2017

WICKHAM ROAD

OPERATIONAL ANALYSIS

Final Report

Eau Gallie Boulevard to Lake Washington Road

Prepared for:
Space Coast Transportation Planning Organization
2725 Judge Fran Jamieson Way
Melbourne, FL 32940
spacecoasttpo.com

Prepared by:
Kittelson & Associates, Inc.
225 E. Robinson Street, Suite 450
Orlando, FL 32801
kittelson.com

SPACE COAST TPO

Appendix A Wickham Road Existing Conditions Summary

2017

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FINAL EXISTING CONDITIONS REPORT

Wickham Road Operational Analysis

From Eau Gallie Boulevard to Lake Washington Road
Brevard County, Florida

Prepared For:
Space Coast Transportation Planning Organization
2725 Judge Fran Jamieson Way, Building B, Room 105
Melbourne, FL 32940

July 2017

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Introduction

Kittelson & Associates, Inc. (KAI) was retained by the Space Coast Transportation Planning Organization (SCTPO) to conduct an operational analysis of Wickham Road between Eau Gallie Boulevard and Lake Washington Road. Wickham Road is a key north/south arterial in Brevard County, starting at US 192 in the south and ending west of I-95 to the north. The scope of this study will address the observed congestion and safety issues while also incorporating multi-modal solutions to facilitate pedestrian, bicycle, and transit movement within the study limits. The scope of this Existing Conditions Summary includes:

- Review of previous studies on and around the Wickham Road study corridor;
- Stakeholder outreach;
- Review of existing land use and roadway characteristics;
- Collection of existing-year (2016) traffic data on roadway segment and intersections;
- Existing operational evaluations;
- 2011-2015 historical safety assessment; and
- Overview of issues/opportunities identified for the study corridor.

Project Goals

The following summarizes the goals identified for the Study:

- Assess capacity improvement at the signalized intersections along the study corridor and recommend a feasible preferred alternative at each intersection, targeting congestion reduction;
- Assess alternatives to provide improved pedestrian, bicycle, and transit facilities along the length of the corridor with an emphasis at signalized intersections and recommend a feasible preferred alternative targeting multi-modal mobility;
- Assess typical section changes such as constructing raised medians to reduce vehicular conflicts and improve safety along the corridor; and
- Solicit input from the public throughout the course of the project. A Project Advisory Team (PAT) will be developed for the purposes of providing guidance when recommending the preferred alternative.

Project Location

Wickham Road from Eau Gallie Boulevard to Lake Washington Road is classified as an urban principal arterial – other. The annual average daily traffic (AADT) along this section ranges from approximately 32,000 to 35,000 based on the counts collected in late 2016. Wickham Road is primarily surrounded by commercial/retail land uses along the length of the corridor. Residential land uses are present behind the commercial/retail development in the surrounding areas. The study corridor is illustrated in **Figure 1**. Wickham Road falls within the jurisdiction of both the City of Melbourne and Brevard County over the study corridor limits.

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FIGURE 1
Study Corridor

Public Outreach Activities

This Study will allow for an ideal opportunity to engage local and regional groups in the identification of issues and project visioning for the development of the preferred improvement alternatives along the corridor. Three key groups will be included throughout the course of the study to solicit guidance and input:

1. Project Advisory Team (PAT);
2. Local Stakeholders; and
3. Members of the Public.

A PAT comprised of regional agency and municipal representatives was established to help guide the identification of issues for the study. The PAT team will provide initial review/feedback for the Study Team (SCTPO and consultant staff) as it shares findings and develops strategies and alternatives to address the needs along the corridor. The PAT is scheduled to meet at key milestones throughout the study process. The PAT is comprised of members from the following partner organizations:

- SCTPO;
- Brevard County;
- City of Melbourne;
- Florida Department of Transportation (FDOT) District 5; and
- Space Coast Area Transit.

As part of this Study, a separate Public Involvement Report will be developed to document the public outreach activities including PAT meetings, stakeholder meetings, and public meetings/workshops.

Previous/Ongoing Studies and Future Improvements

During the existing conditions data collection and PAT Kick-Off Meeting, the Study Team obtained information on the following studies:

- Wickham Road between Sarno Road and Parkway Drive – Road Safety Audit (Completed in June 2016);
- Wickham Road and Eau Gallie Boulevard Feasibility Study (Ongoing Study);
- Aurora Road Corridor Study (Ongoing Study); and
- Aurora Road Sidewalk Improvements (Short Tem Improvement).

The following summarizes the locations of the previous/ongoing studies and future improvement projects along and within the immediate vicinity of the study corridor. **Appendix A** includes the supporting documentation from the studies/future improvement projects.

WICKHAM ROAD SAFETY AUDIT – JUNE 2016

The SCTPO completed a Road Safety Audit (RSA) for Wickham Road between Sarno Road and Parkway Drive. The RSA evaluated crash history to identify a prioritized list of short-term/maintenance-type, near-term, and long-term recommendations. These recommendations were developed to address vehicular and multi-modal mobility and safety needs. The RSA also assigned a qualitative risk rating for the issues observed along the Wickham Road study corridor. ***Category III*** issues have the greatest risk compared to the other issues (summarized in **bold** below). ***Category II*** issues indicate higher risk than some issues and lower risk relative to other observed issues. ***Category I*** issues indicate the least risk compared to the other observed issues. The following summarizes the ***Category III, Category II,*** *and* ***Category I*** issues and specific recommendations for the corridor and at specific high crash locations identified in the RSA that are applicable to the study limits of this study:

- Corridor-wide
    - Category III Issues
        - Left-turn Movements at Signalized Intersections along Wickham Road
        - Unsignalized Crosswalk at Trimble Road
        - Incomplete Pedestrian Facilities at the Aurora Road and Lake Washington Road Intersections
    - Category II Issues
        - Lack of Right-Turn Lanes at Signalized Intersections
        - Intersection Crosswalk Markings
        - Lack of Sidewalks along Wickham Road
        - Lighting from Aurora Road to Lake Washington Road
    - Category I Issues
        - Observed Americans with Disabilities Act (ADA) Issues
        - Street Name Signage Visibility
        - School Zone Extents
- Intersections
    - Eau Gallie Boulevard Intersection
        - **Right-Turn Phase Conflict with Pedestrians Crossings at Eau Gallie Boulevard (Category III)**
        - Eastbound Right-Turn Curb Radius Return (Category I)
    - Aurora Road Intersection
        - **Incomplete Pedestrian Facilities (Category III)**
        - Westbound Through Movement Alignment (Category I)
    - Northgate Plaza Intersection
        - Lack of Pedestrian Facilities (Category II)
    - Lake Washington Road Intersection
        - **Incomplete Pedestrian Facilities (Category III)**
        - Driveway Turn Movement Conflicts (Category II)

- Pedestrian Crosswalk Alignment on the Southbound Approach at Lake Washington Road (Category II)
- Westbound Lane Drop (Category I)

As part of the RSA, the Space Coast Area Transit's Americans with Disabilities Act (ADA) report was reviewed for the transit stops along the study corridor and the recommendations from the ADA report were incorporated into the RSA. The transit improvements identified previously will be included as part of the concept development phase of this study. The specific transit improvements are included in **Appendix A** and are summarized in greater detail later in the Transit Facilities section.

WICKHAM ROAD AND EAU GALLIE BOULEVARD TURN LANE ADDITIONS – JULY 2016

Brevard County, in partnership with the City of Melbourne, conducted a feasibility study at the intersection of Wickham Road and Eau Gallie Boulevard to improve safety and operations. The draft feasibility study was submitted to the County in July 2016; however, the County wishes to combine improvements identified as part of this Operational Analysis Study with the improvements identified in the turn lane feasibility study.

The results of the feasibility study recommended the installation of a 535-foot exclusive southbound right-turn lane and 710-foot exclusive northbound right-turn lane. Concepts were developed to identify potential impacts to adjacent properties and utilities. The feasibility study identified that additional right-of-way and construction easements are necessary. Impacts to three adjacent properties on either side of Wickham Road are anticipated. Relocation of four Florida Power and Light (FPL) power poles along the east side of Wickham Road is also necessary.

AURORA ROAD SIDEWALK IMPROVEMENTS

Brevard County is finalizing right-of-way acquisition for a planned eight-foot sidewalk connection along the north side of Aurora Road, west of Wickham Road, from Marywood Lane to Wickham Road (approximately 1.5 miles of new sidewalk). The County is also in the process of obtaining construction funding for this project.

AURORA ROAD CORRIDOR STUDY

The SCTPO is currently studying Aurora Road from Wickham Road to Stewart Avenue to explore alternatives to improve pedestrian and bicycle facilities and to address safety issues, traffic operations, and transit mobility along the corridor. The Aurora Road Corridor Study will be ongoing with the Wickham Road Operational Analysis Study; however, it is scheduled to finish approximately four months after the Wickham Road Study (May 2018). The preferred alternative at the Wickham Road/Aurora Road intersection will be coordinated with the Aurora Road Corridor Study to maintain consistency between the two projects.

Existing Conditions

The purpose of the existing conditions analysis is to gain an understanding of how the corridor performs today to inform possible future improvement efforts. Topics assessed include land use and community characteristics, stormwater and drainage characteristics, roadway characteristics, traffic volumes and operations, and historical safety statistics.

LAND USE AND COMMUNITY CHARACTERISTICS

Existing Land Use

Figure 2 illustrates existing land use along the study corridor at the individual parcel level. There are distinct clusters of commercial and industrial land uses adjacent to both sides of Wickham Road. There are also large clusters of single family residential land uses to the east and west of Wickham Road.

Figure 3 displays the residential communities that exist along or near the Wickham Road study corridor. Most of these communities do not front Wickham Road. Lansing Ridge has direct access to Wickham Road at Lansing Street; however, most communities connect to Wickham Road using minor streets such as Lake Washington Road, Aurora Road, and Eau Gallie Boulevard.

Figure 3 also displays the community features (places of worship and schools) present along and near the Wickham Road study corridor. There are two schools located along Wickham Road:

- Sabal Elementary School (northeast corner of the Wickham Road/Eau Gallie Boulevard intersection:
    - School hours: 8:00 AM – 2:30 PM
    - Early release on Wednesdays: 8:00 AM – 1:15 PM
    - School zone with overhead structure: 15 mph zone when flashing
    - Crossing guards are present at the intersections of Eau Gallie Boulevard and Trimble Road to facilitate children crossing the street
- South Alternative Learning Center (southeast corner of the Wickham Road/Lansing Street intersection:
    - School hours: 7:00 AM – 3:00 PM

Approved Developments Along Wickham Road

Several new development projects have been identified through the City of Melbourne's Community Development Department. The following briefly lists projects along Wickham Road with submitted site plans:

- Space Coast Credit Union
    - Location: 2447 N. Wickham Road (southeast corner of Wickham Road and Lake Washington Road)
    - 2,500 SF Bank with drive-thru lanes

- Northgate Retail
    - Location: Northgate Plaza Shopping Center
    - 6,000 SF retail
- Twistee Treat
    - Location: Northgate Plaza Shopping Center
    - 583 SF Restaurant
- Lansing Square Phase 2 and 3
    - Location: 2255 N. Wickham Road
    - 840 Mini Storage Units and 20,000 SF Office/Retail

Zoning

Figure 4 shows the generalized zoning along the study corridor. The majority of the land immediately adjacent to the study corridor is zoned as commercial and industrial. A few parcels at the southern end between Aurora Road and south of Eau Gallie Boulevard are zoned as mobile home residential and low density residential.

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FIGURE 2
Existing Land Use

Kingsmill
Longwood
WICKHAM RD.
LAKE WASHINGTON RD.
Timberline Estates
Fairview Estates
LANSING ST.
South Alternative Learning Center
BUSH DR.
Lansing Ridge
DUSA DR.
ELECTRONICS DR.
NORTHGATE ST.
Promiseland Church
The Oaks of Eau Gallie
Harbor City Christian Church
LANSING ST.
AURORA RD.
Beacon Baptist Ministries
New River Baptist Church
Church of Christ at North Melbourne
KINGSTON LN.
PINE HILL DR.
Jehovah's Witnesses Eau Gallie Congregation
TRIMBLE RD.
First Free Will Baptist Church
First Korean Baptist Church
Sabal Elementary School
Leewood Forest
Emmanuel United Methodist Church
EAU GALLIE BLVD.
WICKHAM RD.

LEGEND
- Study Corridor
- Community/Neighborhood
- Church
- School

Scale in Feet
0 700
North

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FIGURE 3
Communities/Neighborhoods and Community Features

WICKHAM RD.
LAKE WASHINGTON RD.
LANSING ST.
BUSH DR.
DUSA DR.
ELECTRONICS DR.
NORTHGATE ST.
LANSING ST.
AURORA RD.
KINGSTON LN.
PINE HILL DR.
TRIMBLE RD.
EAU GALLIE BLVD.
WICKHAM RD.

LEGEND

- Agricultural Estate Use
- Commercial
- Industrial
- PUD
- Residential—Professional
- Low Density Residential
- Medium Density Residential
- High Density Residential
- Rural Estate Use
- Mobile home residential

Scale in Feet
0 700
North

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FIGURE 4
Zoning

STORMWATER AND DRAINAGE BASIN CHARACTERISTICS

Wickham Road is located within the St. Johns River Water Management District (SJRWMD). The study corridor lies within the Water Body Identification (WBID) 3082, Eau Gallie River, which is classified as an impaired basin for nutrients (chlorophyll-a). The project has an adopted Total Maximum Daily Load (TMDL) for fecal coliform. The project corridor is also part of an existing Basin Management Access Plan (BMAP).

The drainage pattern for the area consists of roadway runoff and offsite runoff sheet flowing to a curb and gutter closed drainage system which outfalls to the Eau Gallie River as shown on the USGS Quad Map (Eau Gallie). An inset of the project area is included in **Appendix B**. The project lies in Zone X, areas determined to be outside the 100 year floodplain, as shown on FEMA FIRM 12009C0519G and 12009C0582G, except at the Eau Gallie River which crosses the corridor and is a regulated floodway as shown in **Appendix B**.

The soils located along the project corridor consist of Myakka Sand, Myakka Sand Depressional, Myakka Sand Urban Complex, Pomello Sand, Immokalee Sand and Eau Gallie Sand. Soil types are illustrated in **Appendix B**.

Wickham Road has a closed drainage system with curb and gutter along the entire study corridor. The stormwater management facilities that provide water quality treatment for Wickham Road are limited to one existing FDOT and one Brevard County stormwater pond. No current relevant SJRWMD permits were found. A field review was conducted on Tuesday, February 28, 2017 and examples of existing drainage features are illustrated in **Figure 5**.

Figure 5: Existing Drainage Features along Wickham Road

EXISTING UTILITIES

The following sources were used to obtain information on the existing utilities located within the project corridor:

1) Sunshine One Call;
2) Data from the City of Melbourne; and
3) Field visit.

The Sunshine One Call verified the following utilities along the study corridor:

- AT&T;
- Brevard County Fiber/Signal;
- Brighthouse Networks, LLC;
- City of Melbourne Utilities – Water;
- Florida City Gas;
- Florida Gas Transmission Company;
- Florida Power & Light;
- Level 3 Communications, LLC; and
- Transcore.

Appendix C includes the list of utilities identified along the corridor based on the Sunshine One Call. The overhead utilities and transmission lines lie adjacent to the west side of Wickham Road for the majority of the study corridor (examples shown in **Figure 6**).

Figure 6: Adjacent Utilities along Wickham Road

EXISTING ROADWAY CHARACTERISTICS

The following section summarizes the existing roadway characteristics for the study corridor. In addition, the existing general typical sections/right-of-way widths, pedestrian facilities, transit facilities, and utilities are summarized.

Roadway Characteristics

The following summarizes the general roadway characteristics along the study corridor:

- Functional classification: Urban principal arterial – other
- Five-lane typical section: two northbound lanes, two southbound lanes, and one center two-way left-turn lane (TWLTL).
- Posted speed limits –
    - 35 miles per hour (MPH) from Eau Gallie Boulevard to Dusa Drive; and
    - 40 MPH from Dusa Drive to Lake Washington Road.
- Type F curb and gutter generally present along both sides of Wickham Road with a gap along the west side of Wickham Road between Garden Avenue and Aurora Road.
- No bicycle lanes are present along the study corridor limits.
- Sidewalk present along the majority of the east side of Wickham Road and generally no sidewalk along the west side of the roadway. The specific sidewalk locations are presented in the following Pedestrian and Bicycle Facilities section.
- Intermittent street lighting is present along the east side of Wickham Road with large gaps (1,000’ or more) between street lights.

Typical Section/Right-of-Way Widths

Wickham Road is a five-lane roadway with a center TWLTL. **Figure 7** and **Figure 8** show the existing typical sections along Wickham Road between Eau Gallie Boulevard and Trimble Road and Trimble Road to Lake Washington Road, respectively. Aerial and street view imagery from Google Earth was utilized to develop the existing typical sections along the Wickham Road study corridor. The Study Team performed a field review on February 28, 2017 to verify the typical section elements. Below is a summary of typical sectional elements:

- Five-lane roadway with a center TWLTL –
  - Two lanes northbound and two lanes southbound;
  - One center TWLTL; and
  - Two-foot Type F curb and gutter.
- Travel lane widths are consistently 12 feet wide;
- Center TWLTL width is 12 feet wide;
- Sidewalk width varies between 5’ and 6’ wide along the west side of Wickham Road (6’ wide along the east side of Wickham Road); and
- The grass buffer strip between the sidewalk and the curb adjacent to Wickham Road varies along the corridor (no buffer up to approximately 25’ wide).

The existing right-of-way (ROW) along the corridor was obtained from Brevard County. ROW maps were reviewed and they indicate ROW varies along the corridor from approximately 76 feet to 100 feet of total ROW. The existing typical sections display the various ROW widths along the corridor, where information could be obtained.

Pedestrian and Bicycle Facilities

Figure 9 illustrates the existing pedestrian facilities along the study corridor. A six-foot sidewalk is present along the east side of Wickham for the entire length of the study corridor with the exception of a gap from approximately 450 feet south of Aurora Road to the southwest corner of the Aurora Road intersection. A five- to six-foot sidewalk is present along the west side of Wickham Road between Eau Gallie Boulevard to the southwest corner of the Trimble Road intersection. There are gaps in sidewalk connectivity along the remainder of the west side of Wickham Road (within the study limits) with a few short sections of sidewalk (less than 175 feet in length). No paved shoulders or bicycle lanes are provided along Wickham Road within the study limits.

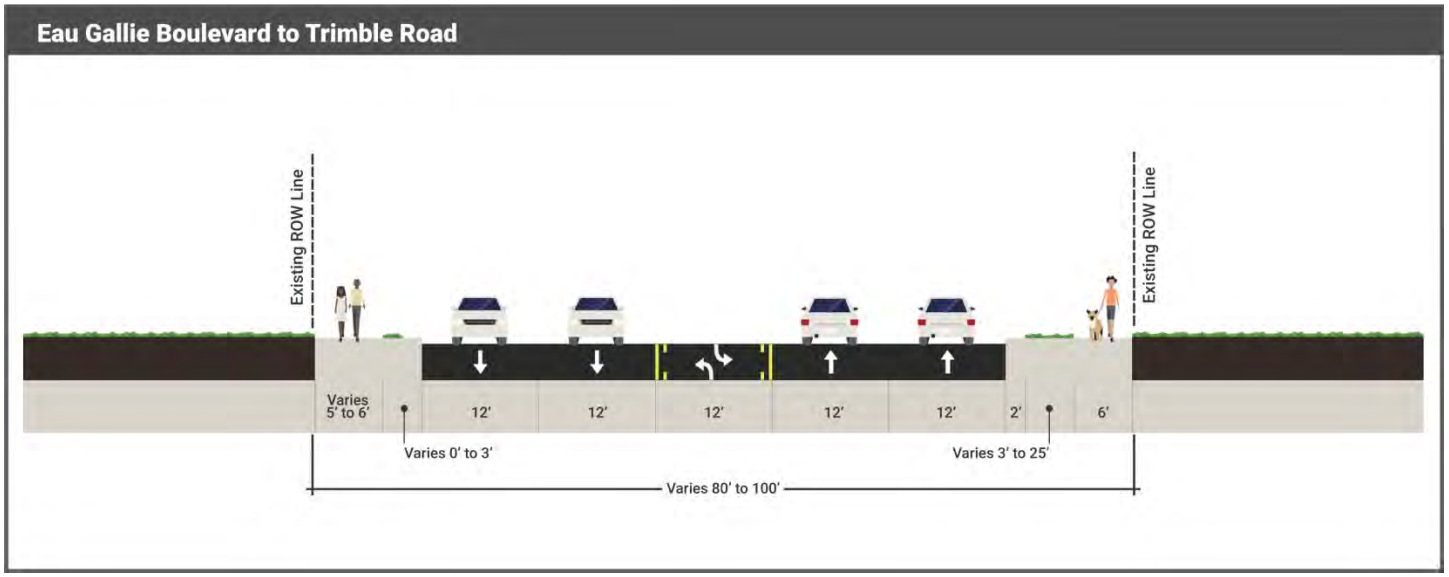


Figure 7: Existing Typical Section – Eau Gallie Boulevard to Trimble Road

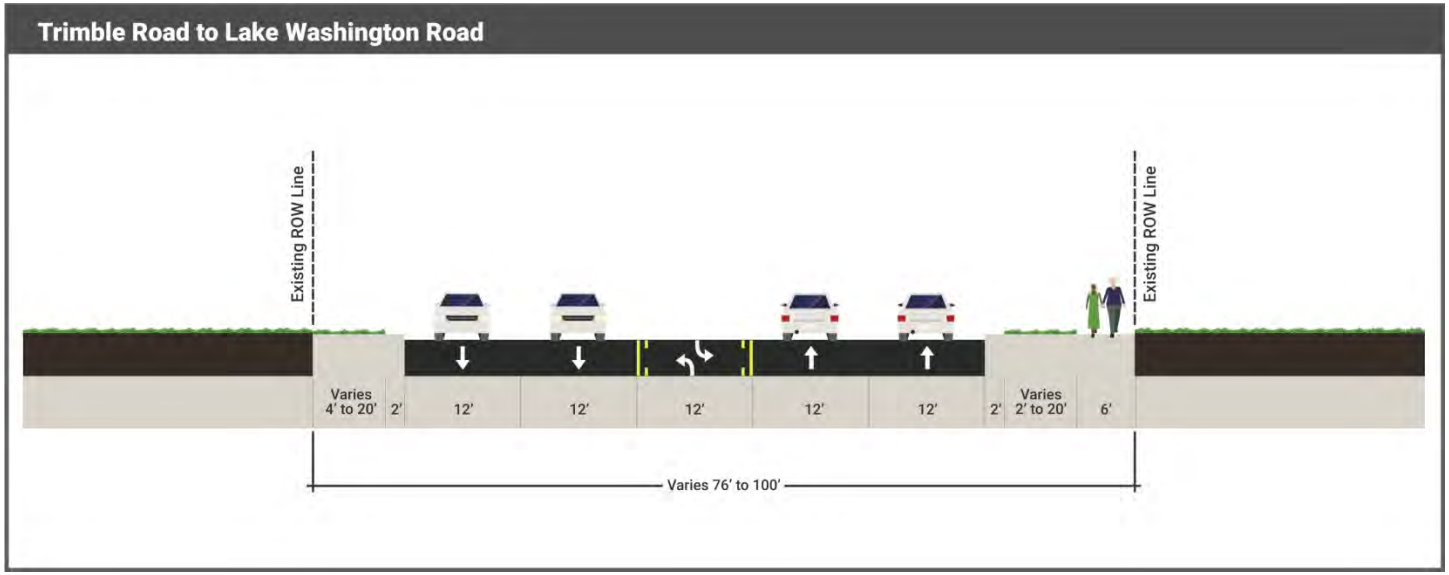
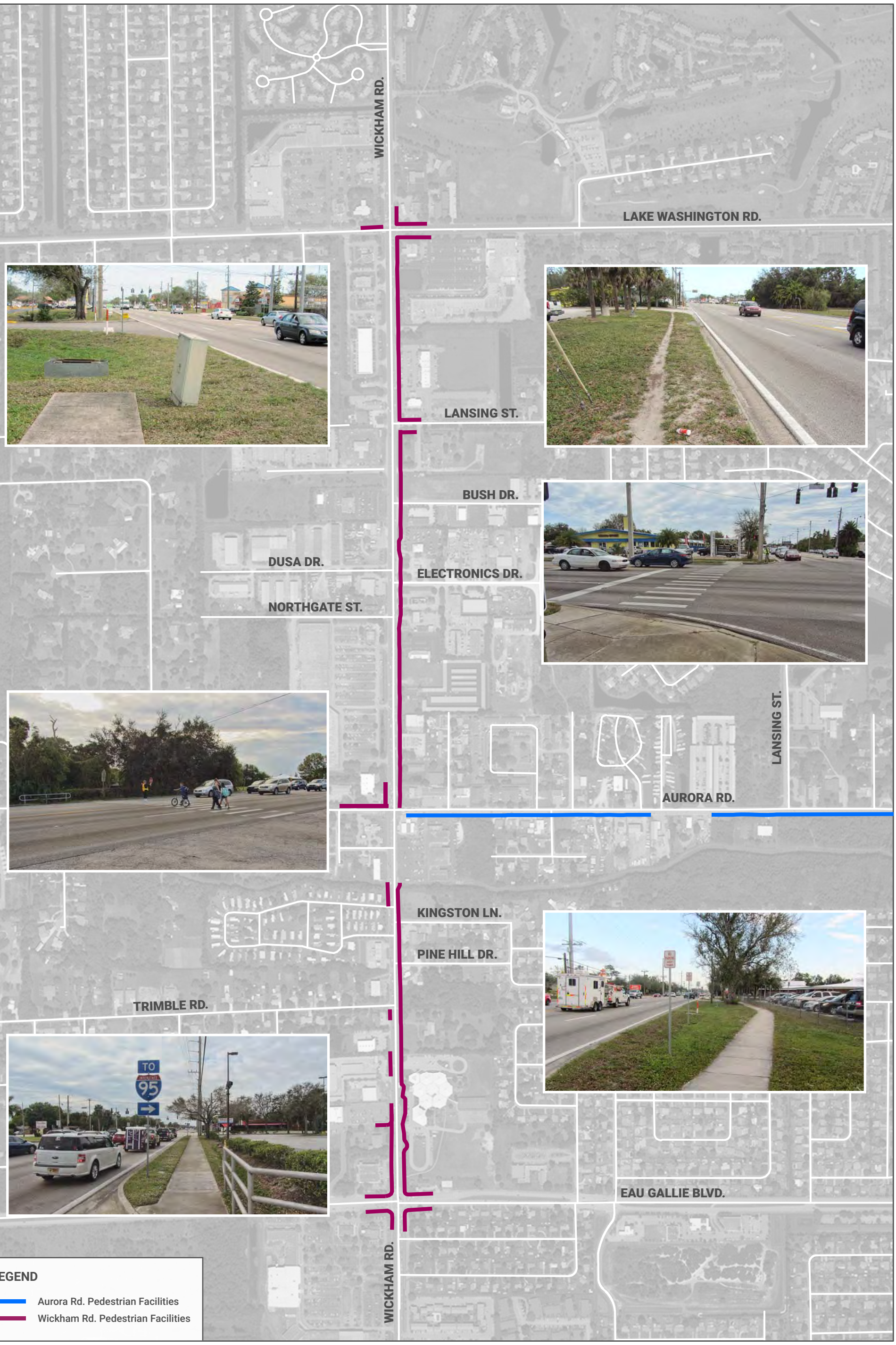


Figure 8: Existing Typical Section – Trimble Road to Lake Washington Road



Scale in Feet
0 700
North

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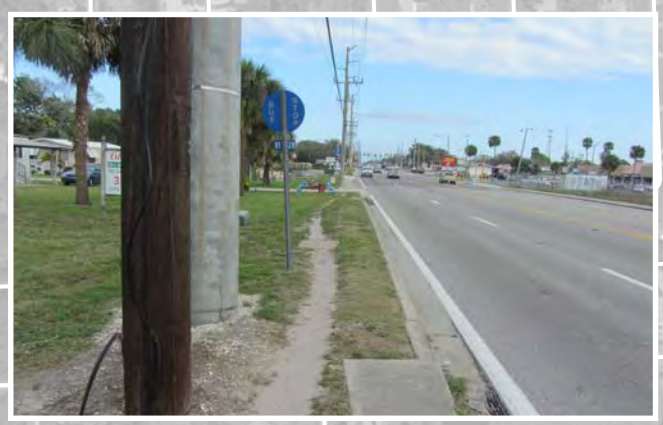
FIGURE 9
Pedestrian Facilities

Transit Facilities

Space Coast Area Transit provides fixed-route service along the Wickham Road study corridor. Space Coast Area Transit Route 28 serves North Melbourne and operates on one hour headways Monday through Saturday. There are nine stops along the study corridor, many of which include a transit stop sign only. The existing transit route and facilities are shown in **Figure 10**. Specific transit improvements were identified along the corridor in previous studies completed for the Space Coast Area Transit and the SCTPO and will be incorporated as part of this study as follows:

- **Eau Gallie Boulevard Westbound**
  - Pave a level 5'x3' slab between the curb and sidewalk to complete a 5'x8' boarding and alighting area (B&A); and
  - Add detectable warnings to the nearby curb ramps.
- **Aldi's Southbound**
  - Pave a level 5'x2' slab behind the sidewalk to complete a 5'x8' B&A area; and
  - Extend the detectable warning at the nearby curb ramps.
- **Pine Hill Drive Northbound**
  - Move the bus stop 175' south;
  - Pave a level 5'x3' slab between the curb and sidewalk to complete a 5'x8' B&A area; and
  - Add detectable warnings to the nearby curb ramps.
- **Orange Manor Drive Southbound**
  - Move stop 145' north;
  - Pave a level 5'x3' slab between the curb and sidewalk to complete a 5'x8' B&A area;
  - Repave the cracks in the sidewalk; and
  - Repave the existing curb ramp and add detectable warnings.
- **Aurora Road Northbound**
  - Move the bus stop 380' north;
  - Pave a level 5'8' slab for the B&A area;
  - Add a 10' path from the B&A area to the sidewalk; and
  - Add detectable warnings to the nearby curb ramps.
- **Aurora Road/CVS Southbound**
  - Pave a level 5'x6' slab between the curb and sidewalk to complete a 5'x8' B&A area;
  - Add detectable warnings to the nearby curb ramps; and
  - Move the pole with the bus schedule adjacent to the pavement to make it accessible.
- **McDonald's**
  - Move the bus stop 195' north;
  - Pave a level 5'x8' slab with a raised 6" curb for the B&A area;
  - Connect the B&A area to the nearby sidewalk; and
  - Add detectable warnings to the nearby curb ramps.

- **Lake Washington Road Southbound**
  - Pave a level 5’x8’ slab for the B&A area;
  - Move the pole with the bus schedule adjacent to the pavement to make it accessible;
  - Add a 100’ path to connect the north;
  - Construct a curb ramp with a slope ≤8.3%;
  - Add detectable warnings to the nearby curb ramps; and
  - Add a crosswalk at the intersection.



WICKHAM RD.

LAKE WASHINGTON RD

LANSING ST.

BUSH DR.

DUSA DR.

ELECTRONICS DR.

NORTHGATE ST.

AURORA RD.

LANSING ST.

KINGSTON LN.

PINE HILL DR.

TRIMBLE RD.

EAU GALLIE BLVD.

WICKHAM RD.

LEGEND

Transit Routes

Bus Stops

Scale in Feet

0 700

North

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FIGURE 10

Transit Facilities

EXISTING TRAFFIC VOLUMES

The following section summarizes the traffic data collection efforts for this study along with the adjustment factors (seasonal and axle) applied to bring the existing counts to an average condition.

Traffic Data Collection

The SCTPO collected turning movement count (TMC) data at the signalized intersections and key unsignalized intersections along the corridor as well as 48-hour volume counts between the signalized intersections. The count types, locations, and dates taken are as follows:

- 48-Hour Volume Counts – October/November 2016
  - Wickham Road, south of Eau Gallie Boulevard
  - Wickham Road, between Trimble Road and Pine Hill Drive
  - Wickham Road, between Lansing Street and Lake Washington Road
  - Wickham Road, north of Lake Washington Road
- 4-hour Intersection Turning Movement Counts – October/December 2015 and November 2016
  - Eau Gallie Boulevard
  - Trimble Road (unsignalized)
  - Aurora Road
  - Northgate Plaza
  - Northgate Plaza – North Entrance (unsignalized)
  - Northgate Street (unsignalized)
  - Lansing Street (unsignalized)
  - Lake Washington Road

The TMC and volume counts were collected in November 2016 with the exception of the Northgate Plaza and Northgate Street intersections (collected in October/December 2015). The intersections where TMCs were taken will be projected for the future year analysis. The raw intersection and volume count data is provided in **Appendix D**. The locations of the volume counts and TMCs along the study corridor are illustrated in **Figure 11**.

Scale in Feet
0 700
North

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FIGURE 11
Data Collection Locations

Existing Traffic Factors and Segment Volumes

The volume counts and turning movement counts were adjusted using a seasonal adjustment factor (included in **Appendix E**), obtained from 2015 FDOT Florida Transportation Information (FTI) DVD, to estimate 2016 Annual Average Daily Traffic (AADT). An axle correction factor (included in **Appendix E**) was also applied to the volume counts. These seasonally adjusted AADT's and turning movement volumes were used for the existing conditions analysis. The existing 2016 segment AADT's along the study corridor are presented in **Table 1** and in **Figure 12**.

Table 1: Existing AADTs along Wickham Road

Roadway	48-Hour Volume Count Dates	ADT	Axle Adj. Factor	Seasonal Adj. Factor	AADT
South of Eau Gallie Boulevard	10/24/16 – 10/25/16	35,118	0.98	0.99	35,000
Between Trimble Road and Pine Hills Drive	11/28/16 – 11/29/16	32,378	0.98	0.99	32,000
Between Lansing Street and Lake Washington Road	10/24/16 – 10/25/16	34,178	0.98	0.99	34,000
North of Lake Washington Road	10/25/16 – 10/26/16	33,053	0.98	0.99	33,000

Note: ADT – Average Daily Traffic
AADT – Annual Average Daily Traffic

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FIGURE 12
Existing AADT along Wickham Road

EXISTING TRAFFIC OPERATIONS

An existing traffic operations analysis was completed using *Highway Capacity Manual* (HCM) *2010* methodologies in order to identify capacity-constrained intersections along the Wickham Road study corridor. This section describes the AM and PM peak hour field reviews, segment operations, and HCM intersection analysis results. This information provides a base line for the traffic analyses and can support verification that analyses reasonably reflect actual conditions in the field.

AM and PM Peak Hour Field Reviews

The study team conducted a field review on Tuesday, February 28, 2017 to observe existing traffic operations along the Wickham Road study corridor during the AM and PM peak hours. The following summarizes the observations of the peak hour reviews:

AM PEAK HOUR – 7:30-8:30

- Southbound queuing along Wickham Road at the Eau Gallie Boulevard intersection extended approximately 1,200 feet to Trimble Road (**Figure 13**).

Figure 13: Southbound Queuing along Wickham Road – AM Peak Hour

- Westbound left-turn queue at Lake Washington Road extends approximately 350 feet into the center TWLTL –
    - The existing storage for the westbound left-turn lane is 150 feet.
    - The queue spillback restricted the ability for vehicles to use the center turn lane for an eastbound left-turn into local businesses along Lake Washington Road.
    - The current green time allocated to the left-turn phase did not serve all of the queued vehicles.

PM PEAK HOUR – 5:00-6:00

- Southbound left-turn queuing at Aurora Road –
  - The southbound left-turn movement experienced queues of five to ten (10) vehicles and would only clear about 75 percent of the queue on average.
  - During some cycles, the southbound left-turn phase was skipped and would go to the permissive phase only.
- Southbound left-turn queuing and delay at Lansing Street –
  - Queues were observed extending approximately 7 vehicles (approximately 175 feet).
  - Due to northbound traffic volume during the PM peak hour, the southbound left-turn movement would wait 3+ minutes to turn left onto Lansing Street.
    - This would create additional delay for westbound left-turning vehicles. These vehicles would have to wait until both the northbound traffic and the southbound left-turning traffic made their movements before the westbound lefts were allowed to turn.
- Similar westbound queueing along Lake Washington Road was present during the PM peak hour as the AM –
  - Westbound queues were observed extending over 500 feet along Lake Washington Road (**Figure 14**).
  - The current green time allocated to the left-turn phase did not serve all of the queued vehicles.

Figure 14: Westbound Queuing along Lake Washington Road – PM Peak Hour

Existing Segment Operations

Brevard County maintains a policy and procedure addressing the operating level of service standards for its arterial and collector roadway system. The term "level of service" (LOS) is defined as the system of six designated ranges from "A" (best) to "F" (worst) used to evaluate roadway facility performance. The LOS standard for a specific facility is defined by the area type it is located within. Class II non-state arterials within an urbanized area in Brevard County have a LOS standard of E. Due to Wickham Road being a class II non-state roadway in an urban area, the LOS standard is E within the study limits.

For the purpose of the segment analysis, Wickham Road was divided into three individual segments between the four signalized intersections along the study corridor. The three segments are displayed on **Figure 15** and summarized below:

- Segment 1 – Wickham Road from Eau Gallie Boulevard to Aurora Road;
- Segment 2 – Wickham Road from Aurora Road to Northgate Plaza; and
- Segment 3 – Wickham Road from Northgate Plaza to Lake Washington Road.

Two analyses were performed to identify segment deficiencies along the Wickham Road corridor:

1. LOS evaluation based on Generalized LOS Tables; and
2. LOS evaluation based on HCM (2010) Methodologies.

Scale in Feet
0 700
North

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FIGURE 15
Segmentation for Operational Analysis

GENERALIZED LOS EVALUATION

An evaluation of the existing LOS along Wickham Road was performed by comparing segment AADTs versus the LOS volume threshold from the generalized LOS volume thresholds from the SCTPO's 2015 State of the System (SOS) report. As summarized in **Table 2**, the 2016 AADT between Aurora Road and Lake Washington Road are below the SOS volume threshold.

Table 2: Generalized LOS Analysis

Segment	AADT	Area Type	Segment Type	Speed Limit (MPH)	LOS Standard	LOS Volume Standard*	Existing Volumes Below LOS Standard?
Eau Gallie Boulevard to Aurora Road	32,000	Urban	Signalized Arterial	35	E	33,800	N
Aurora Road to Northgate Plaza	34,000	Urban	Signalized Arterial	35	E	33,800	Y
Northgate Plaza to Lake Washington Road	34,000	Urban	Signalized Arterial	40	E	33,800	Y

*Source: *2015 State of the System Report*

The generalized LOS analysis methodology is a sketch-planning level tool developed to provide a quick review of capacity and LOS for the roadway being studied. HCM methodologies are the most widely used for analyzing existing facilities and future improvements to corridors.

HCM 2010 LOS EVALUATION

A HCM 2010 Urban Street Segment analysis was performed for the three Wickham Road study segments. This methodology is applicable for segments less than two miles in length between signalized intersections. The HCM 2010 section 17.1 was referenced to evaluate the segment LOS based on the average travel speed (ATS) as a percentage of the base free flow speed (%BFFS). The LOS thresholds for urban street segments are summarized in **Table 3**.

Table 3: LOS for Urban Street Segments (HCM 2010)

LOS	Travel Speed as a Percentage of Free Flow Speed (%)
A	>85
B	>67 – 85
C	>50 – 67
D	>40 – 50
E	>30 – 40
F	≤30

The segment analysis was performed for the AM and PM peak hours in the northbound and southbound directions for each Wickham Road segment. **Table 4** and **Table 5** display the existing conditions LOS for each segment from the HCM analysis. The operational results for each segment are illustrated in **Figure 16**. **Appendix F** contains the HCM inputs and the various outputs/calculations for the segment analysis.

Table 4: HCM LOS Evaluation Results – AM Peak Hour

Segment	BFFS (MPH)	Average Travel Speed (MPH)	% of BFFS	LOS	Segment LOS Below LOS Standard?
Northbound Direction					
Eau Gallie Boulevard to Aurora Road	35	18.1	44%	D	No
Aurora Road to Northgate Plaza	35	17.7	44%	D	No
Northgate Plaza to Lake Washington Road	40	19.3	45%	D	No
Southbound Direction					
Lake Washington Road to Northgate Plaza	40	22.2	52%	C	No
Northgate Plaza to Aurora Road	**35**	**9.9**	**24%**	**F**	**Yes**
Aurora Road to Eau Gallie Boulevard	35	14.6	36%	E	No

Table 5: HCM LOS Evaluation Results – PM Peak Hour

Segment	BFFS (MPH)	Average Travel Speed (MPH)	% of BFFS	LOS	Segment LOS Below LOS Standard?
Northbound Direction					
Eau Gallie Boulevard to Aurora Road	35	16.3	40%	E	No
Aurora Road to Northgate Plaza	35	14.6	36%	E	No
Northgate Plaza to Lake Washington Road	40	15.7	36%	E	No
Southbound Direction					
Lake Washington Road to Northgate Plaza	40	21.3	49%	D	No
Northgate Plaza to Aurora Road	**35**	**10.1**	**24%**	**F**	**Yes**
Aurora Road to Eau Gallie Boulevard	35	18.8	46%	D	No

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FIGURE 16

Existing AM and PM Peak Hour Segment and Intersection Operations

Existing Peak Hour Intersection Operations

Eight (8) intersections along the study corridor were analyzed. Four of the intersections are signalized, while the other four intersections are unsignalized intersections with stop control along the minor street approaches. The existing lane configurations and traffic control for the eight study intersections are shown in **Figure 17**.

The raw intersection turning movement counts were adjusted in a series of steps to prepare for the intersection operational analysis:

1. A system peak hour for the AM and PM peak hours were found based on individual intersection turning movement volumes:
    - AM Peak Hour: 7:30 AM to 8:30 AM; and
    - PM Peak Hour: 5:00 PM to 6:00 PM.
2. The raw counts were adjusted for seasonal variability using a seasonal factor obtained from the FDOT's 2015 Florida Transportation Information (FTI) DVD.
3. The entering/exiting traffic volumes between adjacent intersections were reviewed for reasonableness. Where applicable, minor adjustments were made to the intersections to reduce differences due to different collection years (2015 and 2016).

The existing 2016 peak hour intersection turning movement volumes are summarized in **Figure 18**.

The existing intersection operating conditions (2016) were evaluated for the weekday AM and PM peak hour traffic volume conditions. Current signal timing plans were obtained from Brevard County for use in the analysis. The signal timing plans are provided in **Appendix G**. The intersections were analyzed using *HCM 2010* methodologies as implemented by Synchro Version 9.1. The peak hour intersection operations were shown alongside the segment operations in **Figure 16**. For the signalized intersections, the overall intersection LOS is presented and for the unsignalized intersections, the LOS presented is for the critical movement at the intersection. Detailed HCM output reports are located in **Appendix H**.

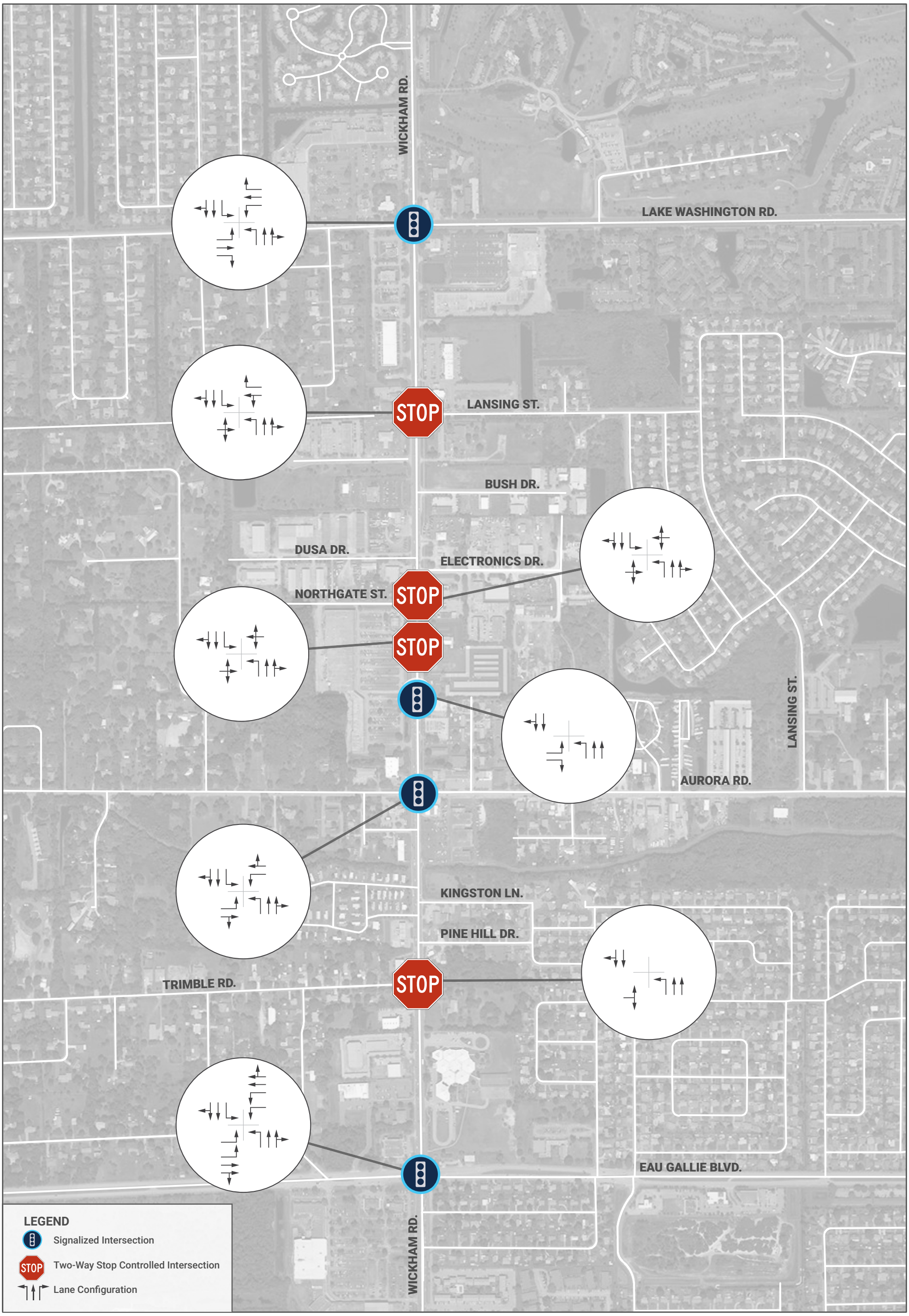

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FIGURE 17

Existing Intersection Lane Configurations and Traffic Control

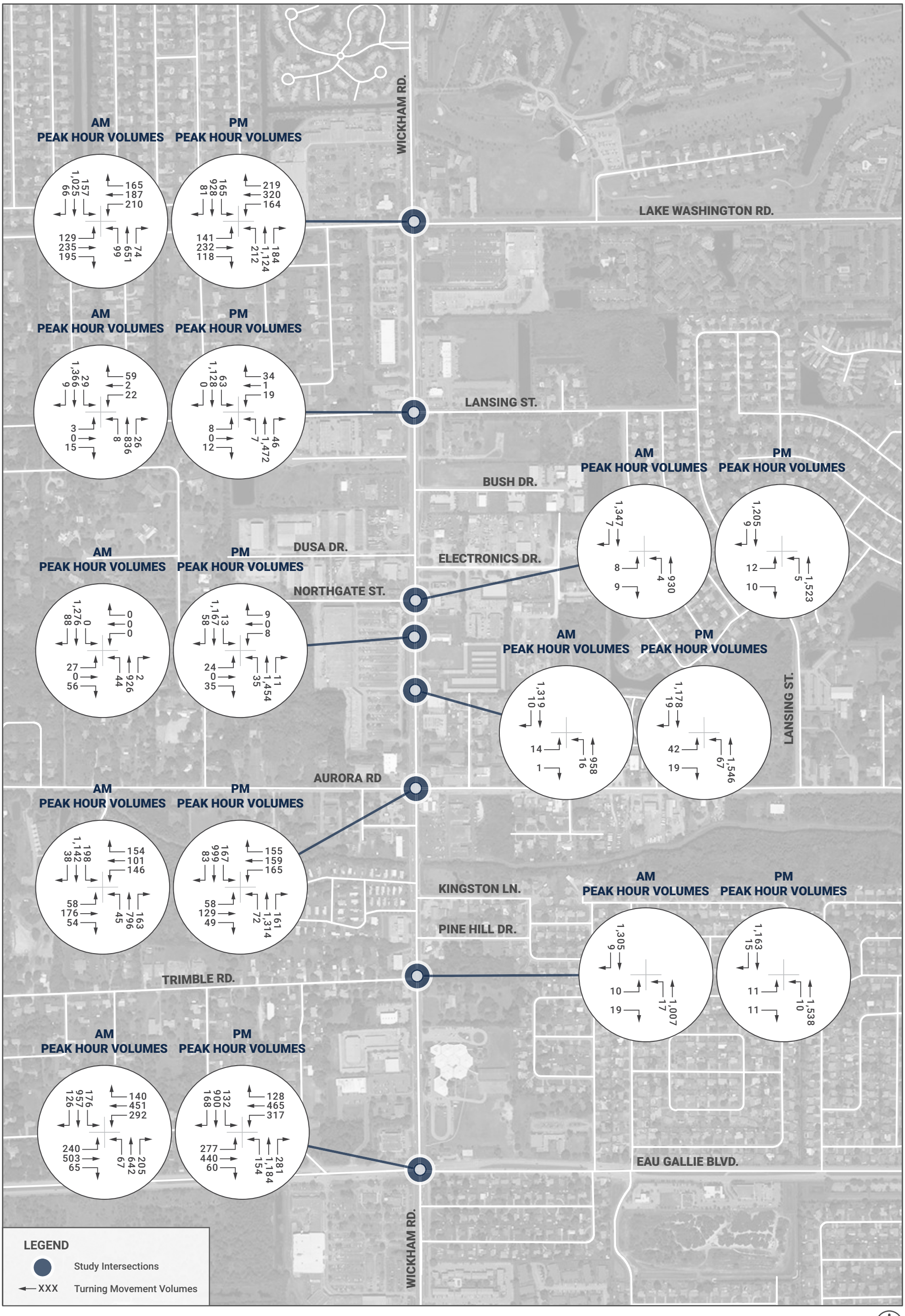

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FIGURE 18

Existing Peak Hour Intersection Turning Movement Volumes

SAFETY ASSESSMENT

Crash records were obtained for Wickham Road within the study limits for the most recent five year period on record (2011 through 2015) from the University of Florida's Signal Four Analytics Database. This section summarizes the corridor wide crash statistics and then reviews crash data for high crash locations along the study corridor. A detailed pedestrian/bicycle safety review is also discussed in this section.

Corridor Wide Crash Statistics

A summary of crash frequency by year along with their respective severity from 2011 to 2015 is displayed in **Figure 19**. There were a total of 667 crashes reported during this period, 187 of which (28 percent) resulted in at least one injury and five (5) of which resulted in at least one fatality. As displayed in **Figure 19**, the number of crashes increased in each year between 2011 and 2014, but decreased in 2015. Note the University of Florida did not have access to all local jurisdiction crash reports in 2011 and 2012, thus the reason for the disparity in crashes between 2011-2012 and 2013-2015. A more detailed summary of the 2011 to 2015 Wickham Road (overall corridor) crash data set in tabular and graphical format is provided in **Appendix I**.

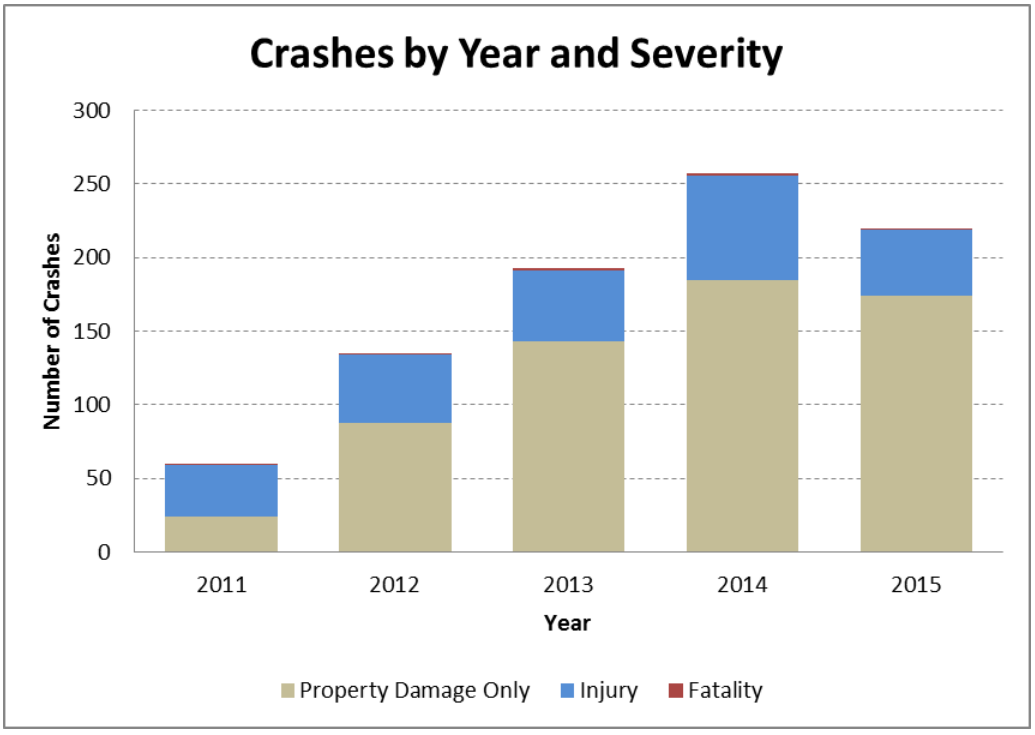

Figure 19: Crashes per Year (Corridor Wide)

Figure 20 displays the crashes along the corridor by type and severity for the five year study period. The highest crash type observed was rear end, comprising 50 percent of the total crashes. Left-Turn (17 percent) and sideswipe (8 percent) were the second and third highest crash types. There were six pedestrian and 21 bicycle crashes over the five years resulting in three of the five fatal crashes (60 percent). A fixed object and angle crash accounted for the other two fatal crashes.

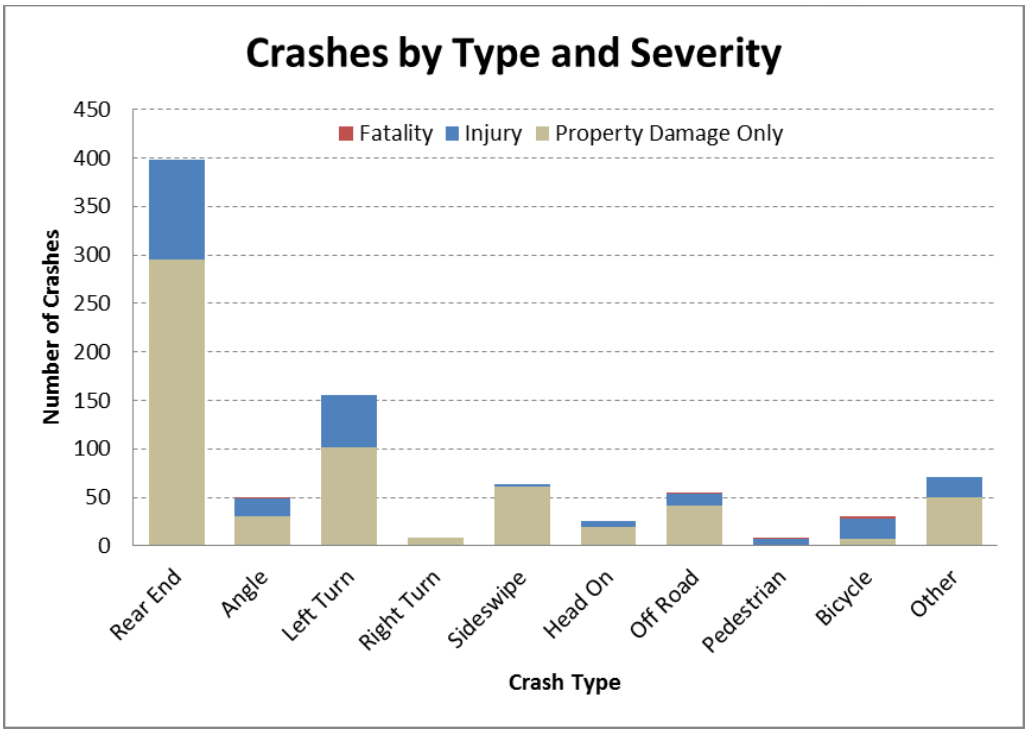

Figure 20: Crashes by Type and Severity (Corridor Wide)

Other crash statistics to note include the following:

- Crashes occurring in non-daylight conditions accounted for approximately 22 percent of the crashes.
- Crashes occurring in wet roadway surfaces conditions accounted for 17 percent of the crashes.
- Eighty (80) percent of the total crashes occurred on a weekday (Monday through Friday).
- Twenty-eight (28) percent of the crashes were observed between 11 AM and 2 PM.
- Thirty-three (33) percent of the crashes occurred between 3 PM and 6 PM.
- Alcohol and drug-related crashes accounted for three percent of the total crashes (23 crashes).

The crashes were further evaluated by intersection and segments as detailed in the following safety sections. The crashes along Wickham Road (2011-2015), as well as the high crash intersections and segments are detailed in **Figure 21**. The figure details the total number of crashes at each high crash intersection/segment, along with the predominant crash types.

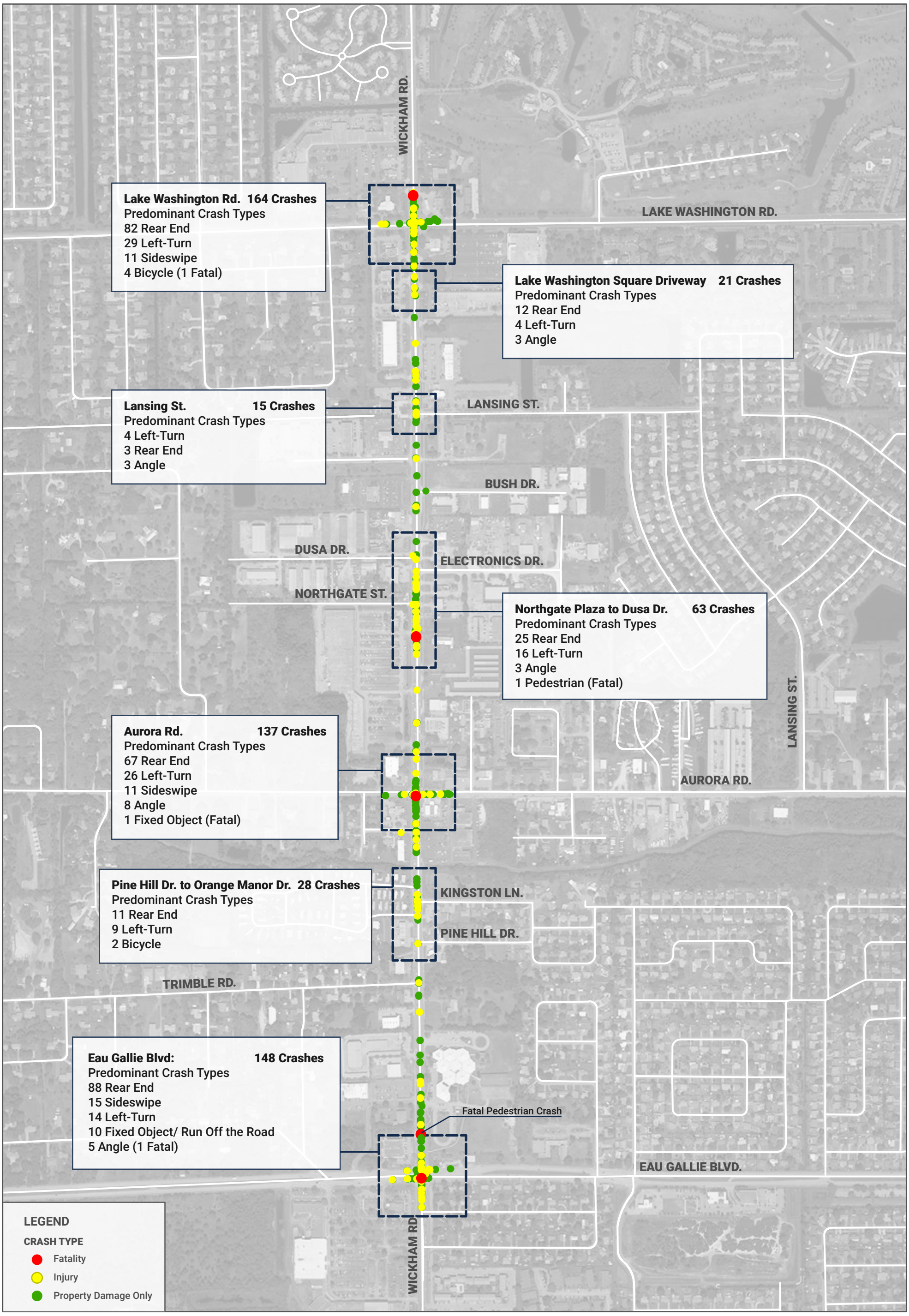

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FIGURE 21
Crash History (2011-2015)

High Crash Intersections

WICKHAM ROAD AT EAU GALLIE BOULEVARD (148 CRASHES)

The signalized intersection of Wickham Road and Eau Gallie Boulevard accounted for 148 (22 percent) of the crashes along the Wickham Road study corridor. **Figure 22** displays the observed crashes at the intersection by crash type and severity. The highest observed crash type at the intersection was rear end, comprising approximately 60 percent of the intersection crashes. Sideswipe and left-turn crashes were the next most common crashes (10 percent each) at this intersection. Two pedestrian and three bicycle crashes, resulting in four injuries were reported at this intersection. One fatal angle crash occurred in 2014. A more detailed summary of the 2011 to 2015 Wickham Road/Eau Gallie Boulevard crash data set in tabular and graphical format is provided in **Appendix I**.

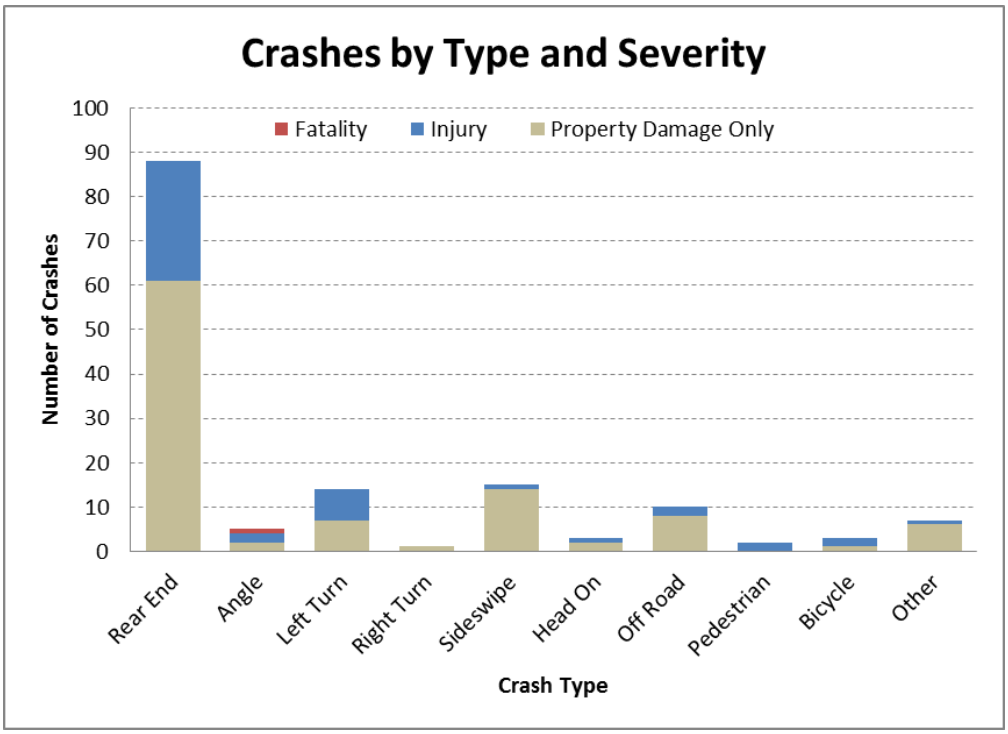

Figure 22: Crashes by Type and Severity (Wickham Road/Eau Gallie Boulevard)

WICKHAM ROAD AT AURORA ROAD (137 CRASHES)

The observed crashes by type and severity at the intersection of Wickham Road and Aurora Road are shown in **Figure 23**. There were a total of 137 crashes reported over the five year crash analysis period (21 percent of the total corridor crashes). Of the 137 total crashes at this intersection, 31 crashes (23 percent) resulted in injury and one resulted in a fatality. The fatal crash was a run-off-the-road/fixed object crash in 2012.

Rear end crashes were the most common at this intersection, comprising approximately 49 percent (67 crashes) of the intersection crashes. Left-turn crashes and sideswipe crashes were the second and third most common crashes (19 and eight (8) percent, respectively). There were two pedestrian and three bicycle crashes reported at the intersection, resulting in four injuries. A more detailed summary of the 2011 to 2015 Wickham Road/Aurora Road crash data set in tabular and graphical format is provided in **Appendix I**.

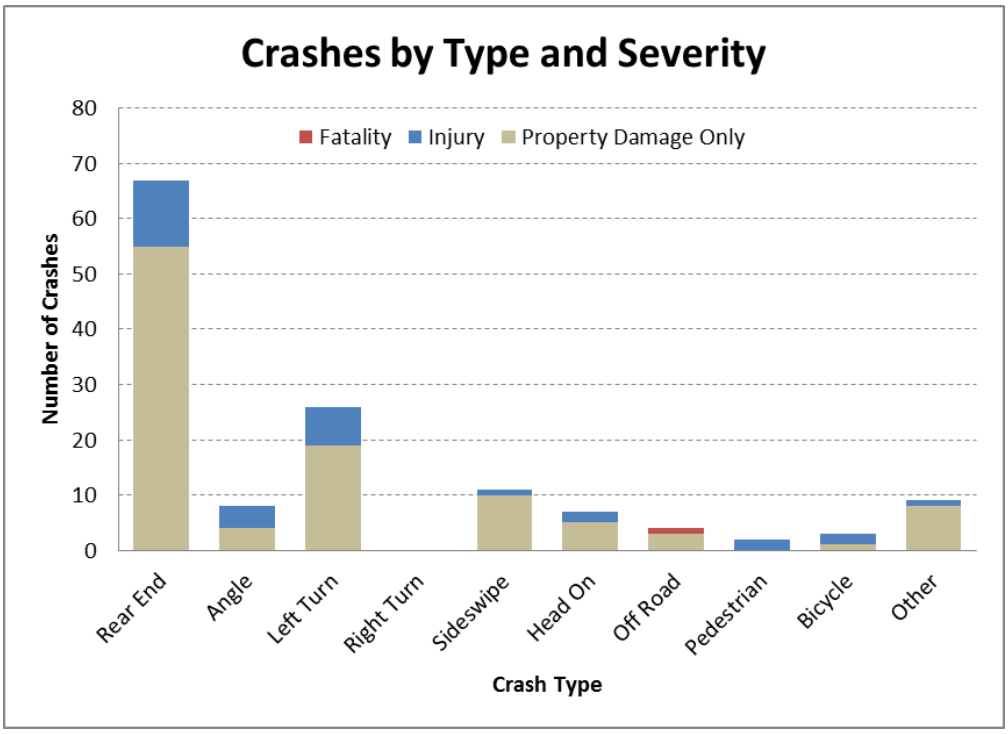

Figure 23: Crashes by Type and Severity (Wickham Road/Aurora Road)

WICKHAM ROAD AT LAKE WASHINGTON ROAD (164 CRASHES)

The signalized intersection of Wickham Road and Lake Washington Road accounted for 164 (25 percent) of the crashes along the Wickham Road study corridor. Approximately 76 percent (125 crashes) of the crashes resulted in property-damage-only (PDO), 23 percent (38 crashes) resulted in injury, and one percent (one crash) was fatal. **Figure 24** displays the observed crashes at the intersection by crash type and severity. The highest observed crash type at the intersection was rear end, comprising 50 percent of the intersection crashes. Left-turn and sideswipe crashes were the next most common crashes (18 percent and seven (7) percent, respectively) at this intersection. Four

bicycle crashes, resulting in three injuries and one fatality were reported at this intersection. The fatal bicycle crash occurred in 2013. A more detailed summary of the 2011 to 2015 Wickham Road/Lake Washington Road crash data set in tabular and graphical format is provided in **Appendix I**.

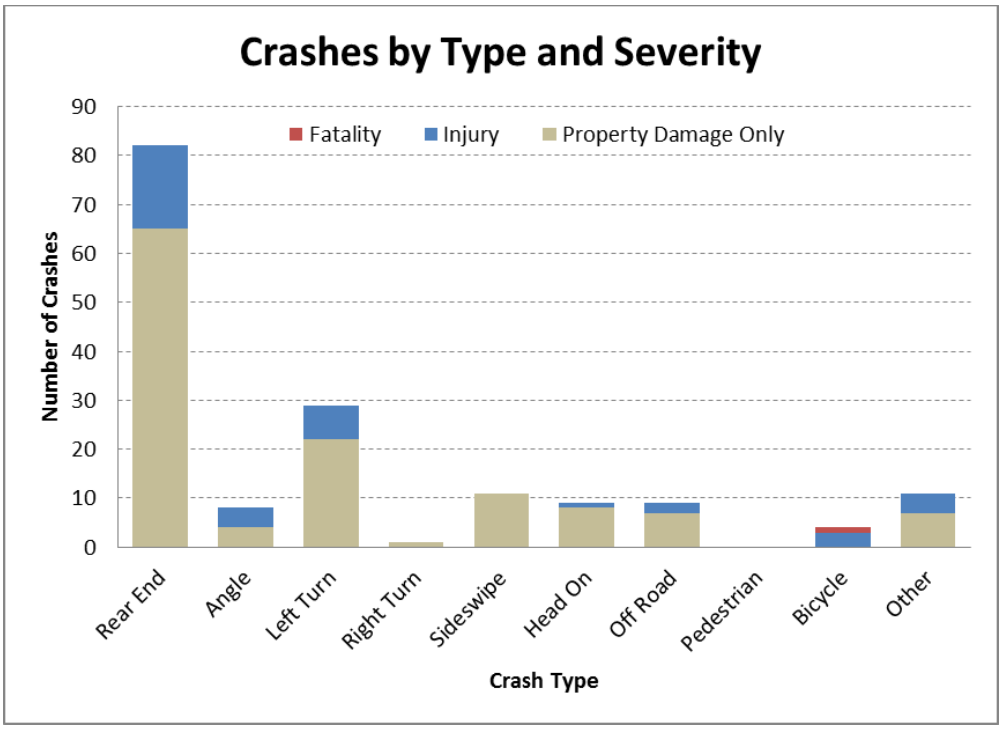

Figure 24: Crashes by Type and Severity (Wickham Road/Lake Washington Road)

Other High Crash Locations

Locations between the signalized intersections were also reviewed for general crash trends. The following summarizes the high crash locations between signalized intersections:

- Pine Hill Drive to Orange Manor Drive –
  - 28 total crashes
  - 11 rear end
  - 9 left-turn
  - 2 bicycle
- Northgate Plaza to Dusa Drive –
  - 63 total crashes
  - 25 rear end
  - 16 left-turn
  - 3 angle
- Lansing Street –
  - 15 total crashes
  - 4 left-turn
  - 3 rear end
  - 3 angle
- Lake Washington Square Driveways –
  - 21 total crashes

- 12 rear end
- 4 left-turn
- 3 angle

Pedestrian and Bicycle Crashes

There were six (6) pedestrian crashes and 21 bicycle crashes during the analysis period. General pedestrian and bicycle statistics are summarized below:

- Of the six (6) pedestrian crashes, two (2) were fatal and four (4) were injury.
- Of the 21 bicycle crashes, one (1) was fatal and 15 were injury.
- Twelve (12) of the 27 pedestrian/bicycle related crashes (44 percent) occurred in non-daylight conditions.
- Eight (8) of the 27 pedestrian/bicycle related crashes (30 percent) occurred on a Friday.
- Alcohol and/or drugs was involved in three (3) of the 27 crashes (11 percent).

Pedestrian and bicycle crashes by location are displayed in **Figure 25**. Detailed crash trends are summarized below:

- Five (5) bicycle crashes occurred between Pine Hill Drive and Kingston Lane (south of Aurora Road). Three of the five crashes resulted in injury.
- Eight (8) of the 27 pedestrian/bicycle crashes occurred when a pedestrian/bicyclist attempted to cross Wickham Road between signalized intersections, including all three reported fatalities.
- Six (6) bicycle crashes involved bicyclists struck while traveling along Wickham Road.
- Eight (8) bicycle crashes and one pedestrian crash occurred at a driveway location with the pedestrian or bicyclist traveling along the sidewalk.

A more detailed summary of the 2011 to 2015 Wickham Road pedestrian/bicycle crash data set in tabular and graphical format is provided in **Appendix I**.

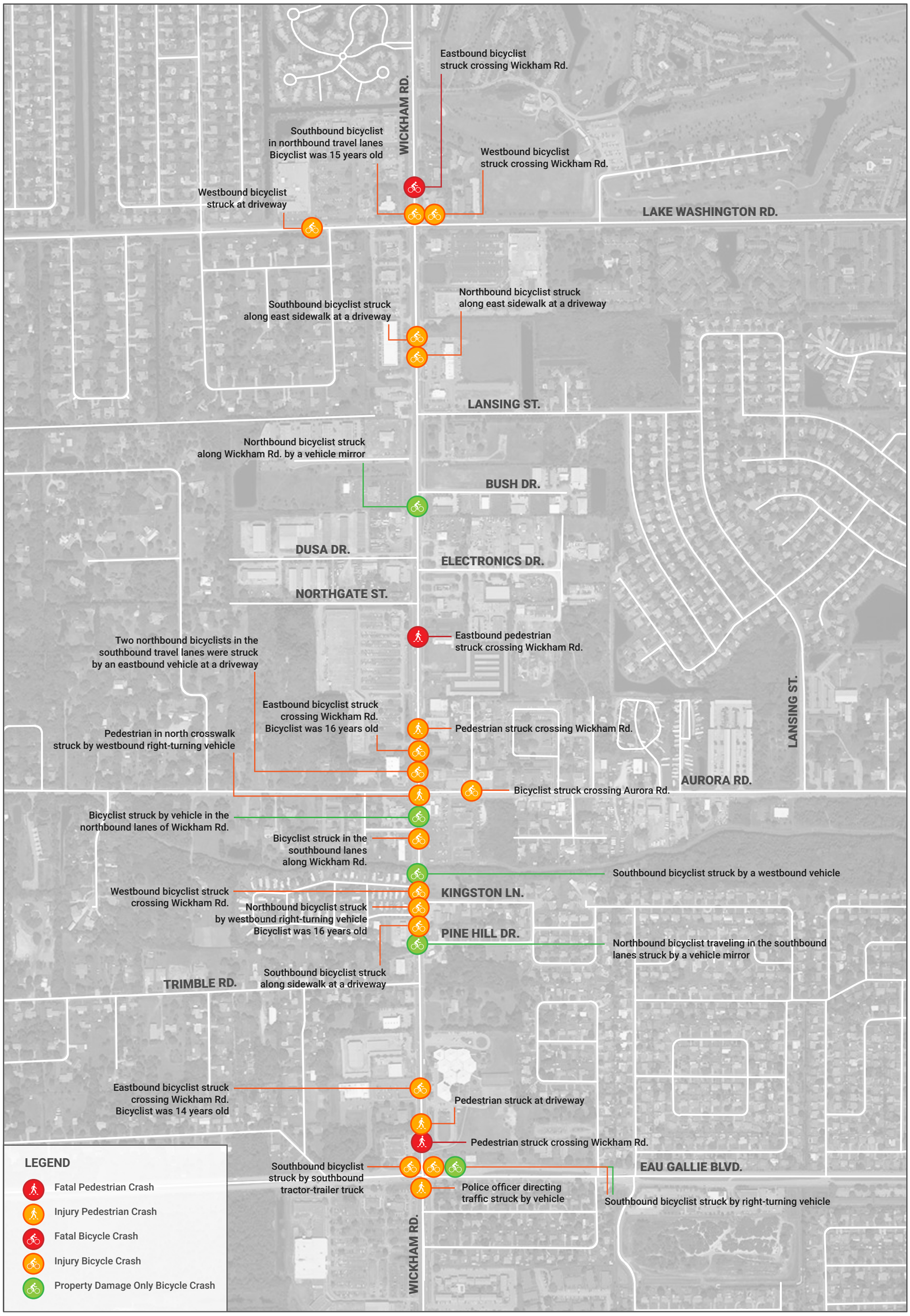

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FIGURE 25
Pedestrian and Bicycle Crashes

Identified Issues and Opportunities

The following opportunities for improvement were identified along the Wickham Road study corridor based on the results of the existing conditions analysis and meetings with the PAT. The following summary of issues and opportunities includes feedback from the public that was solicited during the Existing Conditions Public Meeting held in May.

PEDESTRIAN, BICYCLE, AND TRANSIT ISSUES AND OPPORTUNITIES

- There is a desire and need for enhanced/continuous pedestrian and bicycle facilities along the corridor:
    - There is one minor sidewalk gap (approximately 400 feet) along the east side of Wickham Road to the south of the Aurora Road intersection.
    - Continuous sidewalks are not present along the west side of Wickham Road.
    - There are incomplete pedestrian facilities at three signalized intersections along the corridor:
        - Aurora Road;
        - Northgate Plaza; and
        - Lake Washington Road.
    - The Eau Gallie Boulevard intersection has the most complete pedestrian facilities of the four signalized intersections within the study limits; however, there were two pedestrian and three bicycle crashes reported at the intersection within the study period (2011 to 2015).
    - There are opportunities to improve the unsignalized crossing along the south leg of the Trimble Road intersection as identified in the previously conducted RSA.
    - Potential future signalization of the Lansing Street intersection provides an opportunity to provide pedestrian facilities at the intersection.
    - There were 21 bicycle crashes over the five-year crash analysis period. Six of these crashes involved bicyclists traveling along Wickham Road in the travel. No bicycle facilities exist along the corridor.
- Transit stop improvements were identified for the stops along Wickham Road as part of a Space Coast Area Transit ADA assessment:
    - Non-compliant boarding and alighting areas and a lack of detectable warning surfaces were common identified issues.

The pedestrian, bicycle, and transit issues and opportunities are summarized in **Figure 26**.

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FIGURE 26

Pedestrian, Bicycle, and Transit Issues and Opportunities

VEHICULAR, DRAINAGE, AND UTILITY ISSUES AND OPPORTUNITIES

- Safety along the corridor is a concern with a total of 667 reported crashes from 2011 to 2015, 187 of which (28 percent) resulted in at least one injury and five (5) of which resulted in at least one fatality:
    - A high-number of left-turn crashes relative to total crashes were reported at the following signalized intersections:
        - Eau Gallie Boulevard – 14 left-turn crashes (9 percent of intersection total)
        - Aurora Road – 26 left-turn crashes (19 percent of intersection total)
        - Lake Washington Road – 29 left-turn crashes (18 percent of intersection
    - A high number of left-turn and angle crashes relative to total crashes were reported between the following intersections:
        - Pine Hill Drive to Orange Manor Drive – 9 left-turn crashes (32 percent)
        - Northgate Plaza to Dusa Drive – 16 left-turn and 3 angle crashes (30 percent)
        - Lansing Street – 4 left-turn and 3 angle crashes (47 percent)
        - Lake Washington Square Driveways – 4 left-turn and 3 angle crashes (33 percent)
- Northbound queuing along Wickham Road was observed at the Eau Gallie Boulevard intersection during the PM peak hour.
- Northbound and southbound peak hour queuing was observed along Wickham Road between the Eau Gallie Boulevard and Aurora Road intersections.
- Southbound left-turn lane queuing at the Wickham Road/Aurora Road intersection was observed during the PM peak hour. The queues were observed extending approximately 250 feet, with approximately 75 percent of the queue remaining at the end of each signal cycle.
- Westbound left-turn lane queuing at the Wickham Road/Lake Washington Road intersection was observed during both peak hours. The queuing spilled back approximately 350 feet which blocks the existing center TWLTL. The existing conditions operations also identified operational deficiencies along the westbound approach during the AM and PM peak hours.
- Consideration will need to be given to existing drainage features and utilities along the corridor, specifically adjacent to the west side of Wickham Road when developing roadway concepts.

The vehicular, drainage, and utility issues and opportunities are summarized in **Figure 27**.

Next Steps

The issues and opportunities identified in this Existing Conditions report will be carried forward in the development of operational and geometric alternatives along the study corridor. The study team will begin a sensitivity analysis to aid in the selection of a future growth rate. The future growth rate will be used to forecast existing AM and PM peak hour intersection turning movement volumes. These volumes will then be evaluated as part of a future No-Build operational analysis. The selection of the future growth rate, future volume projections, and future No-Build operational results will be documented in a Future Conditions Summary.

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FIGURE 27

Vehicular, Drainage, and Utility Issues and Opportunities