SCHOOL ROUTES ANALYSIS

DR. W.J. CREEL ELEMENTARY SCHOOL

ASSESSMENT & IMPLEMENTATION REPORT

JULY 2020

SPACE COAST TPO

KITTELSON & ASSOCIATES

School Routes Analysis

Dr. W.J. Creel Elementary School

Melbourne, FL

Assessment & Implementation Report

July 2020

Prepared for:

Space Coast Transportation Planning Organization (SCTPO)
2725 Judge Fran Jamieson Way,
Bldg. B, Room 105,
Melbourne, FL 32940

Prepared by:

Kittelson and Associates, Inc.
225 E Robinson Street,
Suite 355,
Orlando, FL 32801

The preparation of this report has been financed in part through grant(s) from the Federal Highway Administration and Federal Transit Administration, U.S. Department of Transportation, under the State Planning and Research Program, Section 505 [or Metropolitan Planning Program, Section 104(f)] of Title 23, U.S. Code. The contents of this report do not necessarily reflect the official views or policy of the U.S. Department of Transportation.

Table of Contents

List of Figures

List of Tables


STOP

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 Dr. W.J. Creel Elementary School located at 2000 Glenwood Drive, 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 Dr. W.J. Creel Elementary School are summarized in **Table 1.**

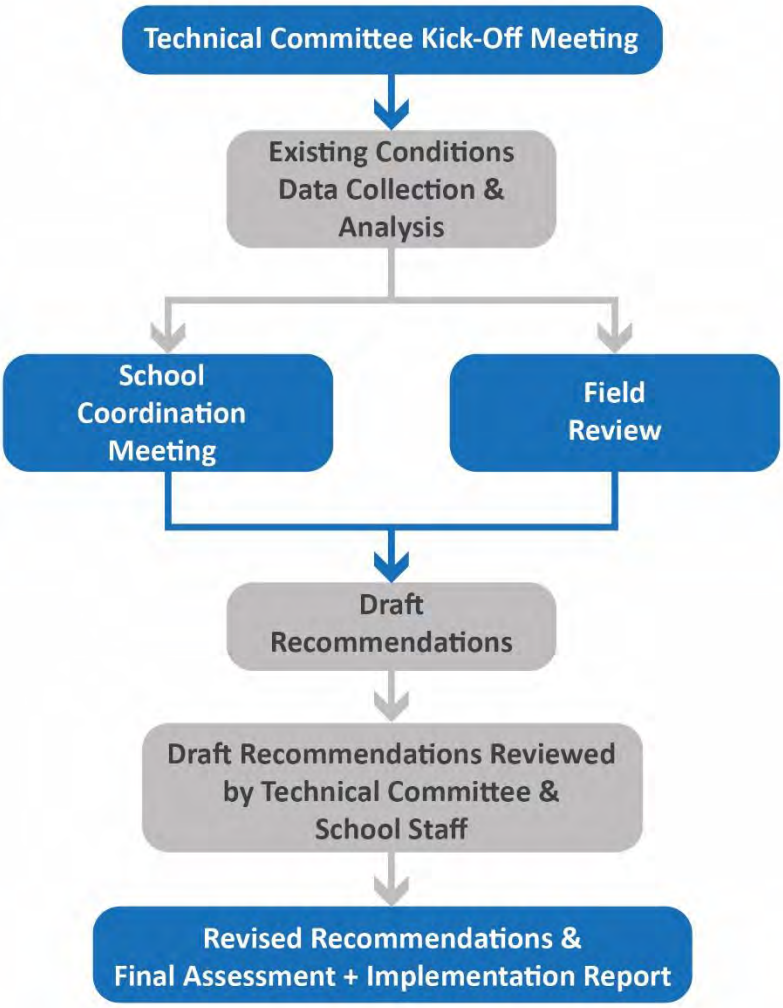


Figure 1: Study Process

Table 1: Recommendations Summary

School Campus Recommendations					
No.	**Location**	**Recommendation**	**Type**	**Time-Frame**	**Cost Estimate**
1	School Entrance Driveway	Build an 8 foot wide sidewalk along the east side of the school entrance to the Palmwood Drive/Glenwood Drive intersection.	Sidewalk	Near-Term	$10,000 to $15,000
2	Diamond Street	Install new speed humps along Diamond Street.	Traffic Calming	Near-Term	$30,000 to $35,000
3	Diamond Street	Install “Do Not Enter” signage along Diamond Street facing west.	School Circulation	Maintenance	$10,000 to $15,000
4	Between Surface Parking Lot and Drop-Off/Pick-Up Loop	Restripe the crosswalks to be high-visibility crosswalks from parking lot to the school's main entrance.	Crossing	Near-Term	<$10,000
5	Parent Drop-Off/Pick-Up Loop	Add pavement for a second travel lane along Diamond Street from the Palmwood Drive/Glenwood Drive intersection to where the paved parking begins on the south side of Diamond Street.	School Circulation	Near-Term	$265,000 to $310,000
6	Southeast Corner of School Campus	The school has requested to relocate the existing fencing in the southeast corner of the school property to be moved from the front of the sidewalk (currently adjacent to Diamond Street) to be behind the sidewalk.	Sidewalk	Near-Term	$25,000 to $30,000

Study Area Recommendations					
No.	**Location**	**Recommendation**	**Type**	**Time-Frame**	**Cost Estimate**
7	Stewart Road School Zone	Provide regular police enforcement along Stewart Road north of Aurora Road during school zone times.	Enforcement	Near-Term	Enforcement could be included as part of a regularly scheduled patrol.
8	Stewart Road and Palmwood Drive School Zones	Change the 15 MPH speed zone signage from a static "from X time to X time" to a flashing beacon. Install more school zone signage intermittently along both Stewart Road and Palmwood Drive.	Sign/Signal	Near-Term	$45,000 to $55,000
9	Stewart Road and Palmwood Drive Intersection	Build an 8 foot wide sidewalk in the northeast corner where the "cow path" is currently located.	Sidewalk	Near-Term	<$10,000
10	Stewart Road and Palmwood Drive Intersection	Add an ADA compliant pedestrian landing pad on the northwest corner to provide a waiting area for the marked east-west crosswalk.	Crossing	Near-Term	<$10,000
11	Palmwood Drive and Glenwood Drive Intersection	Extend the existing median toward the intersection to reduce vehicle turning speeds and reduce the corner curb return radii at the intersection.	Traffic Calming	Near-Term	$10,000 to $15,000

No.	Location	Recommendation	Type	Time-Frame	Cost Estimate
12	School Exit Driveway at Palmwood Drive	Reduce the corner curb radii on northeast and northwest corners.	Traffic Calming	Near-Term	<$10,000
13	School Exit Driveway at Palmwood Drive	Build a channelized raised median in the middle of Palmwood Drive at the school exit driveway to prevent eastbound vehicles along Palmwood Drive from making a left turn into the exit. The channelized median would permit for southbound left from the school exit.	Traffic Calming	Near-Term	$15,000 to $20,000
14	Palmwood Drive and Glenwood Drive Intersection	Remove stop sign and stop bar for the southbound movement coming out of the school at Palmwood Drive/Glenwood Drive.	Sign/Signal	Near-Term	<$10,000
15	Palmwood Drive and Glenwood Drive Intersection	Perform a study to review changing the intersection into an all-way stop control intersection or a roundabout. This would help better control the conflicts between students using the east leg crosswalk and the east/west through movement traffic along Palmwood Drive.	Feasibility Study (Intersection Control)	Near-Term	Further study required

No.	Location	Recommendation	Type	Time-Frame	Cost Estimate
16	Palmwood Drive and Glenwood Drive Intersection	Add a gateway feature for Dr. W.J. Creel Elementary School.	School Circulation	Near-Term	Specific gateway feature elements should be discussed with the School/School Board before an estimate is generated.
17	Palmwood Drive School Zone	Replace the faded "End School Zone" signage along Palmwood Drive.	Sign/Signal	Maintenance	<$10,000
18	Along the Canal from Swan Street to the Dorcas Outreach Center for Kids (DOCK)	Conduct a feasibility study to add a paved trail connecting Swan Street and the DOCK.	Feasibility Study (Trail)	Near-Term	Further study required
19	Glenwood Drive from Aurora Road to South of Palmwood Drive	Build a 5 to 6 foot wide sidewalk on the west side of the road to connect to existing sidewalk.	Sidewalk	Near-Term	$125,000 to $145,000
20	Palmwood Drive from Stewart Road to Cedarwood Drive	Build 5 to 6 foot wide sidewalks to fill gaps on both sides of the road.	Sidewalk	Near-Term	$235,000 to $275,000
21	Mosswood Drive from Aurora Road to Palmwood Drive	Build 5 to 6 foot wide sidewalks both sides of the road.	Sidewalk	Near-Term	$325,000 to $375,000

No.	Location	Recommendation	Type	Time-Frame	Cost Estimate
22	Cedarwood Drive/Pinewood Drive from Mosswood Drive to South of Swan Street	Build a 5 to 6 foot wide sidewalk on the south/east side of the road to connect to existing sidewalk.	Sidewalk	Near-Term	$175,000 to $205,000
23	Palmwood Drive and Glenwood Drive Intersection	Restripe the east leg crosswalk to be a high-visibility crosswalk. Add a new high-visibility crosswalk on north and south legs and ADA compliant pedestrian ramps on all four corners.	Crossing	Maintenance	$15,000 to $20,000
24	Stewart Road and Julia Drive Intersection	Add a 5 to 6 foot wide sidewalk connection and an ADA compliant pedestrian landing pad from the edge of the road to the existing sidewalk on the east side of the road.	Crossing	Near-Term	<$10,000
25	Stewart Road and Carlton Drive Intersection	Add a 5 to 6 foot wide sidewalk connection and an ADA compliant pedestrian landing pad from the edge of the road to the existing sidewalk on the east side of the road. Add stop bars and 'Stop Here for Pedestrian' signs on the northern and the southern approaches along Stewart Road in advance of the marked crosswalk.	Crossing	Near-Term	<$10,000
26	Stewart Road from Palmwood Drive to the Northern School Driveway	Widen the existing east side sidewalk from 5 feet to 8 feet.	Sidewalk	Long-Term	$60,000 to $70,000

Assessment

This section of the report documents the existing conditions within the Dr. W.J. Creel 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 Dr. W.J. Creel 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.

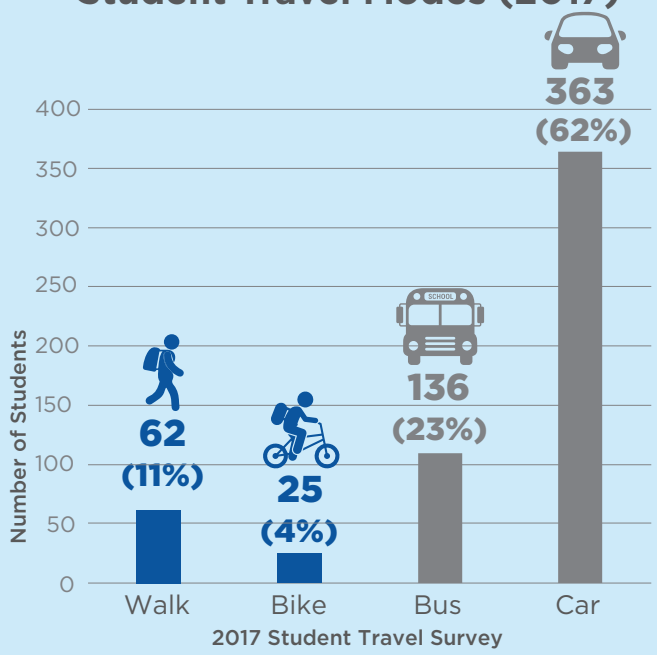
Previous and Ongoing Studies

A segment of the Showcase Trail Network is planned along US 1 , east of Dr. W.J. Creel Elementary School's campus. In 2018, an operational analysis was done for Wickham Road which identified improvements to Lake Washington Road, including turn lane additions/reconfigurations, pedestrian facility upgrades, and the addition of crosswalks on the west and south legs of the intersection. The Aurora Road Corridor Study was completed in 2018 and recommended the following improvements:

- Reconstructing and restriping crosswalks and pedestrian ramps to meet ADA requirements
- Implementing bicycle lanes in both directions
- Widening the sidewalk on the south side to six feet and an eight foot shared use path on the north side
- Adding a two-way center turn lane
- Reducing the number of through lanes from two to one in each direction.

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

11 Pedestrian

19 Bicycle

School Aged Bicycle & Pedestrian Crashes within Study Area

1 Pedestrian

10 Bicycle

1 Injury

4 Property Damage Only

6 Injury

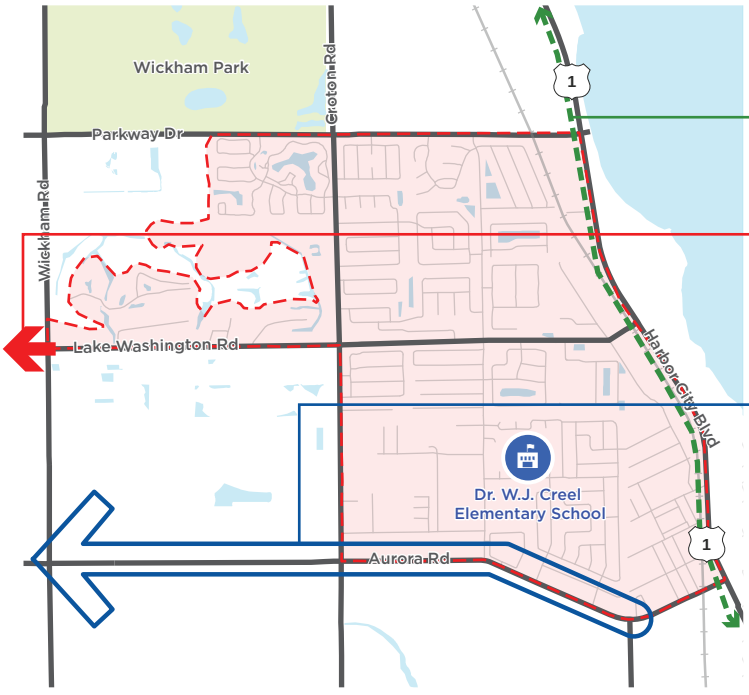
2014 to 2018 Crashes from University of Florida's Signal Four Analytics Database

Signals and Crossings within Study Area

12 Signalized Intersections

6 Unsignalized Marked Crosswalks Across Major Streets

4 Crossing Guards at Lake Washington Rd & Stewart Rd; Stewart Rd and Palmwood Dr; and Glenwood Dr & Palmwood Dr



Previous & Ongoing Plans

Showcase Trails Network

- Trail planned along US 1.

Wickham Road Operational Analysis (2018)

- Lake Washington improvements included turn lane additions/reconfigurations, pedestrian facility upgrades, and crosswalk additions on the west and south legs.

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.

Figure 2: Background Information

SPACE COAST TPO

KITTELSON & ASSOCIATES

School Routes Analysis

Dr. W.J. Creel 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.

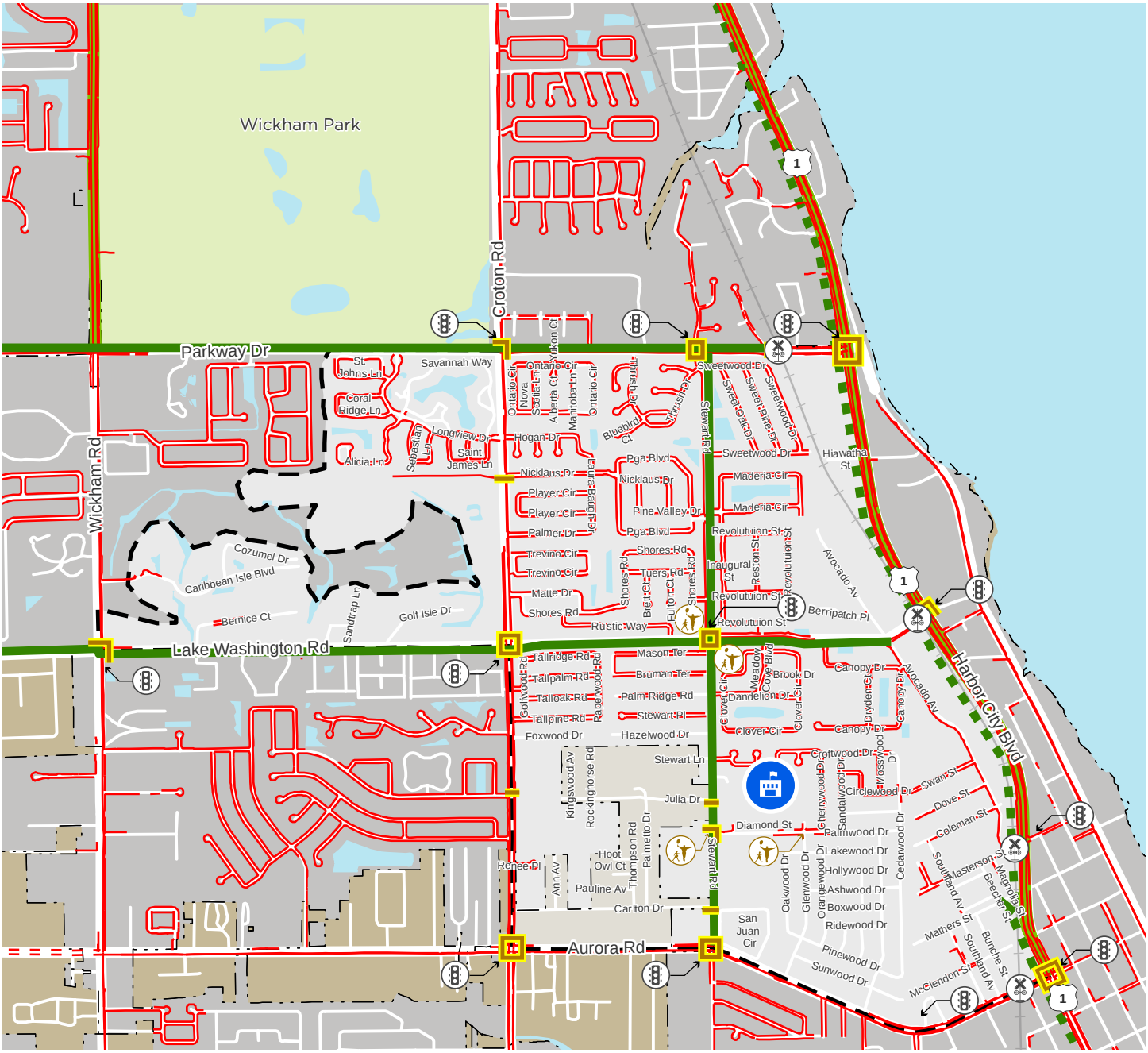
There are existing sidewalks in the study area by the school campus, particularly north and east of Stewart Road and Palmwood Drive. Near the school campus, there are sidewalks on both sides of Palmwood Drive with some sidewalk gaps. There are existing sidewalks on both sides of Cherrywood Drive and on Croftwood Drive. There is a shared use path on the east side of Stewart Road within the study area. The neighborhood streets west of Stewart Road, south of Hazelwood Drive and Foxwood Drive, and the streets south of Palmwood Drive are generally characterized as having no existing sidewalks. East of Cedarwood Drive, some neighborhood streets have existing sidewalks, but there are sidewalks gaps. There are no existing or prioritized bicycle facilities in the study area.

Existing trail/shared use paths are located along Lake Washington Road from Avocado Avenue to Wickham Road, along Parkway Drive from Turtle Mound Road to US 1, and along Stewart Road from Aurora Road to Parkway Drive, with a gap from Palmwood Drive to the northern school driveway. This gap in the shared use path has a 5 foot wide sidewalk from Palmwood Drive to the northern school driveway. A trail is planned along US 1 through the study area.

Signalized intersections and marked crosswalks across major streets were mapped using data from aerial satellite imagery. Crossing guard information was provided by the City of Melbourne. There are twelve signalized intersections within the study area. The signal at the intersection of US 1 and Masterson Street is currently non-operational and is flashing yellow for the north/south movement along US 1. The signalized intersections in the study area have marked crosswalks, except for the intersections of Aurora Road and Stewart Avenue and Masterson Street and US 1.

There are four crossing guard locations for Dr. W.J. Creel Elementary School. The crossing guards are located at Palmwood Drive and Glenwood Drive, Palmwood Drive and Stewart Road, and two crossing guards at Stewart Road and Lake Washington Road.

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.



Dr. W.J. Creel Elementary School

Marked Crosswalks across Major Streets

Existing Trail / Shared Use Path

Planned Trail / Shared Use Path

Existing Sidewalk

Prioritized Sidewalk (As per Draft Bicycle & Pedestrian Master Plan)

Existing Bicycle Facilities*

Prioritized Bicycle Facilities* (As per Draft Bicycle & Pedestrian Master Plan)

Crossing Guard Location

Previous Study - Sarno Road Corridor Study

Traffic Signals within Study Area

Railroad Crossing Signal within Study Area

Railroad Tracks

Study Area

City of Melbourne

Unincorporated Brevard County

** Note: Existing Bicycle Facilities include marked bike lanes, buffered bike lanes, 2-way cycle tracks, and ≥5' wide shoulders. Draft Bicycle and Pedestrian Master Plan does not identify specific bicycle facility types for Prioritized Bicycle Facilities.*

Feet

0 2,000 4,000

N

Figure 3: Existing and Planned Bicycle and Pedestrian Facilities

SPACE COAST TPO

KITTELSON & ASSOCIATES

School Routes Analysis

Dr. W.J. Creel Elementary School

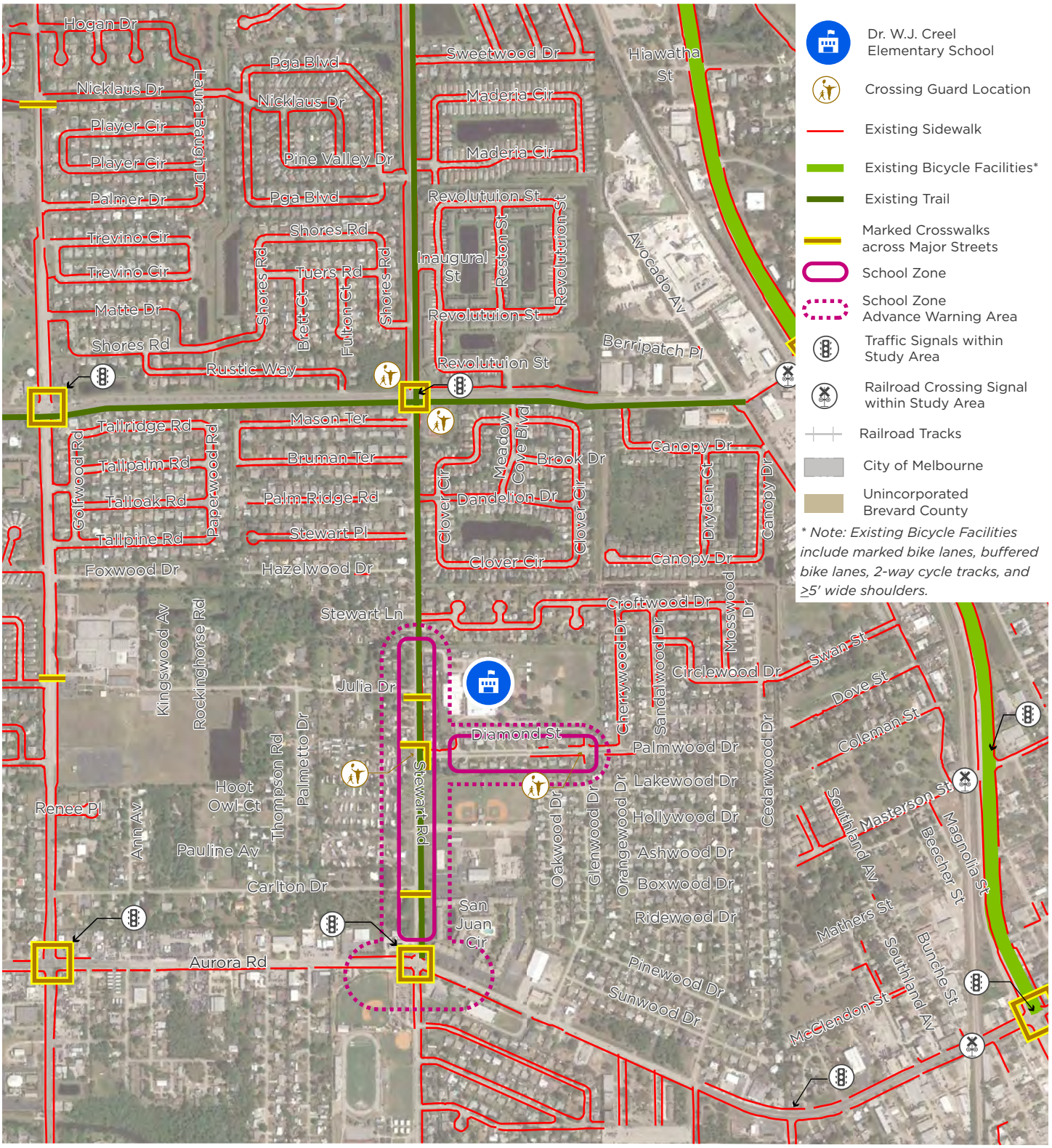


Figure 4: Existing Conditions School Context Aerial Map

School Routes Analysis

Dr. W.J. Creel 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 Palmwood Drive directly in front of the school entrance is 25 MPH. Lake Washington Road has a speed limit of 25 MPH, Croton Road's speed limit ranges from 30 to 35 MPH, and Aurora Road and US 1 have speed limits that range from 40 to 45 MPH. AADT information was mapped using data from SCTPO's 2018 State of the System (SOS) and FDOT. Traffic volume along Croton Road between Aurora Road and Lake Washington ranges from 10,000 to 20,000 vehicles per day. The traffic volume along Aurora Road between Croton Road and US 1 ranges from 10,000 to 20,000 vehicles per day. The traffic volume along US 1 between Aurora Road and Lake Washington Road ranges from 40,000 to 80,000 vehicles per day.

School zone and school zone advance warning areas were mapped using data from aerial satellite imagery and field review observations. There are two school zones within the study area, on Palmwood Drive from east of Stewart Road to Glenwood Drive and on Stewart Road from south of Stewart Lane to south of Carlton Drive. The school zone advance warning area captures the two school zones and Stewart Road from Stewart Lane to the Aurora Road. The school zone warning area at the intersection of Stewart Road and Aurora Road is for Eau Gallie High School.

Figure 5 shows the existing conditions of traffic data.

School Campus Circulation

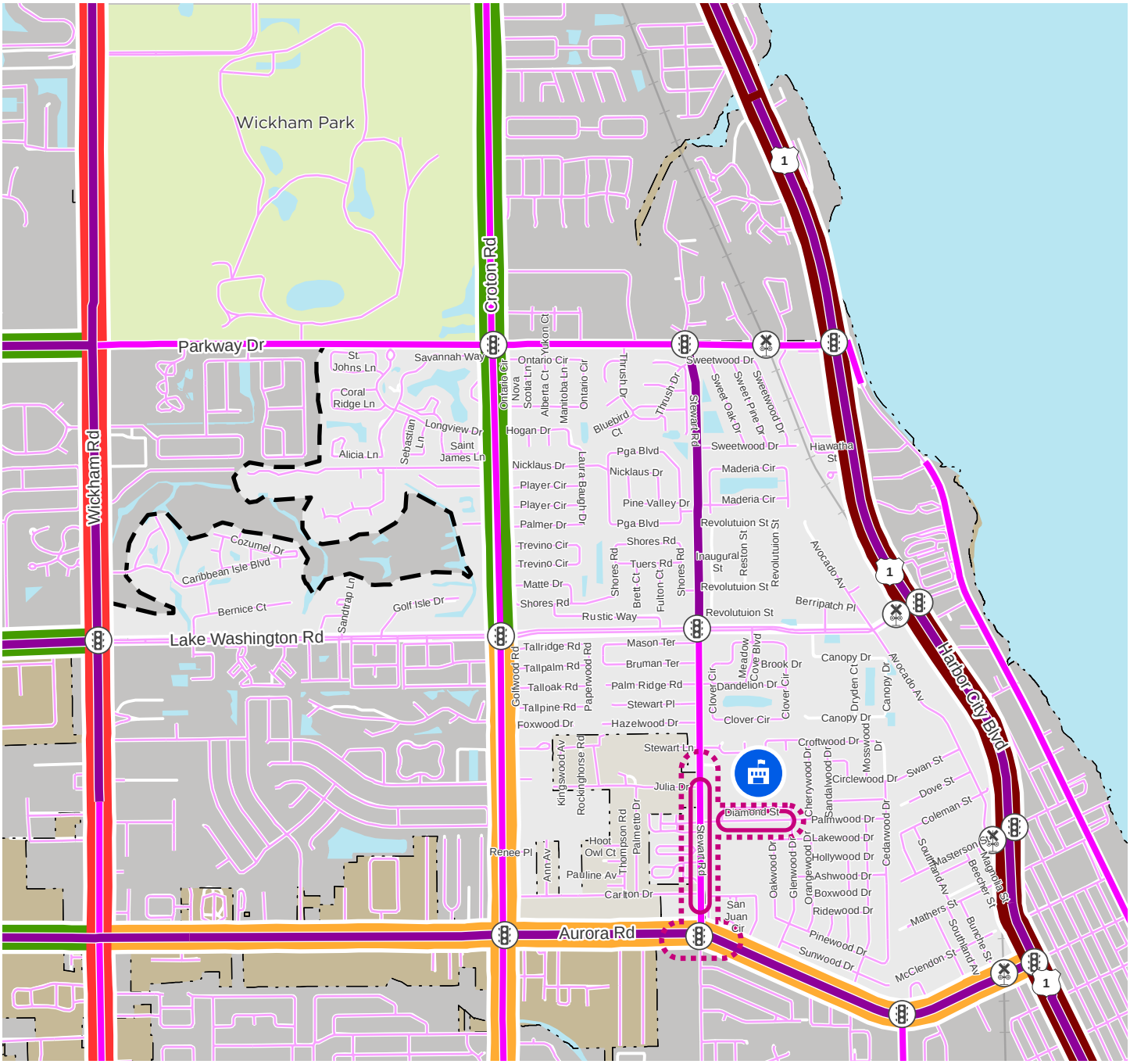
Circulation patterns were gathered during the school coordination meeting and field review. There is one vehicle entrance to the school on Glenwood Drive at Palmwood Drive. Most students arrive to school by being dropped off by car. There is one vehicle exit for the school on Palmwood Drive about 280 feet east of Stewart Road. There are two pedestrian and bicycle entrances to the school campus: one located on the east side of Diamond Street and one on the west. These entrances coincide with the vehicle entrance and exit. Students used the paved shoulder on Glenwood Drive at Palmwood Drive to walk to enter the school campus.

At 7:30 AM, the gated entrance on Diamond Street at Glenwood Drive is opened for students to access the school's main entrance using a sidewalk. Vehicles drop students off using the drop-off/pick-up loop via Diamond Street. Diamond Street splits into the drop-off/pick-up loop directly in front of the school and a parking lot just south of the drop-off/pick-up loop. There is a marked crosswalk from the parking lot to the school main entrance. Some parents/guardian park in the parking lot and walk their children across the drop-off/pick-up loop to the school main entrance.

There are two designated bicycle racks for students on campus. One bicycle rack is near the school exit on the west side of campus, and another bicycle rack is on the east side of campus.

At the northwest corner of the school campus there is a bus loop that is accessed via Stewart Road. Faculty and Staff park near the bus loop and behind the school buildings. When the school buses exit the bus loop around 7:50 AM, daycare vans and vehicles for the Voluntary Prekindergarten Education Program (VPK) and for the Exceptional Student Education (ESE) students use the bus loop. The same sequence of bus, vans and vehicles for certain students is followed at dismissal.

Figure 6 shows various circulation patterns within the school campus.



Dr. W.J. Creel Elementary School

Traffic Signal within Study Area

Railroad Crossing Signal within Study Area

Railroad Tracks

Study Area

City of Melbourne

Unincorporated Brevard County

School Zone

School Zone Advance Warning Area

Posted Speed (Miles Per Hour) (2018)

- 25 MPH or Less
- 30 to 35 MPH
- 40 to 45 MPH

Average Annual Daily Traffic (AADT) (2018)

- Less than 10,000 Vehicles Per Day
- 10,001 to 20,000 Vehicles Per Day
- 20,001 to 40,000 Vehicles Per Day
- 40,001 to 80,000 Vehicles Per Day

Feet

0 2,000 4,000

N

Figure 5: Existing Conditions Traffic Data

SPACE COAST TPO

KITTELSON & ASSOCIATES

School Routes Analysis

Dr. W.J. Creel Elementary School

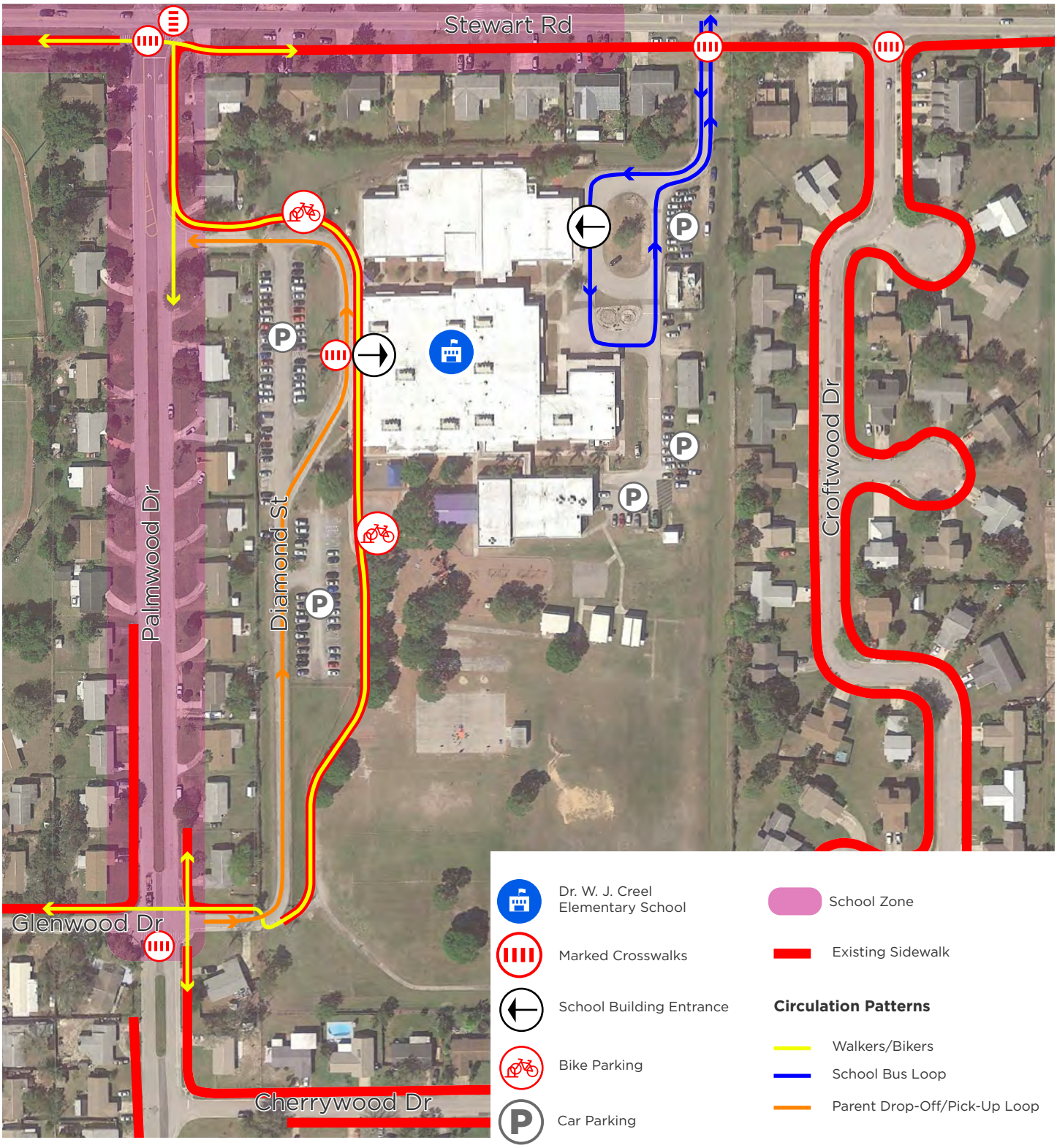


Figure 6: Existing School Circulation Map

School Routes Analysis

Dr. W.J. Creel Elementary School

School Student & Parent Survey Summary

The SCTPO conducts student and parent surveys alternating every other year, with the latest Student Travel Mode Survey conducted in 2017 and Parent Survey conducted in 2018, 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. This section summarizes the results of these surveys for Dr. W.J. Creel 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 Dr. W.J. Creel 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.

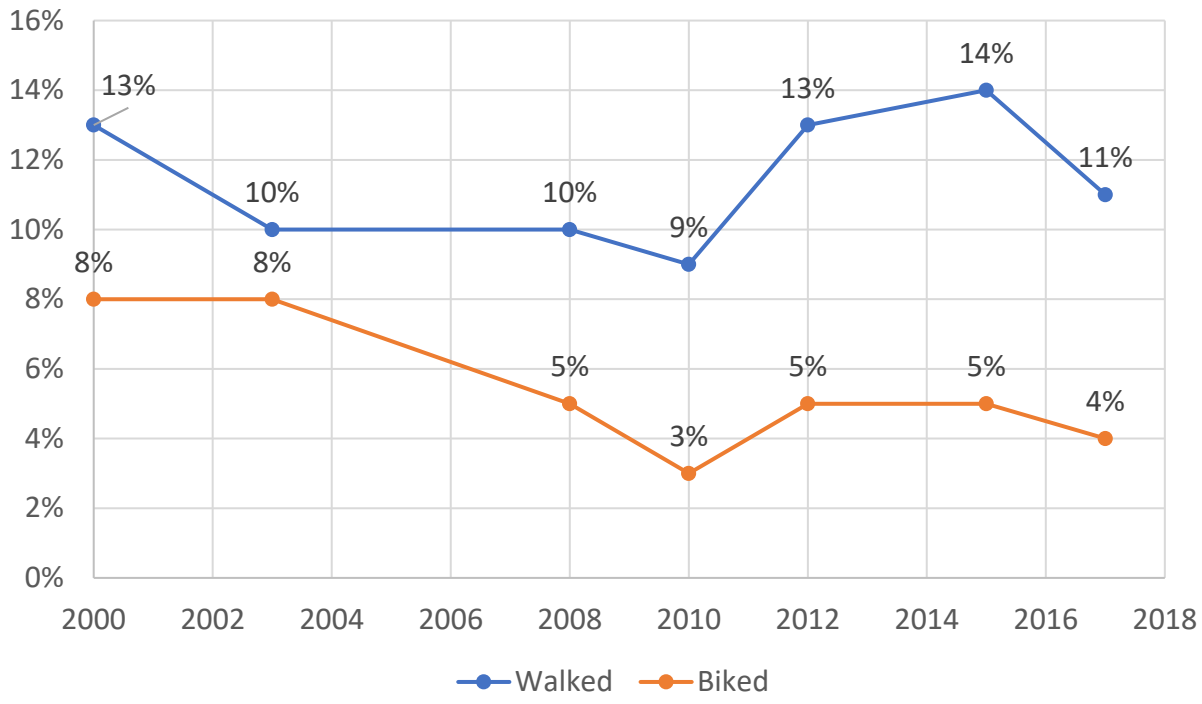


Figure 7: Percentage of Students Walking or Biking to School from 2000 to 2017

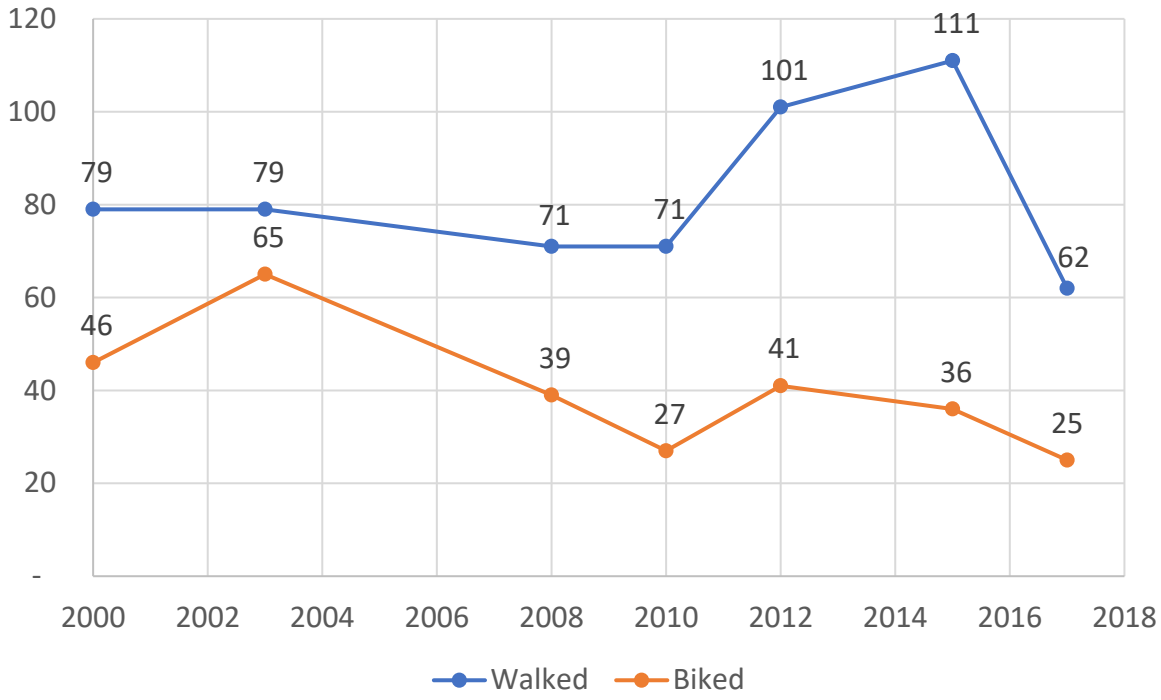


Figure 8: Total Number of Students Walking or Biking to School from 2000 to 2017

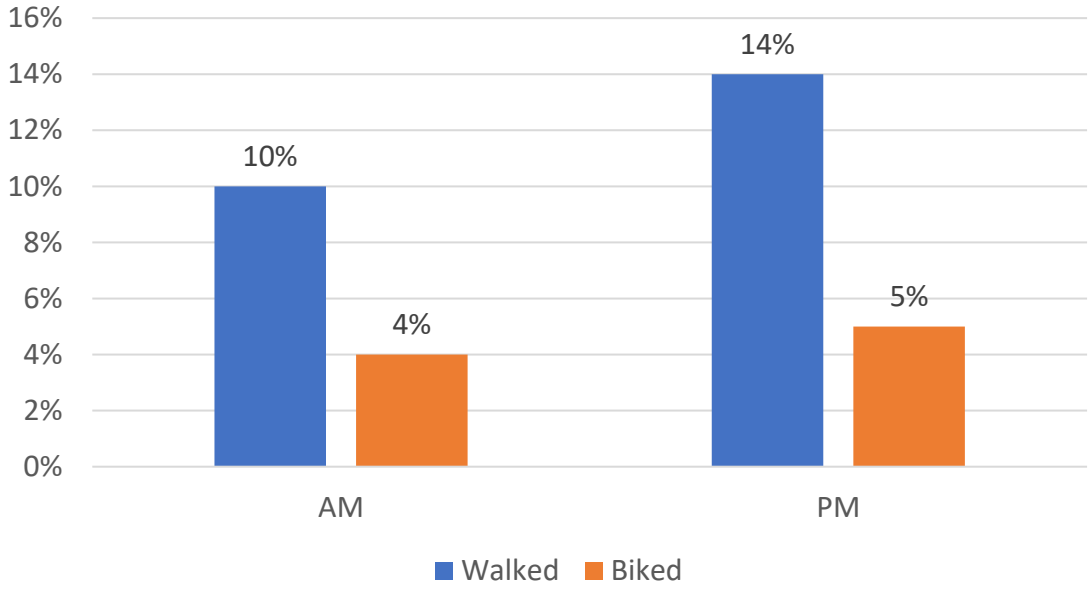


Figure 9: Percentage of Students Walking or Biking to School in 2017 in AM and PM

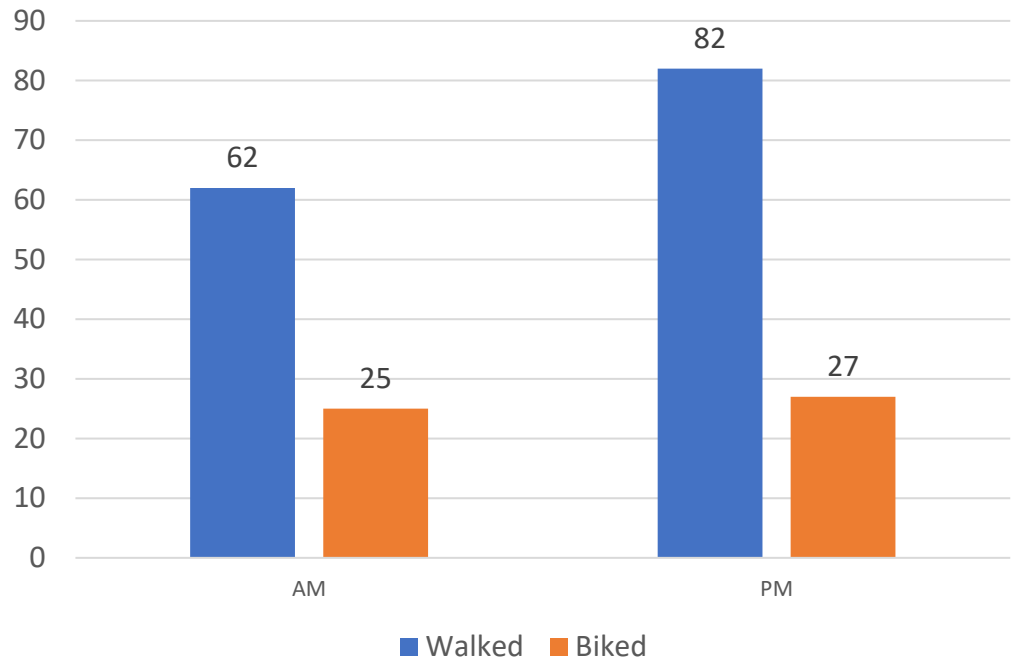


Figure 10: Total Number of Students Walking or Biking to School in 2017 in AM and PM

Main takeaways from the Student Travel Mode Survey:

- Most students either travel by car (62 percent) or bus (23 percent) to school as shown in **Figure 2**.
- On average 16 percent of students travel by walking (11 percent) or biking (five 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.

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 in 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.

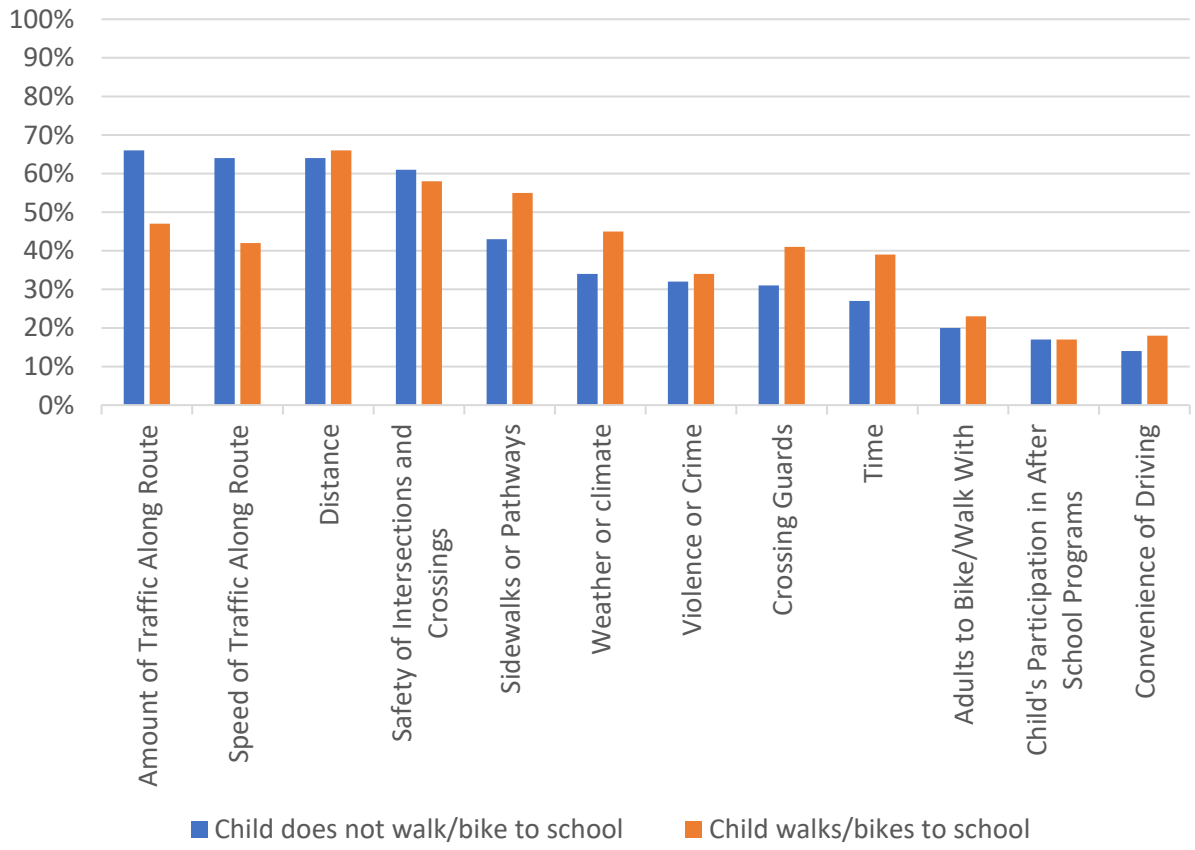


Figure 11: Issues Reported to Affect the Decision to Allow a Child to Walk or Bike to/from School by Parents (Based on 2018 Survey)

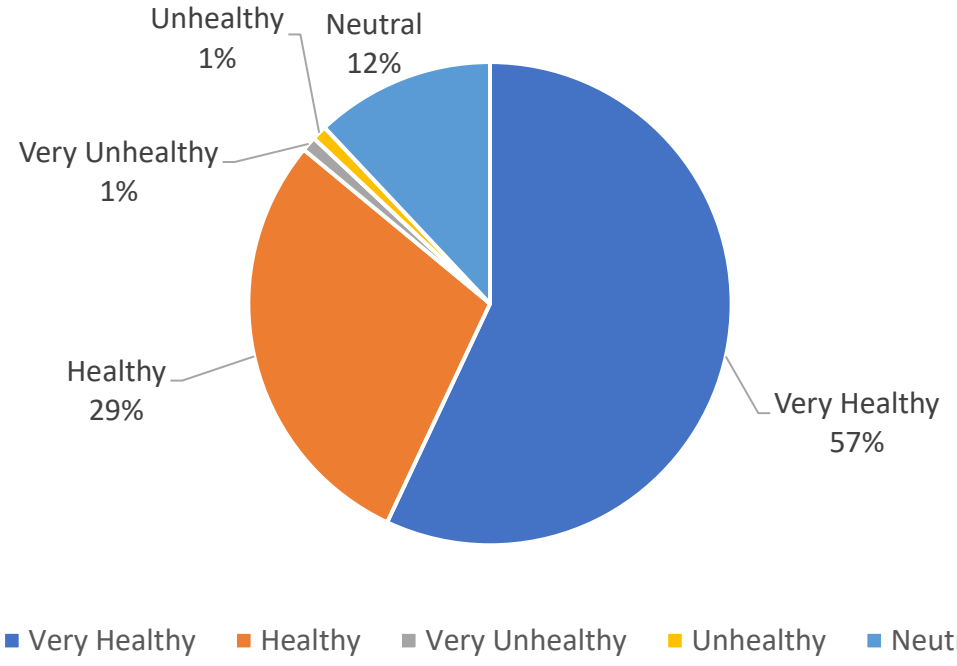


Figure 12: Parent's Opinions about How Healthy Walking and Biking to/from School is for Their Child (Based on 2018 Survey)

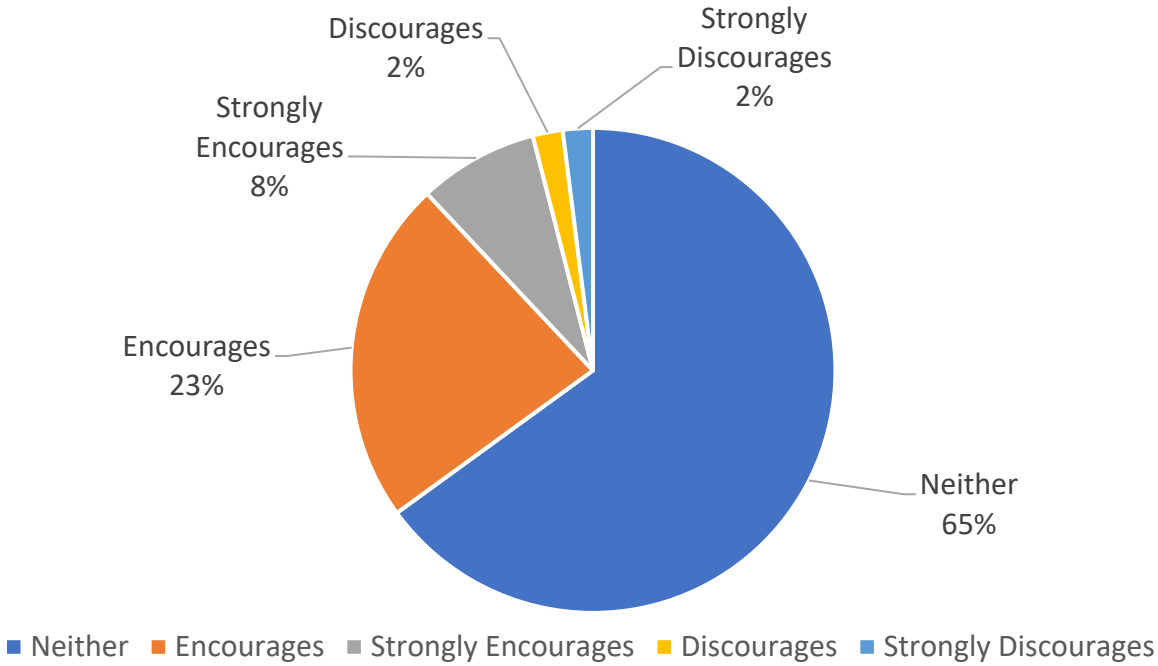


Figure 13: Parent's Opinions about How Much their Child's School Encourages or Discourages Walking and Biking to/from School (Based on 2018 Survey)

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 Dr. W.J. Creel 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 Dr. W.J. Creel Elementary School study area.

Pedestrian/Bicycle Crash Statistics

There were 30 total pedestrian and bicycle crashes within the study area (11 pedestrian and 19 bicycle). Five of the crashes were property damage only and 25 of the crashes resulted in injury. There were no reported fatal crashes. Eighty-three percent of crashes occurred during the day and 97 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**.

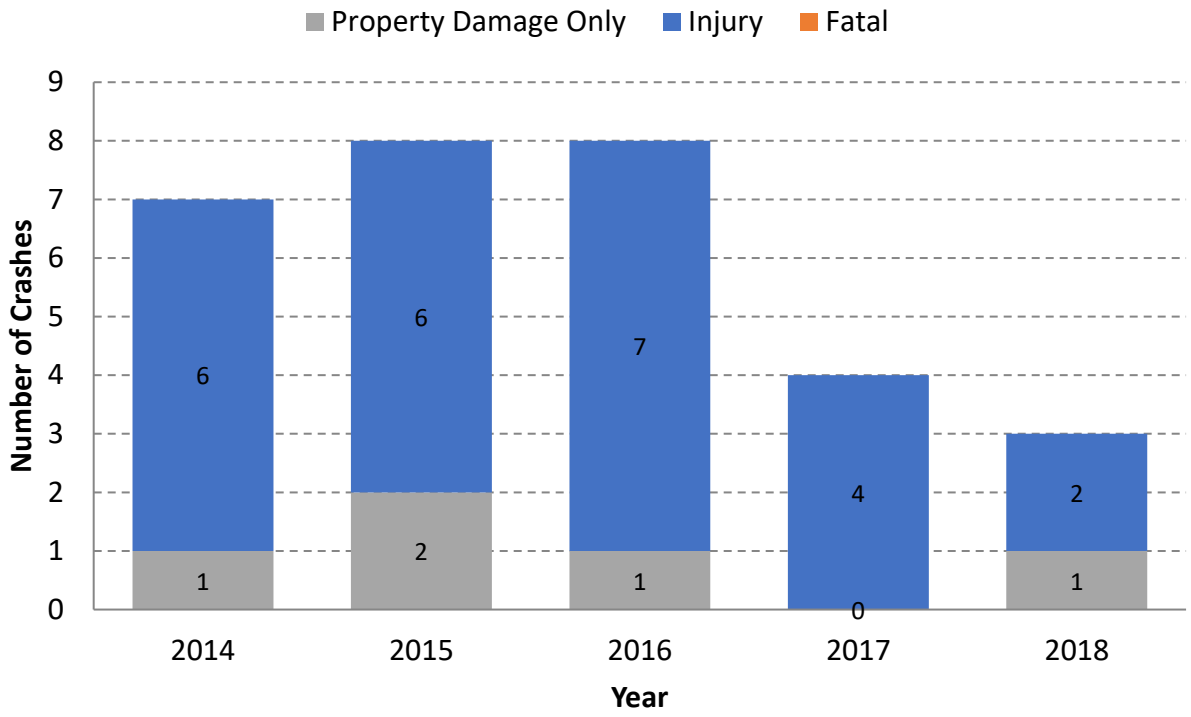


Figure 14: Crashes by Year and Severity

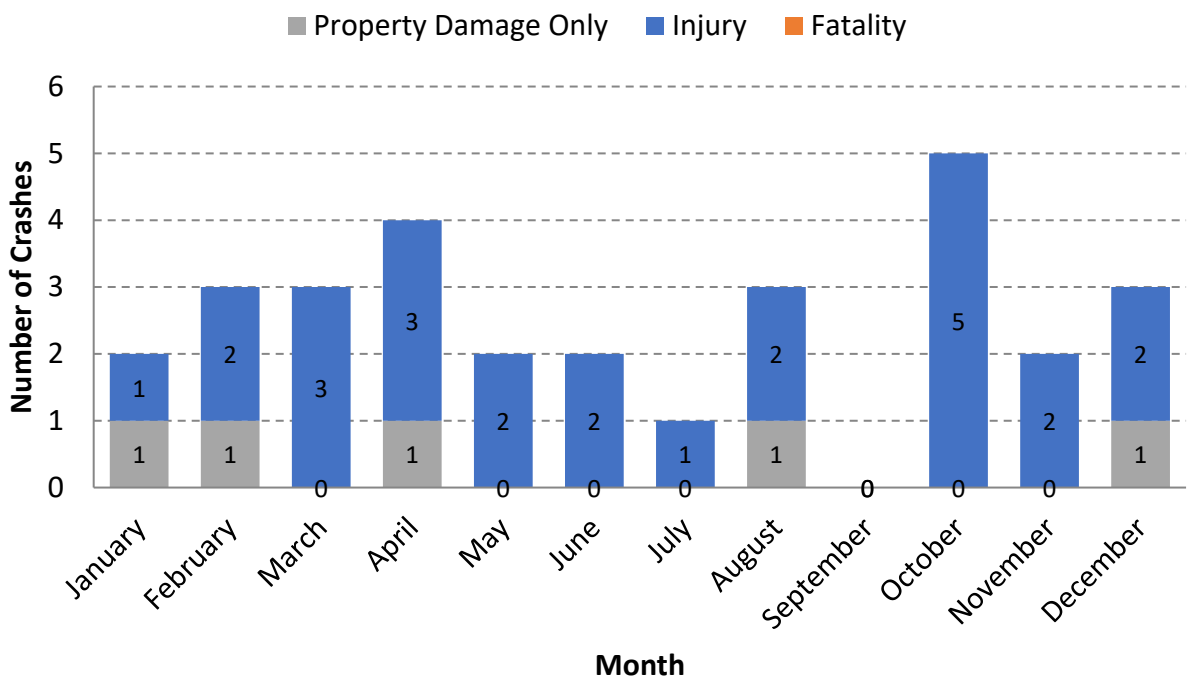


Figure 15: Crashes by Month and Severity

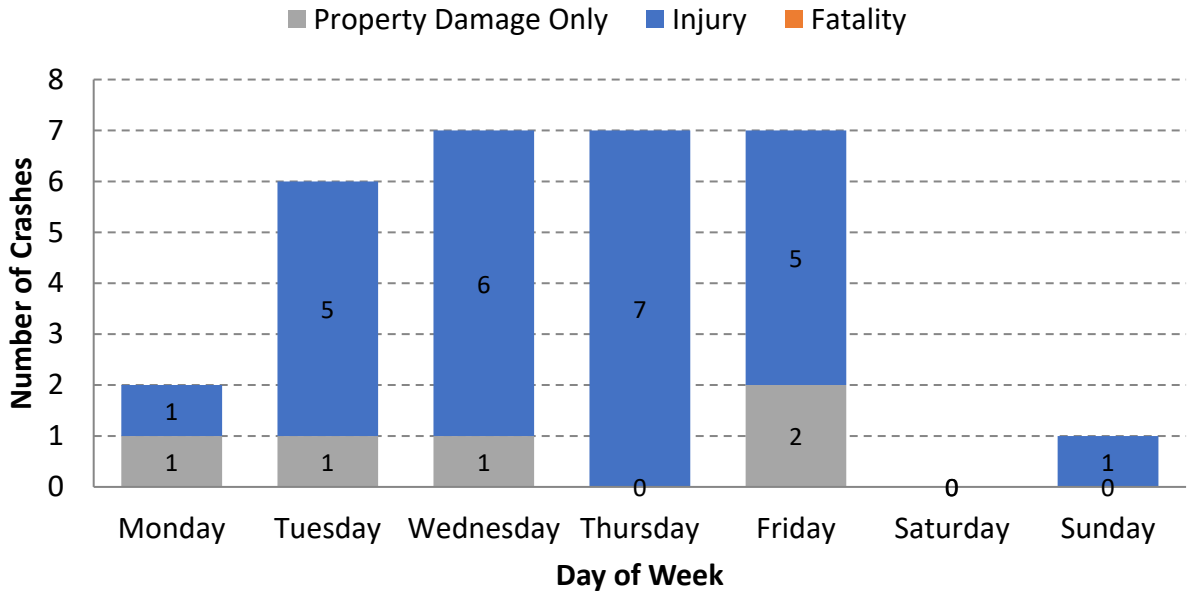


Figure 16: Crashes by Day of Week and Severity

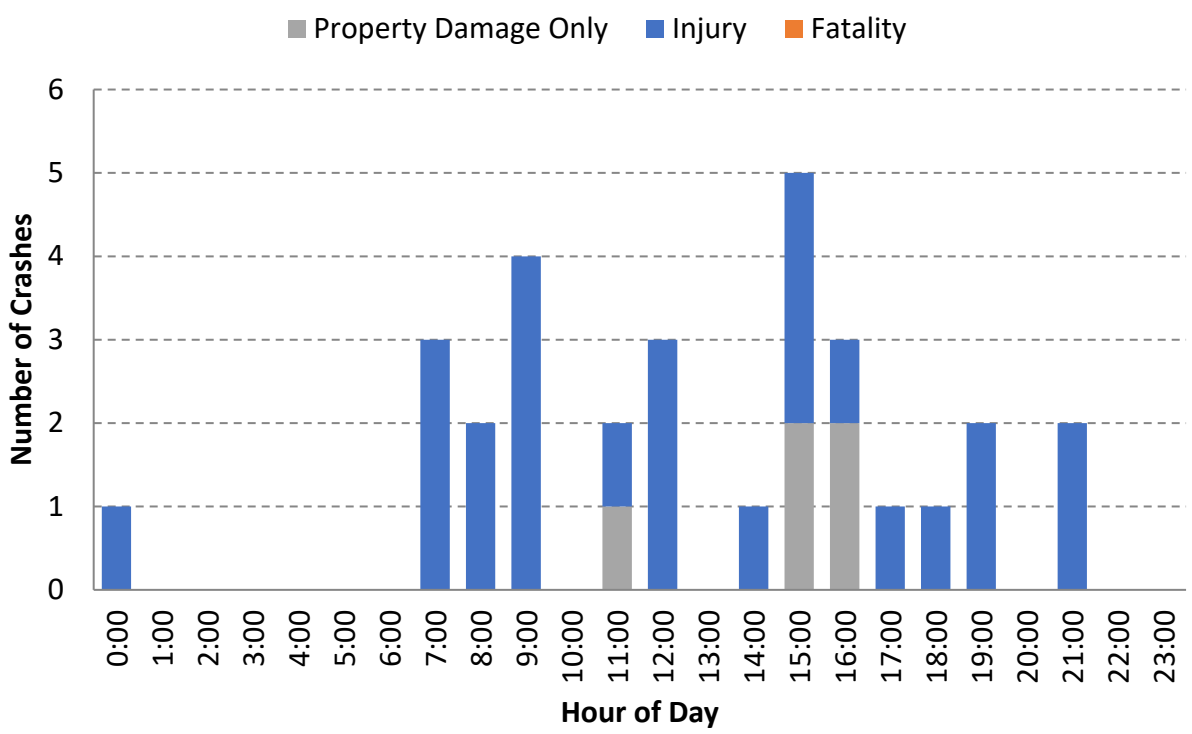


Figure 17: Crashes by Hour of Day and Severity

Eight crashes occurred per year in 2015 to 2016 but decreased to four crashes per year in 2017 and three crashes per year in 2018. The most crashes occurred in the month of October (five) and the most crashes occurred from Wednesday to Friday (seven crashes per day). By time of day, the highest crash hour was from 3 PM to 4 PM (five). Alcohol and/or drug involved accounted for one crash.

School Aged Pedestrian/Bicycle Crash Statistics

There were 11 total school aged pedestrian and bicycle crashes within the study area (one pedestrian and ten bicycle). Four of the crashes were property damage only and seven crashes resulted in injury. Eighty-two percent of school aged crashes occurred during the day and all occurred under dry conditions. **Figure 18** maps 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 19**, **Figure 20**, **Figure 21, Figure 22.**

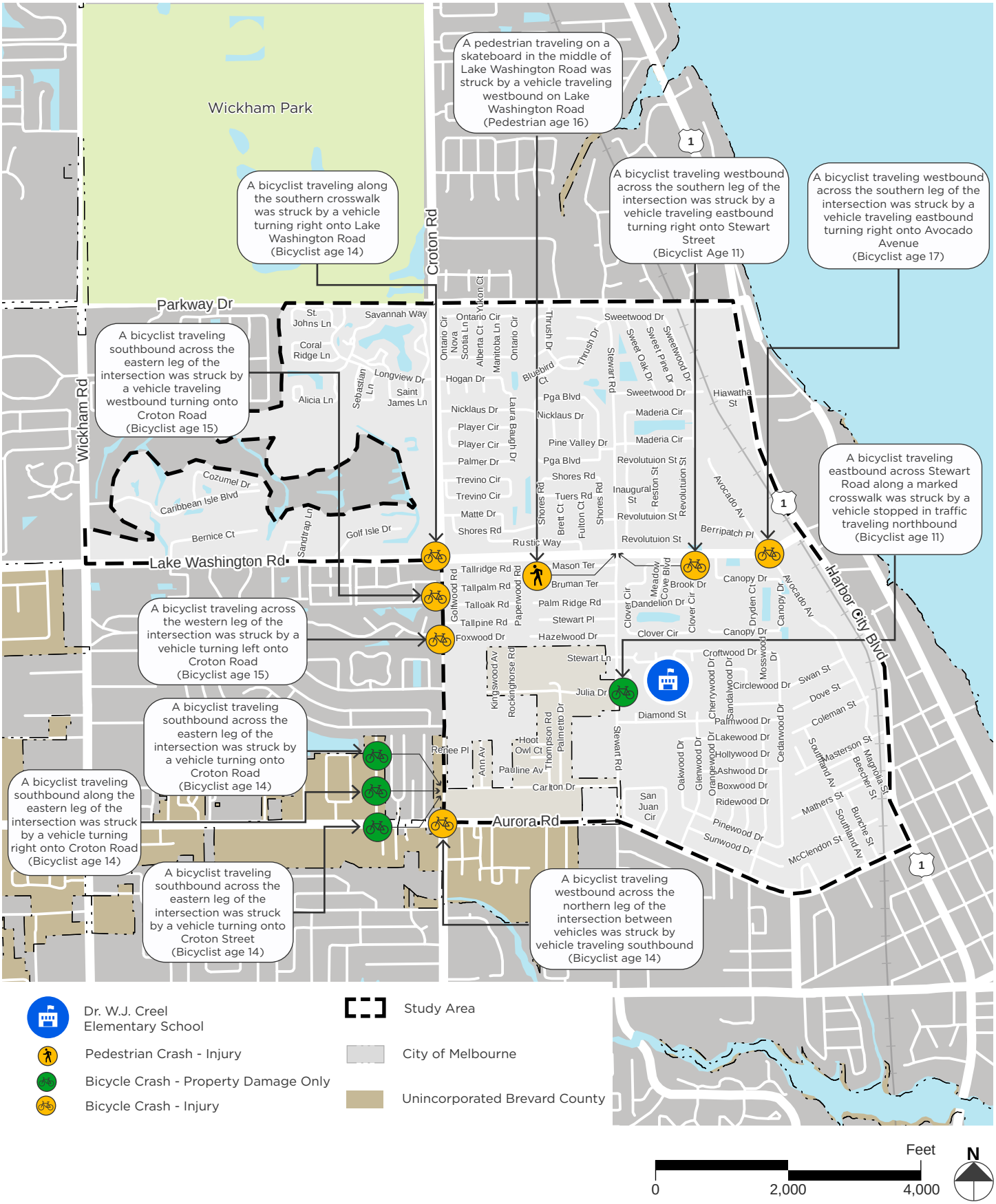


Figure 18: Bicycle and Pedestrian Crashes (2014 - 2018)

School Routes Analysis

Dr. W.J. Creel Elementary School

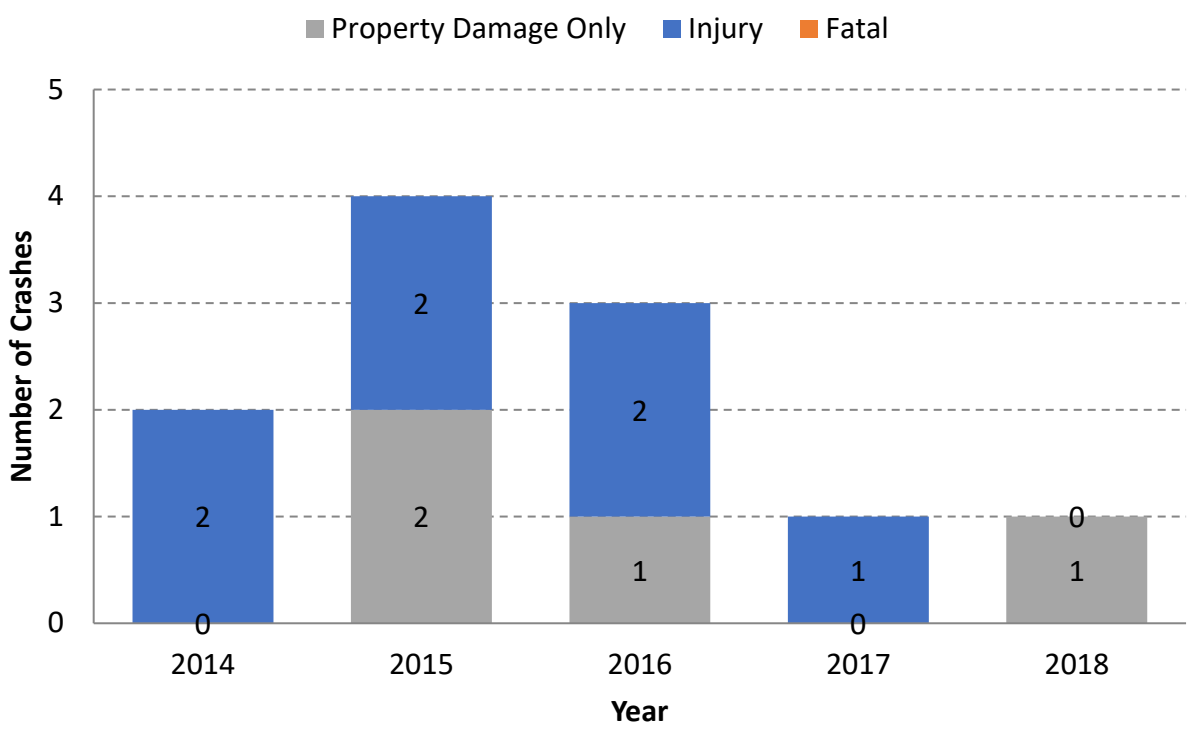


Figure 19: School-Aged Crashes by Year and Severity

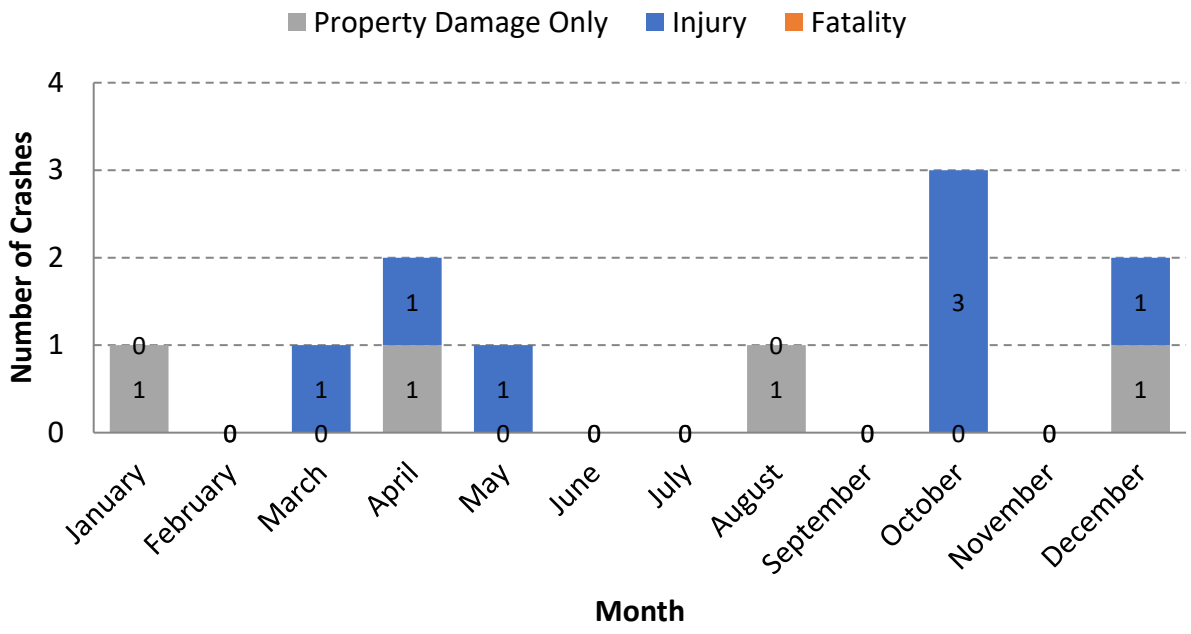


Figure 20: School-Aged Crashes by Month and Severity

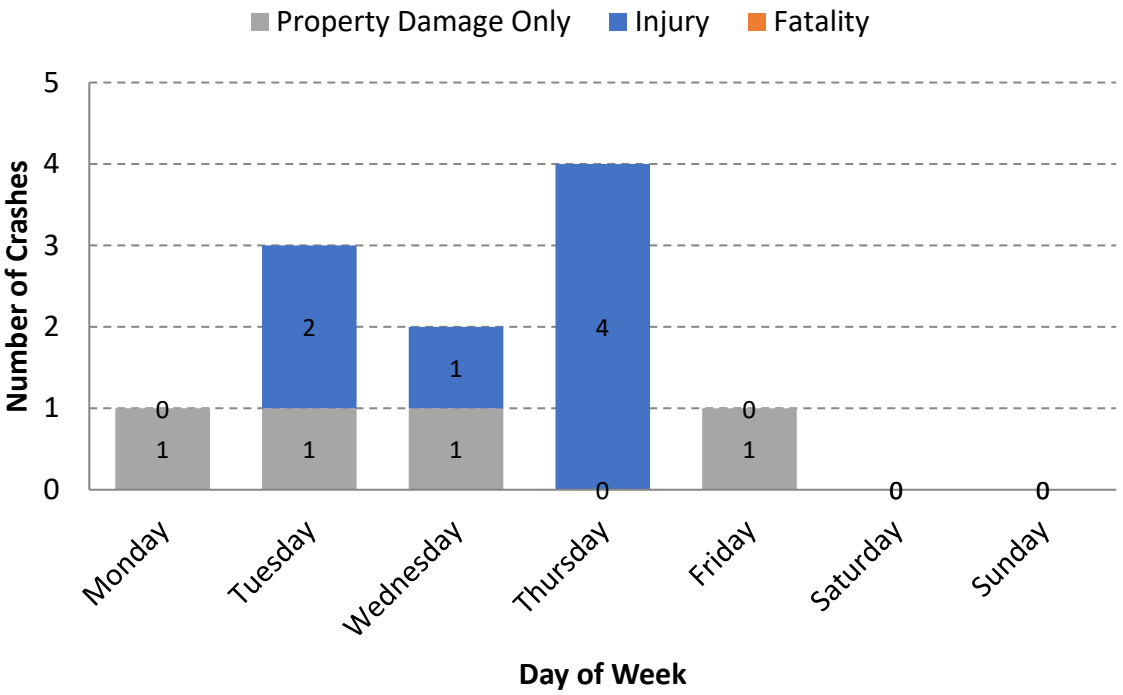


Figure 21: School-Aged Crashes by Day of Week and Severity

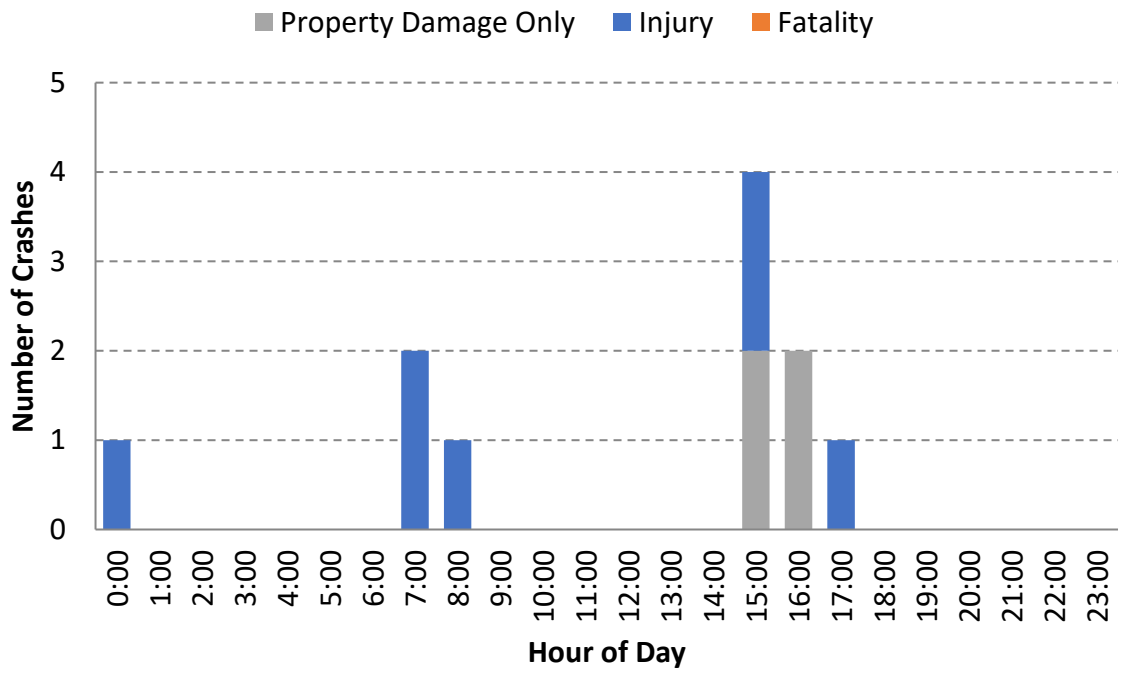


Figure 22: School-Aged Crashes by Hour of Day and Severity

Seven of the 11 crashes occurred in 2015 (four) and 2016 (three). The most crashes occurred in the month of October (three). All crashes occurred during the week with most crashes occurring on Tuesday (three) and Thursday (four). Most crashes occurred in the afternoon between 3 PM and 4 PM (four). A few other crash statistics worthy to note:

- Alcohol and/or drug involved did not account for any of the crashes; and
- Eight crashes involved a vehicle making a left or right turn at an intersection (based on the crash reports).

School-Aged Crash Report Summaries

Pedestrian Crashes:

1. Crash Number: 86395351
    - On October 25, 2016 at 12:26 AM, a crash involving a pedestrian occurred at the intersection of Lake Washington Road and Stewart Road. The pedestrian was traveling in the middle of Lake Washington Road on a skateboard and was struck by a vehicle traveling westbound on Lake Washington Road. The crash resulted in non-incapacitating injury. The crash occurred under dry conditions at night.

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 across the western leg of the intersection 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: 84798460
    - On October 30, 2015 at 7:55 AM, a crash involving a bicyclist occurred at the intersection of Lake Washington Road and Stewart Road. The bicyclist was traveling across the southern leg of the intersection and was struck by a vehicle traveling eastbound on Lake Washington Road who was turning right onto Stewart Road. The crash resulted in non-incapacitating injury. The crash occurred under dry conditions during the day.
3. Crash Number: 84550707
    - On January 23, 2015 at 4:20 PM, a crash involving a bicyclist occurred at the intersection of Stewart Road and Julia Drive. The bicyclist was traveling eastbound on Julia Drive crossing Stewart Road along a marked crosswalk and struck a vehicle stopped in traffic traveling northbound on Stewart Road. The crash did not result in injury. The crash occurred under dry conditions during the day.

4. Crash Number: 84799671
    - On March 12, 2015 at 8:05 AM, a crash involving a bicyclist occurred at the intersection of Lake Washington Road and Avocado Avenue. The bicyclist was traveling westbound across the southern leg of the intersection when a vehicle traveling eastbound on Lake Washington Road turning right onto Avocado Avenue struck the bicyclist. The crash resulted in non-incapacitating injury. The crash occurred under dry conditions during the day.
5. 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.
6. 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 southbound across the eastern leg of the intersection 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.
7. 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 the northern leg of the intersection 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.
8. 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 southbound across the eastern leg of the intersection 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.
9. 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 across the eastern leg of the intersection 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.

10. 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 across the eastern leg of the intersection 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.

Non-School Aged Pedestrian/Bicycle Crash Statistics

There were 19 total non-school aged pedestrian and bicycle crashes within the study area (ten pedestrian and nine bicycle). Eighty-four percent of the crashes occurred in daylight conditions, and 95 percent occurred with dry roadway conditions. The reported crashes are displayed by different measures of time (year, month, day, and hour) in **Figure 23**, **Figure 24**, **Figure 25,** and **Figure 26**.

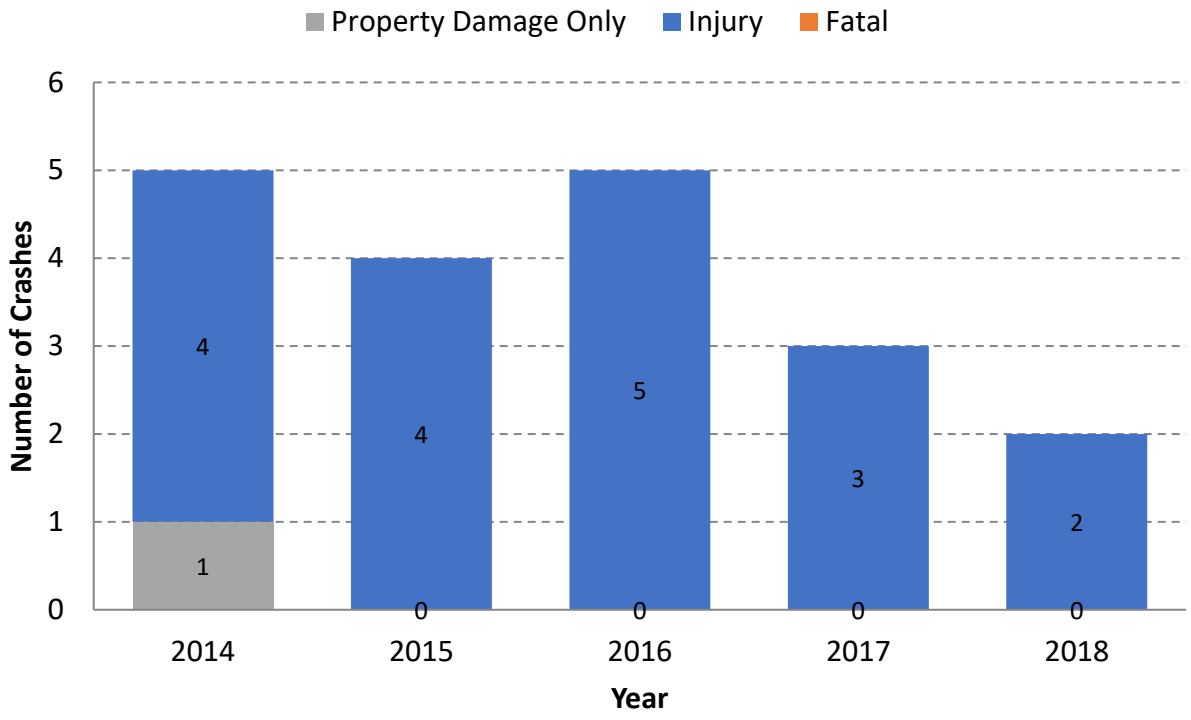


Figure 23: Non-School Aged Crashes by Year and Severity

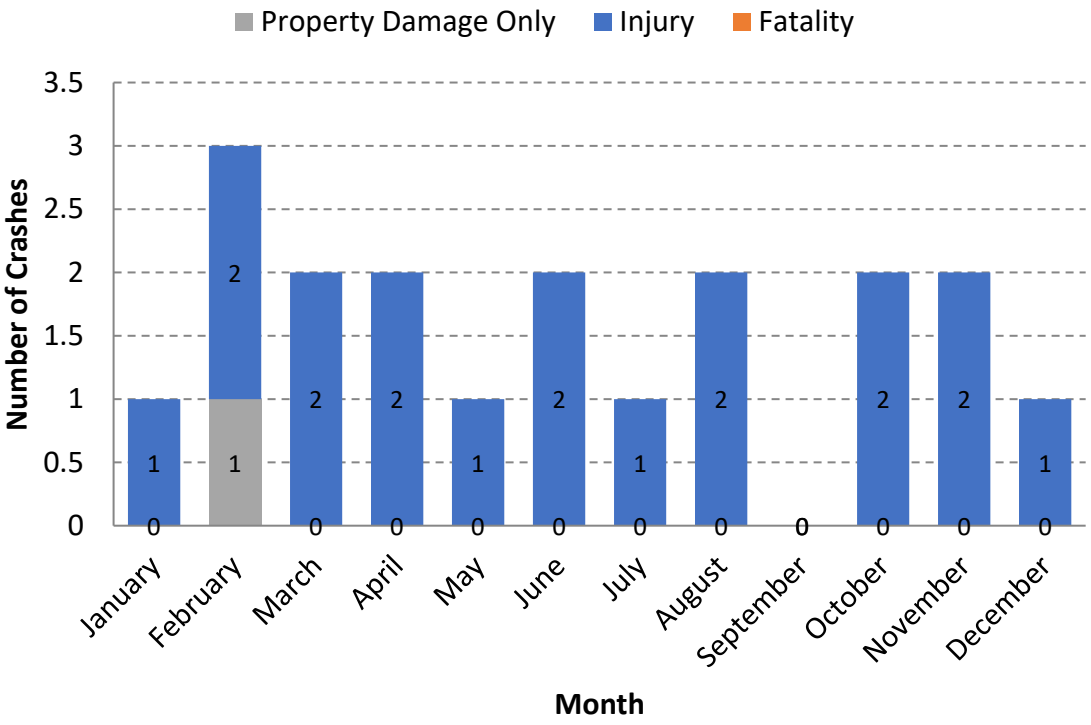


Figure 24: Non-School Aged Crashes by Month and Severity

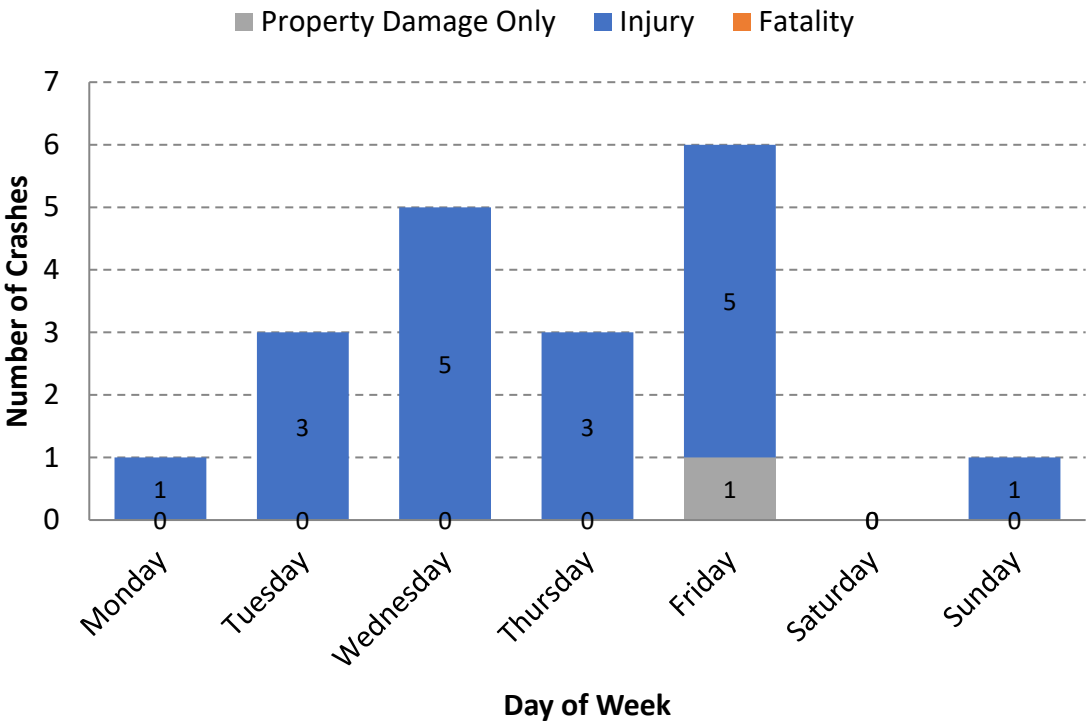


Figure 25: Non-School Aged Crashes by Day of Week and Severity

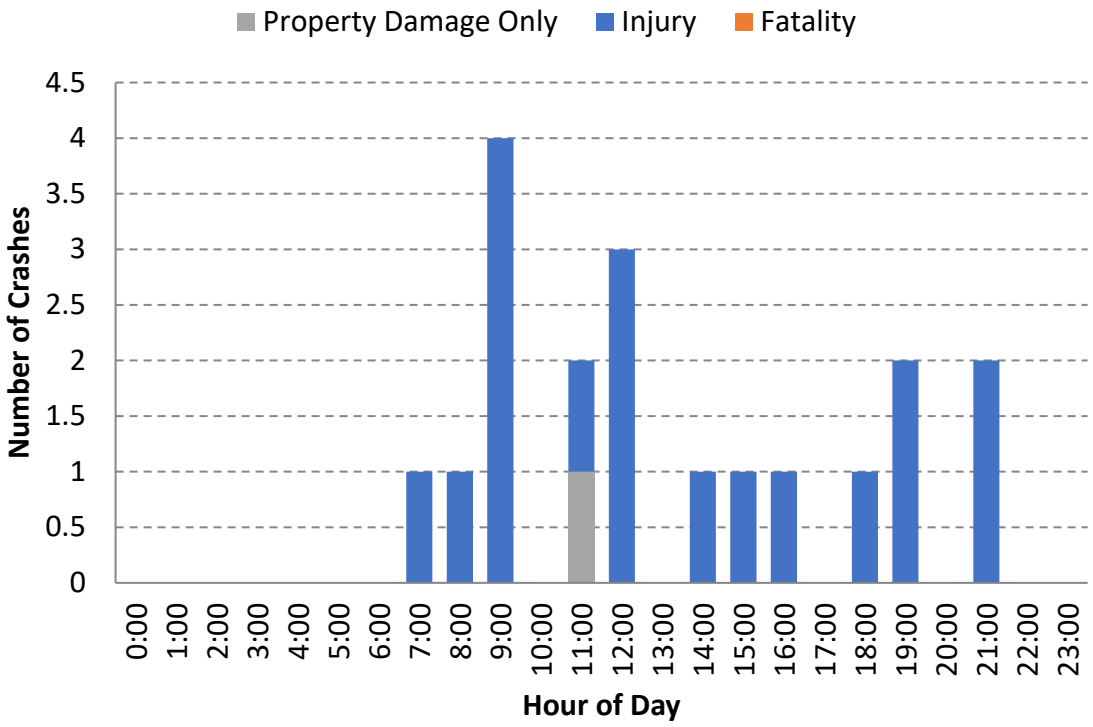


Figure 26: Non-School Aged Crashes by Hour of Day and Severity

Ten out of 19 crashes occurred in 2014 and 2016 (five crashes per year). February was the highest reported crash month (three). Most crashes occurred during the week with Friday being the most common crash day (six). By time of day, the two highest crash hours was from 9 AM to 10 AM (four). Alcohol and/or drug involved accounted for five percent of crashes.

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

Figure 27, Figure 28, **Figure 29**, and **Figure 30** 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).

Overall, there were more non-school aged crashes than school aged crashes from 2014 to 2018. School aged crashes only occurred during months when school is in session while non-school aged crashes occurred throughout the year. Most school aged crashes occurred on a Thursday (four) while most non-school aged crashes occurred on a Friday (six). Most school aged crashes occurred from 3 PM to 4 PM (four) while most non-school aged crashes occurred from 9 AM to 10 AM (four).

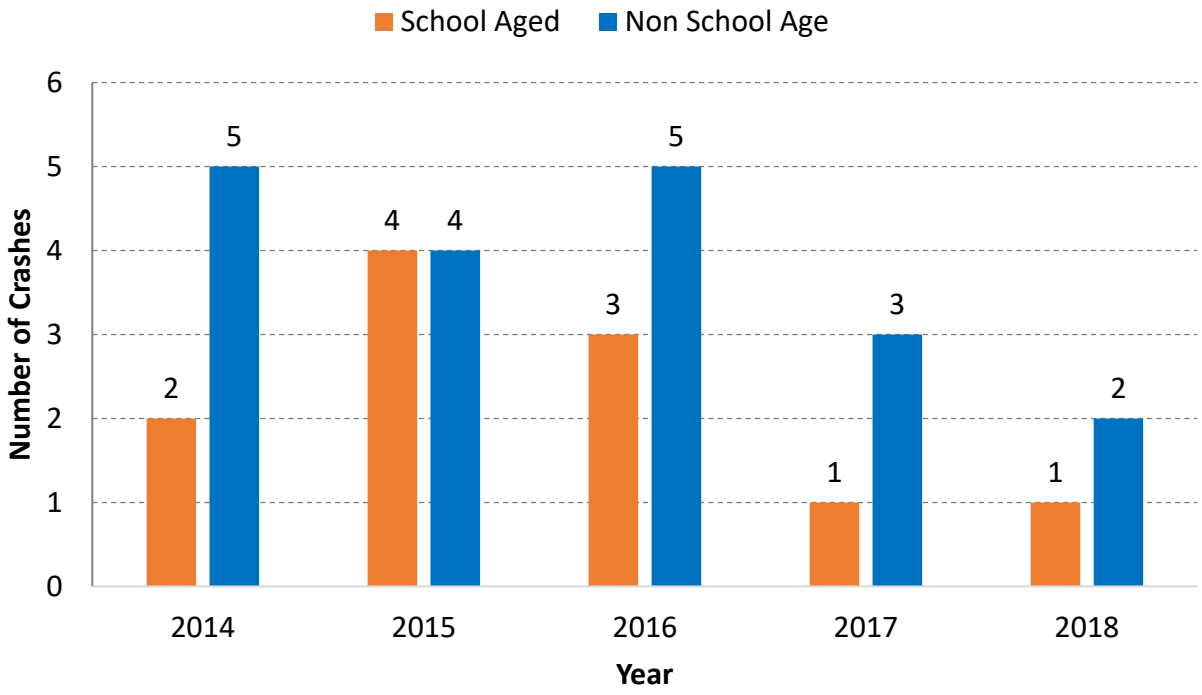


Figure 27: Comparison of School Aged and Non-School Aged Crashes by Year

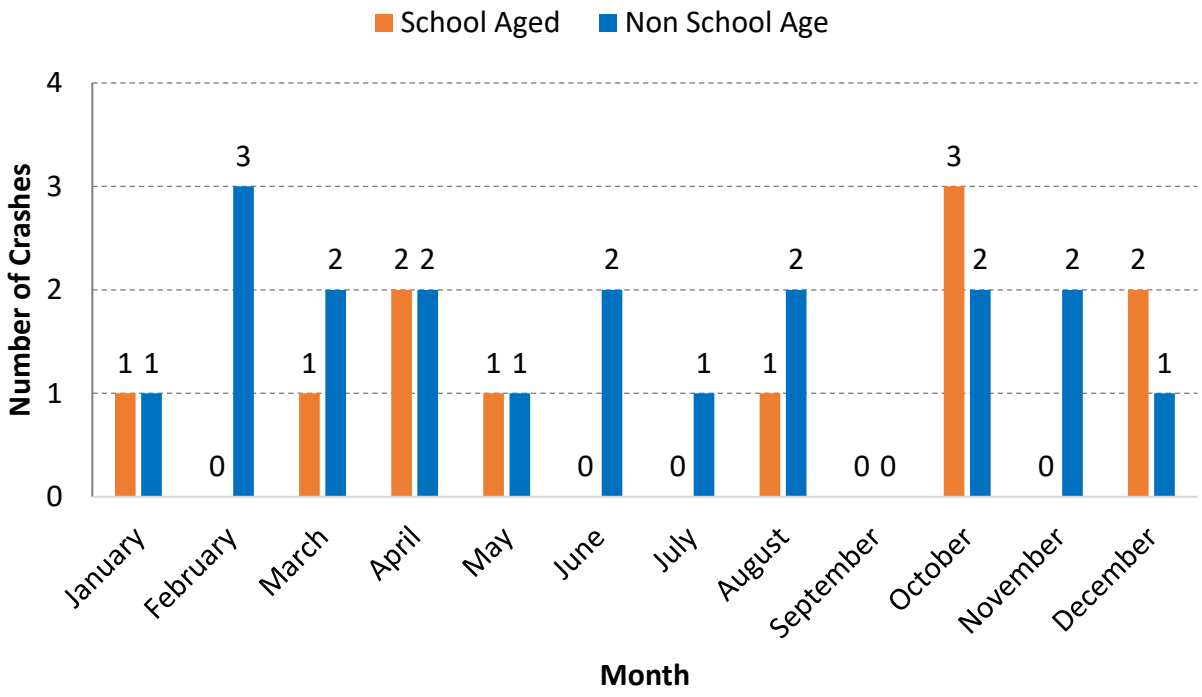


Figure 28: Comparison of School Aged and Non-School Aged Crashes by Month

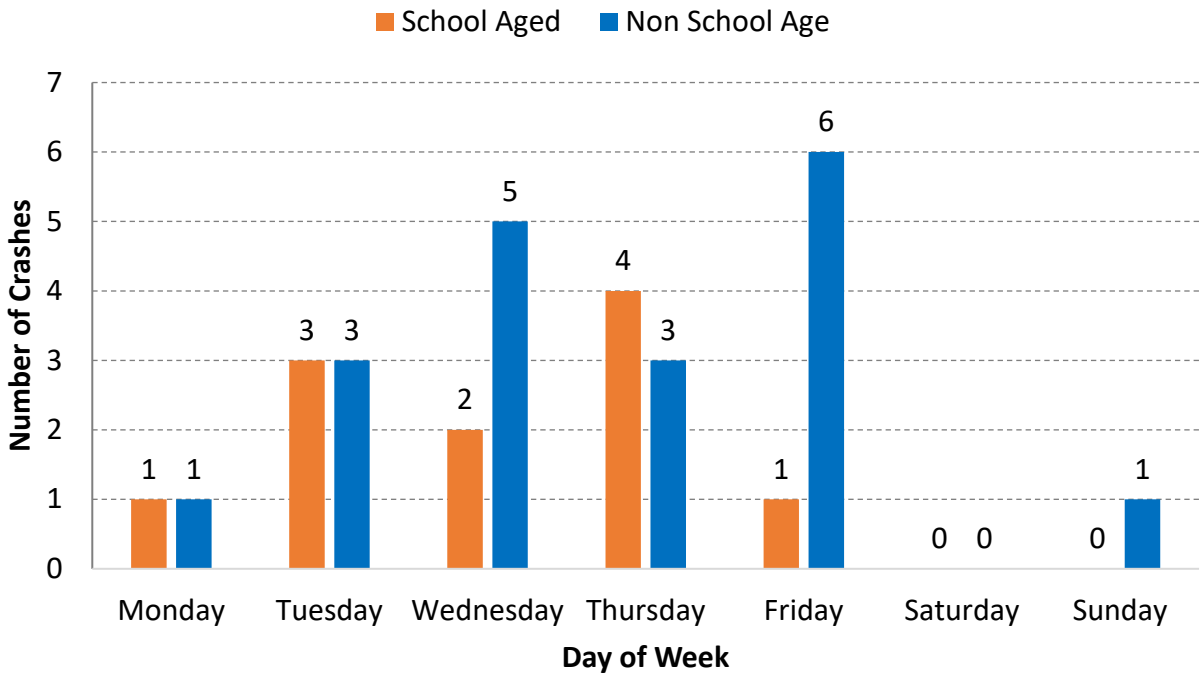


Figure 29: Comparison of School Aged and Non-School Aged Crashes by Day of Week

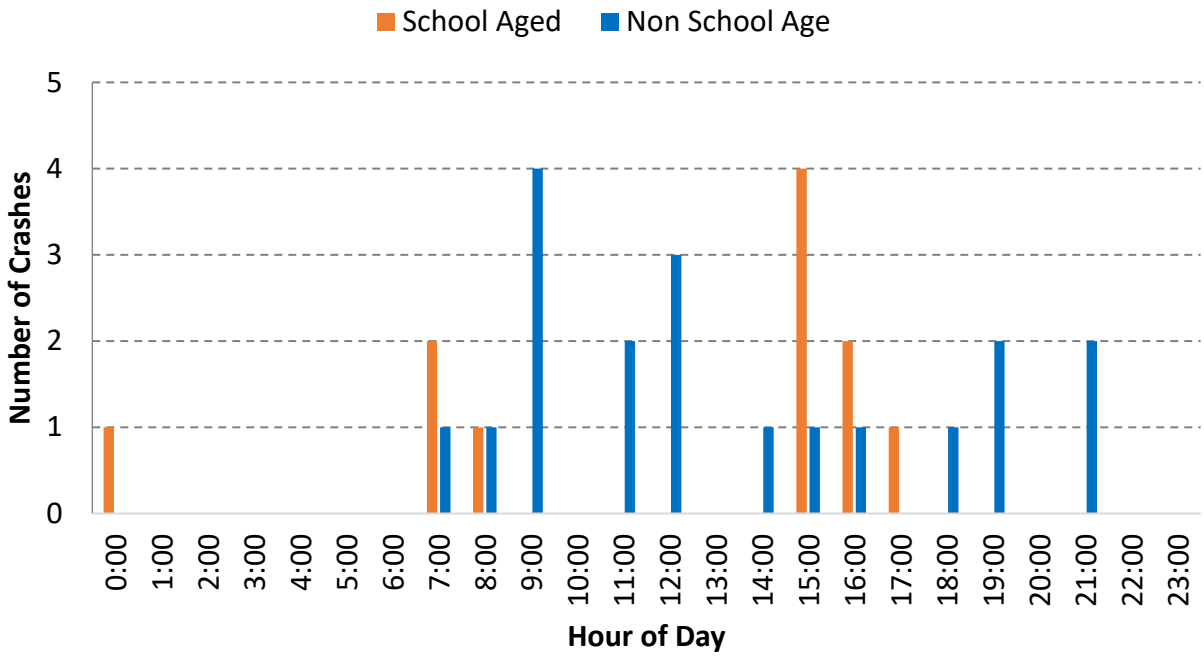


Figure 30: Comparison of School Aged and Non-School Aged Crashes by Hour of Day

School Coordination Meeting

A coordination meeting was held on February 3, 2020 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, SCTPO, KAI, and Dr. W.J. Creel Elementary School 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 initiating introductions. After brief introductions by the attendees, Sarah and Tami Gillen began the discussion with an overview of the project and work conducted to-date. She briefly introduced the meeting materials included in the attendee handout package. The materials shared with attendees include 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; and
    - 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).
- Two larger plots showing the school context aerial and a school campus aerial.

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 on Friday
- The peak period of students arriving in the morning is around 7:30 AM. Students walking to school begin congregating at the gate entrance to the school around 7:20 AM.
- The peak period of students leaving in the afternoon is 2:30 to 3:00 PM. Parents begin to queue around 1:15 PM for afternoon pick-up even though the dismissal time is 2:30 PM for the students.

School Entrances and Circulation

- There is one vehicle entrance to the school on Glenwood Drive at Palmwood Drive. Most students arrive to school by being dropped off by car, and some students use the same entrance to arrive via walking and bicycling.
- There is one vehicle exit to the school on Palmwood Drive about 280 feet east of Stewart Road.
- There are two pedestrian and bicycle entrances to the school campus: one located on the east side of Diamond Street and one on the west. These entrances coincide with the vehicle entrance/exit points.
- Students walking onto campus using the vehicle entrance use the paved shoulder on Glenwood Drive at Palmwood Drive.
- The gated entrance on Diamond Street at Glenwood Drive opens at 7:30 AM when students can use a sidewalk to access to school's main entrance.
- A crossing guard crosses students at Palmwood Drive and Glenwood Drive.
- Students bicycling to school leave their bicycles in one of two designated bicycle parking areas, near the school exit on the west side of campus and another on the east side of campus.
- The bus loop is located in the northwest corner of the school campus.
- After the school buses use the bus loop (around 7:50 AM), daycare vans/vehicles for Voluntary Prekindergarten Education Program (VPK) and vehicles for Exceptional Student Education (ESE) students use the bus loop for drop-off/pick-up.

Main Walking and Biking Routes

- There are traffic cones between the travel lane and marked shoulder along Glenwood Drive at the school vehicle entrance to aid students walking along Glenwood Drive to enter the school, since no sidewalk is present at this entrance.
- There are two bicycle parking locations on campus, one on the west side of campus near the school vehicle exit and one on the east side of campus.
- School staff use the parking lot in front of the school and park behind the school near the bus loop.
- There are sidewalk gaps on the west side of Stewart Road, but there is a continuous sidewalk on the east side of the roadway for the entire study area.
- There are four crossing guards for Dr. W.J. Creel Elementary School. Crossing guards are located at Lake Washington and Stewart Road (two crossing guards), Stewart Road and Palmwood Drive, and Glenwood Drive and Palmwood Drive.
- Some parents walk and bike with their children.

- After school, students walk to the Brevard Neighborhood Redevelopment Agency's Dorcas Outreach Center for Kids (DOCK) travelling along the canal parallel to Cedarwood Drive. Some students also bicycle from school to the DOCK in the afternoon.

Drop-Off/Pick Up

- Most students are dropped off and picked up by a parent/guardian in a vehicle.
- Older children use similar walking and bicycling routes to get to Johnson Middle School and Eau Gallie High School.
- Some vehicles entering and exiting the school on Palmwood Drive are making fast turning movements.
- In the afternoon, eastbound vehicles stack on Palmwood Drive next to the raised median west of Glenwood Drive, on Glenwood Drive at the vehicle entrance on the marked shoulder, and in the parent pickup/drop-off loop.
- Parents/guardians that want to park in the parking lot in front of the school pass the queued vehicles and drive in the grass area along Diamond Street to access the parking lot.

Recent and Planned Projects

- The school has requested to relocate the existing fencing in the southeast corner of the school property to be moved from the front of the sidewalk (currently adjacent to Diamond Street) to be behind the sidewalk. This would give walkers/bikers access to the sidewalk in the southeast corner of the school without the school having to open multiple gates.
- Stewart Road was recently resurfaced.
- The school installed new 'No Parking' signs.

Other Issues

- There have been incidents where residents yell at students walking on their lawn in absence of a sidewalk. Overall, lack of sidewalks in the surrounding neighborhoods is the primary concern from the school.
- A double gate is present at the northeast corner of the school which used to be an entrance for students walking and bicycling, until the local homeowners complained and had it closed.
- Speeding along Diamond Street has been observed. The speed humps along Diamond Street are not effective to slow speeds and could be replaced to slow vehicle speeds.

- The existing drainage swales along the west side of Stewart Road may prohibit the addition of sidewalks.
- Sidewalk gaps are present for the existing sidewalk on both sides of Palmwood Drive.
- There is no gateway feature for the school on Palmwood Drive.

Field Review

A field review was conducted on February 4, 2020 to review the existing conditions and to observe student drop-off activity from about 7:15 AM to 8:00 AM and student pick-up activity from 1:45 PM to 3:00 PM. Members from the Brevard County Schools, 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

- Crossing guards are located at Lake Washington and Stewart Road (two crossing guards), Stewart Road and Palmwood Drive, and Glenwood Drive and Palmwood Drive.
    - Crossing guard at Stewart Road/Palmwood Drive is present from 7:00 to 8:15 AM to cover Dr. WJ Dr. W.J. Creel Elementary School, Lyndon B. Johnson Middle School, and Eau Gallie High School.
    - In the morning – five to ten students crossing across Stewart Road at Palmwood Drive east/west, five to ten students crossing across Palmwood Drive at Stewart Road north/south.
- Teachers are present at arrival and dismissal to let students into and out of campus at the double gate on Glenwood Drive/Diamond Street and Palmwood Drive.
- Westbound vehicles sometime block the crosswalk across Palmwood Drive at Glenwood Drive as they wait for eastbound vehicles to turn into the school entrance.
- Students use the paved shoulder on Palmwood Drive and on Glenwood Drive to enter the campus using the vehicle entrance and use the sidewalk on Palmwood Drive to enter the campus using the vehicle exit.

School Campus

- Students walk on the surface parking lot and Diamond Street after the gate on Diamond Street and Glenwood Drive is closed at 2:45 PM.
- Sidewalk facilities end on both the north and south sides of Palmwood Drive approximately 400 feet west of Glenwood Drive.
- School buses, Prekindergarten Education Program (VPK) and Exceptional Student Education (ESE) vans enter a bus-only driveway loop in the northwest corner of the school campus.
- The existing speed humps along Diamond Street are not effective at slowing vehicles down and need to be replaced.

Study Area

- The major streets that students use to walk and bike to school include Stewart Road, Palmwood Drive, and Glenwood Drive.
- Drainage swales along Stewart Road from Aurora Road to Lake Washington Road would make adding sidewalk facilities on the west side cost prohibitive.
- School zone signage/designation could be more evident/prominent in the school study area, and gateway features at the Palmwood Drive/Glenwood Drive intersection could emphasize the school location.
    - The school zone speed limit signage (reduce to 15 MPH) states specific times when the school zone is in effect: 7-8 AM and 2:30-3 PM. While the times are correct Monday through Thursday, the Friday early release times are not reflected thus drivers will be driving the speed limit, or faster, through the school zones on Friday afternoon.
    - School zone speed limit signage is only present at the beginning of the school zone along both Stewart Road and Palmwood Drive, but the lengths of these school zones are ¼ to ½ miles long with multiple driveways and minor roads intersecting the school zone area. Thus, vehicles may enter the school zone and drive in the school zone without ever seeing a school zone speed limit sign.
    - Speeding is an issue along Stewart Road during the school zone times, drivers were observed driving 25+ MPH in the 15 MPH school zone

Morning Observations

- About sixteen students cross at Stewart Road and Lake Washington to get to school.
- Vehicles are exceeding the speed limit in the school zones.
- Parents park on Palmwood Drive and walk their child to school.
- In the AM peak, eastbound traffic on Palmwood Drive sometimes backs up toward Stewart Drive.
- Most vehicles turning into the school driveway did not have their turn signals on.
- Eastbound and westbound vehicles approaching the school entrance from Palmwood Drive 'negotiate' taking turns driving into the school entrance.
- Some vehicles block the crosswalk across Palmwood Drive at Glenwood Drive while another car turns into the school entrance.
- Approximately 64 children were observed walking to school using the vehicle entrance.
- Approximately 10 children were observed bicycling to school using the vehicle entrance.
- Some parents were accompanying their children to school (walking or bicycling).

- Speeding issues were noted as vehicles turned from Palmwood Drive into the school entrance at Glenwood Drive.
- The peak activity on Palmwood Drive last from approximately 7:45 AM to 7:55 AM.
- Some older kids were observed walking west on Palmwood Drive to Stewart Road, likely heading to Johnson Middle School or Eau Gallie High School.
- The western bicycle rack had twenty bicycles parked in it and the eastern bicycle rack had ten.
- The bus loop gate on the northwest corner of campus opened at 7:00 AM. The first bus arrived at 7:15 AM and the last bus arrived at 7:38 AM. There were nine buses total, and each exited the bus loop once the students boarded.
- At 7:38 AM, four daycare vans entered the bus loop.
- When the school buses enter and exit the bus loop driveway, no other vehicle can fit through the driveway simultaneously.
- Teachers parked their vehicles behind the school campus by the bus loop. Seventeen cars entered the bus loop in the morning.

Afternoon Observations

- In the PM before school dismissal, some parents/guardians will park on the outside of the marked shoulder where the safety cones are located on Glenwood Drive at Palmwood Drive
- Vehicles began queuing by the median on Palmwood Drive and by the shoulder on Glenwood Drive around 1:15 PM.
- At the vehicle entrance, a total of fifty-four walkers and ten bicyclists were observed leaving campus with fifty-one walkers and six bicyclists going east on Palmwood Drive.
- Students were observed walking along the canal adjacent to Cedarwood Drive and crossing the guardrail to access the Brevard Neighborhood Redevelopment Agency's Dorcas Outreach Center for Kids (DOCK) on Masterson Street.
- Multiple vehicles were observed driving the wrong way down Diamond Street (prior to vehicles stacking for school dismissal) to exit the school via the eastern entrance at Palmwood Drive/Glenwood Drive.
- Vehicles were also observed turning into the exit driveway for the school along Palmwood Drive and driving the wrong way to reach the entrance to the school or the parking lot.
- Three field trip buses entered the bus loop on the northwest corner of campus at 1:24 PM and two of the buses left after students alighted.

- At 1:34 PM, twenty-four vehicles were lined up outside the bus loop gate to enter the bus loop for daycare/ESE dismissal. The vehicles left the bus loop once students were boarded, and once all the vehicles were gone the bus loop gate closed again.
- At 1:45 PM, the bus loop gates were reopened for school buses.
- Two vehicles entered the bus loop and waited for regular dismissal.
- Four buses entered the bus loop at 1:50 PM and departed after students boarded. The last bus exited the loop at 2:24 pm.
- Five buses entered the bus loop at 2:23 PM and the last bus entered at 2:45 PM.

Opportunities

- A potential opportunity is to add new sidewalk to fill in gaps on Palmwood Drive between Stewart Road and Glenwood Drive on the both sides of the road.
- Potential opportunities to add new sidewalks on the following roads:
    - Glenwood Drive from Aurora Road to Palmwood Drive
    - Palmwood Drive from Cedarwood Drive to Stewart Road
    - Mosswood Drive from Aurora Road to Palmwood Drive
    - Cedarwood Drive from Mosswood Drive to south of Swan Street
- Add a gateway feature on Palmwood Drive at Glenwood Drive.
- A potential opportunity is to add a paved trail from Swan Street down to the DOCK along the canal.
- A potential solution to accommodate the parents/guardians during drop-off/pick-up is to create a second travel lane between the school entrance and the parking lot along Diamond Street.
- A potential solution to fast turning movements into and out of the school is to 'tighten' the intersection by extending the medians and reducing the corner curb return radii.
- There are opportunities to improve school zone signage/visibility along both Stewart Road and Palmwood Drive. Changing the 15 MPH speed zone signage from a static "from X time to X time" to a more dynamic flashing beacon would help with the variability in school dismissal times on Fridays. Also, more school zone signage should be installed intermittently along both Stewart Road and Palmwood Drive for drivers entering the school zone between the existing school zone signage.
- There is an opportunity to provide regular police enforcement along Stewart Road north of Aurora during school zone times to help reduce the amount of speeding.
- Stewart Road/Palmwood Drive intersection opportunities
    - Add sidewalk connection on the northeast corner between the sidewalk along Stewart Road and the sidewalk along Palmwood Drive where the "cow path" is currently located.

    - Add a concrete landing pad on the northwest corner to provide a waiting area for the marked east/west crosswalk.
- Remove stop sign and stop bar for the southbound movement coming out of the school at Palmwood Drive/Glenwood Drive. Also install “Do Not Enter” signage along Diamond Street facing west.
- Add a new sidewalk along the east side of the school entrance to the Palmwood Drive/Glenwood Drive intersection.
- Add pavement along Diamond Street from the Palmwood Drive/Glenwood Drive intersection to where the paved parking begins on the south side of Diamond Street for a second travel lane. This would allow for the outside lane to be used for stacking cars waiting in the parent drop-off/pick-up loop and the inside lane can be used by a car to pass the stacked vehicles to get to the parking lot.
- New speed humps should be installed along Diamond Street.
- The school has requested to relocate the existing fencing in the southeast corner of the school property to be moved from the front of the sidewalk (currently adjacent to Diamond Street) to be behind the sidewalk.
- A potential opportunity is to restripe the crosswalks to be high-visibility crosswalks to the school’s main entrance.
- The "End School Zone" signage is faded along Palmwood Drive.
- Perform a study to review changing the Palmwood Drive/Glenwood Drive intersection into an all-way stop control intersection or a roundabout. This would help better control the conflicts between students using the east leg crosswalk and the east/west through movement traffic along Palmwood Drive.
- The corners of the intersections at Palmwood Drive/Glenwood Drive and the Palmwood Drive school exit should be reconstructed to reduce the turning radii, helping to slow turning vehicles down.
- A channelized raised median should be added in the middle of Palmwood Drive at the school exit driveway to prevent eastbound vehicles along Palmwood Drive from making a left turn into the exit. The channelized median would still allow for lefts out from the school exit.
- Providing an eastbound left turning lane on Palmwood Drive at the Glenwood Drive intersection was reviewed during the field review. Stacking along Palmwood Drive west of Glenwood Drive was not observed to interfere with eastbound through movement traffic, and these stacked vehicles dissipated by 2:45 PM. At this time, the cost of the new left turn lane would outweigh the benefit that would be provided for 15-30 minutes during the day.


SCHOOL
SPEED
LIMIT
15
7:00 - 8:00 AM
2:30 - 3:00 PM
CAUTION
SCHOOL
WALKWAY

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 Dr. W.J. Creel 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 31** and **Figure 32**.

Table 2: School Campus Recommendations

No.	Location	Recommendation	Type	Time-Frame	Cost Estimate
1	School Entrance Driveway	Build an 8 foot wide sidewalk along the east side of the school entrance to the Palmwood Drive/Glenwood Drive intersection.	Sidewalk	Near-Term	$10,000 to $15,000
2	Diamond Street	Install new speed humps along Diamond Street.	Traffic Calming	Near-Term	$30,000 to $35,000
3	Diamond Street	Install “Do Not Enter” signage along Diamond Street facing west.	School Circulation	Maintenance	$10,000 to $15,000

No.	Location	Recommendation	Type	Time-Frame	Cost Estimate
4	Between Surface Parking Lot and Drop-Off/Pick-Up Loop	Restripe the crosswalks to be high-visibility crosswalks from parking lot to the school's main entrance.	Crossing	Near-Term	<$10,000
5	Parent Drop-Off/Pick-Up Loop	Add pavement for a second travel lane along Diamond Street from the Palmwood Drive/Glenwood Drive intersection to where the paved parking begins on the south side of Diamond Street.	School Circulation	Near-Term	$265,000 to $310,000
6	Southeast Corner of School Campus	The school has requested to relocate the existing fencing in the southeast corner of the school property to be moved from the front of the sidewalk (currently adjacent to Diamond Street) to be behind the sidewalk.	Sidewalk	Near-Term	$25,000 to $30,000

Table 3: Study Area Recommendations

No.	Location	Recommendation	Type	Time-Frame	Cost Estimate
7	Stewart Road School Zone	Provide regular police enforcement along Stewart Road north of Aurora Road during school zone times.	Enforcement	Near-Term	Enforcement could be included as part of a regularly scheduled patrol.
8	Stewart Road and Palmwood Drive School Zones	Change the 15 MPH speed zone signage from a static "from X time to X time" to a flashing beacon. Install more school zone signage intermittently along both Stewart Road and Palmwood Drive.	Sign/Signal	Near-Term	$45,000 to $55,000
9	Stewart Road and Palmwood Drive Intersection	Build an 8 foot wide sidewalk in the northeast corner where the "cow path" is currently located.	Sidewalk	Near-Term	<$10,000
10	Stewart Road and Palmwood Drive Intersection	Add an ADA compliant pedestrian landing pad on the northwest corner to provide a waiting area for the marked east-west crosswalk.	Crossing	Near-Term	<$10,000
11	Palmwood Drive and Glenwood Drive Intersection	Extend the existing median toward the intersection to reduce vehicle turning speeds and reduce the corner curb return radii at the intersection.	Traffic Calming	Near-Term	$10,000 to $15,000

No.	Location	Recommendation	Type	Time-Frame	Cost Estimate
12	School Exit Driveway at Palmwood Drive	Reduce the corner curb radii on northeast and northwest corners.	Traffic Calming	Near-Term	<$10,000
13	School Exit Driveway at Palmwood Drive	Build a channelized raised median in the middle of Palmwood Drive at the school exit driveway to prevent eastbound vehicles along Palmwood Drive from making a left turn into the exit. The channelized median would permit for southbound left from the school exit.	Traffic Calming	Near-Term	$15,000 to $20,000
14	Palmwood Drive and Glenwood Drive Intersection	Remove stop sign and stop bar for the southbound movement coming out of the school at Palmwood Drive/Glenwood Drive.	Sign/Signal	Near-Term	<$10,000
15	Palmwood Drive and Glenwood Drive Intersection	Perform a study to review changing the intersection into an all-way stop control intersection or a roundabout. This would help better control the conflicts between students using the east leg crosswalk and the east/west through movement traffic along Palmwood Drive.	Feasibility Study (Intersection Control)	Near-Term	Further study required

No.	Location	Recommendation	Type	Time-Frame	Cost Estimate
16	Palmwood Drive and Glenwood Drive Intersection	Add a gateway feature for Dr. W.J. Creel Elementary School.	School Circulation	Near-Term	Specific gateway feature elements should be discussed with the School/School Board before an estimate is generated.
17	Palmwood Drive School Zone	Replace the faded "End School Zone" signage along Palmwood Drive.	Sign/Signal	Maintenance	<$10,000
18	Along the Canal from Swan Street to the Dorcas Outreach Center for Kids (DOCK)	Conduct a feasibility study to add a paved trail connecting Swan Street and the DOCK.	Feasibility Study (Trail)	Near-Term	Further study required
19	Glenwood Drive from Aurora Road to South of Palmwood Drive	Build a 5 to 6 foot wide sidewalk on the west side of the road to connect to existing sidewalk.	Sidewalk	Near-Term	$125,000 to $145,000
20	Palmwood Drive from Stewart Road to Cedarwood Drive	Build 5 to 6 foot wide sidewalks to fill gaps on both sides of the road.	Sidewalk	Near-Term	$235,000 to $275,000
21	Mosswood Drive from Aurora Road to Palmwood Drive	Build 5 to 6 foot wide sidewalks both sides of the road.	Sidewalk	Near-Term	$325,000 to $375,000

No.	Location	Recommendation	Type	Time-Frame	Cost Estimate
22	Cedarwood Drive/Pinewood Drive from Mosswood Drive to South of Swan Street	Build a 5 to 6 foot wide sidewalk on the south/east side of the road to connect to existing sidewalk.	Sidewalk	Near-Term	$175,000 to $205,000
23	Palmwood Drive and Glenwood Drive Intersection	Restripe the east leg crosswalk to be a high-visibility crosswalk. Add a new high-visibility crosswalk on north and south legs and ADA compliant pedestrian ramps on all four corners.	Crossing	Maintenance	$15,000 to $20,000
24	Stewart Road and Julia Drive Intersection	Add a 5 to 6 foot wide sidewalk connection and an ADA compliant pedestrian landing pad from the edge of the road to the existing sidewalk on the east side of the road.	Crossing	Near-Term	<$10,000
25	Stewart Road and Carlton Drive Intersection	Add a 5 to 6 foot wide sidewalk connection and an ADA compliant pedestrian landing pad from the edge of the road to the existing sidewalk on the east side of the road. Add stop bars and 'Stop Here for Pedestrian' signs on the northern and the southern approaches along Stewart Road in advance of the marked crosswalk.	Crossing	Near-Term	<$10,000
26	Stewart Road from Palmwood Drive to the Northern School Driveway	Widen the existing east side sidewalk from 5 feet to 8 feet.	Sidewalk	Long-Term	$60,000 to $70,000

Figure 31: Recommendations: School Context Aerial Map

School Routes Analysis

Dr. W.J. Creel Elementary School

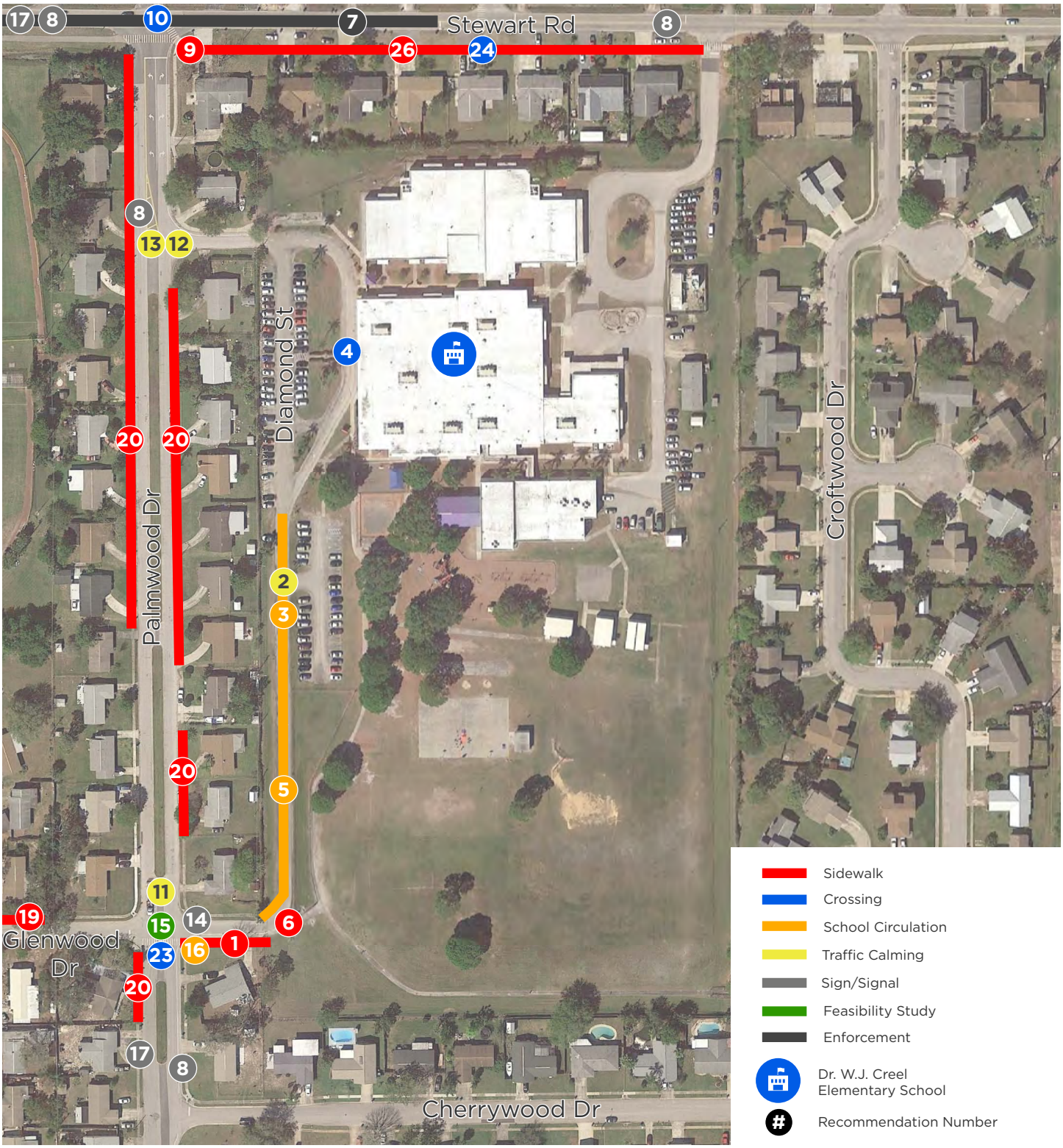


Figure 32: Recommendations: School Campus Aerial Map

School Routes Analysis

Dr. W.J. Creel 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.

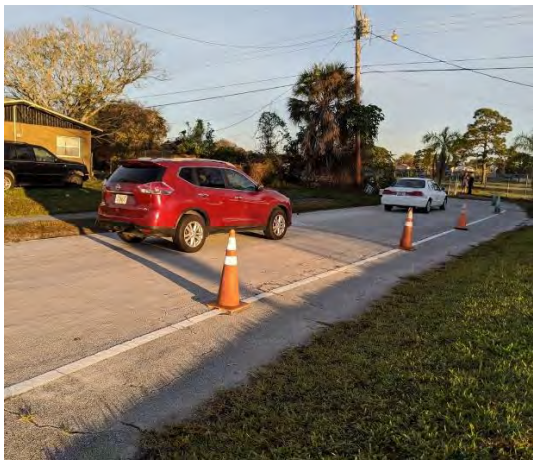
Figure 33 below shows an example of the cost estimate process described above.

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 33: Example Cost Estimate Process

Project 1: New sidewalk connection at the school campus entrance

Location	School Entrance Driveway
Type	Sidewalk
Issue	There are no sidewalks located on the east side of the school entrance.
Recommendation	Build an 8 foot wide sidewalk along the east side of the school entrance to the Palmwood Drive/Glenwood Drive intersection.



Sidewalk Connection on East Side of Glenwood Drive in Blue

	Implementation Time-Frame	Near-Term
	Estimated Project Cost	$10,000 to $15,000
	Right-of Way Needed?	Unknown
	Drainage or Utility Impact?	Unknown
	Responsible Agency	City of Melbourne/Brevard County Public Schools

Project 2: Install speed humps on the school campus

Location	Diamond Street
Type	Traffic Calming
Issue	The existing speed humps along Diamond Street are worn.
Recommendation	Install new speed humps along Diamond Street.

Worn Speed Humps

Diamond Street on School Campus

	Implementation Time-Frame	Near-Term
	Estimated Project Cost	$30,000 to $35,000
	Right-of Way Needed?	No
	Drainage or Utility Impact?	No
	Responsible Agency	Brevard County Public Schools

Project 3: Install “Do Not Enter” signage on school campus

Location	Diamond Street
Type	School Circulation
Issue	Some vehicles are entering campus from the entering from the school exit and driving the wrong direction on Diamond Street.
Recommendation	Install “Do Not Enter” signage along Diamond Street facing west.

Diamond Street on School Campus in Blue

	Implementation Time-Frame	Maintenance
	Estimated Project Cost	$10,000 to $15,000
	Right-of Way Needed?	No
	Drainage or Utility Impact?	No
	Responsible Agency	Brevard County Public Schools

Project 4: High-visibility crosswalk restriping

Location	**Between Surface Parking Lot and Drop-Off/Pick-Up Loop**
Type	**Crossing**
Issue	The crosswalk between the surface parking lot directly in front of the school main entrance connecting to the surface parking lot has longitudinal striping.
Recommendation	Restripe the crosswalks to be high-visibility crosswalks from parking lot to the school's main entrance.

School Drop-Off/Pick-Up Loop and Crossing in Blue

	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 5: Add a second travel lane on Diamond Street

Location	Parent Drop-Off/Pick-Up Loop
Type	School Circulation
Issue	There are cars going to the drop-off/pick-up loop and cars going through to the surface parking lot directly in front of the school main entrance and to the school exit.
Recommendation	Add pavement for a second travel lane along Diamond Street from the Palmwood Drive/Glenwood Drive intersection to where the paved parking begins on the south side of Diamond Street.

Diamond Street Second Travel Lane

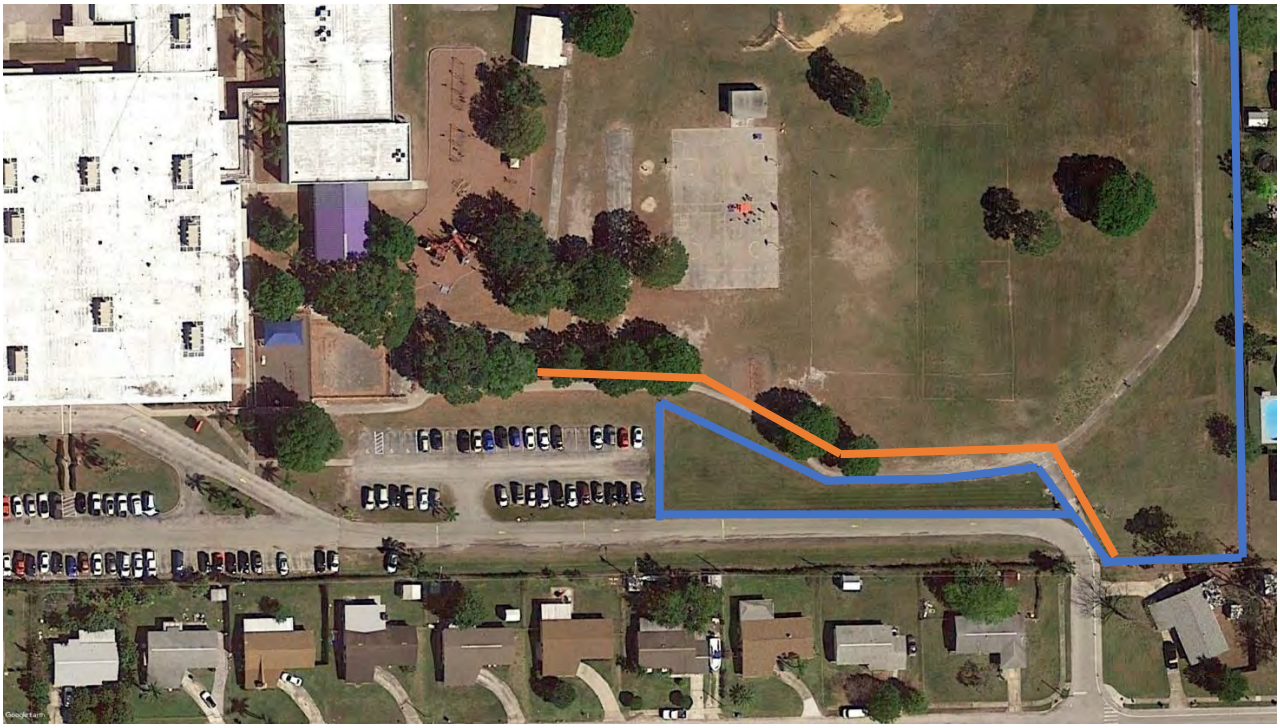
	Implementation Time-Frame	Near-Term
	Estimated Project Cost	$265,000 to $310,000
	Right-of Way Needed?	No
	Drainage or Utility Impact?	Drainage Impact
	Responsible Agency	Brevard County Public Schools

Project 6: Relocate fencing for sidewalk to main school entrance

Location	**Southeast Corner of School Campus**
Type	**Sidewalk**
Issue	There is a fence separating the sidewalk on the school campus from the paved shoulder on Glenwood Drive. The fence parallels Diamond Street up to the first surface parking lot, and then continues north until it circles back to Diamond Street at Glenwood Drive.
Recommendation	The school has requested to relocate the existing fencing in the southeast corner of the school property to be moved from the front of the sidewalk (currently adjacent to Diamond Street) to be behind the sidewalk.

Existing Fence on Diamond Street and Sidewalk on Campus Behind Fence

	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	**Brevard County Public Schools**



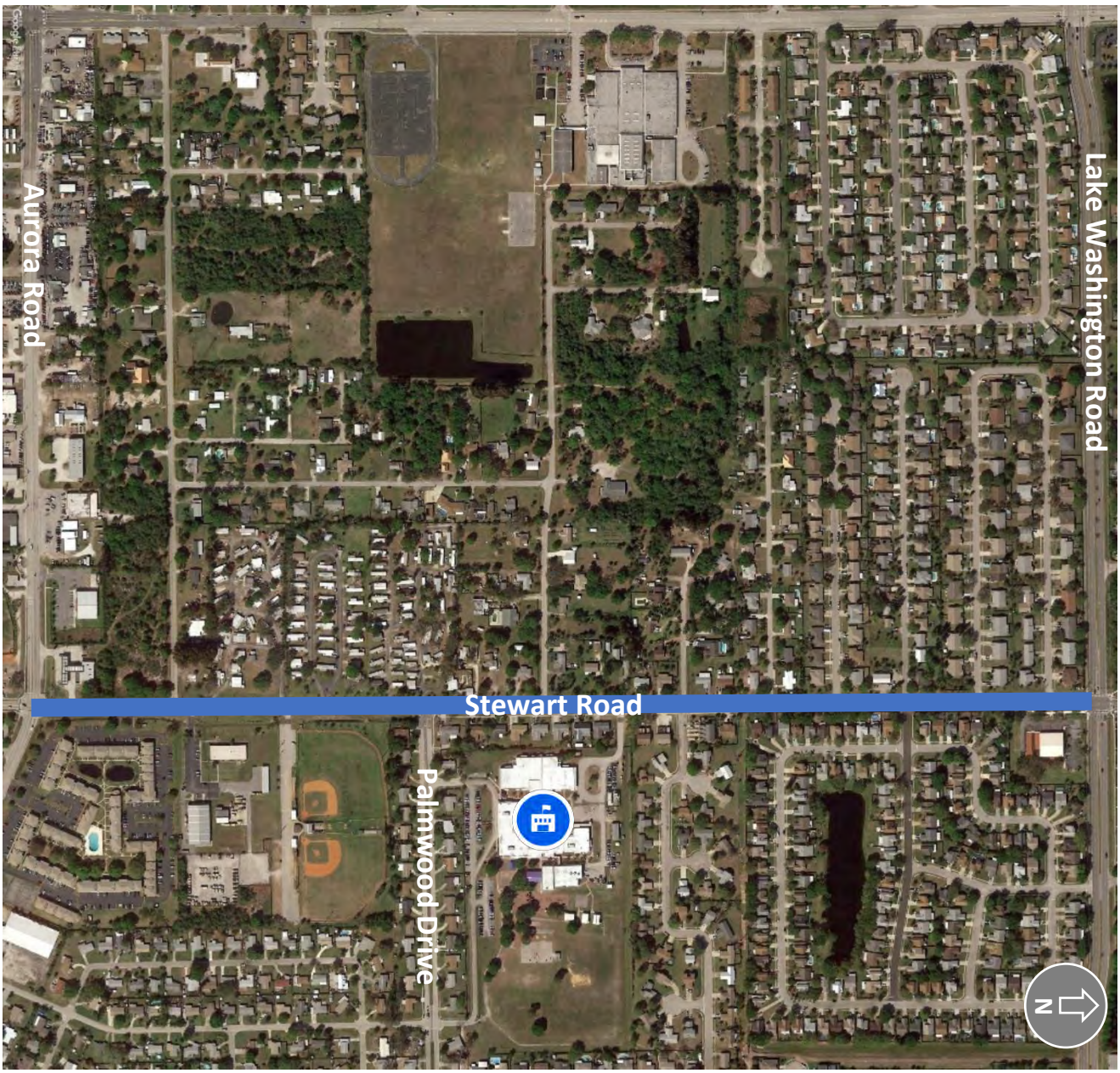
Location of Existing Fence in Blue and Proposed Fenced in Orange

Project 7: Provide regular police enforcement by campus

Location	Stewart Road School Zone
Type	Enforcement
Issue	There is speeding activity along Stewart Road north of Aurora Road.
Recommendation	Provide regular police enforcement along Stewart Road north of Aurora Road during school zone times.

Stewart Road North of Aurora Road

	Implementation Time-Frame	Near-Term
	Estimated Project Cost	Enforcement could be included as part of a regularly scheduled patrol.
	Right-of Way Needed?	No
	Drainage or Utility Impact?	No
	Responsible Agency	City of Melbourne



Provide Regular Enforcement on Stewart Road

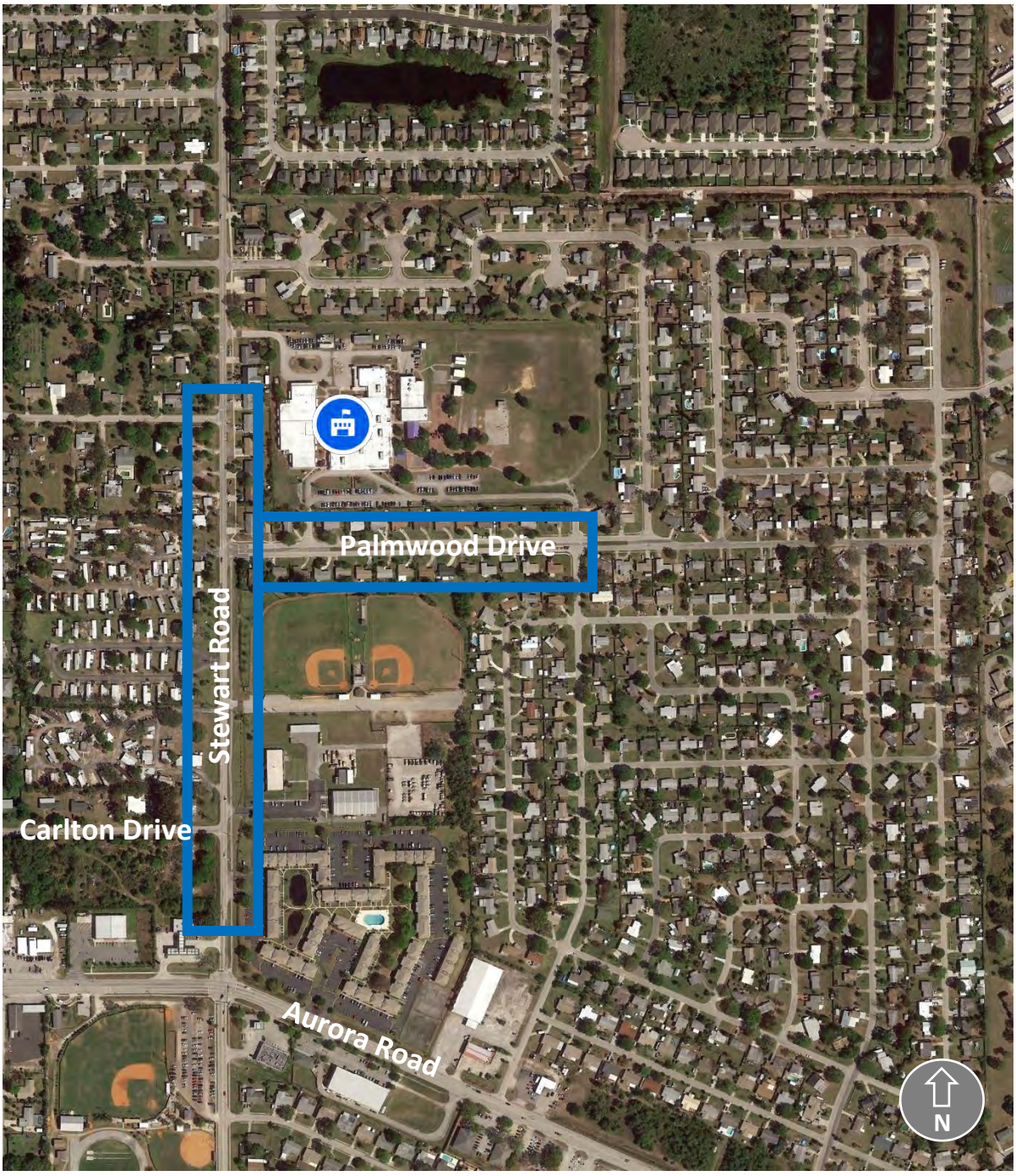
Project 8: Install flashing beacons

Location	Stewart Road and Palmwood Drive School Zones
Type	Sign/Signal
Issue	The existing speed zone signage is not slowing drivers in the school zones.
Recommendation	Change the 15 MPH speed zone signage from a static "from X time to X time" to a flashing beacon. Install more school zone signage intermittently along both Stewart Road and Palmwood Drive.

Existing School Zone Sign

Proposed Flashing Beacon

	Implementation Time-Frame	Near-Term
	Estimated Project Cost	$45,000 to $55,000
	Right-of Way Needed?	No
	Drainage or Utility Impact?	No
	Responsible Agency	City of Melbourne



Install Flashing Beacons and School Zone Signage in School Zones in Blue

Project 9: Build 8 foot sidewalk

Location	Stewart Road and Palmwood Drive Intersection
Type	Sidewalk
Issue	There is no sidewalk on the northeast corner of Stewart Road and Palmwood Drive intersection where a “cow path” currently exists.
Recommendation	Build an 8 foot wide sidewalk in the northeast corner where the “cow path” is currently located.

Existing “Cow Path” in Blue

	Implementation Time-Frame	Near-Term
	Estimated Project Cost	Less than $10,000
	Right-of Way Needed?	Unknown
	Drainage or Utility Impact?	Unknown
	Responsible Agency	City of Melbourne

Project 10: Install pedestrian landing pad

Location	**Stewart Road and Palmwood Drive Intersection**
Type	**Crossing**
Issue	There is no pedestrian landing pad on the west side of Stewart Road at Palmwood Drive for the east-west crosswalk.
Recommendation	Add an ADA compliant pedestrian landing pad on the northwest corner to provide a waiting area for the marked east-west crosswalk.

Pedestrian Landing Pad for Northwest Corner of Stewart Road and Palmwood Drive in Blue

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

Examples of ADA Compliant Pedestrian Curb Ramps

Diagonal Pedestrian Ramp

Perpendicular Pedestrian Ramp

Unflared Perpendicular Curb Ramps

Project 11: Extend median to intersection

Location	**Palmwood Drive and Glenwood Drive Intersection**
Type	**Traffic Calming**
Issue	Vehicles are turning at high speeds on Glenwood Drive from Palmwood Drive.
Recommendation	Extend the existing median toward the intersection to reduce vehicle turning speeds and reduce the corner curb return radii at the intersection.

Median on Palmwood Drive Extension in Blue

	Implementation Time-Frame	**Near-Term**
	Estimated Project Cost	**$10,000 to $15,000**
	Right-of Way Needed?	**No**
	Drainage or Utility Impact?	**Unknown**
	Responsible Agency	**City of Melbourne**

Project 12: Reduce school exit driveway corner curb radii

Location	School Exit Driveway at Palmwood Drive
Type	Traffic Calming
Issue	Vehicles make high-speed turns out of the school exit driveway.
Recommendation	Reduce the corner curb radii on northeast and northwest corners.

School Exit Driveway

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

Project 13: Build a channelized raised median

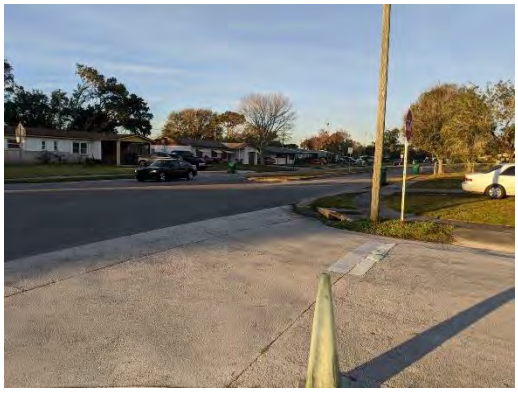
Location	School Exit Driveway at Palmwood Drive
Type	Traffic Calming
Issue	East-bound vehicles on Palmwood Drive turn into the school exit driveway.
Recommendation	Build a channelized raised median in the middle of Palmwood Drive at the school exit driveway to prevent eastbound vehicles along Palmwood Drive from making a left turn into the exit. The channelized median would permit for southbound left from the school exit.

School Exit Driveway and Channelized Median Location in Blue

	Implementation Time-Frame	Near-Term
	Estimated Project Cost	$15,000 to $20,000
	Right-of Way Needed?	No
	Drainage or Utility Impact?	Unknown
	Responsible Agency	City of Melbourne

Project 14: Remove Stop Bar and Stop Sign at School Entrance Driveway

Location	Palmwood Drive and Glenwood Drive Intersection
Type	Sign/Signal
Issue	Some vehicle traffic is exiting the school on using the entrance driveway on Glenwood Drive and Palmwood Drive intersection.
Recommendation	Remove stop sign and stop bar for the southbound movement coming out of the school at Palmwood Drive/Glenwood Drive.



School Exit Driveway, Stop Bar and Stop Sign Location in Blue

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

Project 15: Implement and all-way stop control or roundabout

Location	**Palmwood Drive and Glenwood Drive Intersection**
Type	**Feasibility Study (Intersection Control)**
Issue	There are conflict points between drivers and pedestrians at the intersection of Palmwood Drive and Glenwood Drive.
Recommendation	Perform a study to review changing the intersection into an all-way stop control intersection or a roundabout. This would help better control the conflicts between students using the east leg crosswalk and the east/west through movement traffic along Palmwood Drive.

Location of All Way Stop or Roundabout on Palmwood Drive at the Intersection of Glenwood Drive in Blue

	Implementation Time-Frame	**Near-Term**
	Estimated Project Cost	**Further study required**
	Right-of Way Needed?	**Unknown**
	Drainage or Utility Impact?	**Drainage and Utility Impacts (Roundabout)**
	Responsible Agency	**City of Melbourne**

Project 16: Add school gateway feature

Location	**Palmwood Drive and Glenwood Drive Intersection**
Type	**School Circulation**
Issue	There is no sign indicating the presence of Dr. W.J. Creel Elementary School from the surrounding roadways.
Recommendation	Add a gateway feature for Dr. W.J. Creel Elementary School.

Example School Gateway Features

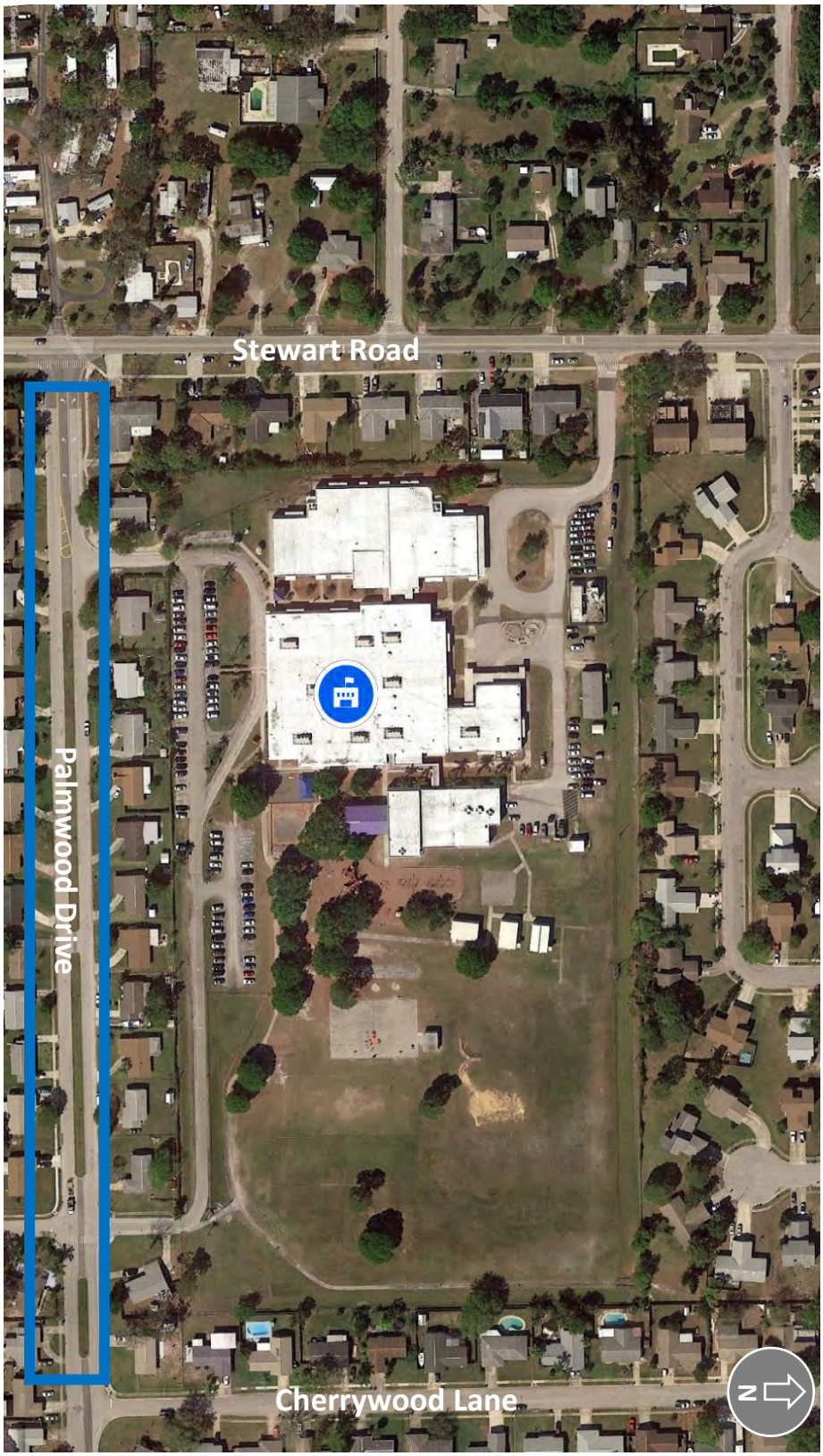
	Implementation Time-Frame	**Near-Term**
	Estimated Project Cost	**Further study required**
	Right-of Way Needed?	**Unknown**
	Drainage or Utility Impact?	**Unknown**
	Responsible Agency	**City of Melbourne/Brevard County Public Schools**

Project 17: Replace faded school zone signage

Location	**Palmwood Drive School Zone**
Type	**Sign/Signal**
Issue	School zone signage is faded.
Recommendation	Replace the faded "End School Zone" signage along Palmwood Drive.

"End School Zone" Sign on Palmwood Drive

	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**



Replace the Faded "End School Zone" Signs along Palmwood Drive in Blue

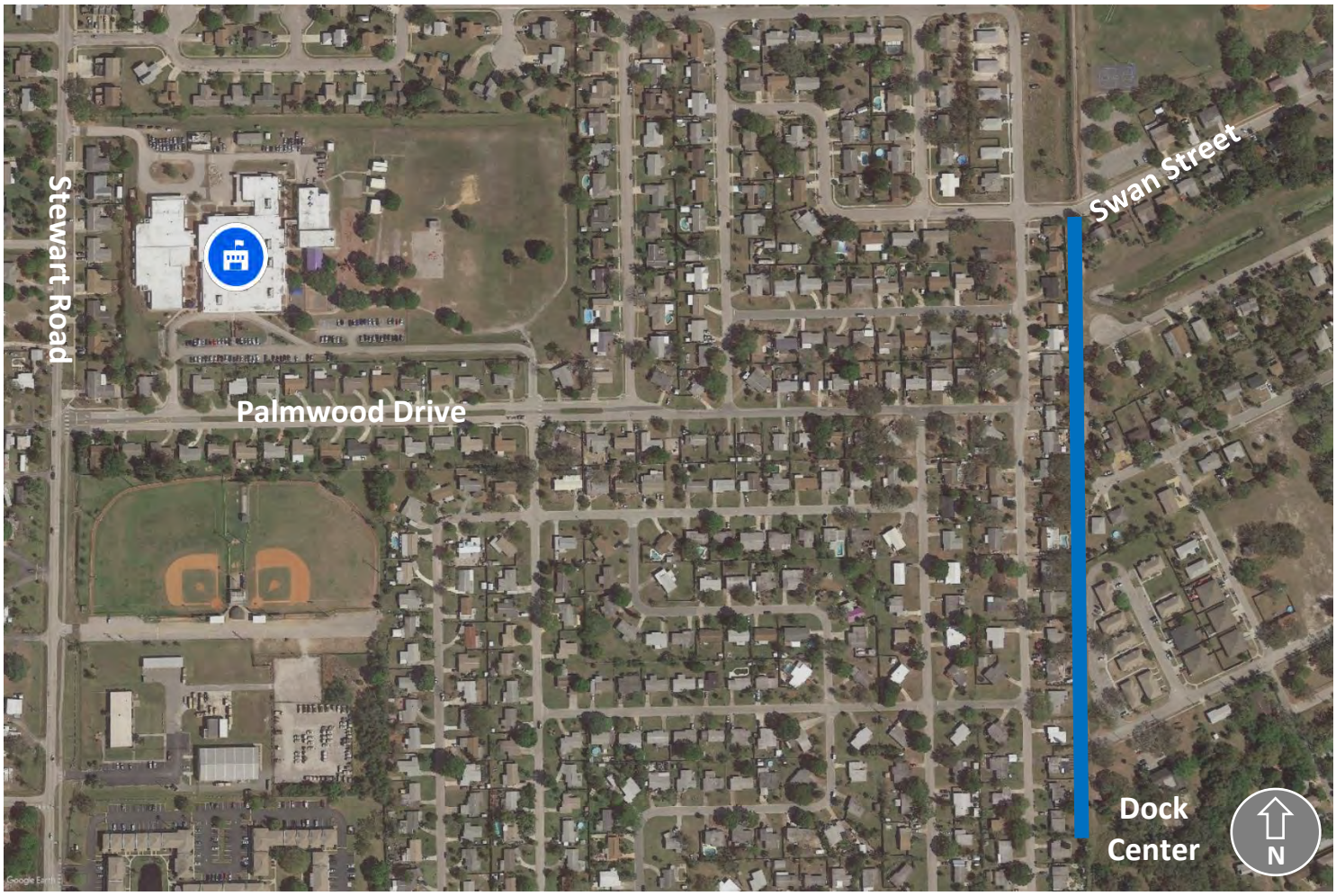
Project 18: Pave trail along canals in the study area

Location	Along the Canal from Swan Street to the Dorcas Outreach Center for Kids (DOCK)
Type	Feasibility Study (Trail)
Issue	Students are traveling alone canals to reach the community center.
Recommendation	Conduct a feasibility study to add a paved trail connecting Swan Street and the DOCK.

Canal in the School Study Area

DOCK Center Sign

	Implementation Time-Frame	Near-Term
	Estimated Project Cost	Further Study Required
	Right-of Way Needed?	Unknown
	Drainage or Utility Impact?	Unknown
	Responsible Agency	Brevard County/City of Melbourne



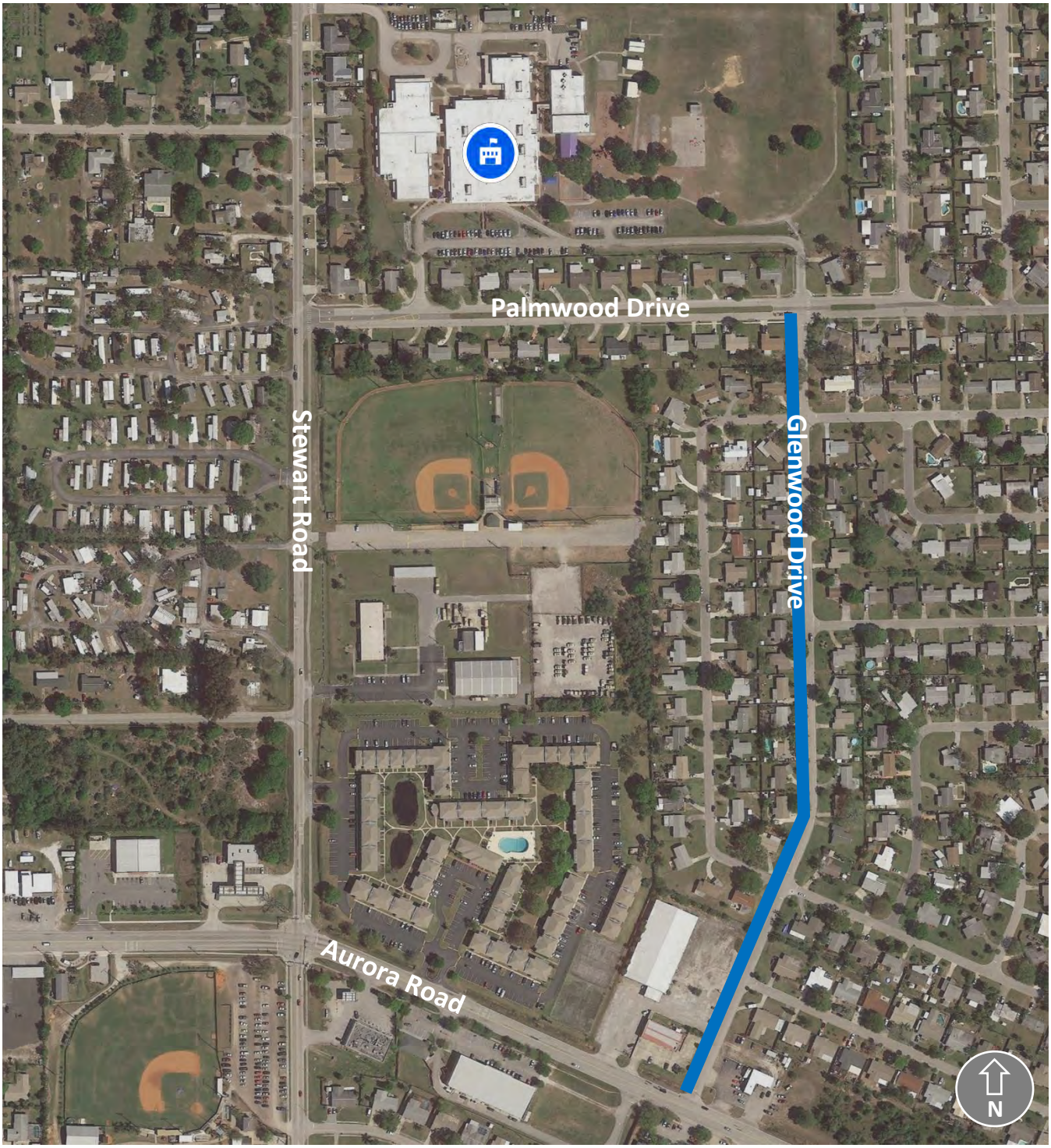
Canal Along Swan Street to DOCK Center in Blue

Project 19: Build a 5 to 6 foot wide sidewalk

Location	**Glenwood Drive from Aurora Road to South of Palmwood Drive**
Type	**Sidewalk**
Issue	There are sidewalk gaps on the west side of Glenwood Drive from Aurora Road to Palmwood Drive.
Recommendation	Build a 5 to 6 foot wide sidewalk on the west side of the road to connect to existing sidewalk.

Glenwood Drive Facing South

	Implementation Time-Frame	**Near-Term**
	Estimated Project Cost	**$125,000 to $145,000**
	Right-of Way Needed?	**Unknown**
	Drainage or Utility Impact?	**Unknown**
	Responsible Agency	**City of Melbourne**



Install Sidewalk on West Side of Glenwood Drive Shown in Blue

Project 20: Build 5 to 6 foot wide sidewalks to fill gaps

Location	**Palmwood Drive from Stewart Road to Cedarwood Drive**
Type	**Sidewalk**
Issue	There are sidewalks gaps on both sides of Palmwood Drive
Recommendation	Build 5 to 6 foot wide sidewalks to fill gaps on both sides of the road.

Sidewalk Gaps on Palmwood Drive in Blue

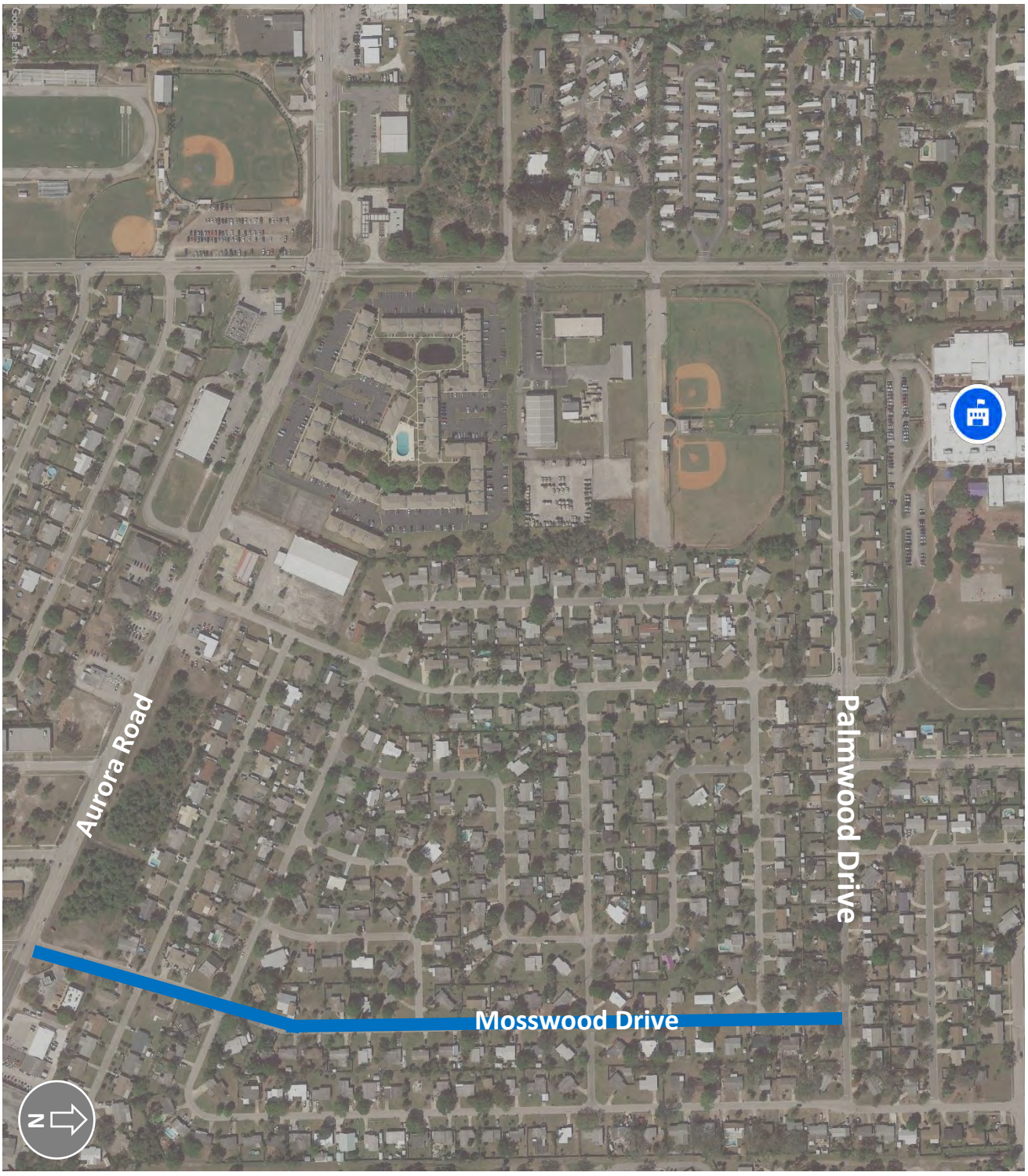
	Implementation Time-Frame	**Near-Term**
	Estimated Project Cost	**$235,000 to $275,000**
	Right-of Way Needed?	**Unknown**
	Drainage or Utility Impact?	**Unknown**
	Responsible Agency	**City of Melbourne**

Project 21: Build 5 to 6 foot wide sidewalks

Location	**Mosswood Drive from Aurora Road to Palmwood Drive**
Type	**Sidewalk**
Issue	There are no sidewalks on either side of Mosswood Drive from Aurora Road to Palmwood Drive.
Recommendation	Build 5 to 6 foot wide sidewalks both sides of the road.

Mosswood Drive North of Aurora Road

	Implementation Time-Frame	**Near-Term**
	Estimated Project Cost	**$325,000 to $375,000**
	Right-of Way Needed?	**Unknown**
	Drainage or Utility Impact?	**Unknown**
	Responsible Agency	**City of Melbourne**



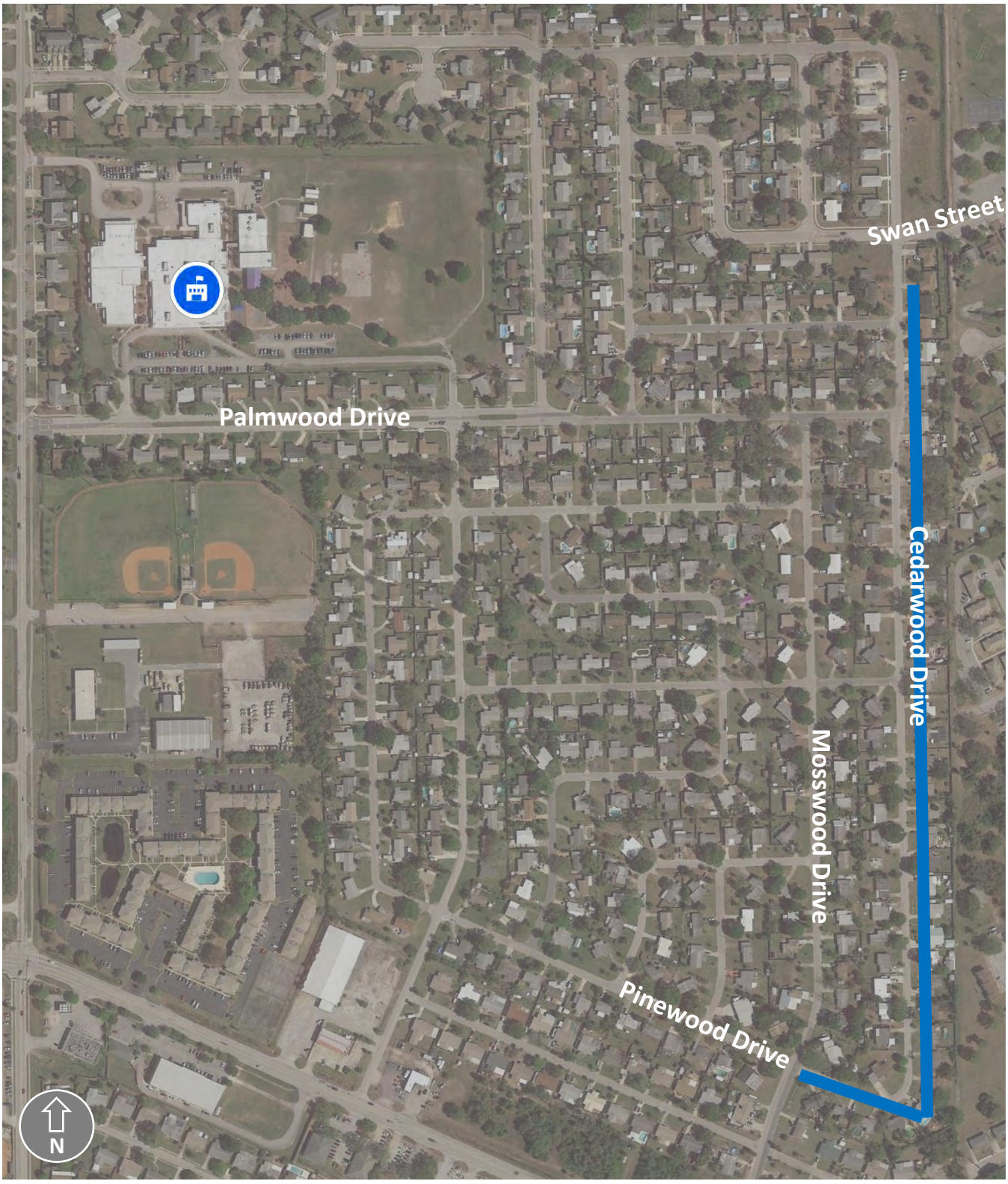
Mosswood Drive Sidewalk for both sides of the roadway from Palmwood Drive to Aurora Road in Blue

Project 22: Build a 5 to 6 foot wide sidewalk

Location	Cedarwood Drive/Pinewood Drive from Mosswood Drive to South of Swan Street
Type	Sidewalk
Issue	There is a sidewalk gap on Pinewood Drive/Cedarwood Drive from Mosswood Drive to south of Swan Street.
Recommendation	Build a 5 to 6 foot wide sidewalk on the east/south side of the road to connect to existing sidewalk.

Cedarwood Drive Facing North

	Implementation Time-Frame	Near-Term
	Estimated Project Cost	$175,000 to $205,000
	Right-of Way Needed?	Unknown
	Drainage or Utility Impact?	Unknown
	Responsible Agency	City of Melbourne



Cedarwood Drive/Pinewood Drive Sidewalk on the East/South of the Roadway from Mosswood Drive to South of Swan Street in Blue

Project 23: Install high-visibility crosswalks and pedestrian ramps

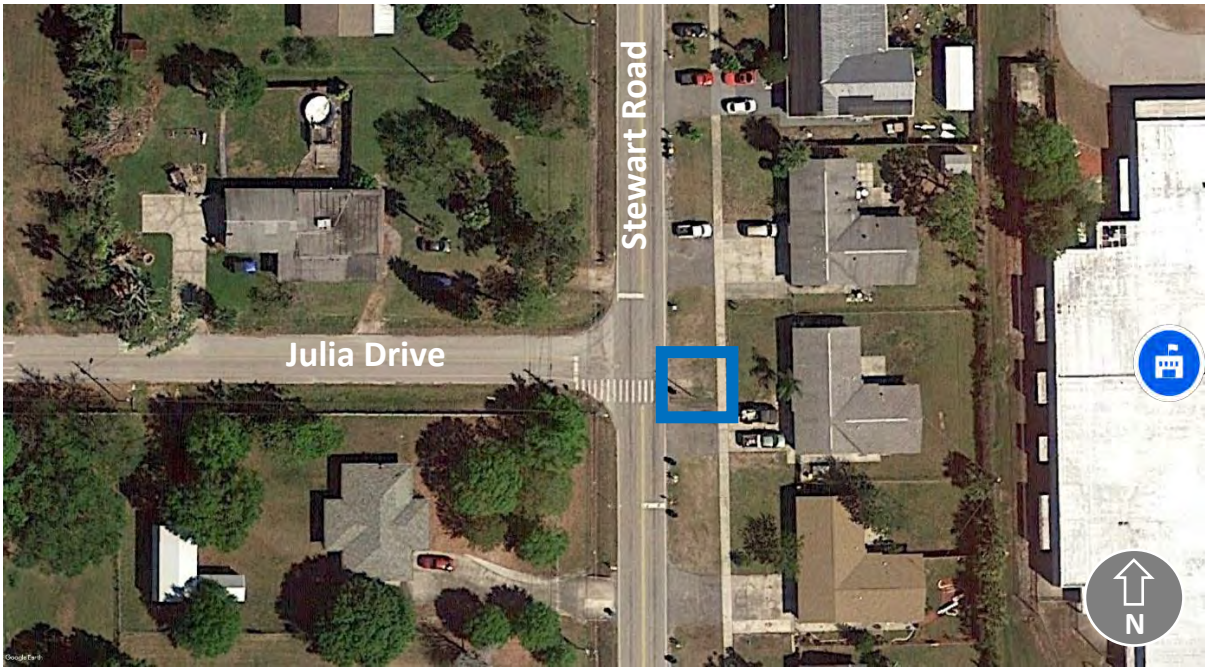
Location	**Palmwood Drive and Glenwood Drive Intersection**
Type	**Crossing**
Issue	The crosswalks at the intersection of Palmwood Drive and Glenwood Drive are faded (east leg), have not been striped (north and south legs), and are not ADA compliant.
Recommendation	Restripe the east leg crosswalk to be a high-visibility crosswalk. Add a new high-visibility crosswalk on north and south legs and ADA compliant pedestrian ramps on all four corners.

Intersection of Palmwood Drive and Glenwood Drive

	Implementation Time-Frame	**Maintenance**
	Estimated Project Cost	**$15,000 to $20,000**
	Right-of Way Needed?	**No**
	Drainage or Utility Impact?	**Drainage Impact**
	Responsible Agency	**City of Melbourne**

Project 24: Sidewalk connection and pedestrian landing pad

Location	Stewart Road and Julia Drive Intersection
Type	Crossing
Issue	There is no sidewalk connection or landing pad from the marked crosswalk to the sidewalk on the east side of Stewart Road at Julia Drive.
Recommendation	Add a 5 to 6 foot wide sidewalk connection and an ADA compliant pedestrian landing pad from the edge of the road to the existing sidewalk on the east side of the road.



Intersection of Stewart Road and Julia Drive and Landing Pad Location in Blue

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

Project 25: Sidewalk connection and pedestrian landing pad

Location	**Stewart Road and Carlton Drive Intersection**
Type	**Crossing**
Issue	There is no sidewalk connection or landing pad from the marked crosswalk to the sidewalk on the east side of Stewart Road at Carlton Drive. There are no stop bars or signage approaching the crosswalk across Stewart road at Carlton Road.
Recommendation	Add a 5 to 6 foot wide sidewalk connection and an ADA compliant pedestrian landing pad from the edge of the road to the existing sidewalk on the east side of the road. Add stop bars and 'Stop Here for Pedestrian' signs on the northern and the southern approaches along Stewart Road in advance of the marked crosswalk.

Intersection of Stewart Road and Carlton Drive and Landing Pad Location in Blue

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

Project 26: Widen Sidewalk from 5 feet to 8 feet

Location	Stewart Road from Palmwood Drive to the Northern School Driveway
Type	Sidewalk
Issue	On Stewart Road from Palmwood Drive to the northwest driveway of the school campus, the sidewalk on the east side of the road is 5 feet wide.
Recommendation	Widen the existing east side sidewalk from 5 feet to 8 feet.

Sidewalk on East Side of Stewart Road at Palmwood Drive Facing North

	Implementation Time-Frame	Long-Term
	Estimated Project Cost	$60,000 to $70,000
	Right-of Way Needed?	Unknown
	Drainage or Utility Impact?	Unknown
	Responsible Agency	City of Melbourne

Sidewalk on the East Side of Stewart Road in Blue

Prepared For:

2725 Judge Fran Jamieson Way,
Bldg. B, Room 105,
Melbourne, FL 32940

Prepared By:

KITTELSON & ASSOCIATES

225 E Robinson Street,
Suite 355,
Orlando, FL 32801