bicyclists. The shoulder is not wide enough to be designated a bike lane, and is also too narrow to function as an undesignated bike shoulder (according the AASHTO *Guide for the Development of Bicycle Facilities* the minimum essential operating space of a bicycle is 40 inches). The audible edge lines also inhibit the ability of bicyclists to move between the shoulder and the travel lane, which is essential even for bicyclists using a full width shoulder—to avoid occasional debris, set up left turns, pass slower bicyclists, etc. — or riding in the travel lane who may need to pull over or move away from a motorist who passes uncomfortably close to them. There are portions locations where the shoulders are wider, but areas beyond the two feet right of the edge stripe were not resurfaced, leaving an uneven transition between the new and old surfaces. The pavement on the older surface is frequently deteriorated, limiting its utility to bicyclist, and is frequently the location of parked cars and drainage inlets.

Figure 4.44: Audible pavement markings and a narrow shoulder make biking on West King Street very challenging.

Figure 4.45: Drainage inlets near the narrow shoulder can catch the wheel of a bicycle.

The current roadway configuration should be modified to improve safety for bicyclists. The shoulders on the roadway could be widened, at least to the inside edge of the drainage grates, and the shoulder width should be widened to an absolute minimum of three feet. Lane widths on the roadway could also be narrowed to 11 feet, which could leave a three foot shoulder on the existing new pavement, or a four foot shoulder (wide enough to designate as a bike lane) if widened to the drainage inlets.

If lane widths

were narrowed to 10 feet, the existing new pavement could include a four foot shoulder, able to be designated as a bike lane. Unless the vibratory edge lines were installed to address a documented problem with run-off-the road crashes, they should be removed. If they are present in response to an established safety problem, they should be moved to the extreme outside edge of the roadway and SHARED LANE MARKINGS should be installed on the roadway (unless width of the resulting lanes exceeds 14 feet).

There are numerous large drain inlets within the shoulders on both sides of the street between Duval Street and Whitney Street, the grates of which are often loosely fitted, leaving large slots and openings into which bicycle wheels could become stuck. Each of these grates should be inspected closely for ways to minimize the open slots along their edges. Foam rubber filling strips, such as those sometimes used on railroad crossings, could be installed. The sides of these grates closest to the road should be marked as obstructions with tapered white striping to guide bicyclists away from them, especially if the roadway shoulders are widened to be designated as bike lanes.

Between Whitney Street and State Road 5/ US 1, King Street is lined with curb-and-gutter, with sidewalks at the back of the curb and a posted speed limit of 25 miles per hour. The roadway varies between 22 and 24 feet in width, leaving no potential for bike lanes. The roadway is very busy, however, as it is a principal corridor heading out of town to the west, and, given its narrowness, feels very intimidating for many bicyclists. It is also an important east-west link for bicyclists, one of the few continuous east-west streets connecting downtown to the San Sebastian neighborhood and West Augustine. SHARED LANE MARKINGS should be installed, to reinforce the rightful place of bicyclists in the roadway on this important connecting route.

East of State Road 5, King Street is also designated as State Road 5A. Between State Road 5 and Cordova Street, it is a two way, two lane roadway, with alternating center left turn lanes and a posted speed limit of 25 miles per hour. There is insufficient space within the existing cross section for bike lanes. SHARED LANE MARKINGS would be effective at reinforcing the rightful place of bicycles in the roadway.

The pavement is rough in portions of this section, and it should prioritized for routine maintenance and/or resurfacing.

At the intersection with Cordova Street, King Street becomes a one-way (eastbound) roadway with on-street parking on both side of the street and two through lanes. Unless on-street parking is removed, there is no room in the existing cross section for bike lanes. SHARED LANE MARKINGS could be installed, potentially in both lanes, to reinforce the proper position of bicycles in the roadway and clear of the door swing zone of cars parked along the right hand side of the roadway. There is a grate at the intersection of King Street and Cordova Street, which has slots aligned parallel king street. This should be replaced with a grate that is traversable by a bike coming from any direction.

Route 8 ends at St. George Street, where it meets with routes 2 and 4. Westbound, Route 8 follows Cathedral Place from St. George Street to Cordova Street, which coincided with a

portion of Route 2, described above, and then Cordova Street, between Cathedral Place and King Street, which coincides with a portion of Route 5, described above.

Recommendations:

- ✓ Remove raised pavement markings west of Whitney Street.
- ✓ Widen shoulder and/or narrow lanes to create bike lanes west of Whiney Street.
- ✓ Investigate ways to mark around drainage inlets and fill gaps around grates.
- ✓ Install SHARED LANE MARKINGS between Whitney Street and State Road 5/US 1.
- ✓ Install SHARED LANE MARKINGS between State Road 5 and Cordova Street.
- ✓ Install SHARED LANE MARKINGS between Cordova Street and St. George Street.
- ✓ Replace grate at intersection with Cordova Street.

Spur Routes

The remaining route descriptions are of spur routes, which are not part of the primary sequences described above, but make connections from those sequences to other sequences or to single destinations. They are organized in alphabetical order, and include just the bulleted recommendations.

Anastasia Park Rd, from State Road A1A to end

Recommendations:

- ✓ Remove advance rumble strips on westbound approach to intersection with Flamingo Drive, or modify to provide at least 18 inches of smooth surface on right side of road.
- ✓ Prioritize for pavement repair or resurfacing.

Figure 4.46: Advance Rumble Strips on Anastasia Park Road make for rough riding on a bicycle.

Arricola Avenue, between Matanzas Boulevard and Moultrie Place

Recommendations:

- ✓ Prioritize for pavement maintenance and resurfacing.
- ✓ At next resurfacing, mill pavement so that finished surface is flush with gutter pan at edge.

Big Joe Lane, between Masters Drive and End

Recommendations:

- ✓ Prioritize for pavement maintenance and resurfacing.

West Castillo Drive, between State Road 5/ US 1 and Orange Street

Recommendations:

- ✓ Apply SHARED LANE MARKINGS.
- ✓ Mark intersection pavement at Riberia Street to discourage blocking of intersection (see Route # 3).

Charlotte Street, between Cuna Street and State Road A1A

Recommendations:

- ✓ Prioritize for pavement maintenance and resurfacing.

Comares Avenue, between Flagler Boulevard and Alcazar Street

Recommendations:

- ✓ Install SHARED LANE MARKINGS 11 feet from the edge of pavement.
- ✓ Prioritize for pavement repair and/or resurfacing.

Cuna Street, between Spanish Street and St. George Street

Recommendations:

- ✓ Prioritize for pavement repair and/or resurfacing.

Cuna Street, between Cordova Street and Spanish Street

Recommendations:

- ✓ Brick street, indicate as such on map.

Cuna Street, between St. George Street and Charlotte Street

Recommendations:

- ✓ Brick street, indicate as such on map.

Douglas Avenue, between Milton Street and Genopoly Street

Recommendations:

- ✓ None.

Flamingo Drive, between Anastasia Park Drive and Lew Boulevard

Recommendations:

- ✓ Prioritize for pavement repair and/or resurfacing.

*Fort Mose Trail, between State Road 5/ US 1 and end***Recommendations:**

- ✓ Prioritize for pavement repair and/or resurfacing.

Genopoly Street, between State Road 5A and Douglas Avenue

Recommendations:

- ✓ Prioritize for pavement repair and/or resurfacing.

Figure 4.47: Pavement is very rough along Genopoly Street.

Grant Street, between Institute Street and State Road 16

Recommendations:

- ✓ Fill gaps or replace storm drain grates at the intersection with Center Street.
- ✓ Consider changing priority at Gabriel Street, Center Street, Pacific Street, and/or Waldo Street to reduce delay for bicyclists.

Grove Avenue, between State Road 5/ US 1 and Riberia Street

Recommendations:

- ✓ Prioritize for pavement repair and/or resurfacing.

Figure 4.48: Gaps in a drainage inlet near Grant and Center Streets can catch a bicycle wheel.

Hypolita Street, between Cordova Street and State Road A1A

Recommendations:

- ✓ Prioritize for pavement repair and/or resurfacing.

Inlet Drive, between Alcazar Street and Oglethorpe Boulevard

Recommendations:

- ✓ Prioritize for pavement repair and/or resurfacing.

Institute Street, between State Road 5./US 1 and State Road 5A

Recommendations:

- ✓ Prioritize for pavement repair and/or resurfacing.
- ✓ Rotate or replace grate adjacent to the commercial driveway near the northeast corner. of the intersection with Ponce de Leon Boulevard (State Road 5/ US 1).

Lew Boulevard, between Red Cox Drive and Flamingo Drive

Recommendations:

- ✓ Prioritize for pavement repair and/or resurfacing.

Magnolia Avenue, between State Road A1A and Nelmar Avenue

Recommendations:

- ✓ Prioritize for pavement repair and/or resurfacing.

Magnolia Avenue, between Nelmar Avenue and Milton Street

Recommendations:

- ✓ Prioritize for pavement repair and/or resurfacing.

Magnolia Avenue, between Nelmar Avenue and Milton Street

Recommendations:

- ✓ Prioritize for pavement repair and/or resurfacing.

Malaga Street, between King Street and State Road 5/US 1

Recommendations:

- ✓ Apply SHARED LANE MARKINGS to position bicyclists away from parked cars.
- ✓ Prioritize for pavement repair and/or resurfacing.

Marine Street, between South Street and end

Recommendations:

- ✓ Prioritize for pavement repair and/or resurfacing

Milton Street, between Magnolia Avenue and Douglas Avenue

Recommendations:

- ✓ Prioritize for pavement repair and/or resurfacing.

N Moultrie Place, between Flagler Boulevard and Anastasia Boulevard

Recommendations:

- ✓ Prioritize for pavement repair and/or resurfacing.
- ✓ Improve markings at N Moultrie Place and Flagler Boulevard to clarify who must stop for whom.

S Moultrie Place, between Arricola Avenue and Anastasia Boulevard

Recommendations:

- ✓ Prioritize for pavement repair and/or resurfacing.
- ✓ Improve markings at N Moultrie Place and Arricola Ave to clarify who must stop for whom.

Nelmar Avenue, between Magnolia Avenue and Magnolia Avenue

Recommendations:

- ✓ Prioritize for pavement repair and/or resurfacing.

Oglethorpe Boulevard between Gerado Street and Inlet Drive

Recommendations:

- ✓ Prioritize for pavement repair and/or resurfacing.
- ✓ Rotate or replace grates at intersections.

Orange Street, between Riberia Street and Cordova Street

Recommendations:

- ✓ Prioritize for pavement repair and/or resurfacing.

Osceola Elementary Road

Recommendations:

- ✓ Install SHARED LANE MARKINGS.
- ✓ Investigate future widening of shoulders to carry bike lanes.

San Carlos Avenue between State Road 5/ US 1 and State Road A1A

Recommendations:

- ✓ *Install SHARED LANE MARKINGS*

San Carlos Avenue between State Road A1A and Magnolia Avenue

Recommendations:

- ✓ Prioritize for pavement repair and/or resurfacing, and debris removal.

San Marco Avenue (State Road 5A) between May Street and Picolata Drive

Recommendations:

- ✓ Install SHARED LANE MARKINGS.

Sebastian Harbor Drive, between Malaga Street and Riberia Street

Recommendations:

- ✓ Prioritize for pavement repair and/or resurfacing.

Sergeant Tutten Drive, between Health Park Drive and State Road 312

Recommendations:

- ✓ Install SHARED LANE MARKINGS.
- ✓ Prioritize for pavement repair and/or resurfacing.

Spanish Street, between Treasury Street and Hypolita Street and between Cuna Strret and Tolomato Lane

Recommendations:

- ✓ Replace grate in the middle of the intersection of Spanish Street and Hypolita Street.
- ✓ Prioritize for pavement repair and/or resurfacing.

State Road 207 between Trailhead 1 mile east of Vermont Boulevard to State Road 5/ US 1

Recommendations:

- ✓ Re-stripe the roadway to include a four foot wide shoulder, separated by a three foot wide buffer from two 11-foot wide lanes.

Tolomato Lane, between Spanish Street and Cordova Street

Recommendations:

- ✓ Prioritize for pavement repair and/or resurfacing.

Treasury Street, between Spanish Street and Cordova Street

Recommendations:

- ✓ Prioritize for pavement repair and/or resurfacing.

University Boulevard, between Sergeant Tutten Drive and end

Recommendations:

- ✓ Prioritize for pavement repair and/or resurfacing.

Vilano Road, between Coastal Highway and Vilano Fishing Pier

Recommendations:

- ✓ Mark around the longitudinal slot drains at all curb inlets.
- ✓ Install SHARED LANE MARKINGS to position bicyclists away from the slot drains.

5. Bike Parking

The need for bicycle parking is evident throughout St. Augustine. The lack of secure parking space keeps many people from using their bikes for basic transportation or forces the use of make-shift bike rack. Leaving a bicycle unattended, even for short periods, can easily result in damage or theft and some bicycle rack designs may cause damage to bicycles. The Association of Pedestrian and Bicycle Professionals (APBP) has published bicycle parking guidelines which describe the characteristics of effective bicycle parking infrastructure. [1] This recently updated guide is a best practices review and offers a great deal of information about how to best address the parking needs of bicyclists. Regardless of trip purpose, people must be able to secure their bikes at their final location, be it at a transit stop or at a location close to their workplace.

Much of the downtown area bicycle parking need is by employees who ride their bicycles to work and park their bicycles for an entire work day. Therefore, consideration should be given to providing the shelter and added security recommended by APBP for long term parking, such as the installation of lockers or use of indoor locations where feasible. Sheltered parking may be infeasible at many locations, but secure bike racks can be installed at most locations with an identified bicycle parking need. In addition to full-scale bike lockers, there are a variety of other long term options that may satisfy the City's needs on a smaller budget. The following sections describe options for both short and long term bicycle parking and illustrate examples of each.

Short Term Bicycle Parking

All short term bike racks should meet the following usability criteria: support the bicycle in two places, allow the frame and the wheel to be secured, and allow front or back-in parking.

Many designs for bike racks exist and some communities may use bike racks as an opportunity to combine form and function as public art as well as serving a need. Standard options include the inverted U design and the post and ring. An inverted U rack, either singly or in series, is space-efficient or allows bicycles to be secured to the racks in two places, supporting the frame. A single U rack can park two bicycles. A post and ring rack may be useful in locations where space is tight. This rack allows two bicycles to be parked at a time and encourages proper use with its intuitive design. Photos of these two rack types are shown in Figures 5.1 and 5.2.

Figure 5.1: Inverted U Bike Racks

Figure 5.2 Post and Ring Bike Racks

[1] Bicycle Parking Guidelines, 2nd Edition, Association of Pedestrian and Bicycle Professionals, 2010 (http://www.apbp.org/?page=Publications)

To best accommodate bicycles and the riders as they maneuver their bicycles into racks, a minimum of 36 inches from center of rack to center of rack is recommended; 48 inches is preferred. It is also important that all bicycle parking be situated in such a way that the parked bicycles do not interfere with basic pedestrian mobility along sidewalks or otherwise compromise compliance with the Americans with Disabilities Act (ADA).

Though on-street parking is limited in St. Augustine, turning a street parking space into bike parking for up to 10 bicycles may be an option if appropriate sites can be identified. This concept, known as a bike corral, can also be used for parking spaces on a parking lot. Such facilities may be most appropriate for locations with especially plentiful bicycle traffic. An example of a bike corral is shown in Figure 5.3.

Figure 5.3: Bike Corral

Long Term Bicycle Parking

There are a variety of long term bicycle parking options available depending on demand and budget. Because bicycles are left for a longer period of time, security becomes a primary concern. Important considerations for long-term parking include the following: controlled access, weather protection, and lighting.

Options for long term parking include “clam shells” (Figure 5.4), bike lockers (Figure 5.5), and bike cages in parking garages. Bike lockers tend to be part of a long term parking program. Users frequently pay rent and complete rental agreements.

Figure 5.4: Clam Shell Bicycle Parking

Figure 5.5: Bike Locker

Event Bicycle Parking

In many cases, providing bicycle parking at events is a good way to encourage an alternative mode of transportation to events. There are a number of ways to provide event parking: valet, attended and unattended. Similar to vehicle valet parking, valet bicycle parking allows riders to leave their bicycles for parking in an appropriate location and provides a supervised location for parking. Attended parking may have some supervision, upon checkout for example, but the bicyclist may be responsible for parking his or her own bicycle. Unattended parking simply means the provision of bicycle racks.

Bike Parking Inventory and Recommendations

Bike parking was surveyed as part of the plan's field reviews. This field survey confirmed the need for increased bike parking options within the City. Bicycles are frequently locked to available trees and poles in addition to being locked in the existing bicycle racks where they are available. Ample parking is available at Flagler College and the occasional rack is provided behind local business in parking lots behind St. George Street. However, the need for additional bicycle parking was evident along St. George Street and in parking lots behind some of the retailers and restaurants throughout downtown.

Existing bike rack locations and types were noted and locations for additional bike parking were also identified. Both existing and proposed locations are identified on the maps. All existing locations are recommended to be improved to either "inverted U" or post and ring type racks. The spreadsheet published in **Appendix A** lists the locations of both existing and improved bike parking, notes the type of existing hardware and recommends, capacities for both (improved) existing and proposed locations. The recommendations identify 108 distinct locations for bicycle parking facilities and a total capacity of 607 bicycles.

In addition to the specific locations identified in the Appendix, it is also recommended that the City and County coordinate with the Sunshine Bus Service to include bicycle parking at all improved bus stop locations (where pads and/or shelters are constructed.) While long term parking types may be most appropriate for someone leaving their bike behind when boarding a bus, any of the recommended rack types would be useful and may be advisable for spatial considerations at a given location. At least one U-type rack would be useful at most stops, while up to four U-type racks might be advisable at multi-line stops or transfer points.

Photo Credits

Figure 5.1: http://boulderspace.files.wordpress.com/2008/03/bike_rack_photo.jpg
Figure 5.2: http://mattbimages.com/images/bike-rack-bw-3120.jpg
Figure 5.3: http://303cycling.com/files/bike-corral.jpg
Figure 5.4: http://austinontwowheels.org/2009/04/15/capital-metro-to-test-bike-lockers-at-park-and-ride/bikelidtrypic.jpg
Figure 5.5: http://www.ci.minneapolis.mn.us/bicycles/bikeparking-lockers.asp

6. Bicycle Crash Analysis

To better understand the bicycling safety issues within the City of St. Augustine, a crash analysis using bicycle crash data from the years 2005 through 2009. Eighty-four bicycle crash reports were reviewed. A summary of findings associated with the crash data is provided below.

It is important to note that not all bicycle crashes are reported and of those that are reported only a limited sample is included in this dataset. It is likely that some bicycle crashes occurred in which neither of the participants was injured and no report was filed. Additionally, it is possible that some non-injury crashes with minimal property damage are not included in the database of crashes that was reviewed.

Distribution of Crashes

The geographic distribution of crashes in the study area is shown in Figure 6.1 on the following page. Of interest is that no crashes were reported within the interior of the City of St. Augustine east of the Bridge of the Lions. It is unclear why this would be the case. One could hypothesize that this is likely to be the case for two reasons. First, A1A has bike lanes or (often) underutilized on-street parking they can use when riding along A1A. Second, there is an off A1A network of roadways through neighborhoods that cyclists may be using to access their destinations. While the latter is true west of the bridge as well, the routes to destinations tend to be more direct than on the west side of the bridge; thus, local routes may be more widely used. It is also possible that bicycling is more common west of the Bridge of the Lions resulting in greater exposure of cyclists.

Crash Characteristics

Injury Severity - Of the 84 bicycle crashes reviewed, 32 crashes (38%) involved no injury or a possible (non-documented) injury (Figure 6.2). Thirty-nine crashes (46%) resulted in non-incapacitating injuries. Twelve of the crashes (14%) resulted in incapacitating injuries. There was one fatal bike crash during the 2005 - 2009 period.

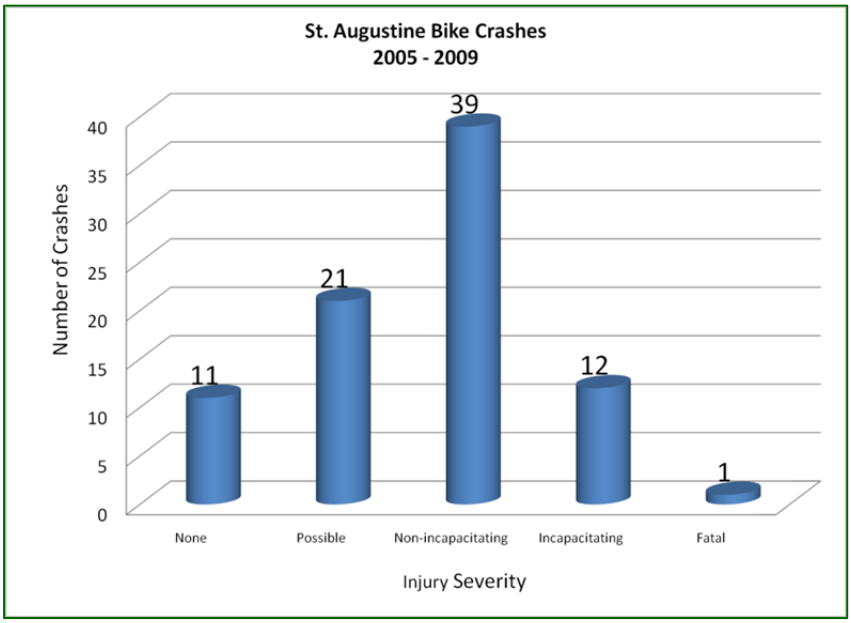


Figure 6.2: Bicycle Crashes by Injury Severity

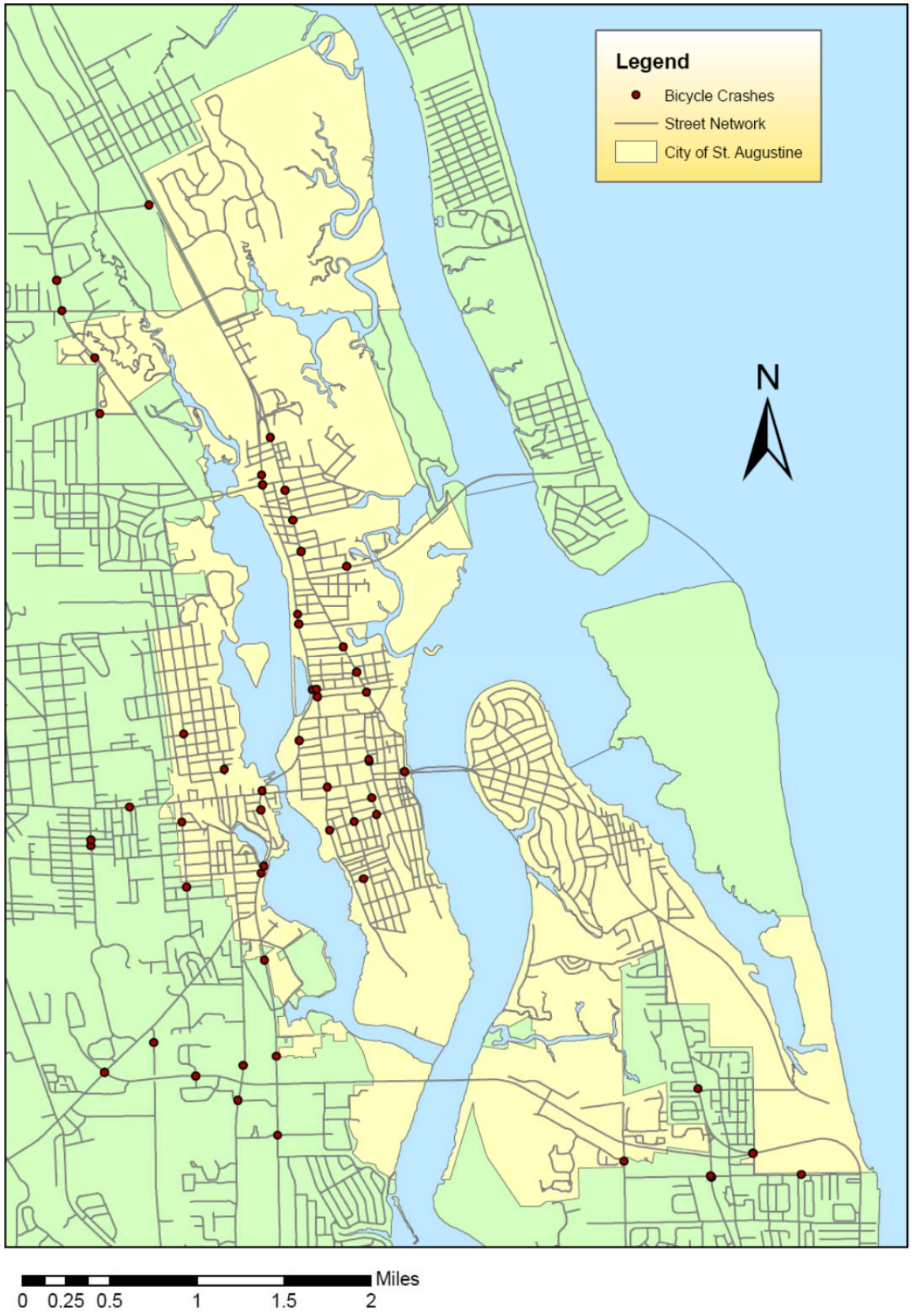


Figure 6.1: Bicycle Crash Locations (2005-2009)

Lighting Conditions - Seventeen percent of the bicycle crashes (14 crashes) in the study area occurred under sub-optimal lighting conditions (Figure 6.3). This suggests that lighting conditions could be a significant cause of bicycle crashes. Two potential countermeasures exist for these low light crashes: improved roadway lighting and education/enforcement of bicycle lighting laws. The enforcement of lighting laws is the most quickly implementable countermeasure and should be pursued immediately. While many bikes have reflectors on them, they only allow bicyclists to be seen when the motorists' headlamps are reflected back to the driver. Thus, they will not often prevent angle crashes that occur when motorists turning onto a roadway hit a cyclists riding on the intersecting roadway or sidewalk. As these "sub-optimal lighting condition" crashes occur largely along the King Street corridor (see Figure 6.4), this increases the likelihood that focused education/enforcement countermeasure would be effective.

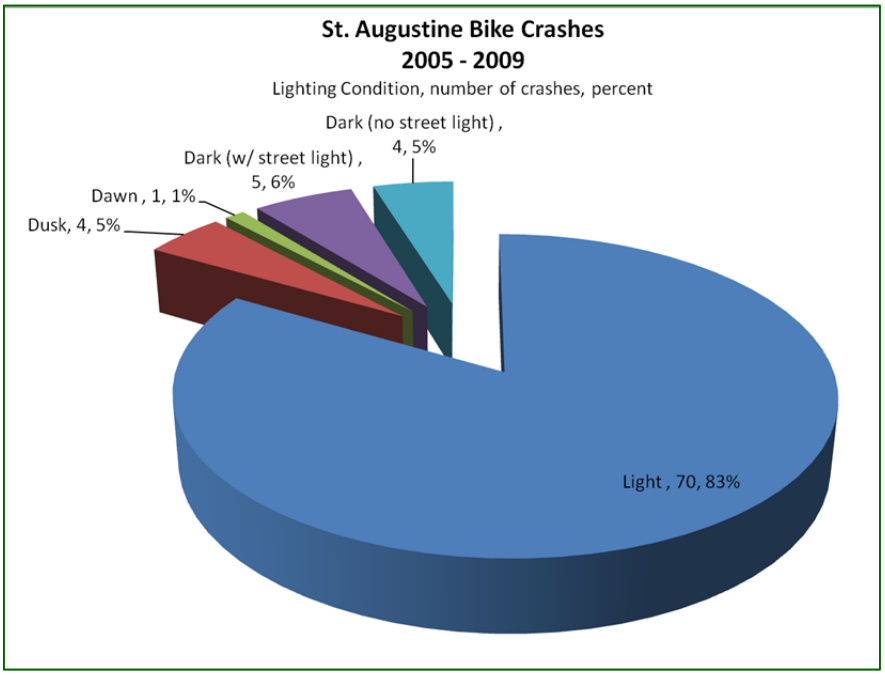


Figure 6.3: Bicycle Crashes by Lighting Condition

Monthly, daily and hourly distribution - The bicycle crashes in St. Augustine were distributed fairly evenly throughout the year (Figure 6.5). Two peaks can be seen in the month of crash histogram - March and July. It is possible that these relate to spring break and summer vacation; however, the number of tourist involved in crashes would appear to be fairly low. Nonetheless, increased motor vehicle traffic during these months could a contributing factor. A review of the FDOT peak season category factors for St. Johns County suggest this could be the case.

On a weekly basis, the crashes are fairly evenly distributed across the days of week with the exception of Sundays (Figure 6.6). Bicycle crashes are substantially lower on Sundays than on other days of the week. This may represent a lower exposure rate (less cycling) on Sundays when compared to other days of the week.

Hourly crash patterns during the daytime in St. Augustine likely represent the relative exposure (volumes) of cyclists through the day (Figure 6.7). Nighttime crashes would seem to be over represented; however, given poor lighting conditions, an increase in crash rates is common at night.

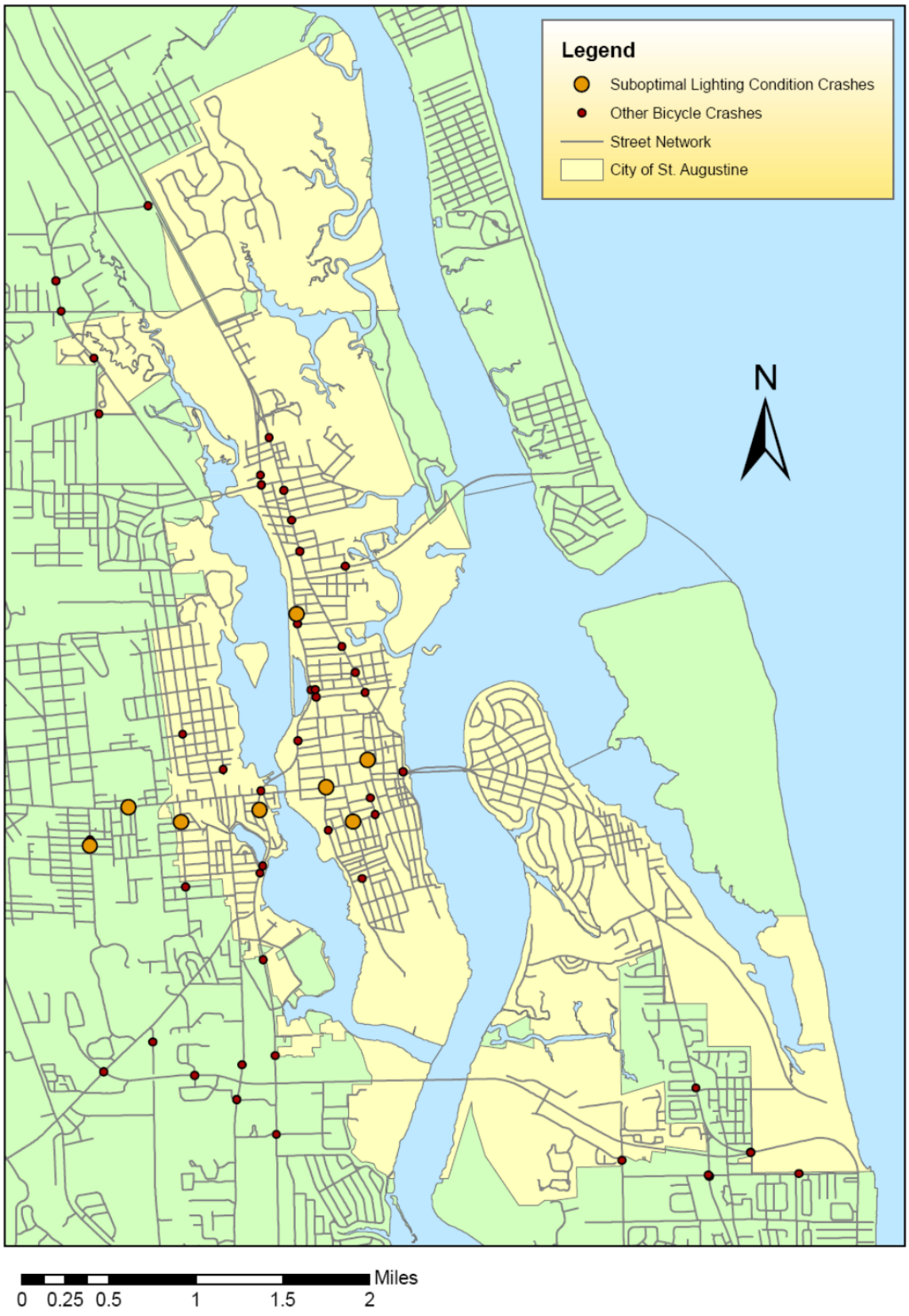


Figure 6.4: Locations of Bicycle Crashes by Lighting Condition

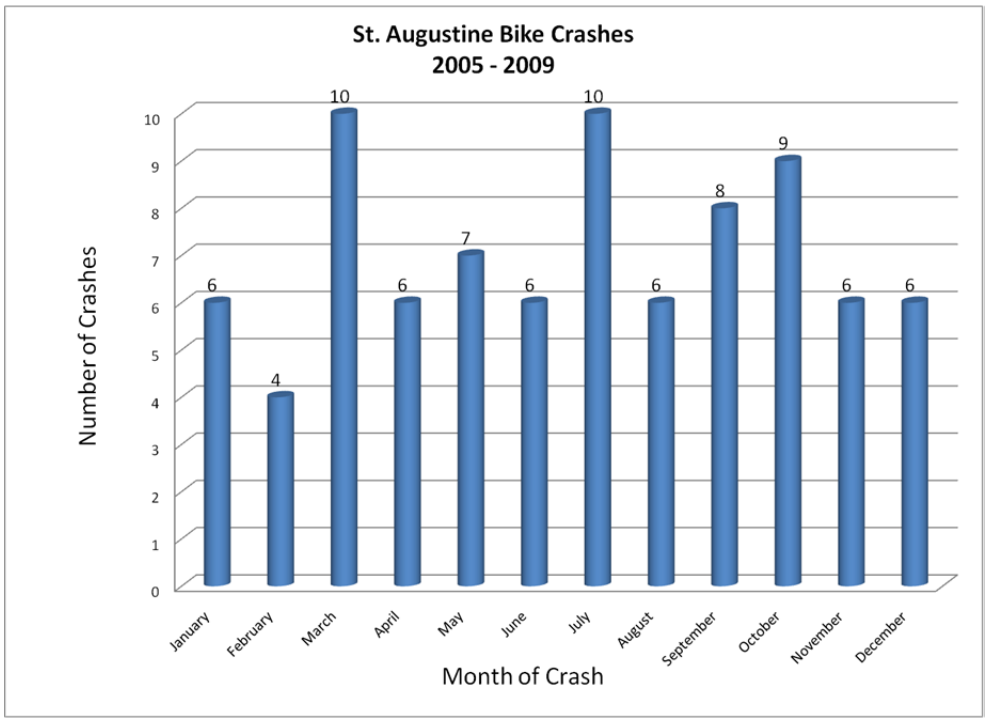


Figure 6.5: Bicycle Crashes by Month of Crash

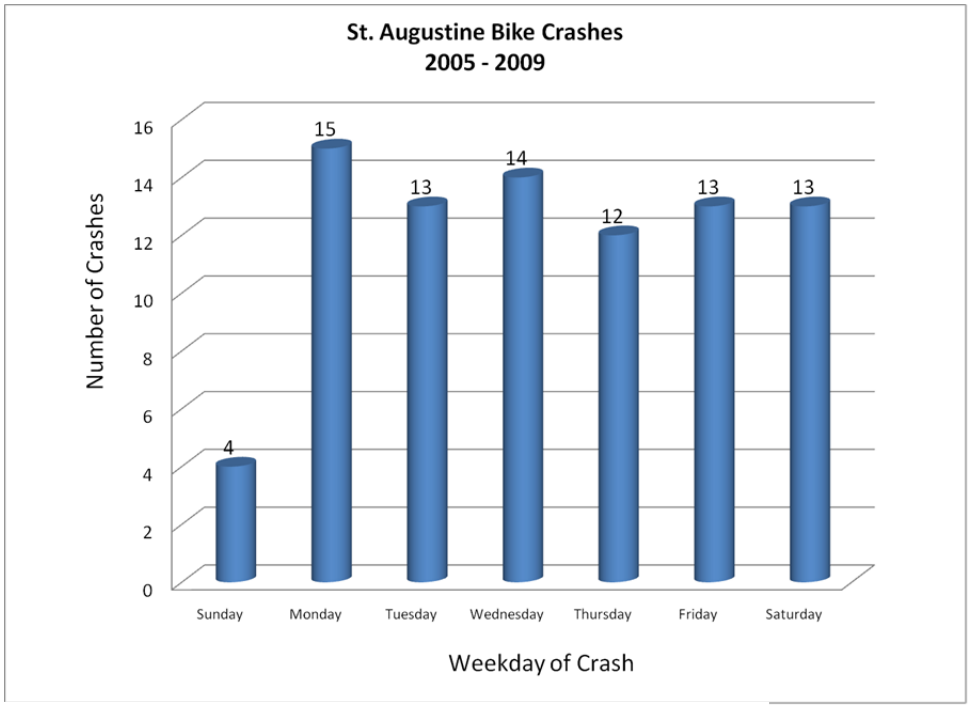


Figure 6.6: Bicycle Crashes by Day of Crash

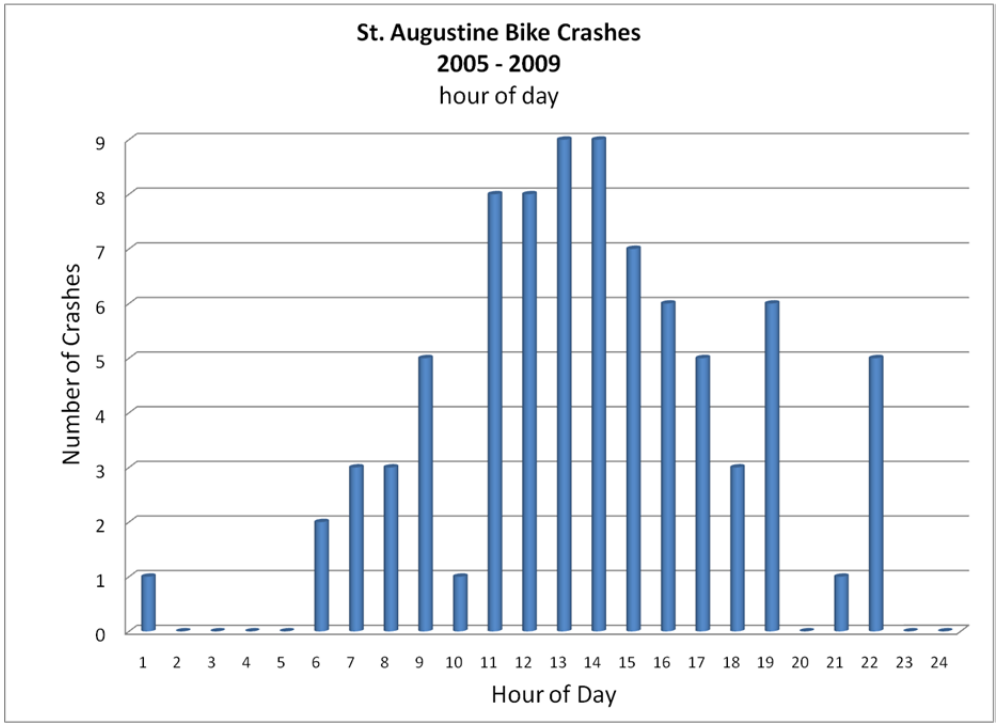


Figure 6.7: Bicycle Crashes by Time of Day

Residence of involved parties - Given the tourist destination character of St. Augustine, it could be hypothesized that a significant portion of the crashes involve non-residents of St. Augustine or St. Johns County (Figures 6.8 and 6.9). The review of the crash data reveals that this is not the case. Seventy-two (89%) of the bicyclists involved in the reviewed crashes were residents of St. Johns County (71 lived in St. Augustine). Only 7 (8%) did not live in St. Johns County. Similarly, 58 (72%) of the motorists were residents of St. Johns County. This suggests tourists are not the predominant problem associated with bicycle crashes in St. Augustine. If it could be shown that the 11% of non-local drivers involved in crashes represented a significantly greater percentage than the percentage of non-local drivers on the roads, then improved motorist wayfinding could conceivably be considered a countermeasure for reducing non-local motorist involvement in crashes.

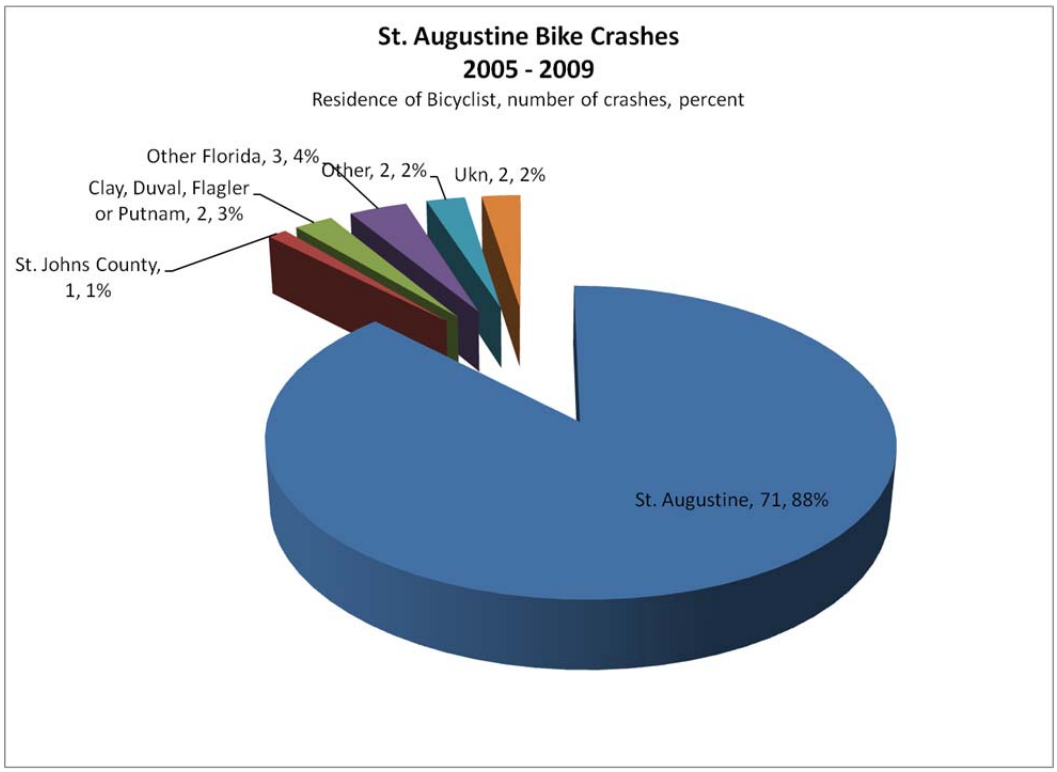


Figure 6.8: Bicycle Crashes by Residence of Bicyclist

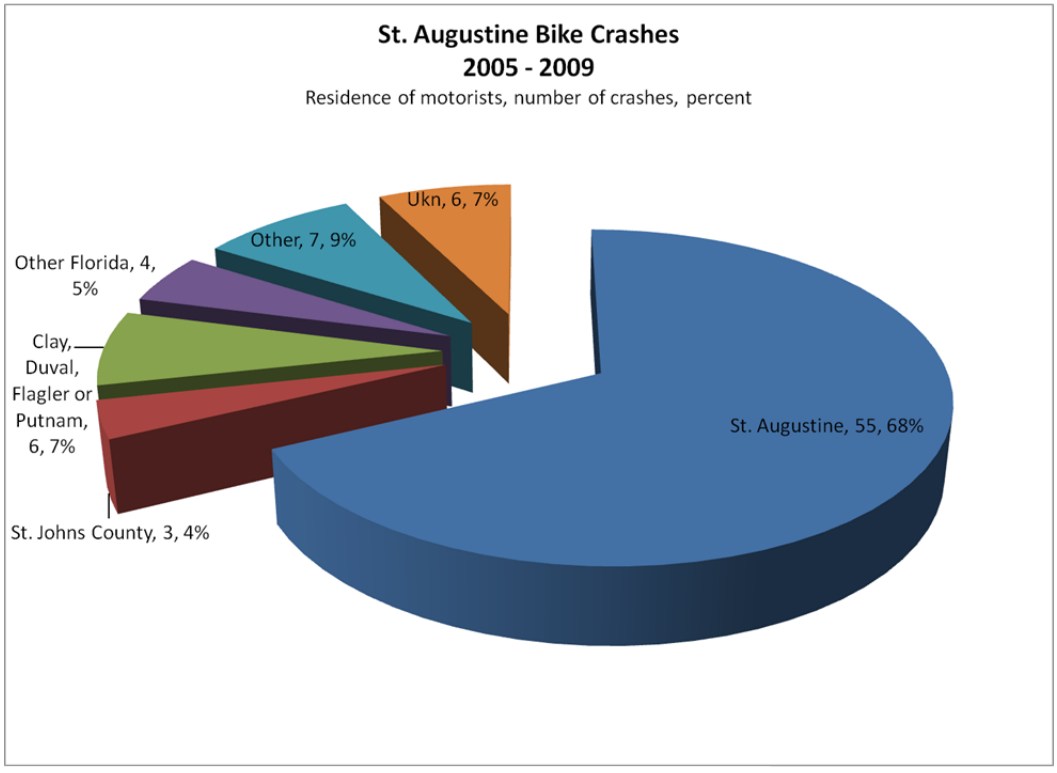


Figure 6.9: Bicycle Crashes by Residence of Motorist

Contributing bicyclist action – In 32% of the crashes, the bicyclist was riding against the flow of traffic, and approximately half of those crashes occurred when the bicyclist was riding on the sidewalk (Figure 6.10). The prevalence of these crashes suggests that educational materials highlighting and illustrating the dangers of wrong way riding may be effective in reducing the City's bicycle crash rate. Another common contributing bicyclist action (13 crashes) is failure to stop or yield, the clearest indication of bicyclist wrongdoing. No contributing bicyclist action was noted in another 13 of the crashes (16%). It is important to keep in mind that these causes are subject to the opinion of the reporting officer.

Contributing motorist action – Easily the most prevalent motorist action contributing to the crashes is a failure to stop or yield (30 crashes, more than one third of the total). Educational and/or enforcement campaigns designed to remind motorists of their responsibilities may be appropriate. In 31 crashes, no contributing motorist action was note, again considering that some subjectivity on the part of the reporting officer may be present (Figure 6.11).

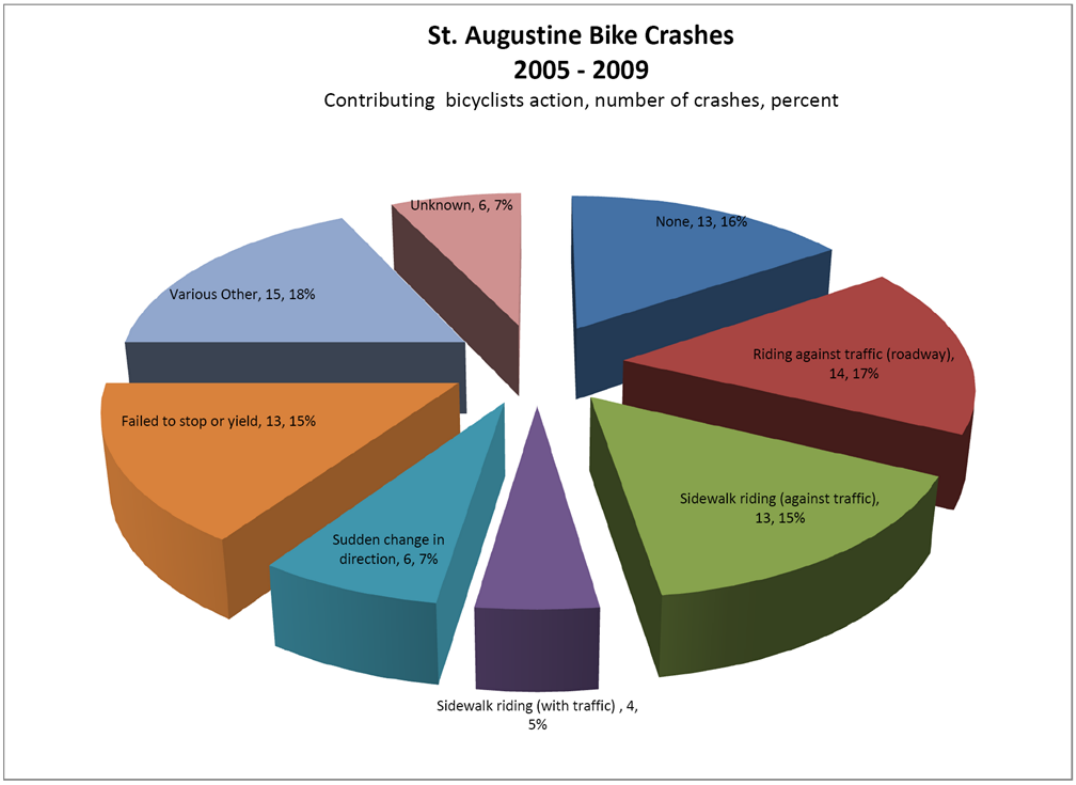


Figure 6.10: Bicycle Crashes by Contributing Action of Bicyclist

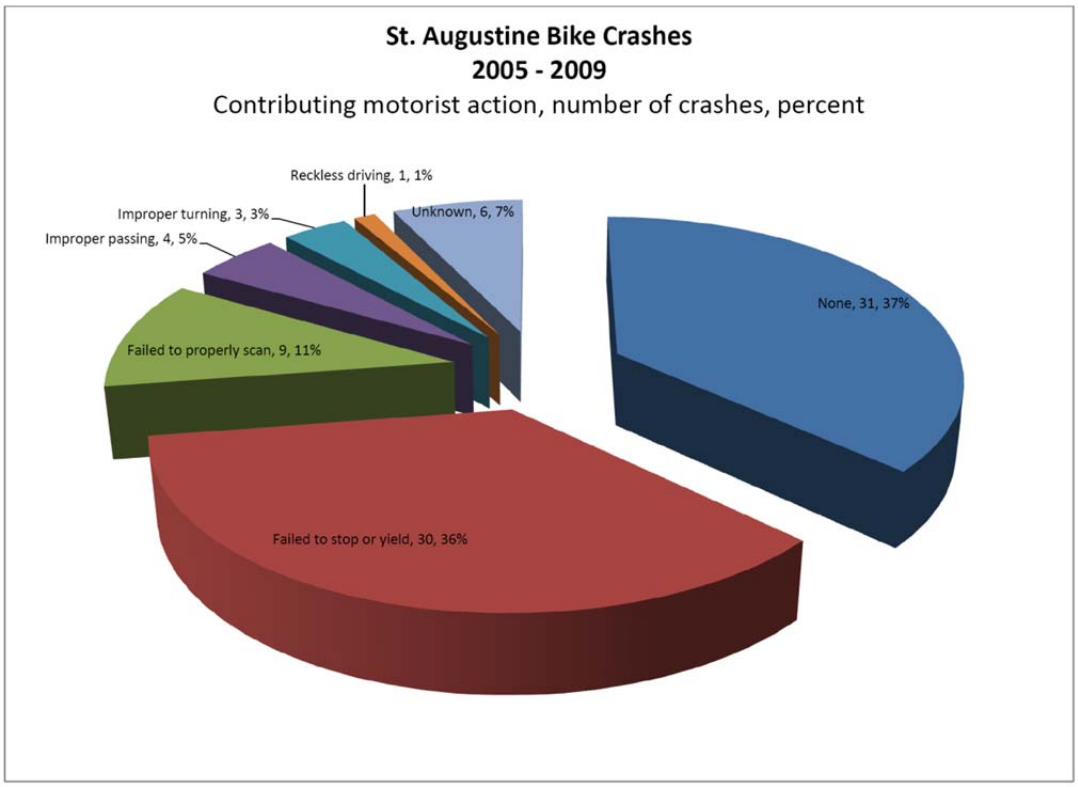


Figure 6.11: Bicycle Crashes by Contributing Action of Motorist

Bicycle Plan for St. Augustine Florida: Summary Table of Improvement Costs and Maintaining Agencies

		Maintaining Agency	CoSA		SJC		FDOT		Other		Total by Improvement Type	
			Mileage	Cost	Mileage	Cost	Mileage	Cost	Mileage	Cost	Mileage	Cost
Improvement Type	Cost per mile											
1. Maintenance only	$0		12.86	$0	2.67	$0	0.35	$0	1.83	$0	17.71	$0
2. Shared Lane Markings	$13,984		3.97	$55,518	2.33	$32,584	7.98	$111,596	0.29	$4,056	14.57	$203,754
3. Buffer Existing Bike Lanes	$20,803		0	$0	0	$0	11.84	$246,312	0	$0	11.84	$246,312
4. New Bike Lanes	$28,251		0	$0	2.63	$74,299	0.91	$25,708	0	$0	3.54	$100,007
5. Add Shoulders	$155,339		0	$0	1.06	$164,659	1.03	$159,999	0	$0	2.09	$324,657
6."Share the Road" Signs	$6,071		0	$0	0.87	$5,282	0	$0	0	$0	0.87	$5,282
7. Shared Use Path	$10,125	(lump sum)	0	$0	*50 ft	$10,125	0	$0	0	$0	*50 ft	$10,125
Total Improvements			16.83	$55,518	9.56	$286,949	22.11	$543,615	2.12	$4,056	50.62	$890,137
Wayfinding Signage												
(9 per mile avg)	$2,930		16.83	$49,310	9.56	$28,009	22.11	$64,779	2.12	$6,211	50.62	$148,309
Bike Racks											Network-wide	
Per rack element	$300										312	$93,600
Total Costs				**$104,828**		**$314,958**		**$608,394**		**$10,267**		**$1,132,047**

Agency Abbreviations

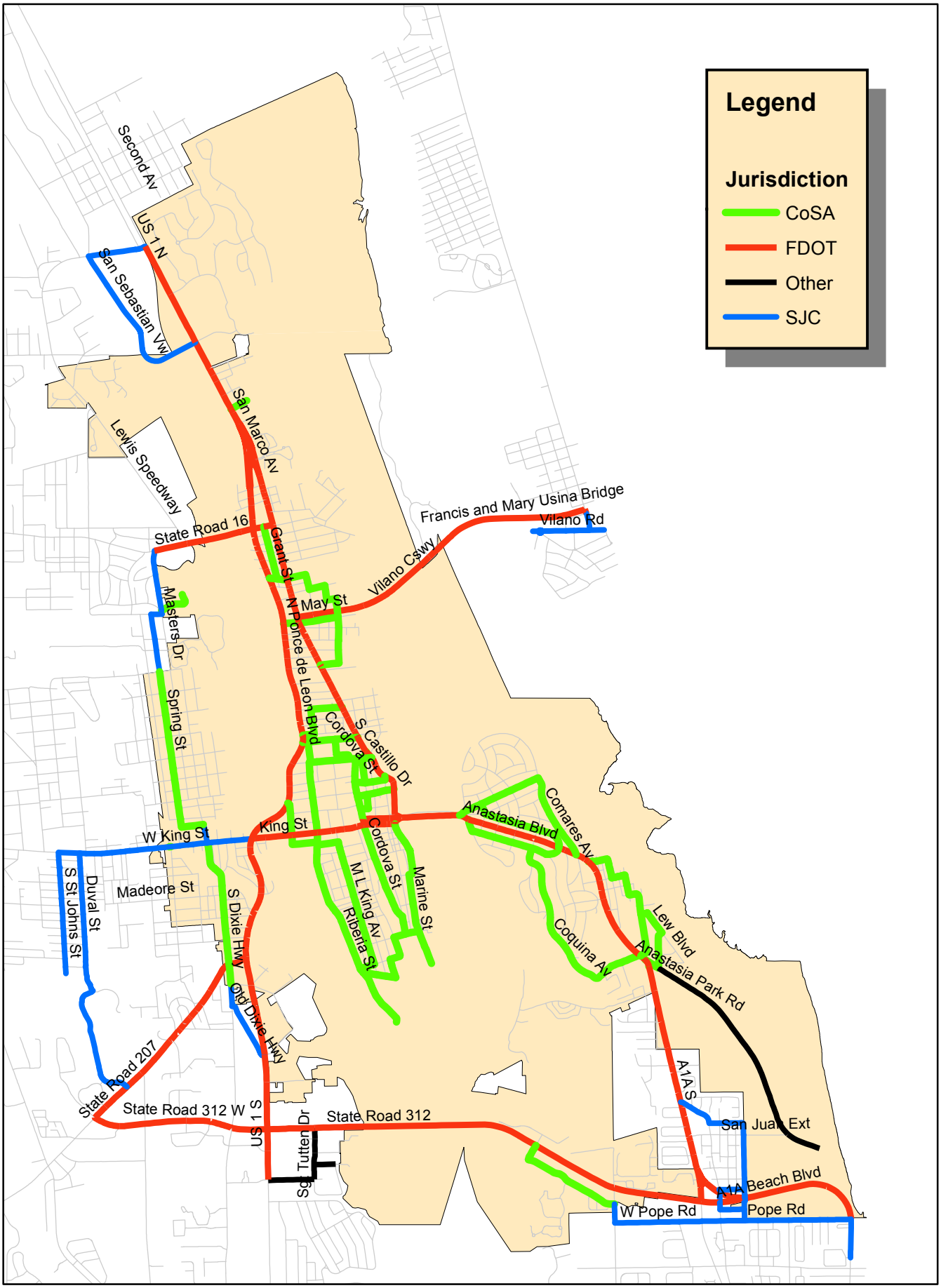
CoSA	City of St. Augustine
SJC	St. Johns County
FDOT	Florida Dept. of Transportation
Other	Flagler Hospital, Florida State Parks

Bicycle Plan for St. Augustine, Florida: Estimated per mile costs for recommended improvements

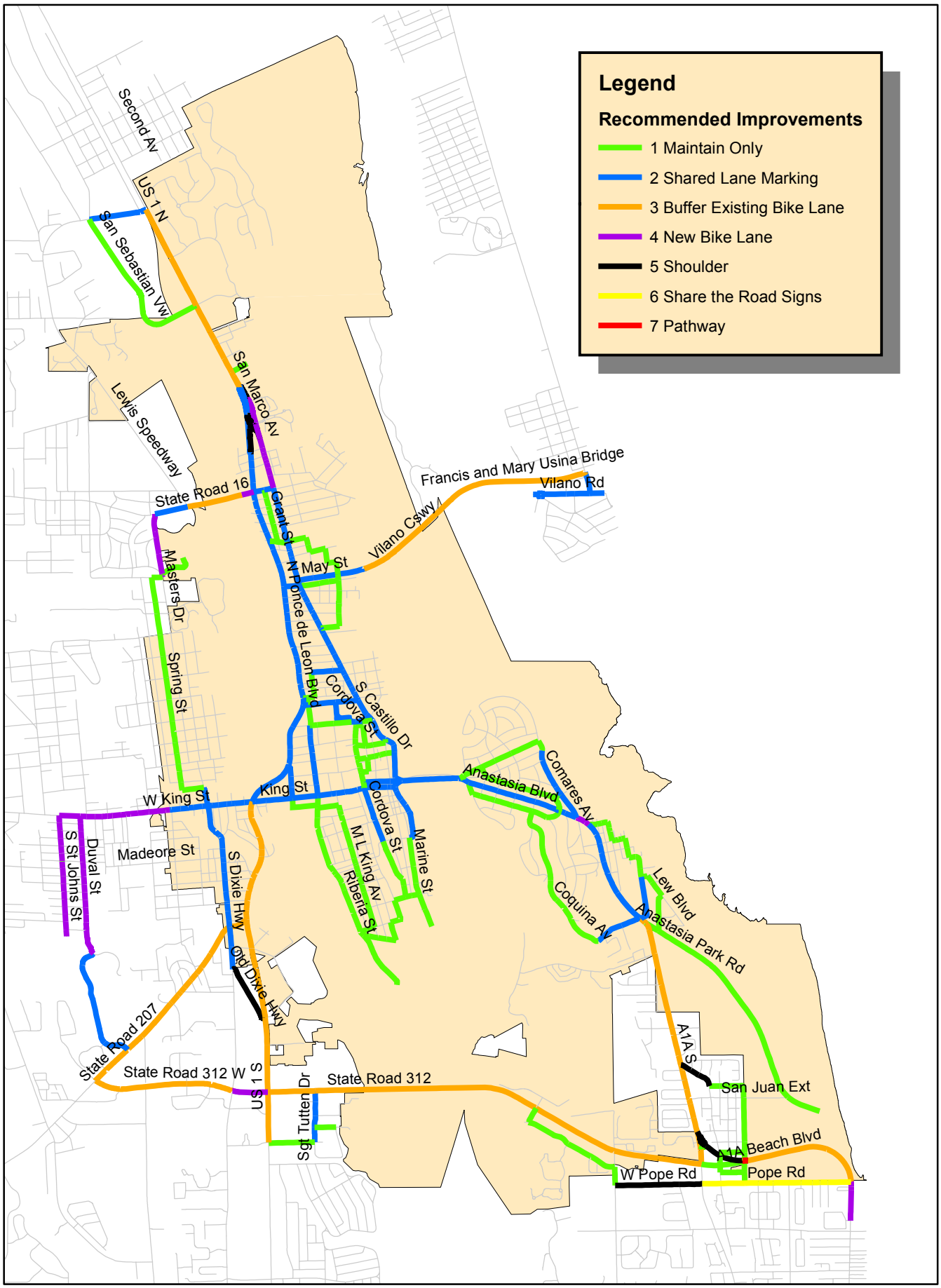
	Qty	Unit	Unit Cost	Total
1. Maintenance Only				
Assume covered in existing expenditures	0	0	$0.00	$0.00
Subtotal				**$0.00**
35% Mobilization, MOT, & Contingency				$0.00
Total per Mile Cost				**$0.00**
2. Shared Lane Markings				
Chevron @250 ft intervals, 2 sides of street	42	Message	$123.32	$5,179.44
Symbol @250 ft intervals, 2 sides of street	42	Message	$123.32	$5,179.44
Subtotal				**$10,358.88**
35% Mobilization, MOT, & Contingency				$3,625.61
Total per Mile Cost				**$13,984.49**
3. Buffer Existing Bike Lanes				
Remove existing 6" 30/10 skip lane line, 2 sides of street	1,320	SF	$2.72	$3,590.40
Install new 30/10 skip lane line, 2 sides of street	2	miles	$1,262.61	$2,525.22
Install new 6" bike lane line, 2 sides of street	2	miles	$3,939.59	$7,879.18
Add Chevrons (1 ft. stripe across 2 ft buffer) @ 20 ft intervals, both sides of street	795	LF	$1.78	$1,415.10
Subtotal				**$15,409.90**
35% Mobilization, MOT, & Contingency				$5,393.47
Total per Mile Cost				**$20,803.37**
4. Add new bike lanes				
Remove existing 6" 30/10 skip lane line, 2 sides of street	1,320	SF	$2.72	$3,590.40
Install new 30/10 skip lane line, 2 sides of street	2	miles	$1,262.61	$2,525.22
Install new 6" bike lane line, 2 sides of street	2	miles	$3,939.59	$7,879.18
Bike Symbol @600 ft intervals, 2 sides of street	20	Message	$123.32	$2,466.40
Arrow @600 ft intervals, 2 sides of street	20	Message	$123.32	$2,466.40
Signs @ 1/4 mile intervals, 2 sides of street	8	Signs	$249.85	$1,998.80
Subtotal				**$20,926.40**
35% Mobilization, MOT, & Contingency				$7,324.24
Total per Mile Cost				**$28,250.64**
5. Add shoulders				
FC 12.5 Asphalt course, 4 ft wide, 2 sides of street	387	Tons	$99.96	$38,704.51
Base course, Optional Group 1, 4.33 ft wide, 2 sides of street	5,081	SY	$6.00	$30,483.12
Type B Stabilization, 8 ft wide, 2 sides of street	9,387	SY	$3.05	$28,629.31
Excavation, 4 SF per section, 2 sides of street	1,564	CY	$2.84	$4,441.76
Fill, 2 SF per section, 2 sides of street	782	CY	$4.30	$3,362.60
Sodding, to limit of grading (5' beyond shoulder), 2 sides of street	5,866	SY	$1.61	$9,444.26
Subtotal				**$115,065.57**
35% Mobilization, MOT, & Contingency				$40,272.95
Total per Mile Cost				**$155,338.51**
6. Install "Share the Road" Signs				
Signs @ 660 ft intervals, 2 sides of street	16	Signs	$249.85	$3,997.60
Subtotal				**$3,997.60**
35% Mobilization, MOT, & Contingency				$1,399.16
Total per Mile Cost				**$5,396.76**
7. Shared Use Path*				
12' wide 50' long asphalt path	1	Lump Sum	$7,500.00	$7,500.00
Subtotal				**$7,500.00**
35% Mobilization, MOT, & Contingency				$2,625.00
Total per Mile Cost				**$10,125.00**
Install wayfinding signs				
443 signs estimated over 51 mile network	9	Signs	$249.85	$2,170.27
Subtotal				**$2,170.27**
35% Mobilization, MOT, & Contingency				$759.59
Total per Mile Cost				**$2,929.86**

All unit costs from FDOT Statewide Averages (11/01/10-10/31/11)
All markings assumed to be Thermoplastic
* Single project too small for accurate per mile comparison

Appendix C:
Maintaining Agencies for Roadways with Recommended Bike Routes



Appendix D: Simplified Map of Recommended Improvements



Bicycle Plan for St. Augustine, Florida
Appendix E
Bicycle Parking Site Recommendations

Number	Site	Spot	Routes	Status 1= exisitng, 2=existing but needs improvement, 3=build new	Comments on existing	Rec Hardware count	Type p= post and loop, u= inverted U	Capacity if P =hdw*1, if U = hdw *2
1.1	Anastasia Boulevard Bus Dist	North 1	4x, 4	3		1	p	1
1.2	Anastasia Boulevard Bus Dist	South 1	4x, 4	3		1	p	1
1.3	Anastasia Boulevard Bus Dist	North 2	4x, 4	3		1	p	1
1.4	Anastasia Boulevard Bus Dist	South 2	4x, 4	3		1	p	1
1.5	Anastasia Boulevard Bus Dist	North 3	4x, 4	3		1	p	1
1.6	Anastasia Boulevard Bus Dist	South 3	4x, 4	3		1	p	1
1.7	Anastasia Boulevard Bus Dist	North 4	4x, 4	3		1	p	1
1.8	Anastasia Boulevard Bus Dist	South 4	4x, 4	3		1	p	1
2.1	Anastasia State Park	Snack Bar	s	2	Wheelbender	4	u	8
2.2	Anastasia State Park	Overlook	s	2	Wheelbender	2	u	4
2.3	Anastasia State Park	Boardwalk	s	2	Wheelbender	3	u	6
2.4	Anastasia State Park	Picnic Shleter	s	3		3	u	6
2.5	Anastasia State Park	Nature Trail S	s	3	Bikes prohibited from trail, s	1	u	2
2.6	Anastasia State Park	Nature Trail N	s	3	Bikes prohibited from trail, s	1	u	2
2.7	Anastasia State Park	Campground Playground S	s	3	Campers using fence	2	u	4
2.8	Anastasia State Park	Campground Playground N	s	3	Campers using fence	2	u	4
2.9	Anastasia State Park	Windsurfing Center	s	3		2	u	4
2.95	Anastasia State Park	Coquina Quarry	s	2	Wheelbender	3	u	6
3.1	Av de Menendez frontage	South 1	2x,s	3		1	p	1
3.2	Av de Menendez frontage	South 2	2x,s	3		1	p	1
3.3	Av de Menendez frontage	South 3	2x,s	3		1	p	1
3.4	Av de Menendez frontage	South 4	2x,s	3		1	p	1
3.5	Av de Menendez frontage	South 5	2x,s	3		1	p	1
4.1	Carrerra Parking Lot	Carrera and Cordova	2	3		5	u	10
5.1	Castillo de san Marcos		2x	3		5	u	10

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6.1	City Hall and Lightner Museum	by front door	5,8	2	Wheelbender at front entrance	3	u	6
6.2	City Hall and Lightner Museum	Rear parking lot	5,8	3	Wheelbender at front entrance	5	u	10
7.1	County Jail	Lewis Speedway Rd	1, 1x	3		2	u	4
8.1	County Permit Center	San Sebastien View	1, 1x	2	Wave rack	2	u	4
9.1	Cune Street	West of St. George	2, 2x, S	3		3	u	6
9.2	Cune Street	East of St. George	2, 2x, S	3		3	u	6
10.1	Davenport Park	San Marco Ave	2x,s	3		3	u	6
11.1	Flagler Hospital	Emergency/ Main Entrance	1, S	2	Wheel bender by ER entrnace (north)	5	u	10
11.2	Flagler Hospital	East entrance	1, S	3	Wheel bender by ER entrnace (north)	3	u	6
12.1	Flagler Library		8	2	Overflow locked to trees in	16	u	32
12.2	Flagler Student Center		8	2		16	u	32
13.1	Fort Mose State Park		1	3	Bicycle user fee, but no bike parking	4	u	8
14.1	Francis Field		3	3		2	u	4
15.1	Hamilton Upchurch Park	Parking lot	4	2	Wave rack by parking lot	5	u	10
15.2	Hamilton Upchurch Park	by skatepark entrance	4	3	Wave rack by parking lot	3	u	6
16.1	Hypolita St	North bollard chain near Spanish St	2, 2x, s	3		2	p	2
16.2	Hypolita St	North bollard chain near St. George St	2, 2x, s	3		2	p	2
16.3	Hypolita St	NE corner of St. George	2, 2x, s	3		2	u	4
16.4	Hypolita St	Tocque Place Parking Lot	2, 2x, s	2	Wheelbender rack with abar	4	u	8
17.1	Joe Pomar Jr. Park	By sports field entrance	1	3		5	u	10
17.2	Joe Pomar Jr. Park	By picnic shelter/ boardwalk	1	3		2	u	4
18.1	Judicial Center	North side	1, 1x	2	Wave Rack at north end, wheelbender in parking lot	2	u	4
18.2	Judicial Center	South side	1, 1x	3	Wave Rack at north end, wheelbender in parking lot	2	u	4
18.3	Judicial Center	Central parking lot	1, 1x	2	Wave Rack at north end, wheel bender in parking lot	5	u	10
19.1	Lighthouse Park, Yacht Club	West tennis court	s	3		2	u	4

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19.2	Lighthouse Park, Yacht Club	East tennis court	s	3		2	u	4
19.3	Lighthouse Park, Yacht Club	Yacht club/ pier	s	3		2	u	4
19.4	Lighthouse Park, Yacht Club	Park area	s	3		2	u	4
20.1	Maria Sanchez Lake	Near Charlotte Pl	5	3		1	u	2
20.2	Maria Sanchez Lake	Near St. George St	5	3		1	u	2
20.3	Maria Sanchez Lake	Near Francis St	5	3		1	u	2
20.4	Maria Sanchez Lake	Near bend in Park Place	5	3		1	u	2
21.1	National Cemetery	Near office	5x	3		2	u	4
22.1	Ocean Pier	South	4	3		4	u	8
22.2	Ocean Pier	North	4	3		4	u	8
23.1	Oglethorpe Park		S	2	Sculptural bike rack in center of park	2	u	4
24.1	Plaza de La constitucion	West side	2, 2x, 4, 8	3		3	u	6
24.2	Plaza de La constitucion	East side	2, 2x, 4, 8	3		3	u	6
25.1	Police Dept		8	3		2	u	4
26.1	Pope Road Park		4, 4x	3		4	u	8
27.1	Post office		8	2	Wheelbender	2	u	4
28.1	Public Library		1, 2x, S	2	Wheelbender	5	u	10
29.1	Railway park		2,8,S	3		1	u	2
30.1	RB Hunt School Fields/Red Cox Rec.	South	s	3		2	u	4
30.2	RB Hunt School Fields/Red Cox Rec.	Middle	s	3		2	u	4
30.3	RB Hunt School Fields/Red Cox Rec.	North	s	3		2	u	4
31.1	Redoubt Wall Park		2, 2x	3		4	u	8
32.1	Council on Aging		s	3		4	u	8
32.3	Sherriff's Office		1, 1x	3		2	u	4
33.1	Solomon Calhoun Community Center	Pool entry	8	2	Wheelbender by back of pool	5	u	10
33.2	Solomon Calhoun Community Center	Front entry	8	3	Wheelbender by back of pool	2	u	4
34.1	Spanish St Lot	Spanish/ Treasury		3		6	u	12
35.1	St . George Street Ped Mall	Cathedral Place	2, S, 2x	3		6	u	12
36.1	St Augustine Amphitheatre	by Amphitheatre entry	4	3	Sign says to bike racks provi	5	u	10

Bicycle Plan for St. Augustine, Florida
Appendix E
Bicycle Parking Site Recommendations

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36.2	St Augustine Amphitheatre	in parking lot, west end of Farmers Mkt	4	3	Sign says to bike racks provi	5	u	10
37.1	St Augustine Little League Park	West of Osceola School Rd	S	3		3	u	6
37.2	St Augustine Little League Park	West side of small fields	S	3		3	u	6
37.3	St Augustine Little League Park	North side of small fields	S	3		3	u	6
37.4	St Augustine Little League Park	by large field	S	3		3	u	6
38.1	Swing Park	Between playground and tennis courts	2	3		2	u	4
39.1	Tolomato Parking Lot	Spanish and Tolomato	2,2x,s	3		5	u	10
40.1	Twine Park	Riberia Street	3	3		1	u	2
41.1	Vickers Park, Gallimore Center	Front entrance	3, 5	2	Wheelbenders	2	u	4
41.2	Vickers Park, Gallimore Center	Pool entry	3, 5	2	Wheelbenders	5	u	10
41.3	Vickers Park, Gallimore Center	Baseball fields	3, 5	3		3	u	6
41.4	Vickers Park, Gallimore Center	Basketball courts	3, 5	2	Wave rack	3	u	6
41.5	Vickers Park, Gallimore Center	community garden	3, 5	3		2	u	4
42.1	Vilano Beach		2	2		4	u	8
43.1	Vilano Boat Ramp		2	3		1	u	2
44.1	Vilano Nature Greenway	North side boardwalk	2	3		1	u	2
45.1	Vilano Pier		s	3		2	u	4
46.1	Vilano Road	North 1	s	2	U racks installed so that capacity is only 1	1	u	2
46.2	Vilano Road	North 2	s	2	U racks installed so that capacity is only 1	1	u	2
46.3	Vilano Road	North 3	s	2	U racks installed so that capacity is only 1	1	u	2
46.4	Vilano Road	North 4	s	2	U racks installed so that capacity is only 1	1	u	2
46.5	Vilano Road	South 1	s	2	U racks installed so that capacity is only 1	1	u	2
46.6	Vilano Road	South 2	s	2	U racks installed so that capacity is only 1	1	u	2

Number	Site	Spot	Routes	Status 1= exisitng, 2=existing but needs improvement, 3=build new	Comments on existing	Rec Hardware count	Type p= post and loop, u= inverted U	Capacity if P =hdw*1, if U = hdw *2
46.7	Vilano Road	South 3	s	2	U racks installed so that capacity is only 1	1	u	2
46.8	Vilano Road	South 4	s	2	U racks installed so that capacity is only 1	1	u	2
47.1	Visitors Center Parking Deck	South portico	2, 2x	2	Wheelbenders	8	u	16
47.2	Visitors' Center		1, s	2	Wheelbenders	8	u	16
47.3	Visitors' Center Parking Deck	East portico	1, s	3		8	u	16
50.1	Nelmar Terrace Park		s	3		1	u	2

Total Hardware	Total Capacity
312	607

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