SCHOOL ROUTES ANALYSIS

CROTON ELEMENTARY SCHOOL

ASSESSMENT & IMPLEMENTATION REPORT

JULY 2020

SPACE COAST TPO

KITTELSON & ASSOCIATES

School Routes Analysis

Croton Elementary School

Melbourne, FL

Assessment & Implementation Report

July 2020

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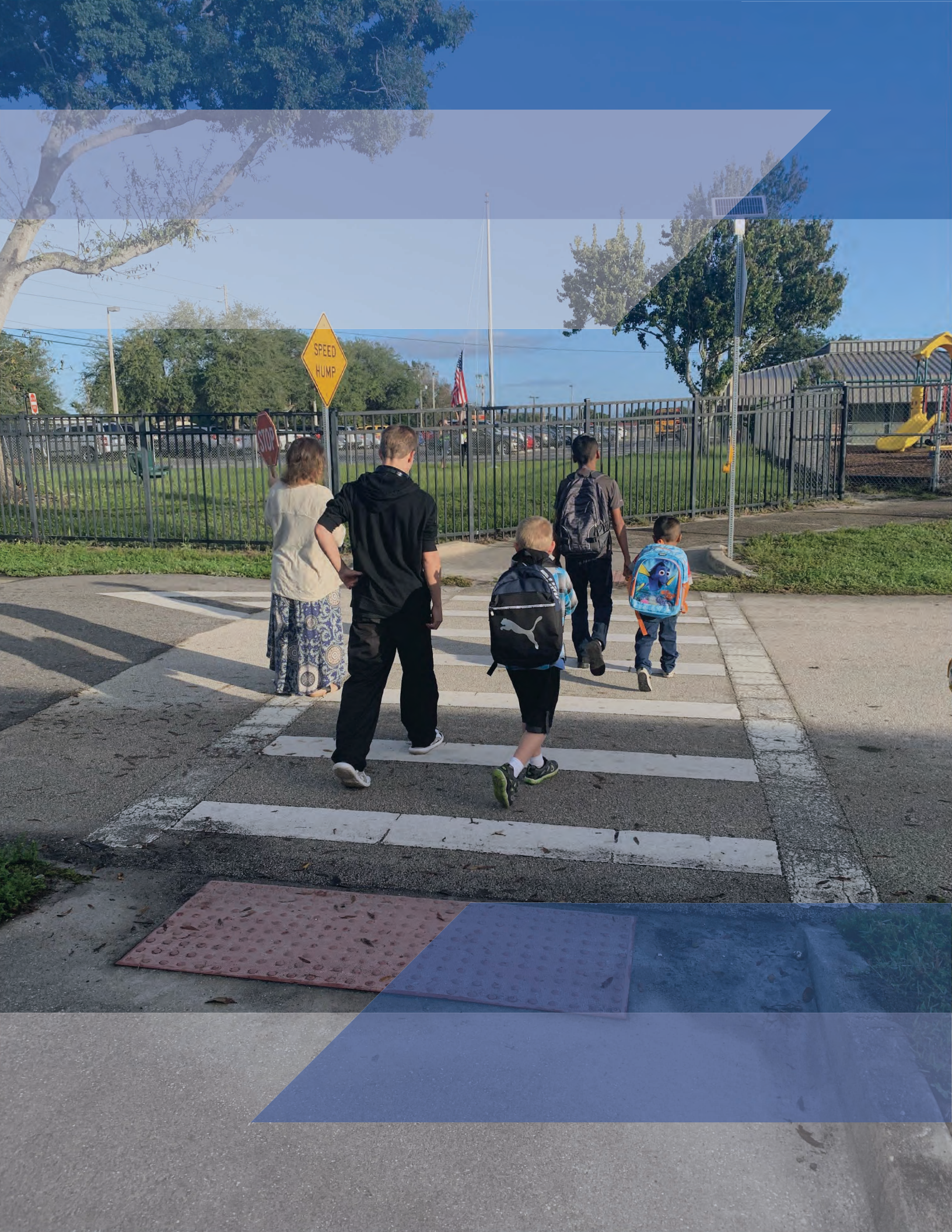
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Executive Summary

Space Coast Transportation Planning Organization (SCTPO) with assistance from Kittelson & Associates, Inc. (KAI) documented existing conditions and developed Safe Routes to School (SRTS) recommendations for nine schools as part of the School Routes Analysis (SRA) project. The nine study schools were selected by the cities of Melbourne and Palm Bay prior to this project. The analysis reviewed the 'study areas' that were identified based on walk zones and attendance boundaries around the nine study schools. This SRA project is intended to serve as a pilot to establish a study methodology that can be replicated at other schools within Brevard County. This report documents the assessment of the existing conditions and lists recommendations for Croton Elementary School located at 1449 Croton Road, Melbourne, FL 32935.

Purpose

The purpose of this project is to create a safe environment for students to walk or bike to school. The goal for the assessment phase of the SRA is to provide the SCTPO with a comprehensive study that will document the observed pedestrian and bicycle circulation routes adjacent to the school site, identify issues associated with student pedestrians and bicyclists within the study area, and make recommendations for improvement. The goal for the implementation phase of this study is to develop recommendations from the assessment phase to create a safer environment for children who live within the walk zone and choose to walk or bicycle to and from the school.

Many local, state, and federal laws require transportation agencies to focus on pedestrian and bicyclist 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 bicyclist infrastructure near schools. Fixing America's Surface Transportation Act (FAST) of 2015 reinforces the Safe Routes to School program. The analysis in the report is to identify projects that could be funded by the State of Florida's Safe Routes to School program or other transportation funding.

Study Process

A study area was identified for the school based on the respective school's walk zone and attendance boundary to determine where students walk and bike. As part of stakeholder engagement, a Technical Committee (TC) was established. The TC was comprised of representatives from the City of Melbourne, the City of Palm Bay, Brevard County Planning, Public Works, and Public Schools, and the Florida Department of Transportation (FDOT). The TC functioned as a sounding board for the Project Team and acted as liaisons for their respective agencies throughout the planning process.

As part of the Assessment Phase of the project, existing conditions, crash data, and survey data were analyzed and mapped prior to the school coordination meeting. The school coordination meeting, comprising of relevant TC members and school administration, was conducted a day prior to the field review at the school campus. A field review of the school's study area was conducted to observe current pedestrian and bicyclist behaviors.

As part of the Implementation Phase of the project, a list of draft issues and recommendations were developed. Recommendations were based on the input received at the school coordination meeting and field review observations. The draft list of recommendations was revised and finalized based on feedback received from TC members. Planning-level cost estimates were calculated for the final recommendations. **Figure 1** graphically shows the study process. Recommendations for Croton Elementary School are summarized in **Table 1**.

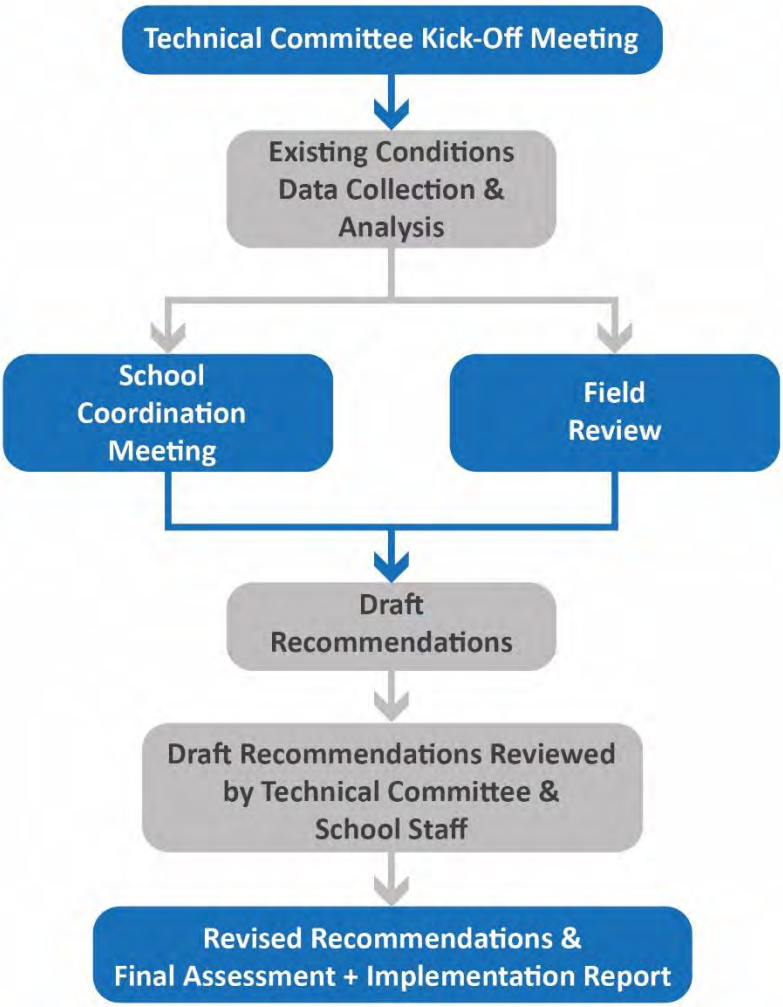

Figure 1: Study Process

Table 1: Recommendations Summary

School Campus Recommendations					
No.	**Location**	**Recommendation**	**Type**	**Time-Frame**	**Cost Estimate**
1	Western Parking Lot	Expand the western parking lot north to the edge of the dry pond.	School Circulation	Long-Term	Further Study Required
2	Eastern Parking Lot	Expand the eastern parking lot to the north and east.	School Circulation	Long-Term	Further Study Required
3	Southwest Corner of the Campus Along Learning Lane	Remove black fencing from Learning Lane and Southern Croton Driveway intersection sight triangles.	School Circulation	Near-Term	<$10,000
4	South Side of the School Front Office	Replace bicycle parking rack.	School Circulation	Maintenance	<$10,000
5	School Property	Replace old signage.	Sign/Signal	Maintenance	<$10,000

Study Area Recommendations					
No.	**Location**	**Recommendation**	**Type**	**Time-Frame**	**Cost Estimate**
6	Eau Gallie Boulevard and Croton Road Intersection	Conduct a feasibility study to add a westbound right turn lane at the Eau Gallie Boulevard/Croton Road intersection.	Roadway	Long-Term	Further Study Required
7	Eau Gallie Boulevard and Croton Road Intersection	Implement FDOT Eau Gallie Boulevard and Croton Road Intersection Improvement Plan - Install "No Turn on Red" blank out signage active during school zone hours. Remove current "No Turn on Red" signage.	Previous Study (Intersection)	Near-Term	$25,000 to $30,000
8	Eau Gallie Boulevard	Implement FDOT Eau Gallie Boulevard Multimodal Mobility and Safety Assessment recommendation - Adjust school zone to include the entire intersection. Update timing to include early day on Friday. Update signage and pavement markings to be consistent with the FDOT Speed Zoning Manual.	Previous Study (Corridor)	Near-Term	Further Study Required

No.	Location	Recommendation	Type	Time-Frame	Cost Estimate
9	Eau Gallie Boulevard and Croton Road Intersection	Add a crossing guard at the southwest corner of intersection to maintain one crossing guard for each leg of the intersection.	Crossing	Near-Term	Coordinate Staffing
10	Croton Road Just North of Eau Gallie Boulevard	Adjust school zone signs and pavement markings to be consistent with the FDOT Speed Zoning Manual. Adjust timing to include early release schedule on Friday.	Sign/Signal	Near-Term	Further Study Required
11	Croton Road Just North of Shelby Drive	Construct a midblock crossing with RRFB, a median refuge, and appropriate signage. Add a crossing guard at this intersection.	Crossing	Near-Term	$750,000 to $870,000 for Midblock Crossing; Coordinate staffing for Crossing Guard
12	Croton Road by Northwest Corner of the School Property	Remove the dead tree.	Maintenance	Maintenance	<$10,000
13	Signalized Intersections within the Study Area	Upgrade/install ADA compliant pedestrian ramps.	Crossing	Near-Term	$55,000 to $65,000

No.	Location	Recommendation	Type	Time-Frame	Cost Estimate
14	Croton Road	Maintain existing landscape to avoid sidewalks being blocked by completely overgrown weeds.	Maintenance	Maintenance	Routine Maintenance
15	Croton Road	Widen sidewalk on one side to make it a 10 to 12 foot-wide shared use path to accommodate bi-directional bicycle traffic.	Sidewalk	Long-Term	$1,100,000 to $1,300,000
16	Eau Gallie Boulevard and Croton Road Intersection; Croton Road and Aurora Road Intersection	Change signal timing to include a Leading Pedestrian Interval (LPI) during school zone times to reduce the number of vehicles turning right while students are crossing.	Sign/Signal	Near-Term	Labor Cost for Signal Technician
17	Aurora Road	Implement recommendations from Aurora Road Corridor Study - 6 foot wide sidewalk on southern side; high visibility crosswalks and ADA improvements at intersections.	Previous Study (Corridor)	Long-Term	$29,690,000

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Assessment

This section of the report documents the existing conditions within the Croton Elementary School study area and summarizes the student and parent survey data, crash analysis, school coordination meeting, and observations from the field review.

A study area was developed for each school. The study area is the walk zone defined as the two mile walking radius within the school's attendance boundary around the school where no school bus service is provided. The study area excludes pedestrian hazardous areas within the two mile walking radius. Pedestrian hazardous areas are generally identified as areas that are separated from the school by major physical barriers such as highways or rivers.

Existing Conditions Mapping & Analysis

A series of maps were prepared to show the existing conditions within the Croton Elementary School study area including existing and proposed pedestrian and bicycle infrastructure, traffic data, crash data, and school circulation patterns. These maps were developed through GIS data collection, review of previous studies and plans, aerial satellite imagery, input from the TC, and observations from the field visit.

Previous and Ongoing Studies

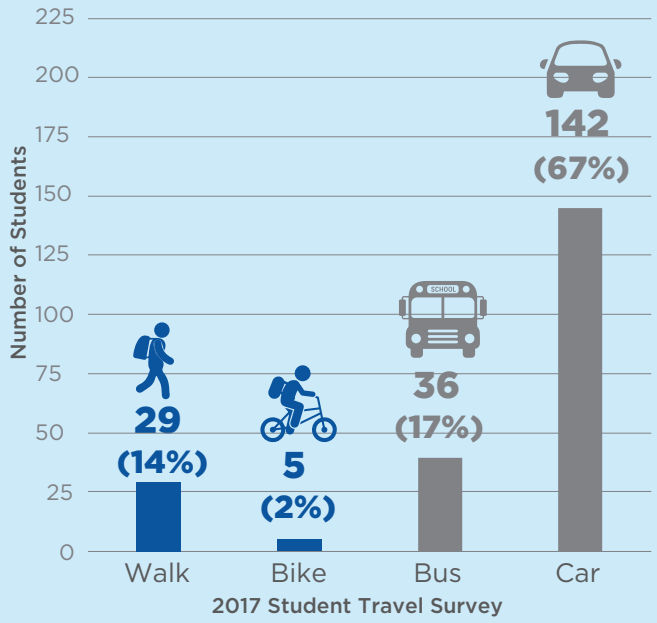
Aurora Road Corridor Study was completed in 2018 by the SCTPO and spans along Aurora Road from Wickham Road to Stewart Avenue. This study recommended short-term, medium-term, and long-term recommendations to improve pedestrian and bicycle facilities as well as to address safety issues, traffic operations, and transit movements along the corridor.

The Eau Gallie Boulevard Multimodal Mobility and Safety Assessment is an ongoing safety assessment by FDOT to evaluate opportunities to improve pedestrian and bicyclist safety along Eau Gallie Boulevard from John Rodes Boulevard to Croton Road. Recommendations relevant to the study area include adjust school zone signage to include the entire intersection of Eau Gallie Boulevard & Croton Road, update signal timing to include early dismissal day on Friday, and update school zone signage and pavement markings to be consistent with the FDOT Speed Zoning Manual.

The Eau Gallie Boulevard and Croton Road Intersection Improvements study is an ongoing intersection improvement plan which seeks to improve pedestrian safety at the intersection of Eau Gallie Boulevard and Croton Road. Recommendations relevant to the study area include the instillation of "No Turn on Red" blank out signage active during school hours.

Figure 2 is an info-graphic summarizing the main background information collected as part of the existing conditions analysis.

Student Travel Modes (2017)



2017 Student Travel Survey

Total Bicycle & Pedestrian Crashes within Study Area

27 Pedestrian

54 Bicycle

School Aged Bicycle & Pedestrian Crashes within Study Area

10 Pedestrian

10 Injury

19 Bicycle

7 Property Damage Only

12 Injury

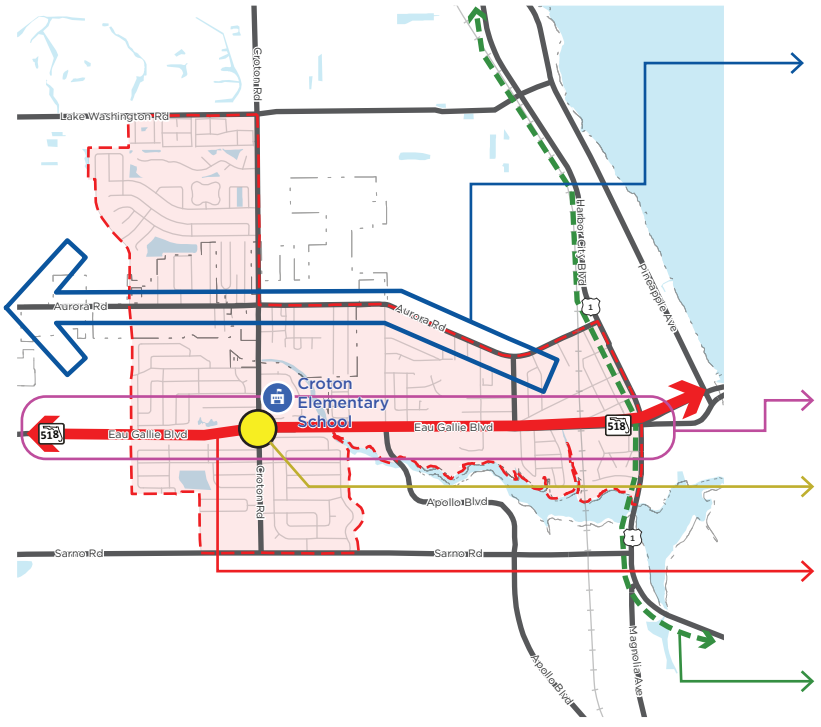
2014 to 2018 Crashes from University of Florida's Signal Four Analytics Database

Signals and Crossings within Study Area

10 Signalized Intersections

1 Unsignalized Marked Crosswalks Across Major Streets

4 Crossing Guards at Croton Rd. & Eau Gallie Blvd.
Croton Rd. & Aurora Rd.



Previous & Ongoing Plans

Aurora Road Corridor Study (2018)

- Reconstruct and restripe crosswalks and pedestrian ramps to make them ADA compliant.
- Add bicycle lanes in both directions.
- Widen sidewalk on south side to 6 feet, and add an 8 foot shared use path on north side.
- Add a new two-way center turn lane and reduce through lanes from two in each direction to one.

Eau Gallie Boulevard (SR 518) Multimodal Mobility and Safety Assessment (Ongoing)

Eau Gallie Boulevard (SR 518) and Croton Road Intersection Improvements (Ongoing)

Bicycle & Pedestrian Master Plan (Ongoing)

- Bicycle facilities prioritized along Eau Gallie Boulevard.

Showcase Trails Network

- Trail planned along US 1.

Figure 2: Background Information

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Croton Elementary School

Existing and Planned Bicycle and Pedestrian Facilities

Existing and planned pedestrian and bicycle facilities including sidewalks, bike lanes, trails, crosswalks, signals, and crossing guard locations were mapped and analyzed. The datasets were mapped using GIS data provided by the City of Melbourne and SCTPO as well as utilizing aerial satellite imagery and field review observations.

Croton Road and Eau Gallie Road have sidewalks on both sides of the roadway and Aurora Road has sidewalks along the south side of the roadway within the study area. The neighborhoods directly south of the school have sidewalks on both sides of the roadway. Neighborhoods north of Grand Teton Boulevard and south of Misty Way Lane and east of Commodore Boulevard and west of Stewart Avenue also have sidewalks on both sides of the roadway within the study area. Most of the other neighborhoods within the study area have large sidewalk gaps.

Bicycle facilities located within the study area are along Eau Gallie Boulevard from Isabella Drive to Stewart Avenue. Currently proposed bicycle facilities were mapped using recommendations from the SCTPO Bicycle and Pedestrian Master Plan. Bicycle facilities are proposed along Eau Gallie Boulevard from Isabella Drive to the western boundary of the study area and from Stewart Avenue to the eastern boundary of the study area.

Signalized intersections and marked crosswalks across major streets were mapped using data from aerial satellite imagery. There are ten signalized intersections within the study area. The only unsignalized marked crosswalk is across Croton Road on the north leg of the intersection of Croton Road and Royal Poinciana Boulevard. Crossing guard information was provided by the City of Melbourne. Crossing guards are present at the intersections of Eau Gallie Boulevard & Croton Road and Croton Road & Aurora Road.

The Showcase Trails Network plans to create a trail along US 1.

Figure 3 shows the existing and planned bicycle and pedestrian facilities within and around the study area. **Figure 4** shows the existing planned bicycle and pedestrian facilities within the immediate context surrounding the school campus.

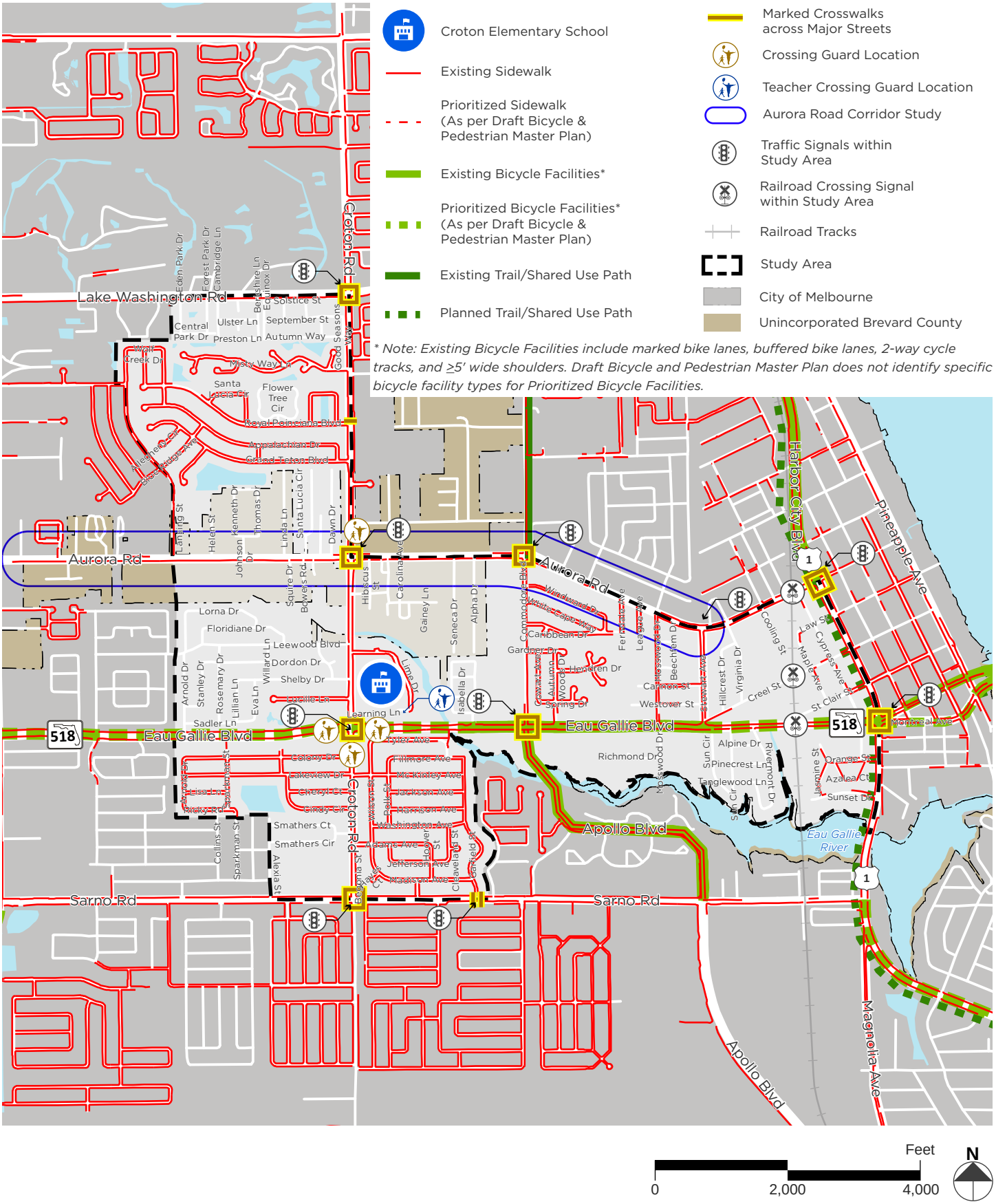

Figure 3: Existing and Planned Bicycle and Pedestrian Facilities

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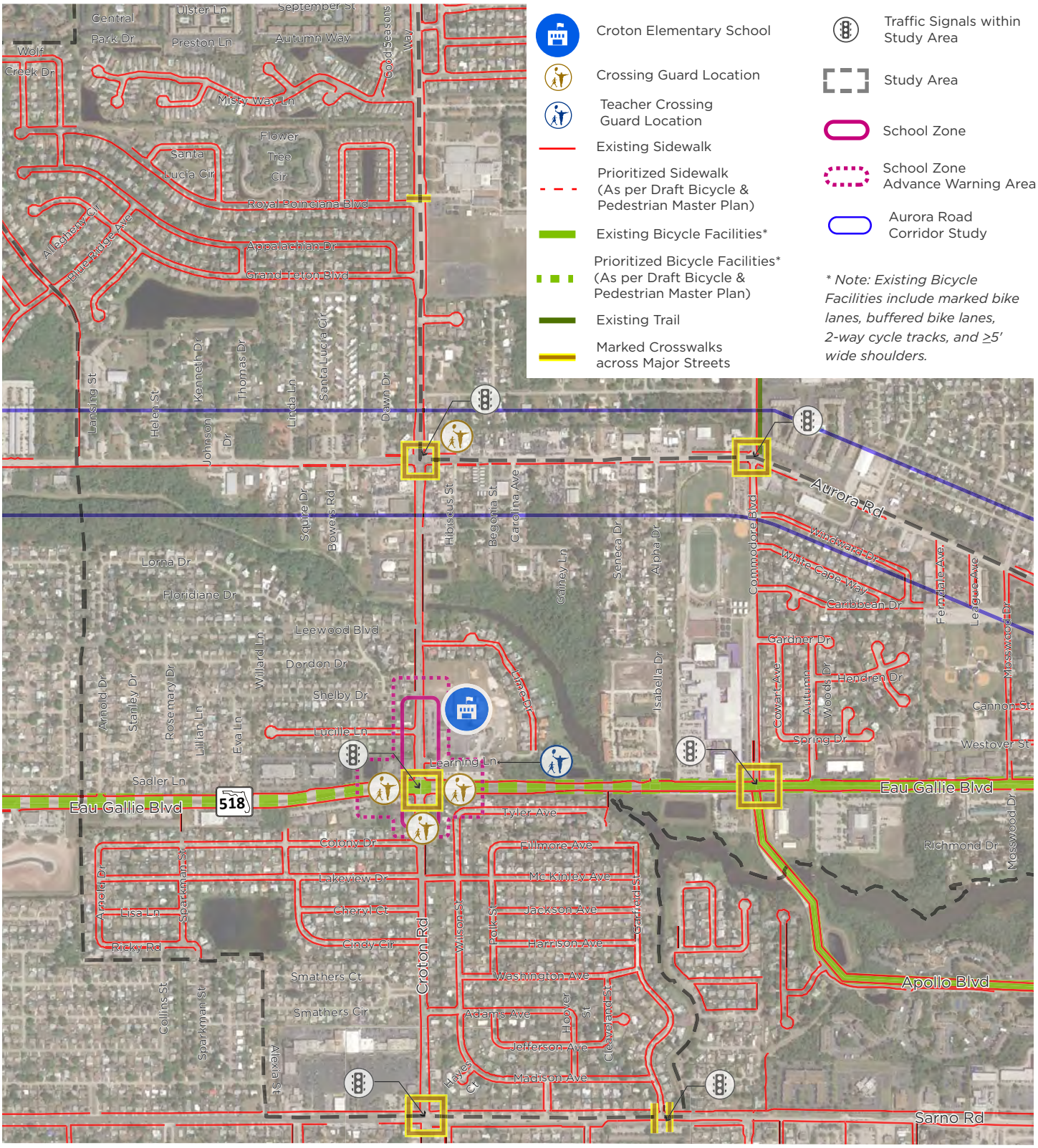

Figure 4: Existing Conditions School Context Aerial Map

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Croton Elementary School

Existing Conditions Traffic Data

Posted speeds, annual average daily traffic (AADT), and school zones were mapped as part of existing conditions traffic data analysis. Speed limit information was mapped using data from FDOT and Open Streets Map. The speed limit along Croton Road near the school campus is 35 miles per hour (MPH). AADT information was mapped using data from SCTPO's 2018 State of the System (SOS) and FDOT. Traffic volumes along Croton Road near the school campus ranges from 10,000 to 20,000 vehicles per day.

School zone and school zone advance warning areas were mapped using data from aerial satellite imagery and field review observations. The only school zone within the study area is located along Croton Road from the intersection of Eau Gallie Boulevard and Croton Road to the entrance to the school campus. The intersection of Eau Gallie Boulevard and Croton Road contains a school zone advance warning area but does not require vehicles to slow down with a regulatory school zone.

Figure 5 shows the existing conditions of traffic data.

School Campus Circulation

Circulation patterns were gathered during the school coordination meeting and field review. There are two entrances to the school campus located along Croton Road. The southernmost entrance is used for student drop-off/pick-up. There is a parking lot along this loop. This entrance is also used by pedestrians and bicyclists and has a bike rack on the south side of the front office. The northernmost entrance to the school is primarily used for the school bus entry. There is a parking lot along this loop. This entrance is also used by pedestrians and bicyclists and has a bike rack on the north side of the front office.

Figure 6 shows various circulation patterns within the school campus.

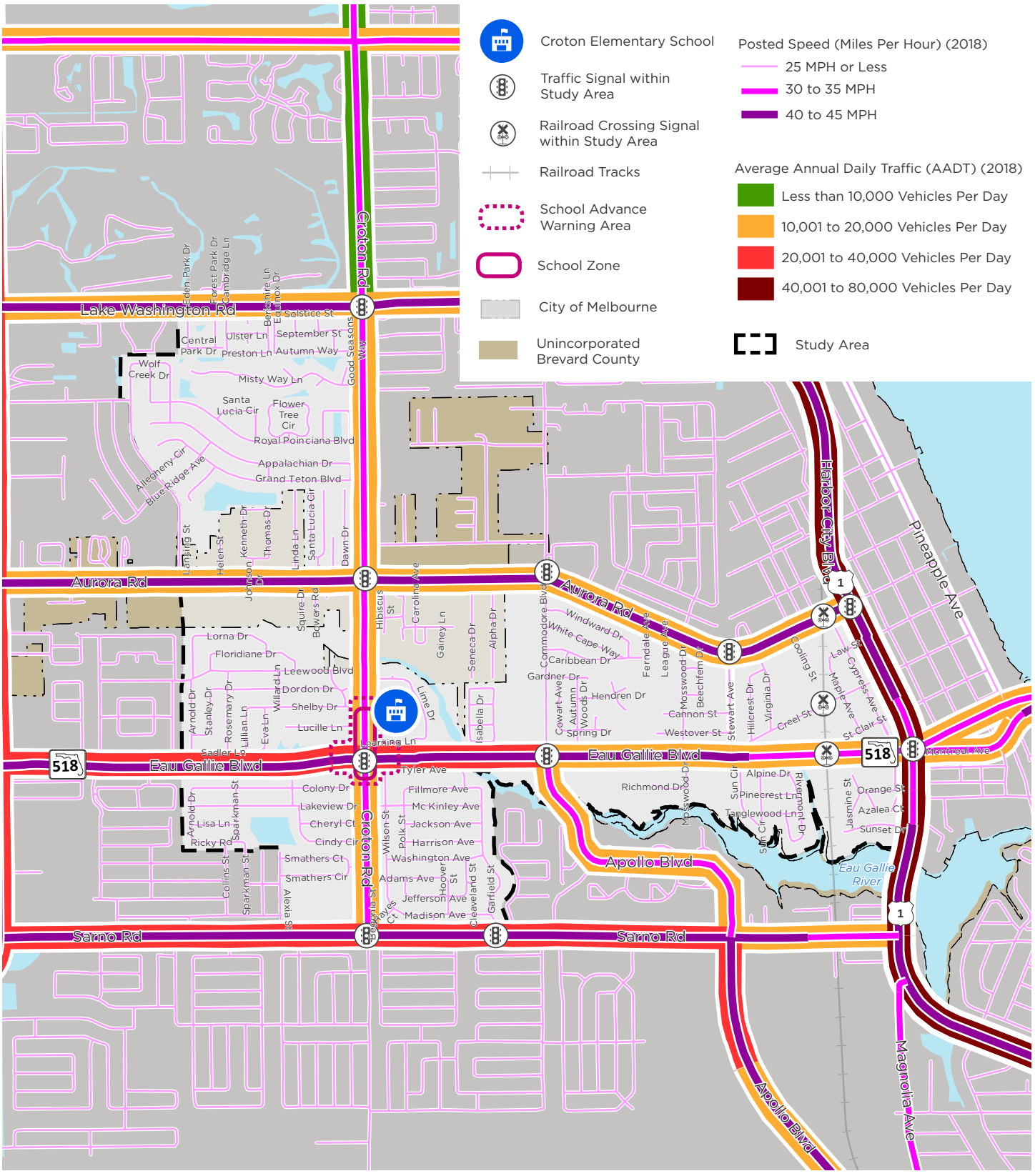

Figure 5: Existing Conditions Traffic Data

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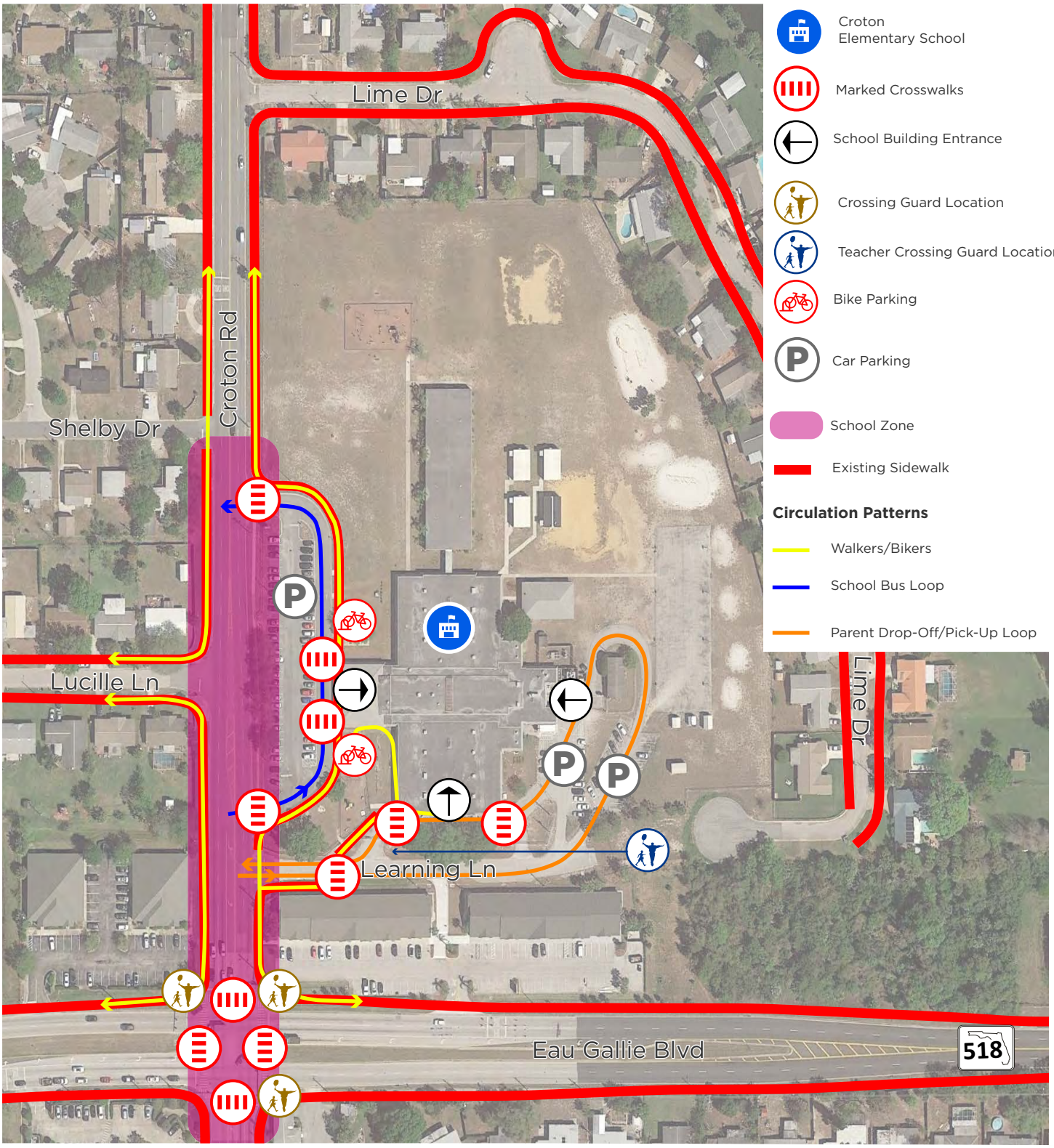

Figure 6: Existing School Circulation Map

School Routes Analysis

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School Student & Parent Survey Summary

The SCTPO conducts student and parent surveys alternating every other year to assess how students get to school and what factors affect parent's decisions to allow or not allow their child to walk or bike to school. The latest Student Travel Mode Survey was conducted in 2017 and the latest Parent Survey was conducted in 2018. This section summarizes the results of these surveys for Croton Elementary School. These surveys are conducted once every two years and provide a snapshot of conditions when the respondents fill out the survey. The survey results may not truly represent the daily average. Variables such as weather, day of week, time of year when the survey is taken, all play into the results of these surveys.

Student Travel Mode Survey

Students at Croton Elementary School were surveyed asking how they traveled to and from school.

Figure 7 shows the percentage of students walking or biking to school from 2000 to 2017. **Figure 8** shows the total number of students walking or biking to school from 2000 to 2017. **Figure 9** shows the percentage of students walking or biking to school in 2017 in AM and PM. **Figure 10** shows the total number of students walking or biking to school in 2017 in AM and PM.

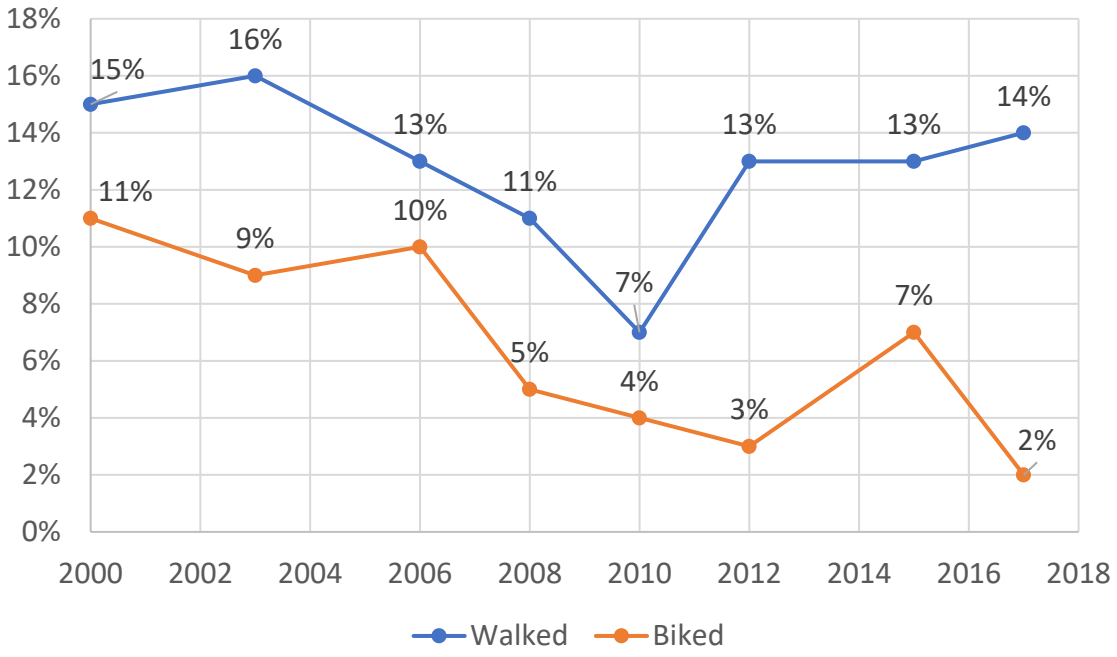

Figure 7: Percentage of Students Walking or Biking to School from 2000 to 2017

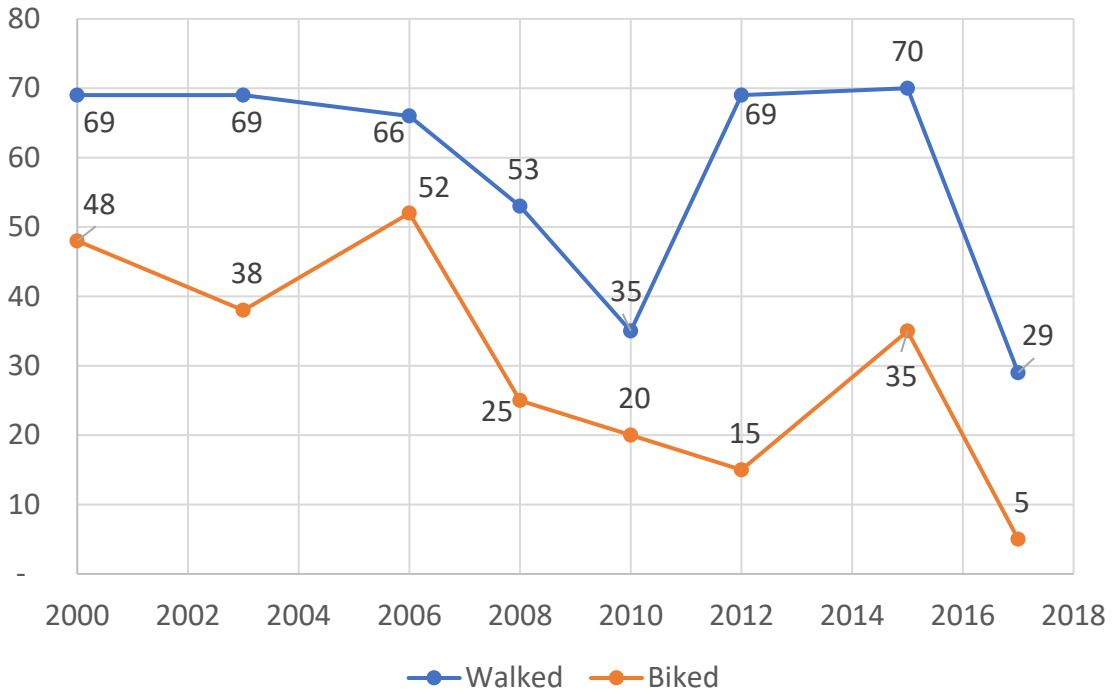

Figure 8: Total Number of Students Walking or Biking to School from 2000 to 2017

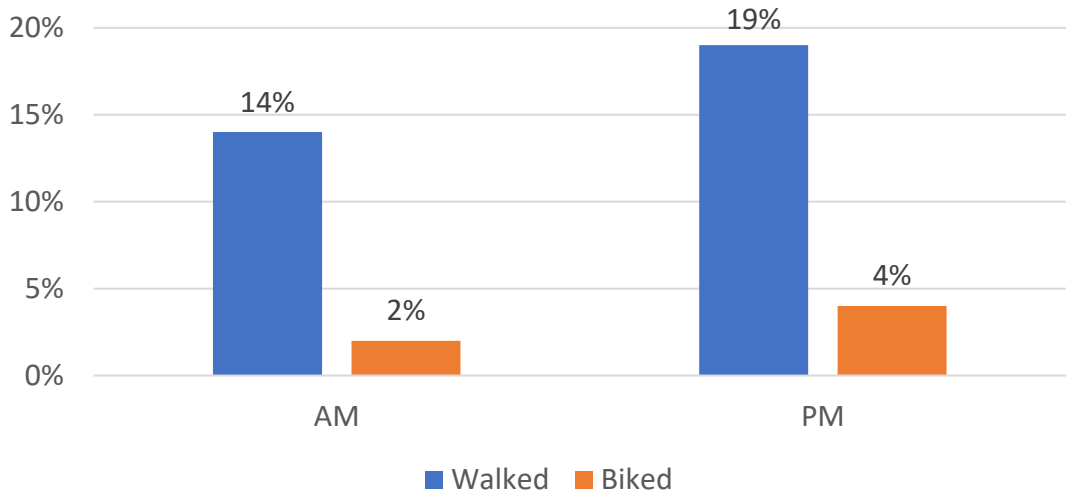

Figure 9: Percentage of Students Walking or Biking to School in 2017 in AM and PM

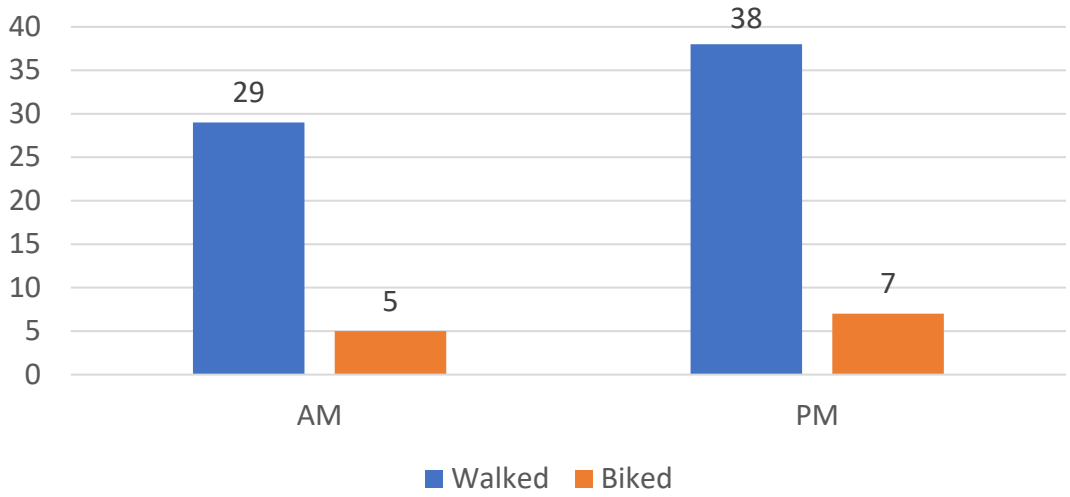

Figure 10: Total Number of Students Walking or Biking to School in 2017 in AM and PM

Main takeaways from the Student Travel Mode Survey:

- Based on the survey data from year 2000 to 2017, on average about 19 percent of total students travel by walking (13 percent) or biking (six percent).
- The total number of students seen walking or biking to school has decreased from 2000 to 2017.
- On average, more students walk or bike to school in the afternoon than in the morning. Most students either travel by car (67 percent) or bus (17 percent) to school as shown in **Figure 2**.

Parent Survey

The following data shows the results from surveys taken from parents with students attending 86 different schools in the area. Data was used from all the schools that responded to the survey because there was not enough data from each individual school to draw reasonable conclusions.

Figure 11 shows issues reported to affect the decision to allow a child to walk or bike to/from school by parents.

Figure 12 shows the parent's opinions about how healthy walking and biking to/from school is for their child.

Figure 13 parent's opinions about how much their child's school encourages or discourages walking and biking to/from school.

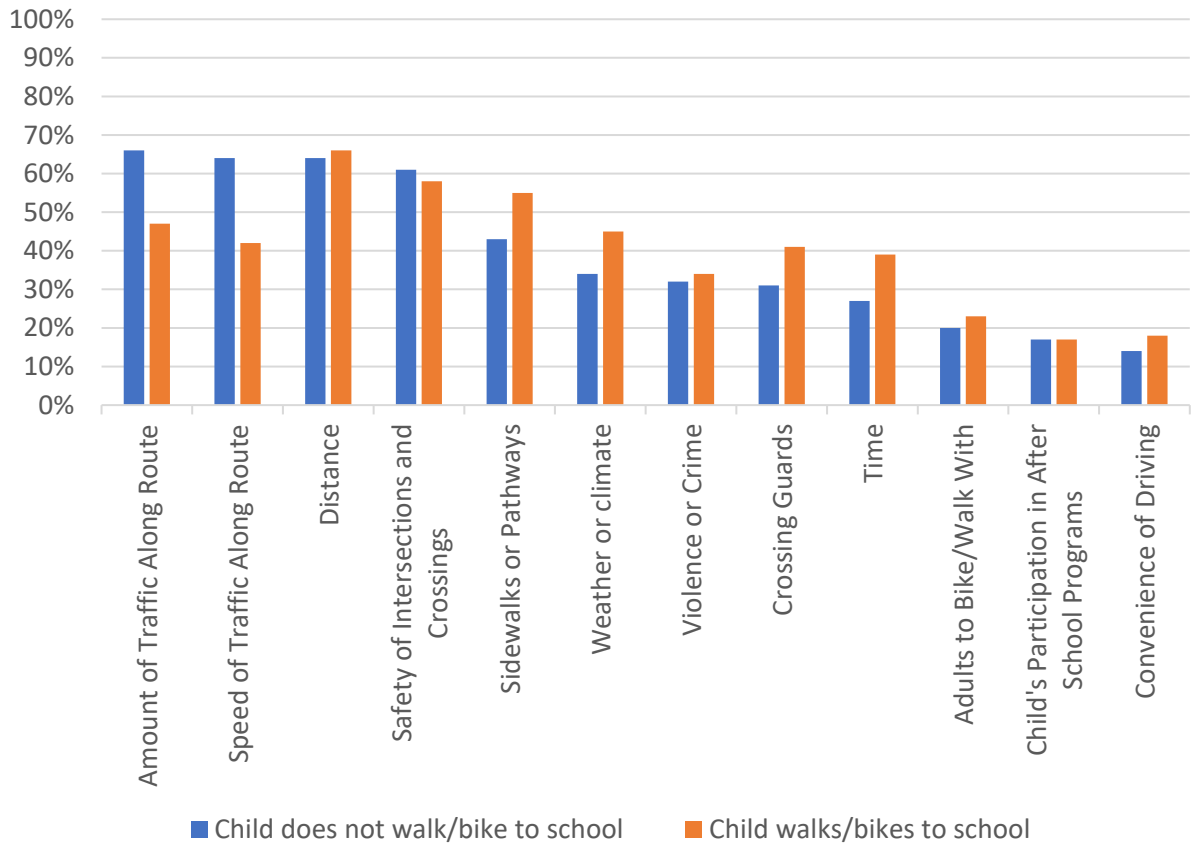

Figure 11: Issues Reported to Affect the Decision to Allow a Child to Walk or Bike to/from School by Parents (Based on 2018 Survey)

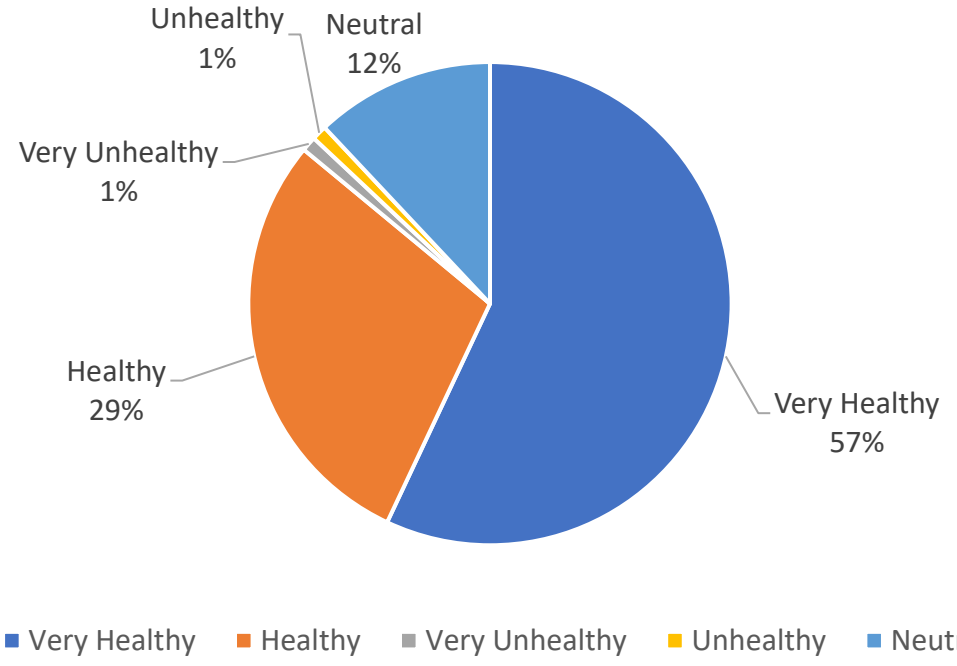

Figure 12: Parent's Opinions about How Healthy Walking and Biking to/from School is for Their Child (Based on 2018 Survey)

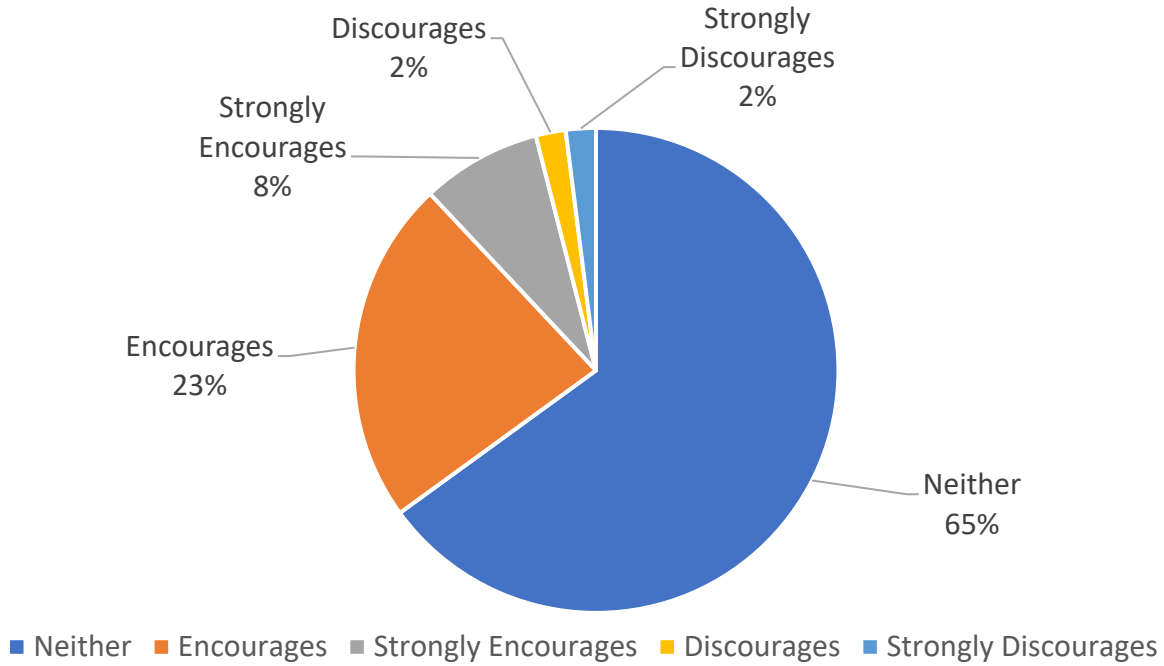

Figure 13: Parent's Opinions about How Much their Child's School Encourages or Discourages Walking and Biking to/from School (Based on 2018 Survey)

Main takeaways from the Parent Survey:

- The most common issues that affect both parents of children who already bike or walk to school and parents' of children that do not currently walk or bike to school decision to allow their child to walk or bike to school are:
    - The amount of traffic along the route
    - The speed of traffic along the route
    - Distance
    - The safety of intersections and crossings
    - Sidewalks or pathways
- Most parents think that walking or biking to school is very healthy for their child but think their child's school neither encourages nor discourages children to walk or bike to school.

For full or updated student or parent surveys please contact SCTPO.

Crash Data Analysis

Crash records were obtained for the Croton Elementary School study area for the most recent five-year period on record (2014 through 2018) from the University of Florida's Signal Four Analytics Database. This section summarizes both the school aged and non-school aged pedestrian/bicycle crashes in the Croton Elementary School study area.

Pedestrian/Bicycle Crash Statistics

There were 81 total pedestrian and bicycle crashes within the study area (27 pedestrian and 54 bicycle). Sixteen of the crashes were property damage only, 64 of the crashes resulted in injury, and one crash resulted in a fatality. Seventy-five percent of crashes occurred during the day and 93 percent of crashes occurred under dry conditions. The reported crashes are displayed by different measures of time (year, month, day, and hour) in **Figure 14**, **Figure 15**, **Figure 16**, and **Figure 17**.

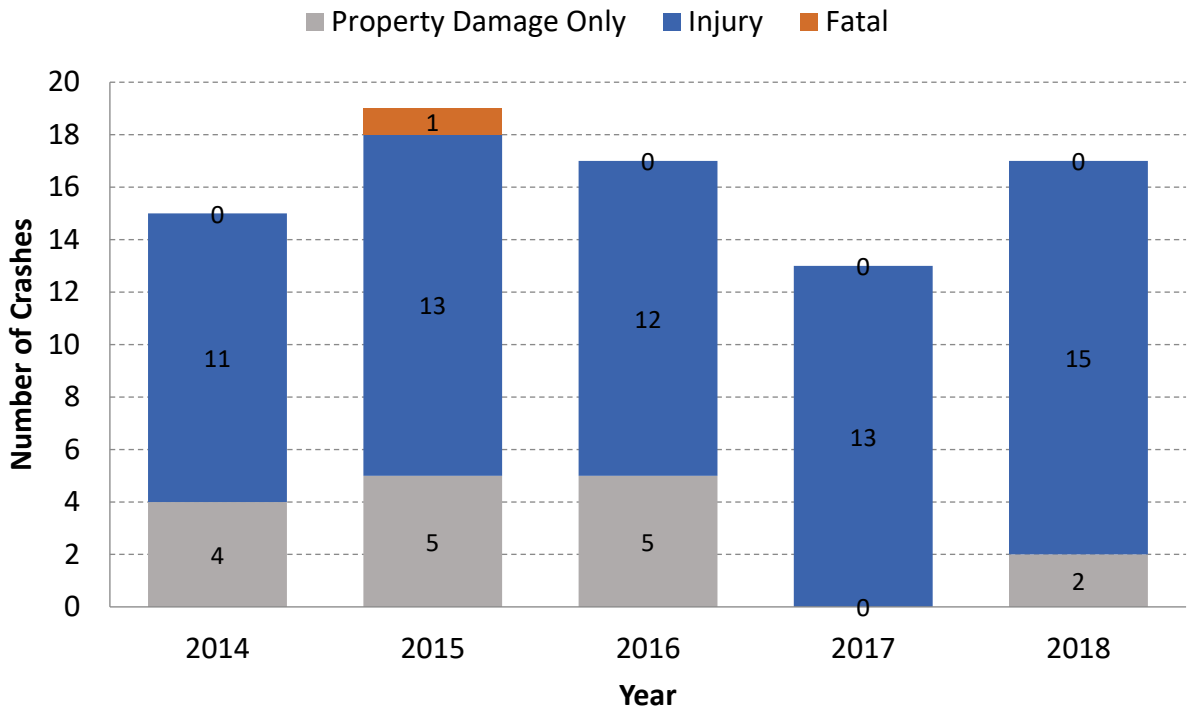

Figure 14: Crashes by Year and Severity

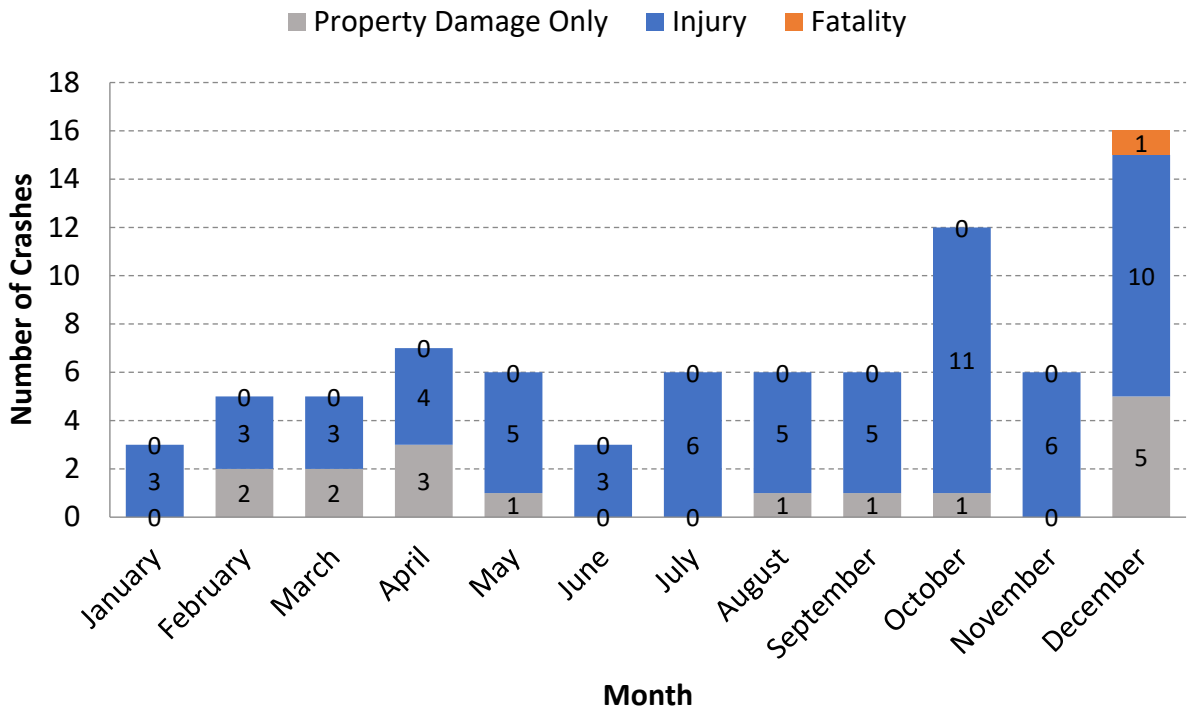

Figure 15: Crashes by Month and Severity

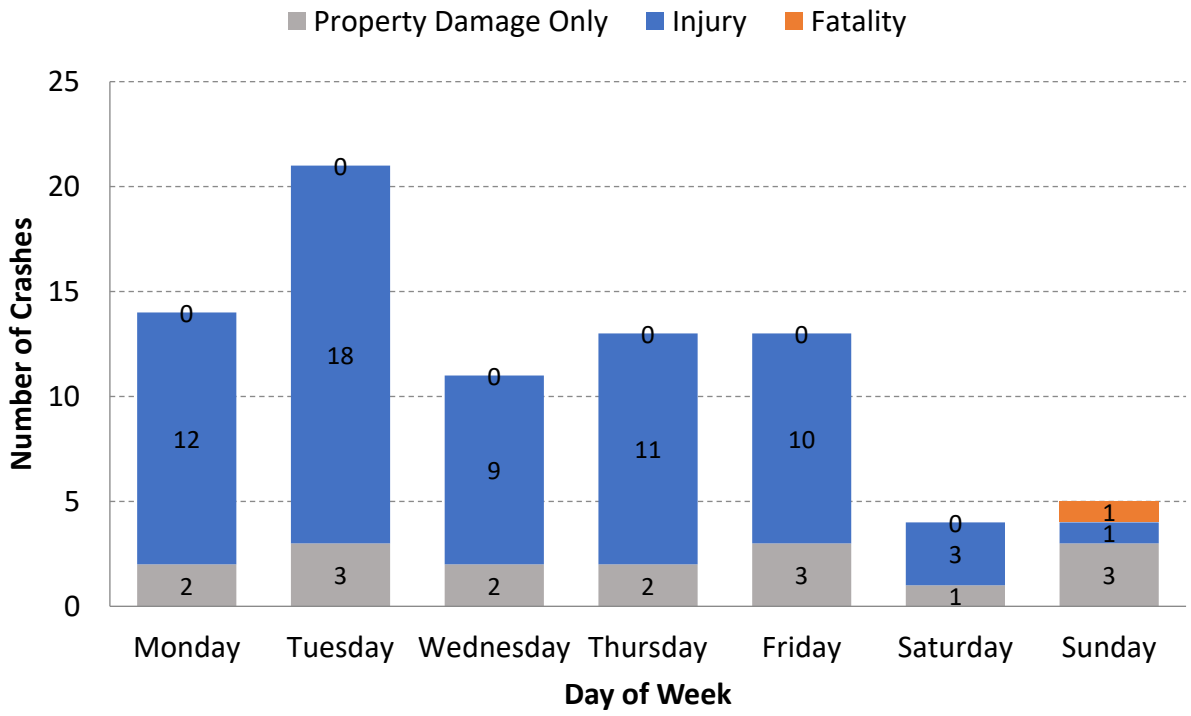

Figure 16: Crashes by Day of Week and Severity

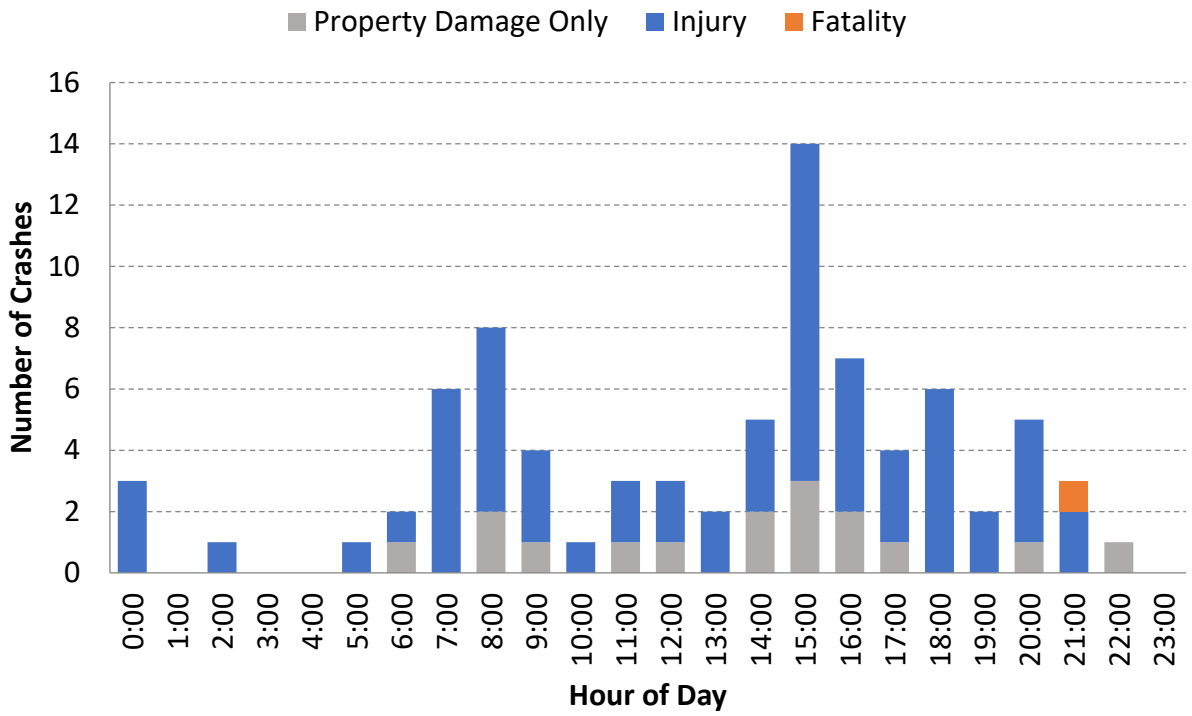

Figure 17: Crashes by Hour of Day and Severity

There was an average of 16 crashes per year from 2014 to 2018. The most crashes occurred in the month of December (16) and Tuesday was the most common day when crashes occurred (21). By time of day, the highest crash hour was from 3 PM to 4 PM (14). Alcohol and/or drug involved crashes accounted for five percent of all reported crashes.

School Aged Pedestrian/Bicycle Crash Statistics

There were 29 total school aged pedestrian and bicycle crashes within the study area (ten pedestrian and 19 bicycle). Seven of the crashes were property damage only and 22 crashes resulted in injury. There were no reported fatal crashes. Eighty-six percent of crashes occurred during the day and 86 percent of crashes occurred under dry conditions. **Figure 18** and **Figure 19** map the locations of the school-aged pedestrian and bicycle crashes. The reported crashes are displayed by different measures of time (year, month, day, and hour) in **Figure 20**, **Figure 21**, **Figure 22**, and **Figure 23**.

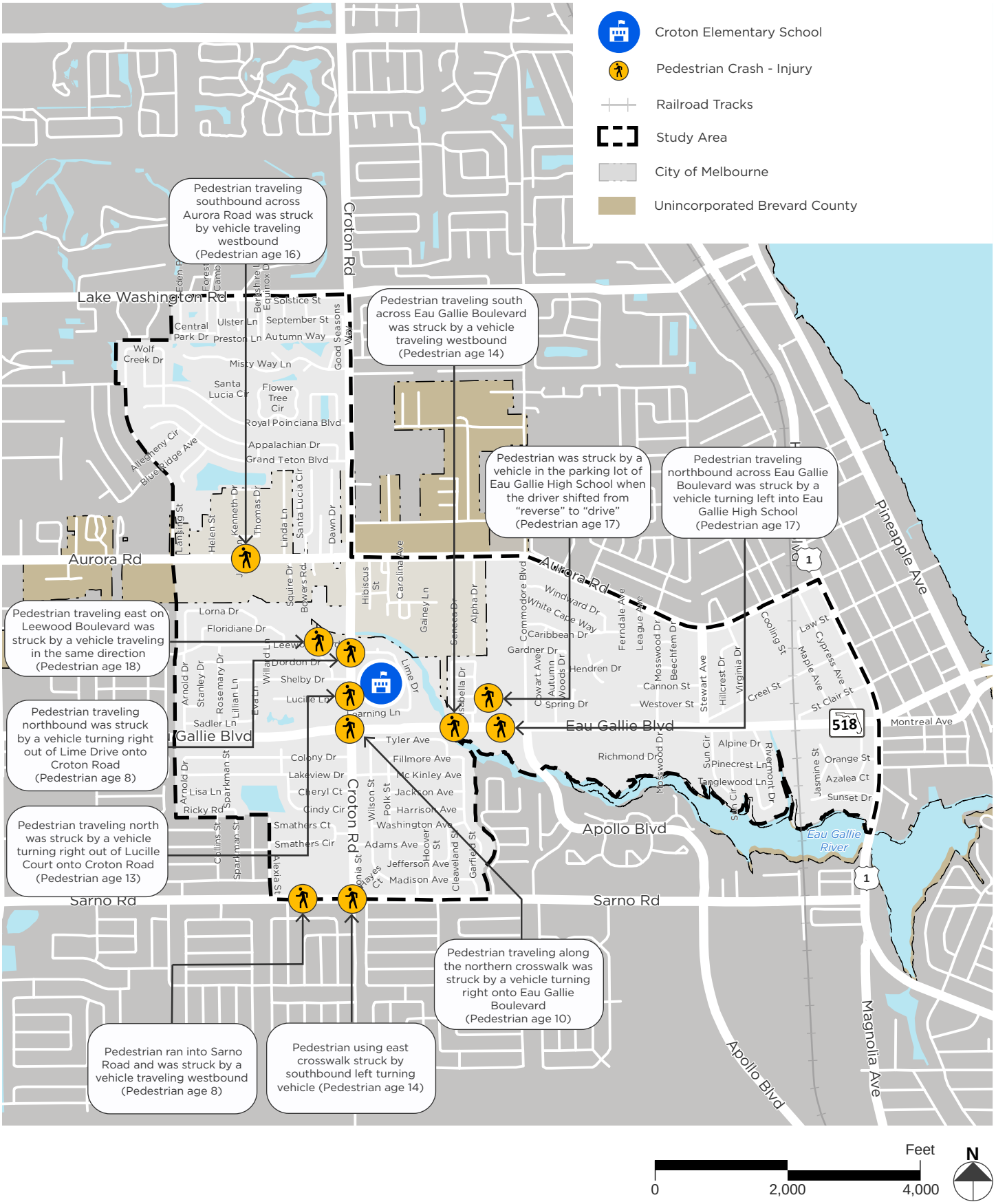

Figure 18: Pedestrian Crashes (2014 - 2018)

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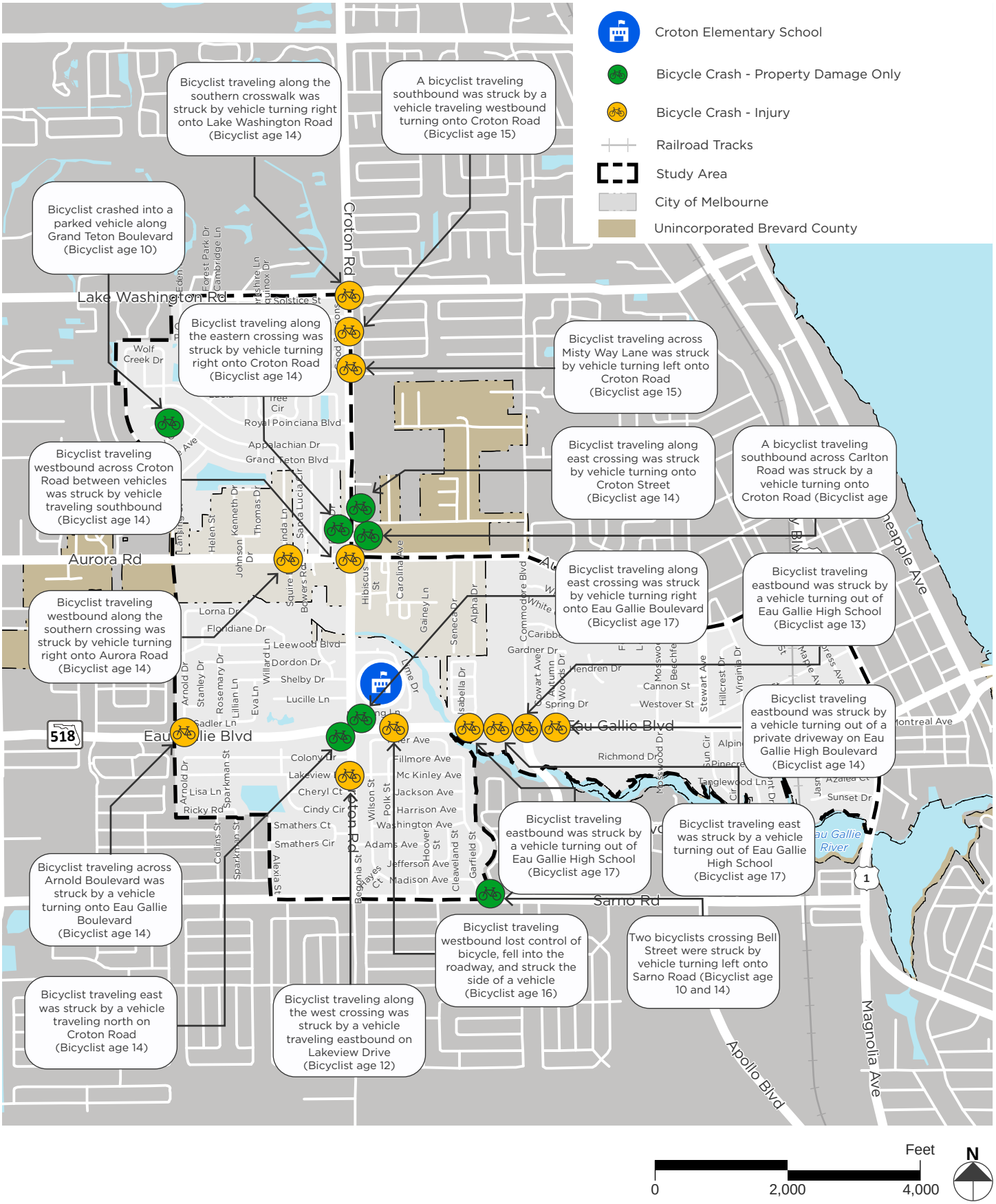

Figure 19: Bicycle Crashes (2014 - 2018)

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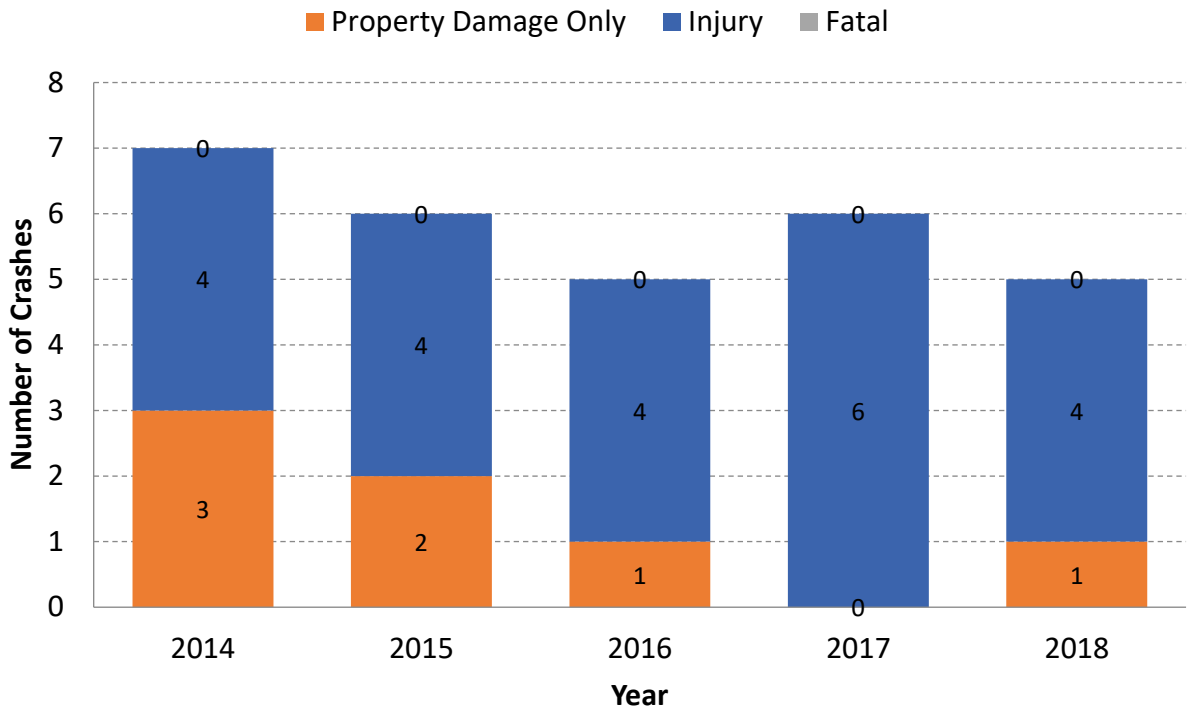


Figure 20: School-Aged Crashes by Year and Severity

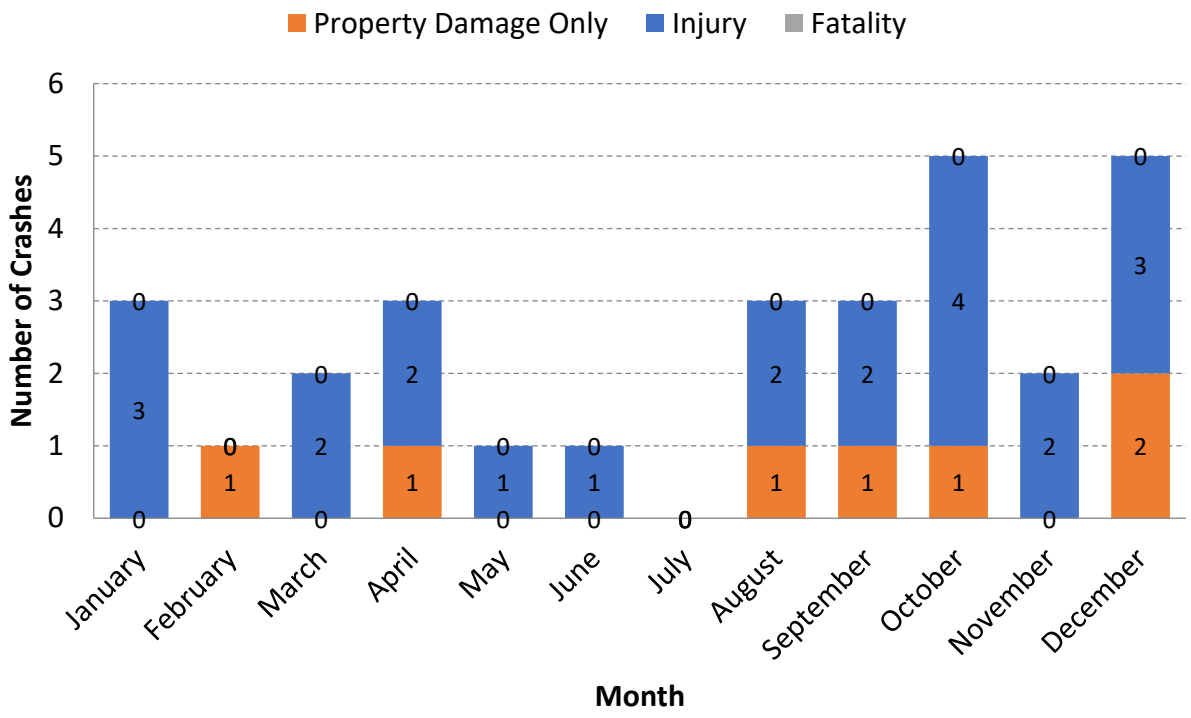


Figure 21: School-Aged Crashes by Month and Severity

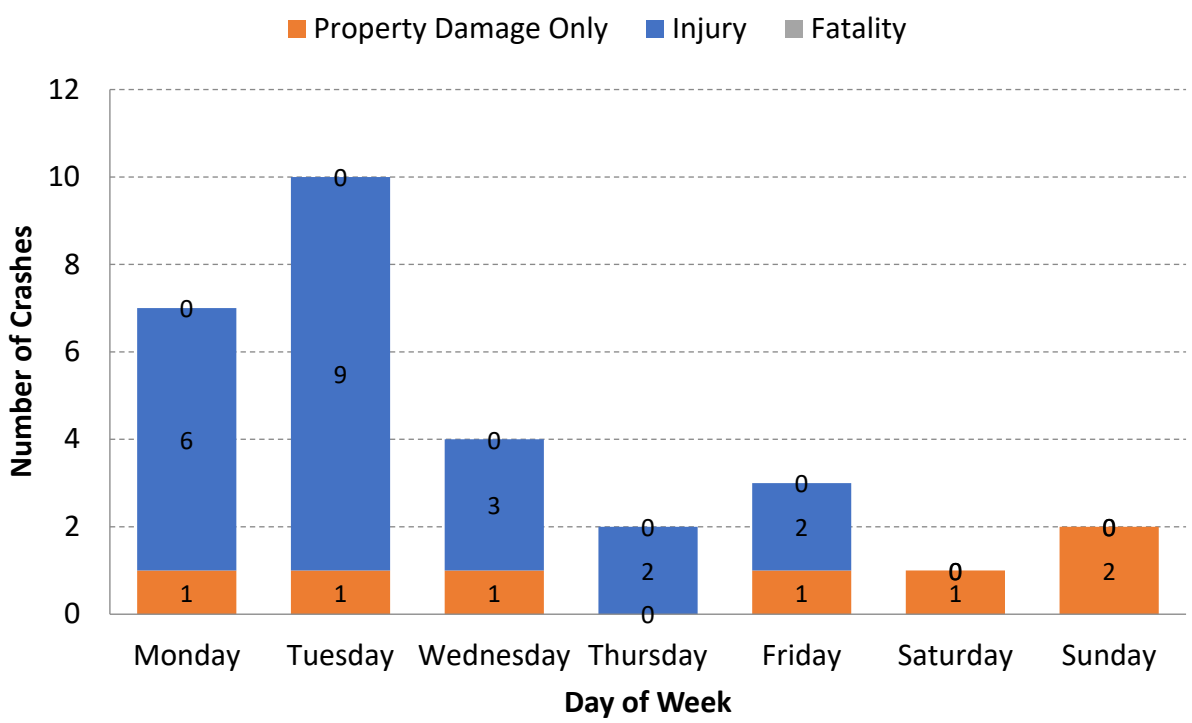


Figure 22: School-Aged Crashes by Day of Week and Severity

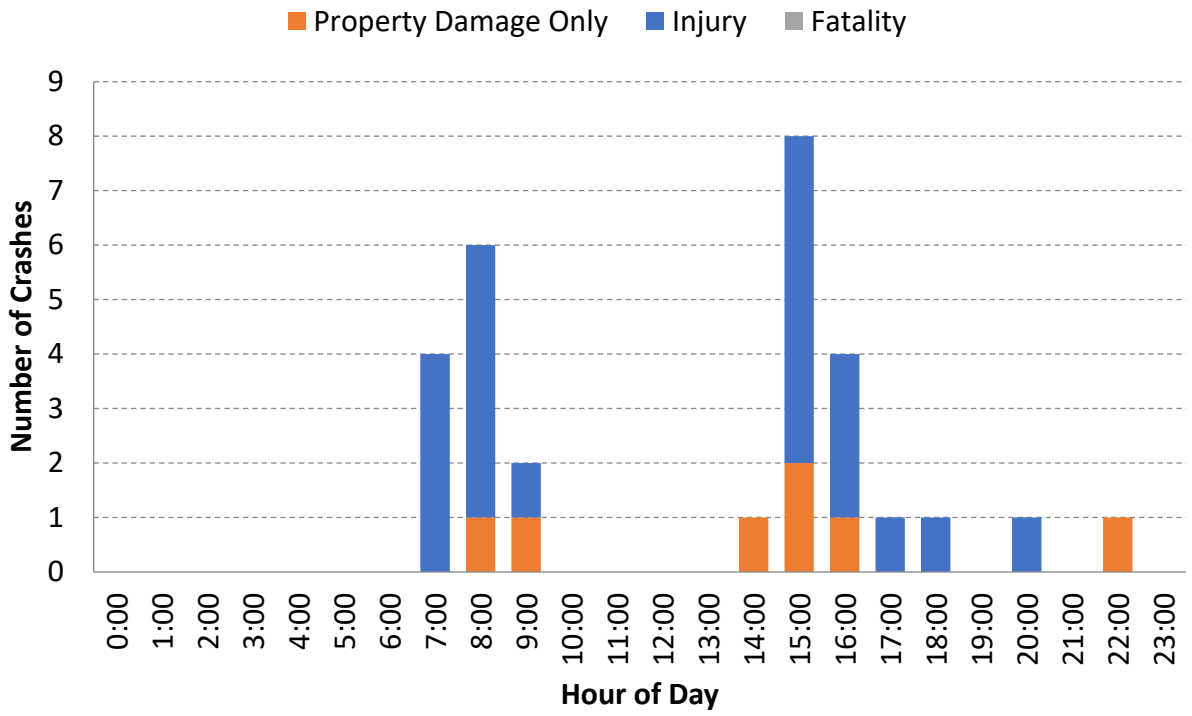


Figure 23: School-Aged Crashes by Hour of Day and Severity

An average of six crashes per year occurred from 2014 to 2018. Most crashes occurred in the month of October and December (five) with the most common crash day being Tuesday (10). By time of day, the highest crash hour was from 3 PM to 4 PM (eight).

A few other crash statistics worthy to note:

- Alcohol and/or drug involvement did not account for any of the crashes;
- Eighteen crashes involved a vehicle making a left or right turn at an intersection (based on the crash reports); and
- Four crashes occurred at the entrance to Eau Gallie High School (based on the crash reports).

School-Aged Crash Report Summaries

Pedestrian Crashes:

1. Crash Number: 84798507
    - On November 4, 2014 at 6:22 PM, a crash involving a pedestrian occurred along Leewood Boulevard near the intersection with Sherry Lane. The pedestrian was walking eastbound on Leewood Boulevard and was struck by a vehicle traveling in the same direction. The crash caused non-incapacitating injuries. The crash occurred under dry conditions at dusk.
2. Crash Number: 84798756
    - On December 2, 2014 at 7:52 AM, a crash involving a pedestrian occurred at the intersection of Croton Road and Sarno Road. The pedestrian was traveling along the east crosswalk when a vehicle making a southbound left turn stuck the pedestrian. The crash resulted in non-incapacitating injuries. The crash occurred under dry conditions during the day.
3. Crash Number: 84799195
    - On January 21, 2015 at 8:21 AM, a crash involving a pedestrian occurred at the intersection Eau Gallie Boulevard and the entrance to Eau Gallie High School. The pedestrian was traveling northbound across Eau Gallie Boulevard and was struck by a vehicle traveling eastbound on Eau Gallie Boulevard turning left into Eau Gallie High School. The crash resulted in a minor injury. The crash occurred under dry conditions during the day.
4. Crash Number: 86792314
    - On December 6, 2016 at 9:55 AM, a crash involving a pedestrian occurred at the intersection of Eau Gallie Boulevard and Croton Road. The pedestrian was traveling along the northern crosswalk and was struck by a vehicle turning right onto Eau Gallie Boulevard. The crash resulted in a non-incapacitating injury. The crash occurred under dry conditions during the day.

5. Crash Number: 85462178
    - On January 24, 2017 at 8:27 PM, a crash involving a pedestrian occurred along Aurora Road near the intersection of Johnson Drive. The pedestrian was attempting to cross Aurora Road and was struck by a vehicle traveling west in the outside lane. The crash resulted in minor injuries. The crash occurred under dry conditions at night.
6. Crash Number: 86793177
    - On March 13, 2017 at 3:47 PM, a crash involving a pedestrian occurred in the parking lot of Eau Gallie High School. The pedestrian was standing in front of a parked vehicle and was struck by the vehicle when the driver accidently shifted from “reverse” to “drive”. The crash resulted in a non-incapacitating injury. The crash occurred under wet conditions during the day.
7. Crash Number: 86794547
    - On August 15, 2017 at 3:35 PM, a crash involving a pedestrian occurred along Eau Gallie Boulevard just west of Isabella Drive. The pedestrian was traveling south across Eau Gallie Boulevard and was struck by a vehicle traveling westbound. The crash caused a minor injury. The crash occurred under dry conditions during the day.
8. Crash Number: 87411381
    - On March 5, 2018 at 7:00 AM, a crash involving a pedestrian occurred at the intersection of Lime Drive and Croton Road. The pedestrian was traveling northbound along Croton Road and was struck by a vehicle traveling westbound on Lime Drive turning right onto Croton Road. The crash resulted in a non-incapacitating injury. The crash occurred under dry conditions during the day.
9. Crash Number: 87412165
    - On June 4, 2018 at 4:50 PM, a crash involving a pedestrian occurred on Sarno Road just east of Cronin Avenue. A pedestrian ran into the middle of the road and a vehicle traveling westbound struck the pedestrian. The crash resulted in a minor injury. The crash occurred under wet conditions during the day.
10. Crash Number: 88677476
    - On October 5, 2018 at 8:40 AM, a crash involving a pedestrian occurred at the intersection of Croton Road and Lucille Court. The pedestrian was traveling north along Croton Road and was struck by a vehicle traveling eastbound on Lucille Court turning right onto Croton Road. The crash resulted in a non-incapacitating injury. The crash occurred during the day with unknown roadway conditions.

Bicycle Crashes:

1. Crash Number: 84290341
    - On May 1, 2014 at 3:47 PM, a crash involving a bicyclist occurred at the intersection of Misty Way Lane and Croton Road. The bicyclist was traveling northbound on the west side of Croton Road when a vehicle traveling eastbound on Misty Way Lane making a left onto Croton Road struck the bicyclist. The crash resulted in a non-incapacitating injury. The crash occurred under dry conditions during the day.
2. Crash Number: 84798072
    - On September 12, 2014 at 8:25 AM, a crash involving a bicyclist occurred at the intersection of Croton Road and Eau Gallie Boulevard. The bicyclist was crossing along the east crosswalk and was struck by a vehicle traveling northbound on Croton Road making a right turn onto Eau Gallie Boulevard. The crash did not result in any injuries according to the crash report. The crash occurred under dry conditions during the day.
3. Crash Number: 84798267
    - On October 4, 2014 at 2:53 PM, a crash involving a bicyclist occurred on Grand Teton Boulevard just west of Allegheny Circle. The bicyclist crashed into a parked vehicle on Grand Teton Boulevard. The crash did not result in any injuries according to the crash report. The crash occurred under wet conditions during the day.
4. Crash Number: 84798339
    - On October 14, 2014 at 3:42 PM, a crash involving a bicyclist occurred along Eau Gallie Boulevard near the intersection of Commodore Boulevard. The bicyclist was traveling westbound along the northern sidewalk on Eau Gallie Boulevard and lost control of the bicycle. The bicyclist fell into the roadway and struck the side of a vehicle. The crash resulted in minor injuries. The crash occurred under dry conditions during the day.
5. Crash Number: 84798975
    - On December 21, 2014 at 10:13 PM, a crash involving a bicyclist occurred at the intersection of Eau Gallie Boulevard and Croton Road. The bicyclist was traveling east on Eau Gallie Boulevard and was struck by a vehicle traveling north on Croton Road. The crash did not result in any injuries according to the crash report. The crash occurred under dry conditions at night.
6. Crash Number: 84799255
    - On January 27, 2015 at 4:55 PM, a crash involving a bicyclist occurred at the intersection of Eau Gallie Boulevard and the entrance to Eau Gallie High School. The bicyclist was traveling east along Eau Gallie Boulevard when a vehicle exiting Eau Gallie High School struck the bicyclist. The crash resulted in a non-incapacitating injury. The crash occurred under dry conditions during the day.

7. Crash Number: 84799362
    - On February 8, 2015 at 9:20 AM, a crash involving two bicyclists occurred at the intersection of Bell Street and Sarno Road. The bicyclists were traveling east on Sarno Road. The driver was traveling south on Bell Street and put up her hand to block the sun in her eyes. The bicyclists thought that the driver was waving them to cross. The driver then attempted to make a left turn on to Sarno Road, striking the two bicyclists. The crash did not result in any injuries according to the crash report. The crash occurred under dry conditions during the day.
8. Crash Number: 84799978
    - On April 16, 2015 at 7:18 AM, a crash involving a bicyclist occurred at the intersection of Lake Washington Road and Croton Road. The bicyclist was traveling along the southern crosswalk when a vehicle traveling northbound on Croton Road turning right struck the bicyclist. The crash resulted in a non-incapacitating injury. The crash occurred under dry conditions during the day.
9. Crash Number: 86004484
    - On August 25, 2015 at 4:40 PM, a crash involving a bicyclist occurred at the intersection of Carlton Drive and Croton Street. The bicyclist was traveling across the east crossing when a vehicle traveling westbound on Carlton Drive turning onto Croton Street struck the bicyclist. The crash did not result in any injuries according to the crash report. The crash occurred under dry conditions during the day.
10. Crash Number: 84800007
    - On April 20, 2015 at 8:25 AM, a crash involving a bicyclist occurred at the intersection of Eau Gallie Boulevard and the entrance to Eau Gallie High School. The bicyclist was traveling eastbound along Eau Gallie Boulevard and was struck by a vehicle turning out of Eau Gallie High School. The crash resulted in minor injuries. The crash occurred under dry conditions during the day.
11. Crash Number: 85365096
    - On September 16, 2016 at 4:35 PM, a crash involving a bicyclist occurred at the intersection of Aurora Road and Squire Drive. The bicyclist was traveling westbound along the southern leg of the intersection when a vehicle traveling north on Squire Drive turning right onto Aurora Road struck the bicyclist. The crash resulted in a non-incapacitating injury. The crash occurred under dry conditions during the day.
12. Crash Number: 86395298
    - On October 19, 2016 at 3:24 PM, a crash involving a bicyclist occurred at the intersection of Croton Road and Aurora Road. The bicyclist was traveling westbound across Croton Road between vehicles when a vehicle traveling southbound on Croton Road struck the bicyclist. The crash resulted in minor injuries. The crash occurred under dry conditions during the day.

13. Crash Number: 86792202
    - On November 22, 2016 at 7:30 AM, a crash involving a bicycle occurred at the intersection of Eau Gallie Boulevard and Arnold Boulevard. The bicyclist was traveling eastbound along Eau Gallie Boulevard across Arnold Boulevard and was struck by a vehicle turning onto Eau Gallie Boulevard. The crash resulted in minor injuries. The crash occurred under dry conditions during the day.
14. Crash Number: 86792380
    - On December 12, 2016 at 3:51 PM, a crash involving a bicyclist occurred at the intersection of Carlton Drive and Croton Road. The bicyclist was traveling across the eastern crossing when a vehicle traveling west on Carlton Drive turning right onto Croton Road struck the bicyclist. The crash did not result in any injuries according to the crash report. The crash occurred under dry conditions during the day.
15. Crash Number: 86794532
    - On August 14, 2017 at 8:17 AM, a crash involving a bicyclist occurred at the intersection of Lakeview Drive and Croton Road. The bicyclist was traveling along the western leg of the intersection and was struck by a vehicle traveling eastbound on Lakeview Drive. The crash resulted in a non-incapacitating injury. The crash occurred under dry conditions during the day.
16. Crash Number: 86794758
    - On September 6, 2017 at 8:08 AM, a crash involving a bicyclist occurred at the intersection of Eau Gallie Boulevard and an exit of Eau Gallie High School. The bicyclist was traveling eastbound along Eau Gallie Boulevard and was struck by a vehicle turning out of Eau Gallie High School. The crash resulted in a minor injury. The crash occurred under dry conditions during the day.
17. Crash Number: 87410537
    - On December 5, 2017 at 5:36 PM, a crash involving a bicyclist occurred at the intersection of Croton Road and Tallhedge Road. The bicyclist was traveling southbound on the east side of Croton Road and was struck by a vehicle traveling westbound on Tallhedge Road turning onto Croton Road. The crash resulted in possible injury. The crash occurred under dry conditions at dusk.
18. Crash Number: 87411745
    - On April 11, 2018 at 3:05 PM, a crash involving a bicyclist occurred at the intersection of Croton Road and Carlton Road. The bicyclist was traveling southbound on Croton Road crossing Carlton Road and was struck by a vehicle traveling westbound on Carlton Road turning onto Croton Road. The crash resulted in no injuries. The crash occurred under dry conditions during the day.

19. Crash Number: 88677604
    - On October 22, 2018 at 3:38 PM, a crash involving a bicyclist occurred at the intersection of Eau Gallie Boulevard and a private driveway along Eau Gallie Boulevard just east of Commodore Boulevard. The bicyclist was traveling eastbound along Eau Gallie Boulevard and was struck by a vehicle turning out of the private driveway onto Eau Gallie Boulevard. The crash resulted in a non-incapacitating injury. The crash occurred under dry conditions during the day.

Non-School Aged Pedestrian/Bicycle Crash Statistics

There were 52 total non-school aged pedestrian and bicycle crashes within the study area (18 pedestrian and 34 bicycle). Nine of the crashes were property damage only, 42 resulted in injury, and there was one fatality. Sixty-seven percent of the crashes occurred in daylight conditions and 96 percent occurred with dry roadway conditions. The reported crashes are displayed by different measures of time (year, month, day, and hour) in **Figure 24**, **Figure 25**, **Figure 26**, and **Figure 27**.

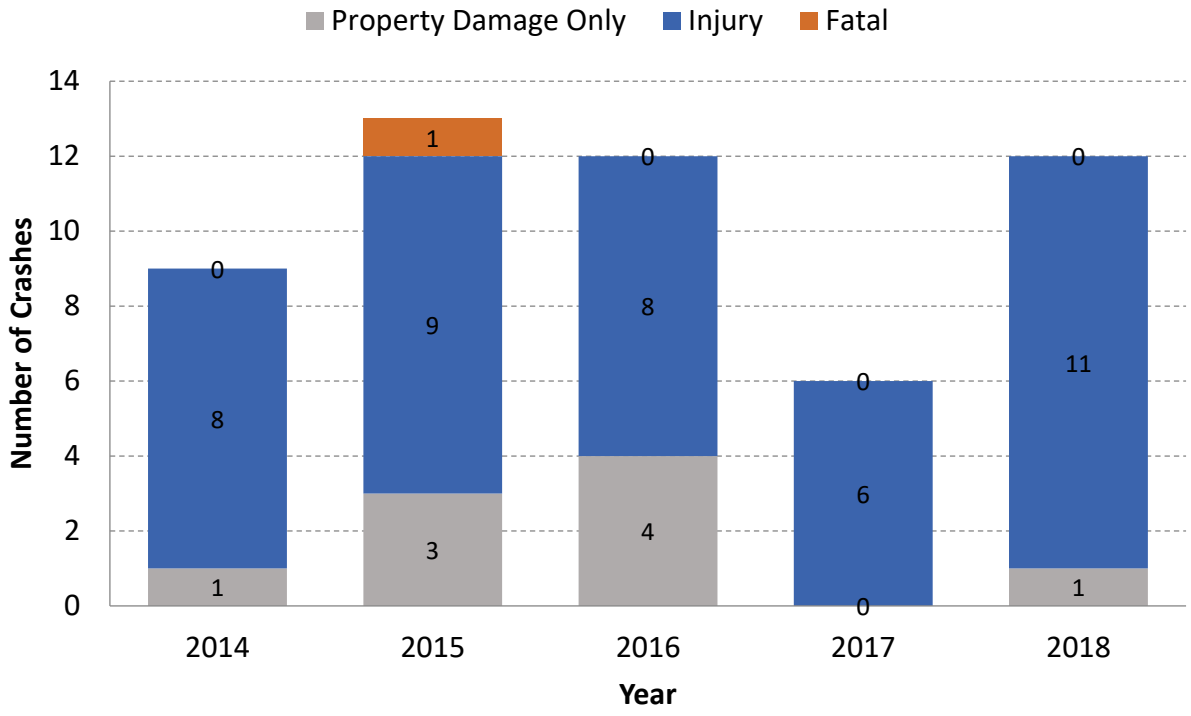


Figure 24: Non-School Aged Crashes by Year and Severity

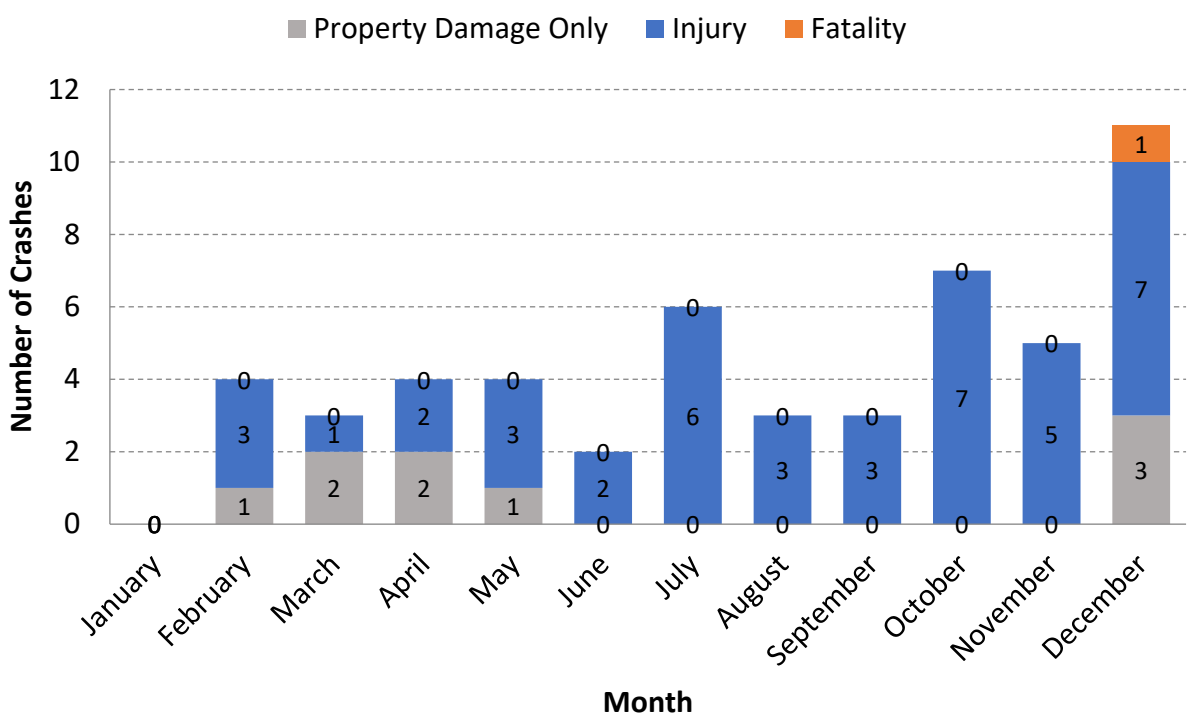


Figure 25: Non-School Aged Crashes by Month and Severity

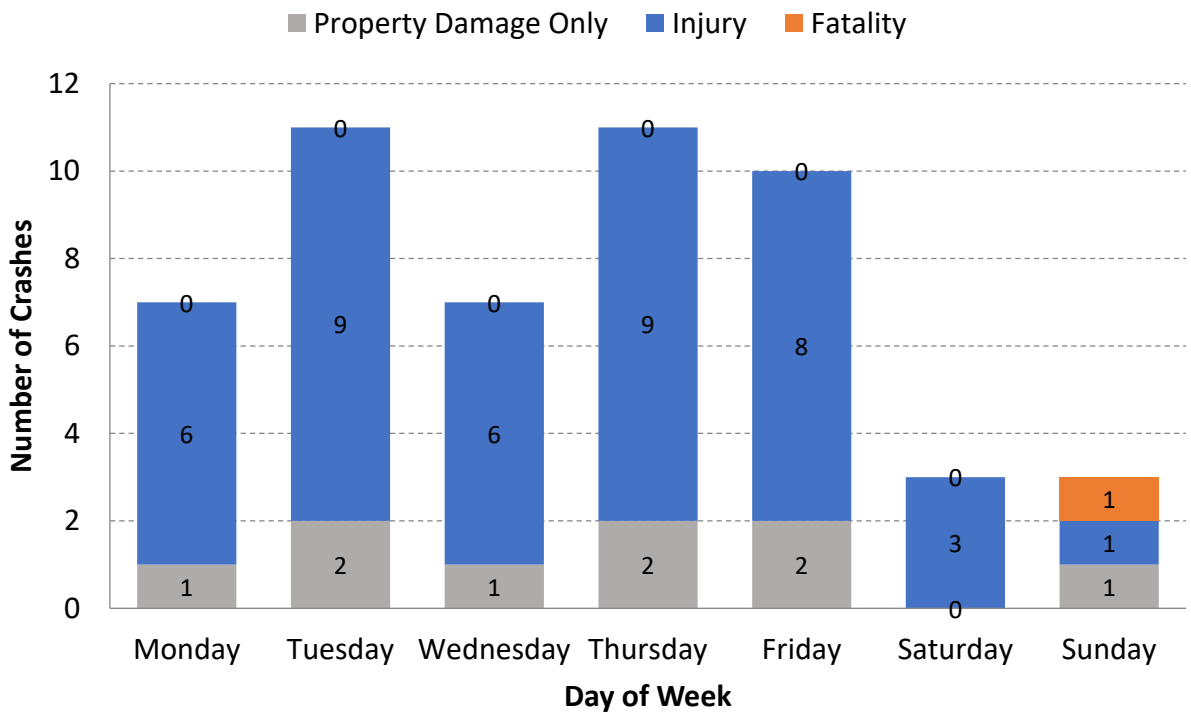


Figure 26: Non-School Aged Crashes by Day of Week and Severity

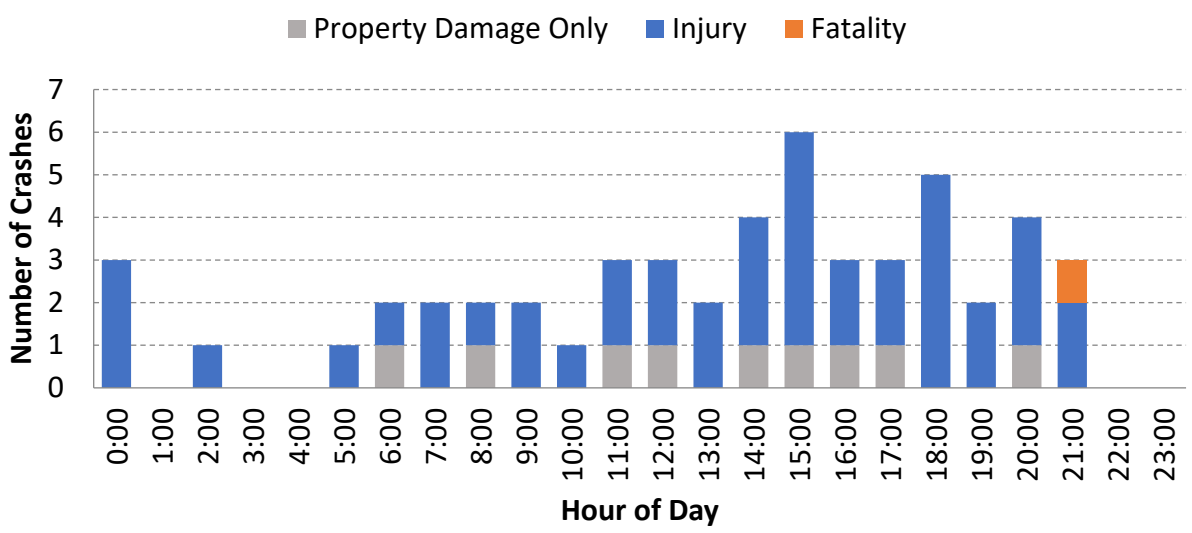


Figure 27: Non-School Aged Crashes by Hour of Day and Severity

Most crashes occurred in 2015 (13), 2016 (12), and 2018 (12). There was one fatality in 2015. December was the highest reported crash month with 11 total crashes. Eighty-nine percent of crashes occurred during the week with Tuesday and Thursday being the most common days (11). By time of day, the highest crash hour was from 3 PM to 4 PM (6). Alcohol and/or drug involvement accounted for eight percent of crashes.

Non School-Aged Fatal Crash Report Summaries

1. Crash Number: 86005548
    - On December 20, 2015 at 9:25 PM, a crash involving a pedestrian occurred at the intersection of Aurora Road and Harbor City Boulevard. The pedestrian was traveling eastbound along the southern crosswalk and was struck by a vehicle traveling northbound on Harbor City Boulevard. The crash resulted in a fatality. The crash occurred under dry conditions during the night.

Comparison between School Aged and Non-School Aged Pedestrian/Bicycle Crash Statistics

Figure 28, **Figure 29**, **Figure 30**, and **Figure 31** show a comparison of the number of school aged and non-school aged pedestrian and bicycle crashes by different measures (year, month, day, and hour).

There were more non-school aged crashes than school aged crashes from 2014 to 2018. Most school aged crashes occurred in October and December (five each month) while most non-school aged crashes occurred in December (11). Most school aged and non-school aged crashes occurred on a Tuesday. Most school aged and non-school aged crashes occurred from 3 PM to 4 PM.

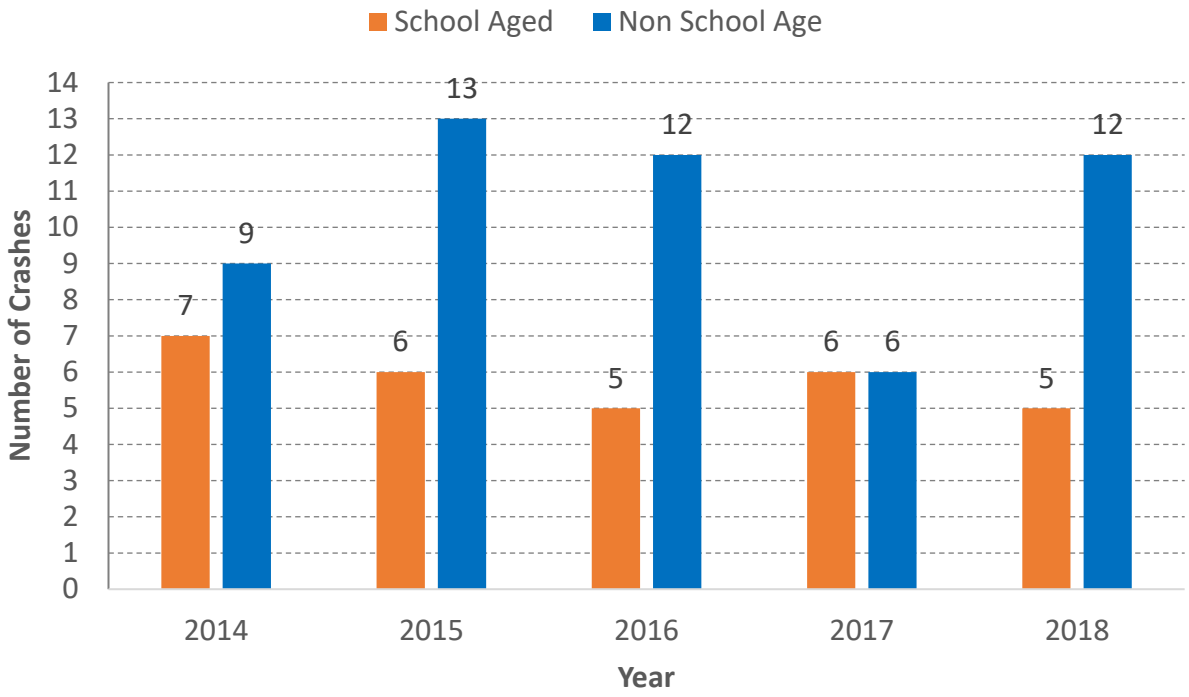


Figure 28: Comparison of School Aged and Non-School Aged Crashes by Year

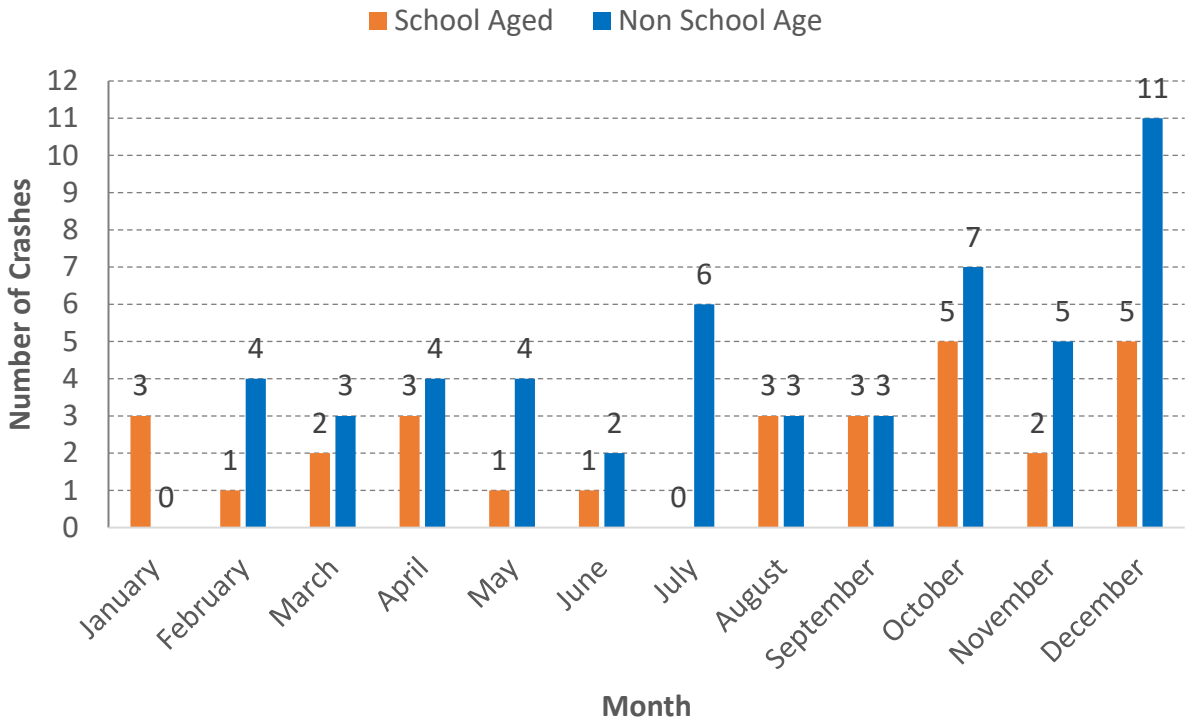


Figure 29: Comparison of School Aged and Non-School Aged Crashes by Month

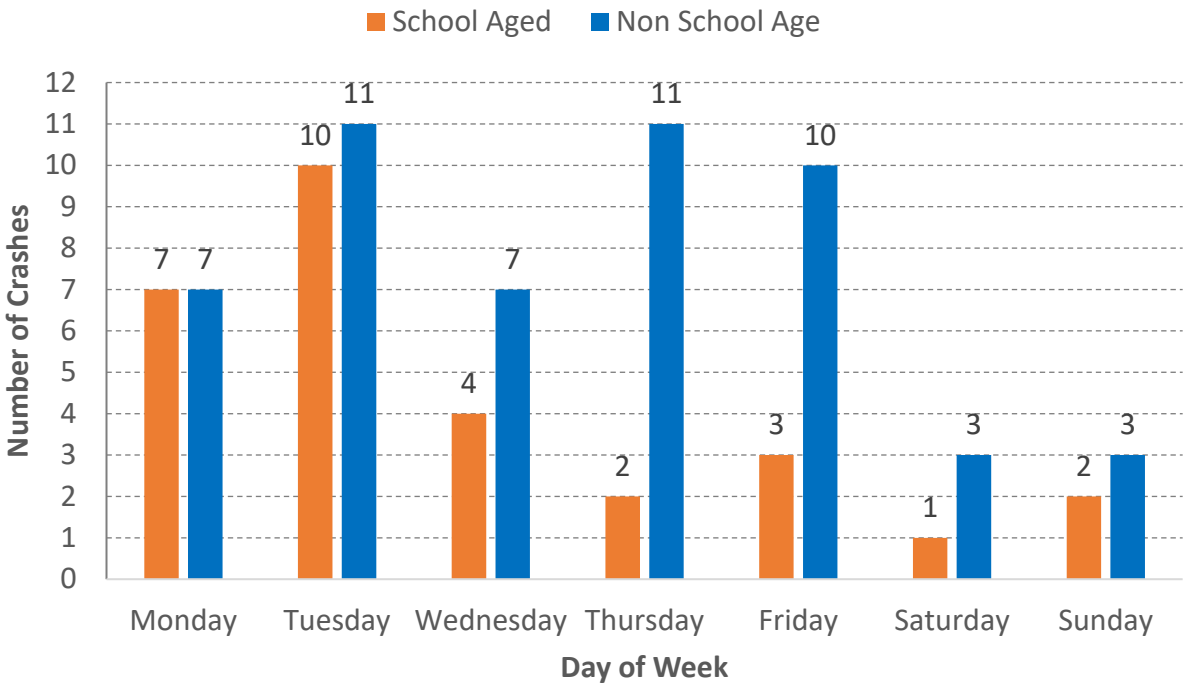


Figure 30: Comparison of School Aged and Non-School Aged Crashes by Day of Week

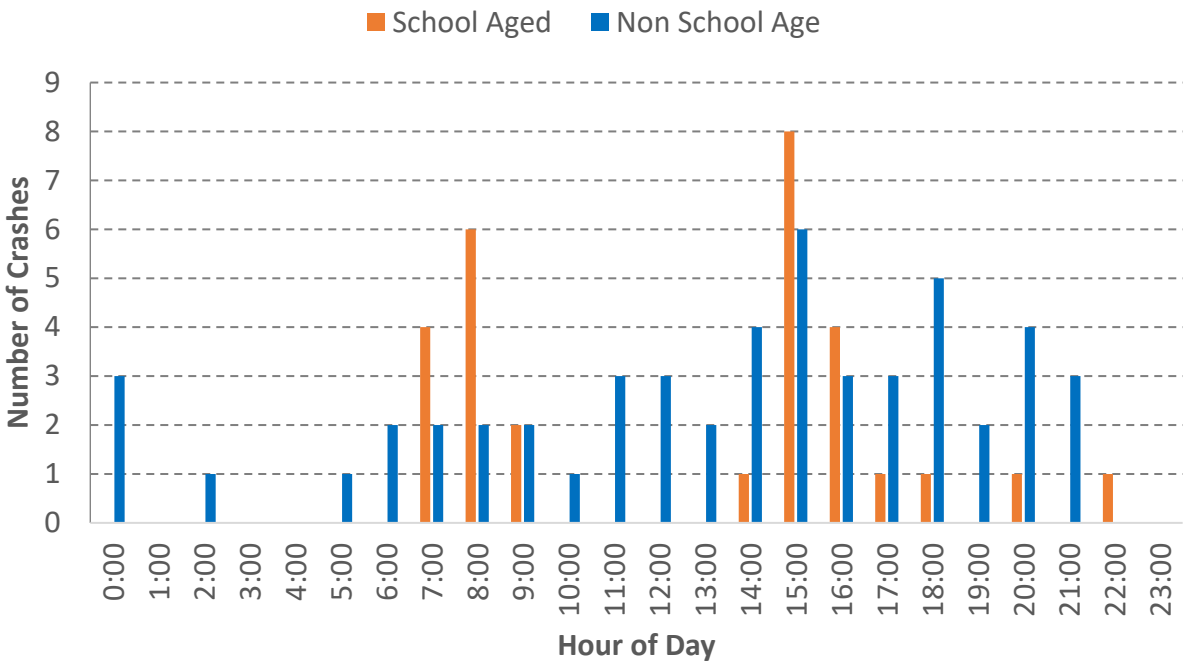


Figure 31: Comparison of School Aged and Non-School Aged Crashes by Hour of Day

School Coordination Meeting

A coordination meeting was held on November 6, 2019 to bring stakeholders together and discuss issues and opportunities related to students walking and biking to the school. Members from Brevard County Schools, City of Melbourne, Croton Elementary School, SCTPO, and KAI were present at this meeting. Notes from this meeting are summarized below.

General Notes

Sarah Kraum began the meeting with a short background about the project and initiated introductions. After brief introductions by the attendees, Adam Burghdoff began the discussion with an overview of the project and work conducted to date. He briefly introduced the meeting materials included in the attendee handout package. The materials shared with attendees includes the following documents:

- Summary Infographic that included:
    - Student travel mode split based on the Student Travel Survey
    - Pedestrian and bicycle crash summary
    - Information regarding signals and crossings with the study area
    - Summary of previous and ongoing plans within the study area
- Map showing existing and planned bicycle and pedestrian facilities
- Map showing existing conditions traffic data
- Map showing school-aged bicycle and pedestrian crashes (2014 - 2018)

The following section summarizes the discussions during and after the group discussion.

School Timings

- The school hours are as follows:
    - 8:00 AM to 2:30 PM - Monday through Thursday
    - 8:00 AM to 1:15 PM - Friday
- The peak period of students arriving is 7:15 AM to 8:00 AM. The gate for student drop-off is opened at 7:30 AM. The peak period of students departing is 2:30 PM to 3:00 PM.
- Parents begin to queue around 1:15 PM for afternoon pick-up. Students are dismissed at 2:30 PM.

School Entrances and Circulation

- The entrances to the school campus are on Croton Road including Learning Lane, which functions as a school driveway.
- A set of two driveways on Croton Road (one entrance and one egress) serves as the drop-off/pick-up point for buses and daycare vans. This same entrance driveway is also used to access a 57-space parking lot adjacent to the drop-off/pick-up loop.

- A set of four driveways along Learning Lane serves as the entrance and egress for parent drop-off/pick-up for students of all grade levels. The easternmost driveway is used as the entrance and also to access a 30-space parking lot along the drop-off/pick-up loop. The westernmost driveway is used as the egress for parents. The middle two driveways are not utilized during parent drop-off/pick-up times.
- Parents are prohibited from making a left turn onto Croton Road from Learning Lane from 7:20 to 8:00 AM and 2:15 to 2:45 PM.
- There are two separate circulation patterns for students walking or biking to/from the school.
    - Students walking or biking from the south side of the school enter along Learning Lane. There is a secure bicycle parking area located on the southwest corner of the school building for students to park their bicycles.
    - Students walking or biking from the north side enter along both driveways along Croton Road. Students using the northern driveway walk or bike along the bus drop-off/pick-up loop; bicyclists will park their bicycles at the secure bicycle parking area just north of the front office. Students using the southern driveway walk or bike along Learning Lane; bicyclists will park their bicycle at the secure bicycle parking area located at the southwest corner of the school building.

Main Walking and Biking Routes

- Students have to walk or bike along Croton Road and/or Learning Lane to enter the school.
- Most students come from the neighborhoods immediately surrounding the intersection of Eau Gallie Boulevard and Croton Road and cross this intersection traveling to school.
- There are three crossing guards present at the intersection of Eau Gallie Boulevard and Croton Road. There is one at the northwest corner, one at the northeast corner, and one at the southeast corner of the intersection.
- There is no marked crosswalk across Croton Road in front of the school, so students must walk south to the intersection of Eau Gallie Boulevard and Croton Road to walk or bike east across Croton Road. The installation of a midblock crossing closer to the school entrance was suggested.
- Jennifer Susin (Assistant Principal, Croton Elementary – Brevard County Schools) and Tracy Carbonell (Parent, Croton Elementary) noted that they have seen many students walking along Croton Road crossing Learning Lane come close to getting struck by a vehicle turning onto Learning Lane.
- Ms. Susin and Ms. Carbonell noted that there are some high school students who will walk or bike through school property and the businesses just south of Learning Lane on their way to school.

- There is a crosswalk across Learning Lane which has a flashing pedestrian warning light and a speed hump. There is also a teacher who helps guide pedestrians and bicyclists across this crosswalk during student drop-off/pick-up times.

Drop-Off/Pick Up

- The school is served by two school buses in the morning and three in the afternoon.
- If parents wish to drop-off their children before 7:30 AM, they must park in either parking lot and walk their children into the school. This can cause some parents to get blocked into their parking spot once parents start to line up for student drop-off closer to 7:30 AM.
- The parent drop-off/pick-up loop gets backed up during the afternoon pick-up period. In the afternoon, a queue forms along the northbound lane of Croton Road and spills out onto the outer westbound lane of Eau Gallie Boulevard. Vehicles will block the crosswalks. The field visit confirmed a queue on Croton Road, but vehicles did not extend to Eau Gallie Boulevard that afternoon. A queue also forms southbound on Croton Road turning left onto Learning Lane; the turn lane here does not have sufficient capacity and vehicles often block traffic.
- Ms. Susin and Ms. Carbonell both noted that some parents try to use the western bus only drop-off/pick-up loop to drop-off/pick-up their students. They also noted a safety concern for parents who do this driving quickly to avoid getting caught.
- Ms. Carbonell noted that some parents park along Mc Kinley Avenue and walk their students to and from school.
- Ms. Susin and Ms. Carbonell both noted that some parents park at the businesses located at the northeast and southeast corner of the intersection of Eau Gallie Boulevard and Croton Road to drop-off/pick-up their students.
- Ms. Susin and Ms. Carbonell both noted that parents used to park along Lime Drive to drop-off/pick-up students, but no parking/no standing signs were installed to prevent parents from doing this.
- There is no left turn lane along Croton Road for buses and staff to turn left into the western drop-off/pick-up loop.

Recent and Planned Projects

- FDOT completed a Multimodal Mobility and Safety Assessment along Eau Gallie Boulevard which recommended the placement of additional “SCHOOL” markings on the northbound lanes of the north approach to the intersection of Eau Gallie Boulevard and Croton Road and to revise school zone signs and pavement markings at the intersection to be consistent with guidance in the FDOT Speed Zoning Manual.

- FDOT completed an Intersection Improvement Study at the intersection of Eau Gallie Boulevard and Croton Road which recommended the addition of blank-out signs on each mast arm which read “No Turn On Red” and “Yield to Peds” and to tighten the curb radii at the corners of the intersection to reduce speeds while turning.
- A corridor study was completed along Aurora Road which included the following recommendations:
    - Reconstruct pedestrian ramps to make them ADA compliant
    - Restripe crosswalks
    - Add bicycle lanes in both directions
    - Eliminate one through lane in each direction and adding a TWLTL (Two-Way Left Turn Lane)
    - Widen sidewalk on the south side to six feet

Other Issues

- The school has a total of 519 students and is 60-years old.
- During rain events, each student has a “rainy day plan” for how they will get home which may differ from their normal routine. The County has implemented the 30/30 rule which means students may not be released from school for 30 minutes if thunder is heard within 30 seconds of a lightning strike. Parents receive a text when the school is under the 30/30 policy.
- At the intersection of Eau Gallie Boulevard and Croton Road:
    - There are many vehicles making a right turn on red at this intersection despite signage preventing this movement during school zone hours. There was a suggestion to install “No Turn on Red” signage on the signal to increase visibility.
    - The school zone is incomplete and only spans along Croton Road. There was a suggestion to expand the school zone to include Eau Gallie Boulevard, to add double beacons for added visibility, and to extend the length of the school zone timing to include high school students.
    - Ms. Susin and Ms. Carbonell noted that there are very high speeds at this intersection making it dangerous for students to cross.
- The parking on the school campus is not sufficient for school events. If there is a school event, Ms. Susin asks parents to park at River Run Church just north of the school campus on Croton Road and walk over. Some parents park along the eastern curb of the bus drop-off/pick-up loop. There was a suggestion to expand the western parking lot north and/or to expand the eastern parking lot east.
- Ms. Susin noted that during certain times of the year the sun blinds parents’ vision on Learning Lane. They cannot see the crosswalk which creates a safety concern for students crossing here.

- Ms. Susin noted a security concern for students walking or biking along Croton Road past the A&M Discount Beverage convenience store.
- During field review check for the following issues:
    - Any signs of children crossing along the rear fence;
    - Review Lime Drive for a potential connection to Learning Lane and/or western drop-off/pick-up loop;
    - The timing of the school zone at the intersection of Eau Gallie Boulevard and Croton Road; and
    - The visibility of vehicles traveling eastbound on Eau Gallie Boulevard.

Field Review

A field review was conducted on November 7, 2019 to review the existing conditions and to observe student drop-off activity from 7:00 AM to 8:15 AM and student pick-up activity from 1:00 PM to 3:00 PM. Members from Brevard County Schools, FDOT, SCTPO, and KAI were present at this field review. The field review also included interacting with the crossing guard and observing and documenting conditions within the school's study area. Notes from this field review are summarized below.

Crossing Guards

- There are three crossing guards present at the intersection of Eau Gallie Boulevard and Croton Road. One at the northeast corner, one at the northwest corner, and one at the southeast corner. They are employed by the City of Melbourne. Crossing guards are at this intersection until 8:15 AM in the morning and 3 PM in the afternoon. They noted that many vehicles make a right turn on red while students are crossing and suggest the addition of "No Turn on Red" signage during school zone hours on the signal for increased visibility. They also mentioned that many vehicles do not follow the school zone speed reduction through this intersection and suggested increased school zone signage.
- There is one crossing guard present at the intersection of Aurora Road and Croton Road on the northeast corner. They are employed by Brevard County. The crossing guard here mentioned that they intend to hire another crossing guard at this intersection at the southwest corner.
- There is a crossing guard at the intersection of Royal Poinciana Boulevard and Croton Road for students at Lyndon B. Johnson Middle School. Lyndon B. Johnson Middle School starts at 9:15 AM.

School Campus

- There is an iron fence on the north side of Learning Lane which blocks vehicle's sight distance when turning out of Learning Lane onto Croton Road. Vehicles cannot see pedestrians or bicyclists traveling southbound on Croton Road approaching the intersection.
- There were 16 bicycles, two scooters, and one skateboard parked at the bicycle rack located on the south side of the front office. It was noted that this bicycle rack is not in good shape and may need to be replaced. There were two bicycles parked at the bicycle rack located on the north side of the front office.
- Traffic signs on school property were observed to be faded and old.
- There are no access points along the fenced perimeter of the school property.
- There is a dry pond located north of the bus drop-off/pick-up loop.

- A teacher serves as a crossing guard along Learning Lane in the morning and afternoon to assist students in crossing where parents come to drop-off/pick-up their students.
- The City of Melbourne has placed “No Parking” signs along the south side of Learning Lane.
- There is a driveway along Learning Lane which connects to the businesses just south of Learning Lane.

Study Area

- The school zone beacon on the southbound side of Croton Road is not in line with the “End School Zone” sign on the northbound side of Croton Road.
- Multiple “Children Playing” signs were observed throughout the neighborhoods surrounding the school suggesting that speeding is an issue along these roadways.
- There is no marked crosswalk on the east leg of the intersection of Adams Avenue and Croton Road.
- The neighborhoods located north of Eau Gallie Boulevard, west of Croton Road, and south of Aurora Road have very narrow roadways and properties with steep slopes. They are likely not suited for the addition of sidewalks.
- Most of the sidewalks found in the neighborhoods surrounding the school are very narrow and are not well maintained.
- Eau Gallie High School starts at 8:30 AM which creates an overlap in students walking and biking to both the schools in this area. High school students were observed during the morning drop-off period.
- Most intersections and pedestrian ramps in the study area are not ADA compliant.
- Heavy bicycle traffic was observed along Croton Road.

Morning Observations

- Two buses dropped students off at the western drop-off/pick-up loop at 7:30 AM. Two day care vans dropped students of at the western drop-off/pick-up loop, one at 7:36 AM and another at 7:48 AM.
- Three bicyclists and five to eight pedestrians were observed traveling southbound along the east sidewalk on Croton Road.
- Eight to ten students were observed walking southbound along the west sidewalk on Croton Road from Leewood Boulevard, all of which went to the intersection of Eau Gallie Boulevard and Croton Road to cross Croton Road.
- Two to four students were observed walking southbound along the west sidewalk on Croton Road from Shelby Drive, all of which went to the intersection of Eau Gallie Boulevard and Croton Road to cross Croton Road.

- Two students and one adult were observed crossing Croton Road between Shelby Drive and Lucille Lane at 7:55 AM. The adult was observed crossing back across Croton Road at the same location at 8:00 AM.
- Multiple parents were observed parking in front of the school to walk their children into the school before 7:30 AM. Some parents were blocked by other parked vehicles.
- Two vehicles traveling northbound on Croton Road were observed making a U-turn at the intersection of Croton Road and Shelby Drive.
- Ten vehicles traveling northbound on Croton Road were observed making a U-turn at the intersection of Croton Road and Lucille Lane.
- Thirty-nine cars were observed traveling southbound along Croton Road turning left onto Learning Lane.
- Before 7:30 AM, students were observed waiting behind the businesses located on the south side of Learning Lane for the school to open. Many students were observed to walk into Learning Lane and some bicycles were left in the roadway.
- Vehicles were observed to block the crosswalks at the intersection of Eau Gallie Boulevard and Croton Road and Learning Lane and Croton Road.
- The following points summarize the discussion with the crossing guard at the northwest corner of Eau Gallie Boulevard and Croton Road:
    - Fifteen to twenty students cross the west leg of Eau Gallie Boulevard in the morning.
    - She stated that this is a dangerous intersection and she is almost hit daily. She observes afternoons to be more dangerous for students than mornings.
    - Vehicles often stop in the middle of the crosswalk and crossing guards struggle to get students across in an appropriate amount of time.
- The following points summarize the discussion with the teacher serving as a crossing guard on Learning Lane:
    - The largest concentration of students that cross Learning Lane are students who wait on the south side of Learning Lane and cross when the school opens at 7:30 AM.
    - The teacher observes that the peak time for students to cross Learning Lane is 7:45 AM.
    - The teacher noted that sometimes throughout the morning, traffic will back up on Learning Lane, onto Croton Road to Eau Gallie Boulevard.
    - The blinking signs and speed hump located on Learning Lane do not appear to encourage vehicles to stop at the crosswalk.
- The following points summarize the discussion with the crossing guard at the northeast corner of Aurora Road and Croton Road.

- The crossing guard is positioned so that vehicles do not make a right turn on red while students are crossing.
- She noted that many vehicles making a right turn on red do not stop.

Afternoon Observations

- The first vehicle arrived at 1:37 PM along Learning Lane for student pick-up.
- At 1:58 PM vehicles along Learning Lane waiting for student pick-up began to back up to Croton Road.
- At 2:10 PM vehicles along Learning Lane waiting for student pick-up began to back up northbound along Croton Road to the intersection of Eau Gallie Boulevard and southbound along Croton Road.
- At 2:15 the gate was opened, and vehicles were able to drive from Learning Lane into the student drop-off/pick-up loop. This caused the queue that had formed along Croton Road to clear. The queue began to form again on Croton Drive at 2:24 PM until students were released at 2:30 PM.
- Vehicles were observed traveling against oncoming traffic to turn left onto Learning Lane from Croton Road.
- The parent pick-up loop cleared, and the gate was locked at 2:50 PM.
- Three buses and three day care vans were observed entering the bus drop-off/pick-up loop.
- Seventy-three pedestrians and 12 bicyclists were observed departing from school along Learning Lane.
- Four students (with an adult) and two to three adults were observed walking westbound across Croton Road at the intersection of Croton Road and Shelby Drive.
- Two to three students (with an adult) were observed walking westbound across Croton Road at the intersection of Croton Road and Lucille Lane.
- Five vehicles traveling northbound on Croton Road were observed making a U-turn at the intersection of Croton Road and Lucille Lane.
- Two vehicles traveling northbound on Croton Road were observed making a U-turn at the intersection of Croton Road and Shelby Drive.
- Vehicles traveling northbound on Croton Road were observed to be speeding past the school.
- Vehicles traveling along Learning Lane turning onto Croton Road were observed to not stop before turning. This creates issues for bicyclists and pedestrians crossing across Learning Lane.
- The school zone signage does not consider early release on Friday.
- The teacher who assists students to cross along Learning Lane leaves at 2:45 PM.

Opportunities

- Add a crossing guard at the southwest corner of the intersection of Eau Gallie Boulevard and Croton Road to have crossing guards on each of the four corners.
- Add “No Turn on Red” signage on the signal at the intersection of Eau Gallie Boulevard and Croton Road to remind drivers of this prohibited movement during school zone hours.
- Consider moving the iron fence back on the north side of Learning Lane at the intersection of Learning Lane and Croton Road to increase vehicle visibility for bicyclists and pedestrians crossing Learning Lane along Croton Road. This could also create space for students to congregate before the school opens.
- Remove the dead tree along the east sidewalk on Croton Road at the north end of the school property.
- Add sidewalk along the north side of Learning Lane to decrease the need to cross Learning Lane.
- Update school zone timing to include the early release schedule on Friday.
- Consider replacing the bicycle rack on the south side of the front office.
- Consider replacing old signage located on the school property.
- Consider connecting Learning Lane and Lime Drive to create more room for vehicles to queue for student pick-up.
- Consider opening the gate to the school at 2:00 PM instead of 2:15 PM to prevent vehicles from queueing onto Croton Road.


Croton
Chiropractic

Implementation

This section of the report will build on the analysis and observations documented in the Assessment Section to make recommendations. The purpose of this section is to list and describe the issues and recommendations identified for the Croton Elementary School study area. Planning level cost estimates, implementation time-frames, and responsible agencies were also listed for the recommendations.

List & Maps of Recommendations

A list of issues and recommendations was developed based on the input received at the school coordination meeting and field review observations. Planning level cost estimates, implementation time-frame and responsible agency were identified for the recommendations.

Recommendations on the school campus are listed in **Table 2**. Recommendations in the larger study area are listed in **Table 3**. Maps showing the locations of these recommendations are shown in **Figure 32**, **Figure 33**, and **Figure 34**.

Table 2: School Campus Recommendations

No.	Location	Recommendation	Type	Time-Frame	Cost Estimate
1	Western Parking Lot	Expand the western parking lot north to the edge of the dry pond.	School Circulation	Long-Term	Further Study Required
2	Eastern Parking Lot	Expand the eastern parking lot to the north and east.	School Circulation	Long-Term	Further Study Required
3	Southwest Corner of the Campus Along Learning Lane	Remove black fencing from Learning Lane and Southern Croton Driveway intersection sight triangles.	School Circulation	Near-Term	<$10,000
4	South Side of the School Front Office	Replace bicycle parking rack.	School Circulation	Maintenance	<$10,000
5	School Property	Replace old signage.	Sign/Signal	Maintenance	<$10,000

Table 3: Study Area Recommendations

No.	Location	Recommendation	Type	Time-Frame	Cost Estimate
6	Eau Gallie Boulevard and Croton Road Intersection	Conduct a feasibility study to add a westbound right turn lane at the Eau Gallie Boulevard/Croton Road intersection.	Roadway	Long-Term	Further Study Required
7	Eau Gallie Boulevard and Croton Road Intersection	Implement FDOT Eau Gallie Boulevard and Croton Road Intersection Improvement Plan - Install "No Turn on Red" blank out signage active during school zone hours. Remove current "No Turn on Red" signage.	Previous Study (Intersection)	Near-Term	$25,000 to $30,000
8	Eau Gallie Boulevard	Implement FDOT Eau Gallie Boulevard Multimodal Mobility and Safety Assessment recommendation - Adjust school zone to include the entire intersection. Update timing to include early day on Friday. Update signage and pavement markings to be consistent with the FDOT Speed Zoning Manual.	Previous Study (Corridor)	Near-Term	Further Study Required

No.	Location	Recommendation	Type	Time-Frame	Cost Estimate
9	Eau Gallie Boulevard and Croton Road Intersection	Add a crossing guard at the southwest corner of intersection to maintain one crossing guard for each leg of the intersection.	Crossing	Near-Term	Coordinate staffing
10	Croton Road Just North of Eau Gallie Boulevard	Adjust school zone signs and pavement markings to be consistent with the FDOT Speed Zoning Manual. Adjust timing to include early release schedule on Friday.	Sign/Signal	Near-Term	Further Study Required
11	Croton Road Just North of Shelby Drive	Construct a midblock crossing with RRFB, a median refuge, and appropriate signage. Add a crossing guard at this intersection.	Crossing	Near-Term	$750,000 to $870,000 for Midblock Crossing; Coordinate staffing for Crossing Guard
12	Croton Road by Northwest Corner of the School Property	Remove the dead tree.	Maintenance	Maintenance	<$10,000
13	Signalized Intersections within the Study Area	Upgrade/install ADA compliant pedestrian ramps.	Crossing	Near-Term	$55,000 to $65,000
14	Croton Road	Maintain existing landscape to avoid sidewalks being blocked by completely overgrown weeds.	Maintenance	Maintenance	Routine Maintenance

No.	Location	Recommendation	Type	Time-Frame	Cost Estimate
15	Croton Road	Widen sidewalk on one side to make it a 10 to 12 foot-wide shared use path to accommodate bi-directional bicycle traffic.	Sidewalk	Long-Term	$1,100,000 to $1,300,000
16	Eau Gallie Boulevard and Croton Road Intersection; Croton Road and Aurora Road Intersection	Change signal timing to include a Leading Pedestrian Interval (LPI) during school zone times to reduce the number of vehicles turning right while students are crossing.	Sign/Signal	Near-Term	Labor Cost for Signal Technician
17	Aurora Road	Implement recommendations from Aurora Road Corridor Study - 6 foot wide sidewalk on southern side; high visibility crosswalks and ADA improvements at intersections.	Previous Study (Corridor)	Long-Term	$29,690,000

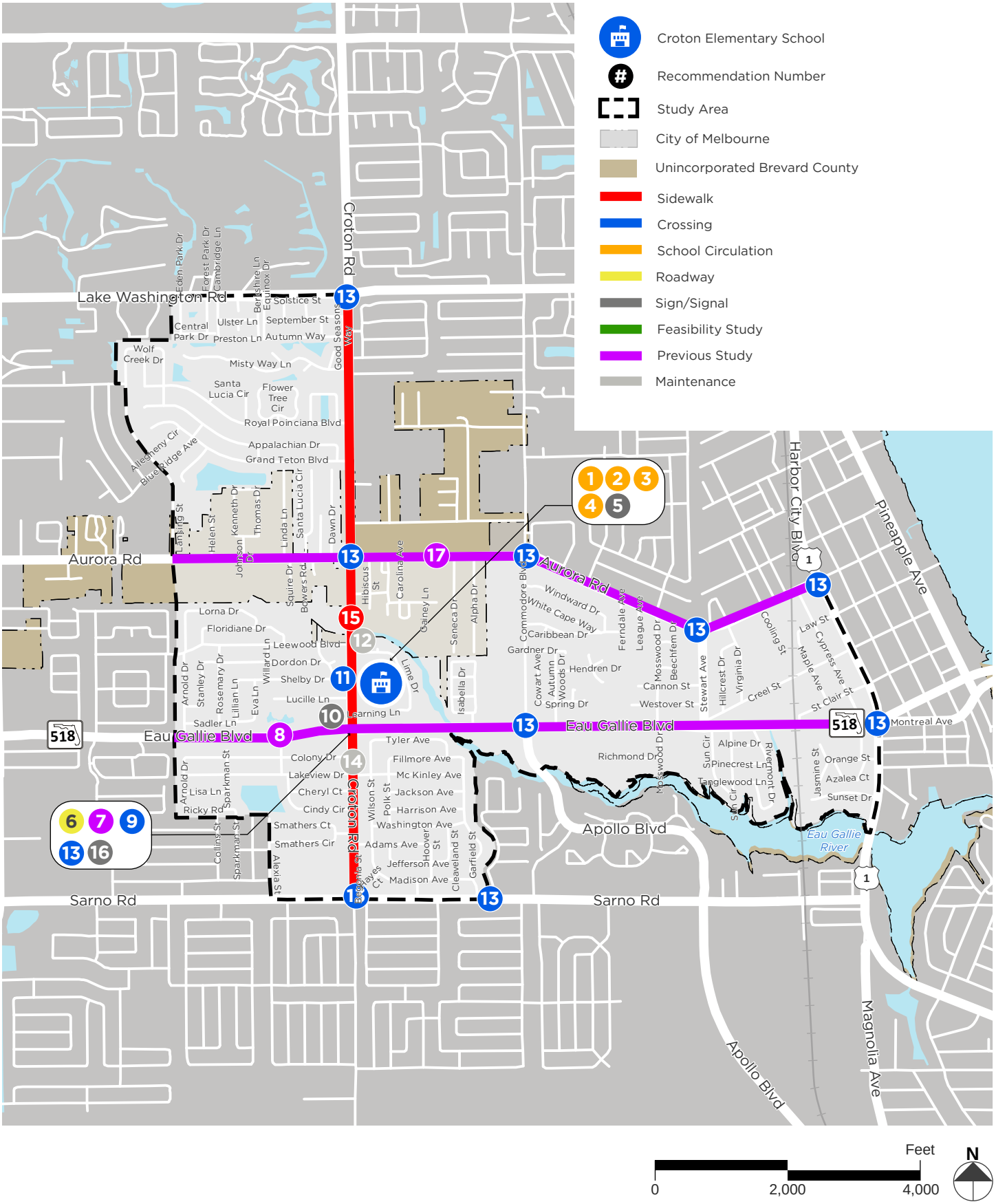


Figure 32: Recommendations

School Routes Analysis

Croton Elementary School

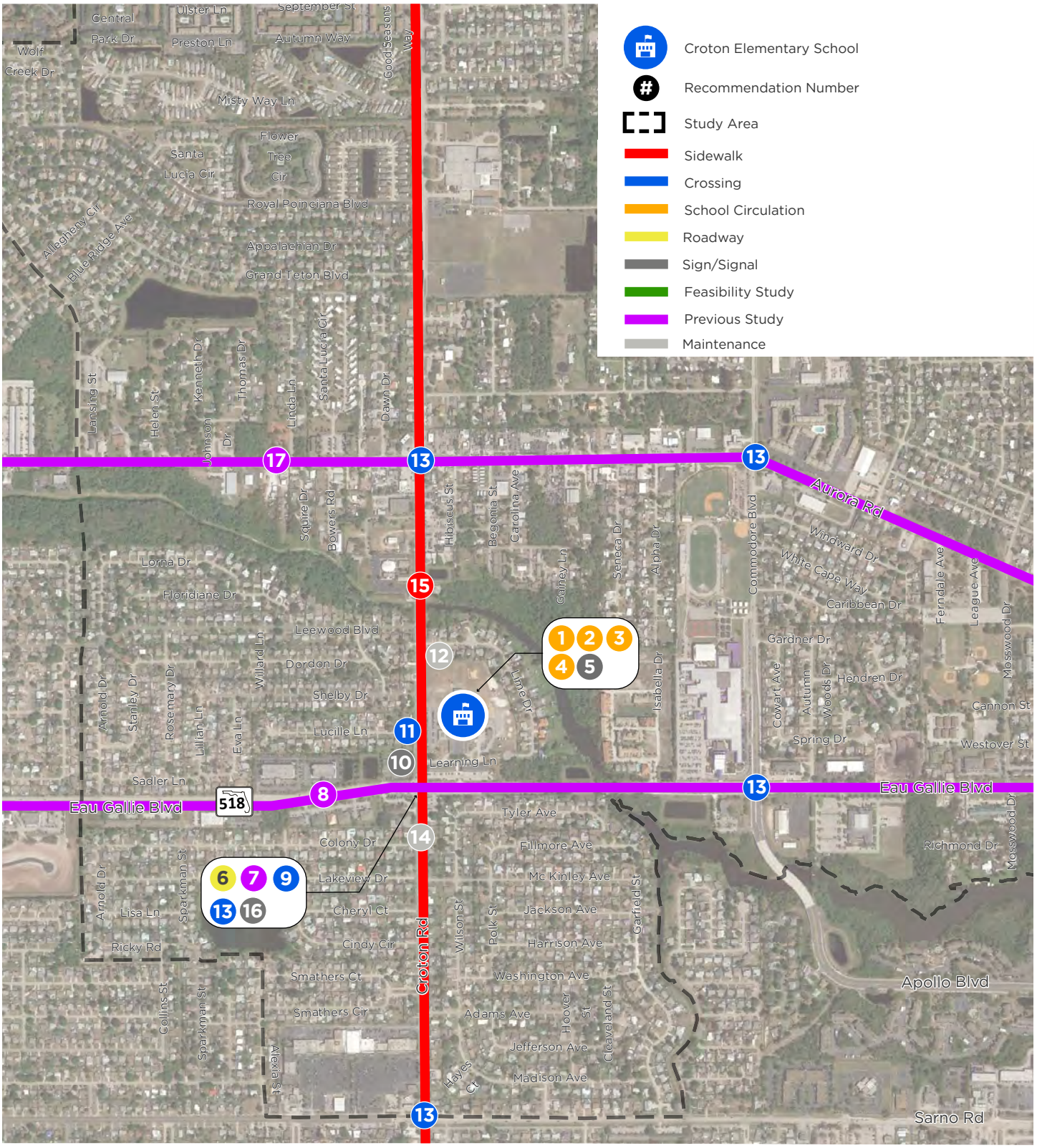


Figure 33: Recommendations: School Context Aerial Map

School Routes Analysis

Croton Elementary School

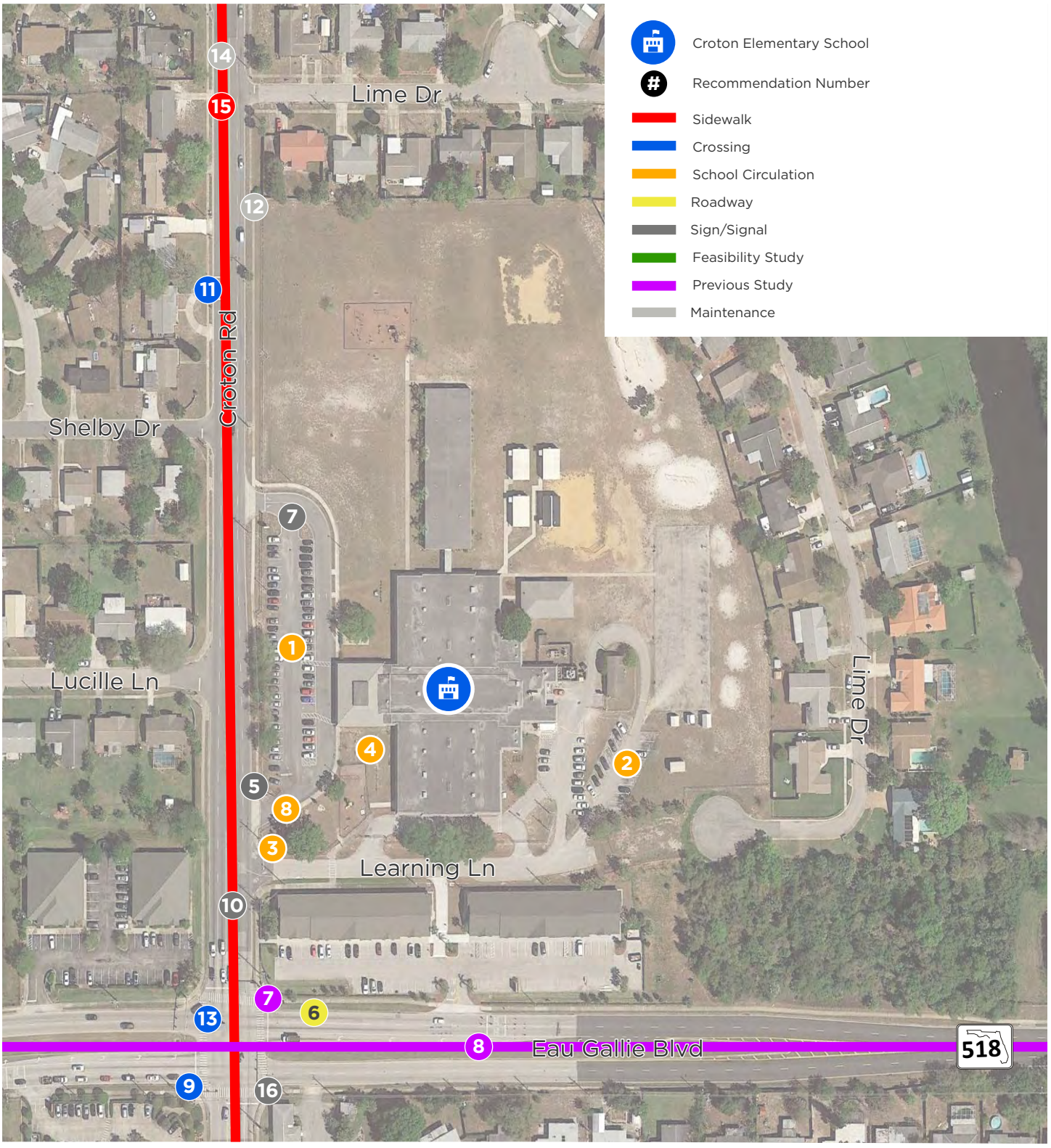


Figure 34: Recommendations: School Campus Aerial Map

School Routes Analysis

Croton Elementary School

Detailed Recommendations

This section lists details for each recommendation including its location, type, issue, recommendation, implementation time-frame, estimated project cost, if right-of-way is needed, if there is anticipated drainage or utility impact, and the responsible agency. The implementation time-frame is listed as "Maintenance", "Near-Term", or "Long-Term" and describes the amount of time it will take for a project to be complete. The responsible agency is the public agency that will be responsible for the implementation of the recommendation.

Methodology to Calculate Cost Estimates

Cost estimates were calculated for the recommended projects in this section, unless otherwise noted. Cost estimates were not prepared for projects where more information was needed, or further follow up study should be undertaken. The bullets below describe the assumptions made for the cost estimating of the recommended projects:

- Pay items and pay item unit costs were obtained from the FDOT Historical Cost website: *https://www.fdot.gov/programmanagement/estimates/historicalcostinformation/historicalcost.shtm*
    - The most current 12 month (12/01/18 – 11/30/19) moving Statewide and Area 8 (which includes Brevard County) pay item average unit costs were utilized
- Maintenance of traffic was assumed to be 10 percent to 15 percent of the construction cost, depending on the level of impact the recommendation has on adjacent roadway traffic. Maintenance of traffic was assumed to be 0 percent for recommendations on the school campus.
- The mobilization of construction equipment to the work site was assumed to be 15 percent of the construction + maintenance of traffic cost.
- Concepts were not prepared for these recommendations so there is a high degree of unknowns that may affect the project cost once it is designed. To account for these unknowns, a 20 percent and 40 percent "contingency/unknowns" cost was calculated for each project to provide a cost estimate "range" for each project. These contingency/unknown calculations were based on the construction + maintenance of traffic + mobilization cost.
- Design and construction engineering inspection (CEI) were assumed to be 15 percent each. These costs were calculated based on the construction + maintenance of traffic + mobilization + contingency/unknowns (20%) cost and the construction + maintenance of traffic + mobilization + contingency/unknowns (40%) cost.
- The total lower range cost estimate for each recommendation was calculated as construction + maintenance of traffic + mobilization + contingency/unknowns (20%) + design (based on 20% contingency/unknowns) + CEI (based on 20%

contingency/unknowns). The total upper range cost estimate for each recommendation was calculated as construction + maintenance of traffic + mobilization + contingency/unknowns (40%) + design (based on 40% contingency/unknowns) + CEI (based on 40% contingency/unknowns).

- The final lower and upper range were rounded up to the nearest $5K or $10K to provide a conservative estimate of the total project cost.

Figure 35 below shows an example of the cost estimate process described above.

Item No.	Description	Unit	Total Quantity	Weighted Average Unit Price	Total Amount
Roadway Items					
110-1-1	CLEARING & GRUBBING	AC	0.27	$9,219.13	$2,516.82
522-1	SIDEWALK CONCRETE, 4" THICK	SY	570.00	$44.53	$25,382.10
Subtotal					$27,898.92
102-1	MAINTENANCE OF TRAFFIC	LS	15%		$4,184.84
Subtotal					$32,083.76
101-1	MOBILIZATION	LS	15%		$4,812.56
Subtotal					$36,896.32
	CONTINGENCY	LS	20%		$7,379.26
	CONTINGENCY	LS	40%		$14,758.53
Total Construction Cost (20%)					$44,275.58
Total Construction Cost (40%)					$51,654.85
	DESIGN (20%)	LS	15%		$6,641.00
	DESIGN (40%)	LS	15%		$7,748.00
	C.E.I (20%)	LS	15%		$6,641.00
	C.E.I (40%)	LS	15%		$7,748.00
Total Cost (20%)					$57,557.58
Total Cost (40%)					$67,150.85
Total Cost (20%) - Rounded					$60,000.00
Total Cost (40%) - Rounded					$70,000.00

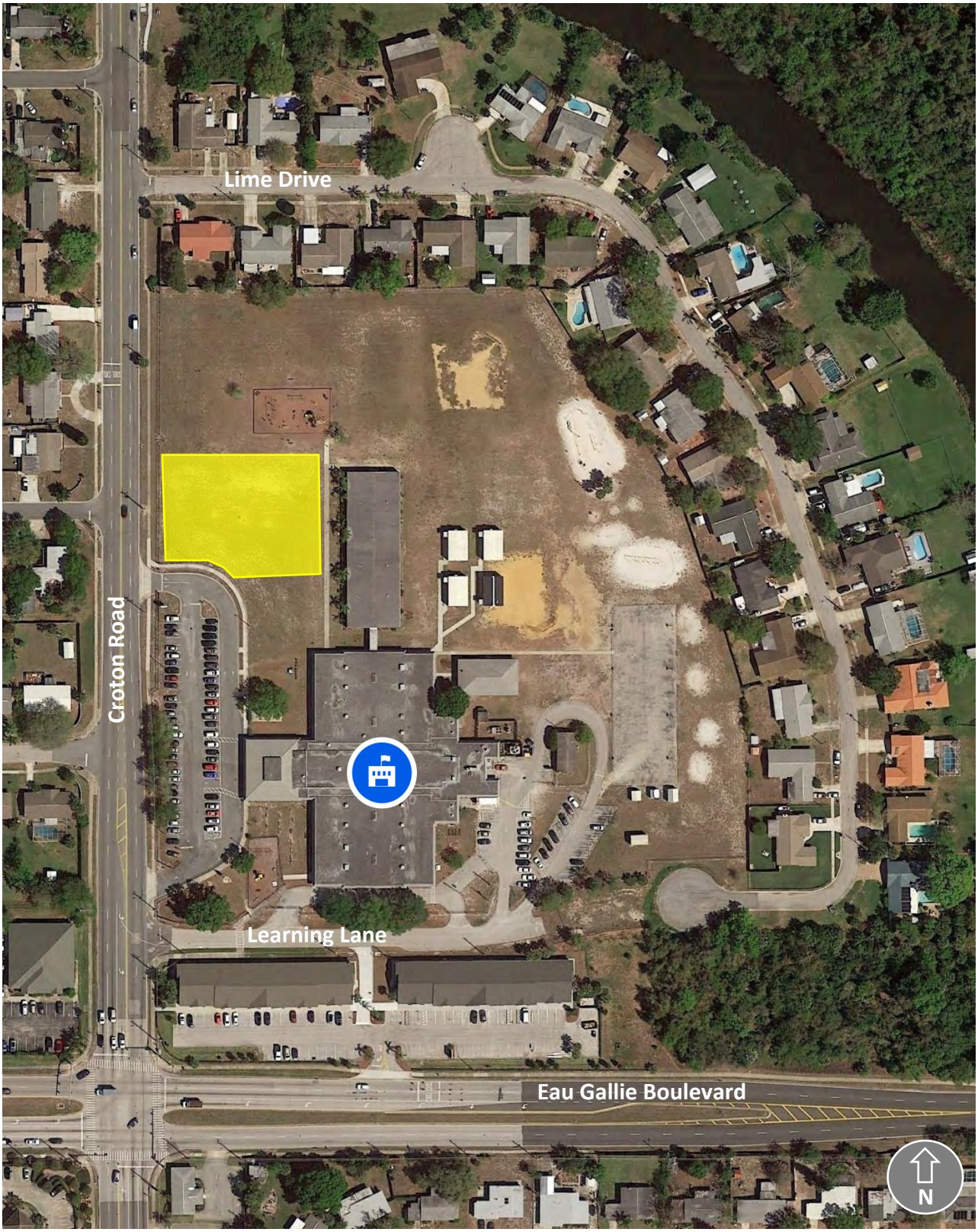
Figure 35: Example Cost Estimate Process

Project 1: Expand western parking lot

Location	Western Parking Lot
Type	School Circulation
Issue	There is not enough parking on the school campus for faculty and parents.
Recommendation	Expand the western parking lot north to the edge of the dry pond.

Current Field North of Western Parking Lot

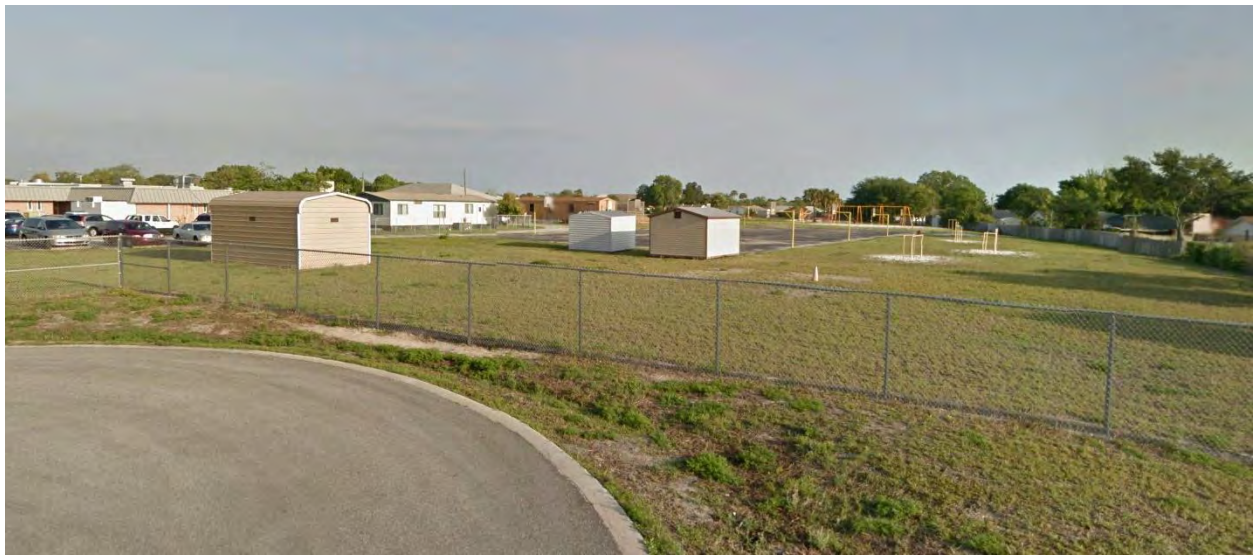
	Implementation Time-Frame	Long-Term
	Estimated Project Cost	Further Study Is Required
	Right-of Way Needed?	No
	Drainage or Utility Impact?	Unknown
	Responsible Agency	Brevard County Public Schools



Expand Western Parking Lot North

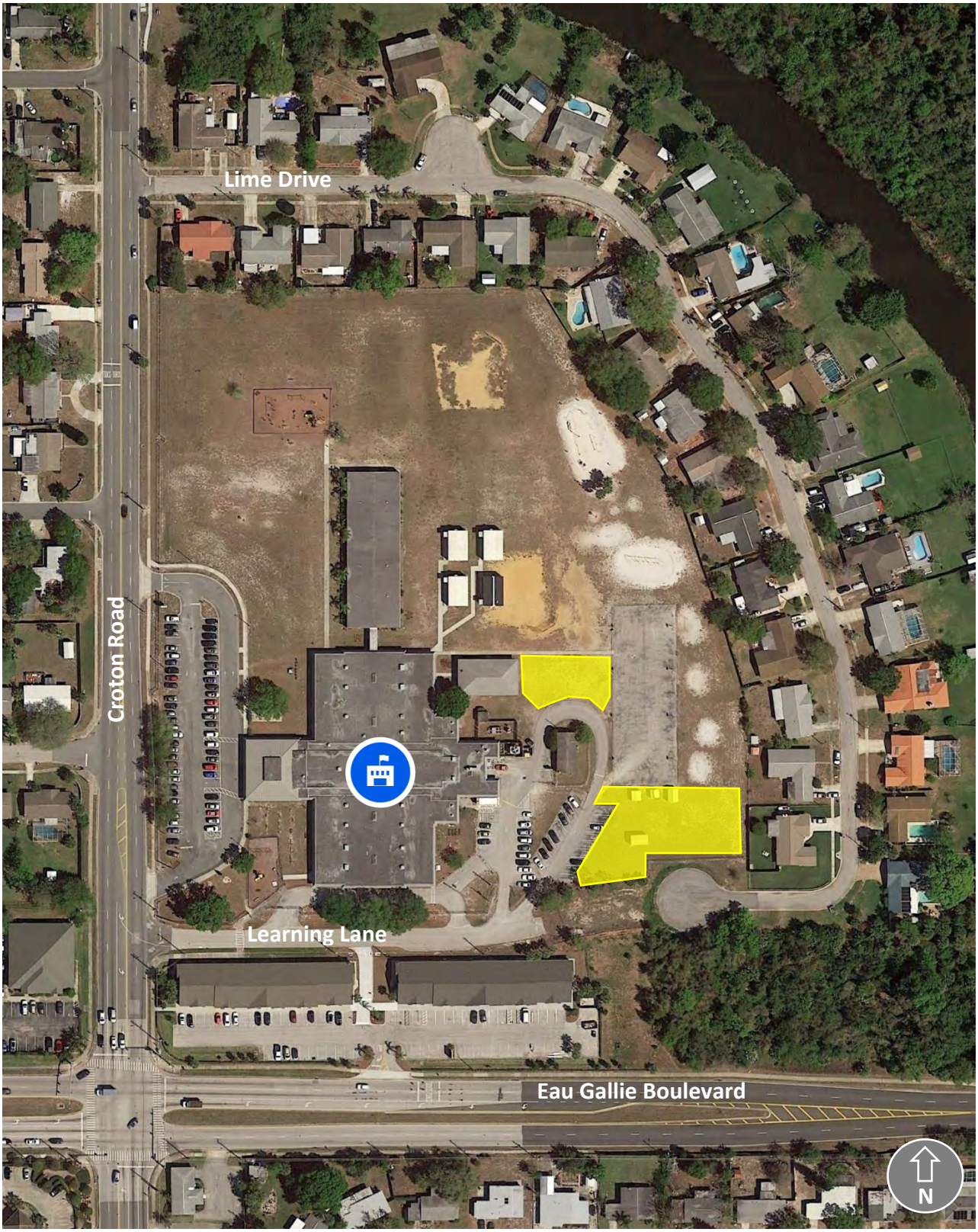
Project 2: Expand eastern parking lot

Location	Eastern Parking Lot
Type	School Circulation
Issue	There is not enough parking on the school campus for faculty and parents.
Recommendation	Expand the eastern parking lot to the north and east.



Existing Field North and East of Eastern Parking Lot

	Implementation Time-Frame	Long-Term
	Estimated Project Cost	Further Study Is Required
	Right-of Way Needed?	No
	Drainage or Utility Impact?	Unknown
	Responsible Agency	Brevard County Public Schools



Expand Eastern Parking Lot North and East

Project 3: Remove black fencing from Learning Lane and Croton Road intersection

Location	**Southwest Corner of the Campus along Learning Lane**
Type	**School Circulation**
Issue	Drivers traveling along Learning Lane turning right onto Croton Road cannot see pedestrians and bicyclists traveling south along Croton Road due to black fencing along the southwest corner of campus along Learning Lane.
Recommendation	Remove black fencing from Learning Lane and Southern Croton Driveway intersection sight triangles.

Black Fencing at Northeast Corner of Learning Lane and Croton Road

	Implementation Time-Frame	**Near-Term**
	Estimated Project Cost	**Less than $10,000**
	Right-of Way Needed?	**No**
	Drainage or Utility Impact?	**No**
	Responsible Agency	**Brevard County Public Schools**

Project 4: Replace bicycle parking rack

Location	South Side of the School Front Office
Type	School Circulation
Issue	The bicycle rack located on the south side of the school front office is old and needs to be replaced.
Recommendation	Replace bicycle parking rack.

Bicycle Rack South of School Front Office

	Implementation Time-Frame	Maintenance
	Estimated Project Cost	Less than $10,000
	Right-of Way Needed?	No
	Drainage or Utility Impact?	No
	Responsible Agency	Brevard County Public Schools

Project 5: Replace old signage

Location	School Property
Type	Sign/Signal
Issue	Signage on the school campus is old, faded, and hard to read.
Recommendation	Replace old signage.

Signage on the School Campus

	Implementation Time-Frame	Maintenance
	Estimated Project Cost	Less than $10,000
	Right-of Way Needed?	No
	Drainage or Utility Impact?	No
	Responsible Agency	Brevard County Public Schools

Project 6: Conduct a feasibility study to add a westbound right turn lane at the intersection of Eau Gallie Boulevard and Croton Road

Location	Eau Gallie Boulevard and Croton Road Intersection
Type	Roadway
Issue	Vehicle stacking occurs along the east leg of the intersection of Eau Gallie Boulevard and Croton Road by vehicles turning right onto Croton Road.
Recommendation	Conduct a feasibility study to add a westbound right turn lane at the Eau Gallie Boulevard/Croton Road intersection.

Add Westbound Right Turn Lane

	Implementation Time-Frame	Long-Term
	Estimated Project Cost	Further Study Is Required
	Right-of Way Needed?	Yes
	Drainage or Utility Impact?	Yes
	Responsible Agency	FDOT

Project 7: Implement FDOT Eau Gallie Boulevard and Croton Road Intersection Improvement Plan

Location	**Eau Gallie Boulevard and Croton Road Intersection**
Type	**Previous Study (Intersection)**
Issue	Vehicles fail to yield to pedestrians crossing when making a right turn at the intersection of Eau Gallie Boulevard and Croton Road.
Recommendation	Implement FDOT Eau Gallie Boulevard and Croton Road Intersection Improvement Plan - Install "No Turn on Red" blank out signage active during school zone hours. Remove current "No Turn on Red" signage.

Current 'No Turn On Red' Sign

Recommended Blank Out "No Turn On Red" Sign

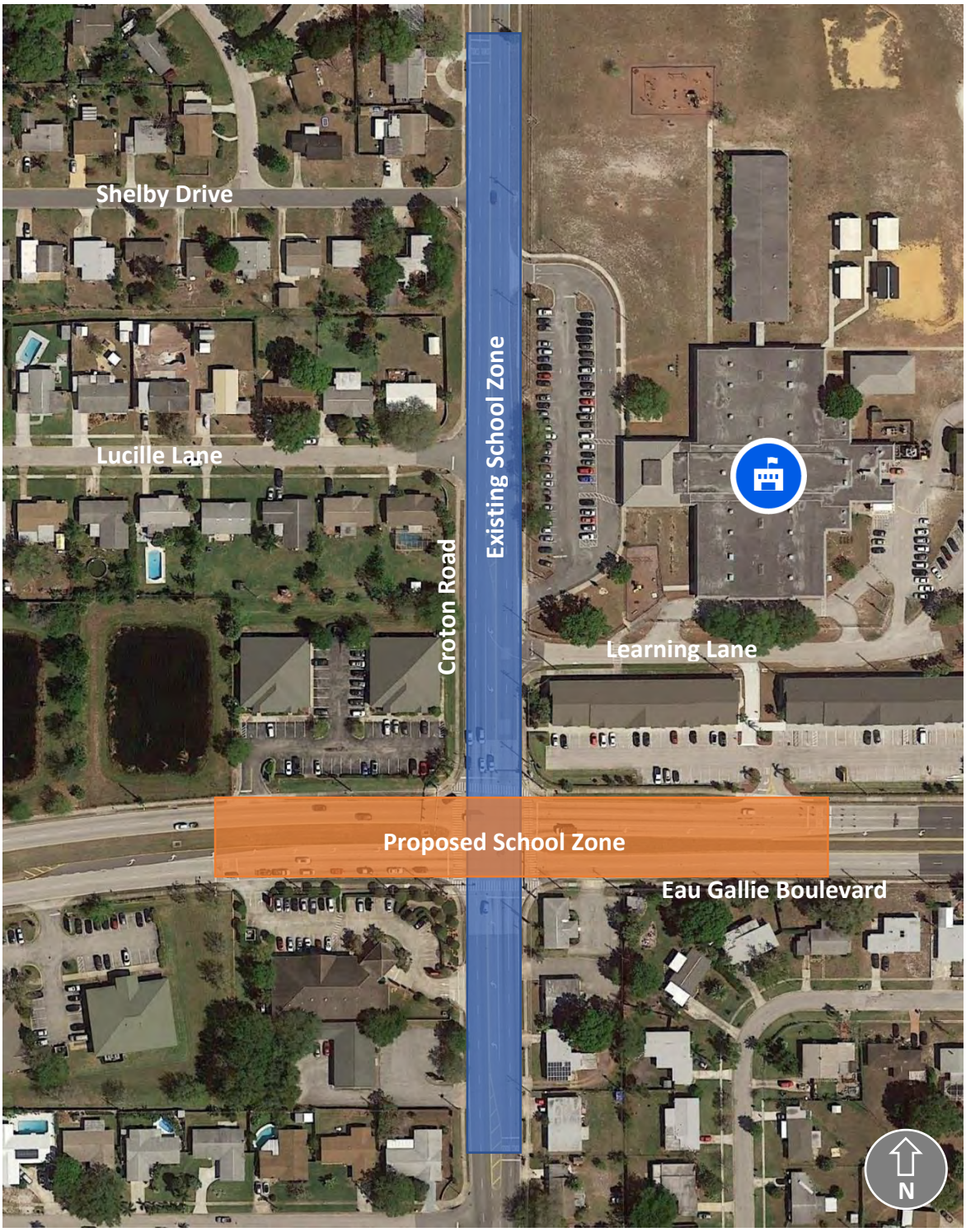
	Implementation Time-Frame	**Near-Term**
	Estimated Project Cost	**$25,000 to $30,000**
	Right-of Way Needed?	**No**
	Drainage or Utility Impact?	**No**
	Responsible Agency	**FDOT**

Project 8: Implement FDOT Eau Gallie Boulevard Multimodal Mobility and Safety Assessment recommendations

Location	**Eau Gallie Boulevard**
Type	**Previous Study (Corridor)**
Issue	School zone signage is not consistent with guidance in the FDOT Speed Zoning Manual. The intersection of Eau Gallie Boulevard and Croton Road only has a school zone along Croton Road.
Recommendation	Implement FDOT Eau Gallie Boulevard Multimodal Mobility and Safety Assessment recommendation - Adjust school zone to include the entire intersection. Update timing to include early release day on Friday. Update signage and pavement markings to be consistent with the FDOT Speed Zoning Manual.

Exisitng School Zone Signage on Croton Road

	Implementation Time-Frame	**Near-Term**
	Estimated Project Cost	**Further Study Required**
	Right-of Way Needed?	**No**
	Drainage or Utility Impact?	**No**
	Responsible Agency	**FDOT**

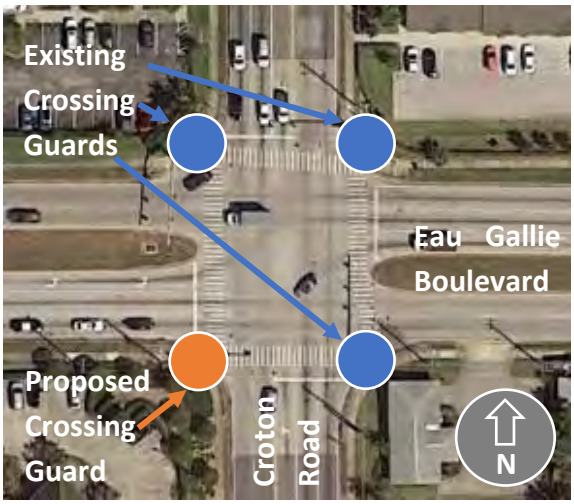


Proposed School Zone

Project 9: Add crossing guard at intersection of Eau Gallie Boulevard and Croton Road

Location	Eau Gallie Boulevard and Croton Road Intersection
Type	Crossing
Issue	Students crossing the intersection of Eau Gallie Boulevard and Croton Road do not have a crossing guard in the southwest corner of the intersection.
Recommendation	Add a crossing guard at the southwest corner of intersection to maintain one crossing guard for each leg of the intersection.

Exisiting Crossing Guard



Proposed Crossing Guard Location

	Implementation Time-Frame	Near-Term
	Estimated Project Cost	Coordinate Staffing
	Right-of Way Needed?	No
	Drainage or Utility Impact?	No
	Responsible Agency	City of Melbourne

Project 10: Adjust school zone along Croton Road north of Eau Gallie Boulevard

Location	Croton Road Just North of Eau Gallie Boulevard
Type	Sign/Signal
Issue	School zone signage is not consistent with guidance in the FDOT Speed Zoning Manual. School zone timing does not include early release schedule on Friday.
Recommendation	Adjust school zone signs and pavement markings to be consistent with the FDOT Speed Zoning Manual. Adjust timing to include early release schedule on Friday.

Existing School Zone Sign along Croton Road

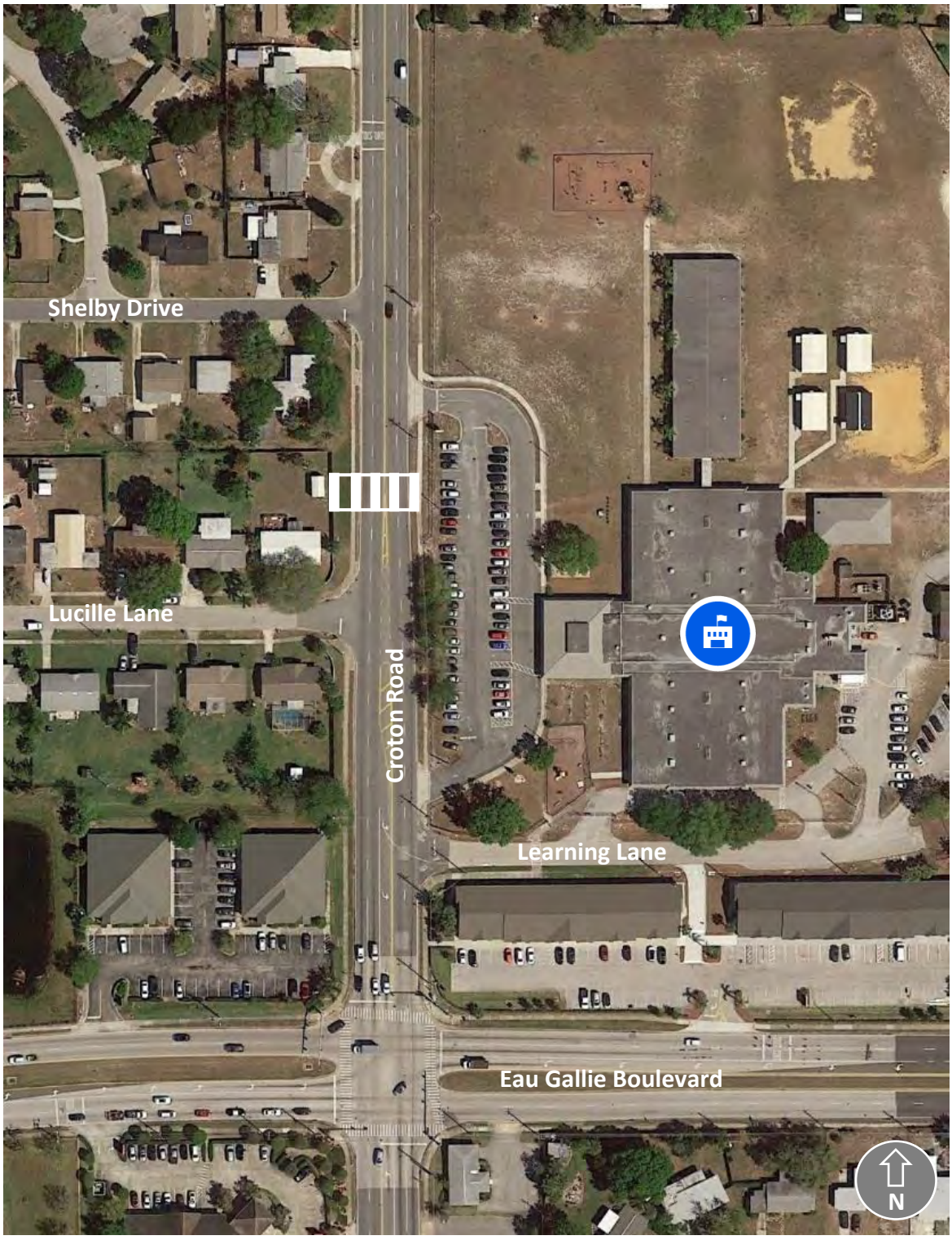
	Implementation Time-Frame	Near-Term
	Estimated Project Cost	Further Study Is Required
	Right-of Way Needed?	No
	Drainage or Utility Impact?	No
	Responsible Agency	FDOT, City of Melbourne, and Brevard County

Project 11: Construct a midblock crossing along Croton Road and add a crossing guard

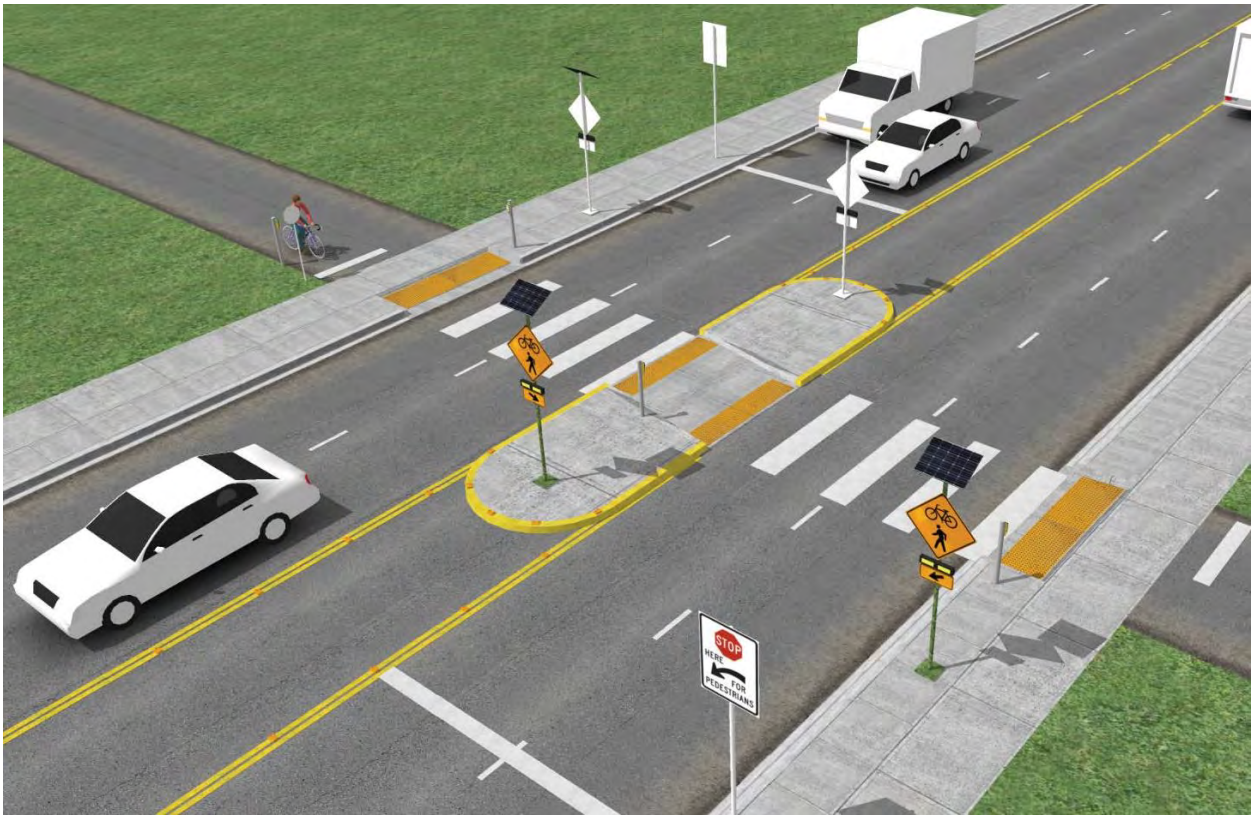
Location	Croton Road Just North of Shelby Drive
Type	Crossing
Issue	Pedestrians and bicyclists were observed walking across Croton Road not at marked crosswalks.
Recommendation	Construct a midblock crossing with a Rectangular Rapid Flashing Beacon (RRFB), a median refuge, and appropriate signage. Add a crossing guard at this intersection.

Pedestrians Walking Across Croton Road

	Implementation Time-Frame	Near-Term
	Estimated Project Cost	$750,000 to $870,000 for Midblock Crossing; Coordinate staffing for Crossing Guard
	Right-of Way Needed?	Unknown
	Drainage or Utility Impact?	Unknown
	Responsible Agency	City of Melbourne and Brevard County



Add Midblock Crossing Across Croton Road



Typical RRFB At A Mid-Block Crossing

Typical RRFB Sign

Project 12: Remove dead tree on sidewalk along Croton Road

Location	Croton Road by Northwest Corner of School Property
Type	Maintenance
Issue	There is a dead tree on the eastern sidewalk along Croton Road by the northwest corner of the school property that blocks the sidewalk.
Recommendation	Remove the dead tree.

Tree Along Croton Road

	Implementation Time-Frame	Maintenance
	Estimated Project Cost	Less than $10,000
	Right-of Way Needed?	No
	Drainage or Utility Impact?	No
	Responsible Agency	City of Melbourne

Project 13: Add ADA compliant pedestrian ramps at signalized intersections

Location	**Signalized Intersections within the Study Area**
Type	**Crossing**
Issue	Pedestrian ramps at signalized intersections in the study area are not ADA compliant.
Recommendation	Upgrade/install ADA compliant pedestrian ramps.

Pedestrian Ramps Within the Study Area

	Implementation Time-Frame	**Near-Term**
	Estimated Project Cost	**$55,000 to $65,000**
	Right-of Way Needed?	**No**
	Drainage or Utility Impact?	**Unknown**
	Responsible Agency	**FDOT, City of Melbourne, and Brevard County**

Examples of ADA Compliant Pedestrian Curb Ramps

Diagonal Pedestrian Ramp

Perpendicular Pedestrian Ramp

Unflared Perpendicular Curb Ramps

Project 14: Maintain existing sidewalks

Location	Croton Road
Type	Maintenance
Issue	Landscaping along sidewalks along Croton Road is overgrown and blocks the sidewalk.
Recommendation	Maintain existing landscape to avoid sidewalks being blocked by completely overgrown weeds.

Sidewalk Along Croton Road

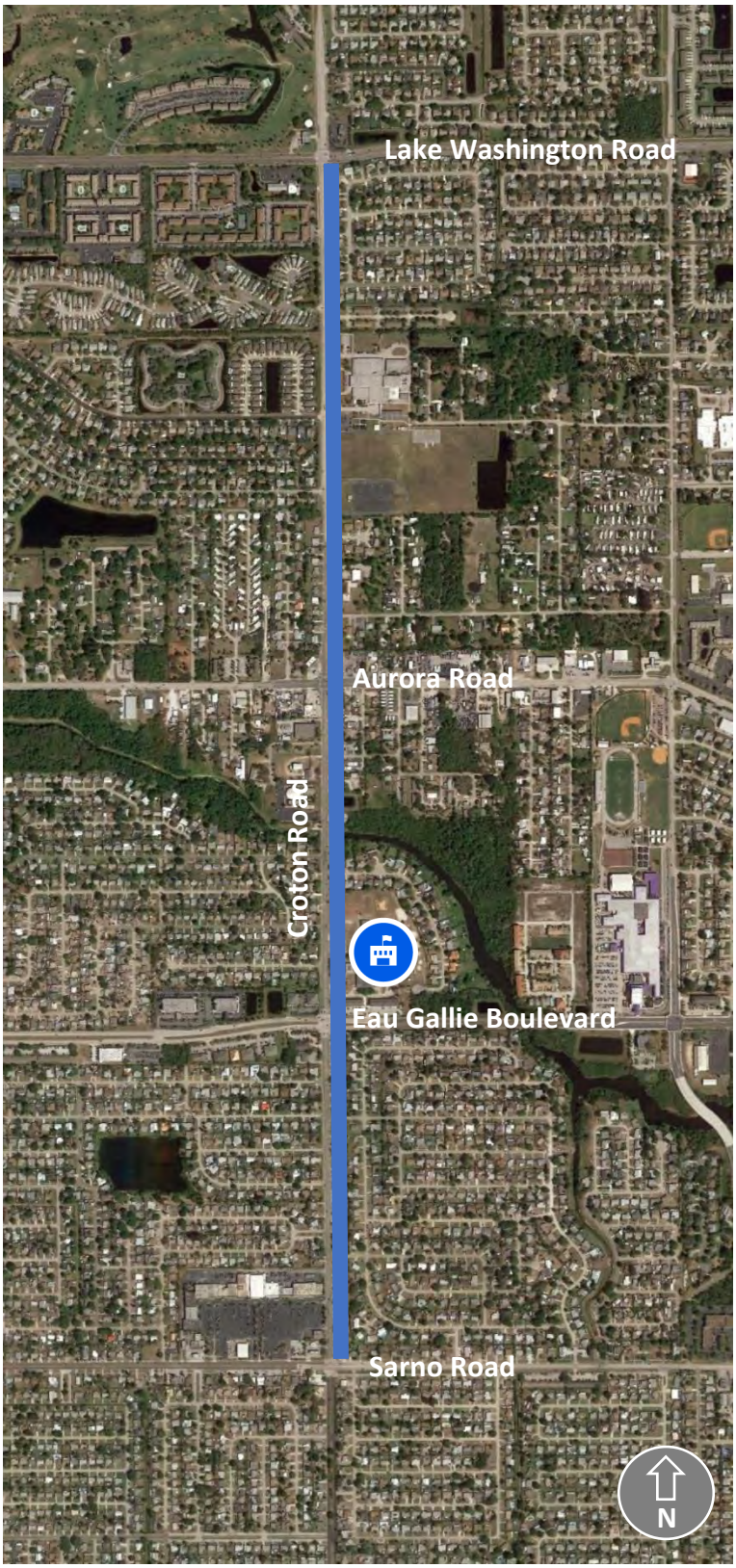
	Implementation Time-Frame	Maintenance
	Estimated Project Cost	Routine Maintenance
	Right-of Way Needed?	No
	Drainage or Utility Impact?	No
	Responsible Agency	City of Melbourne and Brevard County

Project 15: Widen sidewalk along Croton Road to a ten to 12 foot shared use path

Location	Croton Road
Type	Sidewalk
Issue	There are no bicycle facilities along Croton Road.
Recommendation	Widen sidewalk on one side to make it a 10 to 12 foot-wide shared use path to accommodate bi-directional bicycle traffic.

Exisiting Sidewalk Along Croton Road

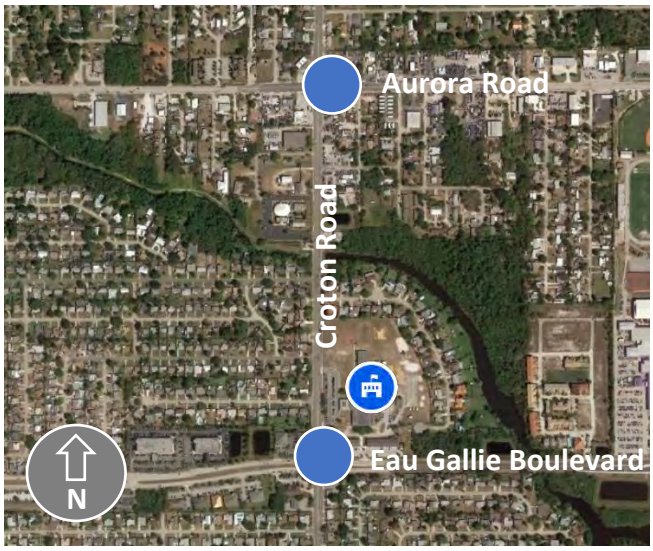
	Implementation Time-Frame	Long-Term
	Estimated Project Cost	$1,100,000 to $1,300,000
	Right-of Way Needed?	Yes
	Drainage or Utility Impact?	Drainage and Utility Impact
	Responsible Agency	FDOT, City of Melbourne, and Brevard County



Add Ten to 12 Foot Shared Use Path on Eastern Side of Croton Road

Project 16: Change signal timing to include a Leading Pedestrian Interval

Location	Eau Gallie Boulevard and Croton Road Intersection; Croton Road and Aurora Road Intersection
Type	Sign/Signal
Issue	Vehicles fail to yield to pedestrians crossing when making a right turn at the intersection of Eau Gallie Boulevard & Croton Road and Croton Road & Aurora Road
Recommendation	Change signal timing to include a Leading Pedestrian Interval (LPI) during school zone times to reduce the number of vehicles turning right while students are crossing.



Eau Gallie Boulevard & Croton Road and Croton Road & Aurora Road

	Implementation Time-Frame	Near-Term
	Estimated Project Cost	Labor Cost for Signal Technician
	Right-of Way Needed?	No
	Drainage or Utility Impact?	No
	Responsible Agency	City of Melbourne and Brevard County

Project 17: Implement Aurora Road Corridor Study recommendations

Location	Aurora Road
Type	Previous Study (Corridor)
Issue	A previous study along Aurora Road was conducted in 2018.
Recommendation	Implement recommendations from Aurora Road Corridor Study - 6 foot wide sidewalk on southern side; high visibility crosswalks and ADA improvements at intersections.

Existing Sidewalk Gap

Aurora Corridor Study Logo

	Implementation Time-Frame	Long-Term
	Estimated Project Cost	$29,690,000
	Right-of Way Needed?	Yes
	Drainage or Utility Impact?	Yes
	Responsible Agency	City of Melbourne and Brevard County

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