AGENDA
BPAC
Bicycle Pedestrian Advisory Committee
Collier County Growth Management Department
Conference Rooms 609/610
2800 North Horseshoe Drive
Naples, FL 34104
August 21, 2018
9:00 a.m.

1. **Call to Order**
2. **Roll Call**
3. **Approval of Agenda**
4. **Approval of April 17, 2018 Meeting Minutes**
5. **Open to the Public for Comment on Items not on the Agenda**
6. **Agency Updates**
   A. FDOT
   B. MPO
   C. Collier County
   D. City of Naples
   E. City of Marco Island
7. **Committee Action**

   None.
8. **Reports & Presentations (May Require Committee Action)**

   A. Draft Bicycle & Pedestrian Master Plan
9. **Member Comments**
10. **Distribution Items**

    None.
11. **Next Meeting Date**

    September 18, 2018
    Collier County Growth Management Department
    Conference Rooms 609/610
12. **Adjournment**

PLEASE NOTE:
This meeting of the Bicycle & Pathways Advisory Committee (BPAC) to the Collier Metropolitan Planning Organization (MPO) is open to the public and citizen input is encouraged. Any person wishing to speak on any scheduled item may do so upon recognition by the Chairperson. Any person desiring to have an item placed on the agenda shall make a request in writing, with a description and summary of the item, to the MPO Executive Director 14 days prior to the date of the next scheduled meeting of the BPAC. Any person who decides to appeal a decision of this Committee will need a record of the proceedings pertaining thereto, and therefore may need to ensure that a verbatim record of the proceeding is made, which record includes the testimony and evidence upon which the appeal is to be based. In accordance with the Americans with Disabilities Act, any person requiring special accommodations to participate in this meeting should contact the Collier Metropolitan Planning Organization 72 hours prior to the meeting by calling (239) 252-5814.The MPO's planning process is conducted in accordance with Title VI of the Civil Rights Act of 1964 and Related Statutes. Any person or beneficiary who believes that within the MPO's planning process they have been discriminated against because of race, color, religion, sex, age, national origin, disability, or familial status may file a complaint with the Collier MPO by calling Ms. Anne McLaughlin at (239) 252-5884 or by writing to her at 2885 South Horseshoe Dr., Naples, FL 34104.

BICYCLE & PEDESTRIAN ADVISORY COMMITTEE
of the
COLLIER METROPOLITAN PLANNING ORGANIZATION
Collier County Growth Management Division
Conference Rooms 609 & 610
2800 North Horseshoe Drive
Naples, FL 34104
9:00 a.m.

April 17, 2018 Meeting Minutes

1. Call to Order

Mr. Bonness called the meeting to order at approximately 9:00 a.m.

2. Roll Call

Ms. Gonzalez called the roll and confirmed that a quorum was present.

Members Present
Joe Bonness, At-Large
Andrea Halman, At-Large
Wendy Olson, At-Large
Jane Cheffy, At-Large
Dayna Fendrick, At-Large
Alan Musico, At-Large
Dr. Mort Friedman, At-Large
Reginald Wilson, At-Large
Victor Ordija, At-Large
Joe Adams, At-Large

Members Absent
Jane Cheffy, At-Large
Ray Steadman, At-Large

MPO Staff
Eric Ortman, MPO Senior Planner
Gabrielle Gonzalez, MPO Admin. Secretary

Others Present
David Agacinski, FDOT
Lorraine Lantz, CCTP
Ned Baier, Jacobs Engineering

3. Approval of Agenda

Mr. Bonness entertained a motion for approval of the agenda. Mr. Ortman stated that staff would like to move the May 15th meeting to May 21st and change it to a stakeholder meeting for the Bicycle & Pedestrian Master Plan. The TAC would meet from 9:00 a.m. to 10:30 a.m. with the stakeholder meeting to follow. The next regularly scheduled BPAC meeting would be on August 21st.

Mr. Adams: **I move to approve the agenda.**

Mr. Musico: **I second the motion.**

THE MOTION CARRIED UNANIMOUSLY.

4. Approval of the February 20, 2018 Meeting Minutes

Mr. Bonness entertained a motion for approval of the February 20, 2018 Meeting Minutes.

Ms. Halman: **I move to approve the minutes.**

Dr. Friedman: **I second the motion.**

THE MOTION CARRIED UNANIMOUSLY.

5. Open to the Public for Comment on Items not on the Agenda

None.

6. Agency Updates

A. FDOT

Mr. Agacinski stated that a FDOT resurfacing project on SR951 from the Judge Jolly Bridge to Fiddlers Creek would include six-foot buffered bike lanes which will improve bicycle safety. Mr. Agacinski stated that FDOT would like to continue the buffered bike lanes from Fiddlers Creek to US41 when a future project is done on that stretch of 951. Mr. Ortman stated that construction is scheduled for FY19. Mr. Musico added that a significant number of people bicycle between Marco Island and Fiddler's Creek.

Mr. Agacinski that the Smart Growth America recently released a report, the "Best Complete Street Initiatives of 2017" in which the Florida Department of Transportation Design Manual was listed as one of the top twelve complete street initiatives in the country.

B. MPO

Mr. Ortman stated that today would be Ms. Gonzalez's last meeting with the BPAC as she had taken another position with the County. Mr. Ortman thanked Ms. Gonzalez for her contributions to the MPO, and her work ethic and lively personality.

C. Collier County

Ms. Lantz stated that Collier County was awarded a TIGER grant for the Immokalee Complete Streets Project. The project would include sidewalks, bike lanes, transit facilities, bus shelters, drainage and lighting. The project area includes the triangle bordered by SR29 and New Market Road. The award amount is $13.1 million with a 20 percent County match making the total amount roughly $16 million.

Ms. Lantz updated the Committee on the County's Pine Ridge Road Corridor Congestion Study stating that the Board of County Commissioners approved staff's recommendation to begin design of a Continuous Flow Intersection (CFI) at the intersection of Pine Ridge Road and Livingston Road. Ms. Lantz stated that at the intersections of Pine Ridge Road at Whippoorwill Road and at I-75 the County was working with FDOT to consider a County recommendation for a Diverging Diamond Interchange (DDI) at I-75. Ms. Lantz stated that there are DDIs that are fully operational in the state of Florida.

Mr. Adams asked about the redesign of the I-75 Davis Boulevard interchange. Ms. Lantz stated that FDOT was working on the design of the project. Mr. Ortman stated that construction was programmed for FY23.

D. City of Naples

E. City of Marco Island

No updates were provided from the City of Naples or the City of Marco Island.

7. Committee Action

A. Endorsement of FY2019 – FY2023 Transportation Improvement Program (TIP)

Mr. Ortman stated that the Committee had seen a draft of the TIP at the December meeting and that no comments had been received. The TAC and CAC had also seen the draft TIP and had not made any comments. The Board had seen the draft in March and only had a couple of minor comments.

Mr. Ortman stated that draft TIP had been developed from a November snapshot with the understanding that FDOT would release a final snapshot in March that MPOs should use to develop their TIPs. FDOT had stated that there would only be minor changes between the two snapshots.

Mr. Ortman summarized the changes between the two snapshots. Three projects had increased in funding with a net increase of $765,000; this was the only change in funding between the two snapshots. Mr. Ortman stated the draft TIP had added five projects; all were included in both FDOT snapshots; four of the project were added to the TIP so that the TIP and the FDOT Work Program would match each other, the fifth project was added to correct a staff omission from an earlier draft of the TIP. Mr. Ortman stated that these changes were included in Attachment 2 as were several administrative changes and changes to prior and future project costs which do not have any impact on funding.

Mr. Ortman stated both the TAC and CAC had endorsed the TIP with two conditions. The first was to remove the Regional Non-motorized Transportation System Map as both committees believed it no longer served its original purpose and that it did not help the County in ongoing negotiations with FDOT on maintenance responsibilities for pathways along state roads. There was a brief discussion on the removal of the map. Ms. Lantz further explained the County's reasoning stating the ongoing negotiations with FDOT on pathway maintenance responsibility; and stating that the map was still in existence for the MPO until such time as the Board takes action. The second condition was to include editorial comments and corrections from Ms. Lantz.

The draft TIP is out for public comments until May 9th. The Board will approve the TIP on June 8 with consideration of all comments received. To date there have been no public comments. Mr. Ortman stated that staff had done the TIP in-house this year as opposed to using a consultant, DTS; and had done it for less money and in less time.

Mr. Musico: **I move to approve the TIP.**

Dr. Friedman: **I second the motion.**

THE MOTION CARRIED UNANIMOUSLY.

8. Reports and Presentations (May Require Committee Action)

A. Update on the Bicycle & Pedestrian Master Plan

Mr. Ortman updated the Committee on the work to date for the Bicycle & Pedestrian Master Plan. (The power point presentation is available on the MPO website colliermpo.com.) Mr. Ortman stated that all the public and committee input, County documents, the previous walkable community studies and Comprehensive Pathways Plan, current facilities inventory, and current crash and Environmental Justice (EJ) data had been used to begin to shape the Plan's criteria, project selection process and other recommendations.

Mr. Ortman stated that more than 600 comments had been received and that safety had emerged as the most important issue to the public and that one of the draft recommendations of the plan would be that additional Road Safety Audits (RSA) be done for areas where there appeared to be crash issues and that the MPO fund projects recommended by these RSAs. Increased connectivity received the second most comments; local road needs and multi-use pathways/greenways also received numerous public comments. As a result of public input, instead of creating a single master list of priorities it was being recommended that local roads, arterials and collectors, and greenways be treated as separate categories as they serve significantly different functions.

Mr. Ortman stated the plan would like to suggest that when any roadway project is done including stormwater improvements that bicycle and pedestrian improvements be included to the extent feasible. Mr. Musico suggested that cost alone should not be the determining factor in whether or not to include bicycle or pedestrian improvements. Discussion ensued over the extent to which the plan could suggest such improvements. Mr. Ortman stated that while this may be a good idea, the plan may not have the ability to be that prescriptive. Ms. Lantz stated that roadways budgets were set by agencies other than the MPO.

Mr. Ortman referenced a slide that showed the public outreach conducted for the plan and that more than 600+ comments had been received which could be broken into four general categories: safety, connectivity, multi-use paths and greenways, and local needs. Large intersections, driver behavior and speed of traffic, lack of lighting, gaps in the network and a lack of facilities were among the safety comments received. Connectivity comments focused on connecting existing facilities before building new ones, and better east-west connections. More interconnected multi-use paths/greenways and local sidewalks filled out the general tone of the comments.

The existing documents and data and public comments were used to develop a strategy to identify needs centered around safety, equity, transit stops, connectivity, local roads, greenways and completing gaps. Mr. Ortman stated that Local road recommendations were pulled from the Tier 1 recommendations of the Walkability Studies; the Golden Gate Tier 1 recommendations will be added once that study is complete. Mr. Ortman described how the criteria were used to develop draft lists of potential projects.

Mr. Ortman stated that there has been significant public input on the need for sidewalks on local roads. As a starting point the consultant has applied the criteria included as Attachment 2 to the Tier 1 recommendations from the three completed walkability studies and will add the Golden Gate City study once complete. The result of this initial application of criteria is shown in Attachment 1. Discussion ensued over whether to include population density as a criterion. There was a general consensus amongst committee members that population density should be considered as a criterion. Mr. Ortman stated that including population density as a criterion would be re-evaluated. Further discussion followed on how many points should be awarded for community support. Mr. Musico stated that some events are attended by relatively large groups. Mr. Othman stated that a lack of community support does not necessarily imply the lack of a need or of potential use. Mr. Adams stated that socio-economic condition and cultural influences way result in greater or lesser areas of public involvement. Mr. Ortman stated that community support would be looked at further.

Mr. Ortman stated that the consultant, and MPO and County staff had started to work on developing potential policy language that could be used by jurisdictions in helping to shape bicycle and pedestrian improvements in future new and redevelopment. Ms. Halman asked where education and enforcement fit in. Mr. Ortman stated that research has shown that education and enforcement are two proven mechanisms that can increase bicycle and pedestrian safety; the plan will include education and enforcement. Mr. Agacinski stated that occasionally there were High Visibility Enforcement Grants offered and that may be another potential funding avenue. Mr. Ortman stated that the plan was trying to identify other area of funding beyond the traditional box funds.

Dr. Friedman asked if the plan was considering a program such as City Bikes where bikes were made available free of charge for people to "rent". Mr. Ortman stated that this was something that could be included in the plan as another suggestion but that it would likely be beyond the reach of the MPO to implement. Discussion ensued over the potential pros and cons of such a program.

Mr. Musico stated that another potential funding source the plan may wish to look to would be the Long Range Transportation Plan where projects could include bicycle and pedestrian facilities that perhaps it would be better to wait until the larger project was done which could include bicycle and pedestrian facilities instead of using box funds. Mr. Bonness stated that although resurfacing project may be another opportunity to get facilities included, sometimes the project can get reclassified so that bike and ped facilities are no longer eligible for the project.

Ms. Fendrick asked if the County's resurfacing maintenance schedule could be reviewed so that perhaps the MPO and the County could work together with sufficient lead time to incorporate bicycle and pedestrian facilities in some resurfacing projects. Mr. Adams suggested that the MPO see if someone from the maintenance department could attend a BPAC meeting where some of the details of a potential effort could be discussed. The committee thought that this was a worthwhile effort to pursue.

Mr. Ortman thanked the Committee for their valuable input. He stated that there would be a stakeholder meeting on May 21; the next time the BPAC would see the plan it would be a draft plan. Dr. Friedman asked if the Congestion Management Committee should be one the stakeholder group. Mr. Ortman stated that the County Traffic Operations department was on the stakeholder group
Mr. Musico asked if the plan will address how it should be used with respect to priorities and implementation. Mr. Ortman stated that the plan will include suggestions as to how it may be implemented but the plan could not be prescriptive for other agencies. Mr. Musico asked how a call for projects might be handled; would the plan be given to FDOT for them to pick from; would be Board members each select a project; or would some other method be used? Mr. Ortman stated that the details for this were still be worked out. One option being considered would be, for example, that the plan equally prioritizes 20 projects on arterials/collectors but allows the BPAC or the County or some other group to do the actual ranking within this list of 20. Local knowledge and changing circumstances may yield a better list than having the plan prioritize the projects in a vacuum.

Ms. Fendrick asked if expanding the call for projects beyond the pathways box had been considered. Mr. Ortman stated that that has not yet been considered as the next call for projects would be in 2020 which would allow ample time to consider this. In addition, many of the currently funded priorities have only been funded for preliminary engineering and would need to be funded for construction in the coming years.

Mr. Ortman stated that a draft plan would be developed during the summer and that the draft plan would be brought to the committees and Board in the fall with adoption scheduled for October. There would also be a second public open house scheduled for late August. Mr. Bonness stated that there one public speaker for this item, Dennis DiDonna.

Mr. DiDonna, stated that he came to speak about Wiggins Pass Road. Mr. DiDonna stated that five new 20-story high rise buildings were being planned near the corner of Vanderbilt Drive and Wiggins Pass Road; a

150,000 square-foot shopping center at the intersection of Wiggins Pass and US 41; and a 60,000 square-foot shopping center near the intersection of US41 and Old US41. Mr. DiDonna stated that this development would add a lot of traffic to Wiggins Pass Road that has two 12-foot lanes, a 4-inch macadam sidewalk and no bicycle facilities.

Mr. DiDonna stated that when cars pass bicycles and allow three-feet of space they are forced to cross the double yellow line into oncoming traffic because there are no bike paths on Wiggins Pass. A pedestrian was recently killed walking when two cars collided and hit the pedestrian. Mr. DiDonna stated that work on Vanderbilt Drive was just completed which included bike lanes that are already getting significant use. If bike lanes are added to Wiggins Pass, people will use them.

Mr. DiDonna stated that he, along with a group of other people, is also working with the County to advance the construction of Veterans Memorial Boulevard which would connect Vanderbilt Drive to Livingston Road. Mr. DiDonna stated that during season it would take up to five traffic signal cycles for him to be able to make a left-turn from 41 onto Immokalee Road. He concluded by thanking the Committee for letting him speak and that he understood that there were limited dollars and needs throughout the County. Mr. DiDonna stated his wish that installing bicycle lanes on Wiggins Pass Road would become part of the Bicycle & Pedestrian Master Plan.

Ms. Fendrick asked if the Wikimap was still active on the website. Mr. Ortman stated that it was still active and that he and Mr. DiDonna had had several conversations and that Wiggins Pass had been identified as a need based on comments from multiple residents in the area. Dr. Friedman stated that this was evidence of continued short-sightedness on the part of the County for not have infrastructure installed before development occurred.

Mr. Bonness stated that the need for bike lanes on Wiggins Pass has been recognized for years and that the sidewalk is sometimes under water during the rainy season. Mr. DiDonna stated that the sidewalk is not wide enough for cyclists and walkers to use at the same time.

B. Update on the Golden Gate City Walkable Community Study

Mr. Ned Baier, Jacobs Engineering, introduced himself stating that the Board was due to adopt the plan in June. A second public meeting would be held this Thursday from 5:00 – 7:00 p.m. at the Golden Gate Community Center. (The power point used for the presentation is available at colliermpo.com or by calling the MPO office at 239-252-5874.)

Mr. Baier described Golden Gate City as a four-square mile area with a young diverse population of 29,000, nine schools, 400 intersections and 76 miles of roads. Jacobs Engineering spent three days in the community meeting with citizens, stakeholders and performing multiple walking and biking audits. Mr. Baier described the Level of Service (LOS) grades, and the criteria used to determine them, for areas within the community. Most of the side roads do not have sidewalks whereas the main roads do have sidewalks. Mr. Baier noted that Golden Gate City has an unusually high number of people who walk and bike and that more than one-third of the total Collier Area Transit ridership comes from the community.

Mr. Baier noted that most of the highest priorities, Tier 1, were around the schools. Recommendations were divided into three tiers which roughly correspond to short, mid and long time frames. Mr. Baier described some relatively easy short-term fixes such as completing sidewalk gaps, providing mid-block crossings and painting intersection crosswalks.

Mr. Baier stated that mid-term recommendations included road diets, sharrows, mini-circles at intersections and home streets. Long-term recommendations include. Longer term recommendations include enhanced transit stops, consideration of roundabouts and mid-block HAWK signals. Ms. Otero stated that most of the recommendations coming from the plan would require additional study,

C. Update on the 2040 LRTP Amendment

Mr. Ortman stated that due to the time, the Committee would need to move quickly through this item. Mr. Ortman stated that an amendment to the Long Range Transportation Plan was being considered as a result of the Rural Lands West development. A public meeting was held for the amendment; a fact sheet used for the meeting is included as Attachment 1. Attachment 2 is public review summary report for the amendment. Highpoints of the summary report include the statement that the Randall Boulevard Oil Well Road corridor is still being studied. Within the study area is the "S-curve" alignment which has generated significant comment both for and against. The report also includes recommendations to add two projects to the Cost Feasible Plan. The projects are to extend Vanderbilt Beach Road from 8th Street 11th Street and extend Randall Boulevard form 8th Street to Everglades Boulevard. The public comment for the amendment is currently open and will close on the 23rd.

9. Member Comments

None.

10. Distribution Items

A. 2018 Bicycle and Pedestrian Priorities
B. Update on the FY2019-FY2020 Unified Planning Work Program (UPWP)

Mr. Ortman stated that this is the same list that has been used in recent years and that the list now shows that 13 of the projects have received funding. The list includes the phase and programmed funding amounts; five of the projects are funded for construction, the other eight for preliminary engineering in FY2023. These eight projects still need to be funded for construction which may consume future box funds.

Mr. Ortman stated that the second distribution item was an update on the amendment to the Unified Planning and Work Program. The amendment includes a de-obligation of $177,000. The biggest impact to the BPAC is the extension of the deadline for the Bicycle & Pedestrian Master Plan until October 30th.

11. Next Meeting Date

The May BPAC meeting is being combined with a stakeholder group meeting for the Bicycle & Pedestrian Master Plan to be held on May 21st at 10:30 a.m.

The next regularly scheduled meeting for the BPAC will be on August 21st at 9:00 a.m.

12. Adjournment

With no further business to attend to, Mr. Bonness entertained a motion to adjourn the meeting.

Dr. Friedman: **I move to adjourn.**

Mr. Bonness: **I second the motion.**

THE MOTION CARRIED UNANIMOUSLY.

The meeting adjourned at approximately 11:30 a.m.

COMMITTEE PRESENTATION
ITEM 8A

Presentation of Draft Bicycle & Pedestrian Master Plan

OBJECTIVE: For the Committee to receive an update on the Draft Bicycle & Pedestrian Master Plan; and to provide input on the draft plan.

CONSIDERATIONS: The draft plan has been developed from the more than 600 public comments, committee input, best practices, the Comprehensive Pathways Plan, and crash data. The following overarching themes were used to develop the draft plan: safety, increased connectivity, Environmental Justice (EJ), and the fact that the needs far outstrip the funding necessitating the securing of additional funding to fully implement the plan.

The committee has seen earlier versions of the first five chapters though they were presented in different formats as the plan was being developed.

Chapter 6 – Implementation – is the heart of the plan. Staff believes that the discussion should heavily focus on this chapter.

STAFF RECOMMENDATION: That the Committee discuss and provide input on the draft plan.

Attachments:

1. Draft Bicycle and Pedestrian Master Plan

Prepared By: Eric Ortman, Senior Planner

CHAPTER 1 EXISTING CONDITIONS

This chapter provides an overview of existing conditions in Collier County, particularly as they relate to the bicycle and pedestrian network (Figure 1) and the people who use the network.

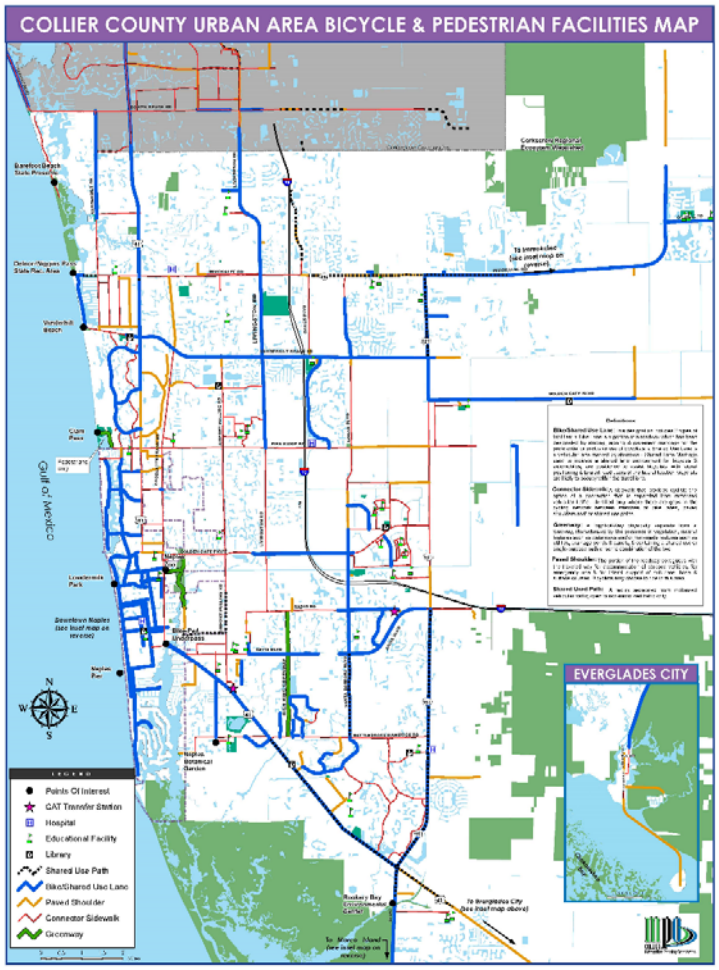


Figure 1: Collier County Bicycle/Pedestrian Facilities Map

Demographics

Collier is the largest county in Florida by land area and had a 2015 Census population estimate of 357,305. The county's population is socio-economically diverse. The average household income is higher than that of Florida, and the percent of people living below the poverty level is lower than Florida. However, there are areas within Collier County—most notably, Golden Gate City, Immokalee, and Naples Manor, but also including other smaller areas—where incomes are significantly lower, levels of poverty are significantly higher, and more people are without access to a vehicle than county or Florida averages, as shown in Table 1. The people who live and work in these areas tend to be greater users of the bicycle, pedestrian, and transit networks. Collier also has many seasonal residents and visitors who, as part of their daily lives, also bike and walk for recreation, to run errands, and for transportation to local destinations.

Table 1: Percent Population/Vehicle, Year Census (2016 Census)

Area	Percent of Population with No Vehicle Available	Percent of Population Who Walk, Bike, or Use Public Transportation to Get to Work
Florida	7%	4%
Collier County	5%	6%
Everglades City	0%	5%
Marco Island	5%	6%
Naples	3%	7%
Golden Gate City	10%	5%
Immokalee	26%	32%
Naples Manor	12%	8%

According to July 2017 Census population estimates, 31% of Collier County's residents are age 65 and older. As they become less comfortable with driving, they may increasingly use the transit system or, with the appropriate infrastructure and proximity, could walk or bicycle to run errands or get to appointments. Research has shown that people are willing to walk about ½ mile to a transit stop, and access to convenient biking infrastructure can increase that travel distance to about 3 miles. This access can have far-reaching impacts on personal and community quality of life and livability and provide better access to jobs and benefit the overall financial health of the community.

As noted in Collier's 2040 Long Range Transportation Plan (LRTP), Collier County is one of the fastest growing counties in the United States, with its population increasing seven-fold between 1970 and 2010. Population projections forecast the addition of another 150,000 people by 2040, bringing the population to almost 500,000. This forecasted growth in population will increase travel demand and likely result in additional traffic congestion. Whereas widening roads to accommodate additional vehicle traffic is one approach, building those roads to accommodate different modes of travel such as bicycles and proactively planning bicycle and pedestrian infrastructure are other important strategies.

To achieve the goals of this plan, the collective needs of all Collier County current residents and those who will be moving to the county must be considered and met to the greatest extent possible.

To begin to identify needs for bike and pedestrian facilities, Collier's population and environmental justice (EJ) areas were mapped. EJ areas are defined as those with greater than 10% of the county average by minority population, are non-native English speaking, are over age 65, or have no access to a vehicle. For the purpose of this plan, any location in which two or more of these factors overlap was included. The areas satisfying these criteria are shown in Map 1. The EJ area map is provided at the end of this chapter.

Bicycle and Pedestrian Infrastructure

With the exception of I-75 and limited access facilities, bicyclists and pedestrians use all types of roads and paths in Collier County, so their needs must be addressed at all levels, from Americans with Disabilities Act (ADA) and intersection improvements to creating corridors that safely accommodate walking and bicycling. There are roughly X centerline miles of maintained roads in the county, including unpaved roads. Aside from I-75, bicyclists may use any of these roads. A 2017 inventory of bicycle and pedestrian infrastructure approximated that these roads include 133 miles of bicycle lanes and 165 miles of paved shoulders, which leaves more than (½, ¾, or X) of these roads without bicycle infrastructure. Facilities that are funded but not yet constructed will add almost 5 more miles of bike lanes. Many factors beyond the number of bicyclists riding in the county influence the extent to which these facilities are used, including traffic volumes, posted speed limits, width of facilities, and rider individual level of comfort and perception of safety. Increasing the quantity, quality, and safety of the bicycle infrastructure is a critical strategy for improving the safety, connectivity, and overall appeal of the bicycle network.

The 2017 inventory approximated that there are 142 miles of sidewalks and 54 miles of pathways in the county, with another 10 miles funded for construction. The county pathway network includes the Richard King Memorial Greenway and the Gordon River Greenway. Collier County also has miles of trails

within parks and sanctuary areas; as the focus of this plan is active transportation, these were included in the totals. Sidewalks have been constructed along major (collector) and arterial roads. Completing gaps and increasing connectivity in the existing sidewalk network and constructing and interconnecting new sidewalks where there is demand as well as extending and interconnecting pathways are critical steps to improving the connectivity and overall appeal of the sidewalk/pathway network.

Maps 2 and 3 depict **existing** walking and biking infrastructure and can be found at the end of this chapter.

Other Bicycle and Pedestrian Plans

Some local jurisdictions within the county have developed their own bicycle and pedestrian plans and identified bicycle and pedestrian priorities. These plans include similar goals of improving bicycle and pedestrian safety and connectivity. The Collier Metropolitan Planning Organization (MPO) Bicycle & Pedestrian Master Plan will work in conjunction with these other plans by incorporating their priorities and needs into the MPOs' list of needed improvements to be prioritized and evaluated for funding. Following are brief descriptions of each of these plans.

City of Naples

In 2013, Naples adopted a Pedestrian and Bicycle Master Plan[1] that identified five-year goals and objectives and outlined programs and projects that would enhance biking and walking in Naples. The infrastructure recommendations include adding bike lanes and shared-lane markings with pavement resurfacing and completing sidewalk gaps.

City of Marco Island

The City of Marco Island is actively working to complete its Master Plan Map, which is updated annually. The plan's goal is to develop "bike lanes and shared use pathway projects to allow both expert and novice riders to get around most parts of the City by bicycle." Many of the plan's projects have been funded and will be completed in the next five years. The City also submits some of the plan's projects to the MPO for consideration of funding. The 2018 Marco Island Bike Path Master Plan and supporting City Council resolution can be found in the Appendix.

City of Everglades City

Everglades City is a small community on the edge of the Florida Everglades. Through development of this plan, Everglades City identified priority sidewalk projects that can be considered for future funding.

Immokalee

Immokalee works with the County through the Community Redevelopment Association (CRA) to identify infrastructure needs and develop funding strategies. Immokalee recently received a $13 million federal TIGER Grant that will construct 20 miles of sidewalk, upgrade 32 intersections, add or upgrade bus shelters and lighting, and make drainage improvements. Many roads identified for improvements in the

[1] https://www.naplesgov.com/community/page/cycling-naples.

grant application were identified in other plans such as the Collier MPO 2012 Comprehensive Pathways Plan and the 2011 Immokalee Walkable Community Study. Needs that are in areas outside the grant area will be included on the list of local needs developed for this plan.

Walkability Studies

The MPO has complete three neighborhood scale Walkability studies, including Bayshore, Immokalee, and Naples Manor. A fourth study, for Golden Gate City, will be completed this year. Each study identified and prioritized walking infrastructure needs within the community and included a list of prioritized recommendations to improve walkability. As part of this study, the first-tier recommendations from each Walkability study were reviewed and added to a list of needs for bicycle and sidewalk infrastructure on local roads. (See Chapter 6—Implementation for a discussion of the action plan for local road projects.)

Safety

Smart Growth America's *Dangerous by Design 2016* stated that Florida had the highest pedestrian danger index in the country.[2] Reducing this index by increasing pedestrian and bicycle as well as motorist safety in the primary focus of this plan. Chapter 2 explores bicycle and pedestrian safety in Collier County and includes a number of strategies that may be employed to successfully increase the safety of residents of and visitors to Collier County.

From 2011 through 2016, there were 808 reported crashes involving a pedestrian or bicyclist.[3] These crashes resulted in 33 fatalities, 119 serious injury crashes, and 460 total injuries. Bicycle crashes made up 65% of the crashes; however, pedestrians were more likely to be involved in a fatal crash or a crash resulting in a serious injury than bicyclists.

Approximately 80% of crashes occurred on a collector or arterial road; these roads have higher posted speed limits and carry higher volumes of traffic than local roads, which accounted for 20% of crashes.

Crash reports are completed when a law enforcement officer reports to the scene of a crash. The accuracy of crash report data continues to improve, and some general assumptions may be drawn from the collective data. Reading each crash report is required to draw more specific conclusions. However, it is important to note that research has indicated that bicycle and pedestrian crashes are underreported; the degree of underreporting varies, but researcher found that it can be a significant number.[4]

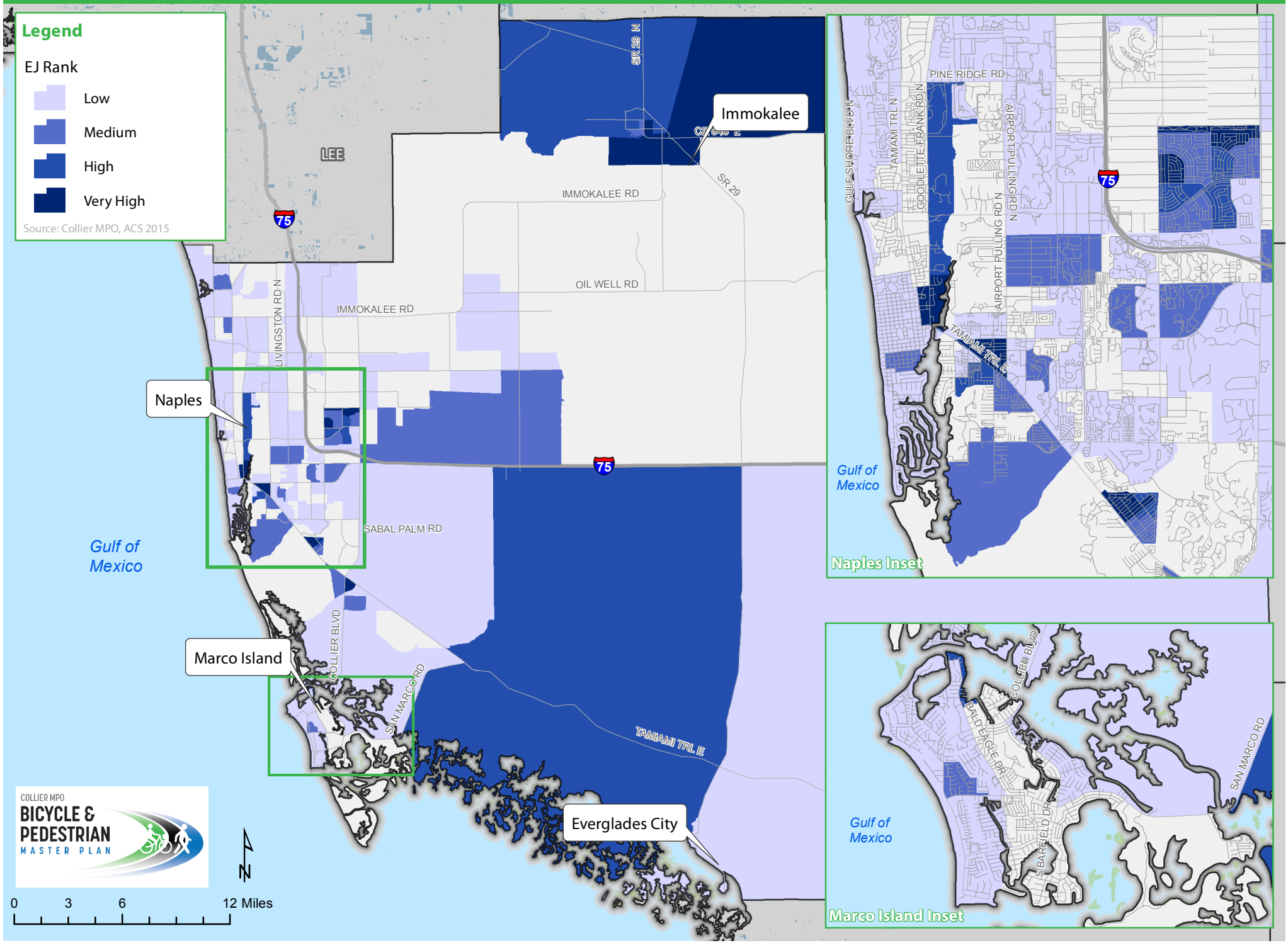
A crash often has multiple contributing factors. In the 809 reported crashes, aggressive driving and crashes in which one or more drivers was at least age 65 were noted as contributing factors in approximately one-third of the crashes. Roughly 20% of the crashes occurred at intersections.

[2] Smart Growth America, *Dangerous by Design 2016*, January 2017, pp. 8-10.
[3] Collier County Crash Data Management System (CDMS) 2011–2016.
[4] Dr. Kari Watkins et al., "Literature Review and Survey Results of Bicycle and Pedestrian Treatment Safety Assessments," http://onlinepubs.trb.org/onlinepubs/Conferences/2016/UTC/OP-3-Watkins.pdf.

Environmental Justice Block Group Ranking

MAP 1

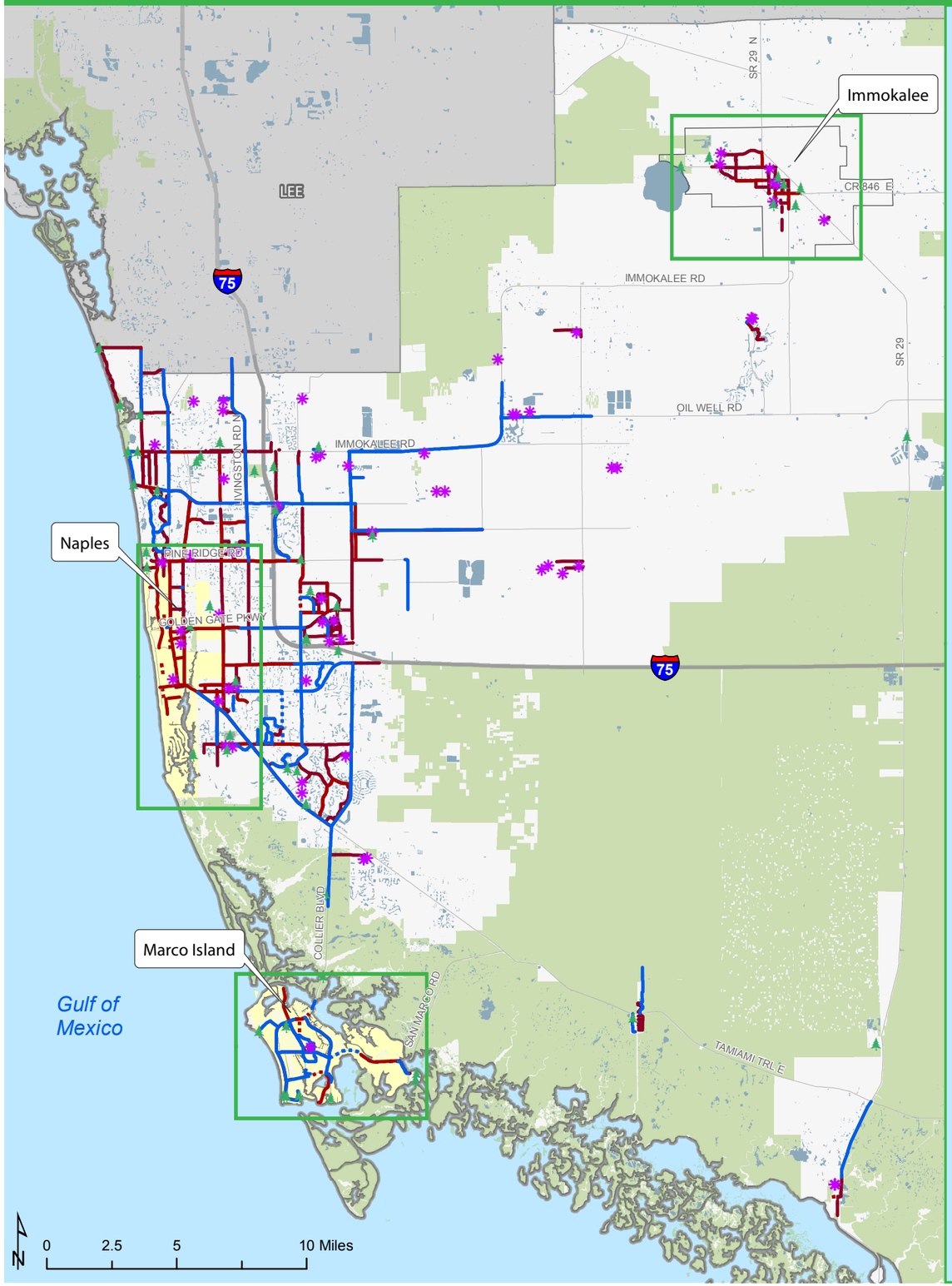
Bicycle & Pedestrian Master Plan

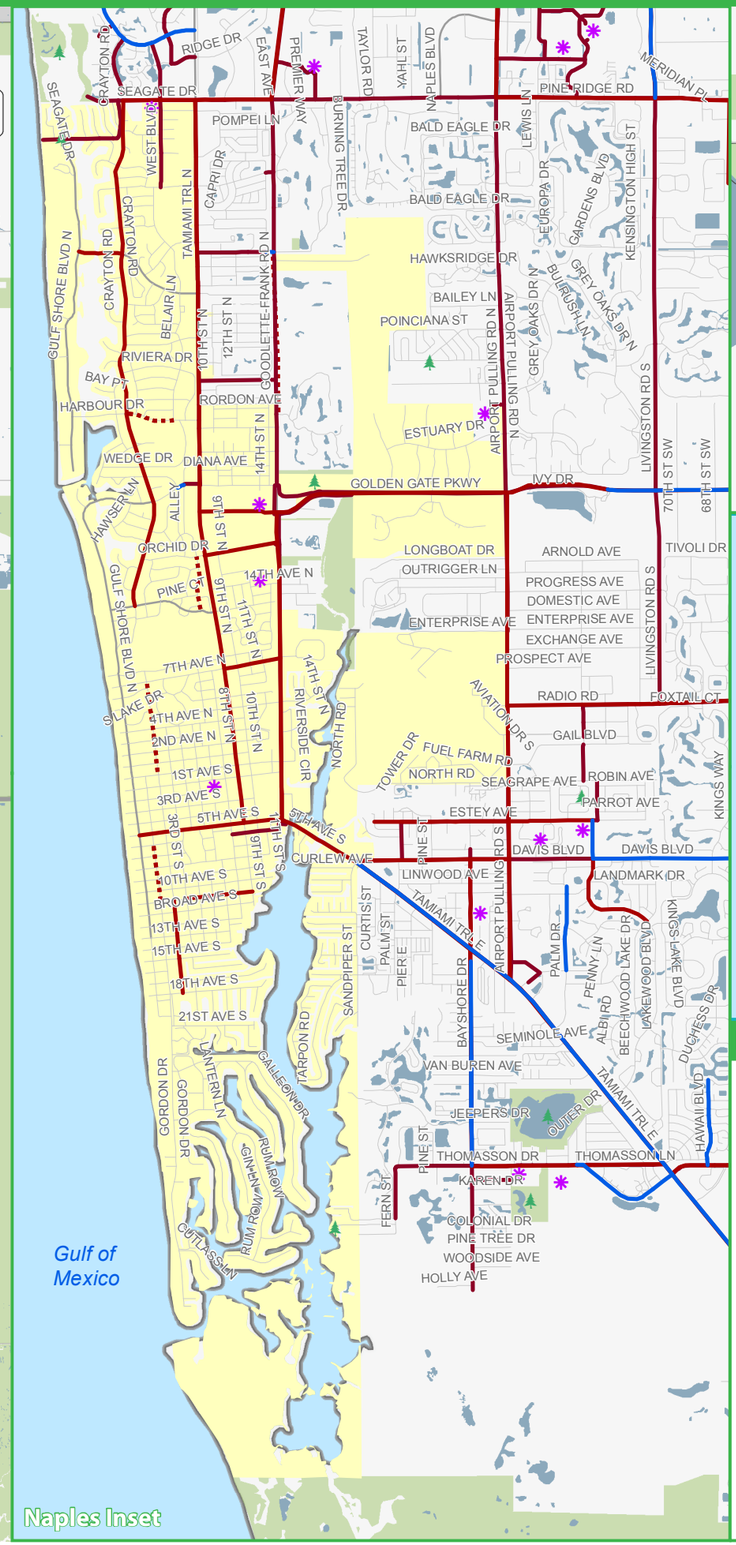


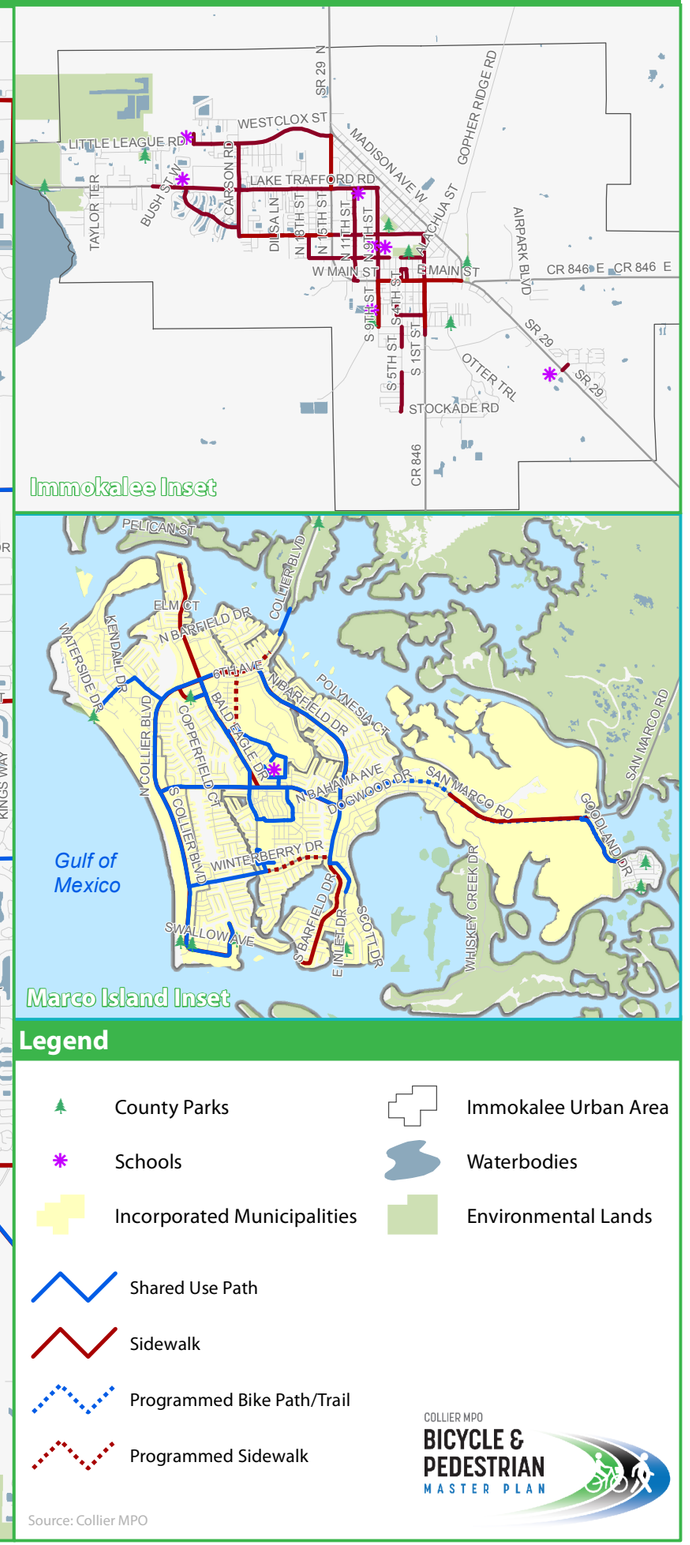
Existing + Committed Pedestrian Facilities

MAP 2

Bicycle & Pedestrian Master Plan







Legend

- County Parks
- Schools
- Incorporated Municipalities
- Immokalee Urban Area
- Waterbodies
- Environmental Lands
- Shared Use Path
- Sidewalk
- Programmed Bike Path/Trail
- Programmed Sidewalk

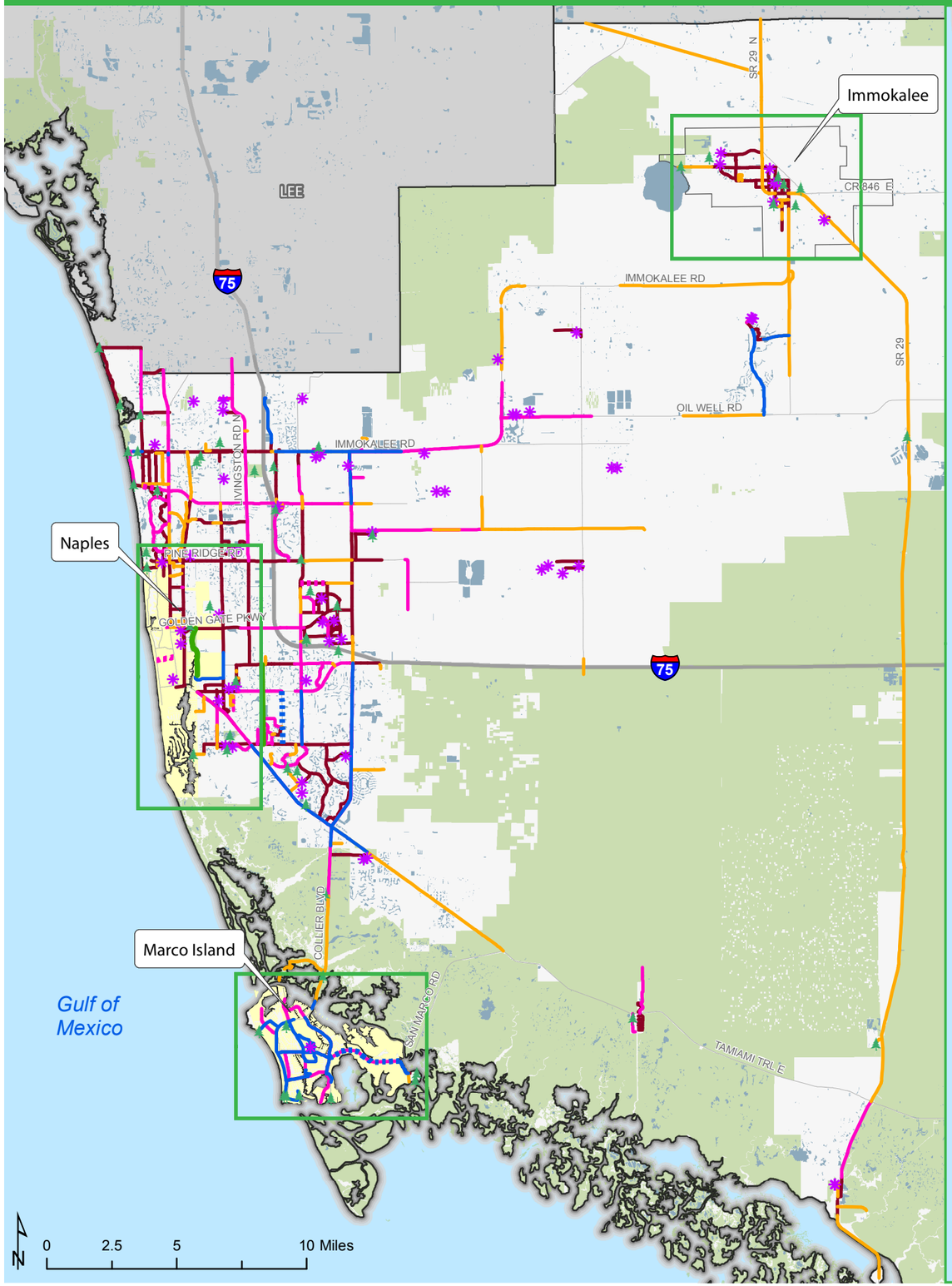
COLLIER MPO BICYCLE & PEDESTRIAN MASTER PLAN

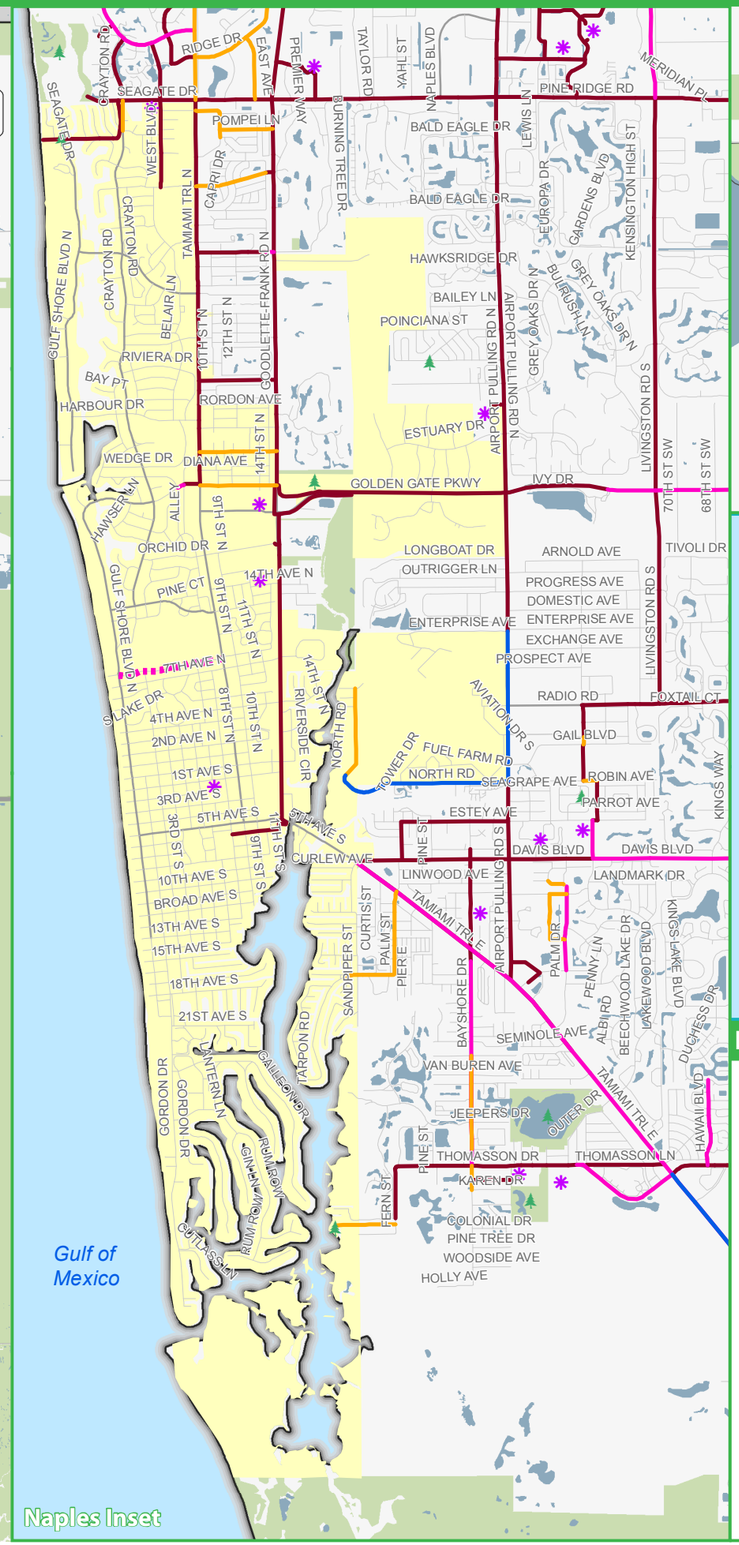
Source: Collier MPO

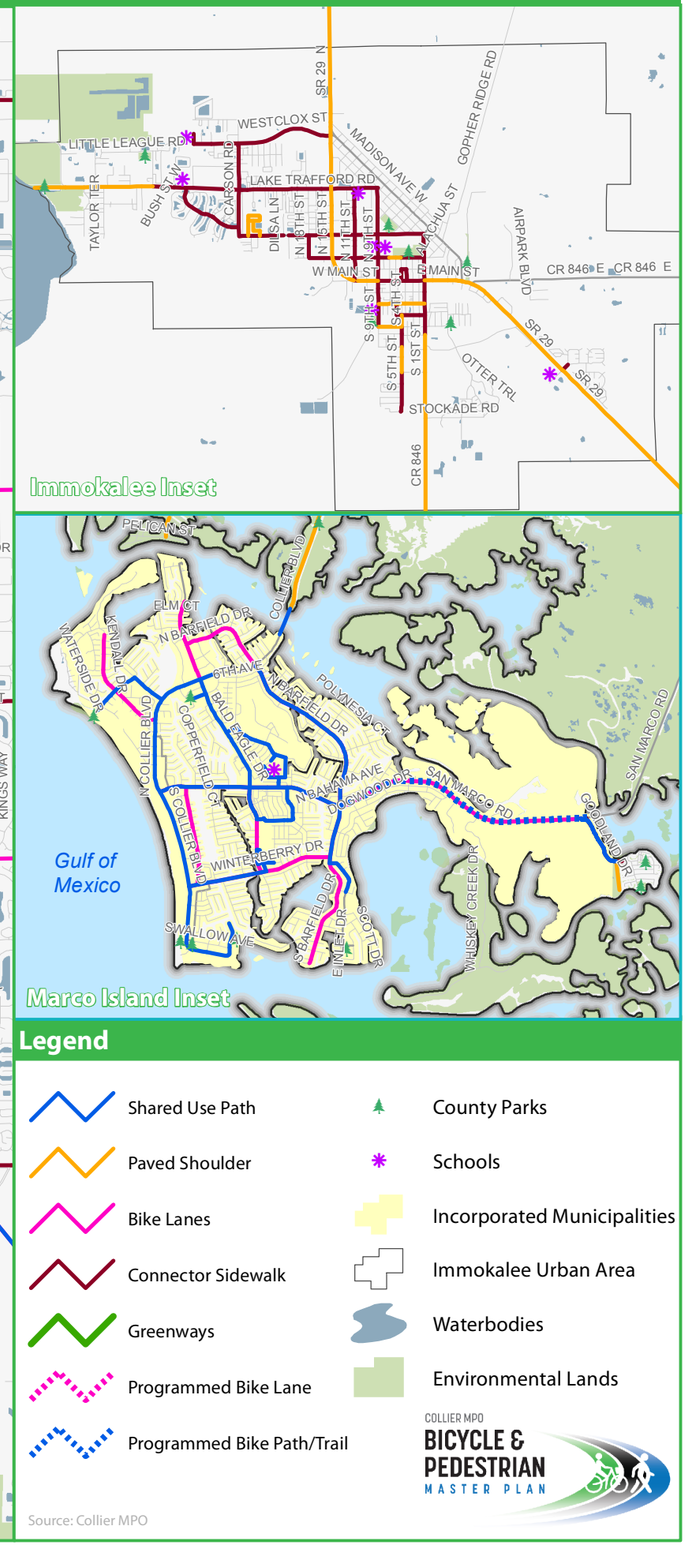
Existing + Committed Bicycle Facilities

MAP 3

Bicycle & Pedestrian Master Plan







Legend

- Shared Use Path
- Paved Shoulder
- Bike Lanes
- Connector Sidewalk
- Greenways
- Programmed Bike Lane
- Programmed Bike Path/Trail
- County Parks
- Schools
- Incorporated Municipalities
- Immokalee Urban Area
- Waterbodies
- Environmental Lands

COLLIER MPO BICYCLE & PEDESTRIAN MASTER PLAN

Source: Collier MPO

CHAPTER 2 – SAFETY CRASH DATA ANALYSIS

To better understand conditions and risks and to begin to identify potential improvement strategies for people walking and biking in Collier County, six years of bicycle and pedestrian crash data (2011–2016) were mapped and analyzed using data from the Collier County Crash Data Management System (CDMS).[1] The primary purposes of the review were to note any changes in trends and to identify where the most severe crashes and crash clusters occur. A similar analysis was done by the MPO in 2010, and the two analyses generally agree and identify similar problem high crash areas. This suggests that the challenges remain consistent, and opportunities for safety-focused projects throughout Collier County continue to be a primary need.

Between 2011 and 2016, there were 808 reported bicycle and pedestrian injury crashes. As shown in **Figure 1**, bicyclists accounted for 60% (485) or these crashes, and 40% (323) involved pedestrians (does not include any unreported crashes). Many studies have examined un-reported crashes and have concluded that reported crashes are the "tip of the iceberg" compared to the total number of crashes. A discussion of these studies is included at the end of this chapter.

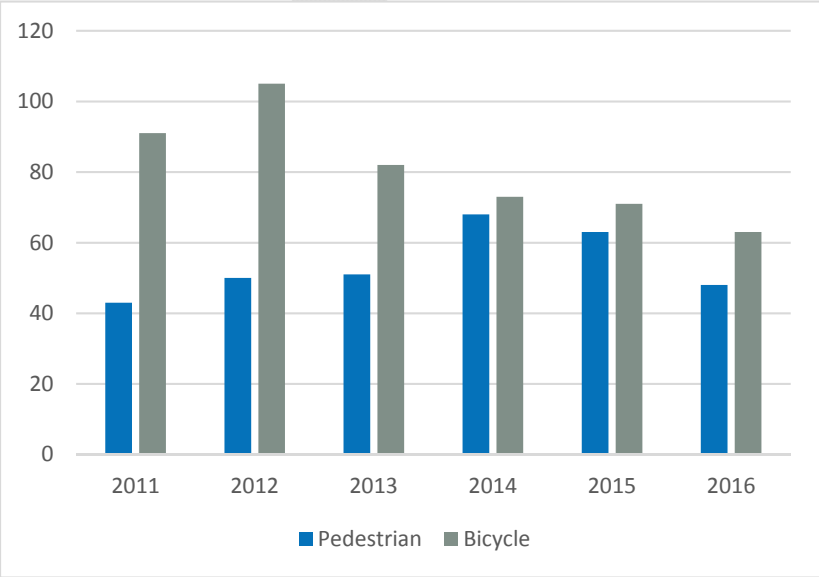


Figure 1: Total Reported Bicycle and Pedestrian Crashes (2011–2016)

The number of bicycle crashes has declined in each of the last six years. Analysis of the reasons for these decreases is beyond the scope of this plan, but even the 63 crashes in 2016, which is the lowest of the six years, still represent a sizeable absolute number of crashes and indicate that further opportunities and challenges to improving safety remain.

Crashes in which people are fatally or severely injured have the greatest impact on the individuals involved and on the larger community. A pedestrian or bicyclist is far more likely to be fatally or severely injured than a motor vehicle driver in a crash. Data from the Department of Highway Safety and Motor Vehicles show that in 2016, there was a 5% chance that a vehicular crash would result in a fatal or severe injury.[2] The CDMS data analyzed for this plan shows that 29% of pedestrian crashes (94 of 323) and 16% of bicycle crashes (79 of 485) resulted in a fatal or severe injury. **Figure 2** shows the number of pedestrians and bicyclists fatally or severely injured in a reported crash.

[1] Source: Collier County Crash Data Management System, 2011–2016.
[2] Florida Department of Highway Safety and Motor Vehicles, "Traffic Crash Facts, 2016 Annual Report," p. 2.

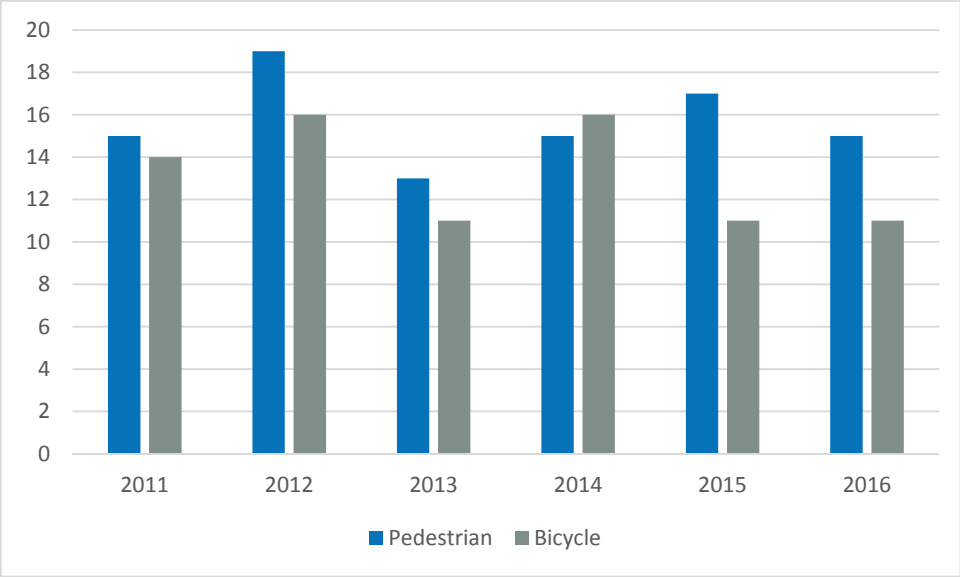


Figure 2: Pedestrian and Bicycle Fatal and Serious Injury Crashes

A National Highway Traffic Safety Administration (NHTSA) study[3] estimated both economic[4] and comprehensive[5] costs of those severely or fatally injured involved in a motor vehicle crash. Neither that study nor the Florida Department of Transportation (FDOT) have developed crash cost numbers that are specific to bicyclists or pedestrians. Generally, the cost per crash is relative to the type of road on which it occurs. **Table 1** shows these costs for bicycle and pedestrian crashes between 2011 and 2016 that resulting in a severe or fatal injury. Costs are expressed in 2010 economics using a 3% discount rate. The cost estimates in Table 1 are for crashes involving at least two motor vehicles, which is not the case for bicycle and pedestrian crashes. Adjustments were not made for this difference; adjustments would lower the costs somewhat but not alter the magnitude of the costs to society.

[3] National Highway Traffic Safety Administration (NHTSA), "The Economic and Societal Impact of Motor Vehicle Crashes," 2010 (revised 2015).

[4] Economic costs are the total of goods and services expended to respond to a crash, treat injuries, repair or replace damaged property, litigate restitution, administer insurance programs, and retrain or replace injured employees; also includes health and environmental congestion impacts and value of workplace and household productivity lost.

[5] Comprehensive costs are the total societal harm resulting from a crash; includes value of lost quality-of-life as measured and economic impacts that result from crash.

Table 1: Economic and Comprehensive Cost of Bicycle & Pedestrian Crashes, 2011–2016

Economic Cost			
Type	**Each Cost**	**Crashes**	**Total Cost**
Severe Injury	$1.0 million	119	$ 119 million
Fatal injury	$1.4 million	33	$ 46 million
Comprehensive Cost			
Type	**Each Cost**	**Crashes**	**Total Cost**
Severe Injury	$ 5.6 million	119	$ 666 million
Fatal injury	$ 9.1 million	33	$ 300 million

Contributing Factors

Data collected for crashes include contributing crash factors. There is often a degree of subjectivity on the part of the law enforcement officials completing this part of the report, and not all contributing factors may be gathered in each report. Understanding contributing crash factors is important in developing strategies to lower the number of crashes. Contributing factors from the CDMS data for this plan are shown in **Figure 3**. Aggressive driving (37%), being an aging driver (32%), and the crash occurring at an intersection (21%) were the top three reported contributing factors. Distracted driving and impaired driving were listed as contributing factors in 10% of crashes. Being a teen driver was noted in only 5%) of crashes. Education and enforcement are two of the most effective strategies for lowering the incidences of aggressive, distracted, and impaired driving.

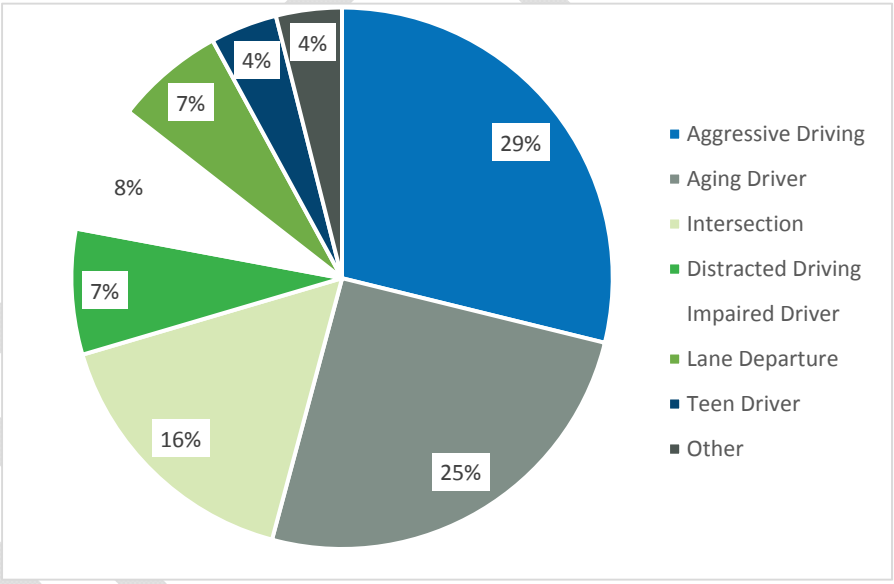


Figure 3: Contributing Factors in Reported Crashes

Speed of Traffic

The main roads in Collier County are designed to quickly and efficiently move high volumes of motorized vehicular traffic. These roads form the backbone of the transportation network and allow the rapid movement of people and goods, providing the necessary infrastructure for a successful economy. Posted speed limits on most of these roads varies between 35 and 50 miles per hour (mph).

This network also provides important bicycle and pedestrian throughfares. Not surprisingly, the vast majority of the bicycle and pedestrian crashes between 2011 and 2016 occurred on one of these roads. Recent studies have found that vehicle speed is a critical factor in the survivability of a pedestrian or bicyclist involved in a crash with a motor vehicle. Figure 4 depicts the liklihood of a pedestrian being fatally or severely injured rising dramatically as the speed of the vehicle increases.

Figure 4: Vehicle Speed Impacts on Pedestrian Survival Rates When Involved in a Crash

Traffic speed and volume impact walking and bicycling comfort and safety and present a challenging transportation issue. Physically separating motorists from bicyclists or pedestrians is the most effective solution to this problem; however, the built environment along most of the region's major roads is significantly constrained, which makes separating the two uses difficult.

The number of vehicles noted as speeding, according to the CDMS crash data used in this plan, is in sharp contrast with number of observations that indicate a significant amount of traffic may be traveling above the posted speed limits; the CDMS data list speed as a contributing crash factor in only two crashes. Speed likely would not be listed as a contributing factor if the driver was shown to be driving at the posted speed limit.

Because the difference in speed between vehicles, and bicyclists/pedestrians is a primary cause of injuries, much of the current focus is on helping drivers obey the speed limit to slow down traffic or separate the modes. Florida's current roadway design, often with wide lanes and straight through-ways, makes applying any of these approaches challenging.[6] A future step in this process will be to identify and study corridors that might be candidates for design and other changes that can slow traffic.

Lighting is also an important safety feature, allowing increased visibilty for motorists, pedestrians, and bicyclists. Questions 5 and 10 of the survey administered during the public engagement process of this study asked respondents what made them feel unsafe when walking or biking. Of the respondents who answered, 30 percent of pedestrians and 22 percent of bicyclists noted a lack of lighting as a reason they felt unsafe. This plan recommends that analysis of adequate lighting be included in all projects.

Large intersections, which are necessary to meet the traffic demands on the region's major roads, present obstacles of varying degrees of difficulty to individuals attempting to cross the road. This plan will recommend that solutions that can appropriately increase the safety of people crossing the road be implemented.

Acknowledging this constraint, the plan recommends several strategies that can increase safety along these roads. One strategy will be to continue to fund Road Safety Audits (RSAs) in high-crash areas; the other is to build separated or wider bicycle and pedestrian facilities whereever possible. Along those lines, the plan supports continued implementation of the 2015 FDOT US 41 RSA completed for US 41 and Airport Pulling Road. The RSA recommends reducing the speed on US 41 from 45 mph to 35 mph in combination with other strateigies that will "aid in slowing motorists down." MPO staff also will continue to work with County staff to identify opportunities for improved facilities.

Road Safety Audits

The CDMS crash data analyzed for this plan provided meaningful insight into crashes related to contributing factors, location, and areas where there appear to be clusters of crashes. However, an in-depth analysis is needed to fully understand the actual problem and to identify appropriate solutions. This analysis is usually done through an RSA, an in-depth multi-disciplinary engineering and planning review of areas of concern. RSAs typically suggest a combination of infrastructure, engineering, education, and enforcement strategies and are considered a critical tool in determining projects that can increase safety and be prioritized for funding. This plan recommends that RSAs be been conducted in areas that, by analysis, appear to have the most significant crash clusters. Bicycle-focused RSAs, with a focus on rider-specific challenges, also should be considered.

A 2015 FDOT Road Safety Audit of US 41 and Airport Pulling Road near the main campus of the Collier County Government Center is a recent RSA success story. Through the collaborative effort of FDOT, the County, and the MPO, $1.5 million in safety improvements will be made on US 41 between Courthouse

[6] Laura Bliss, "Why Does Florida Have America's Most Lethal Roads?" https://www.citylab.com/transportation/2017/01/why-florida-has-americas-most-lethal-roads/512954/.

Shadows and Davis Boulevard when the road in resurfaced. Construction is anticipated in Fiscal Year 2021.

High-Crash Corridors

Previous analysis conducted by the MPO identified corridors with high occurrences of severe and fatal bicycle and pedestrian crashes. This analysis identified locations for possible further study. Additional discussion about high-crash locations and recommended future studies and projects can be found in Chapter 6—Implementation. Table 2 shows the high-crash corridors and some related intersections that are candidates for further crash analysis. Generally, these high-crash intersections represent a sub-set of the corridor list and are listed with their associated roadway. An in-depth analysis of all intersections along the corridor is recommended, as intersections tend to be where pedestrians and bicyclists are the most vulnerable.

Table 2: High Bicycle Crash Corridors

Road Name	High-Crash Intersections
US 41	US 41 @ Airport Rd (CR 31) US 41 @ Bayshore Dr US 41 @ Rattlesnake Hammock Rd US 41 @ Lakewood Blvd US 41 @ Immokalee Rd (Cr 846)/111th Ave
Airport Pulling Rd	Airport Rd (CR 31) @ US 41 CR 31 Airport Rd @ Glades Blvd CR 31 Airport Rd @ Estey Ave Airport Rd (CR 31) @ Davis Blvd (SR 84)
Collier Blvd	Collier Blvd @ US 41
Immokalee Rd	Immokalee Rd (CR 846) @ Airport Rd (CR 31)
Davis Blvd	Davis Blvd (SR 84) @ Kings Way Davis Blvd (SR 84) @ Airport Rd (SR 31) Davis Blvd (SR 84) @ Shadowlawn Dr
North 15th St (SR 29)	SR 29 North 15th St @ S 3rd St SR 29 North 15th StreStet @ Lake Trafford
Pine Ridge Rd	CR 31 Airport Rd @ CR 896 Pine Ridge Pine Ridge Rd (CR 896) @ Shirley St
Golden Gate Pkwy	Golden Gate Pkwy (CR 886) @ Sunshine Blvd Golden Gate Pkwy (CR 886) @ Coronado Pkwy
Radio Rd	Radio Rd (CR 856) @ Leawood Ln Radio Rd (CR 856) @ Santa Barbara Blvd
Vanderbilt Beach Rd	Vanderbilt Beach Rd @ US 41

Limitations of Crash Data

Completing crash data reports involves a certain amount of subjectivity on the part of the officer completing the report; individual officers and different agencies may use different approaches to

completing reports, which can result in data inconsistencies, and there are differences in how the collective data are gathered and managed. Crash data reporting continues to improve.

Despite these limitations, law enforcement crash reports are the best source for gathering data and statistics on bicycle and pedestrian crashes. As analysis of crash data is useful in looking at trends such as number of crashes, severity of crashes, contributing factors, and locations of crash clusters. To fully understand the circumstances of a crash requires reading each crash report in its entirety. Such as effort is far beyond the scope of the plan.

External factors such as the employment, economic activity, and gasoline prices impact the number of crashes. There was a notable reduction in crashes during the state's economic slowdown, with the number of crashes increasing as the economy has recovered. These factors need to be considered when analyzing crash data.

Unreported Bicycle and Pedestrian Crashes

Traditionally, law enforcement crash reports have been the source of bicycle and pedestrian crash statistics. Although these reports provide significant information, they have also been referred to as the "tip of the iceberg" with respect to the total number of bicycle and pedestrian crashes. Many factors contribute to this underreporting. Crash reports often are limited to events that occur on a public roadway and exclude events that occur in parking lots, driveways, on sidewalks, and on private roads. In addition to crashes not on public roads, the presence and/or severity of any injuries, whether an insurance claim is filed, and whether those involved wish to not report the crash all contribute to an underreporting of the total number of crashes.

Many studies show that reported crashes are the "tip of the iceberg" compared to the total number of crashes.

A literature review done by the Federal Highway Administration (FHWA) found that 60–75% of hospitalized victims of pedestrian- and bicycle-motor vehicle crashes were identified in official motor vehicle crash files. The report also found that for persons receiving only emergency room treatment and not hospitalization, the reported crash percentages ranged from 50–60%.[7] A study by Elvik and Mysen in 2007 found that 95% of all fatal pedestrian and bicycle crashes are captured in official crash data; however, the percent of reported crashes declined dramatically with decreasing injury severity to as low as 25% of all crashes.[8] A similar study found that bicyclists who were hospitalized or killed were 1.4 times more likely to be reported in official state crash data than bicyclists who received emergency room treatment but were not admitted.[9]

[7] "Injuries to Pedestrians and Bicyclists: An Analysis Based on Hospital Emergency Department Data," FHWA-RD-99-078 (1999).
[8] Rune Elvik and Ann Borger Mysen, "Incomplete Accident Reporting: Meta-Analysis of Studies Made in 13 Countries," *Transportation Research Record*, 1665, 133-140, 2007.
[9] J. C. Stutts and W. W. Hunter, "Police Reporting of Pedestrian and Bicyclists Treated in Hospital Emergency Rooms," *Transportation Research Record*, 1635, 88-92, 1998.

In addition to actual reported or unreported crashes, "near misses" are not reported as crashes. A survey conducted by the Collier MPO of Collier County residents yielded 478 responses[10] (representing only a fraction of 1% of the county's total population; should not be considered statistically representative of the county's total population.) Key findings of the survey include the folowing:

- Nearly half of the respondents (47%, 225 people) reported either "being in a collision or being forced from their path while biking or walking in the last five years."
- Of these, 86% (194 people) stated that they had not reported the incident.
- Slightly less than two-thirds (62%) of respondents reported feeling "threatened for their personal safety."
- Of these, 85% (252 people) stated that motorists were the cause of their feeling "threatened."

Safety Performance Targets

Safety is the first national goal identified in the Fixing America's Surface Transportation (FAST) Act and is also of critical importance to the MPO. As part of FAST, the Federal Highway Administration (FHWA) required all State departments of transportation (DOTs) and MPOs to adopt five safety performance targets by the end of February 2018. MPOs also were required to adopt their own targets or those of the State DOT. The five safety performance measures are:

1. Number of fatalities
2. Rate of fatalities per 100 million Vehicle Miles Traveled (VMT)
3. Number of serious injuries
4. Rate of serious injuries per 100 million VMT
5. Number of non-motorized fatalities and serious injuries

FDOT has adopted "Vision Zero," a program that sets the goals of zero traffic fatalities or injuries in the state, and the Collier MPO adopted these safety performance targets in February 2018. By doing do, the MPO can rely upon FDOT's annual reporting to FHWA on safety performance in the Statewide Transportation Improvement Program (STIP), which greatly simplifies the reporting requirements associated with the MPO's Transportation Improvement Program (TIP) and LRTP. This plan also includes other performance measures, which are discussed in Chapter 4.

[10] Collier MPO, Pedestrian and Bicycle Safety Study, February 14, 2013.

CHAPTER 3 – COMMUNITY ENGAGEMENT

An enhanced community engagement process was used for this plan to reach the most people and get the broadest possible community input. In addition to traditional workshops, meetings, and open houses, the process included outreach at farmer's markets, attending and gathering comments at non-MPO public meetings, an interactive map on the Collier MPO website, and a survey in English, Spanish, and Creole.

The MPO considered the pubic engagement for this plan to be a success, as more than 600 total comments were received (see Appendix X). Several repeated themes were identified during the process including the following:

- Increase safety for those walking and bicycling.
- Complete sidewalk, bike lane, and path gaps on major roads.
- Address local sidewalk needs.
- Increase connectivity particularly to and from the region's beaches, between existing greenways, and between Immokalee and the rest of the county.
- Develop multi-use trails and path where possible (e.g., along Collier Blvd).

Two open house workshops were held during the plan's development. The first was held early in the process to get input about plan goals and objectives, bicycle and pedestrian facility needs, and the public's perception of this part of the region's transportation system. Attendees voted on goal statements that were used to develop the needs and evaluation criteria. They also marked up maps to show challenging locations, and connections they wanted to see made. A total of 20 people signed in for the meeting, and many comments were received. A second workshop was held at the end of the plan development process to affirm that the planning process had captured the feedback correctly and that there was community support for the plan. Maps of the projects on collectors, arterials, and local roads as well as spot projects were presented for review and comment. Attendees were asked to comment on any omissions or proposed additions to the proposed maps and lists. There were X attendees and X comments received (workshop pending).

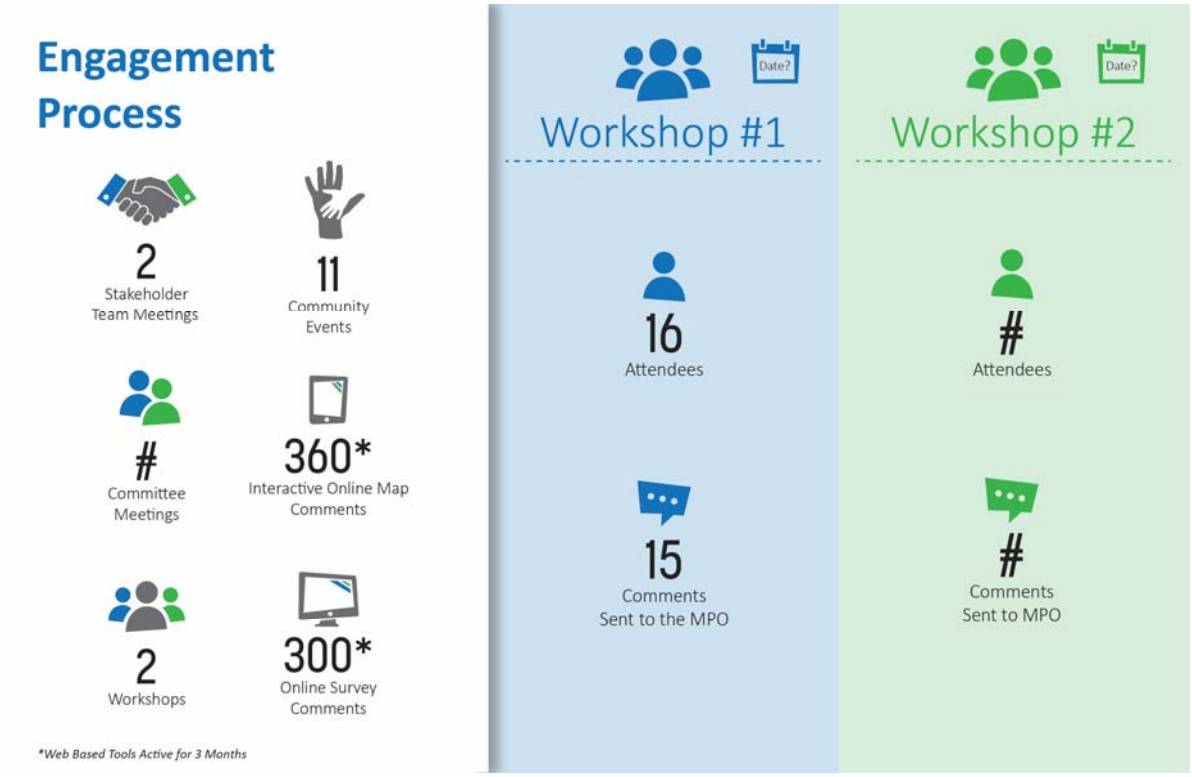


Figure 1: Collier MPO Bicycle and Pedestrian Plan engagement by the numbers

A discussion of the tools and survey results follows.

Interactive Map

An interactive web-based tool was used to enable community members to make comments and identify challenges and desired connections. In Figure 1, purple circles denote comments related to bicycle

needs, orange circles denote challenges, yellow are safety concerns, and yellow lines are connections needed. Users could also make similar comments about pedestrian needs and challenges.

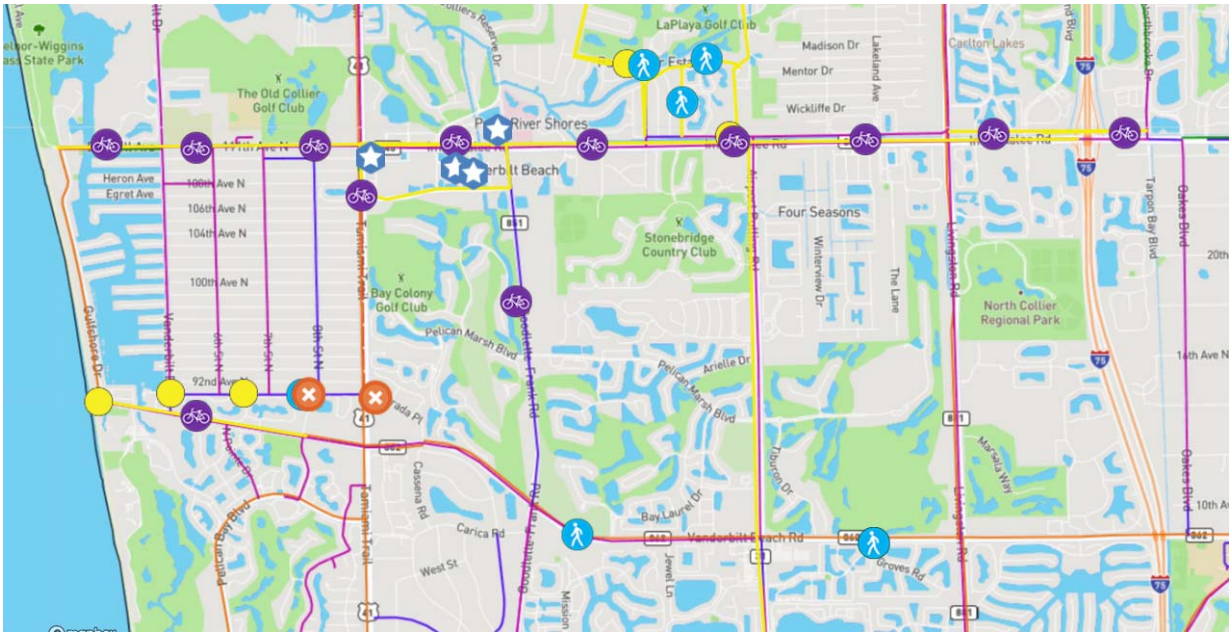


Figure 2: User-Mapped locations and connections using on-line mapping tool

Online Survey

The online survey was used to get a sense of the level of comfort people felt when walk or bicycling and to identify areas of concern and support. Respondents were asked a variety of questions relating to bicycling and walking. Generally, those who responded to the survey expressed discomfort with the bicycling and walking environment in Collier County. The survey received more than 300 responses. The survey and responses as well as other feedback can be found in the Appendix.

87%

of survey respondents stated that there are places they would not bike because of "uncomfortable/unsafe routes or lack of routes."

Respondents were asked what makes them feel unsafe when biking or walking. The top three reasons cited were lack of facilities (81%), driver behavior (78%), and speed of traffic (72%). Figure 2 shows responses to this question.

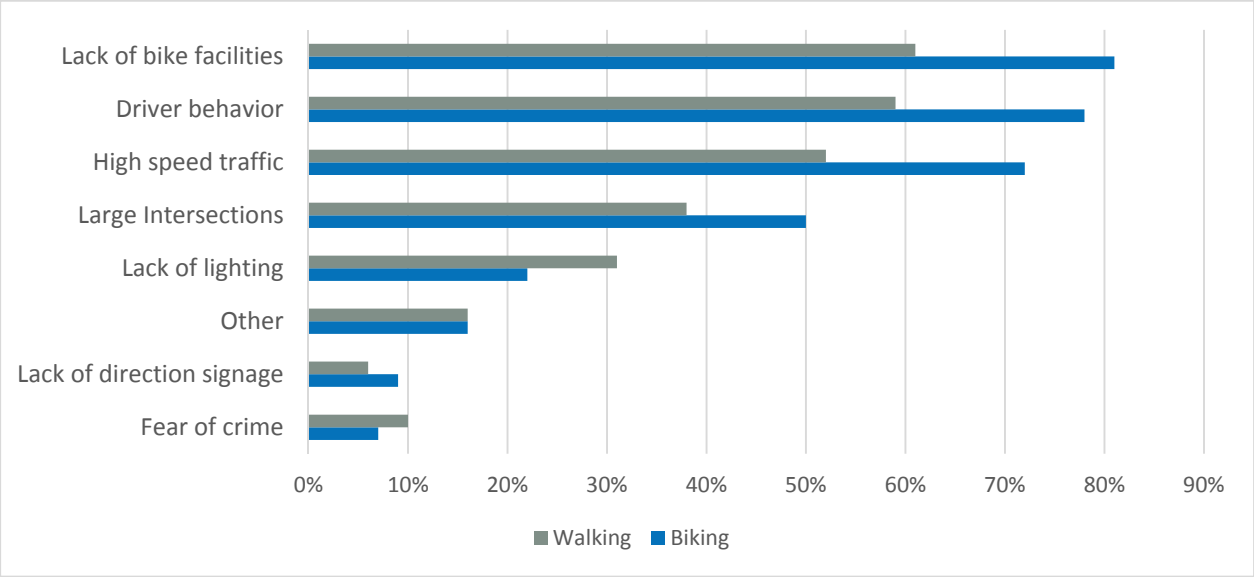


Figure 3: What Makes Pedestrians and Walkers Feel Unsafe?

Respondents were asked what types of facilities or bike support they would like to see more of and could select as many options as desired. Paths/trails were noted by 34%, and bike lanes were noted by 21%. Items in the "Other" category included protected bike lanes, wider bike lanes, green-painted bike lanes, and bike parking.

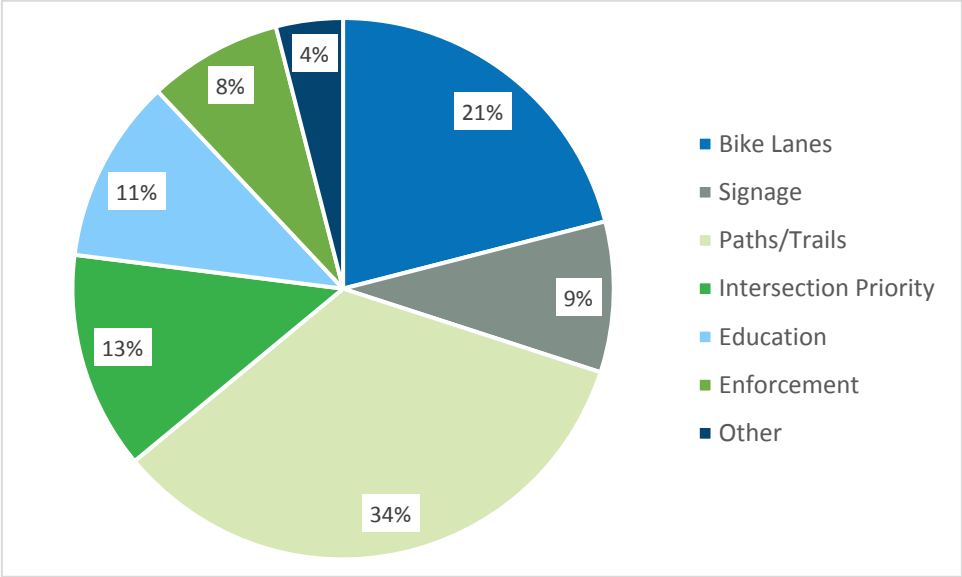


Figure 4: Desired Bicycle Facility Support

Respondents were asked about walking support and could select as many options as desired. New sidewalks had the most support (28%), followed by filling gaps in existing sidewalks (16%) and wider sidewalks (15%). Items in the "Other" category included lighting, maintenance, and mid-block crossings.

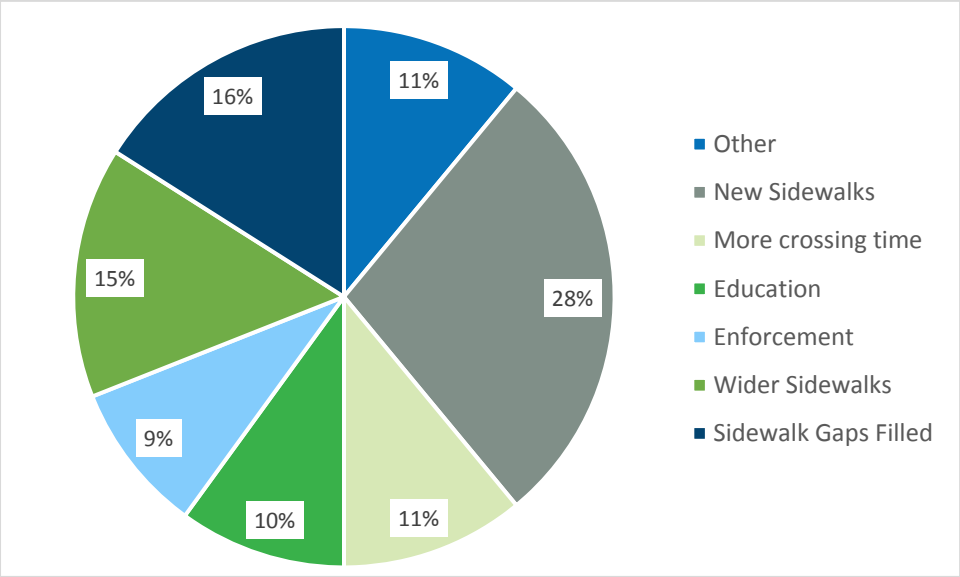


Figure 5: Desired Pedestrian Facility Support

MPO Board and Advisory Committee Meetings

The MPO Board and three of its advisory committees—the Technical Advisory Committee (TAC), the Citizens Advisory Committee (CAC), and the Bicycle and Pedestrian Advisory Committee (BPAC)—were updated regularly on the plan's development and provided meaningful direction and comment. All MPO meetings were open to the public, and additional public comments was gathered at these meetings.

Stakeholder Group

A Stakeholder Group, comprising agency and advocacy groups for users of the bicycle and pedestrian system as well as MPO committee members, was convened twice to solicit feedback on the plan's focus and direction as well as goals and objectives. In addition to providing feedback, the group acted as a voice for people who regularly walk and bike but whose voice may not have been heard through the other public engagement efforts.

CHAPTER 4 – VISION, GOALS, OBJECTIVES, AND PERFORMANCE MEASURES

Defining a vision, goals, and objectives creates the structure for a plan. To develop the vision for this plan, the team reviewed the previous Comprehensive Pathways Plan and other plans and considered public, Board, committee, and stakeholder group input. The following vision statement was used to guide the development of the plan's goals, objectives. and strategies.

Vision

To provide a safe and comprehensive bicycle and pedestrian network that promotes and encourages community use and enjoyment.

Safety and a comprehensive or connected network are the two cornerstones of the plan. Public feedback indicated that safety and making biking and walking more accessible should be primary emphasis points. This interest is supported by travel trends and by current research showing that if there are safe and accessible facilities, whether for walking or for biking, people will use them. With this and the future in mind, the vision for this plan was developed. The vision and the goals and objectives are consistent with the priorities identified in the 2040 LRTP and will be considered in the development of the 2045 LRTP.

Goals

The goals were developed by reviewing local and national best practices and goals in similar plans, including the MPO Comprehensive Pathways Plan, and with consideration of public and committee input. Although similar to the previous plan, the importance of safety has been increased in this plan. The goals became the basis for the development of strategies and project prioritization criteria which are discussed later in the plan.

Goal	Strategy
Safety	Increase safety for people who walk and bicycle in Collier County.
Connectivity	Create a network of efficient, convenient bicycle and pedestrian facilities in Collier County.
Health	Encourage health and fitness by providing a safe, convenient network of facilities for walking and biking.
Environment	Protect the environment by supporting mode choice.
Equity/Livability	Increase transportation choice and community livability through the development of an integrated multimodal system.
Economy	Promote tourism and economic opportunities by developing a safe, connected network of biking and walking facilities.

Table 1: Goals and strategies

Objectives and Strategies

Goals can be general and lofty, but objectives and strategies need to specific enough to help make measurable progress towards the goals. The following objectives and strategies were identified to help achieve the goals developed for this plan.

1. Safety *Increase safety for people who walk and bicycle in Collier County.*

Objectives:

- Reduce the number and severity of bicycle crashes.
- Reduce the number and severity of pedestrian crashes.

Strategies:

- Identify high-crash locations for RSAs. Projects identified in RSAs will be high priority for funding.
- Collaborate with law enforcement to develop and deploy enforcement/education campaigns.
- Work with FDOT to seek funding for High Visibility Enforcement for Pedestrian and Bicycle Safety.
- Adopt a complete streets policy and work with local governments and the County to develop and adopt their own complete streets policies. (Note: The MPO has no implementation ability; therefore, any policy needs to be acceptable to and help local governments work towards their own goals.)
- Work with FDOT to reduce number of severe injury and fatal crashes.

2. Connectivity *Create a network of efficient, interconnected and convenient bicycle and pedestrian facilities in Collier County.*

Objectives:

- Fill in gaps in the existing bicycle and pedestrian network.
- Provide a variety of bikeways and pedestrian facilities connected to transit stops and along transit routes.
- Provide a variety of bikeways and pedestrian facilities connected to parks, schools, downtowns, and employment centers.

Strategies:

- Actively pursue multiple sources of funding to implement plan.
- Use Transportation Management Area (TMA) funds to fill in small gaps in existing facilities.
- Partner with local agencies and the County to use SU box funds to construct Walkability study recommendations on local roads.

TMA funds are distributed from State DOTs to MPOs with populations over 200,000. TMA funds are prioritized by the MPO in conjunction with the State DOT.

- Coordinate with the County and FDOT to complete network gaps that may be completed during roadway widening or reconstruction, or infrastructure projects.
- Coordinate with the County and FDOT to complete gaps during resurfacing projects.
- Locate bicycle and pedestrian projects in areas that will impact the greatest number of people.

3. Equity/livability *Increase transportation choice and community livability through the development of an integrated multimodal system.*

Objectives:

- Provide safe biking and walking conditions in areas of Collier County that are underserved or transit-dependent.
- Provide a variety of bikeways and pedestrian facilities connected to destinations.
- Provide a variety of bikeways and pedestrian facilities connected to transit.

Strategies:

- Work with Collier Area Transit (CAT) to provide bike parking facilities at bus stops.
- Identify and select projects that support the safe, convenient use of transit.
- Locate bicycle and pedestrian projects in areas that will impact the greatest number of people.
  Identify and select projects that allow safe, convenient access to areas of high employment.
- Identify/select a proportion of projects that address the needs in EJ communities/area.
- Adopt a Complete Streets policy.

4. Health *Encourage health and fitness by providing a safe, convenient network of facilities for walking and biking.*

Objectives:

- Partner with the Collier Department of Health and local community organizations to identify areas of concern.

Strategy:

- Continue with process to add projects to the needs list and collaborate on funding.

5. Economy *Promote tourism and economic opportunities by developing a safe, connected network of biking and walking facilities.*

Objectives:

- Improve bikeability to destinations.
- Support bicycle and pedestrian access to jobs.
- Improve connections to lively pedestrian environments.

Strategies:

- Develop wayfinding and directional signage program.
- Identify and select projects that allow safe, convenient access to areas of high employment.
- Work with local agencies to identify projects that facilitate pedestrian access to areas of employment and recreation.
- Collaborate with local agencies to identify opportunities for amenities (e.g., bike parking, benches, street trees).

6. Environment *Protect the environment by supporting mode choice.*

Objectives:

- Provide an accessible, connected network.
- Connect to destinations such as retail or service, making short distance trips on foot or by bike appealing.

Strategies:

- Fill gaps in the network to create better connections and to minimize the disruption in travel.
- Work with agencies to improve intersections and create safe crossing opportunities.

Performance Measures

Safety is the first national goal identified in the FAST Act. Under the Highway Safety Improvement Program and Safety Performance Management Measures Rule (March 2016), all MPOs are required to adopt safety performance targets by the end of February 2018. The rule requires MPOs to set safety-related performance measure targets and report progress to the State DOT. MPOs may adopt the State DOT targets or they may adopt their own targets. The Collier MPO has adopted FDOT's Safety Performance Targets. FDOT has adopted "Vision Zero" as its safety performance measure target with the goal of zero fatalities or serious injuries.

The five FHWA safety performance measures are the following; the fifth measure is directly applicable to bicyclists and pedestrians, and the strategies in this plan will aid in the MPO's pursuit of Vision Zero:

1. Number of fatalities
2. Rate of fatalities per 100 million Vehicle Miles Traveled (VMT)

3. Number of serious injuries
4. Rate of serious injuries per 100 million VMT
5. Number of non-motorized fatalities and serious injuries

The MPO also developed other performance measures to track progress in the implementation of this plan. The performance measures listed below include an increased focus on safety by tracking studies, strategy implementations, and construction of projects recommended by this plan. Subsequent work can be done on the objectives to create targets that can be useful in measuring progress.

- Reduction in number of bicycle/pedestrian crashes, injuries, fatalities.
- Number of shared-use paths studied/funded for construction or built.
- Number of greenways studied/funded for construction or built.
- Miles of bike lanes built.
- Miles of sidewalks planned, programmed, and built.
- Number of RSAs completed and implemented/funded.

CHAPTER 5 – POLICIES AND PROGRAMS

Role of Policies

Policies relating to biking and walking provide part of the framework for building a safe, convenient multimodal network for users of all ages and all abilities. According to FHWA's *Noteworthy Local Policies that Support Safe and Complete Pedestrian and Bicycle Networks*,

> Effective policy shapes long-term planning efforts, as well as more immediate decision making. It informs infrastructure planning, design, construction and maintenance and shapes decision making related to investments in infrastructure and capital improvements. Policy informs and shapes an agency's work in engineering, education, enforcement, emergency response, encouragement, and evaluation efforts. This multidisciplinary approach, embodied in both required Federal safety planning and best practices in bicycle and pedestrian planning and design, is important in establishing a safe and complete pedestrian and bicycle network.[1]

Often, policies that are considered ineffective can be traced back to implementation, education, and/or political will. This is complicated by the fact that local agencies often maintain their own policies and may implement them with different levels of effectiveness. An example of this is differences in facility width or maintenance.

At the most basic level, successful policy implementation requires education. During the comment period for this plan, feedback noted concerns over how the plan would be implemented. As a result of this feedback, the plan recommends that implementing agencies and MPO committees be trained on the latest manuals and available resources for the design of bicycle and pedestrian infrastructure and educated on the benefits of providing it. Setting county-wide standards, based on the *Florida Green Book* or best practices, is an example of a policy that would provide consistency across the network and enhance user experience, no matter their location in the county.

Complete Streets Policies

Complete Streets is a transportation policy and design approach that requires streets to be planned, designed, operated, and maintained to enable safe, convenient and comfortable travel and access for users of all ages and abilities regardless of the mode of transportation.

In 2015, the FAST Act was signed into law and is the first federal transportation bill to include Complete Streets. The bill required a change in roadway design standards to take vulnerable (bicycle and pedestrian) road users into account and allows the use of other roadway design guidance to develop design standards. To date, complete streets policies have been adopted nationwide by more than 1,140 local, regional, and state agencies.[2] Adoption of these policies has been found to save lives. For example, in Florida, a recent study found that the adoption of the complete streets policy that requires the accommodation of bicycle and pedestrian ways along State roads and

[1] "Noteworthy Local Policies that Support Safe and Complete Pedestrian and Bicycle Networks," p. 1, https://safety.fhwa.dot.gov/ped_bike/tools_solve/docs/fhwasa17006-Final.pdf.
[2] Smart Growth America, https://smartgrowthamerica.org/program/national-complete-streets-coalition/.

transportation facilities (Florida Statute 335.065) has had an enormous impact on the reduction in pedestrian fatalities, by some estimates as much as approximately 3,500 lives saved between 1984 and 2013.[3]

By adopting a complete streets policy, communities direct their transportation planners and engineers to **routinely design and operate the entire right-of-way to enable safe access for all users.**[4] This does not assume that all roadways must look alike, but it does assume that, in each context, all users will be considered. In an urban area, this may include adding a buffered bike lane; in a rural area, it may be by adding a wider shoulder.

There is no standard complete streets policy, but they share many common themes. Each agency that has adopted one has crafted a policy that responds to their needs and supports their vision. Smart Growth America has been working with communities since 2004 to develop and implement these policies and have identified 10 elements of a comprehensive complete streets policy:

1. A vision.
2. Specifies all users (pedestrians, bicyclist, transit passengers, trucks, buses, emergency vehicle and cars).
3. Encourages street connectivity and comprehensive, integrated, connected network for all modes.
4. Covers all roads.
5. Applies to new and retrofit projects, including design, planning, maintenance, and operations of the entire roadway.
6. Requires a procedure to implement exceptions and makes them specific.
7. Directs the use of the latest design guidance.
8. Acknowledges the importance of context in the application of complete streets elements
9. Establishes performance standards with measurable outcomes.
10. Includes steps for implementation.

The Collier MPO does not build projects and is not an implementing agency; however, it does play an important role in supporting the implementation of projects and policies as a funding agency. The MPO works collaboratively with local governments and agencies within Collier County. Given this role, any complete streets policy adopted by the MPO should support project selection and collaboration for funding. The Palm Beach MPO Complete Streets policy, adopted in 2016, provides a good example of how a policy and a program that supports the MPO goal of complete streets project implementation.

> The Palm Beach MPO aims to achieve a safe and convenient transportation network by implementing Complete Streets within the context of the County's diverse communities. The Palm Beach MPO will seek to promote Complete Streets by prioritizing the funding

[3] Jamila M. Porter et al., "Law Accommodating Nonmotorized Road Users and Pedestrian Fatalities in Florida, 1975 to 2013," *American Journal of Public Health,* 108(4) (April 1, 2018), pp. 525-531, https://ajph.aphapublications.org/doi/pdf/10.2105/AJPH.2017.304259.

[4] "What are Complete Streets?" https://smartgrowthamerica.org/program/national-complete-streets-coalition/what-are-complete-streets/.

of Complete Street infrastructure projects, providing educational opportunities, and encouraging local jurisdictions to adopt and implement local Complete Streets policies.

In addition to drafting a policy that maximizes what the MPO can do, Palm Beach also adopted an implementation strategy that identifies its process and applicability, clearly identifies how projects will be evaluated, and ties projects back to the 2040 mode share target. The policy document has been included in the Appendix for reference.

Plan Policies

The following policies have been developed to guide the implementation of this plan.

Funding

- Establish prioritization for funding projects based on safety, equity, and connectivity.
- Coordinate with the County to include bikeways and sidewalks in planned road construction projects, maximizing available construction funding and long-range planning efforts.
- Collaborate with FDOT and the county on the construction of trails adjacent to state roads.
- Continue to collaborate with the county and schools to identify Safe Routes to School funding candidates.

Opportunities

- Collaborate with the county to maximize infrastructure opportunities.
- Work to increase or improve bicycle and pedestrian facilities on all roads in populated areas to make walking and biking more convenient.
- Coordinate the integration of bike and pedestrian facility design best practices into roadway cross-sections to assist in future roadway design.
- Make separated bikeways the preferred bikeway facility on county roadways with four or more lanes, traffic speeds of 35 mph, and/or more than 6,000 Average Daily Traffic (ADT). Separated facilities on roads with curbs may be separated bike lanes or shared-use paths, or buffered shoulders on roads with no curbs.
- Increase opportunities for the MPO advisory committees to collaborate with County Engineering and Public Works departments to comment on Plan review.
- Encourage end-of-trip facilities, including secure bicycle parking and shower/changing facilities to make walking and biking more convenient.
- Work with schools to promote Walk/Bike to School Day.

Connectivity

- Encourage the County to revise land development codes to have developers connect project bicycle and pedestrian infrastructure to existing or planned trails within 100 ft. of development entrance.
- Support plan review by MPO advisory committees and staff to ensure connections are made per policy

- Develop a policy that requires interconnections between developments be shown on project submittals. If there is no current adjacent development, opportunities to connect to the future development should be included in the project submittal.

Education and Enforcement

- Promote current rules and regulations for motorists, bicyclists, and pedestrians in a variety of formats.
- Identify locations in the county with the highest number of crashes involving bicycles and pedestrians; provide educational outreach to residents and local police as part of an overall effort to reduce crashes in these locations.
- Work with local law enforcement as part of districtwide Community Traffic Safety Team (CTST) programs.
- Work with FDOT to develop educational and enforcement campaigns targeting Collier County.
- Work with FDOT to identify resources to support additional enforcement campaign such as the High Visibility Enforcement Programs.

Maintenance

- Support coordination among the FDOT, MPO and City and County Maintenance departments for maintenance of multi-use trails, bike lanes and facilities along and within State, County, and local rights-of-way.

Policy and Code Review

- Developing successful and complete bicycle and pedestrian environments requires strong leadership as well as a comprehensive policy approach. The following discussion of policy best practices can be used as guidance for furthering the support for biking and walking in Collier County.
- FHWA has defined a complete network as "a pedestrian and bicycle transportation [that] consists of a series of interconnected facilities that allow nonmotorized road users of all ages and abilities to safely and conveniently get where they need to go."[5] There are six key elements of a successful policy framework:

    - Defining success.
    - Protecting nonmotorized travelers.
    - Promoting bicycle- and pedestrian-supportive development.
    - Designing networks.
    - Maintaining the network.
    - Paying for new investments and ongoing maintenance.

The Plan touches on many of these and MPO collaboration with local agencies will continue to be critical to achieving the vision developed in this plan.

[5] https://www.fhwa.dot.gov/environment/bicycle_pedestrian/guidance/policy_accom.cfm.

To promote the integration of bicycle and pedestrian infrastructure into the transportation system in Collier County, land development codes, facility design guidelines, and comprehensive plans were reviewed to identify opportunities to enhance this integration. Whereas this Master Plan is consistent with and builds upon the plans and guidelines, suggestions for edits have been included in the Appendix. It is recommended that plans and guidelines be reviewed periodically to ensure they are helping to create the environment envisioned.

Programs

The MPO continues to support outreach and education opportunities throughout Collier County. Example programs conducted by the Collier County Sherriff's Office, FDOT and area schools include Safe Kids SWFL, bike helmet fittings and giveaways, car seat fitting and giveaways, Ciclovia, bike rodeos, and programs such as Summer Nights, Winter Nights, and Fridays Nights, which are safety programs targeting school age kids and their parents.

With the increased focus on safety, an increased focus on enforcement and education strategies, which have been proven to be effective should be considered. The following programs support the plan goals:

- **Law Enforcement Officer Training**[6] – Self-paced training on pedestrian safety and bicycle safety is available from the National Law Enforcement Academy Resource Network (NLEARN). Alert Today Alive Tomorrow, FDOT's pedestrian- and bicycle-focused initiative, has developed several roll-call training videos for use by law enforcement officers.[7]
- **Motorist Education/Outreach** – Motorist education that encourages awareness of pedestrians and bicyclists and motorist responsibilities on the road can be helpful in reducing crashes. Current trends related to distracted driving and crashes suggest that motorists need to be reminded about the dangers of driving and texting and other distracting activities.
- **Walking and Biking Education** – The *Bicycle and Pedestrian Curricula Guide*, published by the Safe Routes to School National Partnership, lists many different options for integrating bicycle and pedestrian education into the classroom. Non-profit organizations such as Bike/Walk Tampa Bay offers pedestrian, bicyclist, and driver safety presentations (WalkWise or Bike Smart Tampa Bay) that target adults with brief interactive sessions covering the basics of walking and bicycling.
- **Safe Routes for Seniors** – This program targets pedestrian improvements in areas with senior centers, hospitals, and large numbers of older adult residents. Example programs can be found in Chicago, New York, and San Francisco. The transportation-focused non-profit organization Transportation Alternatives has developed design guidelines that accommodate sensory changes that occur as people age.
- **Safe Routes for Transit Program** – This program targets pedestrian improvements around transit stops and the walking or cycling routes used to reach them. Examples of this program

[6] https://www.iadlest.org/.
[7] https://www.alerttodayflorida.com/RollCall/.

can be found in New York City and in Atlanta, where the Atlanta Regional Commission funds a Last Mile Connectivity Program in their LRTP.

CHAPTER 6 – IMPLEMENTATION

Implementation, or action, is what moves projects from plan to reality. This chapter describes projects identified during the planning process and ways to get them built. The projects are from across the county and range from local, collector, and arterial roads needs to greenway connections, RSAs, and special planning opportunities. They can be incorporated into roadway construction projects or funded independently, and the needs far outstrip the funds available. Partnership with local agencies and FDOT to use local and State funds and grants can help make up for the ongoing funding shortfall. Funding sources are discussed later in the chapter, but it should be noted that funding sources often are limited by project type. For example, Highway Safety Improvement Program (HSIP) funds can be used only for specific safety projects. Generally, the most cost-effective way to implement bicycle facilities and sidewalks is to include them in roadway construction, drainage improvement, or resurfacing projects. In coordination with FDOT, different funding types may be applied to different aspects of a project. The MPO will continue to coordinate with State and local agencies to ensure the incorporation of bicycle and pedestrian facilities whenever possible.

MPO and County staff have made great progress implementing previously-identified projects, with the majority constructed or funded for construction. This plan's updated, focused approach on **safety and equity** facilitates the application of funds across the county to the areas of greatest need. In addition to the opportunities noted below, work should continue with developers to complete gaps and make connections as new homes, communities, and shopping areas are constructed. Local agencies also often have their own plans and funding sources such as local tax revenue that are independent of MPO/FDOT sources. In many cases, matching funds or funding an early phase of a project can expedite its construction.

Currently, the MPO manages the allocation of funds for bicycle and pedestrian projects that are submitted for by application, evaluation, and selection based on a five-year funding cycle. In previous years, bicycle and pedestrian projects have been submitted by jurisdictions for prioritization by the Bicycle and Pedestrian Advisory Committee. Future years may involve a similar call for projects, with an increased focus on safety, equity, and constructability.

Staff coordinate with FDOT on Surface Transportation Block Grant program projects (formally Transportation Alternative projects), collaborate with FDOT to identify and fund safety projects, and coordinate with agencies to take advantage of roadway resurfacing and infrastructure projects. This approach has proven successful for construction of sidewalks and bike lanes throughout the county and for the funding of RSAs.

Because of the nature of infrastructure projects and funding cycles, coordination and communication with FDOT are critical to maximizing the funding available. It is recommended that staff have projects ready to move into the design phase to take advantage of fiscal year-end funds that might be available and other opportunities.

Much of what has been discussed above is relatively short-term. To take advantage of the long range planning horizon, roadways identified in the LRTP for widening as well as new roads should incorporate bike and walk infrastructure that meets or exceed bicycle and pedestrian facility standards as determined by feedback or need.

As projects identified in the last plan had been substantially funded, staff took the opportunity to look critically at the previous approach and propose improvements to it where possible. Review of current planning best practices and community input identified an approach to developing this plan that would continue to help fill infrastructure gaps and would also direct the resources to the primary areas of need, **safety** and **equity**. Whereas safety always has been a consideration, its importance has increased as the crash rates continue to trend upward. It is also worth noting that although spikes in crashes get attention, ongoing crash occurrences are reason enough to redouble the efforts and focus on safety for the most vulnerable road users, people walking and bicycling. The additional focus on equity reflects the MPO's efforts to support the wide range of needs of the county, with an emphasis on areas that are impacted the most and where many community members rely on walking and bicycling as their primary mode of transportation.

Types of Roadways

Arterial road: A roadway that serves primarily through traffic and secondarily provides access to abutting properties.

Collector road: A roadway providing access and traffic circulation service to a residential, commercial, or industrial area and secondarily provides for local through traffic.

Local road or street: A route providing service which is of relatively low traffic volume, serving short trip length, or minimal through-traffic movements, and a high degree of access for abutting properties. Local roads may be privately owned or governed by Collier County or the incorporated municipalities in the county.

The Collier County road network is made up of local, County, and State roads, and walkers and bicyclists use all of these except I-75. The approach to implementation has to be creative and highly collaborative because of the mentioned limitations on funding sources. FDOT and federal funds are available for use on County or State arterial and collector roads. Funding for off-system (local roads) also is available through a variety of sources including FDOT. A discussion of projects, planning costs, and potential funding sources follows.

Identification of Gaps and Needs on Collectors and Arterials

After review of plans and documents that addressed bicycle and pedestrian issues and opportunities, the next step was to review the GIS inventory of these facilities developed by the MPO. These data were mapped and edited after feedback from local agencies, stakeholders, and the community through an extensive public outreach effort, resulting in a current view of the conditions on the ground. Issues with the data were addressed within the scope of this planning effort, but inconsistencies may exist. Field review is recommended for all projects being advanced through the funding application process.

To identify the focus areas for the collector and arterial roads, maps overlaying crash data and EJ areas were created. The methodology for identifying EJ areas can be found in appendix. Map 1 at the end of

this chapter illustrates the areas in the county were crashes occur most often and where EJ or equity areas occur.

Once the high crash and EJ areas were identified, the next step was to identify the needs or gaps in the walk and bike networks. Many of these gaps, which were identified in previous work undertaken by the MPO to develop a facility inventory, were further refined during the pubic engagement process. Maps of facility gaps or needs were then overlaid on the high-crash and EJ areas maps. Although screening criteria were subsequently applied to develop a list of the highest-priority gaps, the complete list of gaps in infrastructure is the plan's foundation and will be used to provide input to the County about the need for bicycle and pedestrian facilities during resurfacing or reconstruction projects in and adjacent to roads. It should be noted that effort to identify multi-use path opportunities adjacent to County roads was by feedback and desktop review. There is strong community support for separated trails, which should be considered the preferred facility and constructed whenever right-of-way allows.

Analysis identified a total of 171 miles of bicycle needs and 185 miles of pedestrian needs on County arterials and collectors. The MPO will continue to work with the County to fund the construction of bicycle and pedestrian facility gaps to complete the networks. These miles are irrespective of features such as drainage or right-of-way that might make completion of facilities challenging. During project development, the unique challenges and opportunities will be identified.

Roadway reconstruction, rehabilitation, and resurfacing—whether to add capacity or to update infrastructure—generally provides the most cost-effective best opportunity to add a bike lane, sidewalk, or, depending on the extent of reconstruction, an adjacent trail. The MPO will continue to work with County staff to coordinate projects and funding for bike and pedestrian needs through the County capital improvement planning process.

Maps 2 and 3 showing the bicycle and pedestrian needs along collectors and arterials can be found at the end of the chapter.

Bicycle/Pedestrian Safety Assessments along High Crash Corridors

As noted in Chapter 2, an RSA is an invaluable tool to analyze and identify improvements on high-crash corridors or areas with above-average safety concerns. The in-depth multi-disciplinary analysis conducted during an RSA develops recommendations to reduce crashes and improve safety. The plan strongly recommends that RSAs—more specifically, Bicycle RSAs—be conducted and their recommendations be implemented. The successful implementation of an RSA will require close coordination among the MPO, FDOT, and the County. Based on the crash analysis done for this plan, several areas for potential Bicycle RSAs are listed below. A more in-depth analysis of potential RSA locations was beyond the scope of this plan but should be undertaken prior to final selection RSAs are eligible for HSIP funds.

Table 1: Potential Bicycle and Pedestrian RSA Corridors

Road Name
US 41
Airport Pulling Rd
Collier Blvd
Immokalee Rd
Davis Blvd
North 15th St (SR 29)
Pine Ridge Rd
Golden Gate Pkwy
Radio Rd
Vanderbilt Beach Rd

Collector and Arterial Roads Gaps

Although the complete list of gaps or needs is useful in defining the scale of the challenge, limited funds make filling the gaps a lengthy process. Given this constraint, the decision was made to apply the focus-area criteria of crash occurrence and EJ areas to the needs map to identify the projects that best satisfy the identified criteria. Map 4, founded at the end of this chapter, shows the bicycle facility needs found in areas where there are both a high number of crashes and EJ factors. Map 5, also at the end of this chapter, shows the pedestrian facility needs found in areas where there are both a high number of crashes and EJ factors. *Table 1* shows the miles of facilities needed in high-crash and EJ areas. Table 2 shows miles of roads without bike lane or sidewalks that fall within EJ areas. Maps 6 and 7 at the end of this chapter illustrates the needs with only EJ criteria applied. The complete list of needs can be found in the appendix.

Table 2: Miles of Facilities Needed in Areas of High Crash and EJ Areas

Type	Criteria/Crash and Equity (Tier 1)	Miles
Bike Lane	3+ crashes and EJ criteria	7 miles (no bike lane)
Sidewalk	3+ crashes and EJ criteria	0.2 miles (no sidewalk) 1 miles (sidewalk only on one side)

Table 3: Miles of Facilities Needed in EJ Areas

Type	Criteria/Equity (Tier 2)	Miles
Bike Lane	EJ criteria	60 mi (no bike lane)
Sidewalk	EJ criteria	77 mi (no sidewalk) 12 mi (sidewalk only on one side)

Local Needs

The MPO completed three Walkability studies that focused on pedestrian needs in a number of areas of the county with concentrated populations and, therefore, more walking and biking. A fourth study will be completed in Fall 2018.The goal of each study was to identify infrastructure needs and then prioritize them into tiers. Tier 1 identified the greatest needs as segments with no sidewalks, Tier 2 was sidewalks on only one side of the street, and Tier 3 included lighting and additional amenities. These studies generated a large number of projects, and considerable progress has been made building the Tier 1 projects. This plan recommends continuing to coordinate with the County to fund the recommended remaining Tier 1 facilities, including the Tier 1 priorities from the fourth Walkability study. Tiers 2 and 3 in high-need areas should be considered and may present opportunities to partner with local groups or agencies.

The segments remaining from the first three studies plus those identified during the recent Golden Gate Walkability Study will be on the list of local road projects and will be prioritized according to the methodology that was developed based on the plan goals. The criteria shown in Table 3 were applied to prioritize walkability study projects. Points were assigned to each criterion and each project scored. The list of projects and their relative priority can be found in the Appendix.

Table 4: Prioritization Criteria for Use on Local Road or Local Agency Bicycle and Pedestrian Needs

Criterion	Intention	Points
Safety	Increase safety for people who walk and ride in Collier County.	25
Connectivity	Enhance the network of efficient, convenient bicycle and pedestrian facilities in Collier County.	20
Equity/Livability	Increase transportation choice and community livability through the development of an integrated multimodal system.	10
Economic Development	Promote tourism and economic opportunities by developing a safe, connected network of biking and walking facilities.	15
Community Support	Agency or local group.	10
Readiness	Has any work been done?	5
Major Road – Bike or Pedestrian Access	Provides bike or pedestrian access to major roads.	5

Because many local road projects identified in previous Walkability studies have been constructed, the need for more projects was identified. Discussion with the County led to the development of a list of transit-related needs focusing on gaps in sidewalks within one mile of transit stops. This analysis yielded 368 miles of sidewalk needs where there are no sidewalks on either side of the street. An EJ area screen, similar to what was applied to collector and arterial bike and pedestrian needs, was applied to the list of transit-related sidewalks on local roads. Map 8 at the end of this chapter illustrates the 160 miles of sidewalk segments within one mile of transit stops that satisfy medium, high, or very high EJ criteria. The list of sidewalk segments can be found in the Appendix.

Local sidewalk needs within one mile of schools also were analyzed. As was done for the transit-related gaps, an EJ screen was applied to the school-related local road gaps. Map 9 at the end of the chapter illustrates the 146 miles of sidewalk segments within one mile of a school that satisfy medium, high, or very high EJ criteria. The list of sidewalk segments can be found in the Appendix.

Review of these needs identified a lot of overlap between sidewalk gaps around schools and near transit stops. Map 10 at the end of the chapter shows the sidewalk gaps that satisfy both criteria. There are 127 miles of sidewalks that could be constructed that would facilitate safer access to schools and to transit stops.

Local Agency Projects

Each city in the county, through its own public engagement process and Council input, identified its top priorities for bicycle and pedestrian projects on local roads, as noted below. These projects were also included on the local projects lists.

Everglades City

1. Copeland Ave: City Hall to Chokoloskee Causeway – sidewalk on east side of road
2. Datura St: E School Dr to Collier Ave (SR 29) – no sidewalks either side, either direction
3. Broadway: Riverside Dr to Copeland Ave – no sidewalks either side, either direction
4. Collier Ave (SR 29): Begonia to bridge – no sidewalks either side, either direction

Marco Island

1. Collier Ave – alternate bike lanes (Landmark extension)
2. Bald Eagle – bike lanes (Collier to San Marco)
3. N Barfield – pathway (Bald Eagle to Collier)
4. Sandhill – pathway (Leland to Winterberry)

Immokalee

The preliminary list of local bicycle and pedestrian projects was developed from a planning analysis or by reviewing crash data, EJ, and existing gaps. Constructability reviews for each potential project will need to be completed prior to any of these being funded for design or construction.

Naples

The following projects were identified in the 2013 Pedestrian and Bicycle Master Plan. They are not prioritized, but the City selects locations to install sidewalks from this list. These segments have been added to the list of local projects that can be found in the Appendix.

Table 5: Naples priority projects

Sidewalk On Residential Streets with support to include in Master Plan Update		
SEGMENT (Side)	**FROM**	**TO**
Old Trail Drive (North)	Park Shore Dr	Belair Lane
FPL Easement Pathway Trail	6th Avenue North	7th Avenue North
6th Avenue North (North)	10th Street North	FPL Easement Pathway
South Golf Drive (North)	Gulf Shore Blvd	US41
1st Avenue South (Both)	10th Street South	Goodlette
13th Avenue South (South)	3rd Street South	Gordon Drive
2nd Avenue South (North)	Gulf Shore Blvd	3rd Street South
4th Avenue South (North)	5th Street South	6th Street South
4th Avenue South (North)	Gulf Shore Blvd	2nd Street South
7th Street North (East)	4th Avenue North	South Golf Drive
4th Street South (West)	Central Avenue	1st Avenue South
5th Street South (East)	1st Avenue South	4th Avenue South
6th Avenue South (North)	GSBS	West Lake Drive
7th Avenue South (North)	GSBS	West Lake Drive
8th Avenue South (North)	GSBS	3rd Street South
9th Avenue South (South)	GSBS	3rd Street South
10th Avenue South (North)	GSBS	3rd Street South
11th Avenue South (North)	GSBS	3rd Street South
13th Avenue South (North)	3rd Street South	Gordon Drive
14th Avenue South (South)	3rd Street South	Gordon Drive
15th Avenue South (North)	3rd Avenue South	GSBS
East Gordon Dr.(Riley Park Path)	18th Avenue South	21st Avenue South
12th Avenue North (South)	Goodlette Frank Rd.	US 41
12th Street North (Easement Reg	3rd Avenue North	12th Street North
3rd Avenue North (Easement Reg	12th Street North	Goodlette Frank Rd.
12th Street South (East)	Central Avenue	1st Avenue South
Riverside Circle (South)	Goodlette-Frank Rd	Dog Park & Future Greenway
Mandarin Drive (West)	Banyan Blvd.	Orchid Drive
Pine Street (North)	Mandarin Drive	Banyan Blvd.
11th Avenue South (North)	5th Street South	6th Street South
4th St South (Both)	8th Avenue South	10th Avenue South
5th St South (Both)	9th Avenue South	11th Avenue South
6th St South (Both)	9th Avenue South	10th Avenue South
West Lake Drive (East)	7th Avenue South	8th Avenue South
East Lake Drive (Both)	5th Avenue South	8th Avenue South

Greenways and Trail Connections

Previous plans noted the importance of, and interest in, greenways. Feedback received during plan development affirmed the continued interest in developing a connected greenway network. The success of the Gordon River Greenway and Rich King Greenway are proof of the demand and success for this type of facility in Collier County.

Greenways offer users a different experience than roadside trails. Their locations might tend more toward recreational use, but all trails can be used for transportation. Opportunities for greenways are defined in the AASHTO *Guide for the Development of Bicycle Facilities* (2012, 4th ed.) as:

> A linear open space established along either a natural corridor such as a riverfront, stream valley, or ridgeline or over land along a railroad right-of-way converted to recreational use, a canal, a scenic road, or other route; any natural or landscaped course for pedestrian or bicycle passage; an open space connector linking parks, nature reserves, cultural features, or historic sites with each other and populated areas; or a local strip or linear park designated as a parkway or greenbelt.

Greenway opportunities may be limited in Collier County, but selected utility corridors and canals should be considered for further study, both for intercounty and regional connectivity. The extension of the Rich King Greenway along the Florida Power and Light corridor to Bonita Springs in Lee County is one that has regional implications. It is on the FDOT SUNTrail network and so is eligible for State funding. This alignment also was mentioned in each of the previous bicycle and pedestrian master plans. Although much of the canal system through the county is under private ownership, there may be areas that remain available and could be considered for non-motorized transportation and recreation. Further study of this opportunity is recommended.

In addition to the interest in more (new) trails and greenways, much of the input received was about connecting existing trails. Doing so makes the trail system more useful by extending its reach and appeal for both recreational and transportation use. Greenways often use utility corridors and other unique land opportunities. Making connections to the rest of the network via a greenway can be difficult to accomplish, so roadway-adjacent trails or separated bike lanes might have to be considered. In the case of connections between the Gordon River Trail, the Rich King Trail Greenway, and the road network, possible infrastructure options may be to widen the sidewalk or add a buffered bike lake to the roadway.

Proposed project opportunities include the following:

- *Purpose and Need: Greenway Connectivity* – This study would identify selected opportunities for greenways and inter-connecting with the rest of the transportation network to increase overall access.
- *Purpose and Need: Canal Trail Feasibility Study* – This study would identify opportunities for greenways along the canals in Collier County. This study is needed to find ways to expand the greenway network to accommodate increasing demand.

Special Projects

Throughout the public engagement process, input was received about challenging locations, problem spots, and additional opportunities for connections or facilities. During the planning process, because MPO and County staff understand that improving the bicycle and pedestrian environment in Collier County takes a multi-faceted approach, a decision was made to identify a range of projects and needs that go beyond adding bicycle lanes or filling sidewalk gaps on collector and arterial roadways.

Generally, corridors with a high number of bicycle or pedestrian crashes, challenging intersections, and trail crossings were identified as opportunities for additional study. Recommendations from the studies would then be considered for feasibility and addition to the appropriate list for prioritization and funding. Examples of spot projects and studies that may be funded include the following projects. Preliminary purpose and need statements have been drafted to explain the need and justify funding. These statements may be revised as projects evolve.

- *Trail Crossing at Davis Blvd and Rich King Greenway* – This study would identify possible trail crossing infrastructure or other solutions at this location that have been recognized as having a safety issue because the trail crosses a major high-speed four-lane road. Extensive public feedback also identified this crossing as having a safety issue. FDOT has begun an initial review of this location.
- *Multimodal Corridor Study – Wiggins Pass Rd* – This study would identify safety improvements for multimodal users of this roadway. The study is needed because Wiggins Pass Rd is one of the few east-west access ways to the beach and is used extensively by pedestrians, bicyclists, and cars. West of US 41, Wiggins Pass Road has a four-foot sidewalk but no shoulders, which requires cars to either enter the oncoming lane of traffic or follow behind cyclists.
- *Multimodal Needs Study – Beach Access Roads* – This study would review all bicycle and pedestrian access ways to the beach. This study is needed because there is an increasing need for access to the counties greatest amenities by other modes.
- *Bicycle/Pedestrian Access to Transit Facility Assessment* – This study would identify bicycle and pedestrian needs as they access transit. Items to study include access to bus stops and sidewalk gaps within ¾ mile of bus stops and bike facilities within 3 miles of transit stops as well as to identify possible mid-block crossing locations.

Project Costs

Routine resurfacing and infrastructure projects represent some of the best and least expensive opportunities to add bicycle lanes and other facilities. Roads are restriped after being resurfaced, so the additional cost to include bike lanes when restriping is minimal. A paved bike lane may be added or a paved shoulder converted to a bike lane as part of a roadway reconstruction project. Costs for construction will be impacted by the unique circumstances of each site, but generalized costs can be helpful when considering projects. Details such as drainage issues and right-of-way availability have not been confirmed as part of this study and would be identified during feasibility. Project costs have been estimated at a planning level. A more detailed engineer's estimate would be required for submission of a project for prioritization consideration.

There are a number of ways to get sidewalk gaps filled. Depending on the agency, sidewalk gaps may be filled during a resurfacing project or they may be filled when a parcel is developed. Another option is to group a number of proximate sidewalk gaps into a "bundle" of projects to gain some efficiencies of scale. The rebuilding of infrastructure, whether it be sub-surface utility work or adding lanes, also provides an opportunity to add both bicycle and pedestrian facilities. Safe Routes to School funding is

limited to gaps in walking infrastructure within two miles middle schools, and applications for those projects are independent of roadway reconstruction.

The unit cost assumptions shown in Table 5 are based the adopted 2040 LRTP and generalized FDOT costs. More detail can be found in the Collier MPO Financial Resources Technical Memorandum on the MPO website.[1] Table 6 shows the total mileage cost to construct the projects identified in high-crash, EJ areas along collector and arterial roads and local roads.

Table 6: Component Costs for Bicycle and Pedestrians Projects – (UPDATE TO CURRENT if avail)

Component	Cost
Bicycle Facilities Unit Cost	
Bike lane per mile (4' width - 2 sides) when widening road, urban (1)	$345,000
Bike lane per mile (5' width - 2 sides) (2)	$178,000
Pedestrian Facilities Unit Costs (3)	
Sidewalks per mile (5' width - 1 side)	$174,000
Sidewalks per mile (6' width - 1 side)	$209,000
Paved Shoulders Unit Costs	
Paved shoulder per mile (4' width - 2 sides) (4)	$293,000
Multi-Use Trail Facilities Unit Cost	
Multi-use trail per mile cost (12' – 1 side) (5)	$333,000
Trail Crossing Unit Cost	
Signalized trail crossing	$120,000(6)

(1) FDOT 2004 Transportation Costs. Costs inflated to 2014 dollars using recent FDOT roadway inflation factors (68% increase).
(2) FDOT District 3 LRE Roadway Costs, December 2013. Costs inflated to 2014 dollars using recent FDOT roadway inflation factors (3.1% increase).
(3) FDOT District 7 LRE Roadway Costs, June 2014.
(4) Based on discussions with FDOT staff, paved shoulders assumed to cost 85% of bike lane per mile (4' width) costs.
(5) FDOT District 7 LRE Roadway Costs, June 2017.
(6) FDOT District 7 LRE Roadway Costs, June 2017.

Table 7: Cost of Facilities by Mileage Totals (confirm)

Component	Mileage/number	Cost
Bicycle lanes - collector and arterial roads	171	$30,438,000
Sidewalks- collector and arterial roads – no sidewalks	185	$38,664,000
Sidewalks – local roads - schools + EJ areas	Medium – 61 mi High – 46 mi Very High – 39 mi	$12,749,000 $9,614,000 $8,151,000
Sidewalks- local roads- transit + EJ areas	Medium – 68 mi High – 50 mi Very High – 42 mi	$11,832,000 $8,700,000 $8,778,000
Trail	Study required	$333,000/mi
Trail crossing	1	$120,000

[1] http://www.colliermpo.com/modules/showdocument.aspx?documentid=8614.

Funding Sources

The MPO collaborates with FDOT on the allocation of a variety of federal funds, which are one component of a complex funding puzzle in which the competition for limited resources is fierce. Cooperation with partners is critical to implementing other funding mechanisms available for the design and construction of bicycle and pedestrian facilities and programs. A number of these sources and opportunities are discussed below, and a list of U.S. Department of Transportation sources and applicable activities or project types can be found in the Appendix.

Local and County Projects

Local community plans are a critical component of county networks, providing the nodes or hubs to which County and State projects can connect and support. Although local and county projects may be implemented by the jurisdiction in which they are located, coordination with the MPO for federal funds may result in significant cost savings by the municipality.

New Development

Review and coordination with plans for new development is an important way to make connections to the planned networks. In every case, plans are subject to review by County staff, and every effort should be made to require connections be made and facilities built to standards identified in this plan.

Shared-Use Non-motorized (SUN) Trail Network

Managed by FDOT, the SUNTrail program funds non-motorized, paved, shared-use trails that are part of the Florida Greenways and Trails System Priority Trail Map. This effort is coordinated by the Office of Greenways and Trails.

Doppelt Family Trail Development Fund[2]

The Rails to Trails Conservancy awards about $85,000 per year to support organizations and local governments that implement projects to build and improve multi-use trails. Applications for funding typically open in December.

Non-Profit Grants

- **Robert Wood Johnson Foundation, Built Environment and Health** – At the national and local levels, the Robert Wood Johnson Foundation is working with a wide array of partners to help ensure that investments in housing, transportation, parks and open space, and other critical aspects of the built environment in communities foster equity and create healthy opportunities for everyone (https://www.rwjf.org/en/how-we-work/grants-explorer/featured-programs/build-healthy-places-network.html).

[2] https://www.railstotrails.org/our-work/doppelt-family-trail-development-fund/.

- **Kodak** American **Greenways Program** – A partnership project of the Eastman Kodak Company, the Conservation Fund, and the National Geographic Society, this program provides small grants to stimulate the planning and design of greenways in communities throughout America (http://www.rlch.org/funding/kodak-american-greenways-grants).

RWJ Foundation Grant Funds Plainsboro Preserve Trail Improvements

The Robert Wood Johnson Foundation awarded a $94,000 grant to pay for the improvement of nature trails at the Plainsboro Preserve in Plainsboro Township, NJ. Additional funds by the town will allow the Preserve to be more pedestrian-friendly, provide ample seating, and give better access to individuals with disabilities.

National Highway Performance Program (NHPP)

NHPP funds may be obligated only for a project on an "eligible facility" – a project, part of a program of projects, or an eligible activity supporting progress toward the achievement of national performance goals for improving infrastructure condition, safety, congestion reduction, system reliability, or freight movement on the National Highway System (NHS). Projects must be identified in the Statewide Transportation Improvement Program (STIP)/Transportation Improvement Program (TIP) and be consistent with the Long-Range Statewide Transportation Plan and Metropolitan Transportation Plan(s). Bicycle transportation and pedestrian walkways associated with an NHS facility such as improvements to facilities or new design features at overpasses and onramps are eligible. Shared-use paths along interstate corridors, but outside the main travel way, are eligible for the use of NHPP funds, as are bicycle lanes, shoulder and sidewalk improvements on major arterial roads that are part of the NHS, and bicycle and/or pedestrian bridges and tunnels that cross NHS facilities.

Surface Transportation Block Grant Program (STBG)

The FAST Act replaced the Transportation Alternative (TA) Program with set-aside funds under the Surface Transportation Block Grant Program. Eligible activities include on- and off-road pedestrian and bicycle facilities, infrastructure projects for improving non-driver access to public transportation and enhanced mobility, community improvement activities such as historic preservation and vegetation management, environmental mitigation related to storm water and habitat connectivity, recreational trail projects, and Safe Routes to School projects. A 20% local match is required. Typically, right-of-way issues and environmental concerns must have been addressed prior to the submission of the application.

The MPO manages a competitive review and prioritization process for projects that are considered eligible for STBG funds.

Highway Safety Improvement Program (HSIP)[3]

HSIP funds can be used for pedestrian and bicycle safety improvements. States may obligate funds under HSIP to carry out any highway safety improvement project on any public road or publicly-owned bicycle or pedestrian pathway or trail, or as provided under Flexible Funding for States with a Strategic Highway Safety Plan, and other safety projects. The HSIP requires a data-driven, strategic approach to improving highway safety on all public roads that focuses on performance. The FAST Act added the following items to the list of approved uses:

- Pedestrian hybrid beacons – roadway improvements that provide separation between pedestrians and motor vehicles, including medians and pedestrian crossing islands
- RSAs

Recreational Trails Program (RTP)[4]

The RTP is a federally-funded competitive grant program that provides financial assistance to agencies of city, county, state, or federal governments and organizations approved by the State, or State- and federally-recognized Indian tribal governments, for the development of recreational trails, trailheads, and trailside facilities. For more information on Florida's RTP, see Chapter 62S-2, F.A.C., the rule governing the program in Florida.

AARP Community Challenge Grants[5]

The AARP Community Challenge funds projects that build momentum for local change to improve livability for all residents. The AARP Community Challenge grant program is part of the nationwide AARP Livable Communities initiative that helps communities become great places to live for residents of all ages. Applications are due in the spring.

FTA Funds

A variety of FTA funding is available that may be used to fund the design, construction, and maintenance of pedestrian and bicycle projects that enhance or are related to public transportation facilities. Improvements made expressly eligible by statute include capital projects such as pedestrian and bicycle access to a public transportation facility and transit enhancements such as pedestrian access, walkways, and bicycle access, including bicycle storage facilities and equipment for transporting bicycles on public transportation vehicles.

Action items

Developing a plan is only the first step in the process to creating a robust and successful active transportation network. After plan adoption, collaboration and action are what make the plan

[3] https://safety.fhwa.dot.gov/legislationandpolicy/fast/guidance.cfm.
[4] https://floridadep.gov/ooo/land-and-recreation-grants/content/recreational-trails-program.
[5] https://www.aarp.org/livable-communities/about/info-2017/aarp-community-challenge.html.

successful. The following implementation actions have been developed to ensure the success of this Plan and should be reviewed on an annual basis:

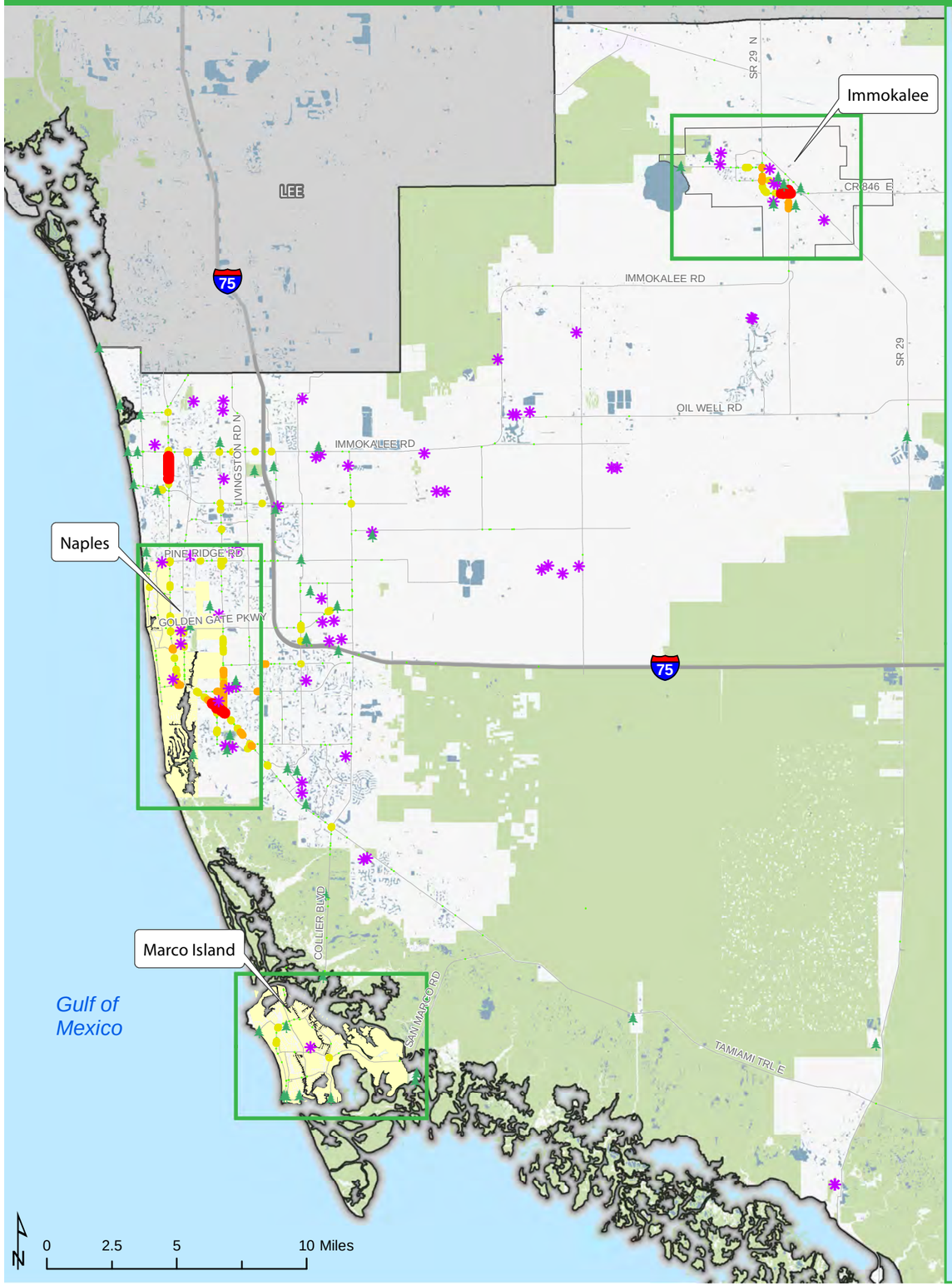
- In February 2018, the Collier MPO Board voted to support FDOT's goal of zero serious auto-related injuries and deaths. In support of the MPO commitment to Vision Zero, one of the primary goals of this Bicycle and Pedestrian Plan update is to reduce the number of bicycle and pedestrian injuries and fatalities by funding projects that will support this goal.
- Adopt a Complete Streets Policy and support the adoption of such a policy by local governments.
- Recognizing that it takes more than engineering solutions to resolve the safety issues in Collier County, the MPO will collaborate with the County, FDOT, and other agencies to identify and fund enforcement and education programs throughout Collier County.
- Continue to work with FDOT to add bicycle and pedestrian facilities to state roads as they are resurfaced or expanded. Wherever possible, separated trails should be included in PD&E and design phases.
- This plan update is a living document and reflects the vision of the MPO and stakeholders and analysis done at the time of its revision. The priority projects identified according to the evaluation process shall not preclude the addition or upgrade of bicycle and/or pedestrian facilities on County roads.
- MPO staff will collaborate with other County staff to ensure that the best possible bicycle and pedestrian facilities are incorporated into all upcoming county resurfacing and reconstruction projects.
- Continue to coordinate with the Collier County Public Works Department to include trails and wider sidewalks on new roadways and roadway expansion plans.
- Continue to coordinate with the City of Marco Island, the City of Naples, Immokalee, other local agencies, and Collier County on submissions of projects to a list of projects that will be prioritized.
- Coordinate with local governments for adoption of the Collier MPO Bicycle and Trail Master Plan into local Comprehensive Plans, the Land Development Code, and City master plans and work to identify and protect trail corridors.
- Continue to coordinate with other government and non-government entities on regional planning issues related to the trail system.
- Work with the Florida Department of Environmental Protection (DEP), the Office of Greenways and Trails (OGT), the Florida Department of Community Affairs, and others to pursue grant opportunities to develop the regional trail network in Collier County.
- Continue to coordinate with staff in adjacent counties, MPOs, OGT, and FDOT to plan for and construct trails and other bicycle infrastructure across county lines to help create a seamless and connected regional trail network.

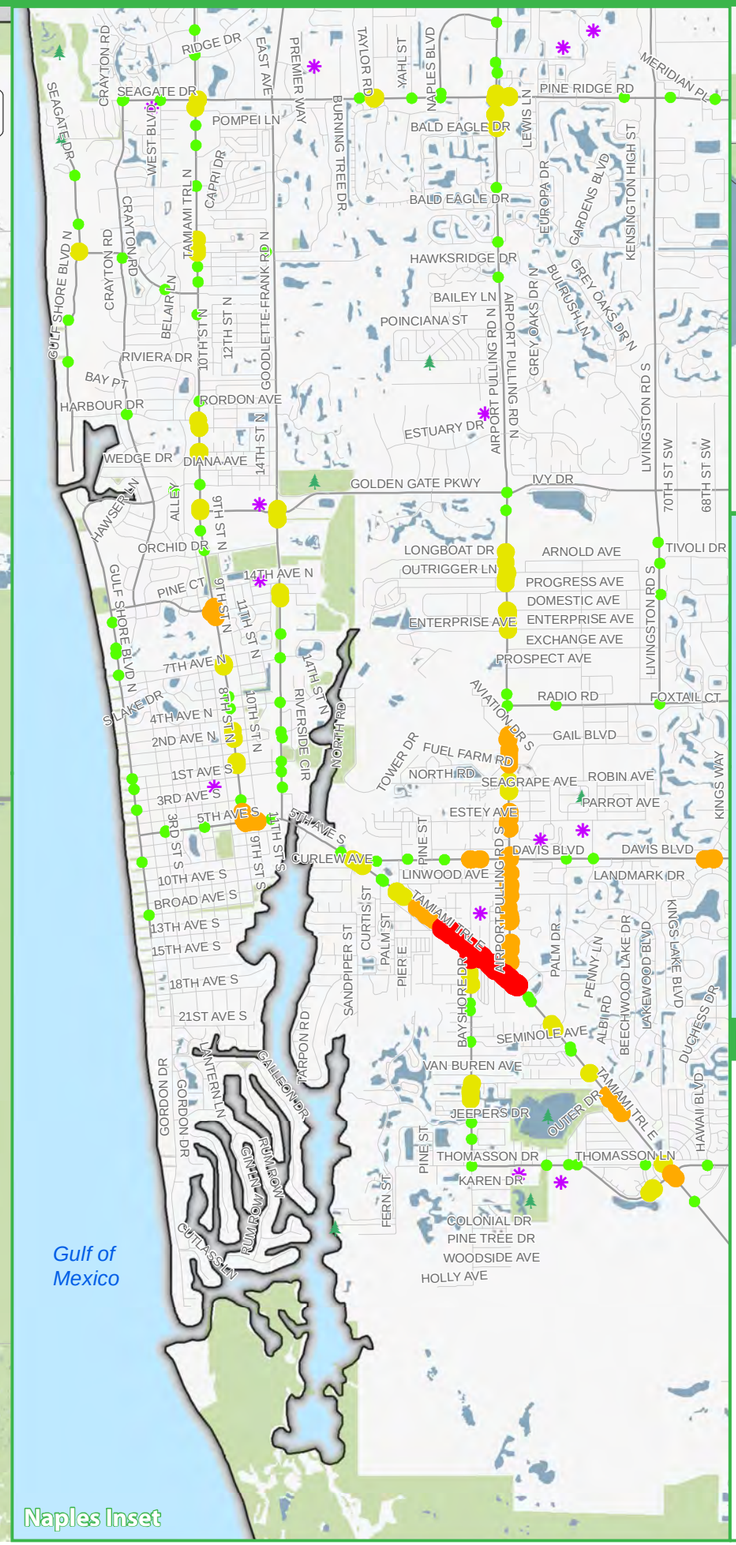
- Coordinate training on latest bicycle and pedestrian best practices and design manuals for MPO committees and implementing agencies.
- Review and revise this plan as needed at least every five years. Interim updates to the map or plan may be required to take advantage of opportunities with developers or local and County agencies.

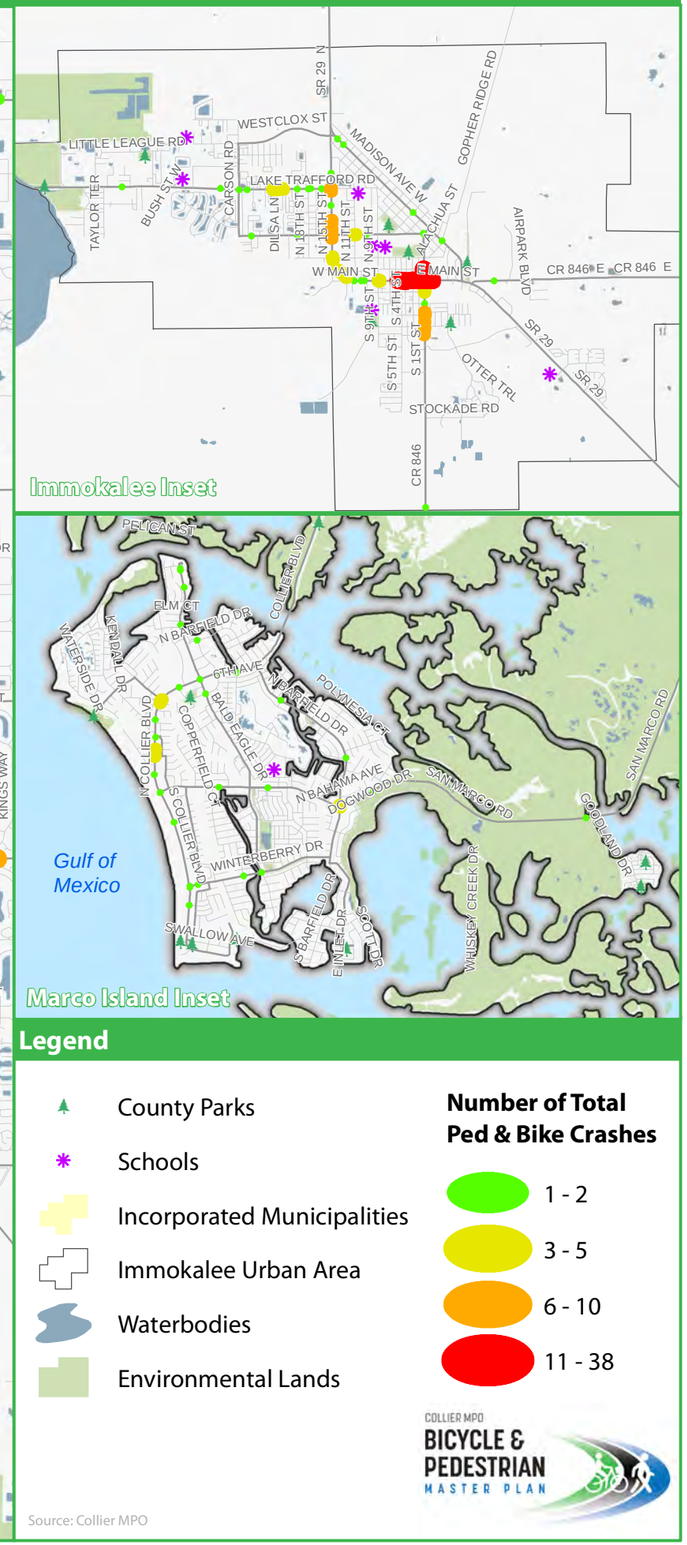
Pedestrian & Bicycle Crashes (2011-2016)

MAP 1

Bicycle & Pedestrian Master Plan







Legend

- County Parks
- Schools
- Incorporated Municipalities
- Immokalee Urban Area
- Waterbodies
- Environmental Lands

Number of Total Ped & Bike Crashes

- 1 - 2
- 3 - 5
- 6 - 10
- 11 - 38

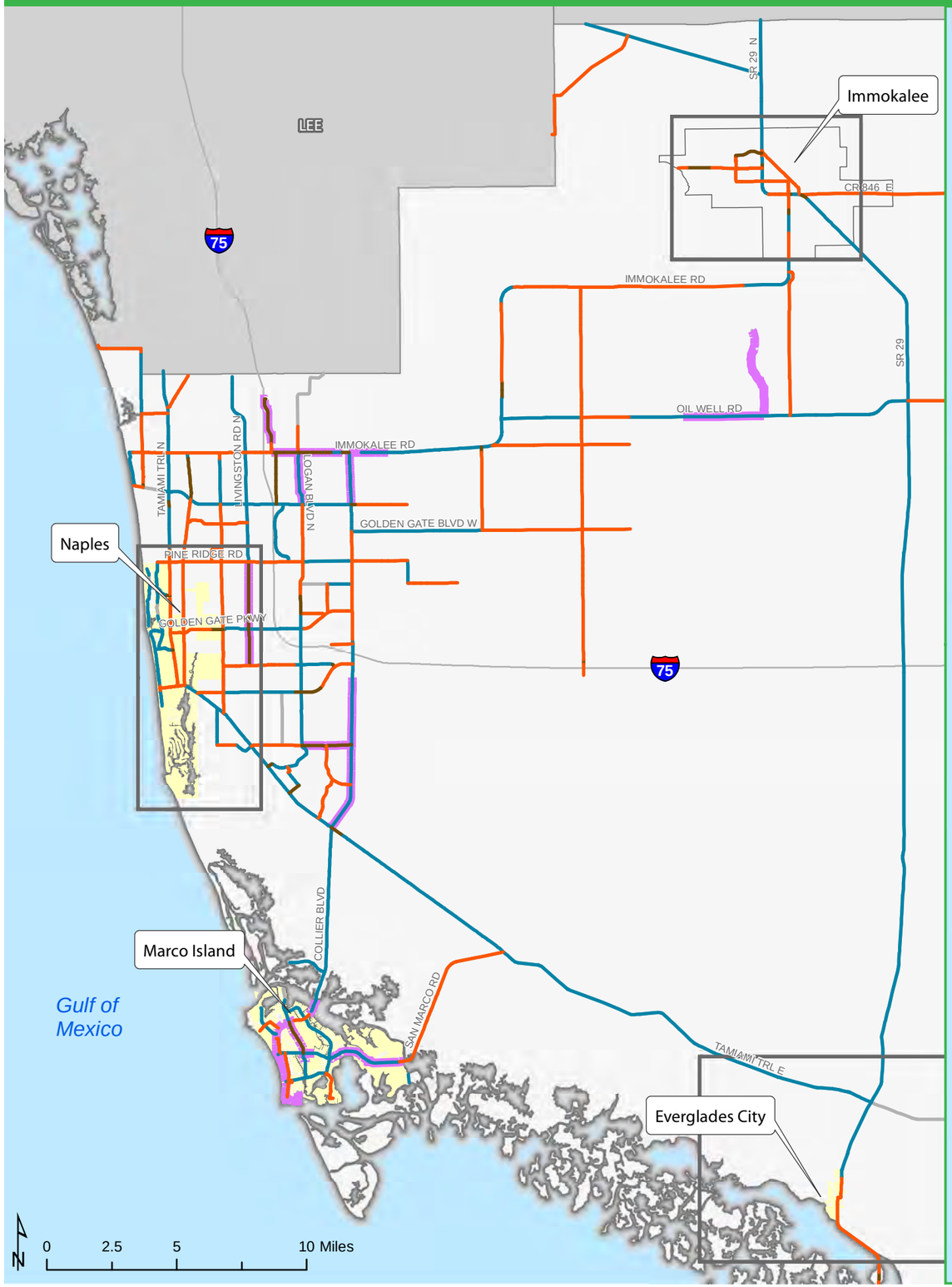
COLLIER MPO BICYCLE & PEDESTRIAN MASTER PLAN

Source: Collier MPO

Bike Lane Gaps (all needs on collector and arterial roads)

MAP 2

Bicycle & Pedestrian Master Plan



Legend

Bicycle Facility Needs

- No Bike Lane or Shared Use Path on Either Side of Street
- Bike Lane on One Side of Street Only
- Bike Lanes on Both Sides of Street
- Existing Shared Use Path

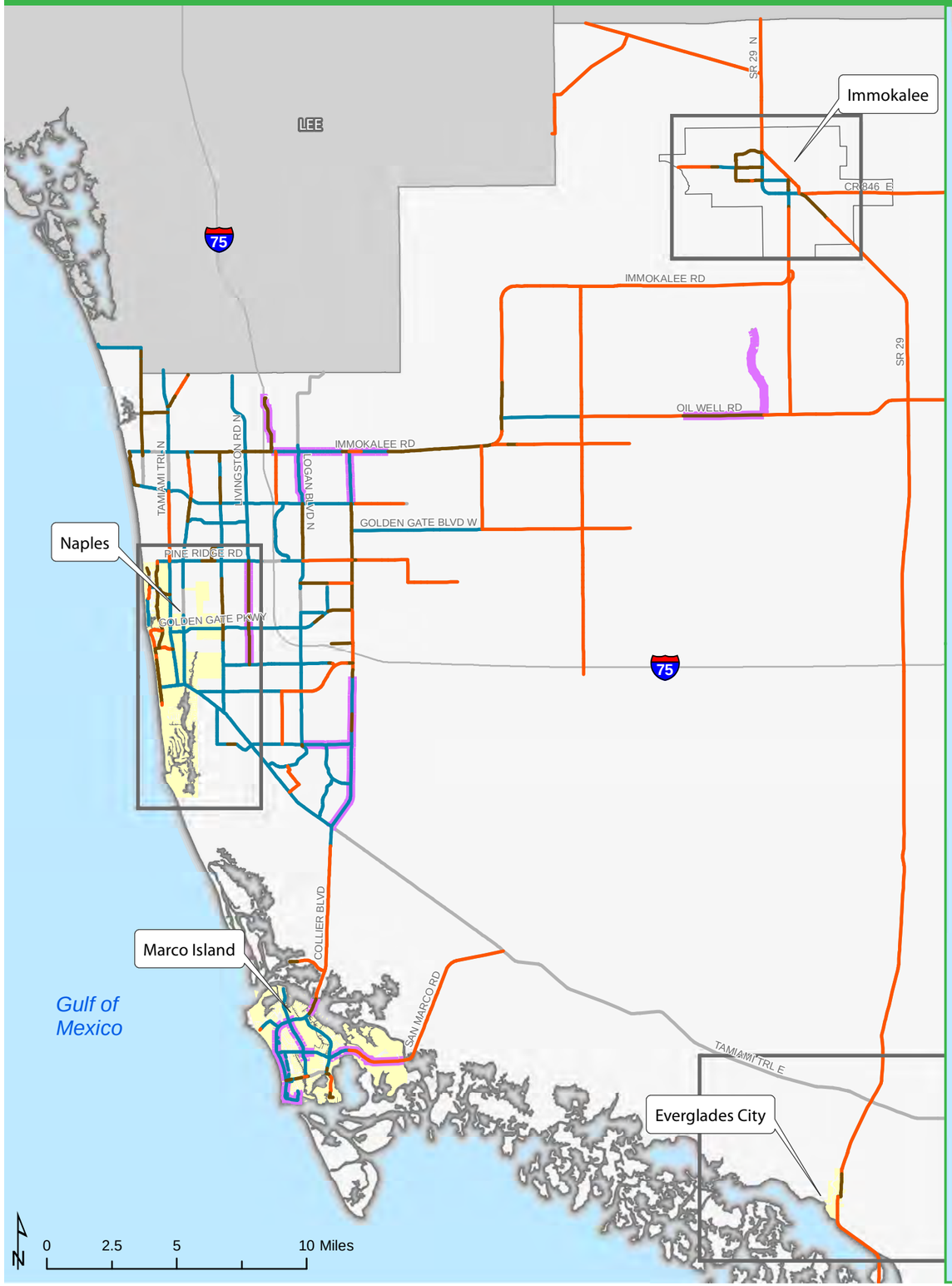
COLLIER MPO BICYCLE & PEDESTRIAN MASTER PLAN

Source: Collier MPO

Sidewalk Gaps (all needs on collector and arterial roads)

MAP 3

Bicycle & Pedestrian Master Plan



Legend

Pedestrian Facility Needs

- No Sidewalks or Shared Use Path on Either Side of Street
- Sidewalk on One Side of Street
- Sidewalk on Both Sides of Street
- Existing Shared Use Path

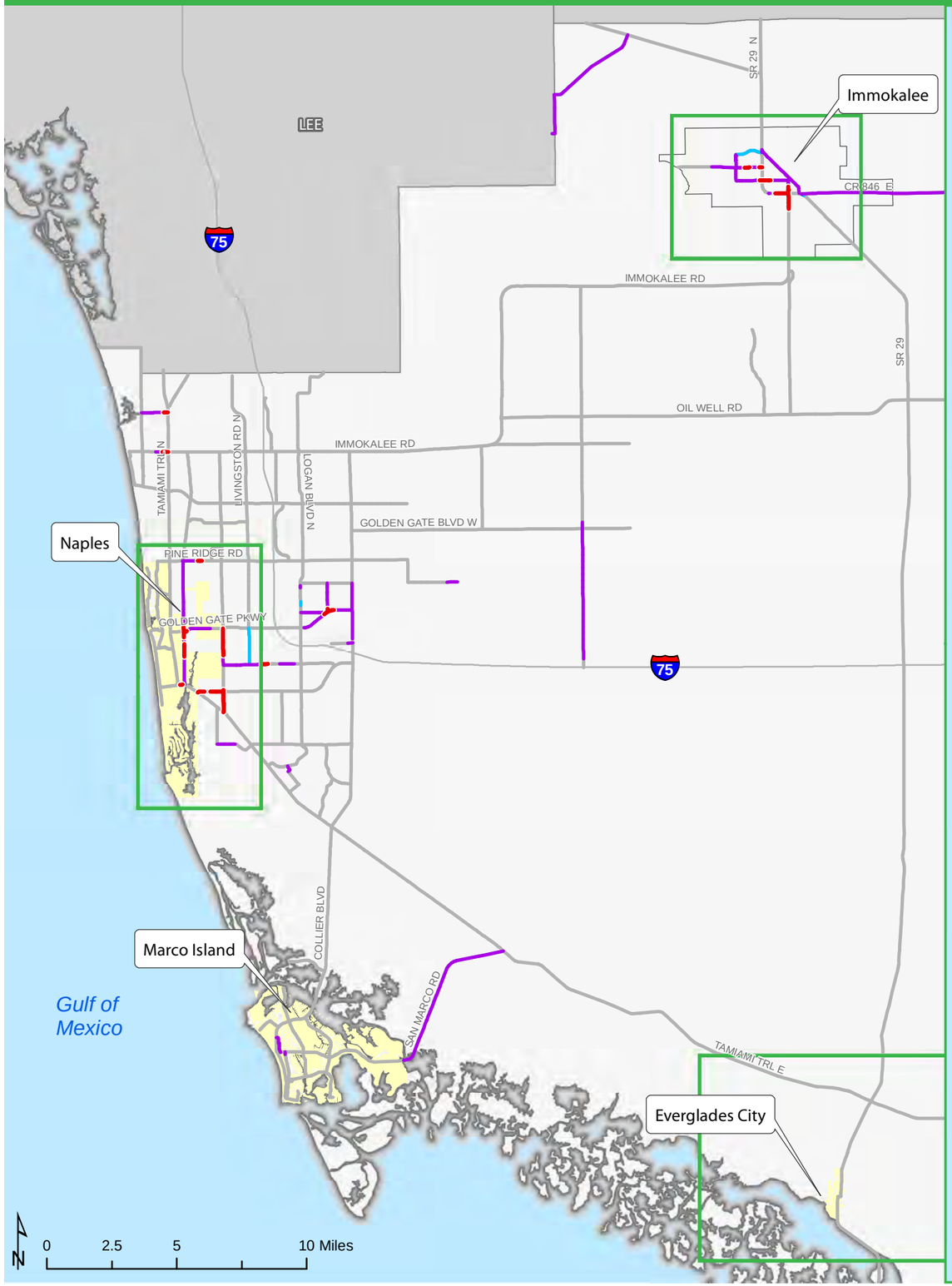
COLLIER MPO BICYCLE & PEDESTRIAN MASTER PLAN

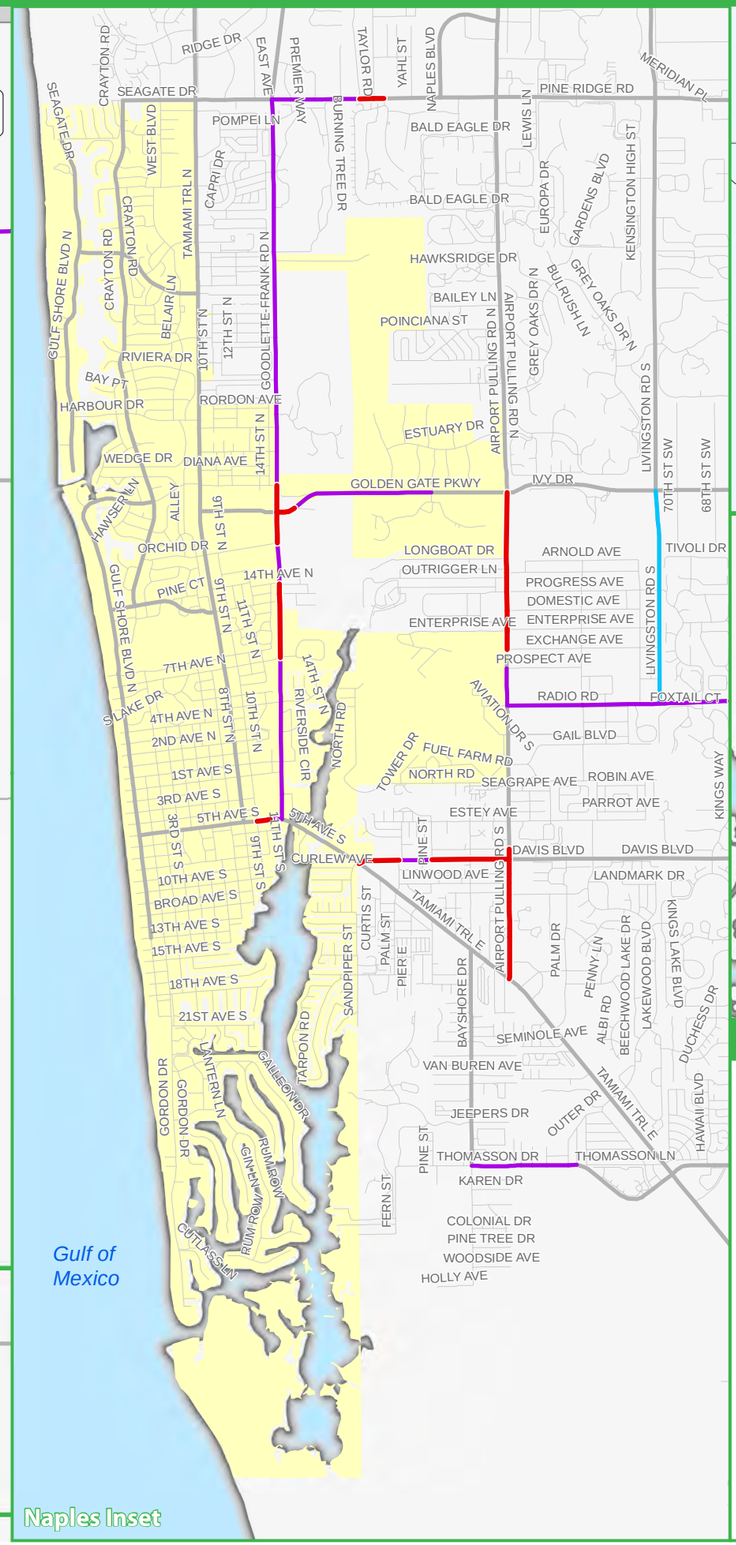
Source: Collier MPO

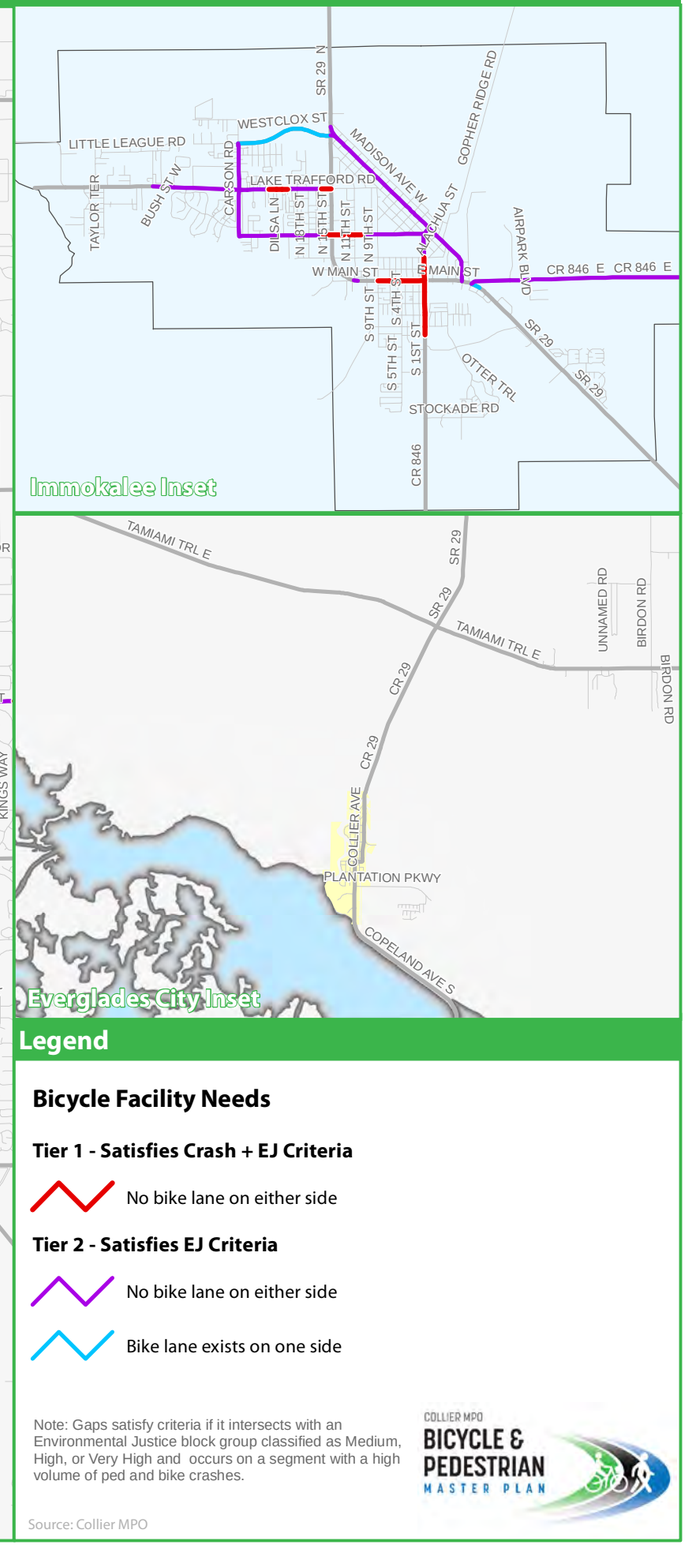
Bike Lane & Shared Use Path Gaps : Collectors and Arterials

MAP 4

Bicycle & Pedestrian Master Plan







Legend

Bicycle Facility Needs

Tier 1 - Satisfies Crash + EJ Criteria

No bike lane on either side

Tier 2 - Satisfies EJ Criteria

No bike lane on either side

Bike lane exists on one side

Note: Gaps satisfy criteria if it intersects with an Environmental Justice block group classified as Medium, High, or Very High and occurs on a segment with a high volume of ped and bike crashes.

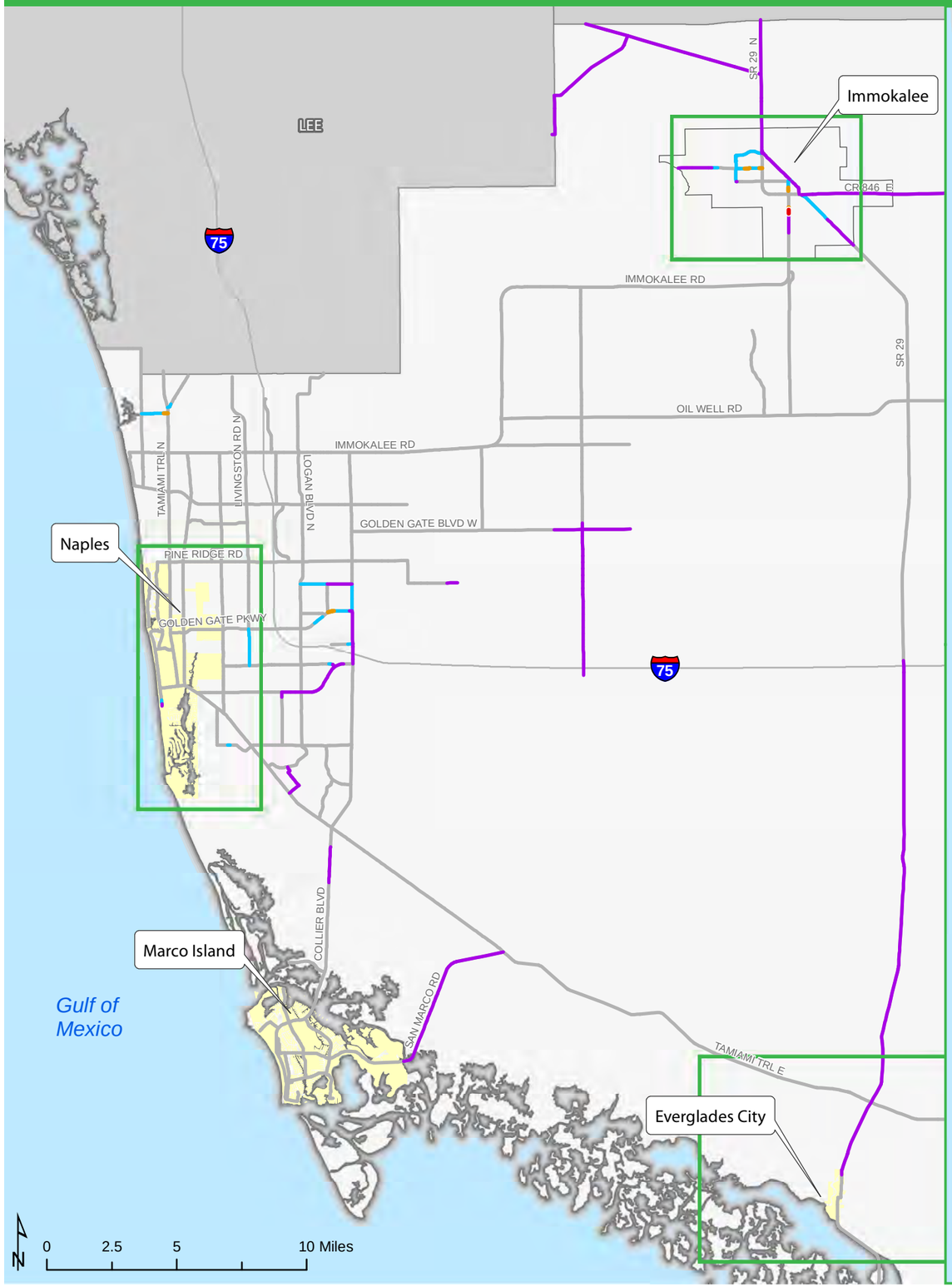
COLLIER MPO BICYCLE & PEDESTRIAN MASTER PLAN

Source: Collier MPO

Sidewalk & Shared Use Path Gaps : Collectors and Arterials

MAP 5

Bicycle & Pedestrian Master Plan



Legend

Pedestrian Facility Needs

Tier 1 - Satisfies Crash + EJ Criteria

- No sidewalk on either side
- Sidewalk exists on one side

Tier 2 - Satisfies EJ Criteria

- No sidewalk on either side
- Sidewalk exists on one side

Note: Gaps satisfy criteria if it intersects with an Environmental Justice block group classified as Medium, High, or Very High and occurs on a segment with a high volume of ped and bike crashes.

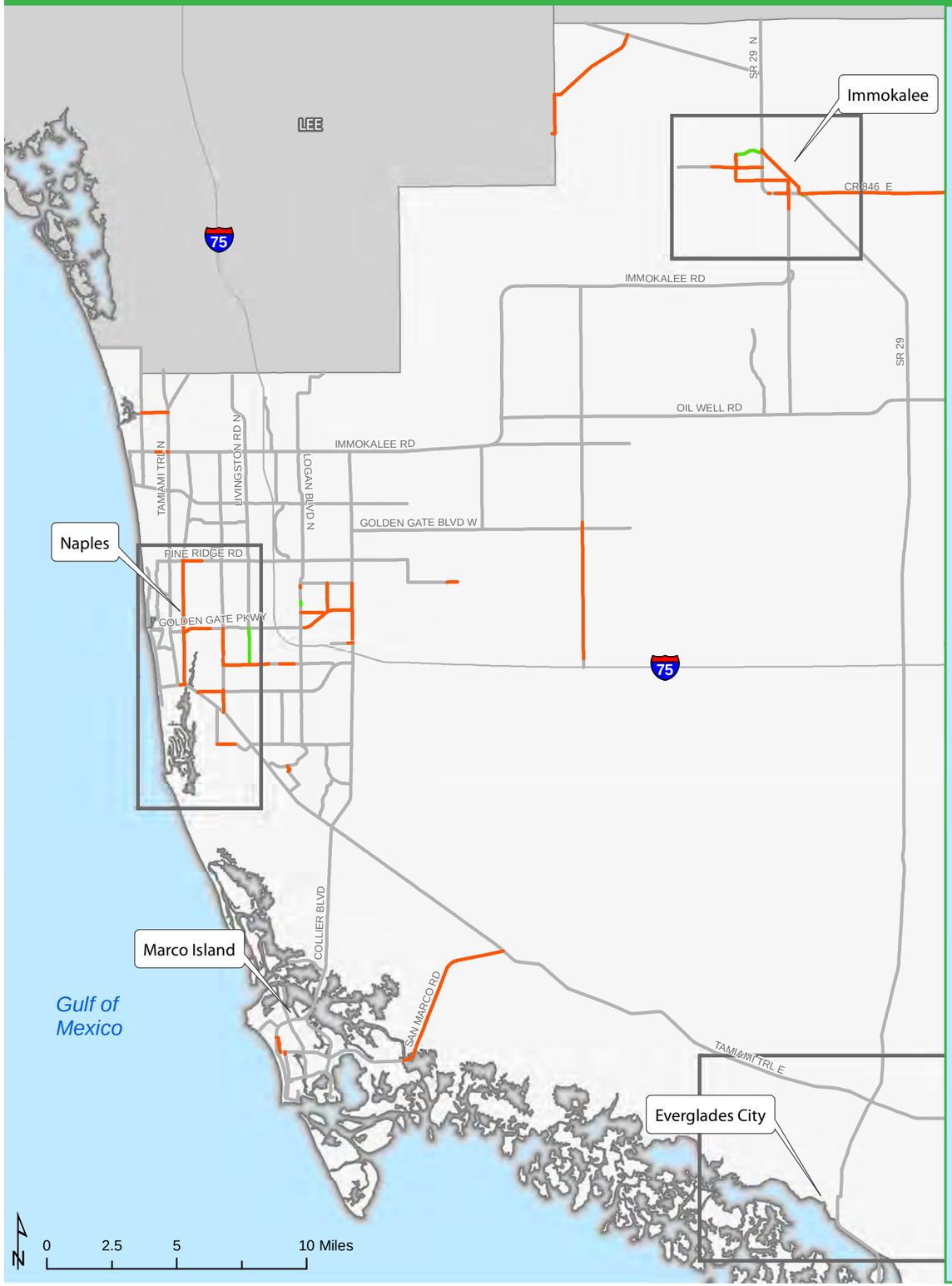
Source: Collier MPO

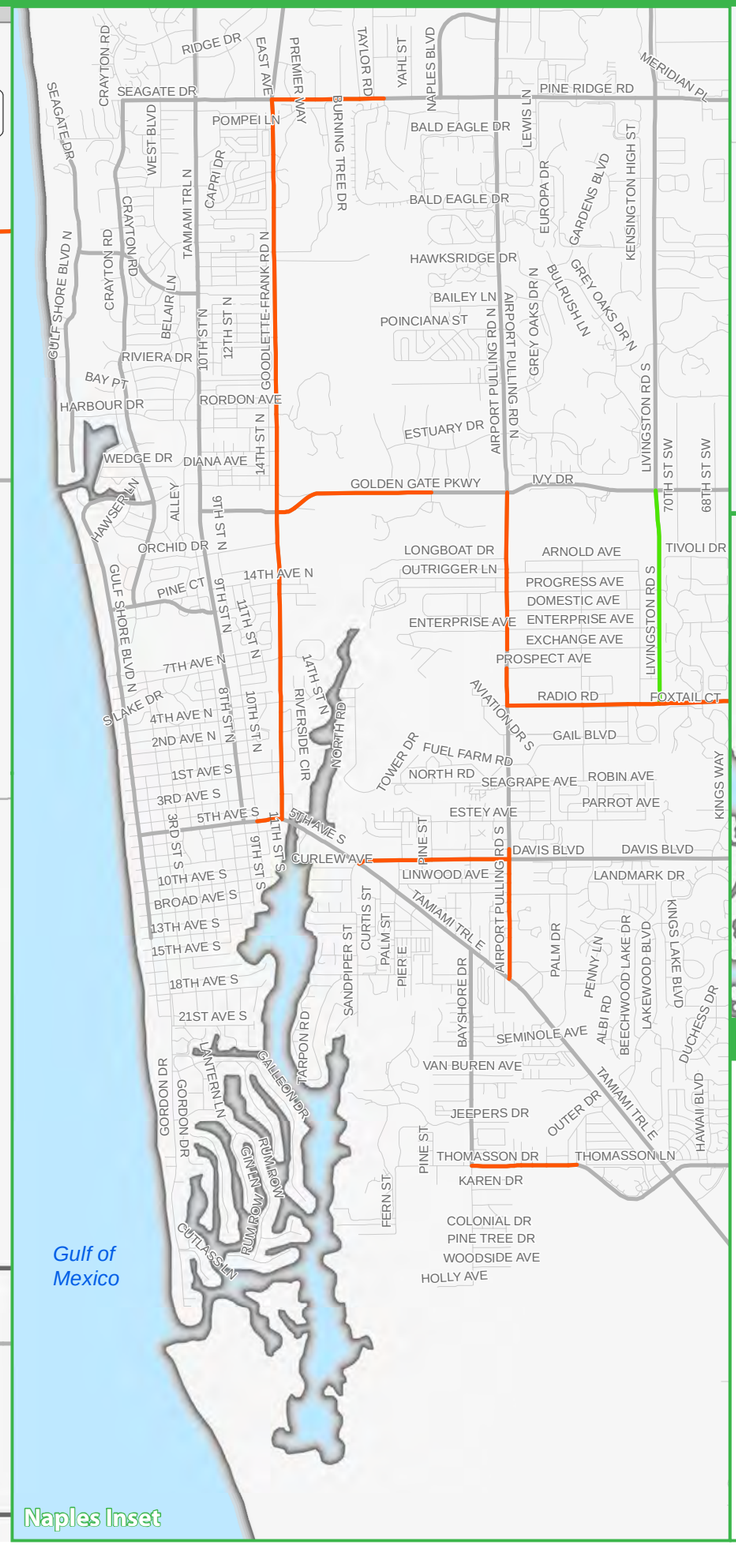
COLLIER MPO BICYCLE & PEDESTRIAN MASTER PLAN

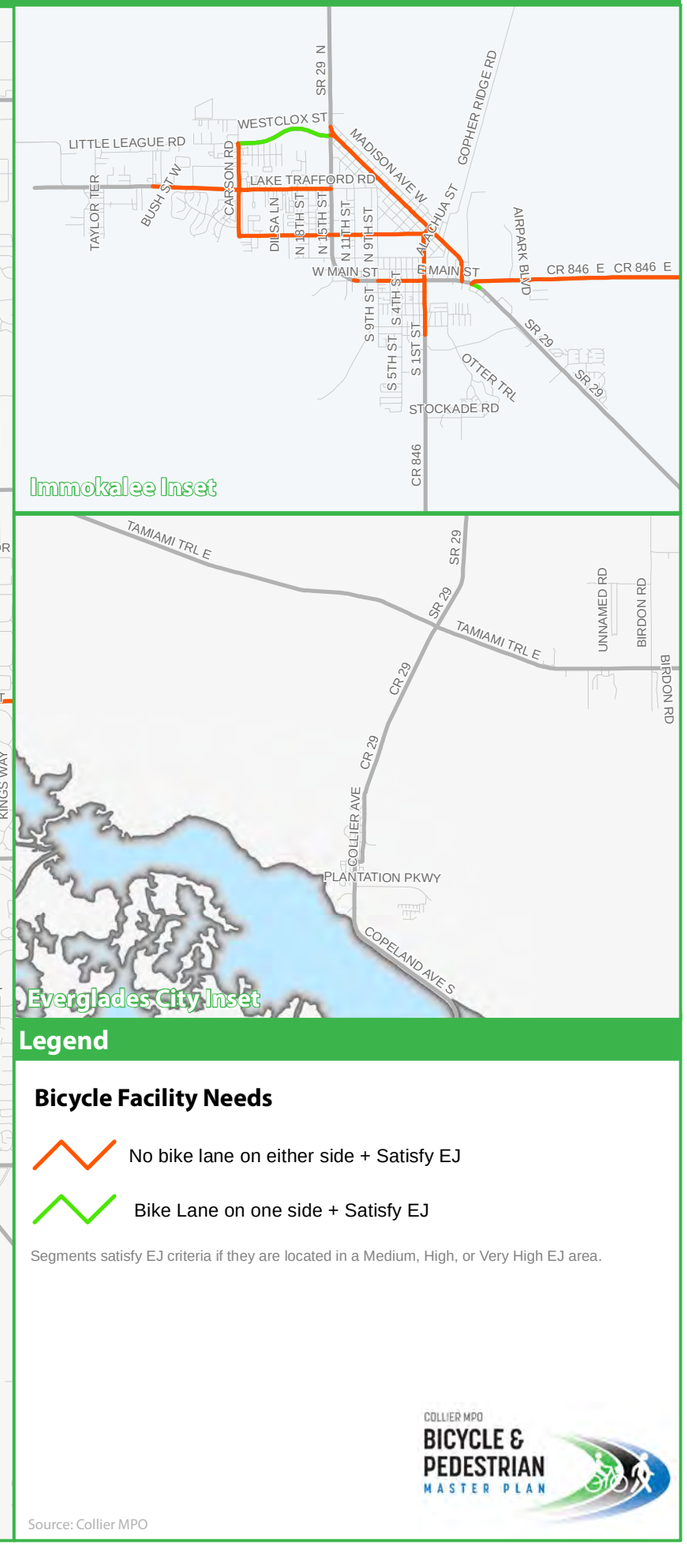
Bike Lane & Shared Use Path Gaps + EJ: Collectors and Arterials

MAP 6

Bicycle & Pedestrian Master Plan







Legend

Bicycle Facility Needs

- No bike lane on either side + Satisfy EJ
- Bike Lane on one side + Satisfy EJ

Segments satisfy EJ criteria if they are located in a Medium, High, or Very High EJ area.

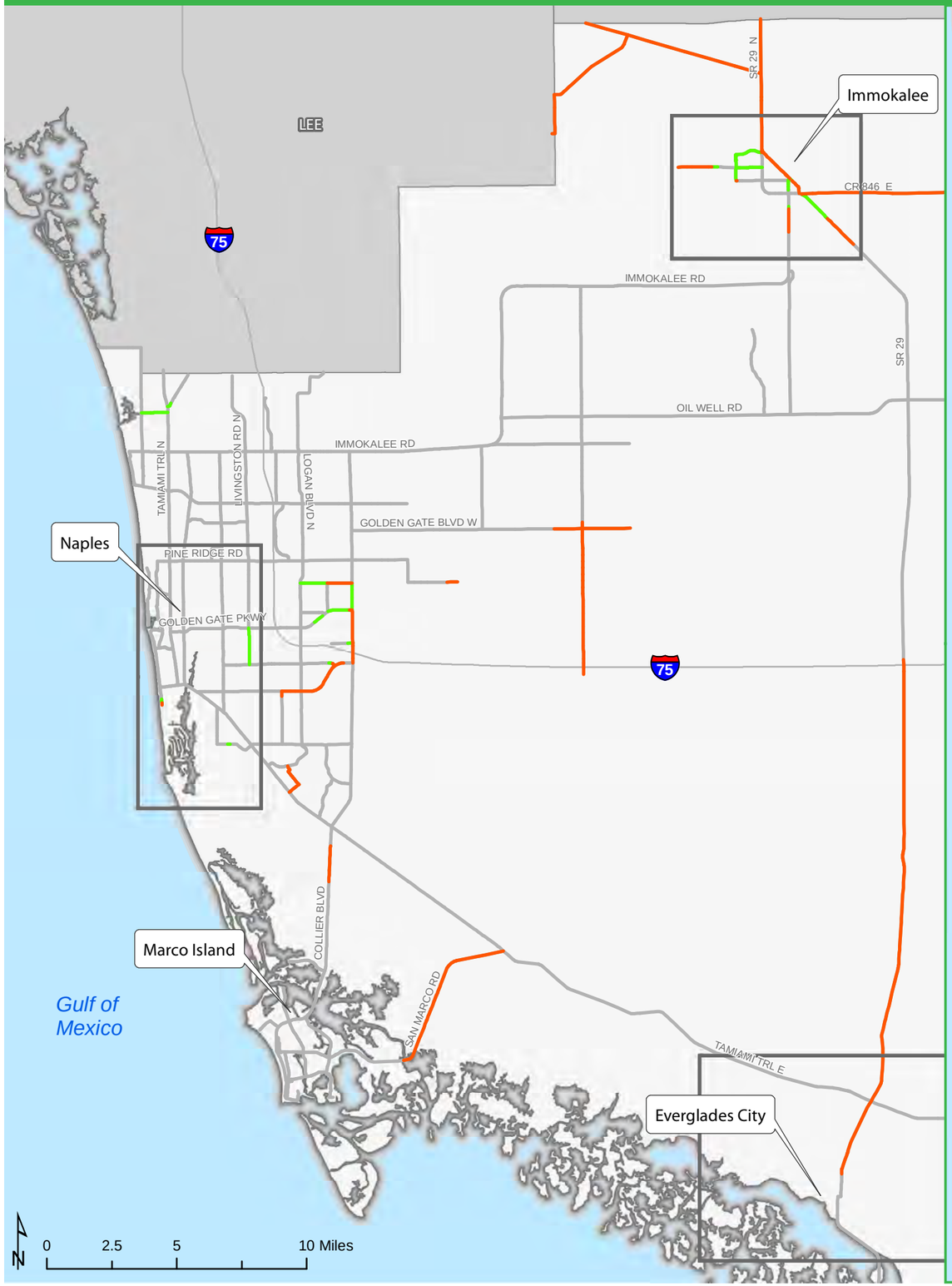
COLLIER MPO BICYCLE & PEDESTRIAN MASTER PLAN

Source: Collier MPO

Sidewalk & Shared Use Path Gaps + EJ: Collectors and Arterials

MAP 7

Bicycle & Pedestrian Master Plan



Legend

Pedestrian Facility Needs

- No sidewalk on either side + Satisfy EJ
- Sidewalk on one side + Satisfy EJ

Segments satisfy EJ criteria if they are located in a Medium, High, or Very High EJ area.

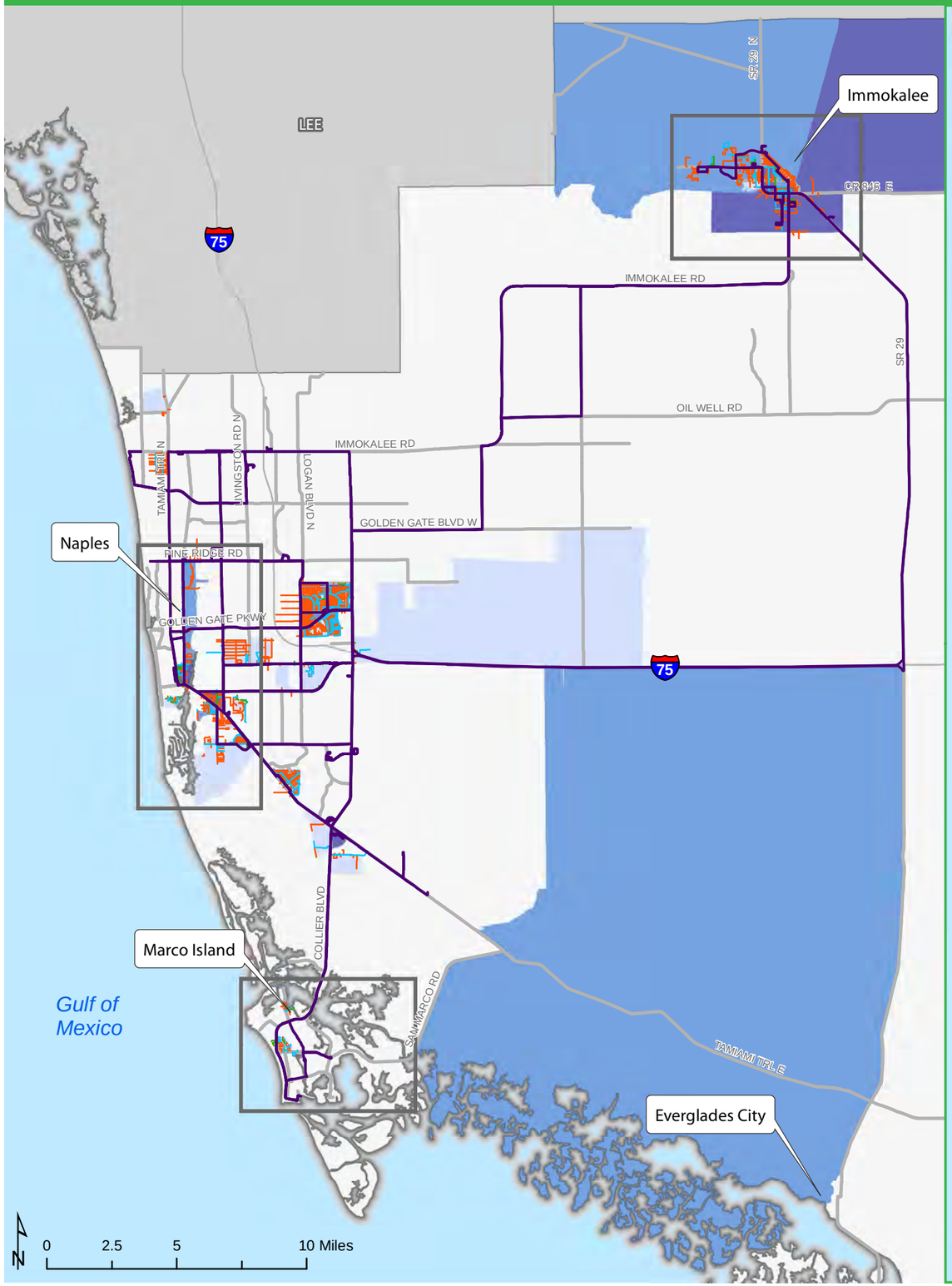
COLLIER MPO BICYCLE & PEDESTRIAN MASTER PLAN

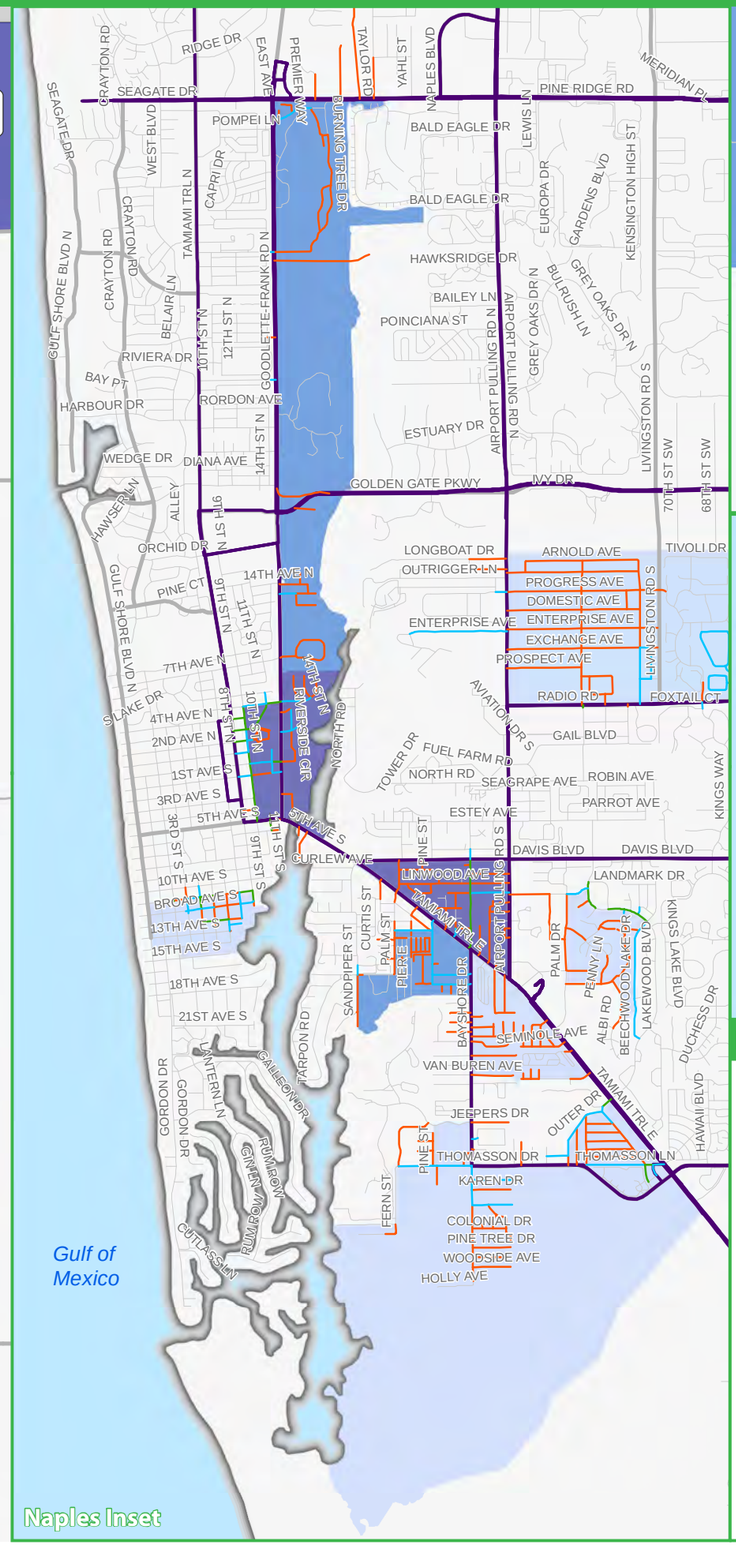
Source: Collier MPO

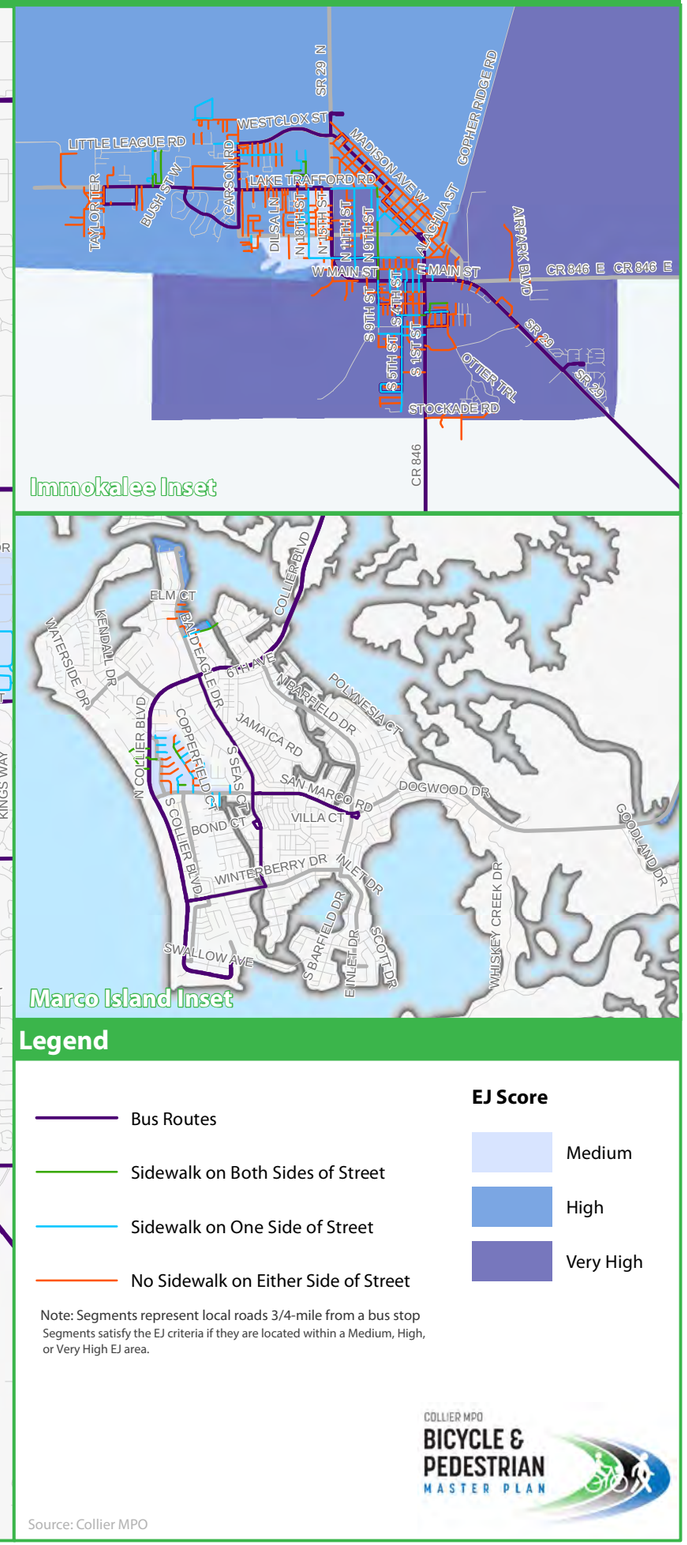
Transit Sidewalk Gaps (3/4 of a mile from Bus Stop + EJ)

MAP 8

Bicycle & Pedestrian Master Plan







Legend

- Bus Routes
- Sidewalk on Both Sides of Street
- Sidewalk on One Side of Street
- No Sidewalk on Either Side of Street

EJ Score

- Medium
- High
- Very High

Note: Segments represent local roads 3/4-mile from a bus stop
Segments satisfy the EJ criteria if they are located within a Medium, High, or Very High EJ area.

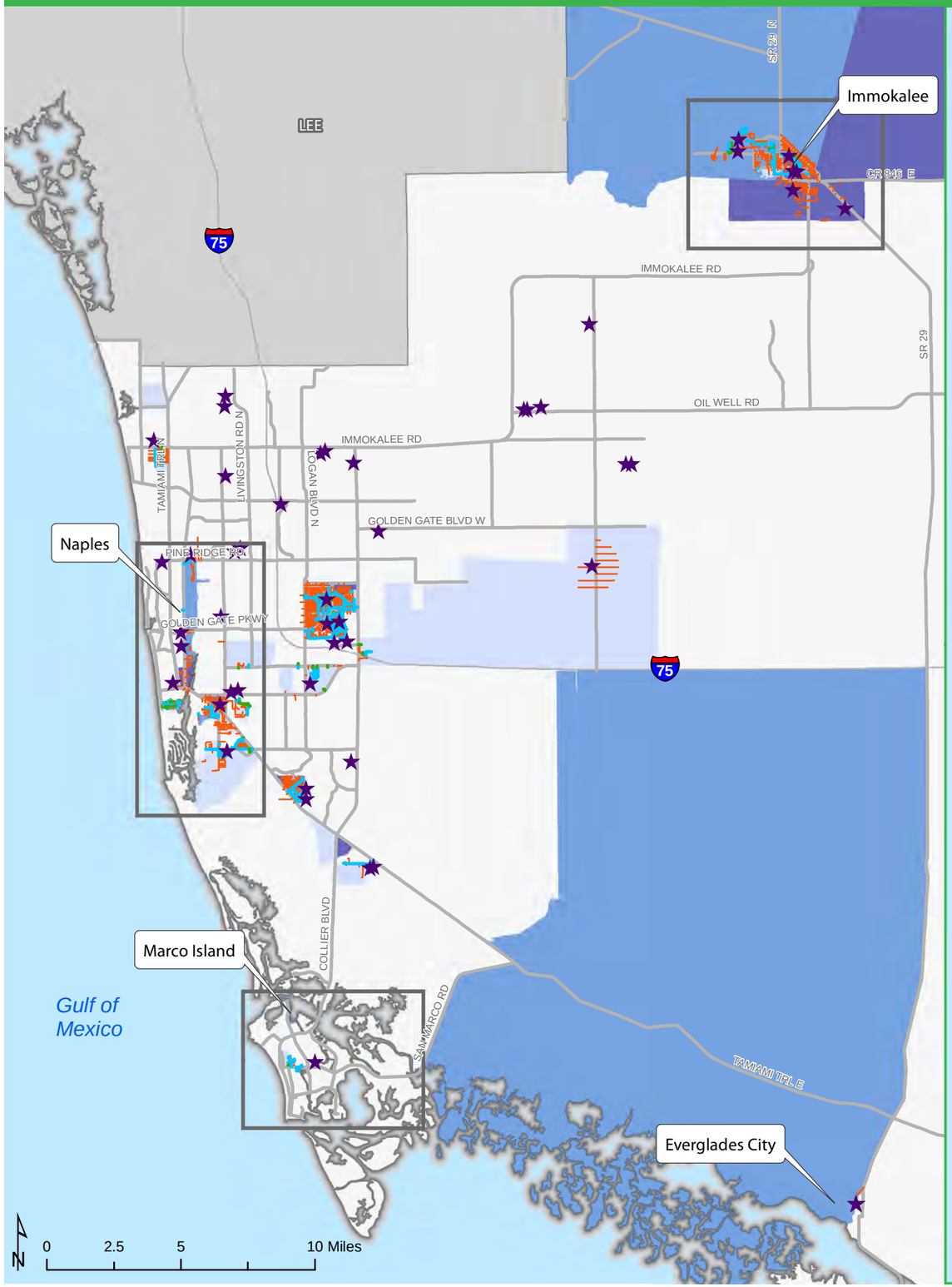
COLLIER MPO BICYCLE & PEDESTRIAN MASTER PLAN

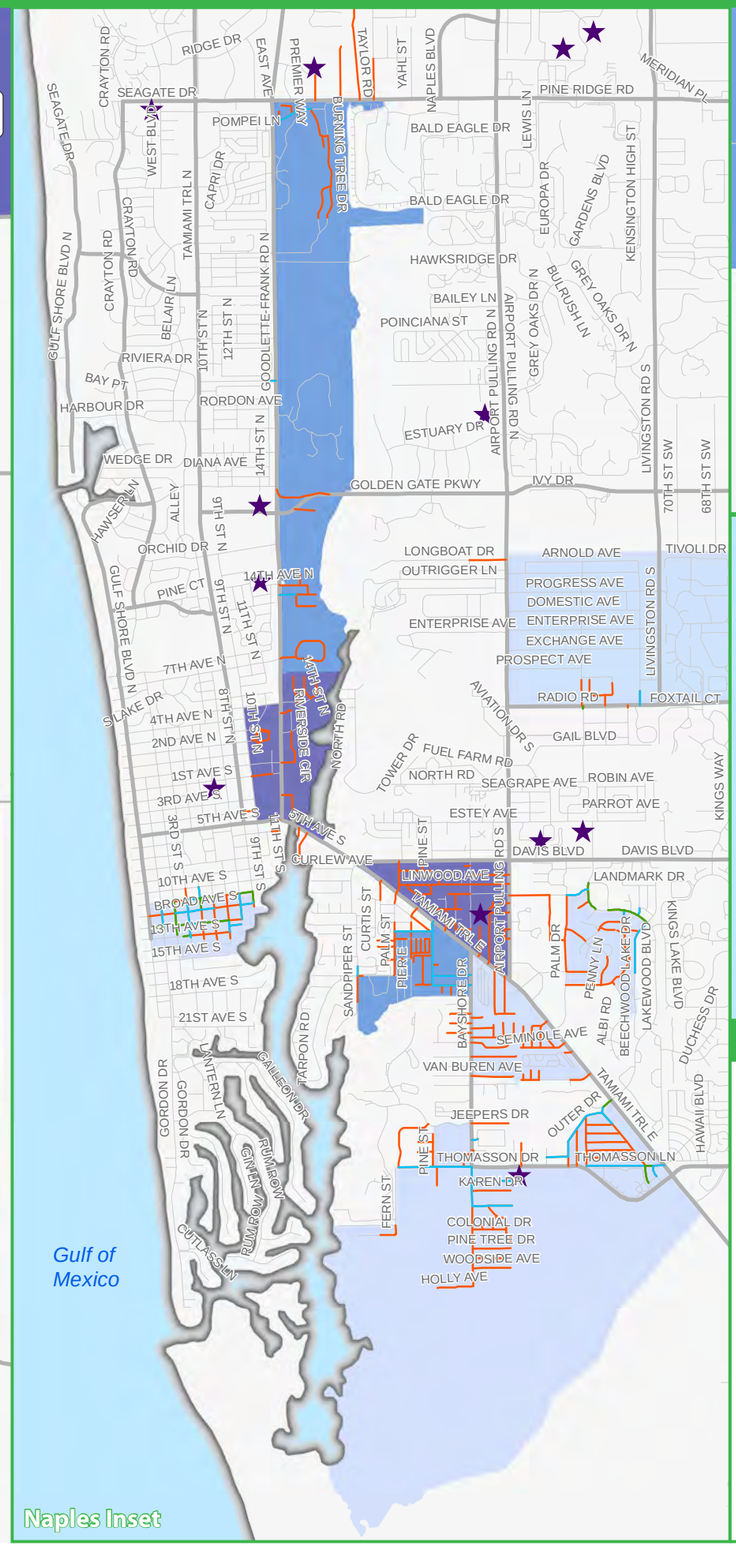
Source: Collier MPO

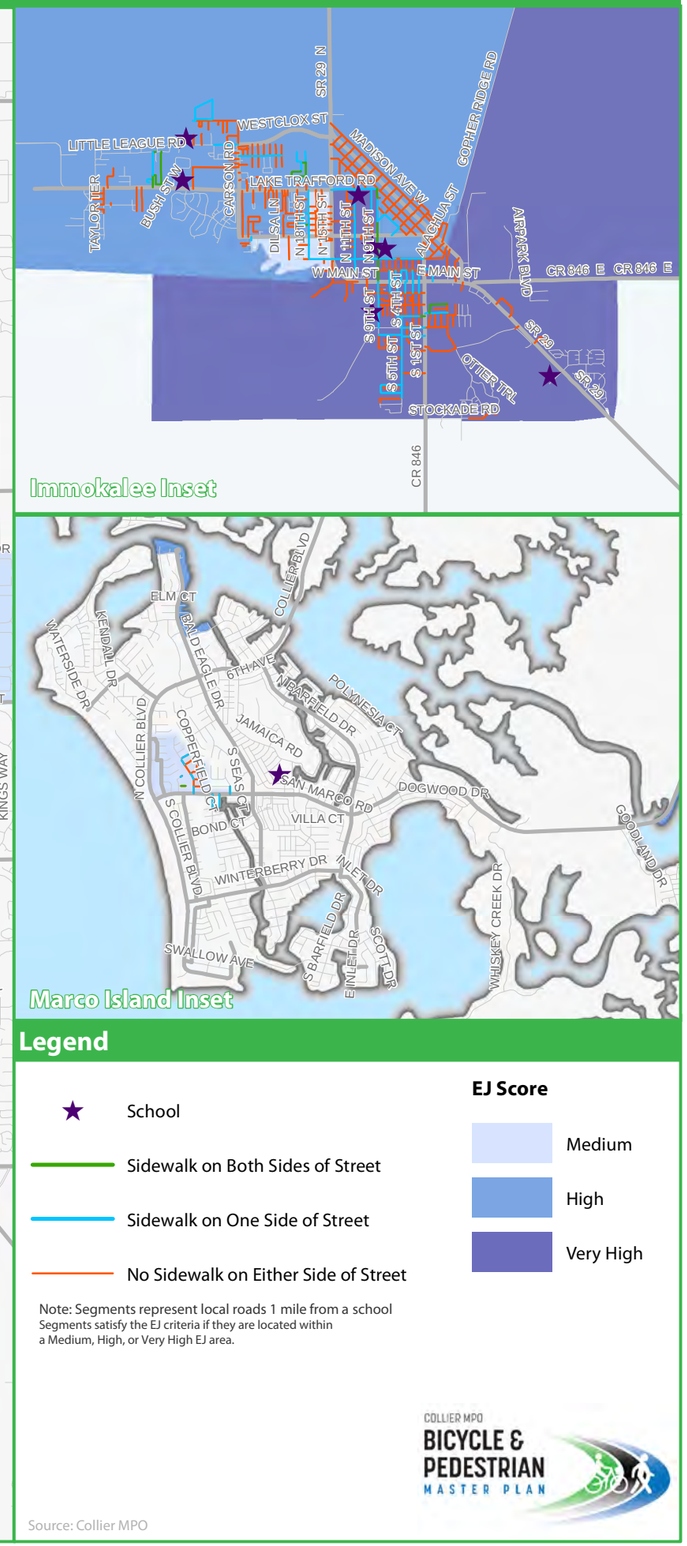
School Sidewalk Gaps (1 mile from a School + EJ)

MAP 9

Bicycle & Pedestrian Master Plan







Legend

- School
- Sidewalk on Both Sides of Street
- Sidewalk on One Side of Street
- No Sidewalk on Either Side of Street

EJ Score

- Medium
- High
- Very High

Note: Segments represent local roads 1 mile from a school
Segments satisfy the EJ criteria if they are located within
a Medium, High, or Very High EJ area.

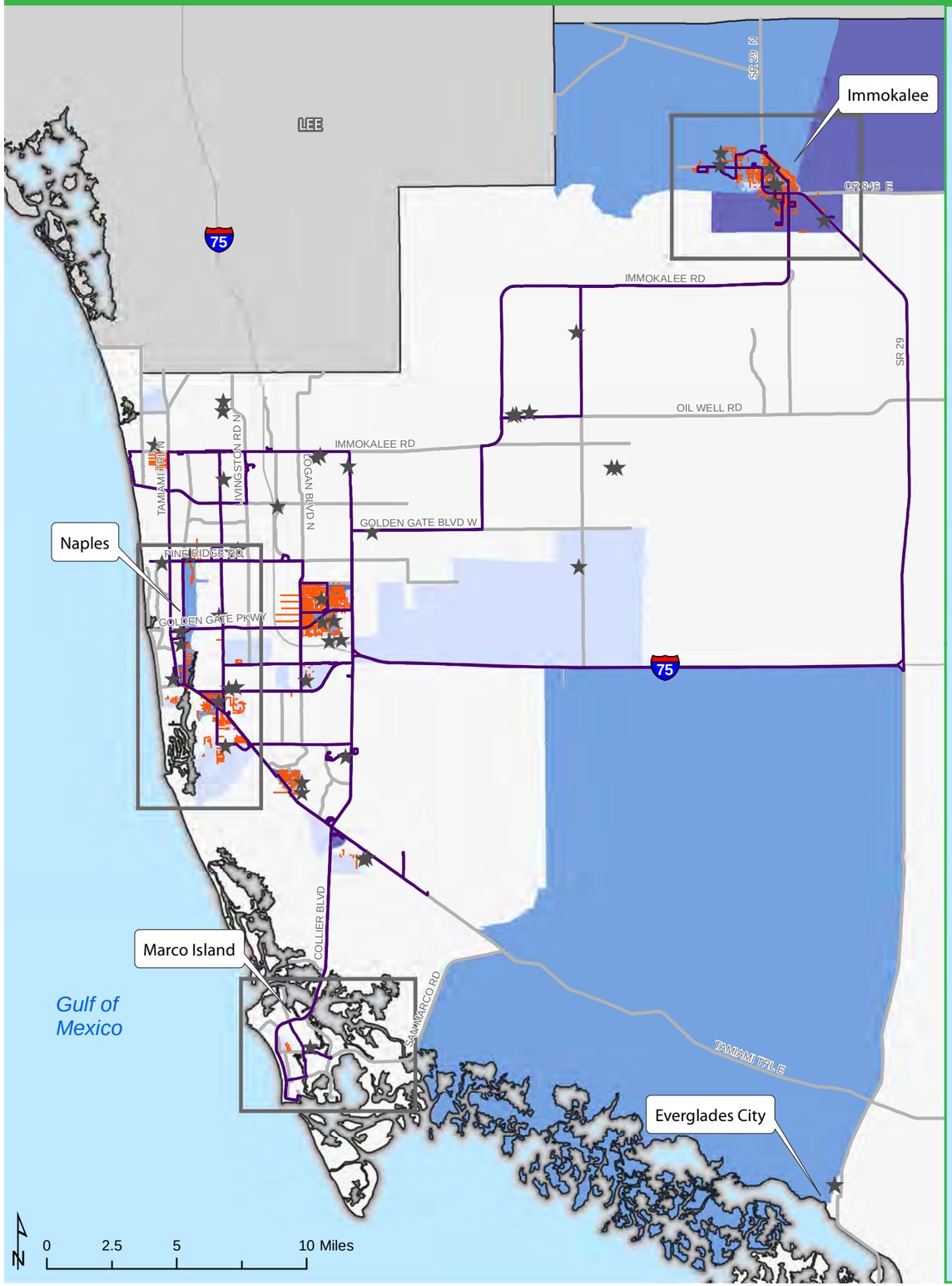
COLLIER MPO
BICYCLE & PEDESTRIAN MASTER PLAN

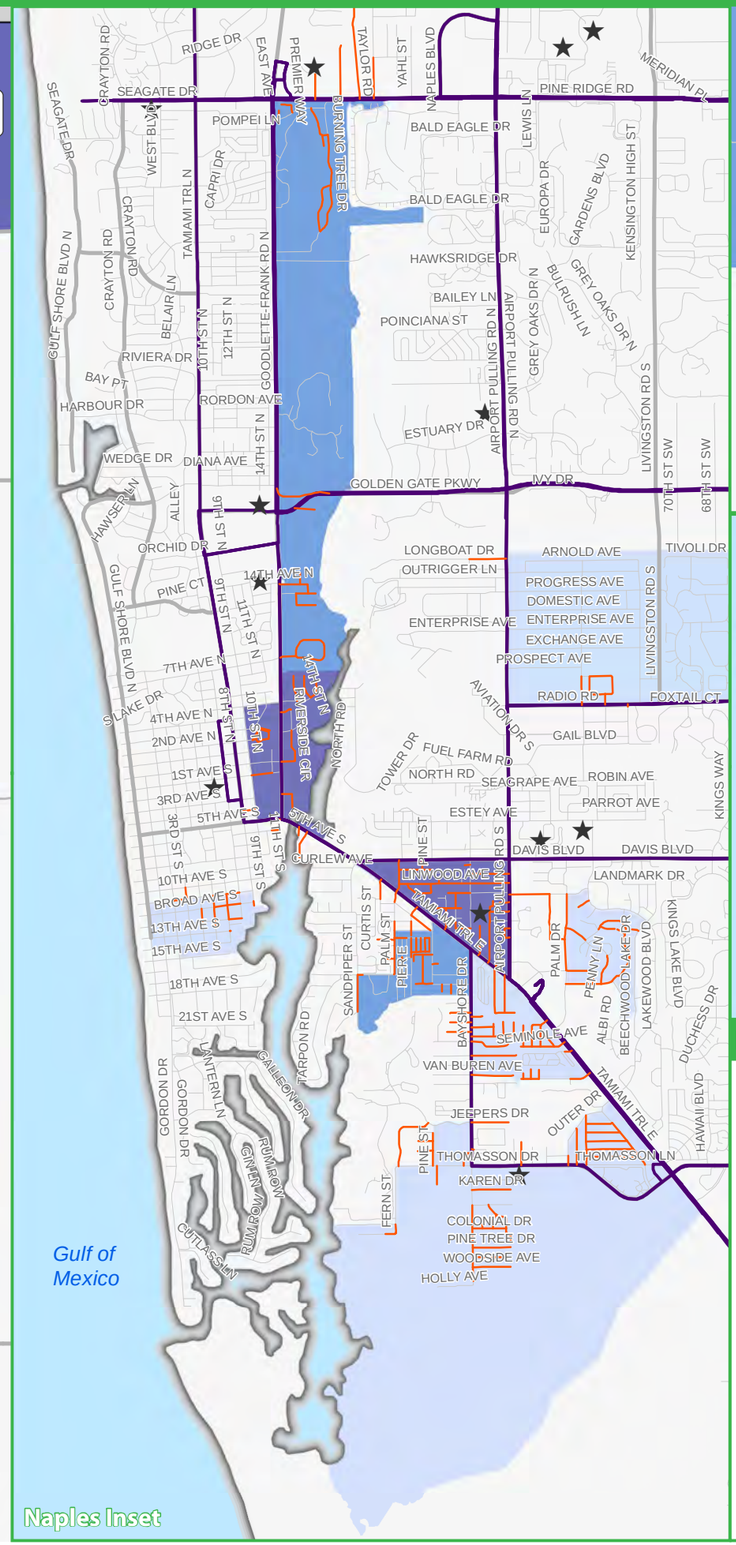
Source: Collier MPO

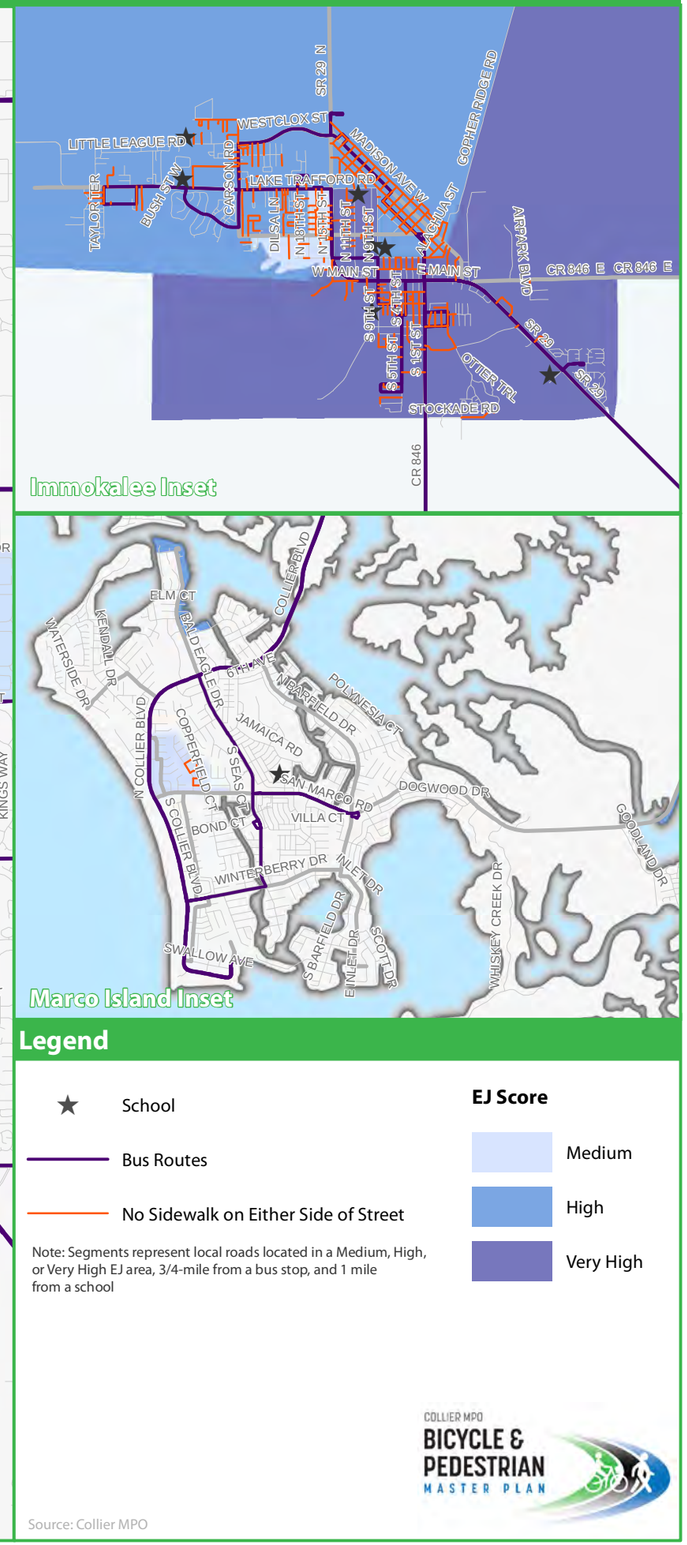
No Sidewalks (3/4 of a mile from Bus Stop + 1 mile from a School + EJ)

MAP 10

Bicycle & Pedestrian Master Plan







Legend

- School
- Bus Routes
- No Sidewalk on Either Side of Street

Note: Segments represent local roads located in a Medium, High, or Very High EJ area, 3/4-mile from a bus stop, and 1 mile from a school

EJ Score

- Medium
- High
- Very High

COLLIER MPO
BICYCLE & PEDESTRIAN MASTER PLAN

Source: Collier MPO

Local Roads Opportunities

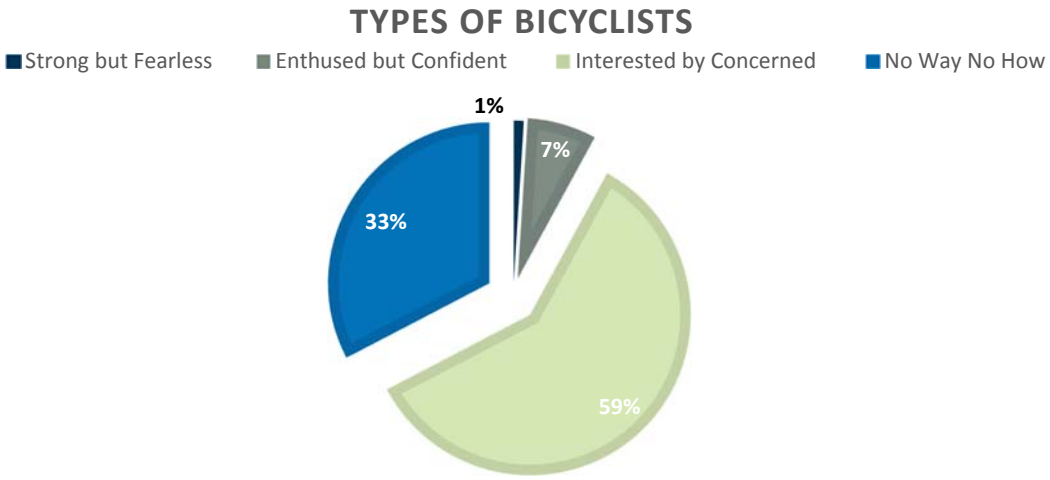
				Proposed Criteria														Points
				15	10	5	5	5	5	10	10	5	5	5	5	5	5	100
				Safety		Connectivity				Equity		Economic Dev			Support		Readiness	Major road	
	Road Name	Low Cross	High Cross	high crash	improve issue	1 path/trail	school/ park	Fills gap	transit	Few or none	EJ	Connects to commerce	High job area	walkable connectivuty	WCS, RSA	Local	Pre-construction	Major road	Totals
Immokalee	N 3rd St	W Main St	2nd Ave	0	0	0	5	5	5	10	10	5	0	5	5	5	0	5	60
Immokalee	N 4th St	W Main St	2nd Ave	0	0	0	5	5	5	10	10	5	0	5	5	5	0	5	60
Immokalee	N 5th St	W Main St	2nd Ave	0	0	0	5	5	5	10	10	5	0	5	5	5	0	5	60
Immokalee	N 6th St	W Main St	2nd Ave	0	0	0	5	5	5	10	10	5	0	5	5	5	0	5	60
Immokalee	N 7th St	W Main St	2nd Ave	0	0	0	5	5	5	10	10	5	0	5	5	5	0	5	60
Immokalee	S 2nd St	W Main St	Boston Ave	0	0	0	5	5	5	10	10	5	0	5	5	5	0	5	60
Immokalee	S 3rd St	W Main St	Boston Ave	0	0	0	5	5	5	10	10	5	0	5	5	5	0	5	60
Immokalee	S 4th St	W Main St	Boston Ave	0	0	0	5	5	5	10	10	5	0	5	5	5	0	5	60
Immokalee	S 6th St	W Main St	Boston Ave	0	0	0	5	5	5	10	10	5	0	5	5	5	0	5	60
Immokalee	E Main St	12th St	15th St	5	0	0	0	5	5	10	10	5	0	5	5	5	0	5	60
Immokalee	S 9th St	W Main St	Eustis Ave	0	0	0	5	5	5	10	10	5	0	5	5	5	0	0	55
Immokalee	Colorado Ave	S 1st St	S 9th St	0	0	0	0	5	5	10	10	5	0	5	5	5	0	5	55
Immokalee	Carson Rd	Lake Trafford Rd	Westclox St	0	0	0	0	5	5	10	10	5	0	5	5	5	0	5	55
Immokalee	Boston Ave	S 1st St	S 9th St	0	0	0	0	5	5	10	10	5	0	5	5	5	0	5	55
City of Naples	3rd Ave S	South Golf Dr	14th Ave S	0	0	0	5	5	5	10	10	5	0	0	5	5	0	0	50
City of Naples	4th Ave S	South Golf Dr	14th Ave S	0	0	0	5	5	5	10	10	5	0	0	5	5	0	0	50
City of Naples	4th - 6th St S	South Golf Dr	14th Ave S	0	0	0	5	5	5	10	10	5	0	0	5	5	0	0	50
City of Naples	7th St N	South Golf Dr	14th Ave S	0	0	0	5	5	5	10	10	5	0	0	5	5	0	0	50
City of Naples	Gordon Dr	South Golf Dr	14th Ave S	0	0	0	5	5	5	10	10	5	0	0	5	5	0	0	50
Gateway	Shadowlawn Dr	US 41	Davis Blvd	0	0	0	5	5	0	10	10	5	0	0	5	5	0	0	45
Marco Island	Collier Alternate South Bike Lanes	Dead end	San Marco Rd	0	0	5	5	5	5	0	0	5	0	5	0	5	0	5	40
Marco Island	Bald Eagle Bike Lanes	San Marco Blvd	N Collier Blvd	0	0	5	5	5	5	0	0	5	0	5	0	5	0	5	40
City of Naples	2nd Ave S	South Golf Dr	14th Ave S	0	0	0	5	5	5	10	0	5	0	0	5	5	0	0	40
City of Naples	6th-15th Ave S	South Golf Dr	14th Ave S	0	0	0	5	5	5	10	0	5	0	0	5	5	0	0	40
City of Naples	12th St N	South Golf Dr	14th Ave S	0	0	0	5	5	5	10	0	5	0	0	5	5	0	0	40
City of Naples	Lake Dr	South Golf Dr	14th Ave S	0	0	0	5	5	5	10	0	5	0	0	5	5	0	0	40
City of Naples	Mandarin Dr	South Golf Dr	14th Ave S	0	0	0	5	5	5	10	0	5	0	0	5	5	0	0	40
City of Naples	Pine St	South Golf Dr	14th Ave S	0	0	0	5	5	5	10	0	5	0	0	5	5	0	0	40
City of Naples	Riverside Cir	South Golf Dr	14th Ave S	0	0	0	5	5	5	10	0	5	0	0	5	5	0	0	40
Gateway	Linwood Ave	Shadowlawn	Commerical Dr	0	0	0	0	5	0	10	10	5	0	0	5	5	0	0	40
Gateway	Pineland St	US 41	Francis Ave	0	0	0	0	5	0	10	10	5	0	0	5	5	0	0	40
Naples Manor	Broward St	Floridan Ave	Texas Ave	0	0	0	5	5	0	10	10	0	0	0	5	5	0	0	40
Naples Manor	Carolina Ave	Texas Ave	McCarty St	0	0	0	5	5	0	10	10	0	0	0	5	5	0	0	40
Naples Manor	Jennings St	Floridan Ave	Texas Ave	0	0	0	5	5	0	10	10	0	0	0	5	5	0	0	40
Naples Manor	Texas Ave	Perry Ln	Catts St	0	0	5	5	0	0	10	10	0	0	0	5	5	0	0	40
Naples Manor	Trammel St	Floridan Ave	Texas Ave	0	0	5	5	0	0	10	10	0	0	0	5	5	0	0	40
Bayshore	Thomasson Drive	Hamiton Ave	US 41	0	0	0	5	0	0	10	10	0	0	0	5	5	0	5	40
Naples Manor	Flemming St	Floridan Ave	Texas Ave	0	0	0	0	6	0	10	10	0	0	0	5	5	0	0	36
Marco Island	Collier Alternate North Bike Lanes	San Marco Blvd	N Barfield Dr	0	0	5	0	5	5	0	0	5	0	5	0	5	0	5	35
Marco Island	North Barfield Shared Use Path	San Marco Blvd	N Collier Blvd	0	0	5	5	5	0	0	0	5	0	5	0	5	0	5	35
Bayshore	Karen Drive	Bayshore Dr	Dead end	0	0	0	5	0	0	10	10	0	0	0	5	5	0	0	35
Gateway	Andrew Dr	US 41	N of Caldonia Ave	0	0	0	5	0	0	10	10	0	0	0	5	5	0	0	35
Gateway	Bayside St	US 41	Dead end	0	0	0	5	0	0	10	10	0	0	0	5	5	0	0	35
Gateway	Caldonia Ave	Andrew Dr	Airport Rd	0	0	0	5	0	0	10	10	0	0	0	5	5	0	0	35
Gateway	Calusa Ave	Andrew Dr	Airport Rd	0	0	0	5	0	0	10	10	0	0	0	5	5	0	0	35
Gateway	Commercial Dr	US 41	Davis Blvd	0	0	0	0	5	0	10	10	0	0	0	5	5	0	0	35
Gateway	Connecticut Ave	Shadowlawn	Airport Rd	0	0	0	0	5	0	10	10	0	0	0	5	5	0	0	35
Gateway	Francis Ave	Dead end	Shadowlawn	0	0	0	0	5	0	10	10	0	0	0	5	5	0	0	35
Gateway	Palm St	Washington Ave	US 41	0	0	0	0	5	0	10	10	0	0	0	5	5	0	0	35
Gateway	Spruce St	Washington Ave	US 41	0	0	0	0	5	0	10	10	0	0	0	5	5	0	0	35
Gateway	Washington Ave	Pine	Palm	0	0	0	0	5	0	10	10	0	0	0	5	5	0	0	35
Naples Manor	Georgia Ave	Jennings St	Confederate Dr	0	0	0	0	5	0	10	10	0	0	0	5	5	0	0	35
Everglades City	Copeland Ave	City Hall	Chokoloskee Causeway	0	0	0	5	5	0	10	0	0	0	5	5	0	0	5	35
Everglades City	Datura St	E School Dr	Collier Ave (29)	0	0	0	5	5	0	10	0	0	0	5	5	0	0	5	35
Everglades City	Broadway	Riverside Dr	Copeland Ave	0	0	0	5	5	0	10	0	0	0	5	5	0	0	5	35
Bayshore	Areca Avenue	Bayshore Dr	Dominion	0	0	0	0	0	0	10	10	0	0	0	5	5	0	0	30
Bayshore	Barrett Avenue E	Bayshore Dr	Dead end	0	0	0	0	0	0	10	10	0	0	0	5	5	0	0	30
Bayshore	Bayshore Drive S - South of Thomasson	Dead end	Thommason Dr	0	0	0	0	0	0	10	10	0	0	0	5	5	0	0	30
Bayshore	Lunar Street	Bayshore Dr	Dead end	0	0	0		0	0	10	10	0	0	0	5	5	0	0	30

Bayshore	Pine Street	Canal	US 41	0	0	0	0	0	0	10	10	0	0	0	5	5	0	0	30
Bayshore	Van Buren Avenue W	Dead end	Bayshore Dr	0	0	0	0	0	0	10	10	0	0	0	5	5	0	0	30
Naples Manor	Gilchrist St	Floridan Ave	Texas Ave	0	0	0	0	0	0	10	10	0	0	0	5	5	0	0	30
Naples Manor	Hardee St	Floridan Ave	Tucker Ave	0	0	0	0	0	0	10	10	0	0	0	5	5	0	0	30
Everglades City	Collier Ave (29):	Begonia	bridge	0	0	0	0	5	0	10	0		0	5	5	0	0	5	30
Marco Island	Sandhill Shared Use Path	Winterberry Dr	San Marco Rd	0	0	5	0	5	0	0	0	0	0	5	0	5	0	0	20
Marco Island	Goodlland			0	0	5	0	5	0	0	0			5	0	5	0		20
Bayshore	Peters Street	Collee Ct	US 41	0	0	0	0	0	0	10	0	0	0	0	5	5	0	0	20
Immokalee	N 9th St	W Main St	Immokalee Dr	0	0	0	5	5	5	10	10	5	0	5	5	10	0	0	TIGER Grant
Immokalee	N 2nd St	W Main St	Roberts Ave	0	0	0	5	5	0	10	10	5	0	5	5	10	0	5	TIGER Grant
Immokalee	Dade St	Washington Ave	Madison Ave W	0	0	0	0	5	5	10	10	5	0	5	5	10	0	0	TIGER Grant
Immokalee	Escambia St	Immokalee Dr	Calle Armistad	0	0	0	5	5	5	10	10	5	0	5	5	10	0	0	TIGER Grant
Immokalee	Adams Ave W	Immokalee Dr	Hendry St	0	0	0	5	5	5	10	10	5	0	5	5	5	0	0	TIGER Grant
Immokalee	Charlotte St	Immokalee Dr	Madison Ave W	0	0	0	0	5	0	10	10	5	0	5	5	5	0	5	TIGER Grant
Immokalee	Adams Ave E	N 1st St	Alachua St	0	0	0	0	5	5	10	10	5	0	5	5	5	0	0	TIGER Grant
Immokalee	Alachua St	New Market Rd E	Roberts Ave	0	0	0	0	5	0	10	10	5	0	5	5	5	0	5	TIGER Grant

CHAPTER 7 – BICYCLE AND PEDESTRIAN FACILITY TOOLBOX

Bicycle and pedestrian facility design is evolving and, for many departments, including FDOT and Public Works, bicycle lanes have been included in the design of roadways for more than two decades. In the last 10 years, however, an increasing number of people have begun riding, and research indicates that most people need more than standard 4' bike lanes to feel comfortable riding.

In 2004, a paper by Roger Geller of the Portland Office (now Bureau) of Transportation suggested general categories and percentages of the types of bicycle users, as shown in Figure 9. The "no way no how" contingent of potential users is strong at 33%, but the "interested but concerned" group (59%) has shown that, with the construction of more protected, safer-feeling facilities, they are willing to ride a bicycle. In an increasing number of cities in which investments have been made in separated facilities such as side paths and in-road separated bike lanes, the percentages of bicyclists has increased.[1]



Source: Geller, Portland Office of Transportation, 2004

Figure 1: Bicyclist Rider Types

Level of Comfort and Facility Type

Because of the strong correlation between comfort and facility type, communities around the US are developing bicycle networks that support more casual cyclists who may be interested in riding but are intimidated by sharing the road with vehicles. The City of Vancouver, for example, has developed an "All Ages and Abilities" (AAA) approach to some of its bicycling facilities to develop a network that targets the "interested by concerned" user group and begins to target the "no way no how" group. This approach is being applied to cities across North America. **Figure 10** illustrates facility types and places them on the level-of-comfort spectrum. Whether or not an "all ages and abilities" approach is adopted,

[1] https://nacto.org/2016/07/20/high-quality-bike-facilities-increase-ridership-make-biking-safer/.

building facilities that are less protected (and, therefore, less comfortable) will limit users to those who are more comfortable on less-protected bicycle facilities.

Sources: City of Vancouver, Transportation Design Guidelines, All Ages and Abilities Cycling Routes

Figure 2: All Ages and Abilities Facility Types by Comfort Level

Much like the general trends seen around Collier County, the online survey developed to capture input for this Master Plan found that although many people ride and walk, the impediment for those who do not ride often is feeling unsafe; in total, 88% of survey respondents said there are places they want to ride in Collier County but do not because they feel unsafe. As noted, comfort and safety are the primary motivators for people who ride by choice. Although those who are bicycle-dependent rarely attend meetings or sit on committees related to bicycle safety, it is important to remember that the routes they take should also be the safest and most comfortable available.

> 88%
> *of survey respondents said there are places they want to ride in Collier County but do not because they feel unsafe.*

The following is a discussion of potential on-road and separated facilities as well as supporting elements that should be considered as appropriate. FDOT has included guidance in the *Florida Design Manual* as well as the *Florida Greenbook*. Additional resources such as the American Association of State Highway and Transportation Officials (AASHTO) *Guide for the Development of Bicycle Facilities* (2012), the National Association of City Transportation Officials *(NACTO) Urban Bikeway Design Guide,* the FHWA *Small Town and Rural Multimodal Networks Guide* (2016), and the FHWA *Separated Bike Lane Planning and Design Guide* (2015) should be consulted for the latest design guidance.

On-Road Facilities

Several different on-road bicycle facility types make use of the current roadway network by working between existing curbs; they can enhance the trail network by connecting parks and trails and creating transportation opportunities and accommodating different categories of users. They also tend to be less expensive to build and may be able to be implemented with a resurfacing project. Increasingly, as noted, research is showing that the more protection bicyclists have from vehicles, the more comfortable they feel and the more people ride. Following are facility types, from least to most protected or comfortable, and a discussion of where they should be considered for construction.

Paved Shoulders

Shoulders are commonly used on rural roads that provide a separated space for bicyclists but are not marked as a bicycle facility. The minimum shoulder width is 4', but on high-speed roadways or roadways with many bicycle users, wider shoulders are recommended (Figure 11).

Figure 3: Paved Shoulder

Rumble-Buffer Bike Lane[2]

This is an enhanced paved shoulder, primarily used along rural roads. Many cyclists report feeling unsafe on a standard paved shoulder, especially when adjacent to high-speed traffic or high volumes of trucks. Maryland DOT has been working to develop a rumble-buffer option for high-speed rural roads; by adding rumble strips and additional paint, the rumble-buffer bike lane adds additional separation between vehicles, continues to function as an emergency travel or stopping space, actively discourages either mode from entering the travel lane, and requires only a modest increase in shoulder width (Figure 12).

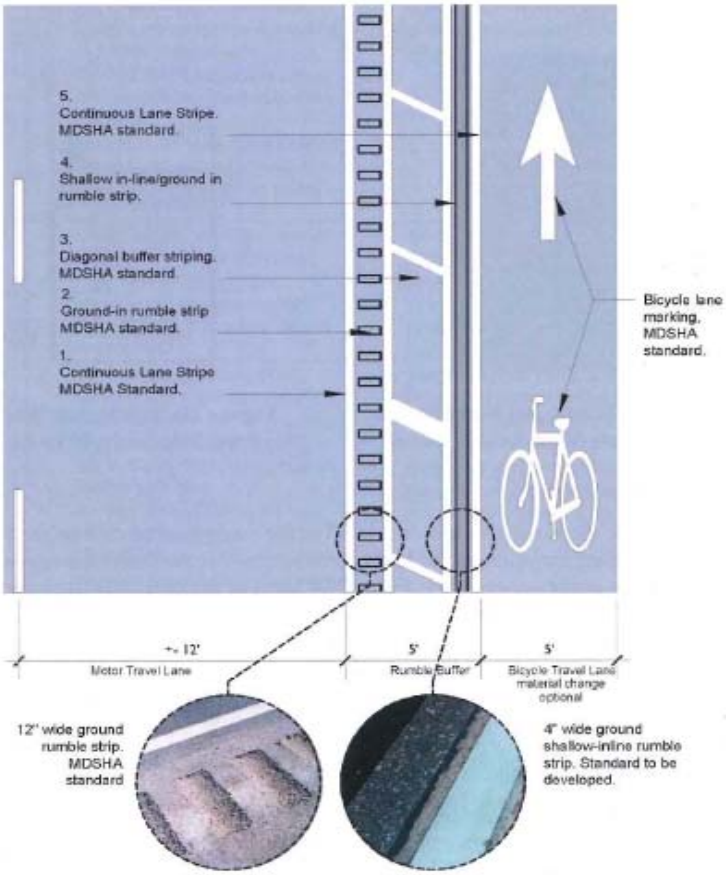


Figure 4: Rumble-Buffer Bike Lane

Bike Lanes

Bike lanes are spaces dedicated to bicycle travel on roadways. They are a minimum of 4-ft-wide if no curb and gutter, and 5-ft wide if included. Typical users are those who are comfortable riding with traffic; they represent a fairly small segment of the bicycle-riding community. This facility type should be considered during roadway resurfacing projects and can be used to make connections between trails. Bike lanes are not considered a preferred facility type for developing a community-friendly trail system
(Figure 13).

Figure 5: Marked Bike Lane

[2] Safe Accommodation of Bicyclists on High Speed Roadways in Maryland, http://www.roads.maryland.gov/OPR_Research/ MD-16-SHA-UM-4-06_Bicycles-on-High-Speed-Roadways_report.pdf.

Buffered Bike Lanes

Buffered bike lanes are spaces dedicated to bicycle travel on roadways and are 7-ft wide with a painted buffer to provide extra space between bicyclists and adjacent vehicles. These facilities provide an additional degree of comfort to bicyclists and should be considered for all new roads being constructed in Hernando and Citrus counties, particularly where higher volumes of bicycle traffic are anticipated (Figure 14).

Figure 6: Buffered Bicycle Lane

Separated Bicycle Lanes

Separated bicycle lanes are on-road facilities that include a traffic separator and dedicated space for bicyclists. They can be one- or two-way depending on the need or the roadway condition and often can be constructed between existing curbs if the roadway has excess capacity. In urban areas, this type of facility can provide a high level of comfort for bicyclists, similar to that of a shared-use path. Design care must be taken at intersections and driveways. Adding this type of facility has been associated with an increase in bicycle usage (Figure 15).

Figure 7: Separated Bicycle Lane

Green Bike Lanes

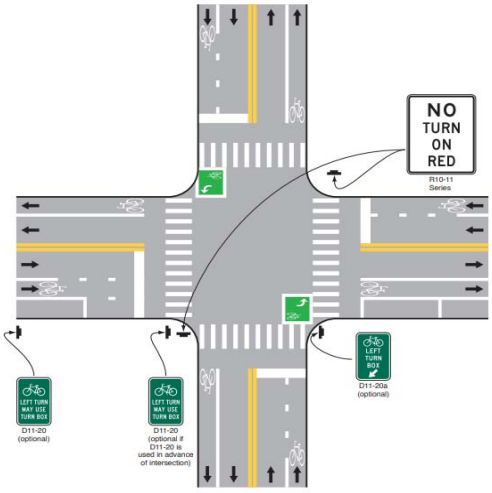
Green paint can be applied to bike lanes in areas of potential conflict where motorists must cross the bike lane to turn or to exit a parking area. Green paint is considered a traffic control device and is subject to guidance in the *Manual on Uniform Traffic Control Devices* (MUTCD), subject to Interim Approval 14 (Figure 16).

Figure 8: Green Bike Lane

Two-Stage Queue Box

A two-stage queue box allows bicyclists to more easily make a left turn. Rather than having to move into a turn lane to make a left turn, the turn box allows bicyclists to proceed across the intersection and position themselves to cross the intersection with the signal. It received FHWA Interim Approval IA-20 in 2017 (Figure 17).

Figure 9: Two-stage Queue Box



Advisory Bike Lane

An advisory bike lane is used on low-speed roadways where there is not enough room for both bike lanes and travel lanes. These markings communicate to both bicyclists and motorists where to ride while also communicating to motorists that they can pass when there is room (Figure 18).

Advisory Shoulder

Advisory shoulders may be used on roads where it is not possible to construct a traditional shoulder. Using paint, space is designated for pedestrians within the travel lane; a dashed line is used to delineate the space may be crossed by motorists if the way is clear. Considered an innovative facility type by FHWA, an approved Request to Experiment is required to implement this facility on federally-funded projects. Additional information can be found it the FHWA's *Small Town and Rural Multimodal Networks.*

Figure 10: Advisory Bike Lane

Bicycle Boulevard

A bicycle boulevard is a low-volume, low-speed street designed to give bicycles priority, typically achieved by a combination of signage and infrastructure. Also called neighborhood greenways, bicycle boulevards generally provide convenient access to local destinations and often connect or go through neighborhoods (Figure 19).

Figure 11: Bike Boulevard

Off-road Facilities

Multi-use Trails

AASHTO defines a multi-use trail as a bikeway that is typically in an independent right-of-way and separated from motorized traffic by open space or a buffer. It may be used for recreation or transportation purposes and falls under the accessibility requirements of the Americans with Disabilities Act (ADA) (Figure 20).

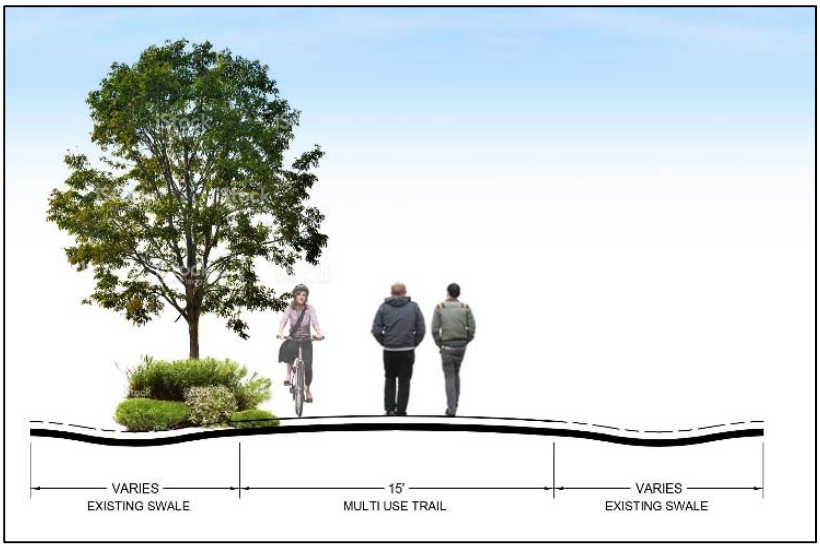


Figure 12: Multi-use Trail Section

Trailheads and Rest Areas

Rest areas and trailheads can take many forms, from the most basic parking lot with trail access to a major trailhead that includes parking, restrooms, water fountains, trail signage, and bike racks (Figure 21). Although the elements of each trailhead may be unique to its location and subject to available space and projected demand, generally, they can be separated into three categories. The provision of areas and elements, even if they do not fully conform to the category, is encouraged.

Figure 13: Shelter on Suncoast Trail

- **Major trailheads** include parking, restrooms, water fountains, bike racks, and a bike repair station. Parking at a major trailhead should be designed to accommodate trailers for recumbent bikes.
- **Minor trailheads** include parking, seating, and bike racks.
- **Rest areas** may be a shelter adjacent to the trail; there may or may not be trail information and a trash can.

911 Emergency Response System Markers (ERSM)

Figure 14: Embedded Pavement Decal

Feeling safe on a trail is critical to its use. Installing location decals on trails such as that shown in Figure 26 is an increasingly common practice to both enhance the feeling of safety and allow emergency responders to locate trail users. Exercise distance monitors could also be considered so users can track distance according to the markers. In Orange County, a process has been developed between the Parks & Recreation Trails Division and fire, EMS, and law enforcement agencies in which 911 operators use GPS to mark coordinates every 1/10 mile. An Excel spreadsheet was created and provided to 911 dispatchers and EMS that also notes the best entry point for each location and whether an ambulance or fire truck could fit. It is increasingly common to install and maintain these markers for the life of a trail. Maintenance must include replacement of decals (Figure 22).

Trail Counters

Understanding trail usage is critical to properly staff and maintain trails. Information on usage can help make the case to expand the system or improve facilities. Cities across the US such as Boulder, San Francisco, and Seattle are installing trail counters (Figure 23). According to the Portland Bureau of Transportation, "… counting bicycles informs [us] about progress toward making bicycling a fundamental part of life in Portland and gives feedback about the usefulness of investments in bicycle infrastructure and city streets" (Brooks, 2014). As the trail system grows, locations for trail counters should be considered in the long term system planning.

Figure 15: Bicycle Barometer in Boulder, CO *(Source: PeopleForBikes)*

Crossings

Walkers and bicycle riders are especially vulnerable as they cross a roadway, whether at an intersection or at a trail/road crossing. A number of engineering design techniques are available to help minimize the risks. Crossing features for both pedestrian and trail infrastructure is discussed below.

Two of the primary challenges for trail and road users are the speed difference between vehicles and the sight distance. Designing intersections that give bicyclists and vehicle operators enough time to react to each other is crucial to minimizing the opportunities for crashes. Several design tools are available to help all users navigate intersections, as described below.

Because each crossing is unique, the specific geometry and location will factor into the design of each intersection. It is important to note that circumstances of use may change over time; this should trigger a review and modification as needed of certain intersections. If, for example, a trail has a higher volume of users than might have been anticipated, it is recommended that the trail crossings be reviewed. It is also important to consider changes to surrounding land use. A crash trend or higher-than-projected volumes for either vehicles or bicyclists may require the need to redesign the crossing to address the challenges.

FHWA is promoting a number of pedestrian safety countermeasures through their Every Day Counts (EDC-4) program:[3]

- **Road diets** can reduce vehicle speeds and the number of lanes pedestrians cross and can create space to add new pedestrian facilities.
- **Pedestrian hybrid beacons** (PHBs) are a beneficial intermediate option between Rectangular Rapid Flashing Beacons (RRFBs) and a full pedestrian signal. They provide positive stop control in areas without the high pedestrian traffic volumes that typically warrant signal installation.
- **Pedestrian refuge islands** allow pedestrians a safe place to stop at the midpoint of the roadway before crossing the remaining distance. This is particularly helpful for older pedestrians or others with limited mobility.
- **Raised crosswalks** can reduce vehicle speeds.
- **Crosswalk visibility enhancements**, such as crosswalk lighting and enhanced signing and marking, help drivers detect pedestrians—particularly at night.

Enhanced At-Grade Crossing or Signalized Crossing

A Pedestrian Hybrid Beacon is a pedestrian-activated traffic control device that is dark to motorists until activated by a pedestrian, at which time a flashing yellow light followed by a solid red light is provided to motorists to direct them to stop (Figure 24). The solid red advances to a flashing red that allows motorists to proceed with caution once the pedestrian has cleared the crossing).

Figure 16: Pedestrian Hybrid Beacon

[3] https://www.fhwa.dot.gov/innovation/everydaycounts/edc_4/step.cfm.

An **RRFB (Figure 25) is a** traffic control device consisting of two rapidly and alternately flashing rectangular yellow indications with an LED array that functions as a warning beacon. This device has Interim Approval through FHWA for use at unmarked crosswalks.

Figure 17: RRFB

Crosswalks

Crosswalks provide critical clarification at intersections, identifying a safe space for bicyclists and pedestrians to cross and heightening the visibility of users of the crossing. The design of a crosswalk should depend on the facility type, adjacent street function, surrounding land use, and level of potential conflict.

The Small Town and Rural Design Guide has identified several factors that can be included to make a crossing safer, including median islands, raised crossings, and crosswalk markings (Figure 26). NACTO's *Bikeway Design Guide* has also identified a number of crosswalk designs that can be implemented depending on context. Features highlighted in the guide include green paint in the intersection and "elephant tracks" or wider white striping along the outside of the intersection.

It is recommended that each intersection or crossing be designed for the context, including the features that would provide the most clarity for all users of the crossing.

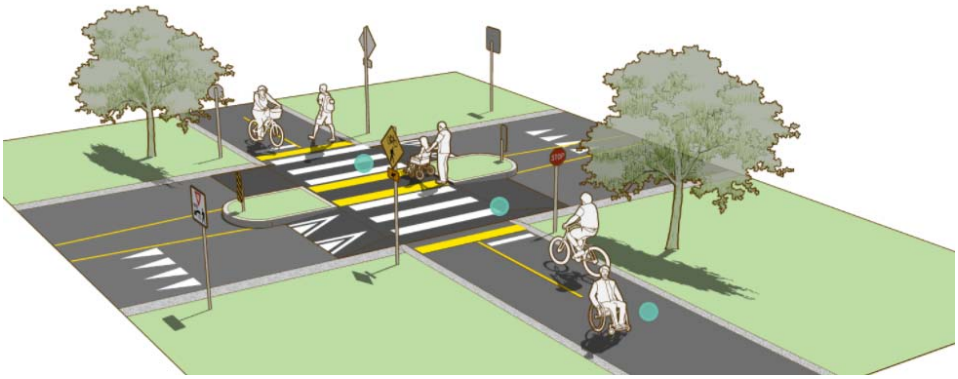


Figure 18: Shared-use Path Crossing
(Source: FHWA Small Town and Rural Design Guide)

Overpasses and Underpasses

Overpasses and underpasses could be considered in locations where traffic volumes are too high to manage with an at-grade crossing, such as multi-lane highway crossings. In some instances, based on usage volume, it may be appropriate to consider the construction of an overpass as part of a long-term plan for the trail.

Geometric Trail Design Criteria

Basic trail design criteria are provided below. More detail can be found in the AASHTO *Guide for the Development of Bicycle Facilities* and the AASHTO *Guide for the Development of Bicycle Facilities*.

- **Lateral clearance** – The minimum lateral clearance distance is 2 ft MUTCD requires 3 ft clearance between trail and signage.
- **Overhead clearance** – The recommended overhead clearance for structures is 1 ft, with a minimum of 8 ft Trees should be limbed up 13 ft above the trail surface.
- **Striping** – Striping may be installed where passing is inadvisable, including at the approach and departure of intersections. Striping may also be advisable where trail user volume is high, sight distance is restricted, or design speed is low.
- **Cross slope –** Shared-use paths adjacent to roadways function as sidewalks according to Public Rights-of-Way (PROWAG) and, therefore, cannot have a cross slope greater than 2%. A 1% cross-slope is recommended for ease of use by people with disabilities.
- **Grade** – The maximum grade of a shared-use path adjacent to a roadway is 5%. Grades for paths in an independent right-of-way should not exceed 5%. Switchbacks and pull-outs can be provided to mitigate excessive grade changes. Signage also should be provided to warn users of grade changes.

Wayfinding

Wayfinding is an important component of a bicycle network and can be defined as:

> … a system [that consists] of comprehensive signing and/or pavement markings to guide bicyclists to their destinations along preferred bicycle routes. Signs are typically placed at decision points along bicycle routes – typically at the intersection of two or more bikeways and at other key locations leading to and along bicycle routes. (*NACTO Urban Bikeway Design Guide*)

Collier County has areas that would benefit from signage that informs bicycle riders in the same way roadway signage informs motorists. Although cell phones have put maps and information at rider fingertips, signage creates confidence in the route being traveled and can quickly and conveniently convey directions and distance. Established local signage plans are helpful when riding in defined areas. Signage can also be used to help 'bridge the gap' between trails or facilities, telling users how to get to a trail or a destination.

NACTO's *Urban Bikeway Design Guide* has been endorsed by FHWA for reference in designing urban bicycle infrastructure. The goal of the guide is to provide cities with state-of-the-art-practice solutions that can help create complete streets that are safe and enjoyable for cyclists. The guide's chapter on "Bike Route Wayfinding Signage and Markings System" describes a wayfinding system as comprehensive

signing and/or pavement markings and identifies three types of signs that should be used when developing a bicycle wayfinding signage system:

- **Confirmation signs** help bicyclists know they are on a bike route and also let motorists know they are on a road that may have higher bicycle traffic. Placement should be every 2–3 blocks and used in conjunction with turn or decision signs. Pavement markings also can be used as confirmation.
- **Turn signs** indicate when the bikeway/bike boulevard is shifting to another street. It is recommended that destination and distance be listed on the sign. Pavement signage can be used.
- **Decision signs** mark the intersection of routes and access to destinations and typically include arrows, named destinations, and distances. Pavement signage can be used.

Bicycle Facilities for Comfort and Safety

Generally, the preferred roadway combination is a trail on one side and a sidewalk on the other. In urban locations, low-speed, low-volume roadways with signage may be appropriate bicycle facilities, or a separated bike lane may be considered. In rural areas, if a separated multi-use trail cannot be achieved, a rumble shoulder or buffered shoulder may be an appropriate facility.

Cost is often the primary determinant in the selection of bicycle facility type. This can lead to the construction of a facility that does not truly meet the needs of bicycle riders. An example of this is a bike lane on a high-speed, high-volume road; a primary reason for this is cost, as building within the curbs is much less expensive than reconstructing a curb. Another reason for adding a bicycle lane might be to help manage speed on the roadway, but this approach, although providing a facility, does not provide one that is comfortable for a majority of bicycle riders.

This Plan proposes that during all roadway reconstruction projects, a separated trail facility be added during design. This resolves the discomfort and danger people feel when sharing the roadway with trucks or fast-moving cars and also helps to build a bicycle network that serves everyone. Excess pavement should still be set aside for bicycle lanes for riders who prefer them. The table shown in Figure 27 was developed by NACTO to provide guidance on the circumstances for including particular facility types; importantly, it offers options that allow designers to include the facility that fits the space based on cost and engineering judgment.

Contextual Guidance for Selecting All Ages & Abilities Bikeways

Roadway Context				All Ages & Abilities Bicycle Facility
Target Motor Vehicle Speed*	Target Max. Motor Vehicle Volume (ADT)	Motor Vehicle Lanes	Key Operational Considerations	
Any		*Any*	*Any of the following:* high curbside activity, frequent buses, motor vehicle congestion, or turning conflicts‡	**Protected Bicycle Lane**
< 10 mph	Less relevant	No centerline, or single lane one-way	Pedestrians share the roadway	**Shared Street**
≤ 20 mph	≤ 1,000 – 2,000		< 50 motor vehicles per hour in the peak direction at peak hour	**Bicycle Boulevard**
≤ 25 mph	≤ 500 – 1,500			
	≤ 1,500 – 3,000	Single lane each direction, or single lane one-way	Low curbside activity, or low congestion pressure	**Conventional or Buffered Bicycle Lane, or Protected Bicycle Lane**
	≤ 3,000 – 6,000			**Buffered or Protected Bicycle Lane**
	Greater than 6,000			**Protected Bicycle Lane**
	Any	Multiple lanes per direction		
Greater than 26 mph†	≤ 6,000	Single lane each direction	Low curbside activity, or low congestion pressure	**Protected Bicycle Lane, or Reduce Speed**
		Multiple lanes per direction		**Protected Bicycle Lane, or Reduce to Single Lane & Reduce Speed**
	Greater than 6,000	*Any*	*Any*	**Protected Bicycle Lane, or Bicycle Path**
High-speed limited access roadways, natural corridors, or geographic edge conditions with limited conflicts		*Any*	High pedestrian volume	**Bike Path with Separate Walkway or Protected Bicycle Lane**
			Low pedestrian volume	**Shared-Use Path or Protected Bicycle Lane**

* While posted or 85th percentile motor vehicle speed are commonly used design speed targets, 95th percentile speed captures high-end speeding, which causes greater stress to bicyclists and more frequent passing events. Setting target speed based on this threshold results in a higher level of bicycling comfort for the full range of riders.

† Setting 25 mph as a motor vehicle speed threshold for providing protected bikeways is consistent with many cities' traffic safety and Vision Zero policies. However, some cities use a 30 mph posted speed as a threshold for protected bikeways, consistent with providing Level of Traffic Stress level 2 (LTS 2) that can effectively reduce stress and accommodate more types of riders.[18]

‡ Operational factors that lead to bikeway conflicts are reasons to provide protected bike lanes regardless of motor vehicle speed and volume.

Figure 19: NACTO Guidance for Selecting Appropriate Bicycle Facilities

Facilities on State Roads[4]

FDOT adopted a Complete Streets Policy in 2014 that accommodates all users along the State roadway system. Although counties typically follow the *Manual of Uniform Minimum Standards for Design, Construction, and Maintenance for Streets and Highways* or the *Florida Green Book*, State roads are

[4] Additional information may be found at http://flcompletestreets.com or at http://fdot.gov/roadway/fdm/.

designed according to the *Florida Design Manual*. The two resources, while separate are coordinated in their approach to developing a transportation system that serves all users. To better serve the different

Figure 20: Illustration of FDOT Context Classification System

users of the system, FDOT developed a Context Classification methodology that, according to infrastructure and land use, assigns a context that reflects where the road way is in the land development continuum, as shown in Figure 28.

This continuum ranges from undeveloped conservation land to the most urban downtowns. By analyzing land use, FDOT determined the facilities that are most appropriate for where they are located. It is FDOT policy that roadways in all counties be classified before or when work is anticipated to assist in the determination of what facilities to include. Table 6 identifies sidewalk facilities by FDOT Context Classification. The highlighted rows and contexts are most relevant to Collier County.

Table 1: FDOT Context Classification Guidance for Sidewalks

Context	Allowable Range (mph)	SIS Minimum (mph)	Sidewalk
C1 Natural	55-70	65	5’ Sidewalk if demand warrants
C2 Rural	55-70	65	5’ Sidewalk if demand warrants
C2T Rural Town	25-45	40 (35 with design elements)	6’ Sidewalk
C3R Suburban Residential	35-55	50 (45 with curb)	6’ Sidewalk
C3C Suburban Commercial			6’ Sidewalk if demand warrants
C4 Urban General	30-45	45	6’ Sidewalk
C5 Urban Center	25-35	35	10’ Sidewalk
C6 Urban Core	25-30	30	12’ Sidewalk

Notes: 1) C2T, C3, C4 sidewalk may be increased to 8’ with demand; 2) C5 and C6 should be maximum width possible, not less than 6’; 3) For RRR projects, 4’ sidewalk may be retained.

Table 7 identifies bicycle facilities by FDOT Context classification. It is important to note that the vision or community intent for a corridor is a factor that FDOT takes into account when it designs a facility and coordination between agencies is critical to the end result.

Table 2: FDOT Context Classification Design Guidance for Bicycle Facilities

Context	Allowable Range (mph)	SIS Minimum (mph)	Bicycle Facility
C1 Natural	55-70	65	Unmarked paved shoulder or shared use path
C2 Rural	55-70	65	Unmarked paved shoulder or shared use path
C2T Rural Town	25-45	40 (35 with design elements)	Marked bicycle lane
C3R Suburban Residential	35-55	50 (45 with curb)	Marked bicycle lane when speed is ≤ 45pmh and shared use path is not present or shared use path
C3C Suburban Commercial	35-55	50 (45 with curb)	Marked bicycle lane hen speed is ≤ 45pmh and shared use path is not present or shared use path
C4 Urban General	30-45	45	When speed is ≤ 45pmh and shared use path is not present
C5 Urban Center	25-35	35	When speed is ≤ 45pmh and shared use path is not present
C6 Urban Core	25-30	30	When speed is ≤ 45pmh and shared use path is not present

Roadway Cross-Sections

The following illustrations represent proposed bicycle and pedestrian roadway cross-sections that incorporate the preferred widths for trails and sidewalks.

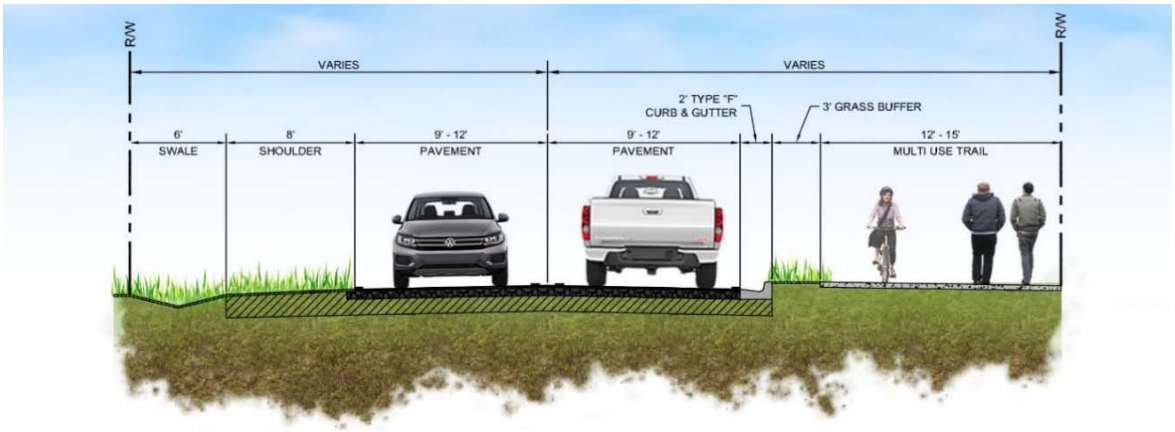


Figure 21: Two-lane Collector with Multi-use Trail

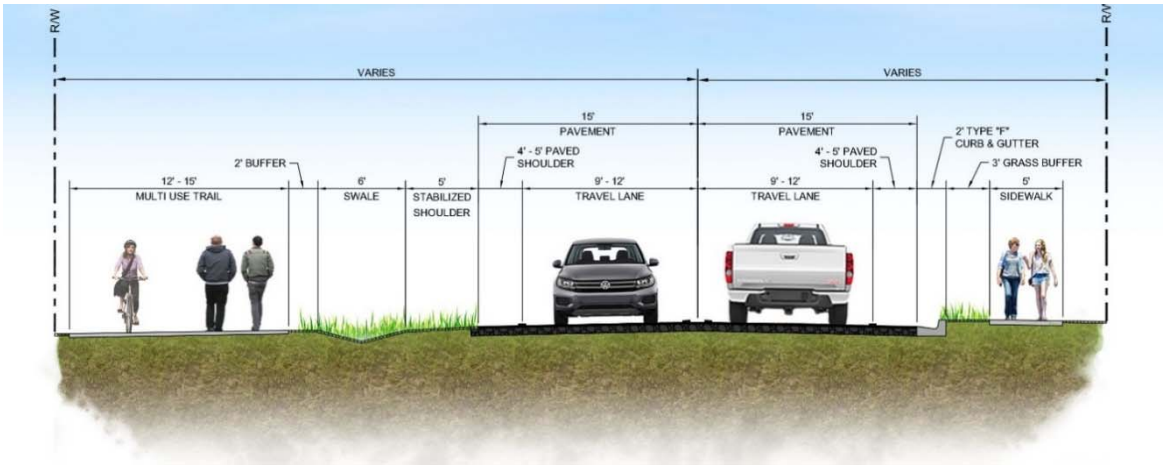


Figure 22: Four-lane Collector or Arterial Road with Trail and Sidewalk

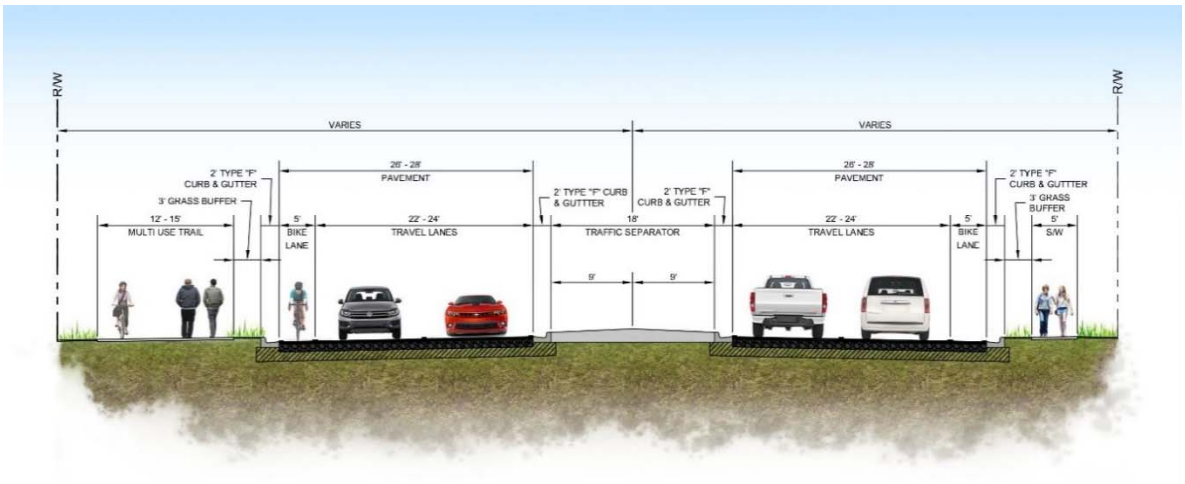


Figure 23: Four-lane Collector with Multi-use Trail and Sidewalk