



BICYCLE AND PEDESTRIAN SCHOOL SAFETY REVIEW STUDY

INDIAN TRAILS MIDDLE SCHOOL

PALM COAST, FLAGLER COUNTY, FL

Assessment & Implementation Report | June 2017



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River to Sea Transportation Planning Organization Bicycle and Pedestrian School Safety Review Study

Indian Trails Middle School Palm Coast, Flagler County, FL

Assessment and Implementation Report

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Table of Contents

List of Figures..... v

List of Tables..... v

Appendices..... v

Executive Summary.....1

 Purpose.....1

 Observations and Recommendations Summary Table3

Introduction 5

Assessment Report 6

 Existing Conditions Analysis6

 Summary of Coordination Meeting..... 14

 Field Review Observations..... 16

Implementation Report 20

 Walk Zone Related Recommendations20

 School Campus Related Recommendations 22

 Recommended Priority Projects..... 24

List of Figures

1. School location map	5
2. School walk zone.....	7
3. Existing conditions	9
4. Existing land use within walk zone	11
5. School campus.....	13
6. Improvements map	21

List of Tables

1. Observations and recommendations summary	3
2. Constructibility matrix.....	23

Appendices

- A. 2016 Florida Statutes Excerpts
- B. Americans with Disabilities Accessibility Guidelines Excerpts
- C. City of Palm Coast Zoning Map, Future Land Use Map, and Land Development Excerpts
- D. FHWA Guidelines for New Sidewalk Installation
- E. Letter and Questionnaire to School Principal
- F. Best Practices
- G. Funding Sources

Executive Summary

Kittelson and Associates, Inc. (KAI) was contracted by the River to Sea Transportation Planning Organization (R2CTPO) to prepare Assessment and Implementation Report for the Bicycle and Pedestrian School Safety Review Study for seven Flagler County schools. The Assessment Report for the Bicycle and Pedestrian School Safety Review Study will enable the R2CTPO to make recommendations for projects that will improve the walkability and bikability of students living within the school walk zone. The Implementation Report for the Pedestrian and Bicycle School Safety Review Study is based on observations and recommendations of the Assessment Report and includes cost data, ranking criterion for the recommended improvements, and the best practices to follow on old and new developments. The subject of this report is Indian Trails Middle School located at --- Belle Terre Parkway, Palm Coast, FL.

Purpose

The purpose of the Bicycle and Pedestrian School Safety Review Study is to create a safe environment for students to walk or bicycle to school. The goal for the assessment phase of this study is to provide the R2CTPO with a comprehensive study that will delineate each of the listed school's concerns, document the observed pedestrian and bicycle circulation routes adjacent to the school sites, and then make recommendations for improvements. The assessment includes the walk zone surrounding the school and it will evaluate safety issues that may affect students walking or bicycling to school. Another goal of the assessment report is to continue the coordination among the stakeholders to implement the recommendations of these studies. The purpose of the Implementation Report for the Bicycle and Pedestrian School Safety Review Study is to conduct a constructibility review and develop a cost feasibility plan that is based upon the recommendations from Indian Trails Middle School's Assessment Report. Ultimately, the recommendations within the Implementation Report should create a safer environment for children who live within the walk zone that choose to walk or bicycle to and from the school.

To make walking and bicycling a chosen mode of transportation for students at Indian Trails Middle School, remedial measures have been recommended that should make the school walk zone safer. Many local, state, and federal laws require transportation agencies to focus on walking and bicycling infrastructure as part of the overall transportation network. The Safe, Accountable, Flexible, Efficient Transportation Equity Act (SAFETEA-LU) of 2005 established the Safe Routes to School program that explicitly focused on funding projects to enhance pedestrian and bicycling infrastructure around schools. Fixing America's Surface Transportation Act (FAST) of 2015 reinforces the Safe Routes to School program. The goal of this report is to create a safer environment along the streets adjacent to Indian Trails Middle School and recommend best practices for older and new developments.

The U.S. Department of Health and Human Services Center for Disease Control (CDC) and Prevention has determined that students are not as active as they were 10 years ago when physical activity was incorporated into each student's schedule (KidsWalk-to-School, CDC). This has caused the percentage of overweight students from ages six to eleven years to double over the past 30 years. The CDC has determined that the following are benefits associated with students who walk or ride bicycle to school.

- Increased practice of safe bicycling, walking, and navigating traffic
- Knowledge of their surrounding neighborhood environment
- Improved childhood health
- Improved sense of self-image and autonomy
- Reduce risk of childhood obesity
- Contributes to a healthy social and emotional development
- More alert students who do better in school
- Increased likelihood that students will grow up to lead a healthy lifestyle

The Safe Routes to School (SRTS) program and the CDC went on to say that not only does a safe walking and bicycling environment benefit students, but it also benefits the community in the following ways:

- Decline in traffic congestion
- Reduce the number of traffic accidents
- Improved air quality
- Improved community security
- Reduced fuel consumption
- Enhanced community accessibility
- Increased community involvement
- Improved partnerships among schools, parents, community groups, and local government leaders

Table 1 summarizes safety concerns observed within Indian Trails Middle School's walk zone with recommendations documented in this report.

Table 1: Observations and Recommendations Summary

Location	Responsible Agency	Observation	Recommendation(s)
	Flagler County Schools	Cars sometimes fail to yield at unsignalized crossing with crossing guard	Assess the need for a rapid flashing beacon at this crossing
Belle Terre Parkway	City of Palm Coast/ Flagler County Sherrif's Department	Speeding observed in school zone	Periodically place speed monitoring trailers to remind drivers that they are driving over the posted speed limit; law enforcement officers should periodically monitor the school walk zone to ensure that motorists are following the rules.
Bird of Paradise Drive and Borroughs Drive	City of Palm Coast	Sidewalks abruptly stop	Perform a Pedestrian Accommodation Feasibility Study*
Barrington Drive and Barring Place		Sidewalks do not exist	Assess the feasibility of an advisory shoulder pilot project to increase bicycle and pedestrian safety on low speed, low volume neighborhood streets.
Bird of Paradise Drive	School officials	Private causes students to walk in street	Communicate with property owner
<p><i>*Where Pedestrian Accommodation Feasibility Studies are recommended, the goal is to identify a feasible exclusive pedestrian facility. Preferably, the facility will provide physical separation in the form of a curb, landscaped strip, or other physical element between the roadway and an ADA compliant pedestrian facility. These studies should identify the costs, right of way, and takings implications of various approaches, and may also recommend spot improvements, crossing treatments, and traffic calming. Interim solutions can be implemented as long as these do not compromise the ultimate goal of providing an exclusive pedestrian facility.</i></p>			

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Introduction

In the winter of 2016/2017, a comprehensive bicycle and pedestrian safety review was performed for Indian Trails Middle School in Palm Coast, Flagler County. The purpose of this study is to evaluate the walk zone of Indian Trails Middle School for any safety issues that students might encounter if they choose to walk or ride their bicycles to school. This review included an information-gathering and coordination meeting with the School, Flagler County School Board, City of Palm Coast, Flagler County, and R2CTPO officials. The coordination meeting was followed by a field review by the consultants. The review also included analysis of mapped conditions including infrastructure mapping and crash reports. The results of this review have been synthesized into the following existing conditions and safety improvement recommendations report.

Background on Indian Trails Middle School

Indian Trails Middle School is located at 5505 Belle Terre Parkway in Palm Coast, FL. The School currently has 974 enrolled students. The suburban school campus is spread across approximately 30 acres and serves suburban neighborhoods consisting of mostly single family residential houses. Figure 1 shows the school location.

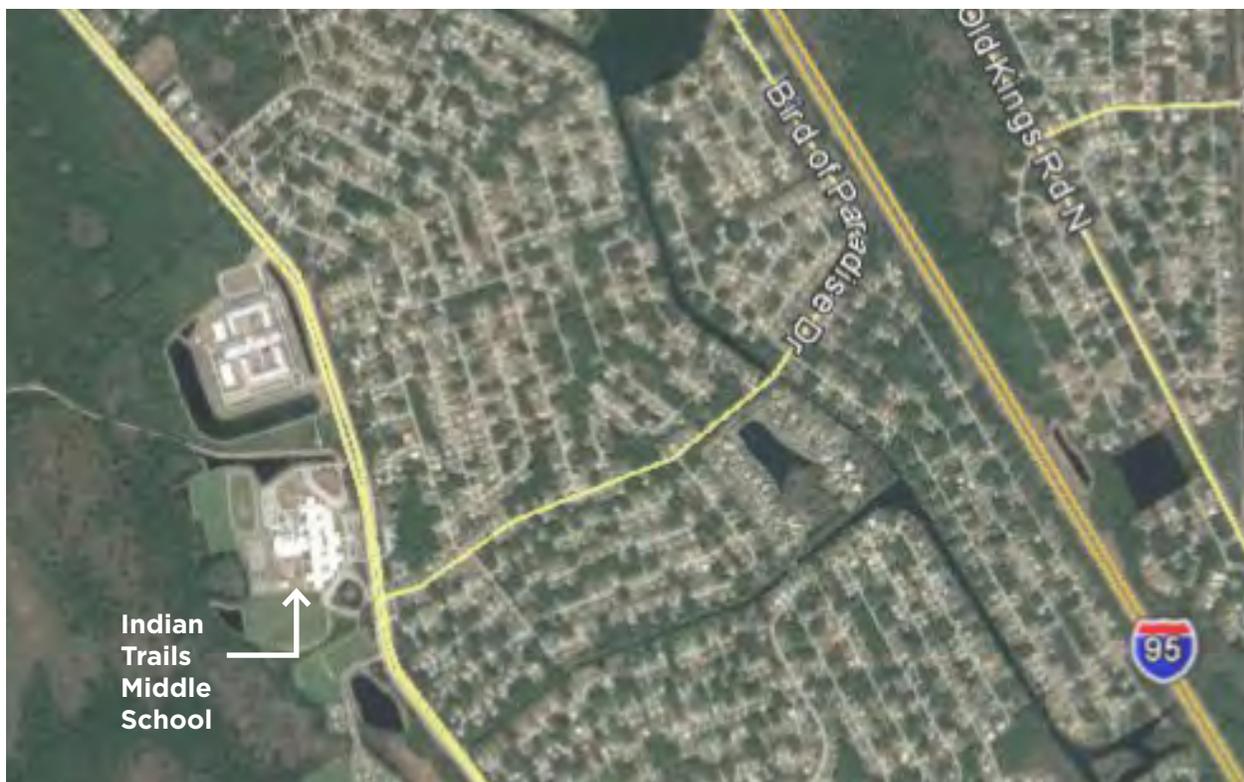


Figure 1: School location map

Assessment Report

This section of the report will document existing condition within the Indian Trails Middle School walk zone, summarize the coordination meeting, and observations from the field review. The walk zone is a two mile radius around middle schools and a one mile radius around elementary schools, constrained by major obstacles such as highways. No school bus service is provided within the walk zones. In practice, most students within the walk zone are driven to and from school.

The Assessment Report for the Bicycle and Pedestrian School Safety Review Study will enable the R2CTPO to make recommendations for projects that will improve the walkability and bikability of students living within the school walk zone.

Existing Conditions Analysis

The existing bicycle and pedestrian infrastructure, safety conditions, and surrounding land uses at each school were evaluated through map review, administrator and school safety officer inputs, and field visits. The field visits included observation of the drop off and pickup periods, and complete review of the presence, absence, and condition of bicycle and pedestrian infrastructure within the walk zone.

Figure 2 shows the walk zone for Indian Trails Middle school that is approximately bound by Palm Coast Parkway to the south, open space to the west, Interstate 95 to the east and Mantanzas Woods Parkway to the north. The walk zone is primarily residential neighborhoods, with a disrupted street grid that feeds back to the few major connecting streets such as Bird of Paradise Drive and Pine Lake Parkway.



Main entrance to the Indian Trails Middle School building



Typical residential street within the walk zone



Figure 2: School walk zone

Existing Conditions Analysis

Pedestrian Infrastructure: Sidewalks within the walk zone are shown on the study area maps, and can be described this way:

- Belle Terre Parkway has eight foot wide sidewalks on both sides of the street through the walk zone. This sidewalk is directly adjacent to the street, but separated from car traffic by a bike lane.
- Pine Lakes Parkway has a multi use trail on the north side.
- Bird of Paradise Drive has a standard width sidewalk on the south side of the street as far as Bunker Hill Drive. This sidewalk is separated from the street by a grass strip/drainage area
- Burroughs Drive has a sidewalk on the north side of the street from Belle Terre Parkway to Burbank Drive. This sidewalk is separated from the street by a grass strip/drainage area
- Sidewalks were missing from the rest of the walk zone.

The sidewalk network within the walk zone is relatively incomplete. Students who walk or bike do so within the street, on their neighborhood streets, until they reach one of the three more major streets listed above. These neighborhood streets tend to have low motor vehicle volumes and speeds, somewhat reducing the safety concerns associated with walking in the roadway.

Approaching the Indian Trails Middle School campus,

Bicycle Infrastructure: Bike facilities in the walk zone consist of a multi-use trail between Belle Terre Elementary and Indian Trails Middle School that comes from the west and terminates at Belle Terre Parkway and a bike lane on Belle Terre Parkway

The multi-use trail appeared to be a safe and comfortable bike facility, but did not connect to any of the residential neighborhoods in the walk zone; the bike lane on Belle Terre parkway is a standard bike lane on a high traffic street, and while several adult riders were seen using it, is not a suitable facility for elementary school aged children. Due to the location and type of the bicycling facilities described above, sidewalks and neighborhood streets are the facilities that the students who walk and bike use to access Belle Terre Elementary.

Crash Analysis: There were 19 reported pedestrian and bicycle crashes within the walk zone in last six years (2010 - 2015). Additionally, the crossing guard mentioned that he had witnessed few 'near misses' at the intersection of Bird of Paradise Drive and Belle Terre Parkway due to motorists failing to yield.

Figure 3 maps all the existing conditions described above.

Existing Land Use: Most of the existing land uses within the school's walk zone consists of single family detached residential houses. Some properties do have multifamily units in form

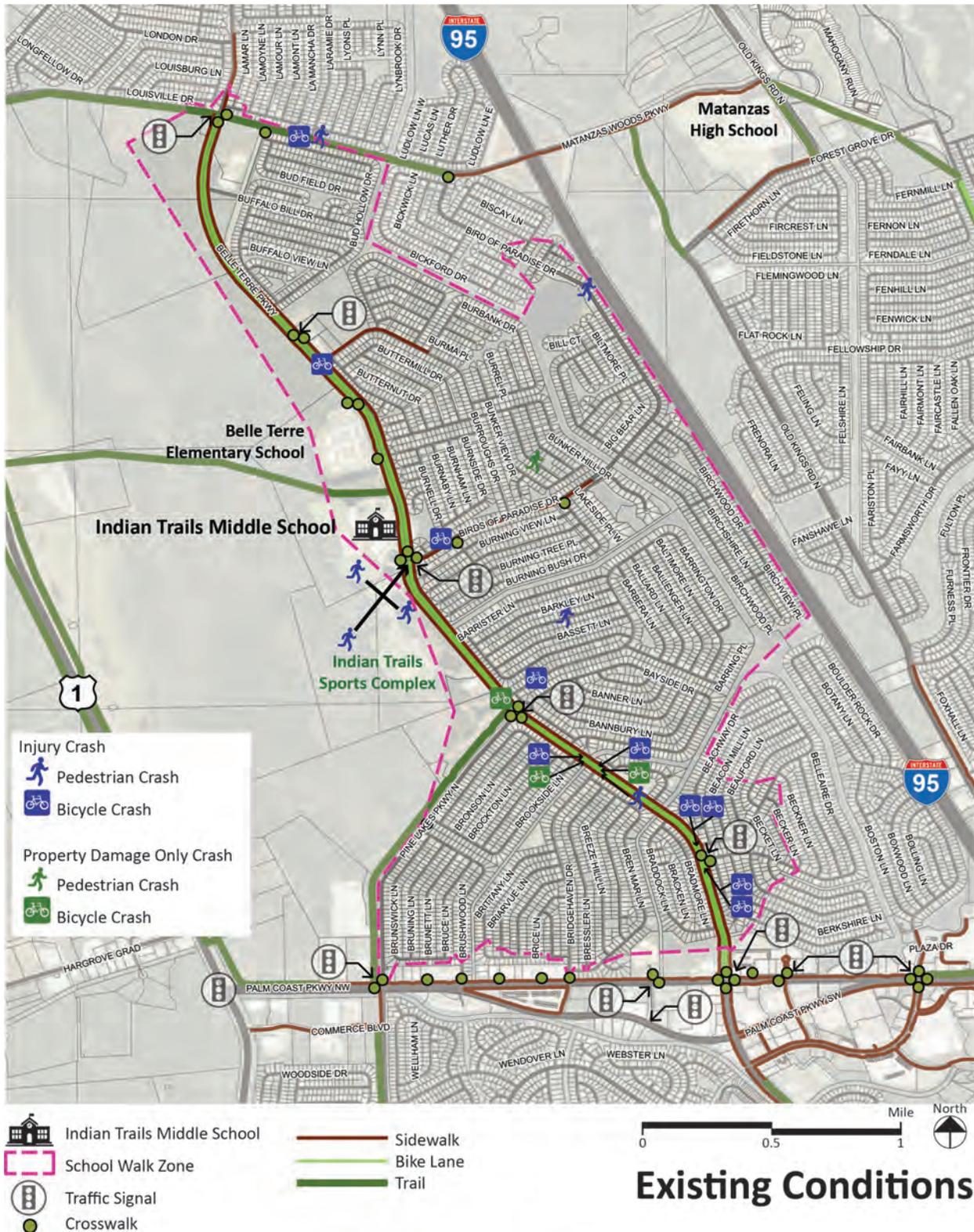


Figure 3: Existing conditions



Students crossing driveway at Belle Terre Parkway with assistance of crossing guards.



Cars crossing driveway crosswalk at Belle Terre Parkway.



School zone sign north of Indian Trails Middle School



Multi use trail heading west from Belle Terre Parkway, north of Indian Trails Middle School

of duplexes or twins, and there is one large multifamily housing parcel south of the Indian Trails Sports Complex. The existing land use is shown in figure 4, at right.

School Campus: The school campus has a single auto drop-off and pick-up entrance on Belle Terre Parkway, as well as a bus loop entrance on Belle Terre Parkway just to the north. The drop-off and pick-up loop was actively managed by school staff, and though cars lined up early to pick-up students, the queue only rarely overflowed the space on to Belle Terre Parkway. Unlike at other Flagler County schools, no parents were observed during the field visit picking up or dropping off students at unsanctioned nearby locations.

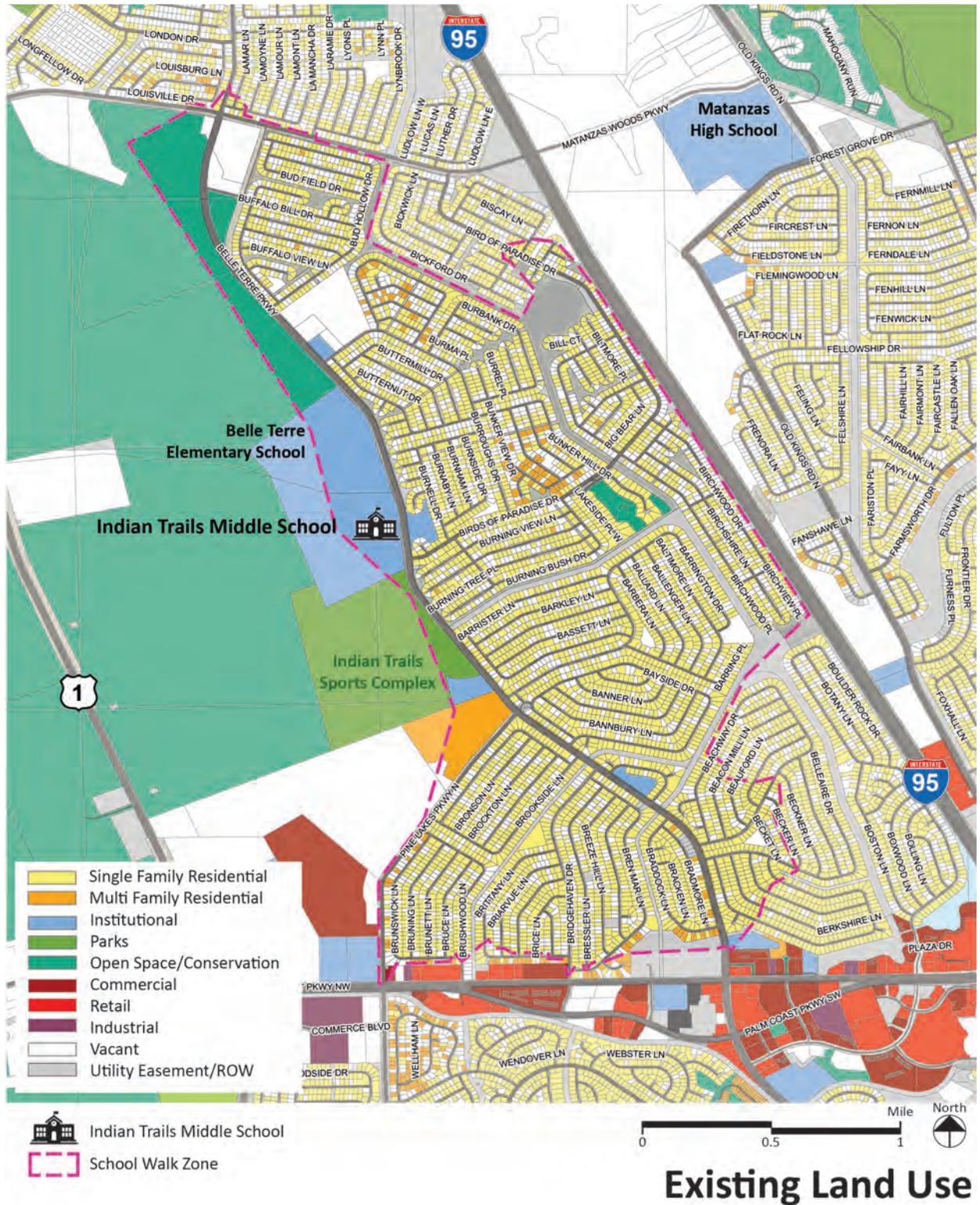


Figure 4: Existing land use

The pick-up and drop-off loop is shown at right, and is approximately 1,200 feet long.

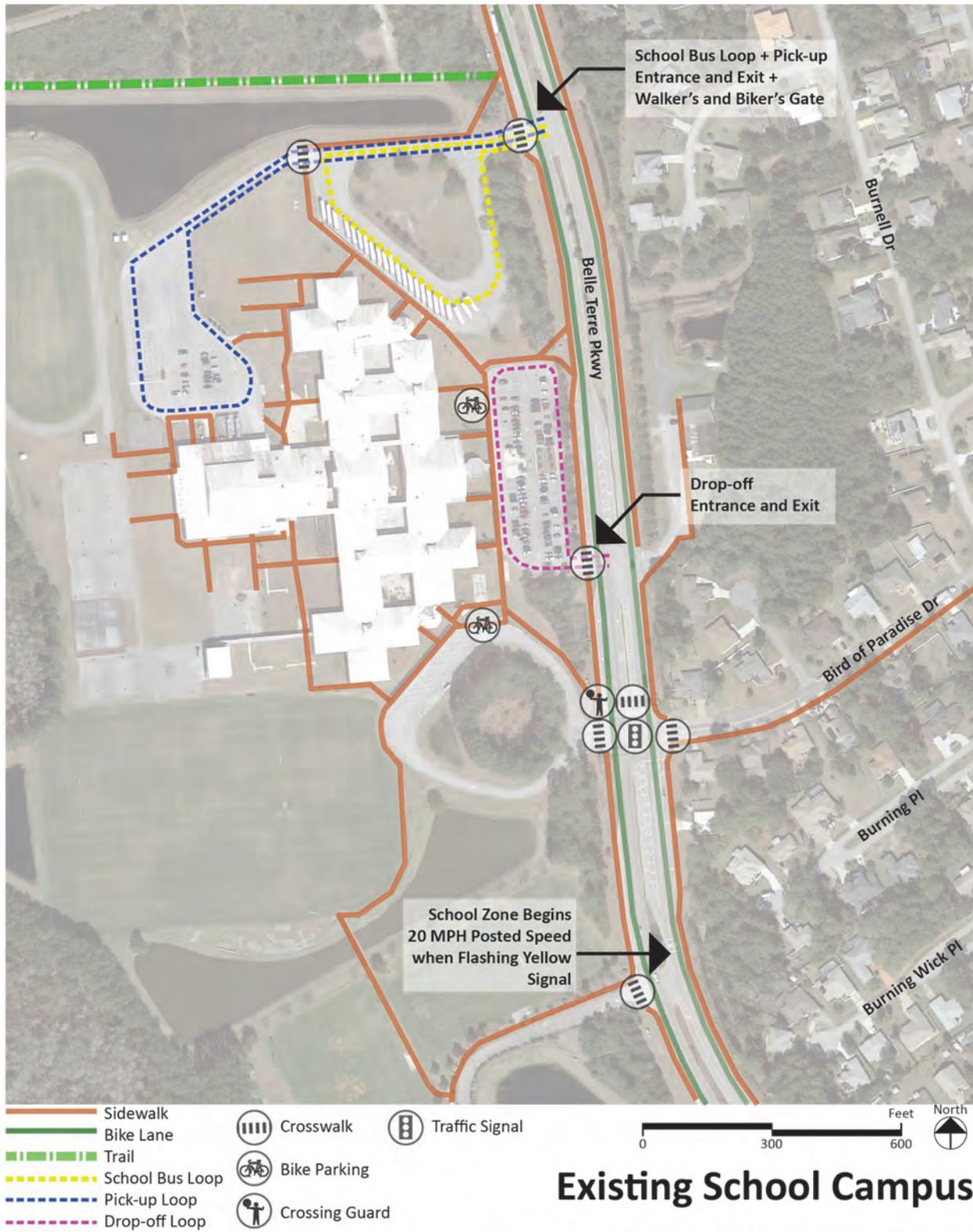
The school campus has 2 designated bicycle parking racks at the southeast and northwest corners of the main building. Around 35 bicycles in total were parked at both bicycle parking racks on the day of the field review.



Bicycle Parking Rack at Indian Trails Middle School



Belle Terre Parkway Bike Lane



Existing School Campus

Figure 5: School campus

Coordination Meeting

The coordination meeting for Indian Trails Middle school and Belle Terre Elementary School was held on November 28th, 2016. The meeting was attended by representatives from the Flagler County School Board, Indian Trails Middle School, Belle Terre Elementary School, City of Palm Coast, Flagler County Sheriff's Office, River to Sea TPO, and Kittelson & Associates.

- Adam Burghdoff, Kittelson & Associates
- Winnie Oden, Flagler County School Board
- Sean Castello, City of Palm Coast
- Tony Conte, Flagler County School Board Transportation
- Stephan Harris, River to Sea TPO
- Liz Gordon, Kittelson & Associates
- Katie Crooke, Indian Trails Middle School
- Jessica DeFord, Belle Terre Elementary School

Stephan Harris and Adam Burghdoff introduced the purpose and explained the study background. This introduction was followed up a group discussion. Following were the main points of the follow up discussion:

- Indian Trails Middle School hours were confirmed to be from 7:20 AM - 1:25 PM
- Site review periods for arrival/dismissal was decided as follows:
 - Arrival field review period - 6:45 to 7:45 AM
 - Dismissal field review period- 1:00 to 2:15 PM
- Both school assistant principals reported that their drop-off and pick-up queues were relatively well managed and functional
- Students usually listen to crossing guards
- Parents arrive for school pick-up very early to secure a good place in lines
- Indian Trails Middle School enforces a single line drop-off and pick-up.
- Belle Terre Elementary School, however, uses a different system (described in that report).
- Most students in the walk zone are dropped off and picked up.
- Most students who do walk or bike to school come from the neighborhoods to the east of Belle Terre Parkway using Bird of Paradise Drive.

- Participants expressed concern that students roughhouse on the sidewalks, especially adjacent to fast moving vehicular traffic on Belle Terre Parkway.
- City of Palm Coast will be sharing signal timings for all the signals in the study area.
- Many students come by bus
- Bicycle and pedestrian numbers are low enough that the crossing guards know each student.
- There are some activities before school at Belle Terre Elementary School, but not at Indian Trails Middle School.
- The afternoon pick-up period is more hectic than morning drop-off because students all leave at once.
- There is a 20 MPH school zone with flashing yellow signal on Belle Terre Parkway, but many drivers speed.

Field Review Observations

The field review for Indian Trails Middle school was conducted on November 30th, 2016 by Kittelson and Associates. The weather conditions on the day of the review were typical for the season in Palm Coast, FL. The weather was dry and sunny with clear skies. The temperatures ranged from low 50s to high 50s. The field review observed the drop-off activity from 6:45 AM to 7:45 AM and pick-up activity from 1:00 PM to 2:15 PM. The field review also included interacting with the crossing guards and observing and documenting conditions within the school's walk zone.

Following are the observations from the field review.

General Observations:

Northern School Bus Entrance Belle Terre Parkway

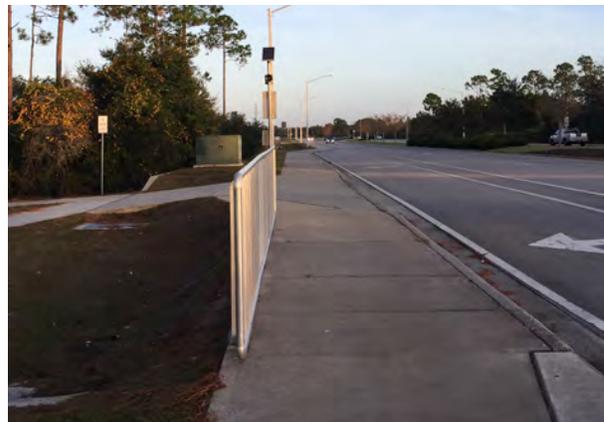
- There is no crossing guard at this location.
- There is one crosswalk across the school driveway, but no crosswalk across Belle Terre Parkway.

Southern School Entrance on Belle Terre Parkway and the second school driveway

- There are crosswalks on three approaches
- Crossing guard is on duty when the school zone flashing light is on.
- The length of crosswalk across Belle Terre Parkway is 101 feet.
- The crossing guards noted that some cars are aggressive near the students who are walking.



Northern school entrance



Connection to trail north of campus

Drop-Off Observations:**Northern School Bus Entrance Belle Terre Parkway**

- No students were observed crossing Belle Terre Parkway at this location.
- Buses yielded to students crossing the driveway.

Southern School Entrance on Belle Terre Parkway and the second school driveway

- The crossing guard knew each student who walks or bikes to school, and said most students know to walk their bike across the crosswalk.
- Most but not all students dismounted their bikes to cross the street.
- The crossing guard actuated the pedestrian signal by pressing the call button every cycle.
- The crossing guard mentioned that a private property sprinkler on Bird of Paradise Drive reaches into the sidewalk and causes students to walk in the street.

Pick-Up Observations:**Northern School Bus Entrance Belle Terre Parkway**

- No students were observed crossing Belle Terre Parkway at this location.
- Buses yielded to students crossing the driveway.

Southern School Entrance on Belle Terre Parkway and the second school driveway

- The crossing guard knew each student who walks or bikes to school, and said most students know to walk their bike across the crosswalk.
- Most but not all students dismounted their bikes to cross the street.
- The crossing guard actuated the pedestrian signal by pressing the call button every cycle.
- Motor vehicles were observed yielding to the crossing guards and obeying their directions.



Right turn lane to enter Indian Trails Middle School



Signalized school entrance north of Indian Trails Middle School

Walk Zone Observations:

- Belle Terre Parkway's sidewalks were adequate for students to walk two to three abreast and in groups without spilling onto the grass buffer
- Only one adult cyclist was observed in the bike lane
- All students who walked and biked to school used the sidewalk
- Most students approached the campus from Bird of Paradise Drive or on Belle Terre Parkway from the south
- Neighborhood local streets almost uniformly did not have sidewalks
- Multiple pedestrians were observed walking in the street on neighborhood streets where there was no sidewalk
- Sidewalks end abruptly where they do exist, such as on Burroughs Drive and Bird of Paradise Drive

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Implementation Report

This section of the report will build on analysis and observations documented in the Assessment Report to make recommendations. Purpose of the Implementation Report for the Bicycle and Pedestrian School Safety Review Study is to conduct a constructibility review and develop a cost feasibility plan. While only a relatively small subset of the students living within the Indian Trails Middle School's walk zone, walk or bike to school, there are opportunities to improve their safety, and also to make walking and biking a more inviting option for more students. Location specific recommendations are listed below.

Walk Zone Related Recommendations:

Location: Bird of Paradise Drive and Burroughs Drive

Observation: These streets are an important connection between neighborhood residential streets and Belle Terre Parkway, but do not have complete sidewalks or other pedestrian accommodation.

Recommendation: Conduct a Pedestrian Accommodation Feasibility Study on these streets.

Location: Belle Terre Parkway

Observation: It was mentioned several times by the crossing guard and school staff members that motorists are driving over the posted speed limit of 20 MPH during flashing yellow signal.

Recommendation: Periodically place speed monitoring trailers to remind drivers that they are driving over the posted speed limit; law enforcement officers should periodically monitor the school walk zone to ensure that motorists are following the rules; if it is found that motorists are driving over the posted speed limit then the Flagler County Sheriff's Office should consider issuing fines during school arrival and dismissal times.

Observation: Crossing guards and school officials expressed concerns that students rough housed near traffic on the sidewalk.



The termination point of the sidewalk on Bird of Paradise Drive and Lakeview Way



Termination of sidewalk on Burroughs Drive at Burbank Drive

Location: Barrington Drive and Barring Place

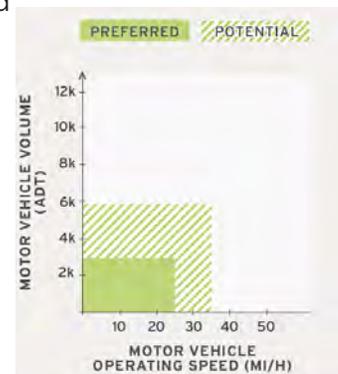
While completing sidewalks for all local streets in the walk zone may not be feasible, a low cost alternative option is to stripe advisory shoulders. Based on the FHWA's *Small Town and Rural Multimodal Networks* report, roads with advisory shoulder accommodate low to moderate volumes of two-way motor vehicle traffic and provide a prioritized space for bicyclists and pedestrians with little or no widening of the paved roadway surface. Barrington Drive and Barring Place are good locations to conduct a cost benefit comparison between this approach and sidewalks. .

Potential signs include:

- A pedestrian (W11-2) warning sign with ON ROADWAY legend plaque.
- Use a Two-Way Traffic warning sign (W6-3) to clarify two-way operation of the road if any confusion exists.

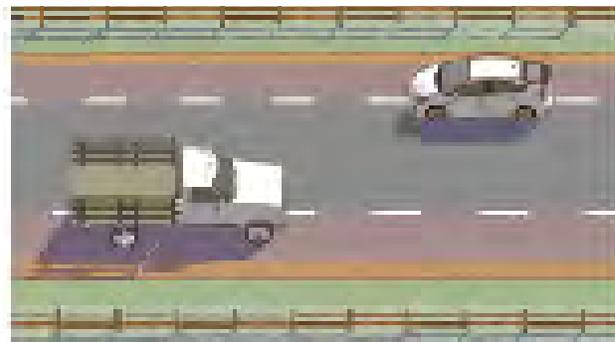
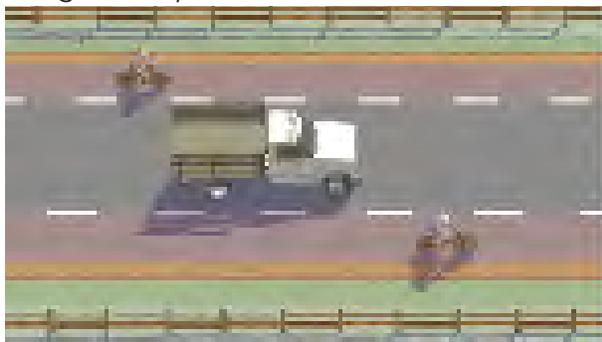


In order to install advisory shoulders, an approved request to experiment is required as detailed in the MUTCD 2009, Sec. 1A.10. FHWA is also accepting requests for experimentation with a similar treatment called "dashed bicycle lanes."



The advisory shoulder space is a visually distinct area on the edge of the roadway, offering a prioritized space for people to bicycle and walk. The preferred width of the advisory shoulder space is 6 feet. Absolute minimum width is 4 feet when no curb and gutter is present.

Preferred and potential traffic volumes and speed limits for advisory shoulder treatment.



Unlike a conventional shoulder, an advisory shoulder is a part of the traveled way, and it is expected that vehicles will regularly encounter meeting or passing situations where driving in the advisory shoulder is necessary and safe. When vehicles traveling in opposite directions meet, motorists may need to enter the advisory shoulder for clear passage.

Recommendation: modify any bike and walk to school day or other programming to include education on safety near auto traffic.

Observation: A crossing guard attending the unsignalized marked crossing of Belle Terre Parkway mentioned difficulty getting cars to yield.

Recommendation: Assess the feasibility of installing a pedestrian Rapid Flashing Beacon (RFB) in this location.

Location: Bird of Paradise Drive

Observation: Private property owners' actions, such as a sprinkler on the south side of Bird of Paradise Drive, can make sidewalks impassable, causing students to walk in the street

Recommendation: Have school officials or the crossing guard conduct an outreach meeting with the property owner to encourage them to solve the problem.

Other Programmatic Recommendations:

Observation: Based on the observation of the drop-off and pick-up periods, school officials and crossing guards proactively manage a queue of cars as well as students and adults who are walking or riding bikes to ensure the safety of all. To the extent that dangerous situations were observed during these times, they occurred at school driveways as vehicles turning into or out of the campus rushed to take advantage of a gap in traffic on Belle Terre Parkway.

Recommendation: Reducing the number of students dropped off and picked up each day is one way to reduce these conflicts and overall congestion during drop-off and pick-up periods.

Programs that could reduce the number of students driven to school include:

- A walking school bus program. Walking school buses provide some supervision and “safety in numbers” to students who choose to walk, reducing safety concerns associated with allowing students to walk by themselves. Best practices for walking school bus programs are well established, and the National Center for Safe Routes to School offers online training modules for schools seeking to start one. http://apps.saferoutesinfo.org/training/walking_school_bus/modules.cfm
- Increased frequency of walk and bike to school days.

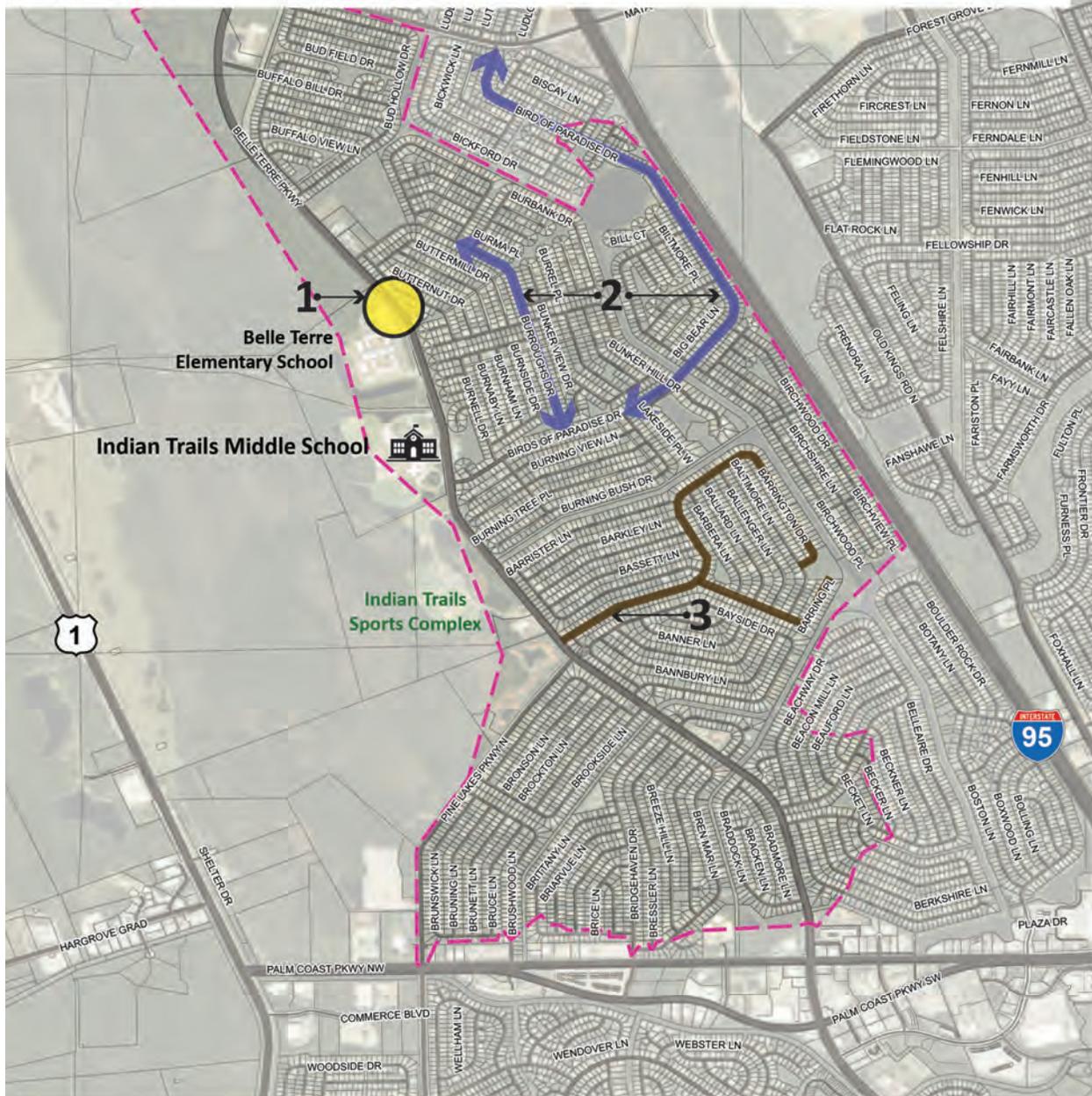
School Campus Related Recommendations:

There are no school campus related recommendations as part of this report. No ADA non-compliant ramps were observed, but a detailed on-campus sidewalk audit was not conducted.

1. RRFB feasibility Study at non-signalized intersection of Belle Terre Parkway and northern school entrance driveway.

3. Conduct Pedestrian Accommodation Feasibility studies along Barrington Drive and Barrington Place.

2. Conduct Pedestrian Accommodation Feasibility studies along Burroughs Drive and Birds of Paradise Drive.



Indian Trails Middle School

School Walk Zone



Improvements Map

Figure 4: Improvements map

Recommended Priority Projects:

This section lists all the recommended priority engineering and construction projects that address the observations and recommendations noted in the earlier section. However, it does not list educational, enforcement, and policy changes which are also recommended in the earlier section.

The following engineering and construction projects are recommended to be implemented as part of this Indian Trails Middle School Bicycle and Pedestrian school Safety Review study:

- Conduct a Pedestrian Accommodation Feasibility Study for Bird of Paradise Drive and Burroughs Drive
- Assess the need for a rapid flashing beacon to warn motorists of pedestrian crossings at the unsignalized crossing with a crossing guard
- Assess the feasibility of a pilot project to test advisory shoulders as an approach for increasing bicycle and pedestrian safety on Barrington Drive and Barring Place

Constructibility Matrix of Priority Projects:

The matrix in Table 3 shows the estimated cost for recommended priority projects. FDOT item average unit costs from 1st December 2015 to 30th November 2016 for Area 7 that includes Flagler county were used to develop the constructibility matrix. The costs shown in the constructibility matrix include construction and labor fees. Grading costs are not included. These improvements are based on field observations and should be verified by a contractor prior to construction.

Location	Description of Project	Pay Item Number	Pay Item Description	Plan Qty	Unit	Unit Price	Contract Amount
Belle Terre Parkway	Assess the need for a rapid flashing beacon at this crossing	654 2 21	Solar powered single Rapid Flashing Beacon	1	Each	\$15,800	\$15,800
TOTAL	\$15,800						
40% Contingency	\$6,320						
GRAND TOTAL	\$22,120						

Table 3: Constructibility matrix

