Hillsborough County Florida

Hillsborough TPO
Transportation
Planning Organization

Bicycle Network Plan

August 2023

Hillsborough County Bicycle Network Plan

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INTRODUCTION

The Hillsborough TPO and Hillsborough County have adopted Vision Zero which is an approach to traffic safety that rejects the notion of an acceptable number of deaths and serious injuries in our transportation systems exists and that the only acceptable number is zero. Vision Zero contemplates a future in which we achieve zero deaths or serious injuries for all modes, with an emphasis placed on system-wide change and with special interest paid to vulnerable roadway users like people walking or biking.

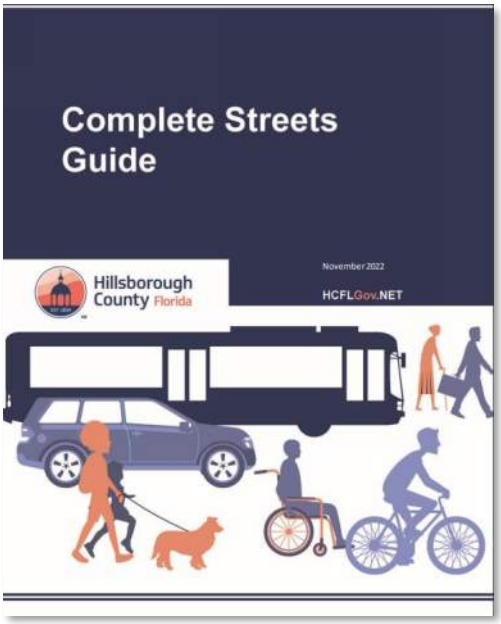
The TPO's Vision Zero Action Plan has four Action Tracks: Paint Saves Lives, which focuses on rapidly deploying pop-up style design interventions, outreach and messaging through One Message, Many Voices, Consistent and Fair traffic enforcement, and The Future Will Not be Like the Past, which focuses on developing and adopting more flexible roadway design standards.

Purpose & Need

As part of its commitment to improving the mobility and safety of all residents, as well as its dedication to Vision Zero, Hillsborough County and the TPO sought to establish a data-driven methodology to identify and address danger for people riding bicycles.

Complete Streets Guide

Hillsborough County published a Complete Streets Guide in November of 2022. The Guide is meant to provide policy guidance on planning and designing county-owned streets and roadways. The guide references the street typologies that are defined in the County's Comprehensive Plan.



Within each primary classification are sub-classes. For example, within Rural C1 & C2, there are Rural Neighborhood Rural Other, and Rural Activity Center typologies. Each context typology comes with a suite of preferred design standards meant to achieve a safe and comfortable roadway system for all road users. The recommendations made as part of this report are based on these defined typologies.

Plan Structure

This plan was developed to identify, prioritize, and suggest improvements for several corridors that present a high risk for people riding bicycles. As such, the process began by developing a methodology to establish a risk score based on a bicyclist's crash risk, their comfort and exposure to traffic, and whether the identified segment helped to achieve a more complete network.

Next, scored segments were prioritized. This was done by applying weight to each score to balance the maximum and minimum scores, and the various qualitative and quantitative aspects that were used to develop the score.

Finally, four segments were ultimately chosen for the project development and recommendations phase. Each recommendation is placed into a tier based on Hillsborough County's Bicycle Corridor Safety Retrofit Toolbox, shown in **Figure 1**.

These actions are described in greater detail throughout this document, and in the accompanying appendices.

Figure 1 - Bicycle Corridor Safety Retrofit Toolbox

NETWORK PRIORITIZATION

Methodology

To establish which roadways were the least safe for people riding bikes, a Bicycle Risk Score was developed. The methodology was driven by factors intended to capture a bicyclist's risk of crashes, bicyclist exposure to traffic, and the existence of a complete bicycle network. The following is a summary of the network prioritization factors and methodology, a more detailed description of the factors, scoring, and outcomes can be found in **Appendix A** of this report.

The Risk Score was based on traffic data on the segment which they travel on including crashes, posted speed limit, average daily traffic volume, number of lanes, and presence of roadway lighting. The Exposure Score was based on proximity to activity generators, activity centers, transit stops, and socio-economic and demographic inputs. Finally, the Network Score included roadway context classification, presence of existing bicycle facilities and sidewalks, and connectivity to existing facilities on intersecting and adjacent segments.

Together, these scores were combined to establish a Prioritization Score using the inputs from the Risk, Exposure, and Network Scores and were used to prioritize locations for bicycle network improvements. The individual factors, measures, and scores for each are shown below as **Table 2**, **Table 3**, and **Table 4**.

Since the risk, exposure, and network scores are naturally unbalanced, in that the potential sum of the factors for each group has a different scoring range, a normalization factor was applied to the groups to create a balanced score for each of the factor groups. The intent of the normalization was to limit the potential maximum score for each factor group to 10, with a total maximum score of 30.

It was determined that the prioritization scoring should be slightly weighted to reflect a priority towards the network factor scoring. It was determined that the factor groups would be weighted with the network factors receiving 40% of the total score and the risk and exposure factors each receiving 30% of the total score. This weighting was achieved using the following formula:

$$Segment\ Prioritization = (\sum Risk \times 0.4 \times 0.9) + (\sum Exposure \times 0.5 \times 0.9) + (\sum Network \times 0.5 \times 1.2)$$

The segment prioritization scores with the Network focused weighting applied are characterized by the scale shown below as **Table 1**. **Figure 2** is a map that illustrates the results of the scoring by roadway segment.

Table 1 - Prioritization Scoring

Prioritization Score Value	Prioritization Score Category
9.9600 – 17.1600	Low
17.1601 – 19.2600	Moderate
19.2601 – 21.2700	High
> 21.2700 (max. 27.0000)	Very High

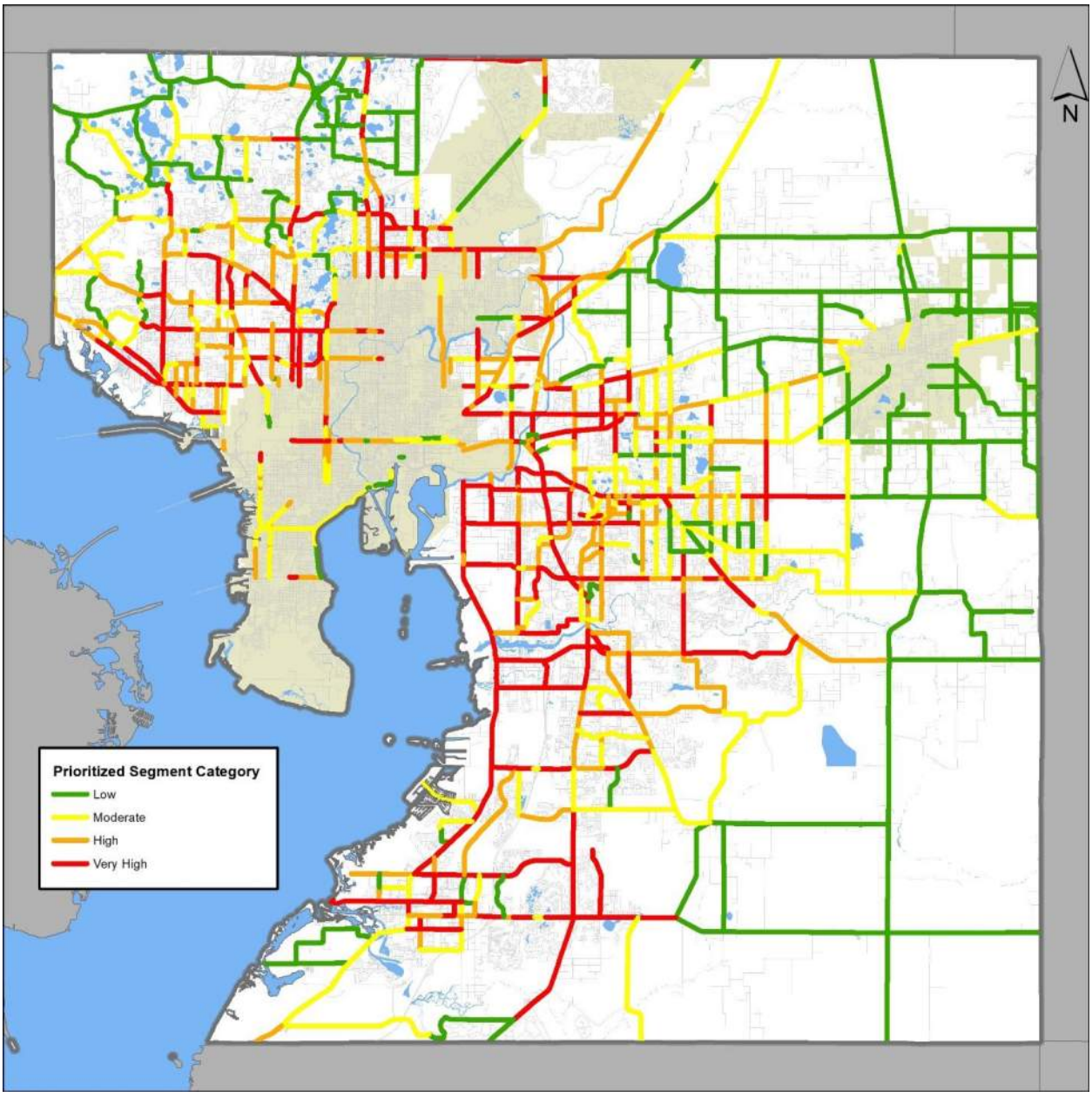


Figure 2: Roadway Segment Prioritization Scoring

Table 2 - Bicycle Risk Factors and Scoring

R Factors	Description	Measure	Score
Crash History (R_{crash})	Bicycle and pedestrian involved crashes along the segment during the analysis period.	0 Crashes	1
		1 Crashes	2
		2 – 3 Crashes	3
		4 – 5 Crashes	4
		>5 Crashes	5
Posted Speed Limit (R_{Speed})	Posted speed limit along the segment.	≤25 MPH	1
		30 MPH	2
		35 MPH	3
		40 MPH	4
		≥45 MPH	5
Average Annual Daily Traffic (AADT) (R_{AADT})	Average annual daily traffic along the segment.	≤5,000	1
		5,001 to 10,000	2
		10,001 to 20,000	3
		20,001 to 30,000	4
		>30,000	5
Total Lanes (R_{Lanes})	Number of travel lanes along the segment.	2 – 3	1
		4 – 5	3
		≥6	5
Lighting ($R_{Lighting}$)	The density (lighting poles per mile) of roadway lighting along the segment.	>35	1
		21 – 35	2
		10 – 20	3
		<10	4
		No Lighting	5
Max Potential Risk Score			***25***

Table 3 - Bicycle Exposure Factors and Scoring

Factor	Description	Measure	Score
Activity Generators ($E_{Generators}$)	Segment's proximity, in miles, to an activity generator such as a park, school, government services, cultural facility, identified activity center, or zoning category of commercial general or intensive.	>0.75	1
		0.75 – 0.51	2
		0.50 – 0.26	3
		0.25 – 0.10	4
		<0.10	5
Residential Density ($E_{ResidentialDensity}$)	The existing residential density (population per acre) of the traffic analysis zones (TAZ) adjacent to the segment.	0 – 2	1
		2 – 4	2
		4 – 8	3
		8 – 12	4
		>12	5
Proximity to Bus Stops ($E_{Transit}$)	Segment's proximity, in miles, to a public transit stop.	<0.10	5
		0.10 - 0.25	4
		0.26 – 0.75	3
		0.76 – 1.50	2
		>1.50	1
Equity & Social Justice (E_{Equity})	Segment is within or directly adjacent to an Underserved Community. Scoring based on the equity factor scoring for each Census block group.	<4	1
		4 – 5	2
		6	3
		7	4
		8 – 9	5
Max Potential Exposure Score			***20***

Table 4 - Bicycle Network Factors and Scoring

Factor	Description	Measure	Score
Existing Bicycle Facility (N_{Bike})	Existing bicycle facility that accommodates bicyclists along the segment.	Separated Facility	1
		Buffered Lane	2
		Standard Lane	3
		Paved Shoulder	4
		None	5
Existing Sidewalk ($N_{Sidewalk}$)	Existing sidewalk along the segment.	Sidewalk (Both Sides)	1
		Sidewalk with Gaps	3
		No Sidewalk	5
Connectivity ($N_{Connectivity}$)	Segment's distance (miles) from an existing or planned bicycle facility.	>0.75	1
		0.75 – 0.51	2
		0.50 – 0.26	3
		0.25 – 0.10	4
		<0.10	5
Context Classification ($N_{Context}$)	Context classification along the segment.	C1 & C2	1
		C3T	2
		C4	3
		C3R	4
		C3C	5
Max Potential Network Score			***20***

Corridor Selection

The Bicycle Network Plan was designed to demonstrate the application of the prioritization process through the selection of four demonstration corridors that would be evaluated for improvements and project development. While geographic diversity is not a prioritization factor, it was determined that it would be valuable for this effort to identify and select corridors that not only have different characteristics and challenges but are also geographically dispersed throughout the county. To help with ensuring geographic diversity, Hillsborough County staff suggested using the County's Mobility Fee Districts, shown in **Figure 3**. Higher priority corridors within each district were identified and reviewed with County staff with an intent of selecting corridors from four of the five districts.

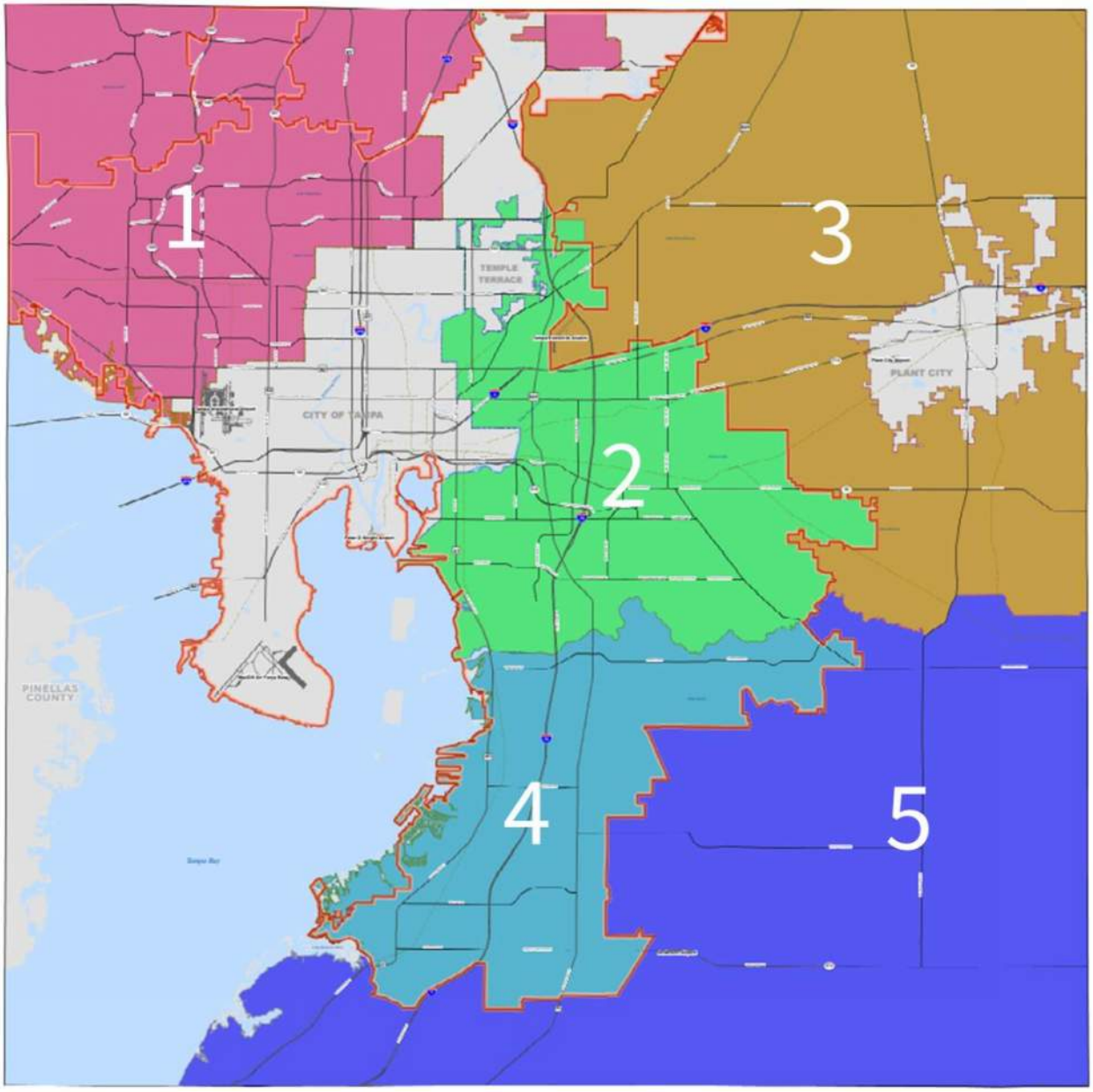


Figure 3: Hillsborough County Mobility Fee Districts

Upon further evaluation, review, and coordination with County staff, four demonstration corridors, within the Unincorporated County were selected for further evaluation and project development:

1. Waters Avenue – Sheldon Road to Veterans Expressway
2. Causeway Boulevard / W Lumsden Road – S. Falkenburg Road to Brandon Parkway
3. Shell Point Road – US 41 to 24th Street NE
4. Balm Riverview Road – Boyette Road to McMullen Road

CORRIDOR EVALUATION AND PROJECT DEVELOPMENT

Design interventions for each corridor are informed primarily by Hillsborough County's Complete Streets Guide, also referred to as the CS Guide. The CS Guide was developed in 2022 to provide guidance on the planning, design, and operation of County-maintained streets and roadways. This guidance helps designers prepare plans that are based on principles of safer, more comfortable, and accessible streets that make bicycling and walking viable transportation alternatives.

This section generally describes each of the four selected corridors, including Existing Conditions, Guiding Practices, Design Concepts, and Planning Level Cost Estimates. **Appendix B** contains a more detailed review of the existing conditions for each corridor along with an evaluation of potential solutions using guidance from the CS Guide. **Appendix C** through **Appendix F** contain full design concepts and planning level cost estimates.

Waters Avenue – Sheldon Road to Veterans Expressway

The Waters Avenue corridor runs approximately 2.35 miles between Sheldon Road and Veterans Expressway in Town 'N Country in Mobility Fee Benefit District 1. The corridor is defined by suburban residential and commercial land uses, with major big-box and strip shopping centers at the intersections with Sheldon Road, Hanley Road, and Henderson Road. The roadway itself is six lanes, divided by concrete and, in some cases, landscaped medians with lefthand turn lanes. Most major intersections are signalized, with frequent driveways between signals. Sidewalks are present on both sides of the corridor along with conventional bike lanes.

Existing Conditions

The following is a summary of the existing conditions and features along the Waters Avenue corridor, including an illustration of the existing typical cross-section (**Figure 4**).

Feature	
Length	2.35 miles
Speed Limit	45 MPH, 35 MPH "Senior Zone" between Riverwood Road and Aiken Road
Total Lanes	6 to 7
Median	Yes, treatment varies
AADT (2019)	55,000
Transit Service	Yes, Routes 16 and 30
Midblock Crossings	None
Bicycle Facilities	Yes, between Pinehurst Drive and Veterans Expressway; Sharrows west of Pinehurst Drive. Pocket bike lanes present at major intersections.
Sidewalks	Yes, 4' minimum, intermittent minor buffer provided
Remarks	Numerous commercial driveways. Concrete barriers on bridge reduces effective shoulder width.

Figure 4: Waters Avenue, Existing Typical Section

Guiding Practices

Hillsborough County Complete Streets Typology

According to the County's Complete Streets typologies, this corridor is designated C3T – Suburban Town. This category includes two typologies: the Town Neighborhood, which is characterized by mostly residential land uses, and the Town Center, which is defined by majority commercial land uses.

The Waters Avenue corridor is best described as a Town Center, with a goal of achieving buildings scaled to the pedestrian and streets with lower design speeds. The target speed for vehicles in this typology is 20 to 25 mph, with a high share of people walking biking and a low truck volume. The preferred design features of this roadway type include four travel lanes, an optional median with midblock pedestrian crossings with refuge islands every 1/8th of a mile, a total pedestrian zone of 15 to 20 feet, and a separated bicycle facility.

High Injury Network

The segment was included on the High Injury Network Next 30 list, ranked 31, and intersects with Sheldon Road from Waters Avenue to Hillsborough Avenue, a Top 20 Corridor, and Hanley Road from Waters Avenue to Woodbridge Boulevard, a Next 30 Corridor.

Town 'N Country Community Plan

The corridor lies within the boundary covered by the Town 'N Country Community Plan, adopted in 2005 in part to establish town centers through redevelopment alongside pedestrian-friendly streets. Waters Avenue was identified as a secondary Town Center, with pedestrian-friendly commercial redevelopment envisioned along this corridor. The plan also seeks to prioritize pedestrian and bicycle-friendly projects including additional roadway crossings, bicycle lanes, trails, and a future connection between the Town 'N Country Greenway and the Upper Tampa Bay Trail.

Design Concepts & Planning-Level Cost Estimates

Design concepts were organized into tiers, based on difficulty and cost of implementation. The first tier represents the easiest improvements to implement, consisting primarily of roadway striping enhancements, the second tier consists of higher cost, but high-profile upgrades such as landscaping or midblock crossings, and the third tier consists of the most difficult, cost-intensive to implement improvements ranging from lighting to roadway reconstruction.

For each improvement, a planning-level cost estimate inclusive of Design, Mobilization, Maintenance of Traffic (MOT), Construction Engineering Inspection (CEI), and Contingency was also developed. Right-of-way acquisition costs were not included. In all, the total recommended enhancements to the corridor total $22,658,400.

The full Design Concepts with Cost Estimates can be found in **Appendix C, Figure 5** below is an illustration of the proposed typical section.

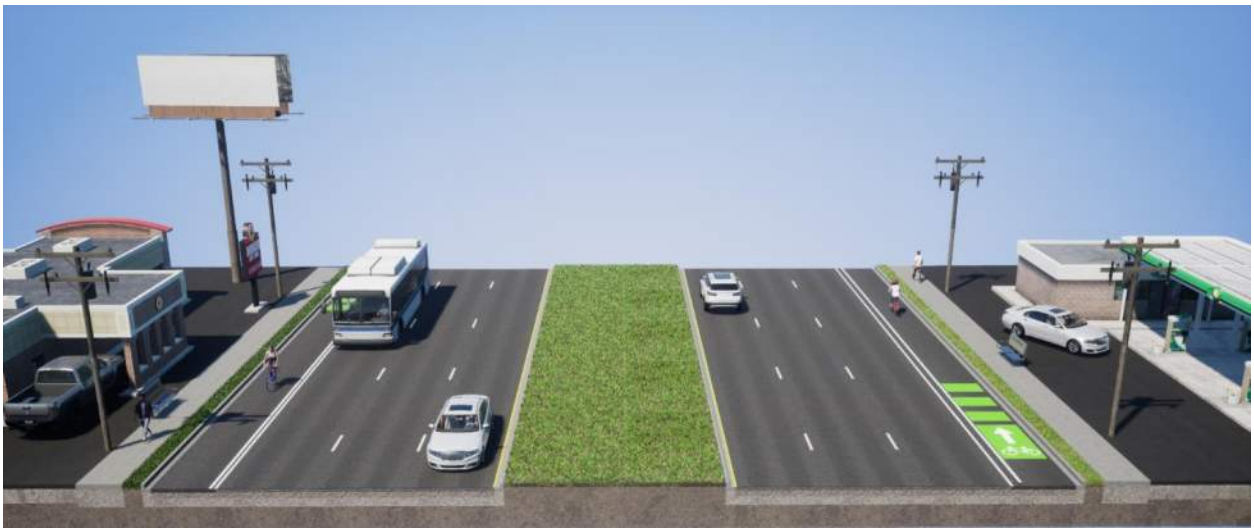


Figure 5: Waters Avenue, Proposed Typical Section

Tier 1

Tier 1 improvements are estimated to cost $7,549,900 and consist of the following:

- **Pavement Markings |** Narrow travel lanes west of Pinehurst Drive to replace existing sharrows with bike lanes. $1,579,500
- **Pavement Markings |** Install bike lane markings throughout, including green markings through all conflict areas, including intersections and driveways. $627,000
- **Pavement Markings |** Install high-visibility pedestrian crosswalks at all applicable intersections, crossings, and driveways. $424,000
- **Median Adjustments |** Modify the median east of Stone Run Court to maintain minimum lane widths. $73,400
- **Separation |** Narrow travel lanes east of Pinehurst Drive to accommodate a buffered bike lane. $4,245,000

- **Separation |** Where feasible, include flexible delineators between bike and travel lanes. $172,400
- **Sidewalks |** Identify and repair areas of sidewalks that are damaged, do not achieve ADA compliance, or have poor drainage. $112,400
- **Signage |** Install MUTCD Bicycle Facility signs. $147,700
- **Signage |** Throughout the corridor, install wayfinding signage leading to the Upper Tampa Bay Trail, the Town 'N Country Trail, the YMCA, parks, schools, and transit hubs. $98,500
- **Signalization |** Modify signal timing to include Lead Pedestrian Intervals (LPIs) at all signalized intersections. $70,000

Tier 2

Tier 2 improvements are estimated to cost $9,367,500 and consist of the following:

- **Landscaping |** Install landscaping, complete with trees, in medians to create a sense of enclosure where feasible. $170,500
- **Pedestrian Enhancements |** Modify the intersection of Waters Avenue and Northbridge Boulevard to provide a crosswalk on the west side of the intersection. $1,130,200
- **Midblock Crossings |** Install a midblock crossing at the following locations:
  - Riverwood Boulevard. $1,130,200
  - Royal Sand Circle. $1,130,200
  - East of JR Manor Drive. $1,130,200
  - Between Waters Avenue Car Wash and Baycare Urgent Care. $1,130,200
- **Separation |** Install concrete separators between bike lanes and travel lanes, where feasible. $114,700
- **Signalization |** Install a full traffic signal at Rustic Drive. $1,381,400
- **Signalization |** Install bicycle detection at all signal-controlled intersections. $333,200
- **Speed Study |** Conduct a speed study to explore reducing the posted speed limit. $76,000
- **Transit Improvements | Upgrade** transit stops throughout the corridor by installing bus stop pads and shelters. $1,398,100
- **Transit Improvements |** Install raised bike lanes through bus stops, where feasible. $242,600

Tier 3

Tier 3 improvements are estimated to cost $5,741,000 and consist of the following:

- **Access Management |** Remove and reconstruct duplicated driveways. $75,300
- **Lighting |** Install lighting at all signalized intersections and crossings. $2,109,700
- **Lighting |** Install pedestrian-scale lighting throughout the entire corridor. $3,466,000
- **Safe Crossings |** Provide pedestrian refuge areas by extending existing median noses to the edge of roadway. $90,000

Additional Considerations

Though not located directly along the subject corridor, the following projects and actions should be considered to enhance the overall effectiveness of the proposed improvements:

- Upgrade the bike lane along Sheldon Road to a buffered or protected facility. Consider revising keyhole bike lanes to achieve a protected intersection.
- Investigate the opportunity for a north-south bike connection between the Upper Tampa Bay and Town 'N Country Trails, potentially along Hanley Road or Pinehurst/Pat/Daycreek.
- Identify additional speed management treatments intended to achieve a 25 MPH target speed, including adjusting signal timing.
- Encourage and/or fund the installation of bike racks at major destinations along the corridor.
- Investigate a bike route connection to the Memorial Bikeway via Shelton Road.
- Relocate utility poles from the sidewalk area between Riverwood and Northbridge.
- Reconstruct all asphalt driveway aprons to achieve an appropriate width and a continuous, level sidewalk surface.

Causeway Boulevard/W. Lumsden Road – S. Falkenburg Road to Brandon Parkway

The Causeway Boulevard/W. Lumsden Road corridor runs approximately 2.2 miles between S Falkenburg Road to Brandon Parkway near Brandon in Mobility Fee Benefit District 2. The corridor is defined by a suburban commercial development pattern west of Providence Road, and a suburban residential development pattern east of Providence Road. The roadway is made up of six travel lanes, divided by a grass median. In addition to major signalized intersections, right-in right-out driveways are found about every 450'. Sidewalks are present on both sides of the street, but no dedicated bike facilities are provided aside from intermittent sidewalks wide enough to qualify as shared-use paths.

Existing Conditions

The following is a summary of the existing conditions and features along the Causeway Boulevard/W. Lumsden Road corridor, including an illustration of the existing typical cross-section (**Figure 6**).

Feature	
Length	2.2 miles
Speed Limit	45 MPH
Total Lanes	6 to 10
Median	Raised concrete and grass
AADT (2019)	27,500
Transit Service	Routes 25 LX and 360 LX
Midblock Crossings	None
Bicycle Facilities	None, wide shoulders provided
Sidewalks	Present throughout, except a major gap approximately between S Falkenburg Rd and Brandon Town Center Dr
Remarks	Wide signalized intersections with multiple turn lanes and channelized islands

Figure 6: Causeway Boulevard/W. Lumsden Road, Existing Typical Section

Guiding Practices

Hillsborough County Complete Streets Typology

According to the County's Complete Streets typologies, this corridor is designated C3R – Suburban Residential. This category includes two typologies: the Suburban Neighborhood, which contemplates low vehicle volumes and speeds that serve shorter trips but with higher bicyclist and pedestrian volumes, and Suburban Residential Connector, which allow higher speed and volume vehicle travel to and from neighborhoods.

The Causeway Boulevard / Lumsden Road corridor is best described as a Suburban Residential Connector. The target speed for vehicles in this typology is 25 to 35 mph. The preferred design features of this roadway type include two or more travel lanes, an optional median with midblock pedestrian crossings with refuge islands every 1/8th of a mile, a total pedestrian zone of 10 to 12 feet including a minimum 6' wide sidewalk, and a separated bicycle facility.

High Injury Network

The segment was included on the High Injury Network Next 30 list, ranked 36.

Design Concepts & Planning-Level Cost Estimates

Design concepts were organized into tiers, based on difficulty and cost of implementation. The first tier represents the easiest improvements to implement, consisting primarily of roadway striping enhancements, the second tier consists of higher cost, but high-profile upgrades such as landscaping or midblock crossings, and the third tier consists of the most difficult, cost-intensive to implement improvements ranging from lighting to roadway reconstruction.

For each improvement, a planning-level cost estimate inclusive of Design, Mobilization, MOT, CEI, and Contingency was also developed. Right-of-way acquisition costs were not included. In all, the total recommended enhancements to the corridor total $22,955,500, depending on which bridge crossing alternative is selected.

The full Design Concepts with Cost Estimates can be found in **Appendix D, Figure 7** below is an illustration of the proposed typical section.

Figure 7: Causeway Boulevard/W. Lumsden Road, Proposed Typical Section

Tier 1

Tier 1 improvements are estimated to cost $515,000 and consist of the following:

- **Bicycles |** Work with THEA to Install bicycle counter equipment on the Brandon Parkway Trail. $25,800
- **Pavement Markings |** Install enhanced sidewalk and path crossings at all unsignalized side streets and driveways. $314,000
- **Pavement Markings |** Modify the intersection at Brandon Parkway to include marked crosswalks. $30,600
- **Sidewalks |** Identify and repair sidewalks throughout, with ADA upgrades. $85,000
- **Signage |** Install wayfinding signage at Brandon Parkway to W Brandon Boulevard, Brandon High School, and the Brandon Town Center Mall. $24,600
- **Signal Timing |** Modify signal timing to include Lead Pedestrian Intervals (LPIs) at all signalized intersections. $35,000

Tier 2

Tier 2 improvements are estimated to cost $10,495,700 and consist of the following:

- **Intersection Improvements |** Modify the intersection at Brandon Town Center Drive to include marked crosswalks with curb ramps, realigned sidewalks, and reduce the number of lanes to match the total through-lanes. $165,800
- **Intersection Improvements |** Modify the intersection at Gomto Lake Road to include marked crosswalks with curb ramps, realigned sidewalks, and reduce the number of lanes to match the total through-lanes. $149,200
- **Landscaping |** Install landscaping with trees where feasible. $170,500
- **Pavement Markings |** Install bike lane markings throughout, including green markings through all conflict areas, including intersections and driveways. $82,700
- **Shared-Use Paths |** Install a shared use path across I-75.
    - Alternate 1: Install pathway and separate bridge on alignment south of the roadway bridges. $7,836,200

    - Alternate 2: Install new pathway and reconfigure roadway to continue pathways across existing bridges on both sides of the roadway. $12,959,900
- **Signage |** Install "Stop Here on Red" signs at all signalized intersections. $25,700
- **Signalization |** Install bicycle detection at all signal-controlled intersections. $83,300
- **Signalization |** Install a full traffic signal at Heather Lakes Boulevard, with small curb radii. $1,588,600
- **Speed Study |** Conduct a speed study to explore reducing the posted speed limit. $76,000
- **Transit |** Install bus stop pads, amenities, and connecting sidewalks at Falkenberg Road (SE corner), Paddock Club Drive (NW and SE corners), and Brandon Parkway (NE corner). $317,700

Tier 3

Tier 3 improvements are estimated to cost $11,944,800 and consist of the following:

- **Lighting |** Install pedestrian-scale lighting throughout the corridor. $2,637,200
- **Lighting |** Install lighting at all signalized intersections and crossings. $3,164,600
- **Shared-Use Path |** Install an asphalt path on both sides of the study corridor to replace the existing sidewalks. $6,143,000

Additional Considerations

Two alternative alignments have been identified for continuing the proposed shared use paths across the bridge over I-75. Further study is required to identify the feasibility of these alternative alignments, or to uncover other potentially feasible alternatives.

Though not located directly along the subject corridor, the following projects and actions should be considered to enhance the overall effectiveness of the proposed improvements:

- Upgrade the existing conventional bike lane along the following corridors to a buffered or protected lane, as feasible:
    - S Falkenburg Road
    - Providence Road
    - S Gornto Lakes Road
    - Provident Lakes Boulevard
- At Falkenburg Road, remove keyhole bike lanes where the lanes are not anticipated to continue to each side of the intersection.
- Identify additional speed management treatments intended to achieve a 35 MPH target speeds, including adjusting signal timing.
- Encourage and/or fund the installation of bike racks at major destinations along the corridor.
- On Providence Road, remove bike lanes and move the curbs in, providing room for side paths and shade trees.
- On Regency Lake Drive and other similar locations, reduce the total number of lanes to match the number of lanes entering and exiting the segment.

Shell Point Road – US 41 to 24th Street SE

The Shell Point Road corridor runs approximately 1.96 miles between US 41 and 24th Street SE near Sun City Center in Mobility Fee Benefit District 4. The roadway is characterized by low-density suburban and rural residential development. At the eastern end of the corridor, at the intersection of 21st Street SE, are Hillsborough Community College – Southshore Campus, Lennard High School, and Thompson Elementary School. The roadway is two lanes, undivided and has sidewalks intermittently throughout. There are currently no marked crosswalks within the study area, except at US 41.

Existing Conditions

The following is a summary of the existing conditions and features along the Shell Point Road corridor, including an illustration of the existing typical cross-section (**Figure 8**).

Feature	
Length	1.96 miles
Speed Limit	40 MPH, 20 MPH School Zone
Total Lanes	2
Median	No
AADT (2019)	10,500
Transit Service	None
Midblock Crossings	None
Bicycle Facilities	Short segments of 10' shared path
Sidewalks	Yes, Gaps
Remarks	At-grade railroad crossing without sidewalks, predominantly residential; Thompson Elementary School, Lennard High School, and HCC SouthShore directly adjacent

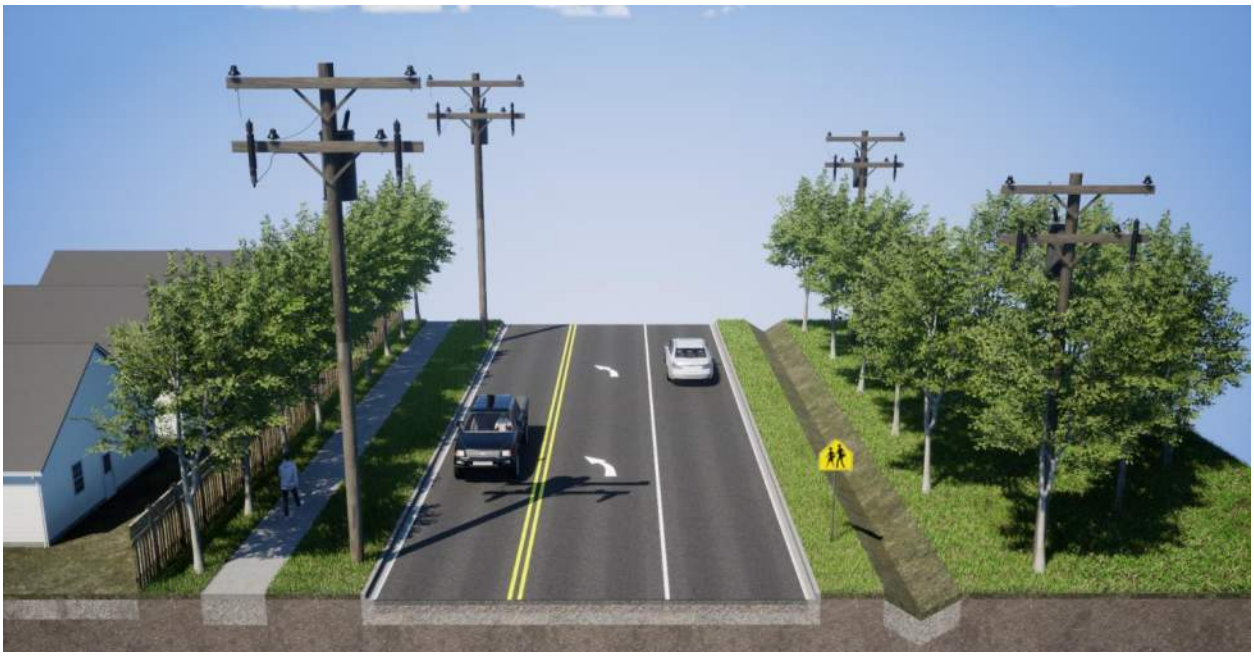


Figure 8: Shell Point Road, Existing Typical Section

Guiding Practices

Hillsborough County Complete Streets Typology

According to the County's Complete Streets typologies, this corridor is designated C3R – Suburban Residential. This category includes two typologies: the Suburban Neighborhood, which contemplates low vehicle volumes and speeds that serve shorter trips but with higher bicyclist and pedestrian volumes, and Suburban Residential Connector, which allow higher speed and volume vehicle travel to and from neighborhoods.

The Shell Point Road corridor is best described as a Suburban Neighborhood. The target speed for vehicles in this typology is 25 to 30 mph. The preferred design features of this roadway type include two total undivided travel lanes, with midblock pedestrian crossings every 1/8th of a mile, a total pedestrian zone of 10 to 12 feet including a minimum 6' wide sidewalk. The Complete Streets Guide recommends protected bike lanes when posted speeds are 25 MPH or above, and a separated facility when posted speeds are 30 MPH or above.

Ruskin Community Plan & SouthShore Areawide Systems Plan

The corridor lies within the boundaries covered by the Ruskin Community Plan, which was adopted 2005 to preserve the area's small-town character, as well as the development of trails, including linking the South Coast Greenway to Simmons Park via Shell Point, which lie west of the corridor. The plan calls for beautification of Shell Point Road through the inclusion of enhanced landscaping, retaining the corridor as a two-lane roadway, expanding sidewalks to both sides of W Shell Point Road, and expanding opportunities for biking and walking.

The corridor is also within the boundaries of the SouthShore Areawide Systems Plan, which was adopted to guide development of the southern half of Hillsborough County. This plan contemplates a connected system of Livable Roadways, which offers a variety of mobility of choices for residents, including the opportunity to safely walk, bike, or drive to any destination.

Design Concepts & Planning-Level Cost Estimates

Design concepts were organized into tiers, based on difficulty and cost of implementation. The first tier represents the easiest improvements to implement, consisting primarily of roadway striping enhancements, the second tier consists of higher cost, but high-profile upgrades such as landscaping or midblock crossings, and the third tier consists of the most difficult, cost-intensive to implement improvements ranging from lighting to roadway reconstruction.

For each improvement, a planning-level cost estimate inclusive of Design, Mobilization, MOT, CEI, and Contingency was also developed. Right-of-way acquisition costs were not included. In all, the total recommended enhancements to the corridor total $14,682,367.

The full Design Concepts with Cost Estimates can be found in **Appendix E, Figure 9** below is an illustration of the proposed typical section.

Figure 9: Shell Point Road, Proposed Typical Section

Tier 1

Tier 1 improvements are estimated to cost $320,900 and consist of the following:

- **Pavement Markings |** Install high-visibility pedestrian crosswalks at all applicable intersections, crossings, and driveways. $19,300
- **Pavement Markings |** Install edge stripe, effectively narrowing the travel lane to 10'. $53,100
- **Pavement Markings |** Install bike lane markings through the intersection at US 41, including green markings through all conflict areas and bike boxes. $68,900
- **School Zone Safety |** Install school zone beacons, markings, and signage for Thompson Elementary School. $81,100
- **Signage |** Install wayfinding signage at US 41, Interchange Street, 24th Street NE, and to the South Coast Trail, the Firehouse Cultural Center, and nearby schools. $98,500

Tier 2

Tier 2 improvements are estimated to cost $9,449,667 and consist of the following:

- **Crosswalks |** Install an enhanced crosswalk with Rectangular Rapid Flashing Beacon (RRFB) at the following locations:
  - 2nd Street. $191,700
  - 6th Street. $50,200
  - 15th Street. $100,500
  - 21st Street. $50,200
- **Landscaping |** Install landscaping with shade trees where feasible. $170,500
- **Railroad Safety |** Install barriers, signage, and markings at the railroad crossing to meet current design standards. $131,367
- **Shared-Use Path |** Install a concrete shared use path along the north side of the corridor. $8,637,600
- **Signalization |** Install bicycle detection at the signal-controlled intersection with US 41. $41,600
- **Speed Study |** Conduct a speed study to explore reducing the posted speed limit. $76,000

Tier 3

Tier 3 improvements are estimated to cost $4,911,800 and consist of the following:

- **Crosswalks |** Install an enhanced crosswalk with RRFB at Interchange Street. $50,200
- **Lighting** | Install lighting at all intersections and crossings. $1,230,700
- **Lighting** | Install pedestrian-scale lighting throughout the corridor. $2,938,600
- **Sidewalks |** Install a sidewalk on the south side of the corridor between 6th Street and Interchange Street. $692,300

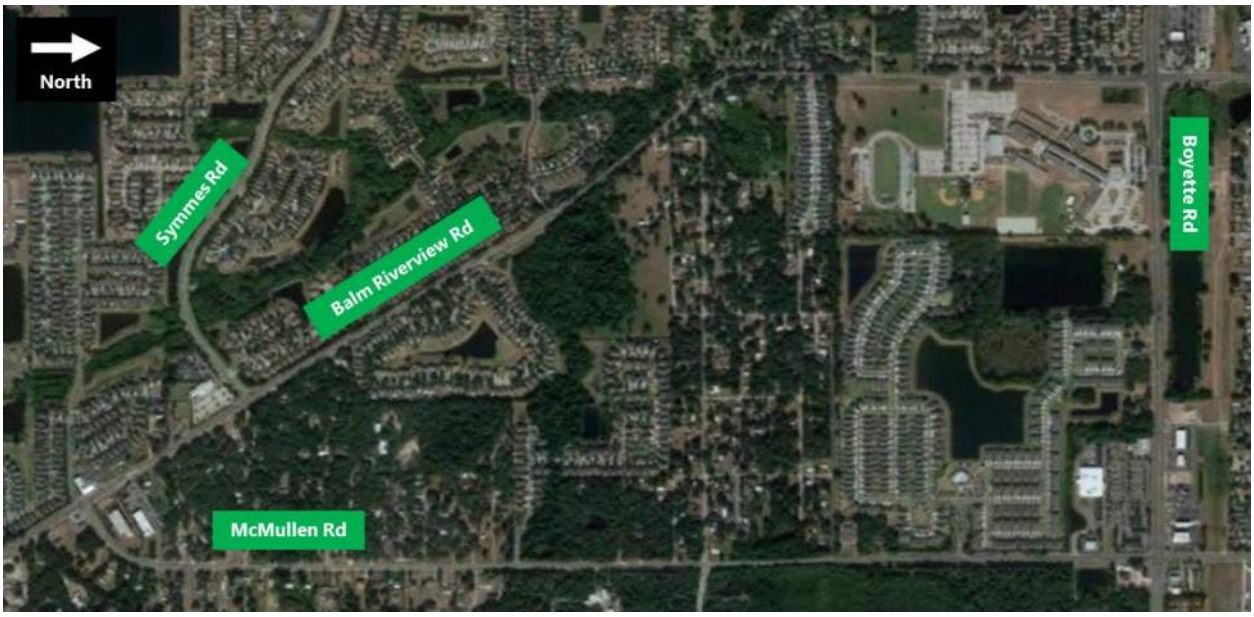
Additional Considerations

Though not located directly along the subject corridor, the following projects and actions should be considered to enhance the overall effectiveness of the proposed improvements:

- Identify additional speed management treatments intended to achieve a 35 MPH target speeds, including adjusting signal timing.
- Encourage and/or fund the installation of bike racks at major destinations along the corridor.
- Install bicycle counter equipment on the South Coast Greenway Trail.

Balm Riverview Road – Boyette Road to McMullen Road

The Balm Riverview Road corridor runs approximately 1.87 miles between Boyette Road and McMullen Road in Riverview in Mobility Fee Benefit District 4. The roadway is characterized by a low-density, primarily residential, and natural land uses, along with Riverview High School Although sidewalks are located on both sides of the corridor, there are few marked crossings and no designated bike facilities present.



Existing Conditions

The following is a summary of the existing conditions and features along the Balm Riverview Road corridor, including an illustration of the existing typical cross-section (**Figure 10**).

Feature	
Length	1.87 Miles
Speed Limit	45 MPH; 20 MPH School Zone; 30 MPH Curve Advisory
Total Lanes	2
Median	None
AADT (2019)	16,900
Transit Service	None
Midblock Crossings	None
Bicycle Facilities	None
Sidewalks	Yes, Both Sides
Remarks	Right of way is limited in some areas; predominantly residential, with some natural areas.

Figure 10: Balm Riverview Road, Existing Typical Section

Guiding Practices

Hillsborough County Complete Streets Typologies

According to the County's Complete Streets Guidance, this corridor is designated C3R – Suburban Residential. This category includes two typologies: the Suburban Neighborhood, which contemplates low vehicle volumes and speeds that serve shorter trips but with higher bicyclist and pedestrian volumes, and Suburban Residential Connector, which allow higher speed and volume vehicle travel to and from neighborhoods.

The Balm Riverview Road corridor is best described as a Suburban Neighborhood. The target speed for vehicles in this typology is 25 to 30 mph. The preferred design features of this roadway type include two total undivided travel lanes, with midblock pedestrian crossings every 1/8th of a mile, a total pedestrian zone of 10 to 12 feet including a minimum 6' wide sidewalk. The Complete Streets Guide recommends protected bike lanes when posted speeds are 25 MPH or above, and a separated facility when posted speeds are 30 MPH or above.

Riverview Community Plan

The corridor falls within the boundaries of the Riverview Community Plan, which was adopted to maintain Riverview's small-town charm and atmosphere. The plan breaks down the area into districts, of which the corridor runs through the Downtown and Residential districts. The Downtown district seeks to focus and direct mixed-use development to create a pedestrian-friendly neighborhood, while the Residential district broadly seeks to maintain consistency between existing and new development patterns. The plan calls for more sidewalks, pedestrian crossings, and connections with greenways throughout the community.

Design Concepts & Planning-Level Cost Estimates

Design concepts were organized into tiers, based on difficulty and cost of implementation. The first tier represents the easiest improvements to implement, consisting primarily of roadway striping enhancements, the second tier consists of higher cost, but high-profile upgrades such as landscaping or midblock crossings, and the third tier consists of the most difficult, cost-intensive to implement improvements ranging from lighting to roadway reconstruction.

For each improvement, a planning-level cost estimate inclusive of Design, Mobilization, MOT, CEI, and Contingency was also developed. Right-of-way acquisition costs were not included. In all, the total recommended enhancements to the corridor total $15,748,000.

The full Design Concepts with Cost Estimates can be found in **Appendix F, Figure 11** below is an illustration of the proposed typical section.

Figure 11: Balm Riverview Road, Proposed Typical Section

Tier 1

Tier 1 improvements are estimated to cost $236,900 and consist of the following:

- **Intersection Improvements |** Realign the intersection with Tucker Road to reduce the crossing distance and provide a safer intersection angle. $25,900
- **Pavement Markings |** Install high-visibility pedestrian crosswalks at all applicable intersections, crossings, and driveways. $39,900
- **School Zone Safety |** Install school zone beacons, markings, and signage for Riverview High School and Kids Community College. $81,100
- **Sidewalks |** Identify and repair areas of sidewalks that are damaged or otherwise do not achieve ADA compliance. $90,000

Tier 2

Tier 2 improvements are estimated to cost $11,396,000 and consist of the following:

- **Crosswalks |** Install an enhanced crosswalk with Rectangular Rapid Flashing Beacon (RRFB) at the following locations:
    - Black Forest Trail

  - Shady Lane
  - Irish Moss Avenue
  - Symmes Road
- **Landscaping |** Install landscaping with shade trees where feasible.
- **Pavement Markings |** Install bike lane markings through the intersection with Boyette Road, including green markings through all conflict areas.
- **Signalization |** Install bike detection at the signal-controlled intersection with Boyette Road.
- **Shared-Use Path |** Install an asphalt shared-use path along the east side of the corridor.

Tier 3

Tier 3 improvements are estimated to cost $4,115,100 and consist of the following:

- **Access Management |** Modify driveways throughout to decrease turning radii and provide pedestrian refuge areas by extending existing median noses to the edge of roadway. $33,700
- **Crosswalks |** Install a raised crosswalk at Shady Lane. $62,800
- **Lighting |** Install lighting at all signalized intersections and crossings. $1,230,700
- **Lighting |** Install pedestrian-scale lighting throughout the corridor. $2,787,900

Additional Considerations

Though not located directly along the subject corridor, the following projects and actions should be considered to enhance the overall effectiveness of the proposed improvements:

- Upgrade the existing conventional bike lane along the following corridors to a buffered or protected lane, as feasible:
  - Boyette Road
  - McMullen Road
  - Symmes Road
- Identify additional speed management treatments intended to achieve a 35 MPH target speeds, including adjusting signal timing.
- Encourage and/or fund the installation of bike racks at major destinations along the corridor.
- Where side paths are installed or planned, remove keyhole bike lanes where the lanes do not continue to the other side of the intersection and end bike lanes with appropriate transitions.

IMPLEMENTATION

This section focuses on potential next steps and potential funding programs to move the identified improvements forward into the implementation phase. With a few exceptions, most of the identified improvements along each of the corridors could be considered shorter to medium-term projects (given the availability of funding) that require little to no right-of-way acquisitions, utility conflicts, or environmental impacts. If upon further evaluation it is determined that significant right-of-way acquisitions or environmental impact analyses are needed, the feasibility and/or priority of the proposed concepts may be impacted and may need to be considered as more of a longer-term option.

Some portions of the proposed concepts may not require a formal design phase and could be implemented using routine maintenance programs or design push-button type contracts. For improvements that cannot be implemented using maintenance or push-button mechanisms, a formal cost estimate and an engineering and feasibility review should be conducted to identify more refined costs, fatal flaws not found in the initial review, general project parameters, need for design standard variances or exceptions, recommended community engagement process, and potential drainage and environmental permitting requirements. Based on the additional cost estimates and feasibility review, issues may be identified that were not apparent in the conceptual project development process, or it may be determined that additional study or analysis is necessary before the project can be programmed. Although no project is "unbuildable," significant feasibility issues may impact project cost and complexity to the extent that a determination may be made that there should be subsequent analysis or documentation rather than implementation of the project or that pursing the recommended project is not an appropriate use of resources. In this event it may be necessary to either modify the project to eliminate the feasibility issue, move the project into a longer-term category for evaluation in the future, or remove the project from the list.

If the project(s) is generally feasible and does not require significant additional preliminary engineering/analysis work, the next step in the implementation process is to verify that the recommended project is acceptable to the public and to the elected leadership of the subject community, it is generally recommended that project-specific coordination take place prior to expending funds necessary to design and construct the project recommendations. In most circumstances, a project that is not supported by the community and its elected officials should not be subject to of additional project development effort; however, there may be instances when a project is sufficiently important to the region that further project development and public engagement work may be merited despite initial opposition.

Potential Funding Options

Once a project has been vetted for constructability/cost-feasibility and accepted by the community, the next step is to identify potential funding sources for the project and prepare and submit any necessary funding applications. If the project is to be funded using local funds, then appropriate funds should be identified, and the project scheduled for specific implementation phases. If the project is to be funded using State or Federal funds, specific steps may need to be taken, including establishing specific schedule points for formal scoping, design, and letting for construction and should be updated and monitored as needed.

A review of potential funding programs and sources was conducted as part of this effort. The following is a summary of funding program review and provides details of the specific funding program, the agency responsible for distributing the funds, and a description of the funding program that includes eligible uses and requirements.

Program Name	Agency	Description
Congestion Mitigation & Air Quality - CMAQ	USDOT Center for Climate Change	The CMAQ Program funds surface transportation improvements or transportation programs that improve air quality and mitigate traffic congestion. Projects and activities include access enhancements to public transportation, pedestrian, and bicycle infrastructure. Furthermore, electric vehicle infrastructure is eligible as a proposed activity. Adds shared micromobility as an eligible use of funds for construction of walkways and bicycle transportation facilities. Permits the Secretary, at the request of the MPO to assist the MPO with tracking progress made in minority or low-income populations as part of a performance plan.
Surface Transportation Block Grant Program (STBG)	Federal Highway Administration	The Surface Transportation Block Grant program (STBG) provides flexible funding that may be used by States and localities for projects to preserve and improve the conditions and performance on any Federal-aid highway, bridge and tunnel projects on any public road, pedestrian and bicycle infrastructure, and transit capital projects, including intercity bus terminals.
Highway Safety Improvement Program	Federal Highway Administration	The Highway Safety Improvement Program (HSIP) is a core Federal-aid program with the purpose to achieve a significant reduction in traffic fatalities and serious injuries on all public roads, including non-State-owned roads and roads on tribal land.
FTA Section 5310 Enhanced Mobility for Seniors and Individuals with Disabilities	Federal Transit Administration (FTA)	Section 5310 Program is intended to enhance mobility for seniors and persons with disabilities. It provides funds for transportation projects and/or programs that serve the special needs of transit-dependent populations beyond traditional public transportation services and complementary para-transit services under the ADA. Projects can be funded through this program include building an accessible path to a bus stop, including curb-cuts, sidewalks, accessible pedestrian signals or other accessible features, and improving signage, or way-finding technology.

Program Name	Agency	Description
RAISE Discretionary Grants	USDOT / FHWA	Rebuilding American Infrastructure with Sustainability and Equity (RAISE), will fund a wide range of eligible projects including multimodal grant funds for fewer road and more car-free transportation. It will include $1.5B in grant funding for capital and planning projects. The RAISE program helps communities large and small fix and modernize their infrastructure.
Active Transportation Infrastructure Investment Program	USDOT / FHWA	Law authorizes the Connecting American's Active Transportation System Act, to receive $200 million per year. A new competitive grant program to increase safety for all road users and reconnecting communities that face barrier to mobility. (Funding not yet appropriated)
Congestion Relief Program	USDOT / FHWA	Provides competitive grants to States, local governments, and MPOs for projects in large, urbanized areas. Aim to advance innovative, integrated, and multimodal solutions to congestion relief in the most congested metropolitan areas.
Healthy Streets Program	USDOT / FHWA	Discretionary grant program to install cool and/or porous pavements or to expand tree cover with the goal of reducing urban heat centers and improve air quality.
Safe Routes to School (SRTS) Program	USDOT / FHWA	Program has been codified and amended to apply through 12th Grade to enable and encourage high school students to walk and bike to school safely.
Carbon Reduction Program	USDOT / FHWA / State / MPOs	Aims to reduce transportation emissions. Eligible projects include public transit projects and others to facilitate non-motorized users of the road. This entails the construction, planning, and design of on-road and off-road trail facilities for pedestrians and bicyclists.
PROTECT Program	USDOT / FHWA / State / MPOs	PROTECT Program is to improve the resiliency of the transportation infrastructure. It will include $7.3B in formula, plus $1.4B in grants.
Safe Streets and Roads for All	USDOT /FHWA / MPOs /Municipalities	Provides supplemental funding to support local initiatives to prevent death and serious injury on roads and streets. Eligible projects include A) develop a comprehensive safety action plan; b) conduct planning, design, and development activities for projects and strategies identified in a comprehensive safety action plan; or C) carry out projects and strategies identified in a comprehensive safety action plan.

Program Name	Agency	Description
Reconnecting Communities	USDOT / FHWA / State / MPOs	Funds will be made available to reconnect as many as 20 communities by removing portions of interstates, redesigning rural main streets and repurposing former rail lines. It will include $150M for planning grants, plus $350M capital construction grants.
Green Infrastructure Funding	US Environmental Protection Agency (EPA)	Managing Wet Weather with Green Infrastructure, Municipal Handbook on Funding Options.
People for Bikes Community Grant	People for Bikes	For City/County agencies or non-profits - grants of up to $10,000 awarded can be helpful for meeting local match requirements for other grants. People For Bikes generally holds 1-2 open grant cycles per year.
Safety of Vulnerable Road Users	FDOT / USDOT	Requires at least 15% of a state's highway safety improvement program funds to address pedestrians, bicyclists, and other non-motorized road users, if those groups make up 15% or more of the state's crash fatalities.
Florida Federal Lands Access Program	FDOT / USDOT	The Federal Lands Access Program (Access Program) was established in 23 U.S.C. 204 to improve transportation facilities that provide access to, are adjacent to, or are located within Federal lands. The Access Program supplements State and local resources for public roads, transit systems, and other transportation facilities, with an emphasis on high-use recreation sites and economic generators.
Florida Job Growth Grant Fund - Public Infrastructure Grant	Florida Department of Economic Opportunity	The Florida Job Growth Grant Fund is an economic development program designed to promote public infrastructure and workforce training across the state. Proposals are reviewed by the Florida Department of Economic Opportunity (DEO) and Enterprise Florida, Inc. (EFI) and chosen by the Governor to meet the demand for workforce or infrastructure needs in the community they are awarded to.
Transportation Alternatives Program (TAP) Set-Aside from STBG Recreational Tails Program	TPO / USDOT	Federally funded, community-based projects that expand travel choices and enhance the transportation experience by integrating modes and improving the cultural, historic, and environmental aspects of our transportation infrastructure. MPO's get a larger share of funding and obligation authority, meaning they can sign checks and get projects moving without State.

Program Name	Agency	Description
Local Planning Assistance Grants	State, Various	Local planning assistance grants can have a variety of names, but they are funds offered by the state for communities to help with planning. Typically, this involves creating or updating a bicycle and/or pedestrian plan, transportation plan, Safe Routes to School programs, and in some cases, feasibility studies for bikeshare programs. Funds can come from state departments of transportation and health.
Trail Grants	Rails to Trails Conservancy	Rails-to-Trails Conservancy emphasizes strategic investments that support significant regional and community trail development goals. Many of our funded projects are small in scope and scale and can be hard to finance within traditional funding streams. These projects are essential to building, maintaining, and managing the trails that so many of us love and that communities rely upon for recreation, transportation, and economic vitality.
Florida Recreational Trails Program (RTP)	Florida Department of Environmental Protection	The federally funded Recreational Trails Program of the United States Department of Transportation's Federal Highway Administration (FHWA) provides competitive, matching-grant funds to renovate, develop, or maintain recreational motorized, nonmotorized, and mixed-use trails and trailside facilities.
Public Private Partnerships	Various	Private entities may be involved in designing, building, financing, maintaining, and/or operating a facility. The three most common types are: design-build, design, build-finance, and design-build-finance-operate-maintain.
Ballot Measures	Local	Ballot measures can leverage significant funding. Through local sales taxes, property taxes, gas taxes, or vehicle fees, some municipalities have secured tens of millions of dollars specifically for bicycle and pedestrian projects. A ballot measure can focus on one specific project, a broader category of projects (e.g., active transportation improvements), or a variety of targeted outcomes.
Value Capture	Local	Value capture funding options include land value tax/split rate tax, special assessment districts, joint development fees, development impact fees, transportation utility fees, negotiated exactions, sale tax districts, tax increment financing.

APPENDIX A – LOCATION SCREENING AND RANKING METHODOLOGY

Hillsborough County Florida

Hillsborough TPO
Transportation
Planning Organization

Bicycle Network Plan Location Screening and Ranking Methodology

October 2022

Hillsborough County Bicycle Network Plan

Location Screening and Ranking Methodology Memorandum

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Task Authorization Number TOA-03

October 2022

TABLE OF CONTENTS

INTRODUCTION

To accomplish Hillsborough County's goals of Complete Streets, Vision Zero, and multimodal networks, which support alternatives to driving and travel by modes of choice to destinations people want to go, Hillsborough County and the Hillsborough Transportation Planning Organization (TPO) are working to identify, evaluate, and prioritize bicycle facility needs along County-owned roadways. To accomplish this, a methodology was developed to identify candidate locations for improvements to existing bicycle facilities and locations for new bicycle facilities to improve network connectivity. The methodology is driven by factors which capture both bicyclist risk to crashes, bicyclist exposure to traffic, and other prioritization factors. The bicycle risk score is based on traffic data on the segment which they travel on including crashes, posted speed limit, average daily traffic volume, number of lanes, and presence of roadway lighting. The exposure score is based on proximity to activity generators, activity centers, transit stops, and socio-economic and demographic inputs. The network score includes context classification, presence of existing bicycle facilities and sidewalks, and connectivity to existing facilities on intersecting and adjacent segments. The prioritized score will be calculated using the inputs from the risk, exposure, and network scores and will be used to prioritize locations for bicycle network improvements. The remainder of the technical memorandum provides details on the source data used and a summary of the scoring methodology used to develop the prioritized segments.

BICYCLE RISK FACTORS AND SCORING

The bicycle risk score includes a series of factors and indicators that reflect the potential crash risk for people on bikes traveling along a roadway segment. These factors also reflect the impact that the roadway segment may have on the level of stress and comfort for people riding along them. Therefore, where there may not be an inherent crash risk or safety issue, the factors in this category are often key indicators that determine an individual's perception of safety and risk. The risk score includes bicycle and pedestrian crash history, posted speed limit, average daily traffic volume, the number of through travel lanes, and the presence of roadway lighting.

The bicycle risk score is determined using the following formula that utilizes the factor inputs and scoring described in the following table.

$$\textit{Bicycle Risk Score} = R_{Crash} + R_{Speed} + R_{AADT} + R_{Lanes} + R_{Lighting}$$

R Factors	Description	Measure	Score
Crash History (R_{crash})	Bicycle and pedestrian involved crashes along the segment during the analysis period.	0 Crashes	1
		1 Crashes	2
		2 – 3 Crashes	3
		4 – 5 Crashes	4
		>5 Crashes	5
Posted Speed Limit (R_{Speed})	Posted speed limit along the segment.	≤25 MPH	1
		30 MPH	2
		35 MPH	3
		40 MPH	4
		≥45 MPH	5
Average Annual Daily Traffic (AADT) (R_{AADT})	Average annual daily traffic along the segment.	≤5,000	1
		5,001 to 10,000	2
		10,001 to 20,000	3
		20,001 to 30,000	4
		>30,000	5
Total Lanes (R_{Lanes})	Number of travel lanes along the segment.	2 – 3	1
		4 – 5	3
		≥6	5
Lighting ($R_{Lighting}$)	The density (lighting poles per mile) of roadway lighting along the segment.	>35	1
		21 – 35	2
		10 – 20	3
		<10	4
		No Lighting	5
Max Potential Risk Score			***25***

Crash History (R_{Crash})

A demonstrated history of crashes involving people riding a bike or walking is indicative of both demand for, and a lack of, safe non-motorized facilities. Further, Hillsborough County has committed to Vision Zero, a framework that seeks to eliminate all crashes that result in a serious injury or death, reducing pedestrian and bicycle crashes will help in achieving this goal.

Prioritization Factor:

Crashes	Score
0	1
1	2
2 – 3	3
4 – 5	4
> 5	5

Data Source: Crash Data Management System (2017-2021)

Posted Speed Limit (R_{Speed})

Posted speed limit is a significant factor in determining the level of bicycle stress, and therefore the likelihood of use, and statistical level of risk for a person riding a bicycle.

Prioritization Factor:

Speed	Score
≤25 MPH	1
30 MPH	2
35 MPH	3
40 MPH	4
≥45 MPH	5

Data Source: Hillsborough County AADT 2019 shapefile

Traffic Volume (R_{AADT})

Traffic volume, measured as Average Annual Daily Traffic (AADT), is another important determinant of the level of stress and statistical level of risk for a person riding a bicycle.

Prioritization Factor:

Volume	Score
≤ 5,000	1
5,001 to 10,000	2
10,001 to 20,000	3
20,001 to 30,000	4
> 30,000	5

Data Source: Hillsborough County AADT 2019 shapefile

Total Lanes (R_{Lanes})

The total number of travel lanes is another determinant of the level of stress and statistical risk for a person riding a bicycle, with the level of separation required being closely related to the total number of travel lanes.

Prioritization Factor:

Lanes	Score
2 to 3	1
4 to 5	3
≥6	5

Data Source: Hillsborough County AADT 2019 shapefile

Roadway Lighting ($R_{Lighting}$)

The presence of roadway lighting and density of that light is an indicator of the safety of comfort of using a facility in dark conditions. The density, number of light poles per mile along a segment, was used to determine lighting conditions along each segment.

Prioritization Factor:

Volume	Score
>35	1
21 – 35	2
10 – 20	3
<10	4
No Lighting	5

Data Source: Hillsborough County Street Light shapefile

BICYCLE EXPOSURE FACTORS AND SCORING

The bicycle exposure score includes factors and indicators that reflect one's likelihood, desire, or need to ride a bicycle. The bicycle exposure score includes a segments proximity to activity generators like schools, libraries, parks, community centers, and government services; proximity to areas with a higher density of population; whether a segment has transit stops located along it, and the segments proximity to areas that contain people who have been historically underserved.

The bicycle exposure score is determined using the following formula that utilizes the factor inputs and scoring described in the following table.

$$Bicycle\ Exposure\ Score = E_{Generators} + E_{Residential\ Density} + E_{Transit} + E_{Equity}$$

Factor	Description	Measure	Score
Activity Generators ($E_{Generators}$)	Segment's proximity, in miles, to an activity generator such as a park, school, government services, cultural facility, identified activity center, or zoning category of commercial general or intensive.	>0.75	1
		0.75 – 0.51	2
		0.50 – 0.26	3
		0.25 – 0.10	4
		<0.10	5
Residential Density ($E_{ResidentialDensity}$)	The existing residential density (population per acre) of the traffic analysis zones (TAZ) adjacent to the segment.	0 – 2	1
		2 – 4	2
		4 – 8	3
		8 – 12	4
		>12	5
Proximity to Bus Stops ($E_{Transit}$)	Segment's proximity, in miles, to a public transit stop.	<0.10	5
		0.10 - 0.25	4
		0.26 – 0.75	3
		0.76 – 1.50	2
		>1.50	1
Equity & Social Justice (E_{Equity})	Segment is within or directly adjacent an Underserved Community. Scoring based on the equity factor scoring for each Census block group.	<4	1
		4 – 5	2
		6	3
		7	4
		8 – 9	5
Max Potential Exposure Score			***20***

Proximity to Activity Generators ($E_{Generators}$)

For this task, an Activity Generator refers to an individual facility or land use that a person riding a bicycle may desire to visit and would therefore generate individual bicycle trips. Activity Generators include parks, schools, universities and colleges, public cultural facilities such as museums and libraries, identified land use activity centers, and commercial general and intensive zoning categories.

Prioritization Factor: A segment's proximity, in miles, to an activity generator was used to determine scoring.

Proximity	Score
>0.75	1
0.75 – 0.51	2
0.50 – 0.26	3
0.25 – 0.10	4
<0.10	5

Data Source: County Parks, Schools, Libraries, Museums, and Zoning shapefiles

Residential Density ($E_{ResidentialDensity}$)

Higher residential densities are often associated with being more supportive of non-motorized trips, including bicycle trips.

Prioritization Factor: A segment that directly abuts, runs through, or connects a traffic analysis zone (TAZ) with an existing (2015 base year) population density will be scored based on the information in the following table.

Pop/Acre	Score
0 – 2	1
2 – 4	2
4 – 8	3
8 – 12	4
>12	5

Data Source: TPO 2045 LRTP Existing SE Data shapefile(s)

Proximity to Transit ($E_{Transit}$)

Transit service and access can help extend the range in which a person on a bike can travel and is often associated with non-motorized demand, given that the first and last mile of most transit stops involve a journey on a bicycle or by foot.

Prioritization Factor: A segments proximity, in miles, to an existing transit stop.

Proximity	Score
<0.10	1
0.10 - 0.25	2
0.26 – 0.75	3
0.76 – 1.50	4
>1.50	5

Data Source: Hillsborough Area Regional Transit (HART) stops shapefile

Equity & Social Justice (E_{Equity})

Enhancing access to a comfortable, well-connected bicycle network is one way to work towards achieving equity. Considering this aim, and in compliance with USDOT requirements, the TPO's 2021 Nondiscrimination and Equity Plan included the development of a methodology to identify Underserved Communities. The methodology is inclusive of the following data as described by the plan:

- Racial Minorities: Non-white residents who are non-Hispanic/Latinx, including African American or Black, Asian, Pacific Islander, American Indian, Alaskan Native, and members of two or more races
- Ethnic Minorities: Hispanic or Latino(a/x)
- Low-Income Households: Households that earn at or below the poverty line; for this effort the census definition of poverty is used which varies based on total household size
- Persons with Disabilities: Households with at least one person with a disability
- Limited English Proficiency Households: Households in which English is not the primary language and who do not speak English well
- Zero Vehicle Households: Households who do not own a car
- Low Educational Attainment: Persons without a high school degree
- Female Head of Households: Households with a female listed as head of household, with no husband present
- Youth: Residents who are between the ages of 10 and 17
- Older Adults: Residents who are 65 years old or older

Prioritization Factor: A segment that runs through or directly abuts a designated Undeserved Community will be awarded points based on the number of equity factors as described in the following table.

Equity Factors	Score
<4	1
4 – 5	2
6	3
7	4
8 – 9	5

Data Source: Most Underserved Area Shapefile

BICYCLE NETWORK FACTORS AND SCORING

The bicycle network score includes factors and indicators that reflect the existing conditions that impact the ability and opportunities to ride a bicycle. Having existing bicycle facilities, connectivity to other facilities, and land use that is generally more supportive of multiple travel modes impact people's decisions one where and how to ride a bicycle. The bicycle network score includes whether a

segment currently has an existing bicycle facility and what type of facility; whether a segment has existing sidewalks that can help support bicycle mobility; proximity to other existing bicycle facilities, if a segment intersects or connects to a segment that has a facility it can potentially help support longer trips; and the context classification of the segment, which reflects the expected users along a segment based on that segment's location, surrounding land use, and the surrounding street network.

The bicycle network score is determined using the following formula that utilizes the factor inputs and scoring described in the following table.

$$Bicycle\ Network\ Score = N_{Bike} + N_{Sidewalk} + N_{Connectivity} + N_{Context}$$

Factor	Description	Measure	Score
Existing Bicycle Facility (N_{Bike})	Existing bicycle facility that accommodates bicyclists along the segment.	Separated Facility	1
		Buffered Lane	2
		Standard Lane	3
		Paved Shoulder	4
		None	5
Existing Sidewalk ($N_{Sidewalk}$)	Existing sidewalk along the segment.	Sidewalk (Both Sides)	1
		Sidewalk with Gaps	3
		No Sidewalk	5
Connectivity ($N_{Connectivity}$)	Segment's distance (miles) from an existing or planned bicycle facility.	>0.75	1
		0.75 – 0.51	2
		0.50 – 0.26	3
		0.25 – 0.10	4
		<0.10	5
Context Classification ($N_{Context}$)	Context classification along the segment.	C1 & C2	1
		C3T	2
		C4	3
		C3R	4
		C3C	5
Max Potential Network Score			***20***

Existing Bicycle Facility (N_{Bike})

Existing bicycle facilities, or the way bicyclists are separated from motorists, has an impact on the safety and experience of biking along a roadway. Generally, the higher the degree of separation between bicyclists and motorists, the higher the level of comfort and feeling of safety.

Prioritization Factor:

Bicycle Facility	Score
Separated Facility	1
Buffered Lane	2
Standard Lane	3
Paved Shoulder	4
None	5

Data Source: Hillsborough County Bicycle Facilities, Sidewalk, and 2019 AADT shapefiles

Existing Sidewalk ($N_{Sidewalk}$)

Sidewalks, in many instances, especially in situations where bicycle facilities are not present or are not an attractive option to users, are utilized as the de facto bicycle facility. While sidewalks are not specifically designed to accommodate people riding bicycles, they can and often do provide people with a more comfortable riding experience.

Prioritization Factor:

Sidewalk	Score
No Sidewalk	1
Partial Sidewalk	3
Complete Sidewalk (Both Sides)	5

Data Source: 2019 AADT and Hillsborough County Sidewalk shapefiles

Connectivity ($N_{Connectivity}$)

A crucial aspect of achieving a highly useful, efficient, effective, and comfortable bicycle network is connectivity. Although the process of building out system-wide connectivity is typically a slow one, it is critically important to making bicycling a reasonable modal choice. Closing a gap between existing facilities or provide a direct connection to intersecting facilities will create a more connected and effective network of bicycle facilities.

Prioritization Factor: A segment that continues or is perpendicular to/intersects with an existing or planned bicycle facility will be awarded a score based on the following table.

Proximity	Score
>0.75	1
0.75 – 0.51	2
0.50 – 0.26	3
0.25 – 0.10	4
<0.10	5

Data Source: County Bicycle Facilities Shapefile

Context Classification ($N_{Context}$)

According to Hillsborough County's 2022 Complete Streets Guide, context-based roadway classification communicates the overall development pattern and form for a street. The Complete Streets plan asserts that, by considering the local context, design decisions can be focused to address user needs, connectivity, walkability, placemaking, livability, and community values. The number of typologies reflect the variety of ways in which streets serve the community and reflect the need for the design to be more closely aligned with the environment it serves. Different roadway classifications demand different bicycle treatments and as built today, lend a certain level of comfort for people riding bikes.

Prioritization Factor:

Context Classification	Weight
Rural (C1 & C2)	1
Suburban Town (C3T)	2
Urban (C4)	3
Suburban Residential (C3R)	4
Suburban Commercial (C3C)	5

Data Source: Hillsborough County Context Classification and FDOT District 7 Initial Context Classification shapefile

SEGMENT PRIORITIZATION SCORE

The segment prioritization score is the overall score for each location considering the risk, exposure, and network factors described in this memorandum. The segment prioritization score can be used to prioritize and inform the planning and development of bicycle network improvements. The segment prioritization scores are a product of the risk, exposure, and network scores, with the higher scores indicating locations with a higher priority, based on the data-driven process outlined in this document.

Since the risk, exposure, and network scores are naturally unbalanced, in that the potential sum of the factors for each group has a different scoring range, a normalization factor was applied to the groups to create a balanced score for each of the factor groups. The following formula shows how the normalization factors were applied.

$$Segment\ Normalization = (\sum Risk \times 0.4) + (\sum Exposure \times 0.5) + (\sum Network \times 0.5)$$

The result of the normalization is that the potential maximum score for each factor group is 10, with a maximum total score of 30.

It was determined that the prioritization scoring should be slightly weighted to reflect a priority towards the network factor scoring. It was determined that the factor groups would be weighted with the network factors receiving 40% of the total score and the risk and exposure factors each receiving 30% of the total score. This weighting was achieved using the following formula:

$$Segment\ Prioritization = (\sum Risk \times 0.4 \times 0.9) + (\sum Exposure \times 0.5 \times 0.9) + (\sum Network \times 0.5 \times 1.2)$$

The segment prioritization scores with the Network focused weighting applied are characterized by the following scoring scale:

Prioritization Score Value	Prioritization Score Category
9.9600 – 17.1600	Low
17.1601 – 19.2600	Moderate
19.2601 – 21.2700	High
> 21.2700 (max. 27.0000)	Very High

DATA REFERENCES

Data Category	Data Source
Crash History	Hillsborough County Crash Data Management System (CDMS) 2017 – 2021 pedestrian and bicycle related crashes
Posted Speed Limit	Hillsborough County/TPO AADT 2019 shapefile
Average Annual Daily Traffic	Hillsborough County/TPO AADT 2019 shapefile
Total Travel Lanes	Hillsborough County/TPO AADT 2019 shapefile
Lighting	Hillsborough County Street Light shapefile
Activity Centers	County Parks, Schools, Libraries, Museums, and Zoning shapefiles
Residential Density	TPO 2045 LRTP Existing SE Data shapefile
Proximity to Bus Stops	Hillsborough Area Regional Transit (HART) stops shapefile
Equity and Social Justice	TPO Most Underserved Area shapefile
Existing Bicycle Facility	Hillsborough County Bicycle Facilities, Sidewalks, and Hillsborough County/TPO AADT 2019 shapefile
Existing Sidewalk	Hillsborough County Sidewalk and Hillsborough County/TPO AADT 2019 shapefile
Connectivity	Hillsborough County Bicycle Facilities shapefile
Context Class	Hillsborough County Context Classification and FDOT District 7 Initial Context Classification shapefile

APPENDIX B – CORRIDOR EVALUATION AND POTENTIAL IMPROVEMENTS

Hillsborough County Bicycle Network Plan

High Priority Corridor Potential Improvements

October 18, 2022

Updated

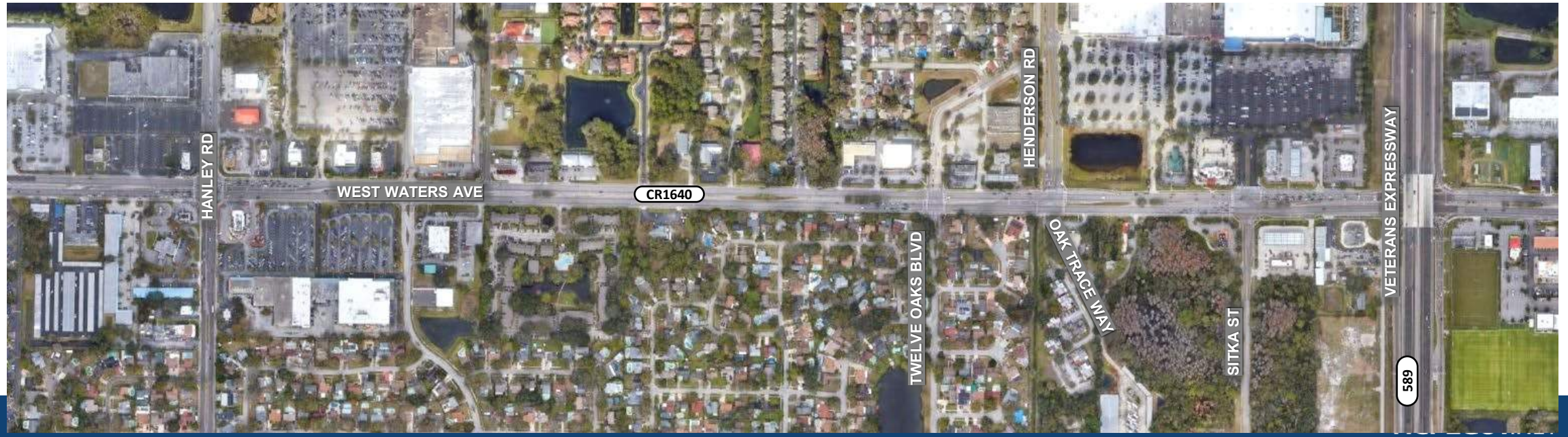
Hillsborough County Florida

High Priority Corridor Opportunities

- **W Waters Avenue – Sheldon Road to Veterans Expressway**
- **Causeway Blvd / W Lumsden Road – S Falkenburg Rd to Brandon Pkwy**
- **E Shell Point Road – US41 to 24th Street NE**
- **Balm Riverview Road – Boyette Rd to McMullen Rd**

W WATERS AVENUE (CR1640) – SHELDON ROAD TO VETERANS EXPRESSWAY (RTE 589)

2.35 MILE CORRIDOR

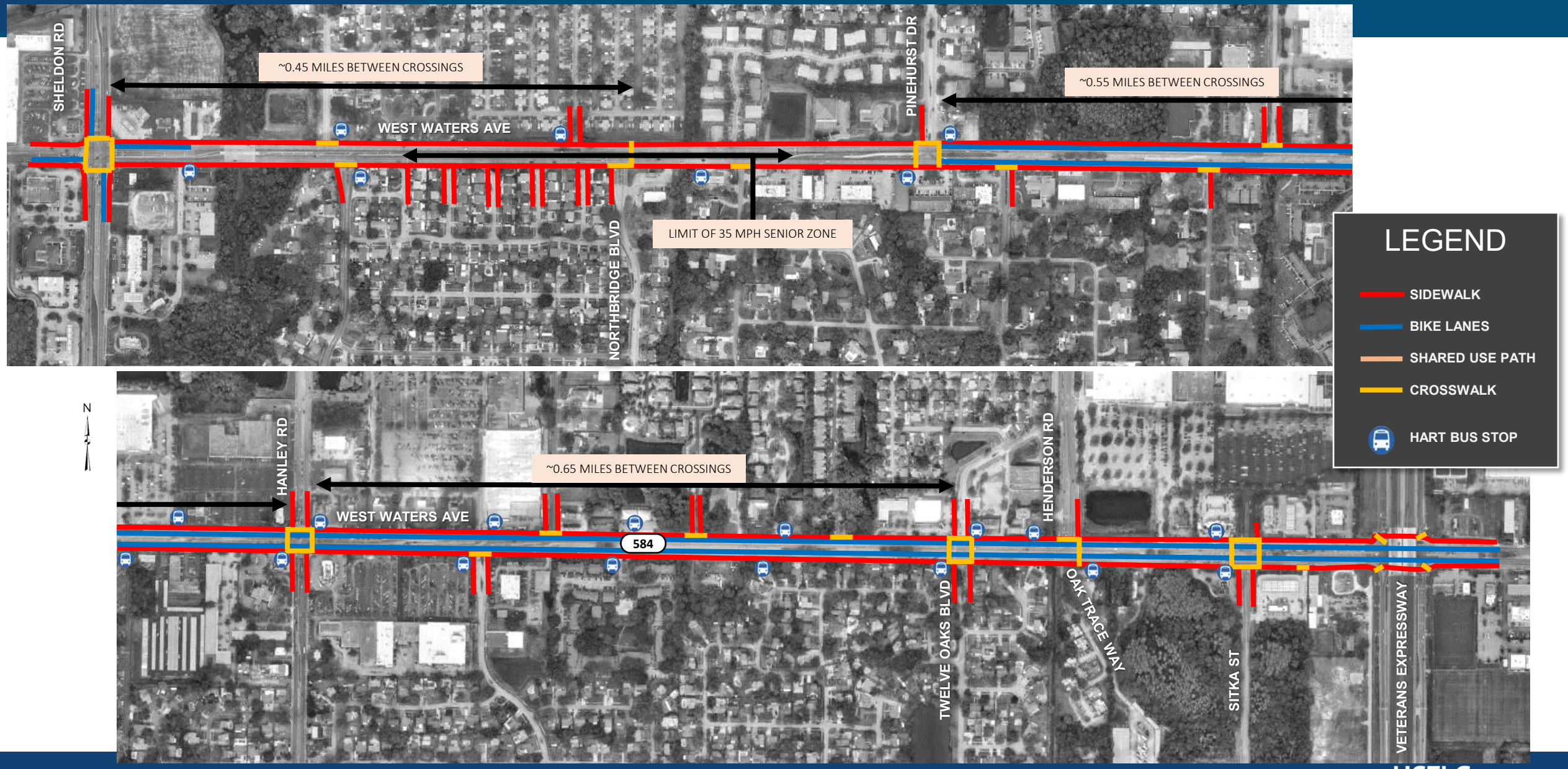


W WATERS AVENUE (CR1640) – SHELDON ROAD TO VETERANS EXPRESSWAY (RTE 589)

EXISTING

- Bike lanes in both directions between (substandard at 45MPH)
  - Sheldon Rd and Stone Run Ct (~380 feet)
  - Pinehurst Dr and Veterans Expressway (1.65 miles)
  - No markings through intersections, no green pavement, no pocket Bike lanes at intersections
- Bike LOS: Sheldon to Pinehurst LOS E; Pinehurst to Veterans LOS D
- Sharrow pavement markings between Stone Run Ct and Pinehurst Dr (~0.65 miles), substandard at 35MPH
- Jersey barriers reduce shoulder width on bridge over the Upper Tampa Bay Watershed
- Sidewalks provided on both sides of the roadway. Variable condition and presence of grass buffer in some segments. Some segments are only 4’ wide and not incompliance with ADA.
- Posted Speed - 35 MPH “SENIOR ZONE” between Riverwood Rd and just east of Aiken Ct; 45 MPH the rest of corridor
- Cross section ranges from 6 to 7 lanes. Directional travel separated by raised median; various access management median treatments.
- Wide, multilane signalized intersections
- No midblock crossings, long separation of signalized intersections
- Numerous commercial driveways along both sides of the roadway
- HART Bus Route - Routes 30 and 16 traverse the corridor. Transit transfer station at Sheldon/Waters. Route provides Hurricane Shelter service.

W WATERS AVENUE (CR1640) – SHELDON ROAD TO VETERANS EXPRESSWAY (RTE 589) – EXISTING CONDITIONS



W WATERS AVENUE (CR1640) – SHELDON ROAD TO VETERANS EXPRESSWAY (RTE 589)

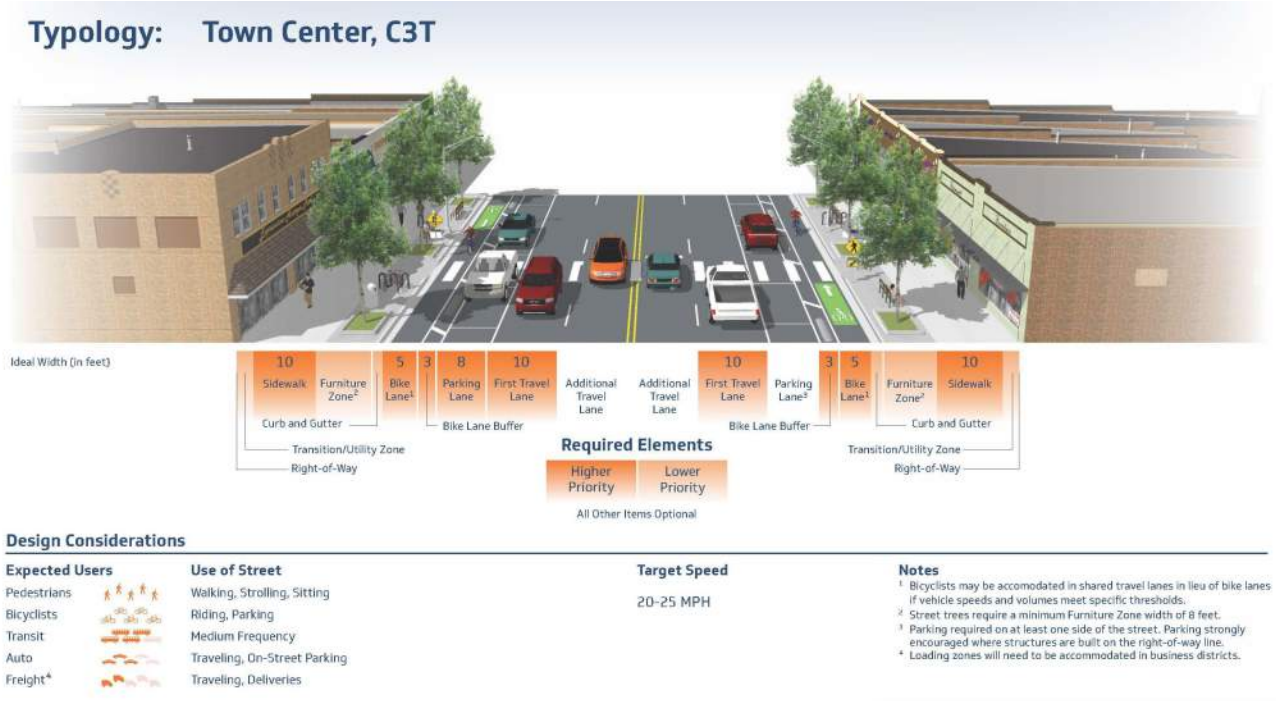
General Conditions

Sidewalk / ADA / Drainage Conditions

W WATERS AVENUE (CR1640) – SHELDON ROAD TO VETERANS EXPRESSWAY (RTE 589)

BACKGROUND

- Context Class – C3T, Target Speed 20-25 MPH
- HC Complete Streets Guide – Buffered/Parking Protected Facility
- High Injury Network - #31 in Top 50
  - Hanley Rd North of Waters - #41 in Top 50
  - Sheldon Rd - #13 in top 20



TOWN 'N COUNTRY COMMUNITY PLAN

- Hanley @ Water's Secondary Town Center
- Encourage alternative modes - transit, bicycle and pedestrian modes. Expand transit service.
- ***Identify and prioritize sidewalk , pedestrian crossing, bicycle/pedestrian bridges, bicycle lane and trail connection projects.***
- ***Provide a safe, off-street route from the Town 'N Country Greenway to the Upper Tampa Bay Trail***

W WATERS AVENUE (CR1640) – SHELDON ROAD TO VETERANS EXPRESSWAY (RTE 589)

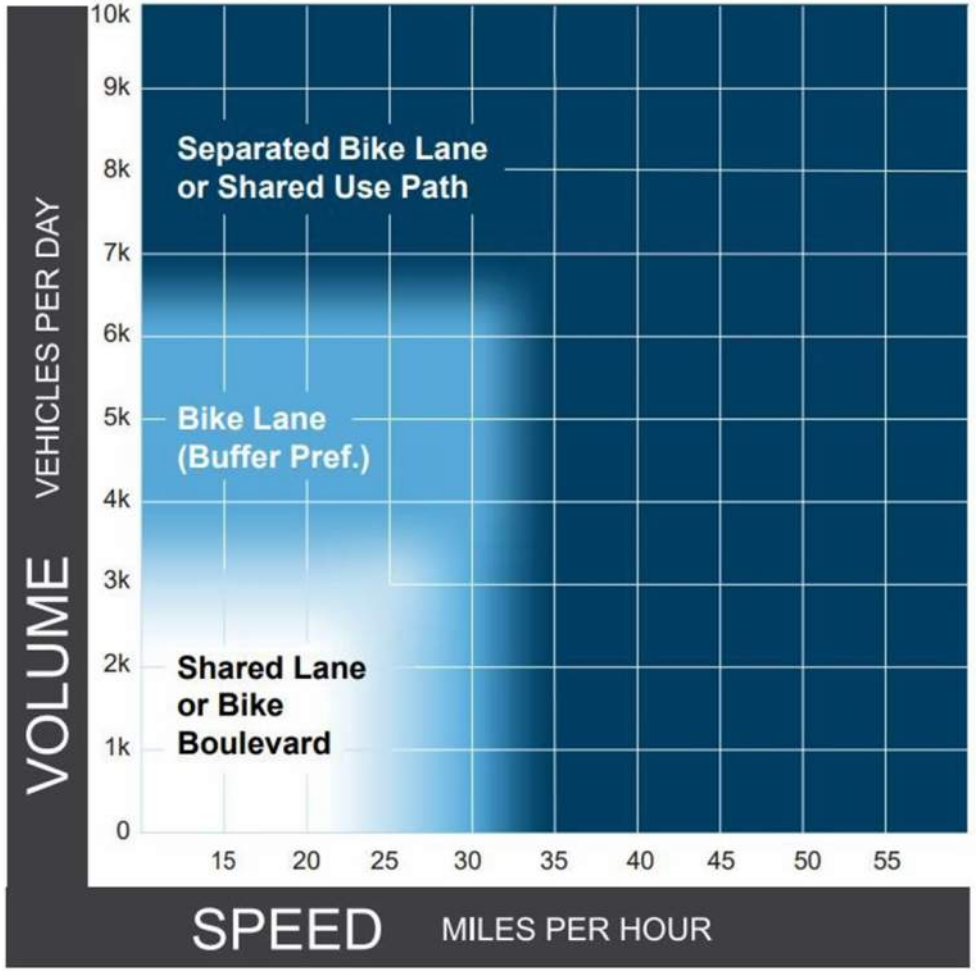
DESTINATIONS

- Residential – Rocky Creek Sr. Housing; dense residential neighborhoods
- Commercial – Fresco y Mas, Save A Lot, El Grande Supermarket, Walmart, Publix, Target, Lowes
- Restaurants – variety of cultural and drive thru
- Civic – churches, Woodbridge Elementary School, Bellamy Elementary School
- Recreational - Deerfield Park, Northwest County Dog Park, Channel Park Pavilion/Upper Tampa Bay Trail, NW Family YMCA, Shimberg Sports Complex, Town 'N Country Trail

POTENTIAL OPPORTUNITIES (TYPICAL FOR ALL 4 CORRIDORS)

1. Bike facilities - enhance to meet current standards and/or retrofit new facilities
2. Neighborhood connectivity – Identify needs (major destinations, adjacent trails), 1st mile/last mile improvements
3. Intersections and crossings – enhance and/or add new crossings

USDOT Bikeway Selection Guide



W WATERS AVENUE (CR1640) – SHELDON ROAD TO VETERANS EXPRESSWAY (RTE 589)

POTENTIAL IMPROVEMENTS

Tier 1

- Lane narrowing– 10’ interior travel/turn lanes w/ 11’ outside lane
- Buffered bike lanes, w/ vertical concrete non-continuous separators, where possible
- Add green paint to all bike lanes at conflict points, major commercial driveways, and through intersections
- Removal of sharrows in favor of buffered bike lanes
- High visibility pedestrian crossing markings at all crossings (intersections, midblock, major driveways for priority treatment)
- Install consistent MUTCD bike facility signs
- Repair drainage, sidewalks and all ADA needs
- Add Leading Pedestrian Intervals (LPIs) at all signal-controlled intersections
- Wayfinding sign/markers at Sheldon & Hanley intersection to UTBTrail, parks, YMCA, Schools, Transit Hub and Town ‘N Country Trail

Tier 2

- Protected bike lanes w/ full continuous concrete separators
- Bicycle improvements at intersections - 2-stage LT box, green pavement
- Modify Existing Midblock Crossing – Northbridge Blvd – Relocate crossing to west side of intersection; modify median to a refuge median crossing; install PHB or Signal controlled crossing.
- New Midblock crossing medians (zig zag where possible) and signal control at: Riverwood Blvd; near Wilsky Blvd; Rustic Drive
- Transit Stops – Concrete pads, shelter, lighting, raised crossing through bike lane
- Landscaping - Plantings in the median to create a boulevard feel
- Reduce posted speed limit

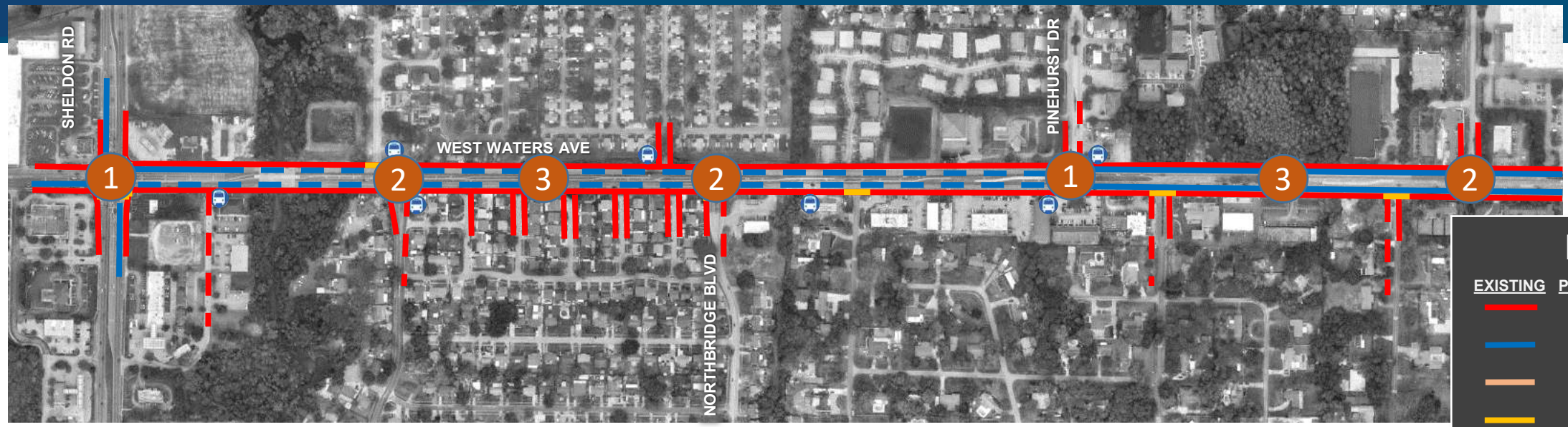
Tier 3

- Lighting throughout the corridor including at all crossings for vehicular and pedestrian level
- Protected Intersections, where possible.
- Potential reduction of driveway density and curb-cut width
- Connection to Memorial Bikeway along Sheldon Rd (unfunded)

ADJACENT & SUPPLEMENTAL PROJECTS

- Sheldon Road - Convert Bike Lane to Buffered/Protected Bike lanes
- Hanley Rd – investigate the opportunity of a north/south connector of UTBT and Town ‘N Country Trail
- Identify additional speed management and traffic calming treatments throughout the corridor to facilitate the desired Target Speed of 25 MPH

W WATERS AVENUE (CR1640) – SHELDON ROAD TO VETERANS EXPRESSWAY (RTE 589)



LEGEND

EXISTING	POTENTIAL	
		SIDEWALK
		BIKE LANES
		SHARED USE PATH
		CROSSWALK
		HART BUS STOP

1 INTERSECTION TREATMENTS

2 MIDBLOCK CROSSING TREATMENTS

3 CORRIDOR TREATMENTS

TRANSIT STOPS/MIDBLOCK

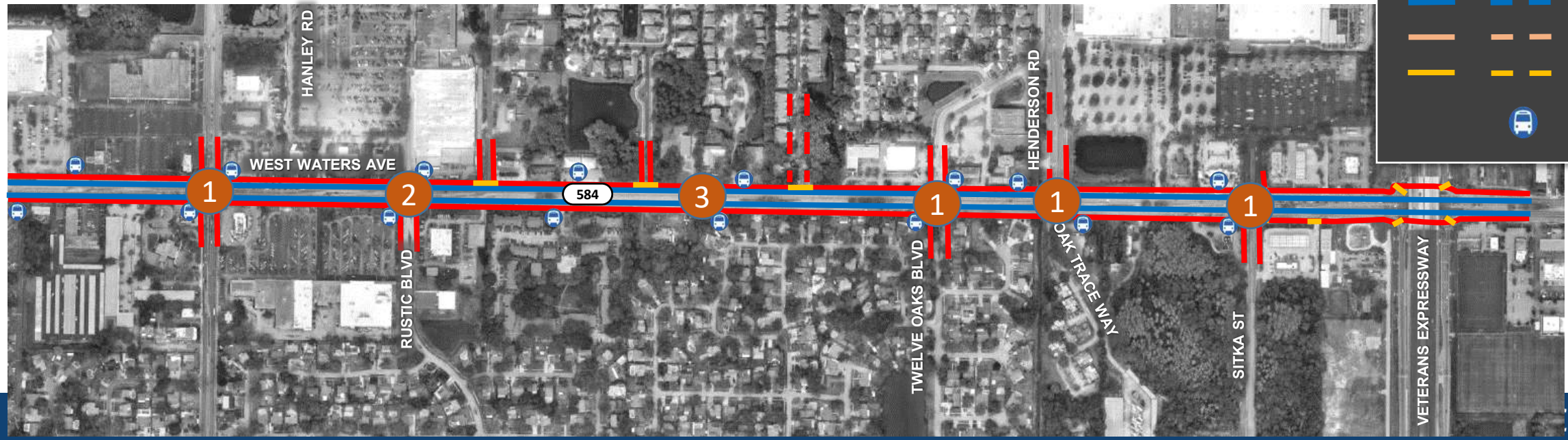
W WATERS AVENUE (CR1640) – SHELDON ROAD TO VETERANS EXPRESSWAY (RTE 589)

1 INTERSECTION TREATMENTS

2 MIDBLOCK CROSSING TREATMENTS

3 CORRIDOR TREATMENTS

TRANSIT STOPS/MIDBLOCK



LEGEND

EXISTING	POTENTIAL	
		SIDEWALK
		BIKE LANES
		SHARED USE PATH
		CROSSWALK
		HART BUS STOP

Causeway Blvd / W Lumsden Rd (CR676) – S Falkenburg Rd to Brandon Pkwy

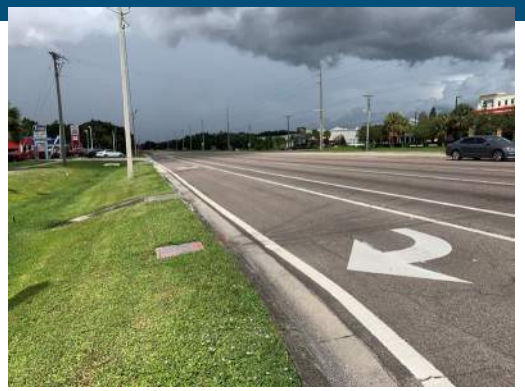
N

2.2 MILE CORRIDOR

Causeway Blvd / W Lumsden Rd (CR676) – S Falkenburg Rd to Brandon Pkwy

EXISTING

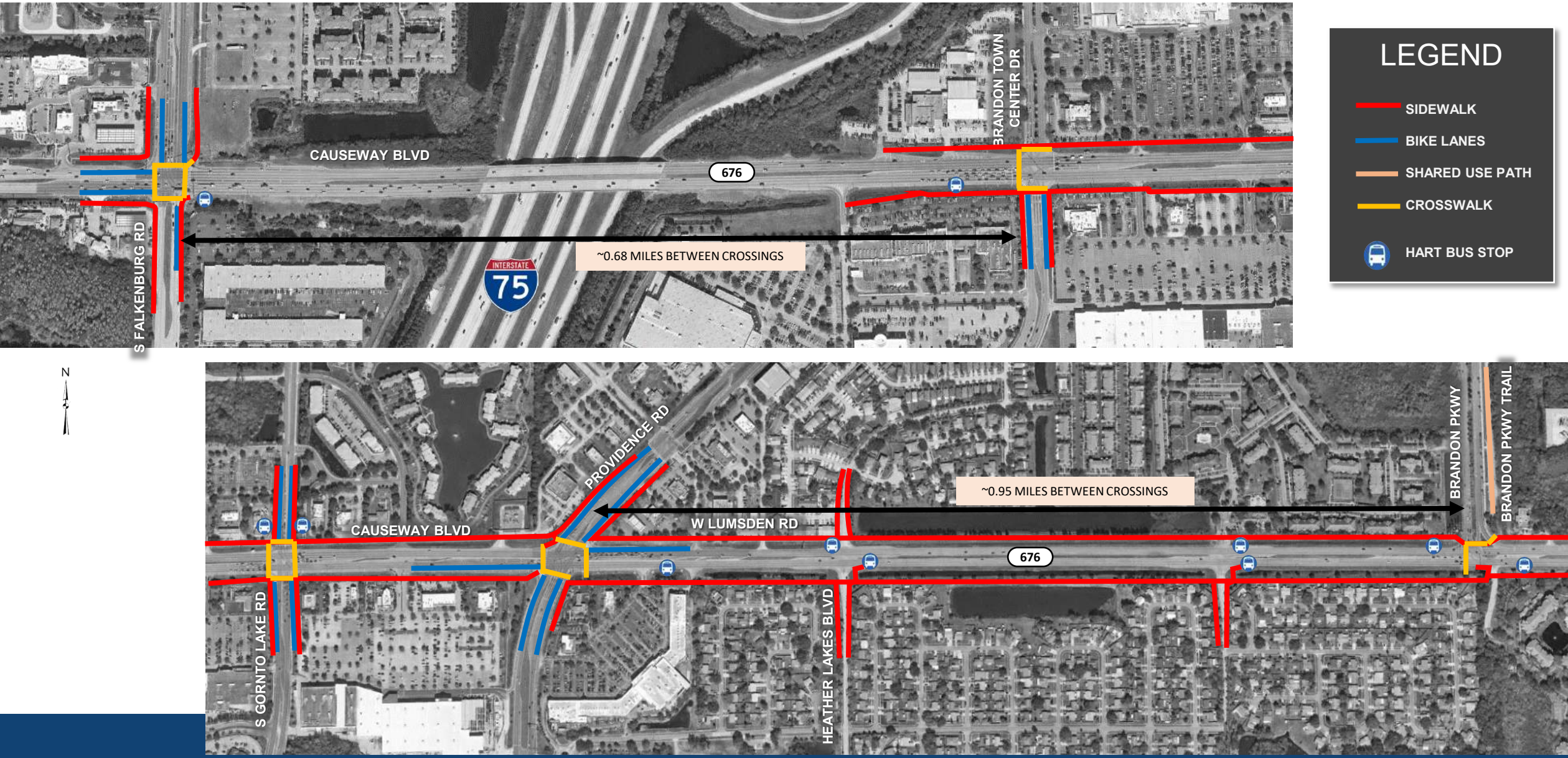
- Bike lane keyhole markings approaching Providence Road intersection only.
- Bike LOS E
- Wide paved shoulders in some sections.
- Connection opportunities to:
  - Bike lanes on S Falkenburg Rd (Substandard at 45MPH)
  - Bike lanes on Providence Rd connecting to Brandon Pkwy Trail (Substandard at 45MPH), w/Conflict zone green markings
  - Bike lanes on S Gornto Lake Rd (Substandard at 45MPH)
  - Bike lanes on Providence Lakes Blvd (Substandard at 40MPH)
- Sidewalks on both sides of the roadway, with some gaps; variable width drainage swale buffer. Sidewalk along southerly side of the road appears to be outside of ROW based on GIS.
- Posted 45 MPH, operating speed >52mph
- Cross section ranges from 6 to 10 lanes. Directional travel separated by raised concrete/grass median
- Wide signalized intersections with multiple turning lanes and channelized islands
- HART Bus routes 360 LX, 25 LX



DESTINATIONS

- Residential – dense residential neighborhoods, apartments, single family mix
- Commercial – Publix, Walmart Supercenter, Costco, Lowe's
- Restaurants – variety of cultural and drive thru
- Recreational – Brandon Pkwy Trail; Heather Lakes Park (Heather Lakes Blvd)

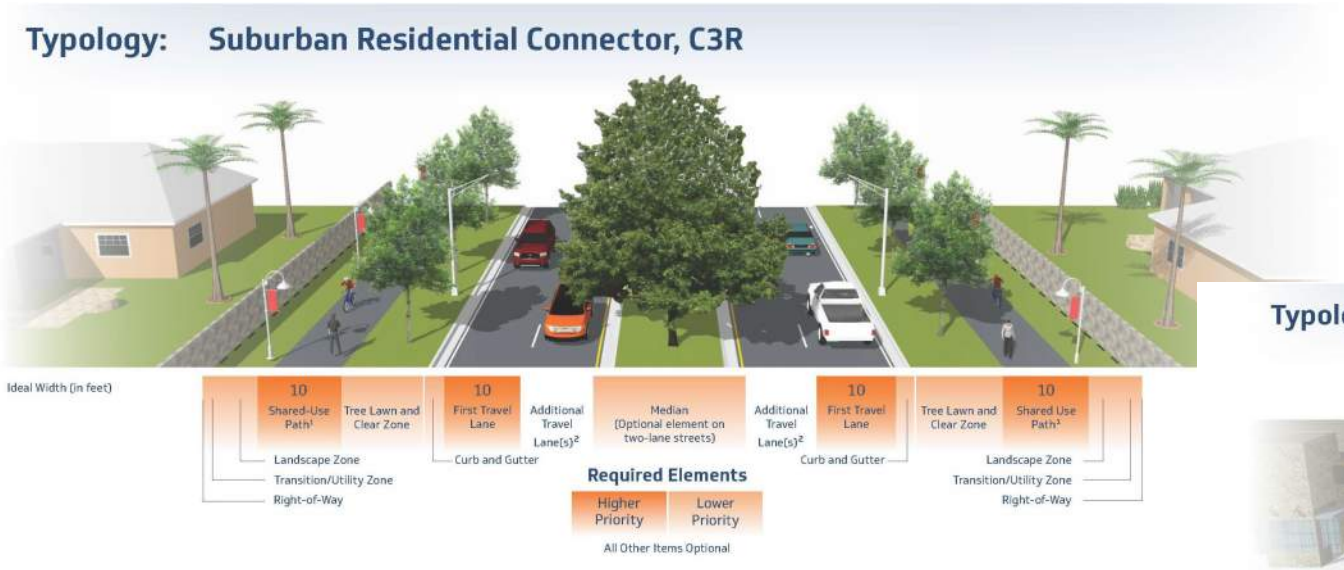
Causeway Blvd / W Lumsden Rd (CR676) – S Falkenburg Rd to Brandon Pkwy - EXISTING



Causeway Blvd / W Lumsden Rd (CR676) – S Falkenburg Rd to Brandon Pkwy

BACKGROUND

- Context Class – C3R
- Target Speed 25 to 35MPH
- HC Complete Streets Guide – Shared Use Path
- High Injury Network - #36 in Top 50



BRANDON COMMUNITY PLAN

- Park and ride in the vicinity of Falkenburg Road and Causeway Blvd.
- ***As roads are improved, require the addition of amenities for pedestrians and bicyclists.***
- ***Design all intersections to be walkable and to reflect best practices in pedestrian-oriented roadway and site design.***
- ***Causeway/Lumsden is part of the Urban Center of Brandon***

Causeway Blvd / W Lumsden Rd (CR676) – S Falkenburg Rd to Brandon Pkwy

POTENTIAL IMPROVEMENTS

Tier 1

- High visibility pedestrian crossing at ***all*** crossings (intersections, midblock, major commercial driveways for priority treatment).
- Provide crosswalks on all four approaches to signalized intersections – Brandon Town Center; Brandon Pkwy
- Repair sidewalks and all ADA needs
- Wayfinding signs /markers at Brandon Pkwy to: W Brandon Blvd, Brandon High School
- Add Leading Pedestrian Intervals (LPIs) at all signal-controlled intersections

Tier 2

- New Midblock crossing – at Heather Lakes Blvd, and Kensington Ridge Blvd; PHB or Signal controlled
- Reconstruct sidewalks at intersections to align with crosswalks: Brandon Town Center Dr.,
- Transit Stop landing pads and amenities needed at: Falkenburg Rd SE; Kensington Ridge Blvd NW; Paddock Club Dr NW; Brandon Pkwy NW;
- Shared Use Path on I-75 overpass, separated with jersey barriers, may require lane narrowing on approaches
- Construct sidewalk connection to bus stop locations and provide bus shelters.
- Plantings in the medians and ROW edges for traffic calming, shade and comfort at transit stops and crossings
- Bicycle improvements at intersections - 2-stage LT box, green pavement
- Design connections to bike lanes on S Falkenburg Rd, Providence Rd, Providence Lakes Blvd, Gorton Lake Rd
- Install bicycle counter on Brandon Pkwy Trail
- Transit Stops - move bus stops to departure side of intersections, provide concrete pads, shelter, lighting
- Landscaping - Plantings in the median and near Shared Use Path for traffic calming and shade.
- Install No Right On Red signs at all Shared Use Path Crossings
- Reduce posted speed limit

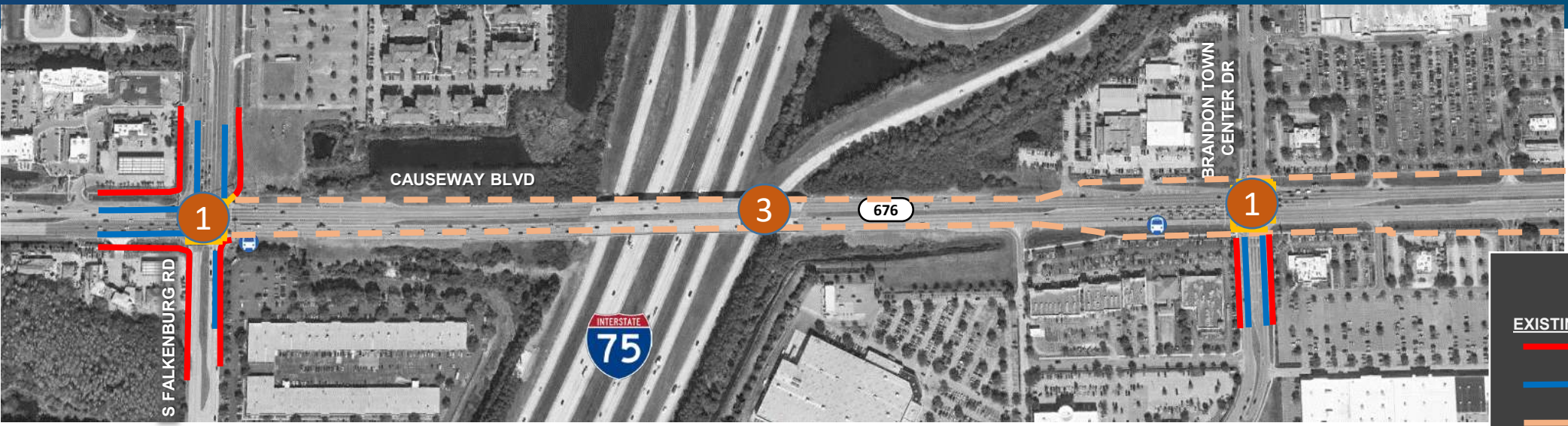
Tier 3

- Consider Protected Intersections, where possible.
- Reconstruct sidewalks to consistently provide a 10-12’ shared-use path on both sides of Causeway/Lumsden; would require the reconstruction of some channelized islands at major intersections
- Lighting at all intersections and crossings, ped level lighting along the shared use path

ADJACENT & SUPPLEMENTAL PROJECTS

- S. Falkenburg Rd, Providence Rd, S Gornto Lakes Rd, Provident Lakes Blvd - Convert Bike Lane to Buffered/Protected Bike lanes
- Identify additional speed management and traffic calming treatments throughout the corridor to facilitate the desired Target Speed of 35 MPH

Causeway Blvd / W Lumsden Rd (CR676) – S Falkenburg Rd to Brandon Pkwy



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LEGEND

EXISTING	POTENTIAL	
		SIDEWALK
		BIKE LANES
		SHARED USE PATH
		CROSSWALK
		HART BUS STOP

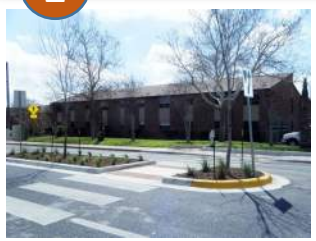
1 INTERSECTION TREATMENTS

3 CORRIDOR TREATMENTS

Causeway Blvd / W Lumsden Rd (CR676) – S Falkenburg Rd to Brandon Pkwy

1 INTERSECTION TREATMENTS

2 MIDBLOCK CROSSING TREATMENTS



3 CORRIDOR TREATMENTS

LEGEND

EXISTING	POTENTIAL	
		SIDEWALK
		BIKE LANES
		SHARED USE PATH
		CROSSWALK
		HART BUS STOP

E Shell Point Rd (CR2440) – US41 to 24th Street NE

1.96 MILE CORRIDOR

E Shell Point Rd (CR2440) – US41 to 24th Street NE

EXISTING

- New sidewalk/concrete path on the northside of the road by schools are wide (±10'), proceeds west till 6th St NE.
- Bike LOS F
- Sidewalk on the south side from 6th St NE to 2nd St NE;
- Intermittent sidewalk from 2nd ST NE to US41; poor condition
- Posted 40MPH; 20 MPH in School Zone w/no pedestrian crossing
- No Pedestrian / bicycle crossings with exception of at endpoints (2 miles)
- Proposed part of the path from Cedar Dr to 30th St SE. Connects to the South Coast Greenway.
- At grade railroad crossing (CSX Rail), with no sidewalks
- NO HART Bus service within corridor limits
- Predominantly residential
- Connection opportunities to:
  - South Coast Greenway Trail at HCC + future phases
  - Interchange St Sidepath – however, it's more of a sidewalk w/maintenance needs

DESTINATIONS

- Schools – Thompson Elementary School, Lennard High School, HCC SouthShore
- Civic – churches, Firehouse Cultural Center
- Commercial – minor small businesses, retail along US41 & College Ave, library, post office

E Shell Point Rd (CR2440) – US41 to 24th Street NE - EXISTING

LEGEND

- SIDEWALK
- BIKE LANES
- SHARED USE PATH
- CROSSWALK
- HART BUS STOP

E Shell Point Rd (CR2440) – US41 to 24th Street NE

Shared Use Path - 24th St to Laguna Mill Dr.





CSX Crossing – Missing or poor condition sidewalks



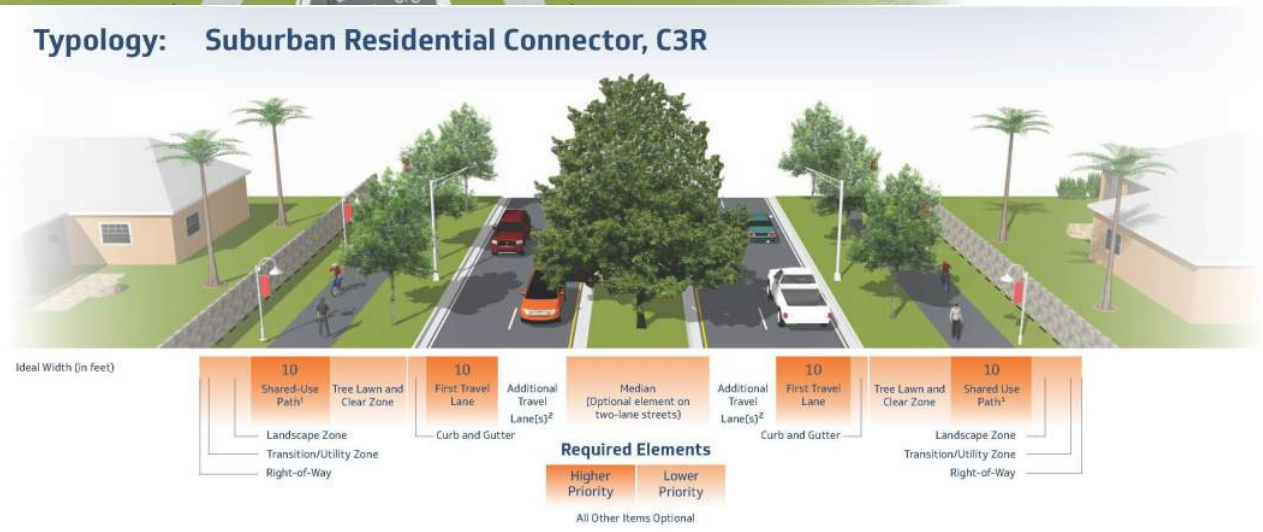
2nd to US41– Missing or poor condition sidewalks

E Shell Point Rd (CR2440) – US41 to 24th Street NE

BACKGROUND

- Context Class – C3R, Target Speed 25 to 35MPH
- HC Complete Streets Guide – On-Street w/sidewalks or Shared Use Path
- HC Greenways Master Plan – Sidepath studied, portion built

Ideal Width (in feet)



RUSKIN COMMUNITY PLAN (SOUTHSHORE PLAN)

- Desire to see the development of trails around and through the community with a large loop that meanders along the river connecting with the South Coast Greenway coming south and linking with Shell Point and Simmons Park.
- Control speeding vehicles by building two lane streets and retaining those two-lane streets that now exist.
- Preserve and enhance the traditional “grid” pattern of roadways.
- ***Retain Shell Point Road as a 2-lane roadway, allowing only intersection and site-related improvements.***
- ***Complete sidewalks along Shell Point Road West.***

E Shell Point Rd (CR2440) – US41 to 24th Street NE

POTENTIAL IMPROVEMENTS

Tier 1

- Reduce roadway width to provide 10’ travel lanes and turn lanes (only where necessary)
- Extend School Zone to include Thompson Elementary School – 200 FT from School Grounds per MUTCD with crossings.
- High Visibility marked crosswalks at all side streets, intersections and major driveways for priority treatment.
- Bicycle improvements at intersections at US 41 (signalized) – Bike boxes, wayfinding signage
- Wayfinding sign/markers at US 41, 24th St NE intersection to South Coast Trail, Schools, Firehouse Cultural Center

Tier 2

- New high visibility crossings w/RRFBs, refuge islands at: 2nd St NE; 6th St NE, 15th St SE; 21st Street SE
- Bicycle improvements at intersections at 24th St NE (unsignalized) - RRFBs for all approaches. Reconstruct 24th St NE medians to provide refuge
- Install bike counters at South Coast Greenway Trail
- Landscaping – additional plantings near Shared Use Path for traffic calming and shade.
- Reduce posted speed limit

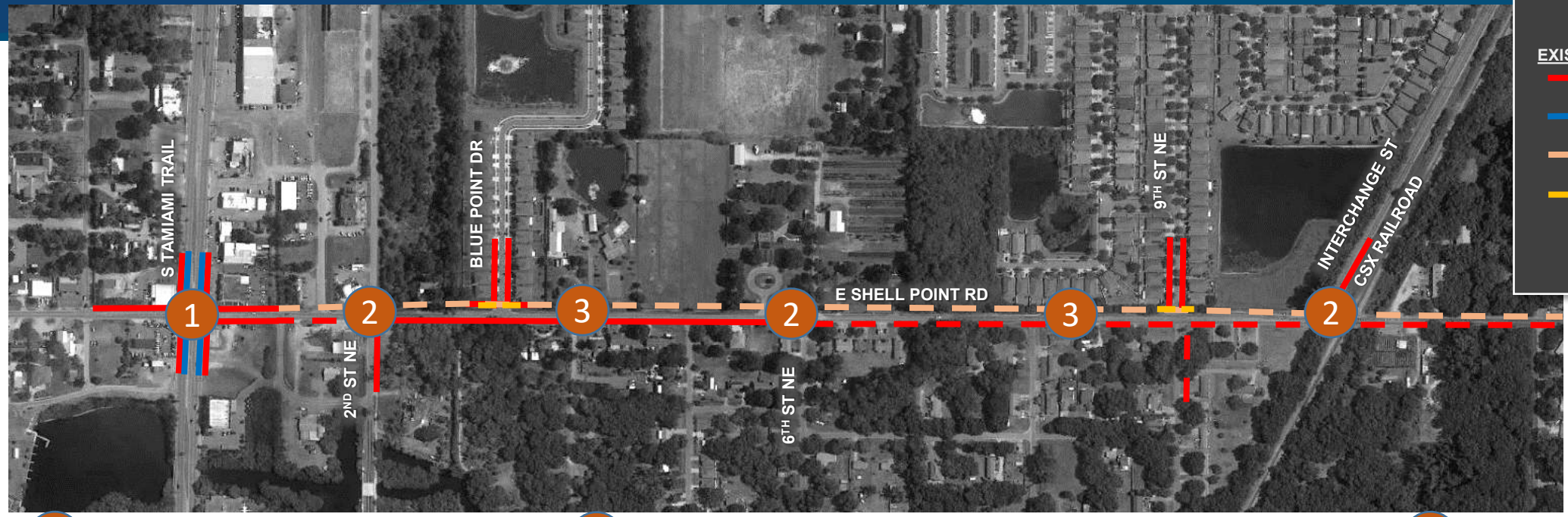
Tier 3

- Continue 10-12’ Shared Use Path along the north side of E Shell Point Road to US41
- Construct sidewalk on south side of E Shell Point Road
- New high visibility crossings w/RRFBs at Interchange St (once sidewalk is built)
- Lighting at all intersections and crossings, ped level lighting along the shared use path
- Provide MUTCD signage, markings, & barrier arms at railroad crossing (if active)
- Improve RR crossing: sidewalk/shared use path

ADJACENT & SUPPLEMENTAL PROJECTS

- Identify additional speed management and traffic calming treatments throughout the corridor to facilitate the desired Target Speed of 35 MPH

E Shell Point Rd (CR2440) – US41 to 24th Street NE



LEGEND

EXISTING	POTENTIAL	
		SIDEWALK
		BIKE LANES
		SHARED USE PATH
		CROSSWALK
		HART BUS STOP

1 INTERSECTION TREATMENTS

2 MIDBLOCK CROSSING TREATMENTS

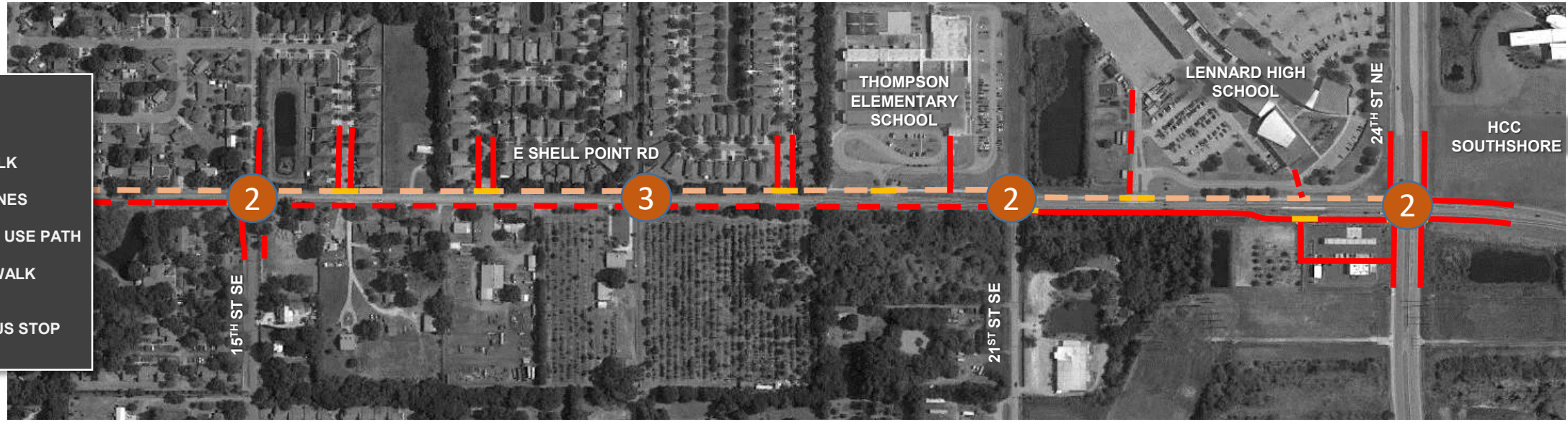
3 CORRIDOR TREATMENTS

E Shell Point Rd (CR2440) – US41 to 24th Street NE

1 INTERSECTION TREATMENTS

2 MIDBLOCK CROSSING TREATMENTS

3 CORRIDOR TREATMENTS



Balm Riverview Rd (CR3830) – Boyette Rd to McMullen Rd

1.87 MILE CORRIDOR

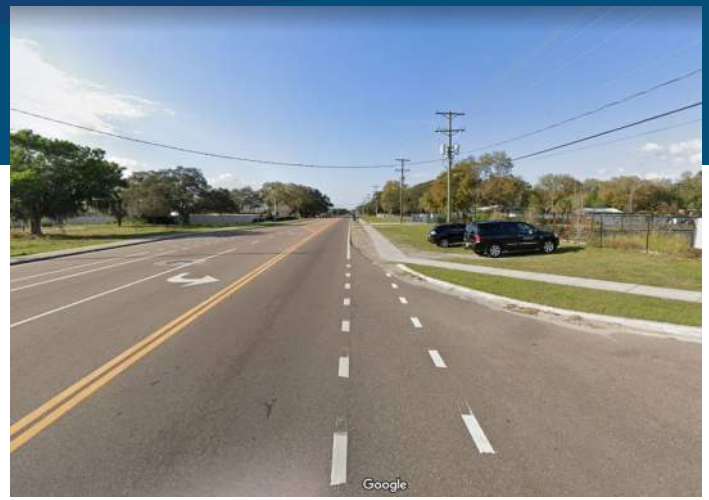
Balm Riverview Rd (CR3830) – Boyette Rd to McMullen Rd

EXISTING

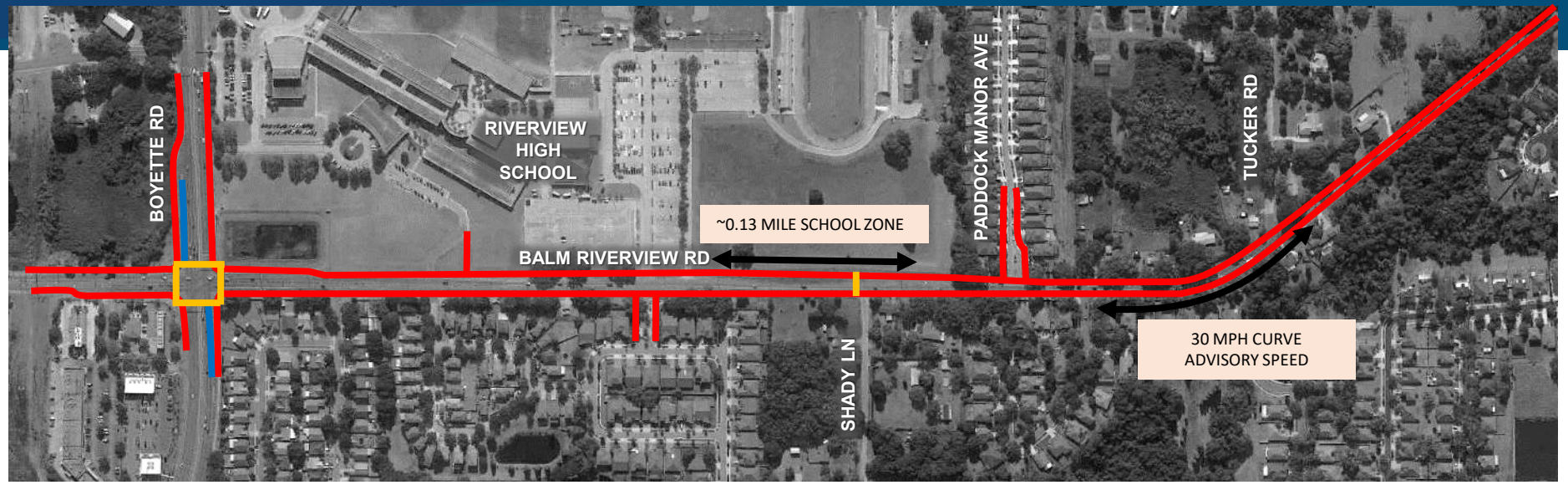
- ***No bike facilities***; bike lanes approaching McMullen intersection only
- Bike LOS E
- Sidewalks provided on both sides of the roadway; some segments in poor condition; with variable width grass buffer from the road
- Pedestrian Crossings at: Boyette Rd, Shady Ln, McMullen Rd
- Posted Speed ***45 MPH***, 20 MPH School Zone; 30 MPH Curve advisory
- No HART transit service

DESTINATIONS

- Schools: Riverview High School, KCC, Kids Community College SE, Krestview Kid's Academy,
- Connecting Opportunities:
  - Bike lanes on McMullen Rd, 45 MPH
  - Bike lane EB only on Symmes Rd, 40 MPH
  - Bike lanes on Boyette Rd, 45MPH



Balm Riverview Rd (CR3830) – Boyette Rd to McMullen Rd



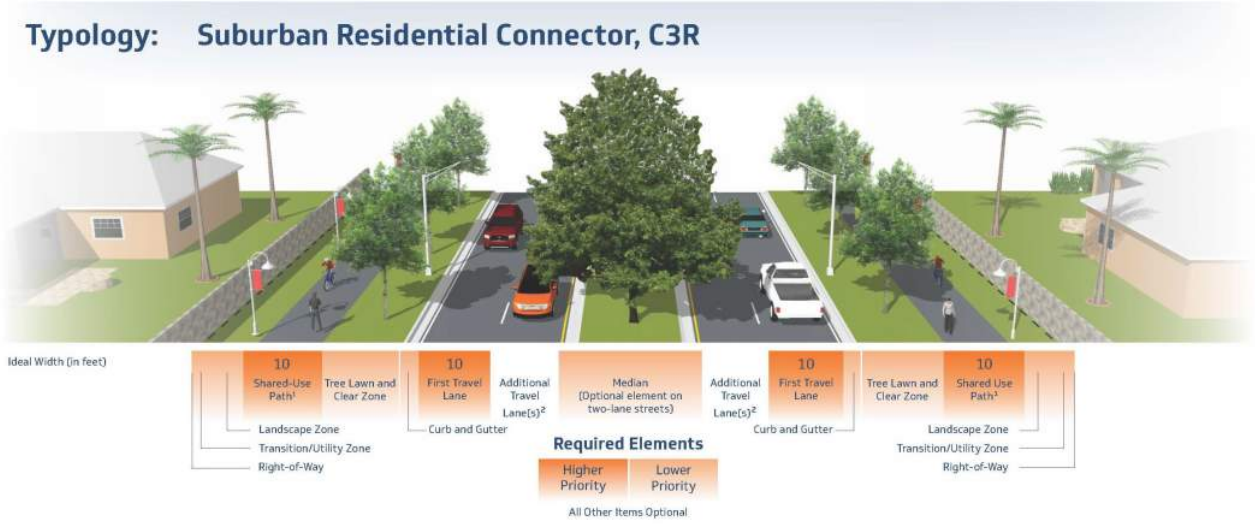
LEGEND

- SIDEWALK
- BIKE LANES
- SHARED USE PATH
- CROSSWALK
- HART BUS STOP

Balm Riverview Rd (CR3830) – Boyette Rd to McMullen Rd

BACKGROUND

- Context Class – C3R, Target Speed 25 to 35MPH
- HC Complete Streets Guide – On-Street w/sidewalks or Shared Use Path



RIVERVIEW COMMUNITY PLAN

- Provide safe, attractive, efficient multi-modal transportation, including vehicular, bicycle/pedestrian and transit.
- Provide sidewalks, pedestrian crossings, bike lanes, and connections to the Hillsborough County Greenway and Trail Master Plan and extend crossing signal times and use traffic calming techniques along major thoroughfares.
- Diligently enforce traffic speed laws.
- Work with local schools to co-develop roadway and pedestrian facilities.
- Develop a pedestrian, bicycle and equestrian trail pathways plan that connects key destinations such as the Civic Center, Camp Christina' schools, neighborhoods and parks and links environmental greenways through various districts.
- ***Encourage "walk to school" programs, e.g. "walking school buses," to increase safety and to reduce school-related automobile trips.***
- ***Provide sidewalks, pathways and/or trails wide enough (wider than 5 feet) for people to easily pass each other or travel side-by-side.***

Balm Riverview Rd (CR3830) – Boyette Rd to McMullen Rd

POTENTIAL IMPROVEMENTS

Tier 1

- High visibility pedestrian crossing markings at all crossings (intersections, sidestreets, midblock, major driveways for priority treatment)
- Extend School Zone (Riverview HS and KCC) to include 200 FT from School Grounds per MUTCD and all new crossings.
- Realign Tucker Rd to meet Balm Riverview Rd at 90-degree approach (paint/flexposts) reducing crossing distance
- Repair sidewalks and all ADA needs

Tier 2

- New or Enhanced Midblock crossing w/RRFBs with refuge island at: Black Forest Trail; Shady Lane; Irish Moss Ave; Symmes Rd
- Bicycle improvements at intersections:
  - Boyette Rd (signalized) – Bike boxes, green conflict paint, wayfinding sign
  - McMullen Rd (signalized) – Bike boxes, green conflict paint, wayfinding sign
- Design connections to bike lanes on Boyette Rd, McMullen Rd, Symmes Rd
- Landscaping - Plantings near Shared Use Path/Sidewalk for traffic calming and shade

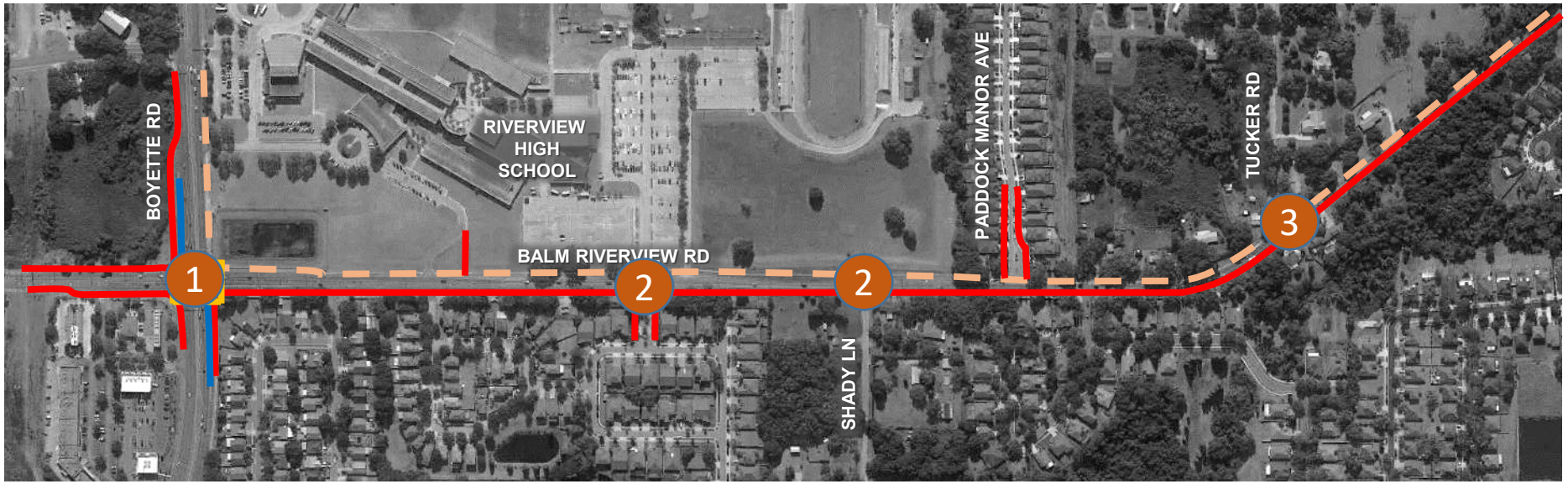
Tier 3

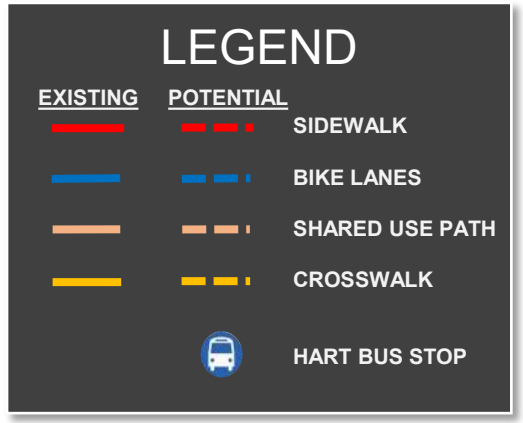
- Consider protected intersections, where possible
- Convert sidewalks to a shared use path on east side adjacent to schools.
- Lighting at all intersections and crossings, ped level lighting along the shared use path

ADJACENT & SUPPLEMENTAL PROJECTS

- Boyette Rd, McMullen Rd, Symmes Rd - Convert Bike Lane to Buffered/Protected Bike lanes
- Identify additional speed management and traffic calming treatments throughout the corridor to facilitate the desired Target Speed of 35 MPH

Balm Riverview Rd (CR3830) – Boyette Rd to McMullen Rd





1 INTERSECTION TREATMENTS

2 MIDBLOCK CROSSING TREATMENTS

3 CORRIDOR TREATMENTS

Balm Riverview Rd (CR3830) – Boyette Rd to McMullen Rd

1 INTERSECTION TREATMENTS

2 MIDBLOCK CROSSING TREATMENTS

3 CORRIDOR TREATMENTS

Next Steps

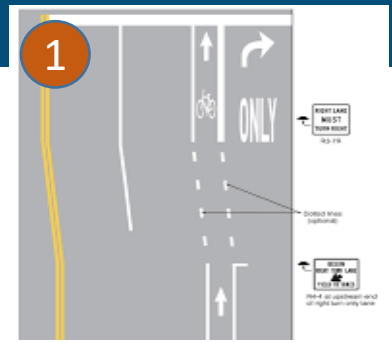
Evaluate Potential Improvements

- Bike Facility enhancement or retrofit
- Intersections and Crossings

Potential Solutions

SEGMENT TREATMENTS

1. **Buffered bike lane** (35 - 45 MPH) – 6 FT with 2 FT wide buffer.
   Combined Bike Lane / Turn Lane with shared lane markings should be considered where there is not enough space to maintain a standard-width bicycle lane at the intersection. May not be appropriate at intersections with high peak right turn demand.
2. **Conventional bike lane** (35 MPH) – 6 FT wide.
   May require sliver widening, utility relocation, land taking where the roadway narrows.
3. **Road Diet** (35 - 45 MPH):
   - *Reduce frequency and/or storage lengths for right-turn lanes.*
   - *Reduce travel lane width for through and turn lanes to reduce vehicle travel speeds.*
4. **Green Conflict Zone Markings** – *To be applied where bikes and vehicles could conflict.*
   - *"In cities where local vehicle codes require motor vehicles to merge into the bike lane in advance of a turn movement, lane striping should be dashed from 50 to 200 feet in advance of intersections to the intersection. Different states have varying requirements."*
5. **Cycle Track / Shared Use Path**
   Provide connections to WB&A Trail and Watkins Park Access Trail.
6. **Sign and Pavement Markings**
   To be installed per the current standards.



INTERSECTION TREATMENTS

1. **Through Bike Lane 'bicycle pocket'**
   - *Treatment for MD 193 and side street approaches.*
   - *Reduce conflicts between turning vehicles and bicycle through traffic.*
   - *Accompanying signage should include R3-7R "Right Lane Must Turn Right" and R4-4 "Begin Right Turn Yield to Bikes" (MUTCD).*
2. **Intersection Crossing Markings**
   - *Guide bicyclists on a safe and direct path through intersections, including driveways and ramps.*
   - *Reduces bicyclist stress by delineating the bicycling zone.*
   - *Reduces conflicts between bicyclists and turning motorists.*
3. **Two Stage Turn Queue Boxes**
   - *A safe way for bikes to make left turns at multi-lane signalized intersections from the bike lane.*
   - *Can also be used at mid-block and unsignalized intersections.*
4. **Bike Boxes**
   - *Apply on side street approaches with 2 lanes or less.*
   - *An ingress lane should be used to define the bicycle space.*
   - *Reduce right or left-turn conflicts. Accommodate* left-turn bike traffic.
5. **Sign and Pavement Markings**
   - *All to be installed per the current standards.*

Resource: NACTO

EXAMPLE RAISED CYCLE TRACK WITH GRASS BUFFER FROM NACTO







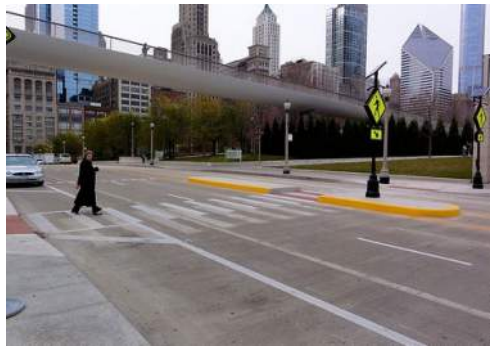

Resource: NACTO







Resource: FHWA Bike Selection Guide







Resource: FHWA EDC, STEP Guide

FDOT, Orange Blossom Trail

FDOT, Daytona Beach

Bikeportland.org

Universalhub.com

Transit stop or Crossing locations

Impactrecovery.com

altago.com

Virginiadot.org

APPENDIX C – WATERS AVENUE CORRIDOR DESIGN CONCEPTS

BICYCLE NETWORK PLAN: CORRIDOR DESIGN CONCEPTS

Hillsborough County

W. Waters Ave. – Sheldon Rd. to Veterans Expressway

January 2023

PREPARED BY:

PATEL, GREENE AND ASSOCIATES
12570 Telecom Drive
Temple Terrace, FL 33637

Table of Contents

List of Appendices

INTRODUCTION

Committed to improving the mobility and safety of all residents, Hillsborough County, and the Hillsborough Transportation Planning Organization (TPO) have identified, evaluated, and prioritized bicycle facility needs along the County's roadway transportation network. The data-driven methodology addresses the mobility and safety needs of people on bicycles. The resulting plan will assist Hillsborough County in realizing the commitment and desire to provide a safe, connected, and inviting network of bicycle facilities.

The planning process identified four high priority corridors that are geographically dispersed across the county for further evaluation. Review and analysis of each corridor yielded a range of potential project opportunities to add or improve bicycle facilities. The recommended improvements have been grouped into tiers based on priority and screened for feasibility. This design report introduces conceptual design plans, cost estimates, and implementation considerations to construct the recommendations for W. Waters Ave. between Sheldon Rd. and Veterans Expressway.

Waters Ave. in the project corridor is a six-lane divided roadway in the community of Town 'n' Country. The 2.7 miles long corridor's land use is primarily commercial in the vicinity of the signalized intersections with a mix of commercial, single-family, and multi-family residential in the segments between. The median is curbed and restricts left turns to or from many side streets and driveways. There are many curb cuts with most parcels having their own driveways. The signalized intersections have exclusive left turn lanes throughout the corridor and exclusive right turn lanes only at each end of the corridor.

The corridor has two distinct roadway configurations to either side of Pinehurst Dr. West of Pinehurst Dr., the pavement width is 35 ft to each side of the median. The posted speed limit of 35 mph includes warning plaques noting "Senior Area." The corridor has sidewalks located at the back of the curb and Shared Lane Markings in the curb lane, though there is no signage associated with the shared lane condition. East of Pinehurst Dr., the median widens and the pavement width is 37.5 ft to each side of the median. The posted speed limit is 45 mph though operating speeds can be observed much faster. There are sidewalks with a narrow grass buffer and 4 ft wide bike lanes, though there is no signage associated with the bike lane pavement markings. Green conflict areas have been added to the keyhole bike lane areas where there are exclusive right turn lanes at the east end of the corridor. Bike lanes intersect the corridor along Sheldon Rd. at the project's western terminus.

In addition to serving local bicyclists, the corridor leads to the Channel Park Pavilion trailhead for the Upper Tampa Bay Trail west of the project limits. The Town 'n' Country Greenway runs parallel to the corridor one mile to the south.

The Hillsborough Area Regional Transit Authority (HART) operates transit service along the corridor. Route 16 operates along the entire corridor with 30-minute headways Monday-Saturday and 60-minute headways on Sunday. Route 30 operates between Sheldon Rd. and Hanley Rd. before continuing south along Hanley Rd, operating with 60-minute headways seven days a week. The HART Northwest Transfer Center is located outside the western project limits where several additional bus routes converge including: 34, 39, and route 812 operated by the Pinellas Suncoast Transit Authority (PSTA).

RECOMMENDATIONS

The most substantial recommendation to improve conditions for bicyclists is to narrow the lane striping to add bike lanes where they do not exist and to widen and buffer the existing bike lanes. The recommendations are supportive of the new bike lanes and safety for all roadway users through elements that encourage a reduction of traffic speeds. The recommendations improve access to the bike lanes with the addition of enhanced crossings, improved bus stops, and continuing the bike lane markings through intersections. Additional recommendations add elements to improve the overall safety and comfort of roadway users including updated pavement markings, signage, landscaping, and lighting.

The recommendations have been split into three tiers and are summarized in the tables below. Conceptual design plans showing the recommendations are included in Appendix A.

Table 1: Tier 1 Recommendations

	Recommendation	Implementation Notes	Cost Estimate
A	Reconfigure the roadway striping to narrow the travel lanes east of Pinehurst Dr. and add buffers to the bike lanes.	37.5 ft. pavement width east of Pinehurst Dr. yields 10 ft interior travel lanes, 11 ft outside travel lane, and 6.5 ft buffered bike lanes. Resurfacing to be completed as part of the striping changes.	$4,245,000
B	Install flexible delineators to feasible segments of the buffered bike lanes.	Install flexible posts to bike lane buffers at 30 ft on center where there are no conflicts with turning movements.	$172,400
C	Reconfigure the roadway striping to narrow the travel lanes west of Pinehurst Dr. and replace shared lane markings with bike lanes.	35 ft. pavement width west of Pinehurst Dr. yields 10 ft travel lanes and 5 ft bike lanes. Resurfacing to be completed as part of striping changes.	$1,579,500
D	Install bike lane markings through intersections and across selected driveways, including green through conflict areas.	Typical configuration is to continue the bike lane width through the intersection with 2 ft-4 ft skip through conflict areas, adding green within those skips and 40 ft solid green before and after conflict areas.	$627,000
E	Modify the median east of Stone Run Ct. to maintain minimum widths for eastbound travel lanes and bike lane through the choke point.	Modifications required to maintain minimum width of travel lanes and bike lane, and should be completed coincident with resurfacing.	$73,400
F	Install high visibility pedestrian crossing markings at all intersections, midblock crossings, and major driveways.	Locations shown on design plans.	$424,000
G	Install consistent MUTCD bicycle facility signs.	Sign assembly content and placement to be determined during final design. Planning-level cost estimate included. Not shown on design plans.	$147,700

H	Identify and repair areas of sidewalk damage, poor drainage, and ADA compliance issues.	Quantities and locations to be determined following ADA inventory. Planning-level cost estimate included. Not shown on design plans.	$112,400
I	Modify timing plans to add Leading Pedestrian Intervals (LPI) at all signal-controlled intersections.	Planning-level cost estimate for new signal timing plan. Should they be needed, add the following costs per location: controller upgrade $13,400, blank out sign $104,800, mast arm upgrade $1,310,400.	$70,000
J	Install wayfinding signs at the intersections with Sheldon Rd. and Hanley Rd., leading to the following destinations: Upper Tampa Bay Trail, parks, YMCA, schools, transit hubs, and Town 'N Country Trail.	Sign assembly content and placement to be determined during final design. Planning-level cost estimate included. Not shown on design plans.	$98,500

Table 2: Tier 2 Recommendations

	Recommendation	Implementation Notes	Cost Estimate
A	Install concrete separators to feasible segments of buffered bike lanes.	Install 8 in wide concrete separators instead of flexible posts in locations where there are no conflicts with turning movements. Not shown on design plans.	$114,700
B	Modify intersection at Northbridge Blvd. to add crossing on the west side of the intersection.	Elements include decreasing the southwest corner radius, median modifications, crosswalk ramps and markings, and relocated bus stops to far side of crossings.	$1,130,200
C	Install midblock crossing to existing median at Riverwood Blvd.	Traffic study and warrant analysis to be completed. Elements include median modifications, crosswalk ramps and markings, FDOT-standard Midblock Pedestrian Signals (MPS), mast arms, and relocate bus stops to far side of crossings.	$1,130,200
D	Install midblock crossing between Royal Sand Cir. driveways pair.	Traffic study and warrant analysis to be completed. Elements include median modifications, crosswalk ramps and markings, FDOT-standard Midblock Pedestrian Signals (MPS), mast arms, and relocate westbound bus stop to far side of crossing.	$1,130,200

E	Install full traffic signal at Rustic Dr.	Traffic study and warrant analysis to be completed. Elements include median modifications, crosswalk ramps and markings, traffic signal heads, mast arms, and relocate bus stops to far side of crossings.	$1,381,400
F	Install midblock crossing east of JR Manor Dr.	Traffic study and warrant analysis to be completed. Elements include median modifications, crosswalk ramps and markings, traffic signal heads, mast arms, and relocate bus stops to far side of crossings.	$1,130,200
G	Install midblock crossing between Waters Ave Car Wash & Baycare Urgent Care.	Traffic study and warrant analysis to be completed. Elements include median modifications, crosswalk ramps and markings, traffic signal heads, mast arms, and relocate bus stops to far side of crossings.	$1,130,200
H	Install bus stop pads and amenities.	Planning-level cost estimated to add the following bus stop elements: 30 ft x 10 ft concrete pad and typical HART shelter. Individual locations may have increased construction elements dependent on easements or right-of-way required during design phase.	$1,398,100
I	Install raised bike lane through feasible bus stops.	Cost estimate per bus stop location is based on typical configuration from NACTO Urban Transit Design Guide: 30 ft x 6 ft concrete pad, 15 ft x 6 ft concrete ramps, 30 ft curb and gutter, and 30 ft detectable warning. Not shown on design plans.	$242,600
J	Install landscaping with trees to feasible segments of the median to create a boulevard feel.	Feasible areas shown on plans. Tree placement to be determined during final design.	$170,500
K	Conduct speed study to reduce posted speed limit.	Planning-level cost estimate for required speed study and replacement signage. Not shown on design plans.	$76,000
L	Install bicycle detection at signal-controlled intersections.	Planning-level cost estimate for new microwave detection equipment.	$333,200

Table 3: Tier 3 Recommendations

	Recommendation	Implementation Notes	Cost Estimate
A	Install lighting at all signalized intersections and crossings.	Planning-level cost estimate for lighting at each intersection and midblock crossing, both existing and those added in Tier 2. Not shown on design plans.	$2,109,700
B	Install pedestrian-scale lighting throughout the corridor.	Planning-level cost estimate for pedestrian-scale lighting on both sides, spaced at 50' on center. Additional right-of-way or easements to be acquired prior to final design. Not shown on design plans.	$3,466,000
C	Remove and reconstruct duplicate driveways.	Coordination and approvals required from adjacent property owners prior to final design. Planning-level cost estimate to reconstruct six 24 ft wide commercial driveways.	$75,300
D	Extend median noses to roadway edge to provide pedestrian refuge areas.	Locations noted on plans: Riverwood Blvd., Rustic Dr. (both sides), Hulsey Rd. (north side), Sand Beach St., Henderson Rd., and Sitka St.	$90,000

COST ESTIMATES SUMMARY

Cost estimates for each recommendation are included above in Tables 1-3. The estimates have been developed using pay items and expected unit costs sourced from District 7 of the Florida Department of Transportation, the Department's Long Range Estimating (LRE) system, and engineering judgement. The planning-level estimates include percentage-based multipliers applied to the construction costs as shown in Table 4. Any needed right-of-way acquisition is not included in the estimates. An overview of the cost estimates aggregated by tier are shown in Table 5. Cost estimate details for each recommendation are provided in Appendix B.

Table 4: Cost Estimates Assumptions

Cost Element	Multiplier
Maintenance of Traffic (MOT)	20%
Mobilization (MOB)	15%
Contingency	30%
Design	25%
CEI	15%

Table 5: Cost Estimates by Tier

Implementation Tier	Cost Estimates
Tier 1	$7,549,900
Tier 2	$9,367,500
Tier 3	$5,741,000
Corridor Total	$22,658,400

IMPLEMENTATION GUIDANCE

The recommendations for bicycle facilities on the corridor were developed in collaboration with Hillsborough County staff and subsequently screened for feasibility. The screening for feasibility and development of design plans included conformance with the applicable local, state, and federal design standards and guidance. The designs applied engineering judgement and contemporary best practices for the safety of all users within the right-of-way. Implementation notes are included for each recommendation in the tables above. The following content identifies general issues and considerations to be addressed along the entire corridor as the recommendations are advanced through the forthcoming stages of design and implementation.

RIGHT-OF-WAY, DRAINAGE, AND UTILITIES

The right-of-way information used to develop the design concept is based on Hillsborough County's GIS data and field investigation. The next stage of project development will require survey to verify property lines, topography, and utilities.

Based on the available property line data, the property lines generally lie beyond the back of the sidewalks with an additional buffer. However, there are two segments along the north side of the corridor where the private property boundaries appear to extend well into the curb lane of the roadway. Those segments are from Sheldon Rd. To Pinehurst Dr. and again from just east of Sandy Beach St. to Henderson Rd.

Other than the segments along the north side of the corridor noted above, all recommendations fall within the public right-of-way. Additional right-of-way may be required for the relocation of impacted utilities or to add the recommended traffic signals equipment and lighting.

Utility relocations, adjustment, or additions may be required to install the recommended traffic signals and lighting.

ADDITIONAL CONSIDERATIONS

All curb ramps are to be ADA-compliant. They are not specifically shown on the conceptual design plans, though they are included in the cost estimate for the corresponding recommendation. The width of each curb ramp and detectable warning pads are to match the corresponding path or sidewalk width.

Field assessment of ADA compliance is required to identify any needed associated modifications.

A speed study will be required prior to advancing the recommendation to lower the posted speed limit.

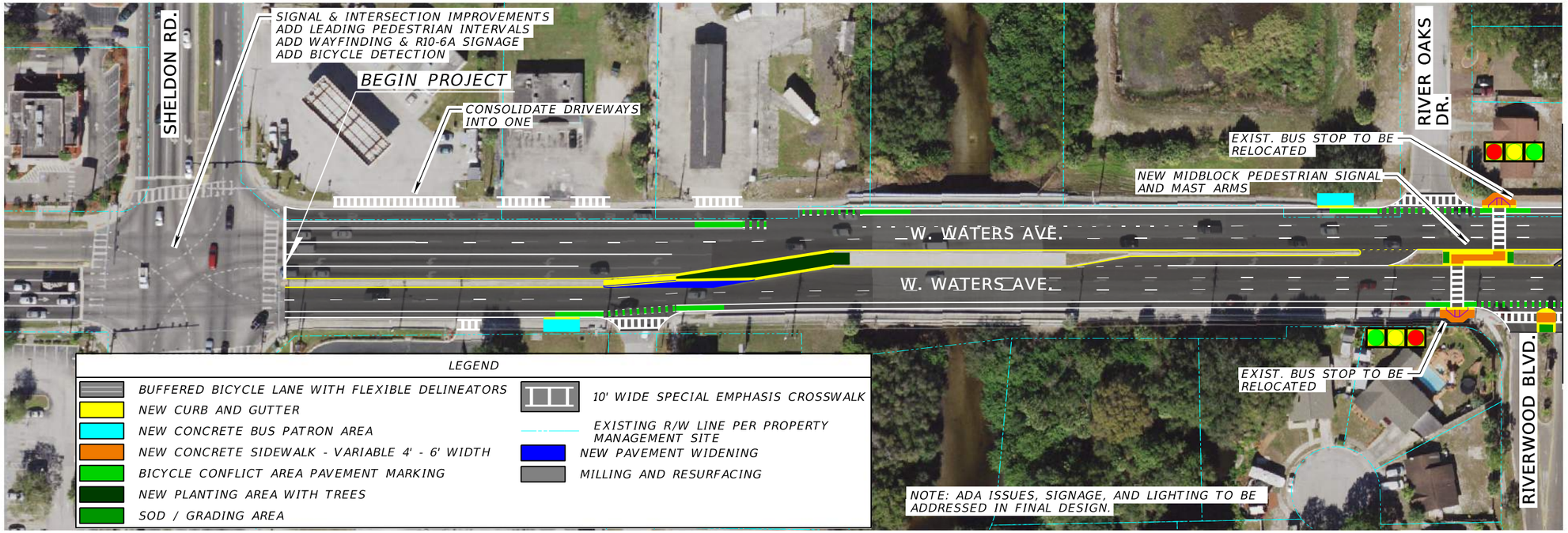
The addition of Leading Pedestrian Intervals (LPI) and bicycle detection equipment to intersections with existing traffic signals may require replacement of the traffic controller cabinet if required to enable that capability.

The recommended lighting will require assessment of existing lighting conditions, impacts to trees, and right-of-way once the grading design has been established.

All pavement markings should be thermoplastic.

Appendix A

Design Concept Plans



REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

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12570 TELECOM DRIVE
TEMPLE TERRACE, FL 33637
PHONE: 813-978-3100
LUCAS CRUSE

HILLSBOROUGH COUNTY
601 E. KENNEDY BLVD. TAMPA, FLORIDA 33602

BICYCLE NETWORK PLAN

W. WATERS AVE. PLANS

SHEET NO. 1

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REVISIONS			
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PATEL, GREENE & ASSOCIATES, LLC
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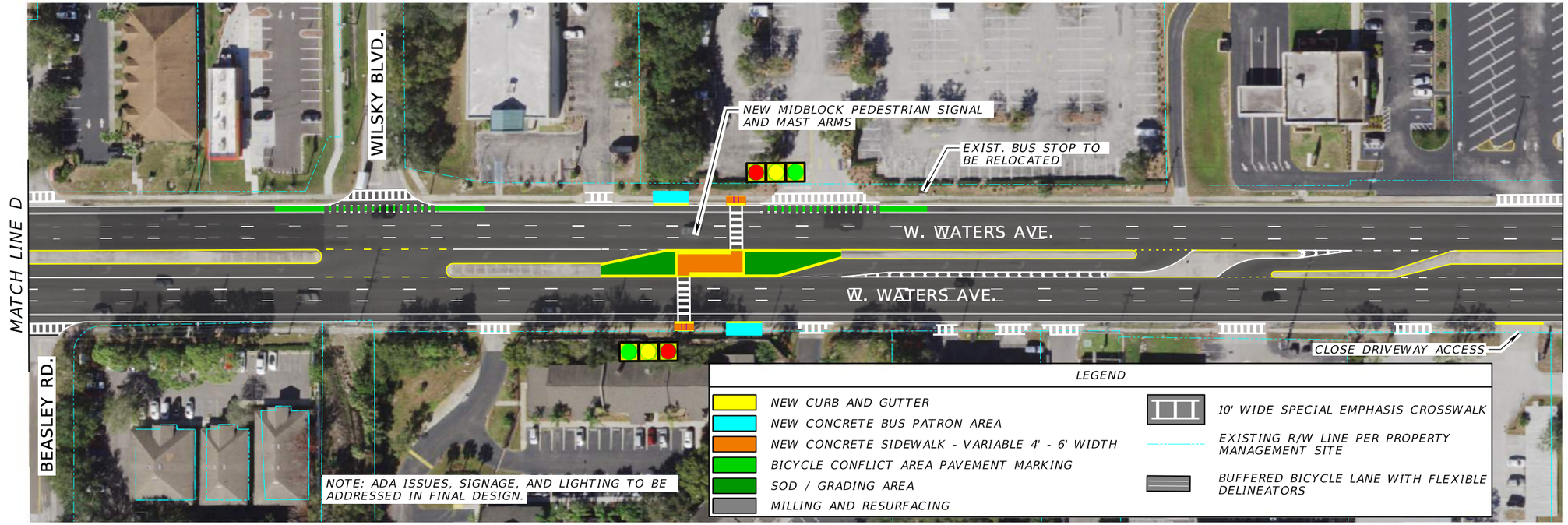
HILLSBOROUGH COUNTY
601 E. KENNEDY BLVD. TAMPA, FLORIDA 33602

BICYCLE NETWORK PLAN

W. WATERS AVE. PLANS

SHEET NO. 2



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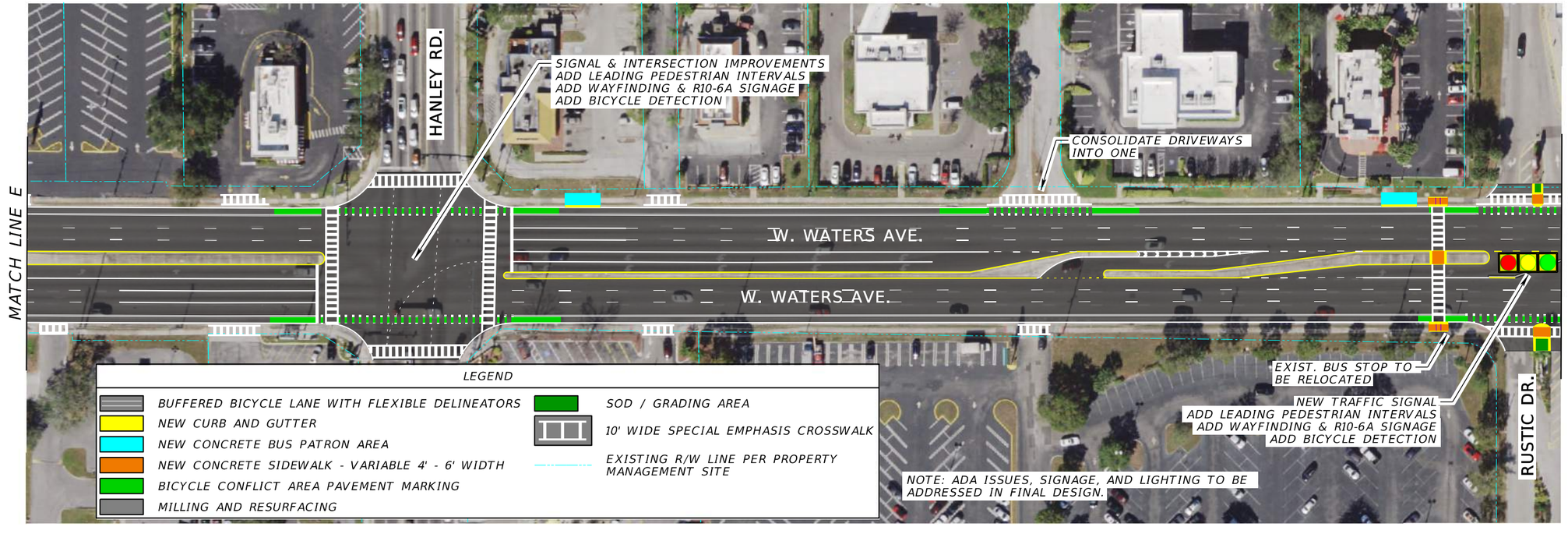

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HILLSBOROUGH COUNTY
601 E. KENNEDY BLVD. TAMPA, FLORIDA 33602

BICYCLE NETWORK PLAN

W. WATERS AVE. PLANS

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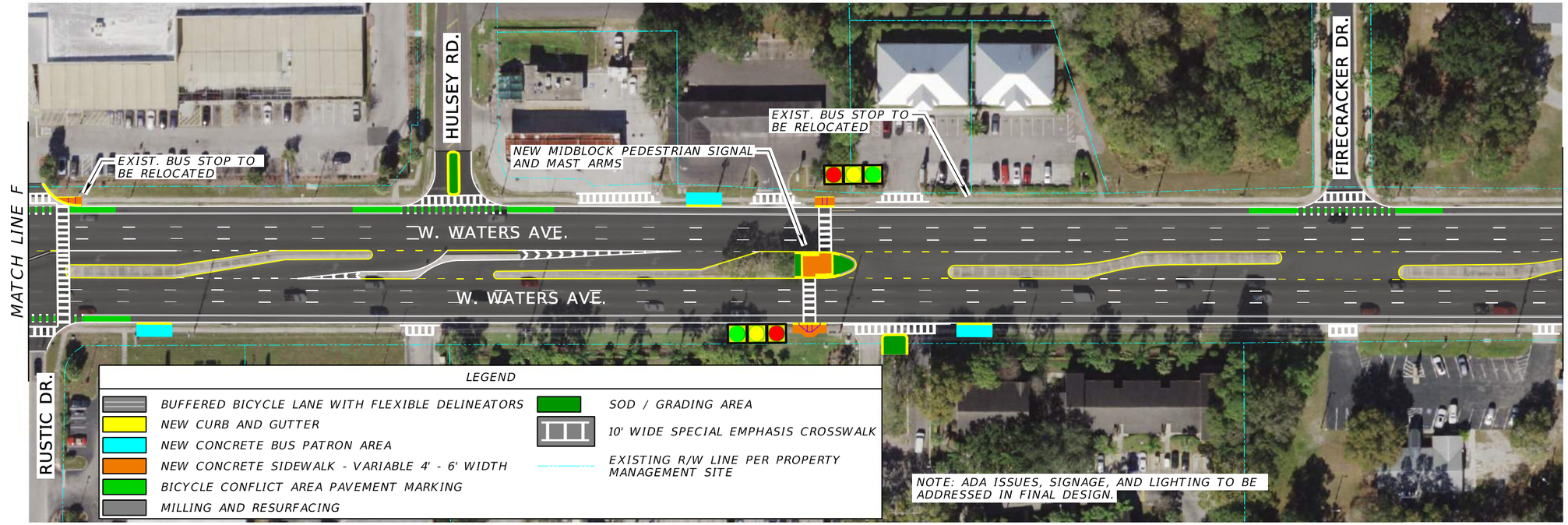

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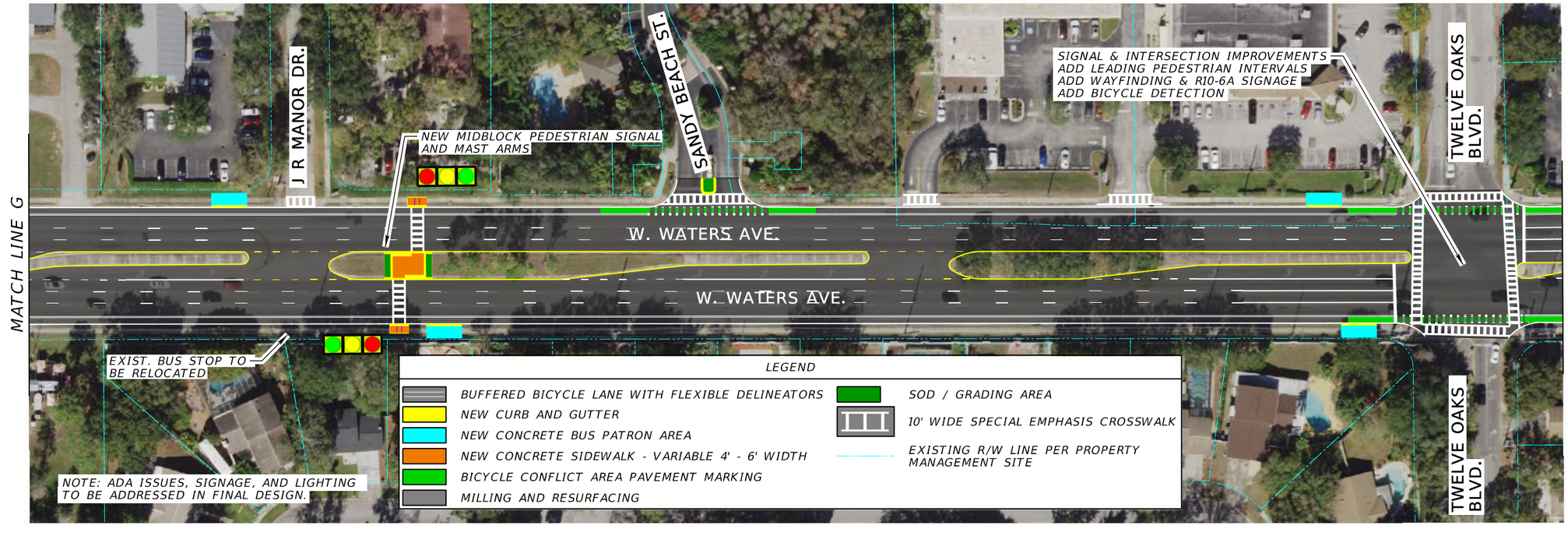

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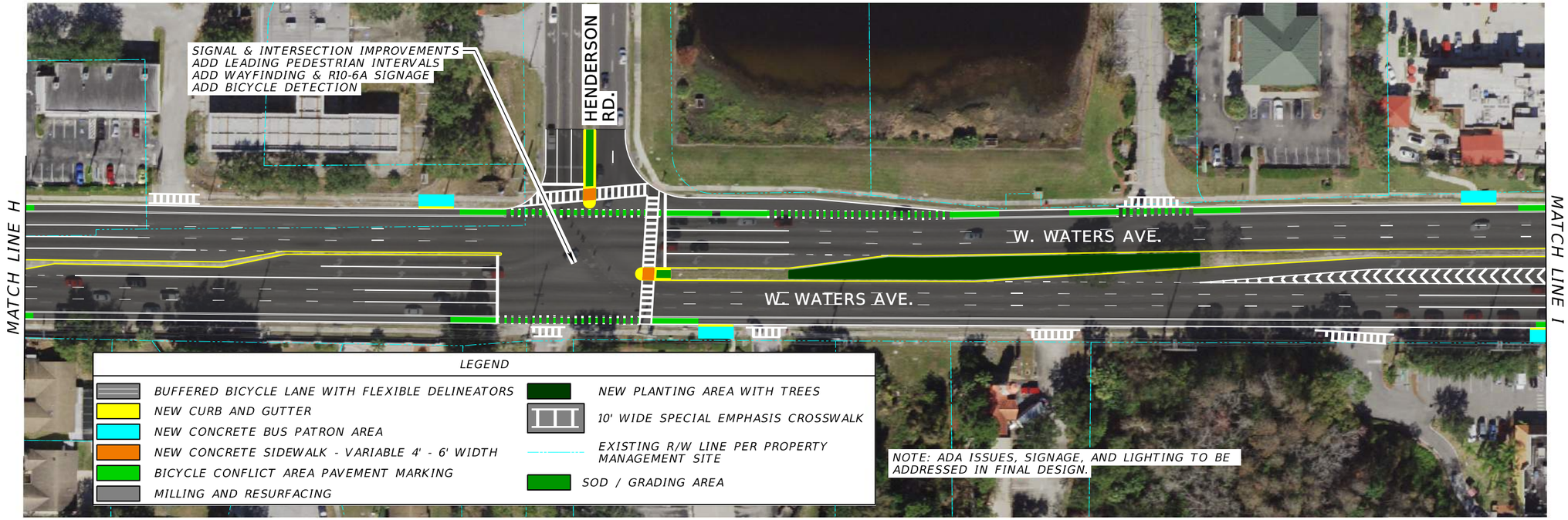
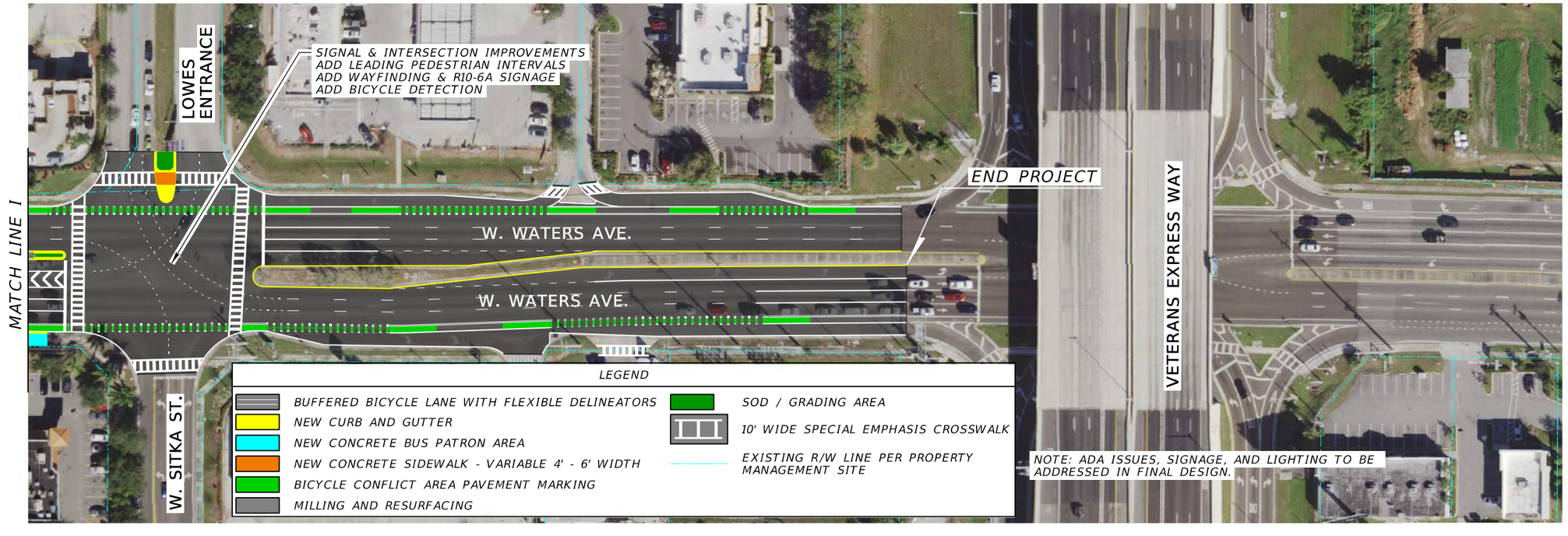
601 E. KENNEDY BLVD. TAMPA, FLORIDA 33602

BICYCLE NETWORK PLAN

W. WATERS AVE. PLANS

SHEET NO. 4





REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

PATEL, GREENE & ASSOCIATES, LLC
12570 TELECOM DRIVE
TEMPLE TERRACE, FL 33637
PHONE: 813-978-3100
LUCAS CRUSE

HILLSBOROUGH COUNTY
601 E. KENNEDY BLVD. TAMPA, FLORIDA 33602

BICYCLE NETWORK PLAN

W. WATERS AVE. PLANS

SHEET NO. 5

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Appendix B

Cost Estimates Details

Hillsborough County Bike Network - Conceptual Design Cost Estimate Details
W. Waters Ave. – Sheldon Rd. to Veterans Expressway

	Tier 1	Implementation Notes	Final Cost Estimate	Construction Cost	MOT (20%)	Sub-Total	MOB (15%)	Sub-Total	CONTINGENCY (30%)	Sub-Total	DESIGN (25%)	CEI (15%)	Total Cost	Cost Estimate Notes
A	Reconfigure the roadway striping to narrow the travel lanes east of Pinehurst Dr. and add buffers to the bike lanes.	37.5 ft. pavement width east of Pinehurst Dr. yields 10 ft interior travel lanes, 11 ft outside travel lane, and 6.5 ft buffered bike lanes. Resurfacing to be completed as part of the striping changes.	$ 4,245,000	$ 1,690,174	$ 338,035	$ 2,028,209	$ 304,231	$ 2,332,440	$ 699,732	$ 3,032,172	$ 758,043	$ 454,826	$ 4,245,041	Obtained the construction cost from the design file.
B	Install flexible delineators to feasible segments of the buffered bike lanes.	Install flexible posts to bike lane buffers at 20 ft on center where there are no conflicts with turning movements.	$ 172,400	$ 68,649	$ 13,730	$ 82,379	$ 12,357	$ 94,736	$ 28,421	$ 123,156	$ 30,789	$ 18,473	$ 172,419	Measured 9340 ft that tubular posts could be applied with a spacing of 20 ft for a total of 467 posts. Each post costs 147 dollars
C	Reconfigure the roadway striping to narrow the travel lanes west of Pinehurst Dr. and replace shared lane markings with bike lanes.	35 ft. pavement width west of Pinehurst Dr. yields 10 ft travel lanes and 5 ft bike lanes. Resurfacing to be completed as part of striping changes.	$ 1,579,500	$ 628,866	$ 125,773	$ 754,639	$ 113,196	$ 867,835	$ 260,351	$ 1,128,186	$ 282,046	$ 169,228	$ 1,579,460	Obtained the construction cost from the design file.
D	Install bike lane markings through intersections and across selected driveways, including green through conflict areas.	Typical configuration is to continue the bike lane width through the intersection with 2 ft-4 ft skip through conflict areas, adding green within those skips and 40 ft solid green before and after conflict areas.	$ 627,000	$ 249,624	$ 49,925	$ 299,549	$ 44,932	$ 344,481	$ 103,344	$ 447,825	$ 111,956	$ 67,174	$ 626,956	Obtained the construction cost from the design file.
E	Modify the median east of Stone Run Ct. to maintain minimum widths for eastbound travel lanes and bike lane through the choke point.	Modifications required to maintain minimum width of travel lanes and bike lane, and should be completed coincident with resurfacing.	$ 73,400	$ 29,206	$ 5,841	$ 35,047	$ 5,257	$ 40,304	$ 12,091	$ 52,396	$ 13,099	$ 7,859	$ 73,354	Obtained the construction cost from the design file.
F	Install high visibility pedestrian crossing markings at all intersections, midblock crossings, and major driveways.	Locations shown on design plans.	$ 424,000	$ 168,821	$ 33,764	$ 202,585	$ 30,388	$ 232,973	$ 69,892	$ 302,865	$ 75,716	$ 45,430	$ 424,011	Obtained the construction cost from the design file.
G	Install consistent MUTCD bicycle facility signs.	Sign assembly content and placement to be determined during final design. Planning-level cost estimate included. Not shown on design plans.	$ 147,700	$ 58,824	$ 11,765	$ 70,589	$ 10,588	$ 81,177	$ 24,353	$ 105,530	$ 26,383	$ 15,830	$ 147,742	Using 700 1 12 assembly and putting an assembly every 500 ft along the project limits. Project length is 12,209 ft in one direction Original Cost of Sign = 1,634. Estimate includes 36 signs.
H	Identify and repair areas of sidewalk damage, poor drainage, and ADA compliance issues.	Quantities and locations to be determined following ADA inventory. Planning-level cost estimate included. Not shown on design plans.	$ 112,400	$ 44,748	$ 8,950	$ 53,698	$ 8,055	$ 61,752	$ 18,526	$ 80,278	$ 20,069	$ 12,042	$ 112,389	Assumed 5% of project length. Project length is 24,418 ft in both directions with a 5 ft width. 6" concrete is at 66 dollars a SY.
I	Modify timing plans to add Leading Pedestrian Intervals (LPI) at all signal-controlled intersections.	Planning-level cost estimate for new signal timing plan. Should they be needed, add the following costs per location: controller upgrade $13,400, blank out sign $104,800, mast arm upgrade $1,310,400.	$ 70,000	$ 70,000	$ -	$ 70,000	$ -	$ 70,000	$ -	$ 70,000	$ -	$ -	$ 70,000	Flat rate of 70k for the study. Controller upgrade use pay item 671 2 11 at a price of $5,130 ea. Blank out sign use $40,000 ea. Mast Arm upgrade use $500,000 ea.
J	Install wayfinding signs at the intersections with Sheldon Rd. and Hanley Rd., leading to the following destinations: Upper Tampa Bay Trail, parks, YMCA, schools, transit hubs, and Town 'N Country Trail.	Sign assembly content and placement to be determined during final design. Planning-level cost estimate included. Not shown on design plans.	$ 98,500	$ 39,216	$ 7,843	$ 47,059	$ 7,059	$ 54,118	$ 16,235	$ 70,354	$ 17,588	$ 10,553	$ 98,495	Using 700 1 12 assembly. Original Cost of Sign = $1,634. 24 total signs.
	Total Costs for Tier 1:		$ 7,549,900	$ 3,048,128	$ 595,626	$ 3,643,754	$ 536,063	$ 4,179,817	$ 1,232,945	$ 5,412,762	$ 1,335,690	$ 801,414	$ 7,549,866	

	Tier 2	Implementation Notes	Final Cost Estimate	Construction Cost	MOT (20%)	Sub-Total	MOB (15%)	Sub-Total	CONTINGENCY (30%)	Sub-Total	DESIGN (25%)	CEI (15%)	Total Cost	Cost Estimate Notes
A	Install concrete separators to feasible segments of buffered bike lanes.	Install 8 in wide concrete separators instead of flexible posts in locations where there are no conflicts with turning movements. Not shown on design plans.	$ 114,700	$ 45,662	$ 9,132	$ 54,795	$ 8,219	$ 63,014	$ 18,904	$ 81,918	$ 20,480	$ 12,288	$ 114,685	Measured 9340 ft that 8 in wide concrete separators could be applied. 6" concrete is 66 dollars per SY.
B	Modify intersection at Northbridge Blvd. to add crossing on the west side of the intersection.	Elements include decreasing the southwest corner radius, median modifications, crosswalk ramps and markings, and relocated bus stops to far side of crossings.	$ 1,130,200	$ 450,000	$ 90,000	$ 540,000	$ 81,000	$ 621,000	$ 186,300	$ 807,300	$ 201,825	$ 121,095	$ 1,130,220	$450,000 midblock crossing and signal.
C	Install midblock crossing to existing median at Riverwood Blvd.	Traffic study and warrant analysis to be completed. Elements include median modifications, crosswalk ramps and markings, FDOT-standard Midblock Pedestrian Signals (MPS), mast arms, and relocate bus stops to far side of crossings.	$ 1,130,200	$ 450,000	$ 90,000	$ 540,000	$ 81,000	$ 621,000	$ 186,300	$ 807,300	$ 201,825	$ 121,095	$ 1,130,220	$450,000 midblock crossing and signal.
D	Install midblock crossing between Royal Sand Cir. driveways pair.	Traffic study and warrant analysis to be completed. Elements include median modifications, crosswalk ramps and markings, FDOT-standard Midblock Pedestrian Signals (MPS), mast arms, and relocate westbound bus stop to far side of crossing.	$ 1,130,200	$ 450,000	$ 90,000	$ 540,000	$ 81,000	$ 621,000	$ 186,300	$ 807,300	$ 201,825	$ 121,095	$ 1,130,220	$450,000 midblock crossing and signal.
E	Install full traffic signal at Rustic Dr.	Traffic study and warrant analysis to be completed. Elements include median modifications, crosswalk ramps and markings, traffic signal heads, mast arms, and relocate bus stops to far side of crossings.	$ 1,381,400	$ 550,000	$ 110,000	$ 660,000	$ 99,000	$ 759,000	$ 227,700	$ 986,700	$ 246,675	$ 148,005	$ 1,381,380	$550,000 full traffic signal.
F	Install midblock crossing east of JR Manor Dr.	Traffic study and warrant analysis to be completed. Elements include median modifications, crosswalk ramps and markings, traffic signal heads, mast arms, and relocate bus stops to far side of crossings.	$ 1,130,200	$ 450,000	$ 90,000	$ 540,000	$ 81,000	$ 621,000	$ 186,300	$ 807,300	$ 201,825	$ 121,095	$ 1,130,220	$450,000 midblock crossing and signal.
G	Install midblock crossing between Waters Ave Car Wash & Baycare Urgent Care.	Traffic study and warrant analysis to be completed. Elements include median modifications, crosswalk ramps and markings, traffic signal heads, mast arms, and relocate bus stops to far side of crossings.	$ 1,130,200	$ 450,000	$ 90,000	$ 540,000	$ 81,000	$ 621,000	$ 186,300	$ 807,300	$ 201,825	$ 121,095	$ 1,130,220	$450,000 midblock crossing and signal.

H	Install bus stop pads and amenities.	Planning-level cost estimated to add the following bus stop elements: 30 ft x 10 ft concrete pad and typical HART shelter. Individual locations may have increased construction elements dependent on easements or right-of-way required during design phase.	$ 1,398,100	$ 556,644	$ 111,329	$ 667,973	$ 100,196	$ 768,169	$ 230,451	$ 998,619	$ 249,655	$ 149,793	$ 1,398,067	$10,000 for aluminum bus shelter. 15,302 construction cost from the design file. 22 locations.
I	Install raised bike lane through feasible bus stops.	Cost estimate per bus stop location is based on typical configuration from NACTO Urban Transit Design Guide: 30 ft x 6 ft concrete pad, 15 ft x 6 ft concrete ramps, 30 ft curb and gutter, and 30 ft detectable warning. Not shown on design plans.	$ 242,600	$ 96,580	$ 19,316	$ 115,896	$ 17,384	$ 133,280	$ 39,984	$ 173,265	$ 43,316	$ 25,990	$ 242,570	Cost of 6" concrete is 66 dollars per SY and cost of curb is 35 dollars per ft. Concrete Pad is 20 SY and the concrete ramps are 2x 10 SY.
J	Install landscaping with trees to feasible segments of the median to create a boulevard feel.	Feasible areas shown on plans. Tree placement to be determined during final design.	$ 170,500	$ 67,900	$ 13,580	$ 81,480	$ 12,222	$ 93,702	$ 28,111	$ 121,813	$ 30,453	$ 18,272	$ 170,538	Used a lump sum pay item 580 1 2 Landscape Complete - Large Plants. This covers the entire project limits. The construction cost was determined from the FDOT Histrical Averages.
K	Conduct speed study to reduce posted speed limit.	Planning-level cost estimate for required speed study and replacement signage. Not shown on design plans.	$ 76,000	$ 16,340	$ 3,268	$ 19,608	$ 2,941	$ 22,549	$ 6,765	$ 29,314	$ 7,328	$ 4,397	$ 76,040	Flat rate of $35,000 for the study. Using 700 1 12 assembly. Original Cost of Sign = $1,634. 10 total signs.
L	Install bicycle detection at signal-controlled intersections.	Planning-level cost estimate for new microwave detection equipment.	$ 333,200	$ 132,664	$ 26,533	$ 159,197	$ 23,880	$ 183,076	$ 54,923	$ 237,999	$ 59,500	$ 35,700	$ 333,199	Use 1 (660 3 11) at a cost of $4,252 and 2 (660 3 12) at a cost of $12,331 pay items per intersection. 8 intersections.
		Total Costs for Tier 2:	$ 9,367,500	$ 3,715,790	$ 743,158	$ 4,458,948	$ 668,842	$ 5,127,791	$ 1,538,337	$ 6,666,128	$ 1,666,532	$ 999,919	$ 9,367,579	

	Tier 3	Implementation Notes	Final Cost Estimate	Construction Cost	MOT (20%)	Sub-Total	MOB (15%)	Sub-Total	CONTINGENCY (30%)	Sub-Total	DESIGN (25%)	CEI (15%)	Total Cost	Cost Estimate Notes
A	Install lighting at all signalized intersections and crossings.	Planning-level cost estimate for lighting at each intersection and midblock crossing, both existing and those added in Tier 2. Not shown on design plans.	$ 2,109,700	$ 840,000	$ 168,000	$ 1,008,000	$ 151,200	$ 1,159,200	$ 347,760	$ 1,506,960	$ 376,740	$ 226,044	$ 2,109,744	$70,000 for lighting at each crossing based on a previous LRE. 12 crossings.
B	Install pedestrian-scale lighting throughout the corridor.	Planning-level cost estimate for pedestrian-scale lighting on both sides, spaced at 50' on center. Additional right-of-way or easements to be acquired prior to final design. Not shown on design plans.	$ 3,466,000	$ 1,380,000	$ 276,000	$ 1,656,000	$ 248,400	$ 1,904,400	$ 571,320	$ 2,475,720	$ 618,930	$ 371,358	$ 3,466,008	$300,000 per mile based on a previous LRE. 4.6 miles.
C	Remove and reconstruct duplicate driveways.	Coordination and approvals required from adjacent property owners prior to final design. Planning-level cost estimate to reconstruct six 24 ft wide commercial driveways.	$ 75,300	$ 30,000	$ 6,000	$ 36,000	$ 5,400	$ 41,400	$ 12,420	$ 53,820	$ 13,455	$ 8,073	$ 75,348	$5,000 per driveway. 6 locations.
D	Extend median noses to roadway edge to provide pedestrian refuge areas.	Locations noted on plans: Riverwood Blvd., Northbridge Blvd., Rustic Dr. (both sides), Hulsey Rd. (north side), Sand Beach St., Henderson Rd., and Sitka St.	$ 90,000	$ 35,816	$ 7,163	$ 42,979	$ 6,447	$ 49,426	$ 14,828	$ 64,254	$ 16,063	$ 9,638	$ 89,955	Avg. Cost from design file per location is $4,477.
		Total Costs for Tier 3:	$ 5,741,000	$ 2,285,816	$ 457,163	$ 2,742,979	$ 411,447	$ 3,154,426	$ 946,328	$ 4,100,754	$ 1,025,188	$ 615,113	$ 5,741,055	
		Total Costs for All Tiers:	**$ 22,658,400**	**$ 9,049,734**	**$ 1,795,947**	**$ 10,845,681**	**$ 1,616,352**	**$ 12,462,033**	**$ 3,717,610**	**$ 16,179,643**	**$ 4,027,411**	**$ 2,416,446**	**$ 22,658,500**	

	Adjacent & Supplemental Projects	Implementation Notes
A	Convert bike lane along Sheldon Road to buffered/protected bike lanes	Removal of the keyhole bike lanes along Sheldon Rd would also facilitate creation of a protected intersection at Waters.
B	Investigate the opportunity of a north/south bicycle route connector between the Upper Tampa Bay Trail and Town 'N Country Trail.	Route alternatives include Hanley Rd and Pinehurst/Pat/Drycreek as north-south alternative routes to make the connection.
C	Identify additional speed management and traffic calming treatments throughout the corridor to facilitate the desired Target Speed of 25 mph.	Update corridor signal timing coordination to approach desired speeds.
D	Encourage and fund installation of bicycle racks at major commercial, civic or service destinations within the corridor.	N/A
E	Investigate a bike route connection to Memorial Bikeway along Sheldon Rd.	N/A
F	Relocate utility poles out of sidewalk on south side between Riverwood and Northbridge.	N/A
G	Reconstruct all asphalt driveway aprons to be appropriate width, concrete, and include a continuous sidewalk surface.	N/A

APPENDIX D – CAUSEWAY BOULEVARD/LUMSDEN ROAD CORRIDOR DESIGN CONCEPTS

BICYCLE NETWORK PLAN: CORRIDOR DESIGN CONCEPTS

Hillsborough County

Causeway Blvd./W. Lumsden Rd. – S. Falkenburg Rd. to Brandon Pkwy.

January 2023

PREPARED BY:

PATEL, GREENE AND ASSOCIATES
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INTRODUCTION

Committed to improving the mobility and safety of all residents, Hillsborough County, and the Transportation Planning Organization (TPO) have identified, evaluated, and prioritized bicycle facility needs along the County's roadway transportation network. The data-driven methodology addresses the mobility and safety needs of people on bicycles. The resulting plan will assist Hillsborough County in realizing the commitment and desire to provide a safe, connected, and inviting network of bicycle facilities.

The planning process identified four high priority corridors that are geographically dispersed across the county for further evaluation. Review and analysis of each corridor yielded a range of potential project opportunities to add or improve bicycle facilities. The recommended improvements have been grouped into tiers based on priority and screened for feasibility. This design report introduces conceptual design plans, cost estimates, and implementation considerations to construct the recommendations for Causeway Blvd./W. Lumsden Rd. between S. Falkenburg Rd. and Brandon Pkwy.

Causeway Blvd./W. Lumsden Rd. in the project corridor is a six-lane divided roadway in the community of Brandon. The western 2/3 of the corridor is primarily commercial with multi-family residential set back behind the commercial properties. The eastern 1/3 of the corridor is a mix of single- and multi-family residential. The 2.2 miles long corridor has a posted speed limit of 45 mph though observed speeds are significantly higher. The corridor has open drainage and continuous sidewalks at the back of the right-of-way along both sides with the exception of the bridge over Interstate 75 where there are only shoulders and no sidewalks. The median is curbed and restricts left turns to and from many side streets and driveways. The signalized intersections have added single or dual left turn lanes and added right turn lanes, some with striped or curbed slip lanes. Along most of the corridor, the roadway's paved width is consistently wider than the three through lanes in each direction, striped with acceleration/deceleration tapers or blocks-long drop right turn lanes.

The only dedicated bicycle facilities along the corridor are keyhole bike lanes present on the approaching sides of the signalized intersection at Providence Rd. There are no bike lanes upstream of the keyhole sections and bike lanes do not continue on the leaving sides of the intersection. Green conflict area paint is added to the beginning of the keyhole bike lanes, which is over 700 ft upstream of the intersection on the eastbound side. Bike lanes intersect the corridor along Brandon Town Center Dr. (south leg only), Gornto Lake Rd., and The Brandon Parkway Trail begins along that roadway at this project's eastern terminus.

The Hillsborough Area Regional Transit Authority (HART) operates limited transit service along the corridor, with bus stops concentrated on the eastern end. Route 360LX operates along the entire corridor with 60-minute headways Monday-Saturday, but only has stops in the eastbound direction and no stops between Falkenburg Rd. and Providence Rd. Route 25LX operates in both directions between Providence Rd. and Brandon Pkwy., but only operates three westbound morning trips and three eastbound afternoon trips on weekdays. Route 8 crosses the corridor along Gornto Lake Rd. and Route 31 crosses the corridor along Providence Rd.

In addition to serving local bicyclists, the corridor is one of the few crossings of Interstate 75 that is not a limited access highway. The next closest crossings of Interstate 75 are SR 60. where there are bike lanes and sidewalks 1.3 miles to the north or Progress Blvd. with only shoulders 2.2 miles to the south.

RECOMMENDATIONS

The most substantial recommendation to improve conditions for bicyclists is to build continuous asphalt shared use paths along the entire corridor. That includes two alternatives for crossing Interstate 75 where no facilities exist today and replacing the existing sections of sidewalk with widened asphalt path. The recommendations are supportive of the new pathways and safety for all roadway users through intersection modifications, improved bus stops, and the addition of enhanced crossings where the pathways cross side streets and driveways. Additional recommendations add elements to improve the overall safety and comfort of roadway users including updated pavement markings, signage, landscaping, and lighting.

The recommendations have been split into three tiers and are summarized in the tables below. Conceptual design plans showing the recommendations are included in Appendix A.

Table 1: Tier 1 Recommendations

	Recommendation	Implementation Notes	Cost Estimate
A	Install enhanced sidewalk/path crossings at all unsignalized side streets and driveway crossings.	Elements include 12 ft wide concrete approaches, median modifications where existing, markings with combination green/white configuration, W11-15/W11-15P signs, and R1-6a in-pavement signs.	$314,000
B	Modify intersection at Brandon Pkwy to include marked crosswalks on all four legs.	Elements include median modifications, crosswalk ramps, and markings.	$30,600
C	Identify and repair areas of sidewalk damage and ADA compliance issues.	Quantities and locations to be determined following ADA inventory. Planning-level cost estimate included. Not shown on design plans.	$85,000
D	Install wayfinding signage at Brandon Pkwy to: W Brandon Blvd, Brandon High School, and mall	Sign assembly content and placement to be determined during final design. Planning-level cost estimate included.	$24,600
E	Modify timing plans to add Leading Pedestrian Intervals (LPIs) at all signal-controlled intersections.	Planning-level cost estimate for new signal timing plan. Should they be needed, add the following costs per location: controller upgrade $13,400, blank out sign $104,800, mast arm upgrade $1,310,400.	$35,000
F	Install bicycle counter equipment on the Brandon Pkwy Trail.	Generalized cost estimate for permanent counting equipment. Model and location to be determined in design phase. Note that additional funds will be required for ongoing operations, communications service, and maintenance.	$25,800

Table 2: Tier 2 Recommendations

	Recommendation	Implementation Notes	Cost Estimate
A	Install full traffic signal at intersection of Heather Lakes Blvd (south side)/Kensington Ridge Blvd (north side), including a smaller radius at the northwest and southeast corners.	Traffic study and warrant analysis to be completed. Elements include median modifications, concrete sidewalk, curb and gutter, sod, crosswalk ramps and markings, traffic signal heads, and mast arms.	$1,588,600
B	Modify intersection at Brandon Town Center Dr to include marked crosswalks on all four legs, realign sidewalks, and match the number of lanes entering and leaving the intersection to shorten pedestrian crossing distances.	Elements include concrete sidewalk, curb and gutter, sod, crosswalk ramps and markings. NW Corner - narrow pavement to 3 WB lanes leaving intersection. NE corner - narrow pavement to 2 NB lanes leaving intersection. SE corner - narrow pavement to 2 EB lanes leaving intersection.	$165,800
C	Modify intersection at Gornto Lake Rd. to realign sidewalks and match the number of lanes entering and leaving the intersection to shorten pedestrian crossing distances.	Elements include concrete sidewalk, curb and gutter, sod, crosswalk ramps and markings. NW Corner - narrow pavement to 3 WB lanes leaving intersection. NE corner - tighten radius. SE corner - narrow pavement to 3 EB lanes leaving intersection.	$149,200
D	Install bus stop pads, amenities, and connecting sidewalks at: Falkenburg Rd. southeast corner, Paddock Club Dr. northwest and southeast corners, and Brandon Pkwy northwest corner.	Planning-level cost estimated to add the following bus stop elements: 30 ft x 10 ft concrete pad, typical HART shelter, curb and gutter, 6 ft wide concrete sidewalk, and grading/drainage modifications.	$317,700
E.1	Install shared use path across Interstate 75.	Alt 1 - Install pathway and separate bridge on alignment to the south of the roadway bridges. Planning-level cost estimate includes pedestrian bridge 750' long and 14' wide, plus trail approaches on each side.	$7,836,200
E.2		Alt 2 - Install new pathway and reconfigure roadway to continue pathways across existing bridges on both sides of the roadway. Planning-level cost estimate includes bridge widening on each side 750' long and 12' wide, plus pathway on all four approaches.	$12,959,900* **Amount excluded from Tier 2 and Corridor Totals in Table 5.*
F	Install landscaping with trees where possible.	Feasible areas shown on plans. Tree placement to be determined during final design.	$170,500

G	Install bike lane markings through intersections and merges, including green through conflict areas.	Typical configuration is to continue the bike lane width through the intersection with 2 ft-4 ft skip through conflict areas, adding green within those skips and 40 ft solid green before and after conflict areas. Note that green is not included in the markings interior to the Providence Rd. intersection because there are no conflicting movements due to the islands and the signal phasing.	$82,700
H	Install R10-6a "Stop Here on Red" signs at all signalized intersections to improve right turning driver yielding compliance.	Sign placement to be determined during final design. Planning-level cost estimate included for four sign assemblies per signalized intersection.	$25,700
I	Conduct speed study to reduce posted speed limit.	Planning-level cost estimate for required speed study and replacement signage. Not shown on design plans.	$76,000
J	Install bicycle detection at signal-controlled intersections.	Planning-level cost estimate for new microwave detection equipment.	$83,300

Table 3: Tier 3 Recommendations

	Recommendation	Implementation Notes	Cost Estimate
A	Install asphalt path on both sides of the study corridor to replace the existing sidewalks. Segments east of the I-75 bridge and pathways in Tier 2.	Estimate includes new 12' asphalt pathway, utility relocations, grading, drainage, sod, and removal of existing sidewalk.	$6,143,000
B	Install lighting at all signalized intersections and crossings.	Planning-level cost estimate for lighting at each intersection and crossing, both existing and added in Tier 2. Not shown on design plans.	$3,164,600
C	Install pedestrian-scale lighting throughout the corridor.	Planning-level cost estimate for pedestrian-scale lighting on both sides, spaced at 50' on center. Additional right-of-way or easements to be acquired prior to final design. Not shown on design plans.	$2,637,200

COST ESTIMATES SUMMARY

Cost estimates for each recommendation are included above in Tables 1-3. The estimates have been developed using pay items and expected unit costs sourced from District 7 of the Florida Department of Transportation, the Department's Long Range Estimating (LRE) system, and engineering judgement. The planning-level estimates include percentage-based multipliers applied to the construction costs as shown in Table 4. Any needed right-of-way acquisition is not included in the estimates. An overview of the cost estimates aggregated by tier are shown in Table 5. Cost estimate details for each recommendation are provided in Appendix B.

Table 4: Cost Estimates Assumptions

Cost Element	Multiplier
Maintenance of Traffic (MOT)	20%
Mobilization (MOB)	15%
Contingency	30%
Design	25%
CEI	15%

Table 5: Cost Estimates by Tier

Implementation Tier	Cost Estimates
Tier 1	$515,000
Tier 2	$10,495,700
Tier 3	$11,944,800
Corridor Total	$22,955,500

IMPLEMENTATION GUIDANCE

The recommendations for bicycle facilities on the corridor were developed in collaboration with Hillsborough County staff and subsequently screened for feasibility. The screening for feasibility and development of design plans included conformance with the applicable local, state, and federal design standards and guidance. The designs applied engineering judgement and contemporary best practices for the safety of all users within the right-of-way. Implementation notes are included for each recommendation in the tables above. The following content identifies general issues and considerations to be addressed along the corridor as the recommendations are advanced through the forthcoming stages of design and implementation.

I-75 PATHWAY CROSSING

Two alternative alignments are identified for continuing the pathway connections across I-75. Additional data and analysis are needed to further develop and evaluate the alternatives including topographical survey, structural analysis, and soil analysis.

RIGHT-OF-WAY, DRAINAGE, AND UTILITIES

The right-of-way information used to develop the design concept is based on Hillsborough County's GIS data and field investigation. The next stage of project development will require survey to verify property lines, topography, and utilities.

Based on the available property line data, much of the existing sidewalks east of Interstate 75 are placed either at the outside edges of the public right-of-way or are located on private property. Where the existing sidewalks appear to be outside the public right-of-way, the private property lines also contain substantial portions of the open drainage along the roadway.

To minimize property impacts, the pathway alignments shown generally follow the existing sidewalks. The segments that will replace existing sidewalk outside the public right-of-way will require additional right-of-way acquisition or easements, as will segments where the pathway alignment encroaches into the adjacent parcel rather than modifying the existing open drainage. The width of right-of-way needed will be greater than shown where required for the relocation of impacted utilities or to tie the pathway shoulders to the existing grade, otherwise additional grading and railings will be required.

Utility relocations, adjustment, or additions may be required to install the recommended traffic signal and lighting.

ADDITIONAL CONSIDERATIONS

ADA-compliant curb ramps are to be included at all crosswalks. They are not specifically shown on the conceptual design plans, though they are included in the cost estimate for the corresponding recommendation. The width of each curb ramp and detectable warning pads are to match the corresponding path or sidewalk width.

A speed study will be required prior to advancing the recommendation to lower the posted speed limit.

Field assessment of ADA compliance is required to identify any needed associated modifications.

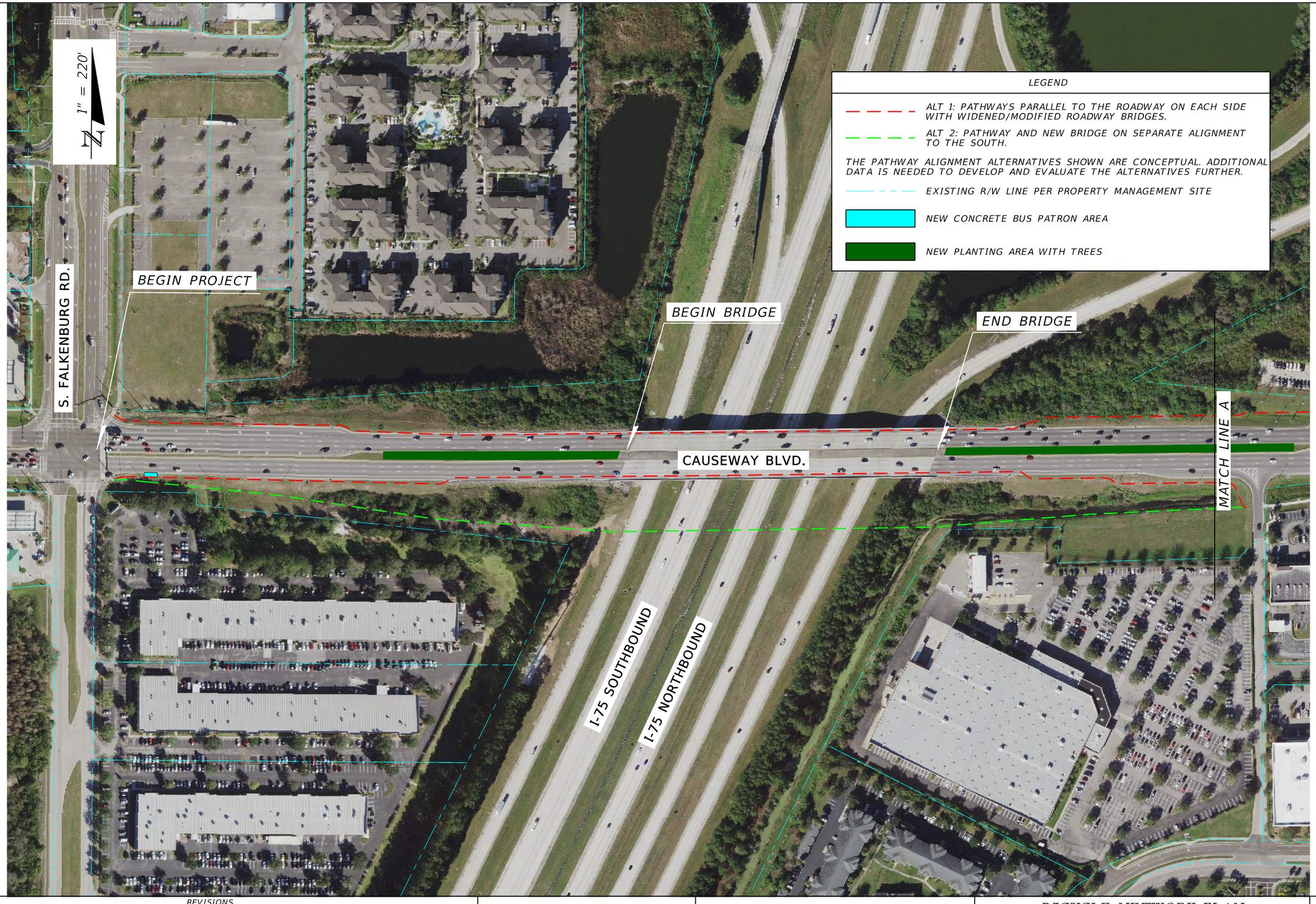
The addition of Leading Pedestrian Intervals (LPI) and bicycle detection equipment to intersections with existing traffic signals may require replacement of the traffic controller cabinet if required to enable that capability.

The recommended lighting will require assessment of existing lighting conditions, impacts to trees, and right-of-way once the grading design has been established.

All pavement markings should be thermoplastic.

Appendix A

Design Concept Plans



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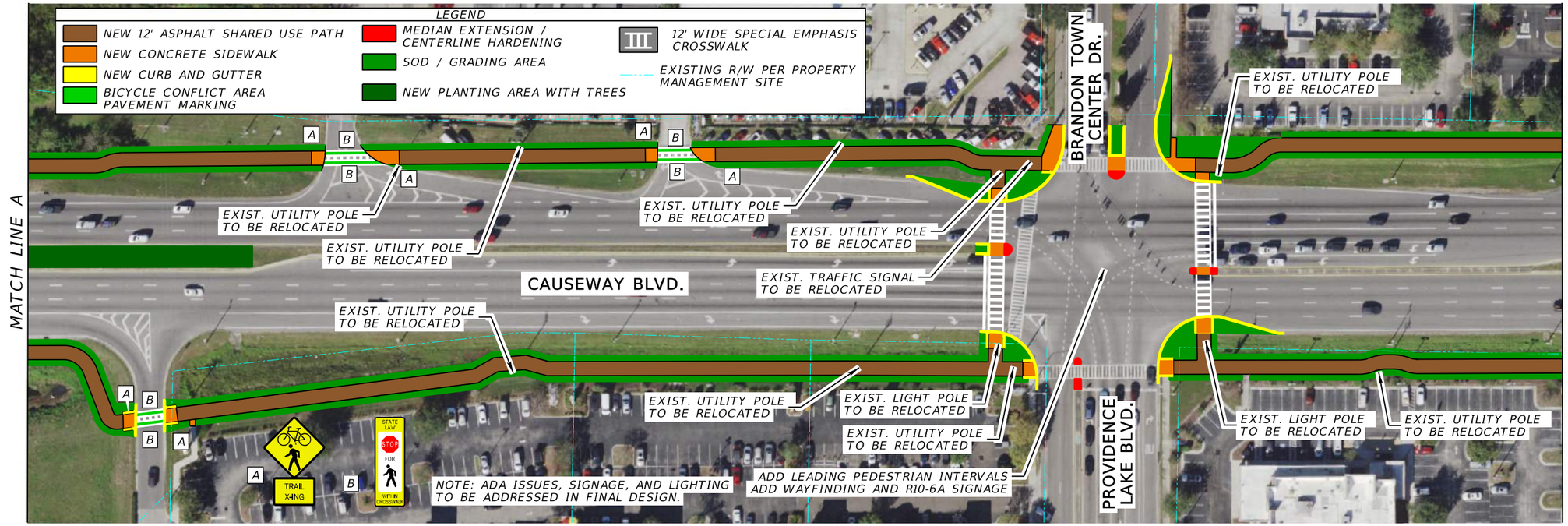
PATEL, GREENE & ASSOCIATES, LLC
12570 TELECOM DRIVE
TEMPLE TERRACE, FL 33637
PHONE: 813-978-3100
LUCAS CRUSE

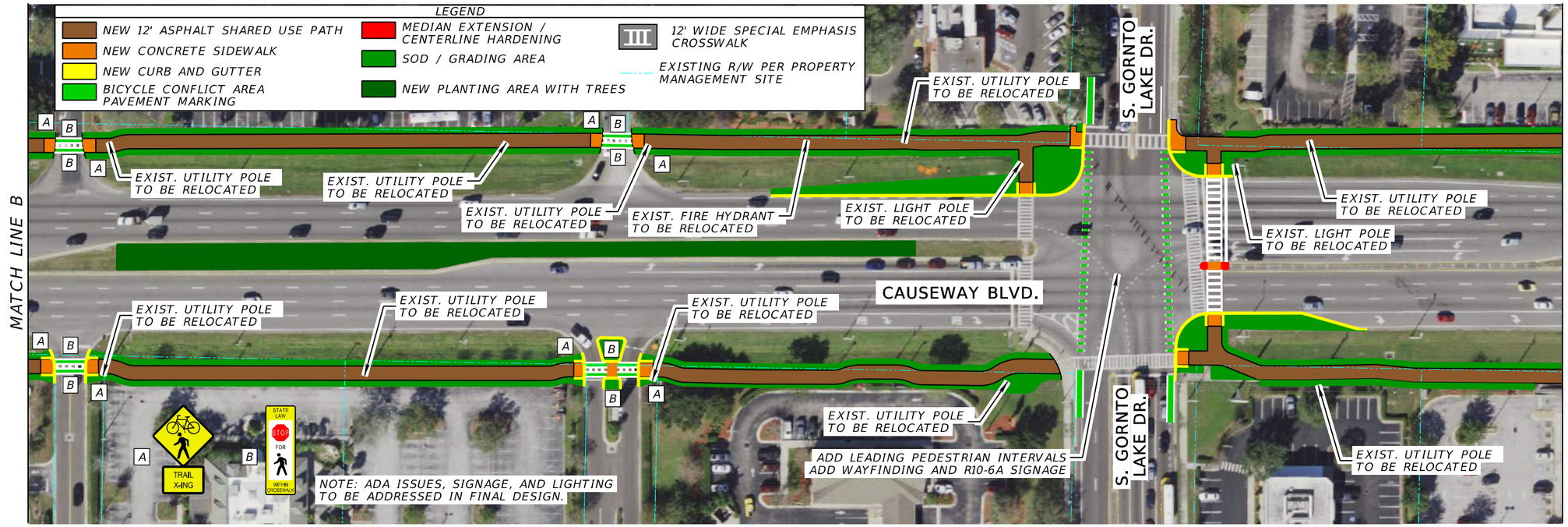
HILLSBOROUGH COUNTY
601 E. KENNEDY BLVD. TAMPA, FLORIDA 33602

BICYCLE NETWORK PLAN

CAUSEWAY / LUMSDEN PLANS

SHEET NO. 1





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BICYCLE NETWORK PLAN

CAUSEWAY / LUMSDEN PLANS

SHEET NO. 2

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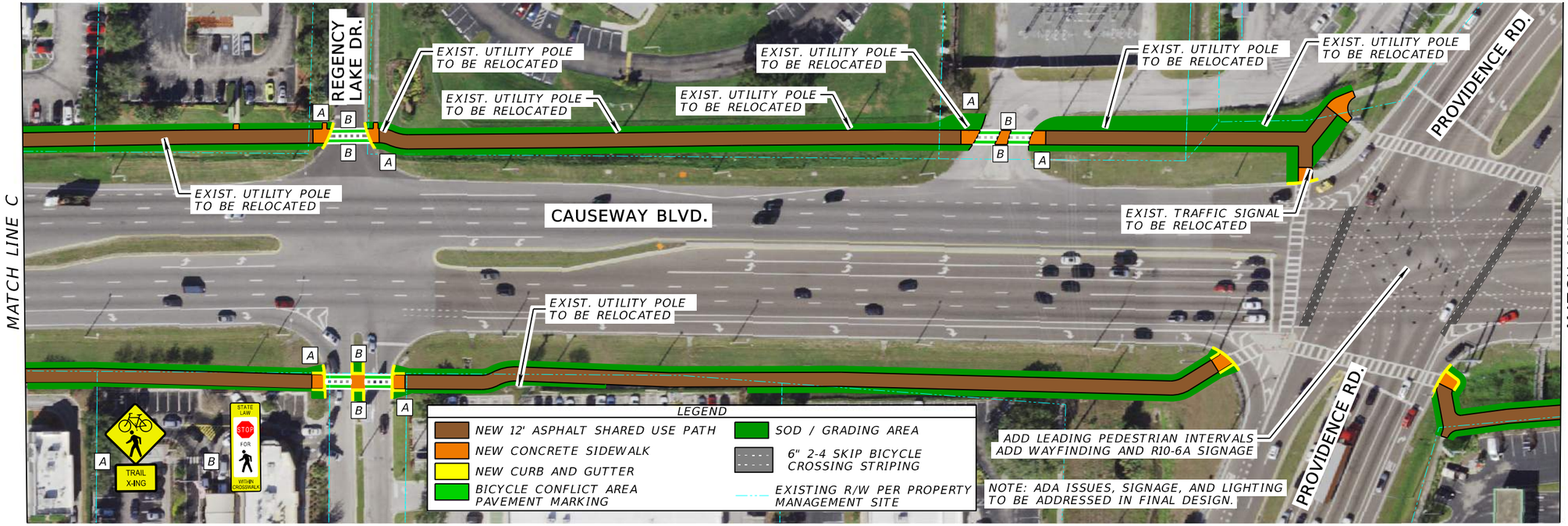

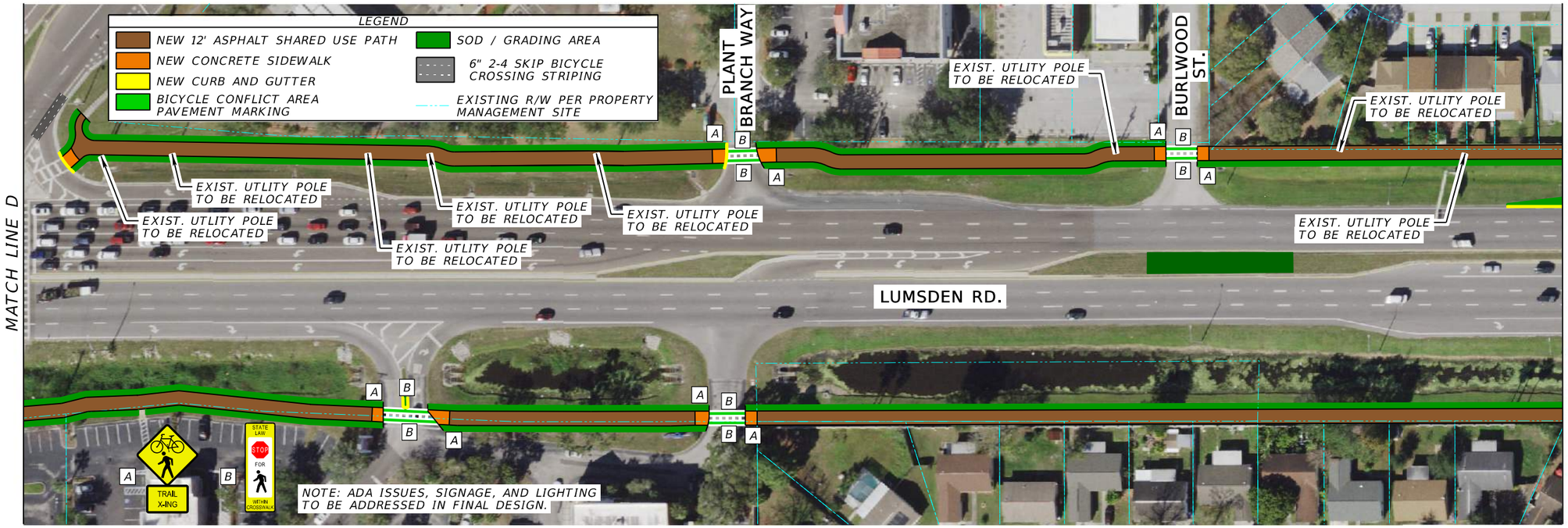

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BICYCLE NETWORK PLAN

CAUSEWAY / LUMSDEN PLANS

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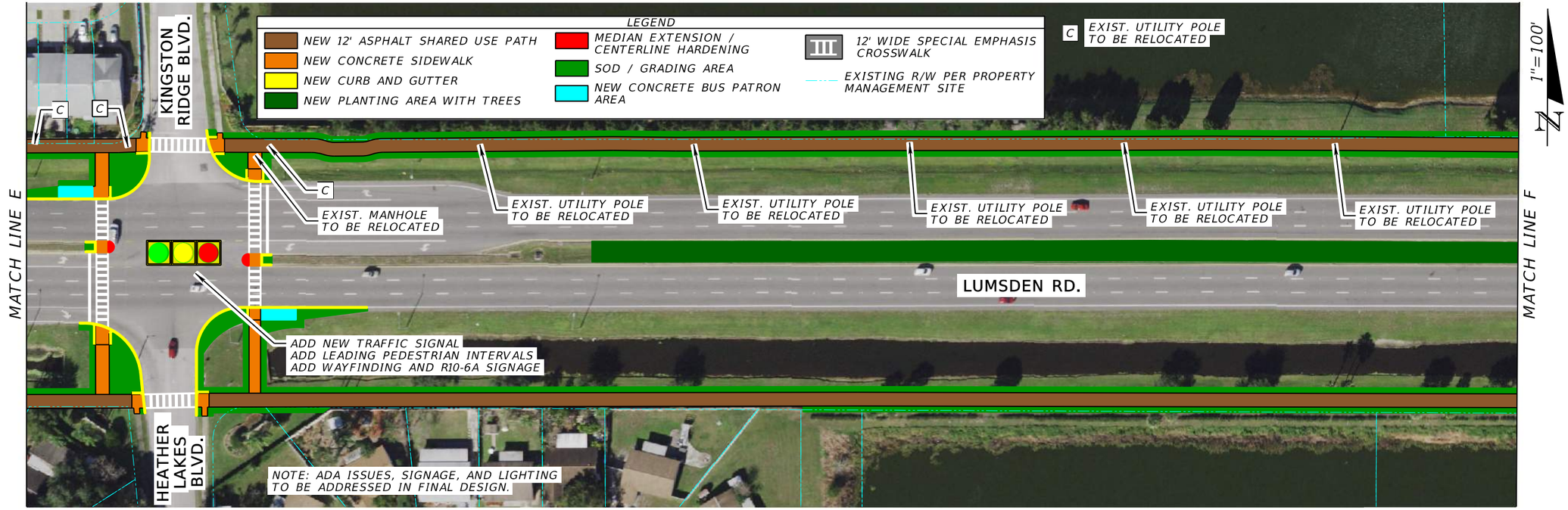

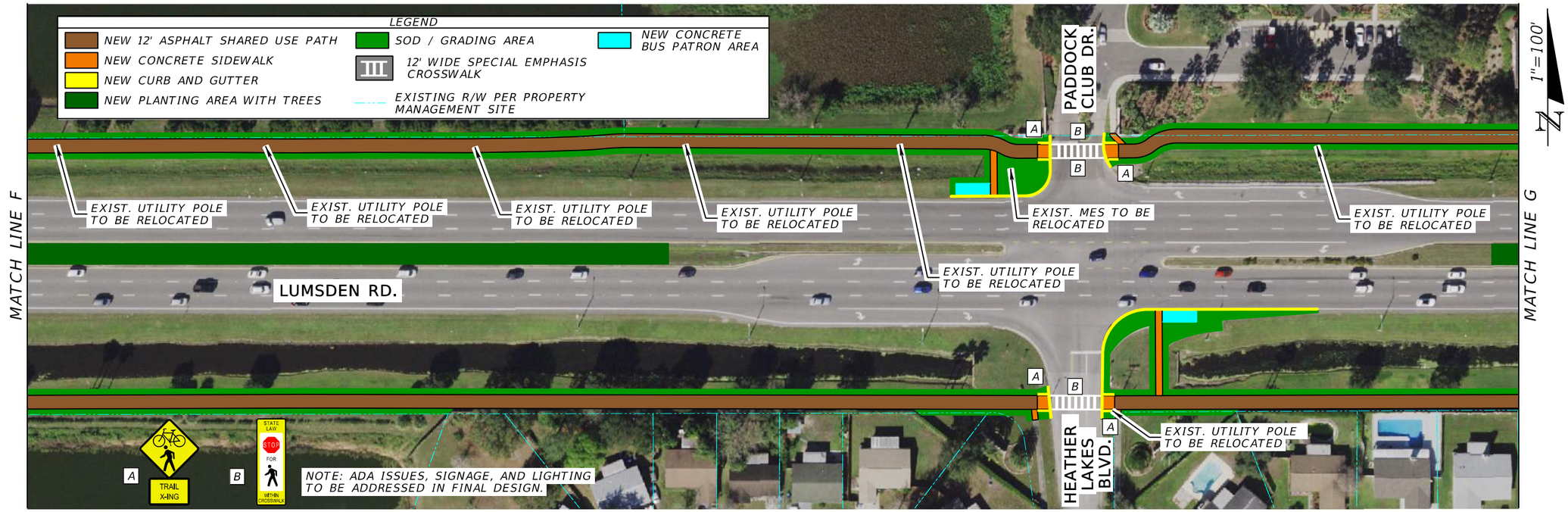

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BICYCLE NETWORK PLAN

CAUSEWAY / LUMSDEN PLANS

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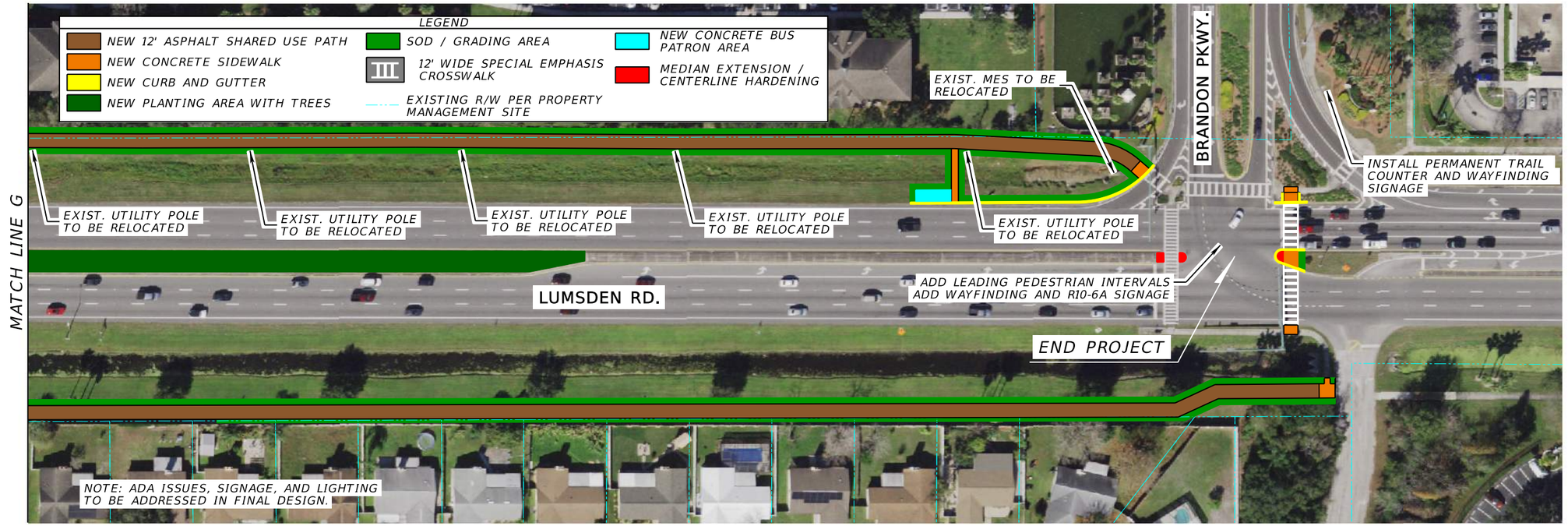

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BICYCLE NETWORK PLAN

CAUSEWAY / LUMSDEN PLANS

SHEET NO. 5

Appendix B

Cost Estimates Details

Hillsborough County Bike Network - Conceptual Design Notes
Causeway Blvd / W. Lumsden Road – S. Falkenburg Rd to Brandon Pkwy

	Tier 1	Implementation Notes	Final Cost Estimate	Construction Cost	MOT (20%)	Sub-Total	MOB (15%)	Sub-Total	CONTINGENCY (30%)	Sub-Total	DESIGN (25%)	CEI (15%)	Total Cost	Cost Estimate Notes
A	Install enhanced sidewalk/path crossings at all unsignalized side streets and driveway crossings.	Elements include 12 ft wide concrete approaches, median modifications where existing, markings with combination green/white configuration, W11-15/W11-15P signs, and R1-6a in-pavement signs.	$ 314,000	$ 125,008	$ 25,002	$ 150,010	$ 22,501	$ 172,511	$ 51,753	$ 224,264	$ 56,066	$ 33,640	$ 313,970	Construction cost for markings per location is $3,080 from the design file. Using 700 1 12 four sign assmblies at $1,634 ea. 13 locations.
B	Modify intersection at Brandon Pkwy to include marked crosswalks on all four legs.	Elements include median modifications, crosswalk ramps, and markings.	$ 30,600	$ 12,177	$ 2,435	$ 14,612	$ 2,192	$ 16,804	$ 5,041	$ 21,846	$ 5,461	$ 3,277	$ 30,584	Obtained the construction cost from the design file.
C	Identify and repair areas of sidewalk damage and ADA compliance issues.	Quantities and locations to be determined following ADA inventory. Planning-level cost estimate included. Not shown on design plans.	$ 85,000	$ 33,858	$ 6,772	$ 40,630	$ 6,094	$ 46,724	$ 14,017	$ 60,741	$ 15,185	$ 9,111	$ 85,038	Assumed 5% of project length. Project length is 18,480 ft in both directions with a 5 ft width. 6" concrete is 66 dollars a SY.
D	Install wayfinding signage at Brandon Pkwy to: W Brandon Blvd, Brandon High School, and mall	Sign assembly content and placement to be determined during final design. Planning-level cost estimate included.	$ 24,600	$ 9,804	$ 1,961	$ 11,765	$ 1,765	$ 13,530	$ 4,059	$ 17,588	$ 4,397	$ 2,638	$ 24,624	Using 700 1 12 assembly. Original Cost of Sign = $1,634. 6 total signs.
E	Modify timing plans to add Leading Pedestrian Intervals (LPIs) at all signal-controlled intersections.	Planning-level cost estimate for new signal timing plan. Should they be needed, add the following costs per location: controller upgrade $13,400, blank out sign $104,800, mast arm upgrade $1,310,400.	$ 35,000	$ 35,000	$ -	$ 35,000	$ -	$ 35,000	$ -	$ 35,000	$ -	$ -	$ 35,000	Flat rate of 35k for the study. Controller upgrade use pay item 671 2 11 at a price of $5,130 ea. Blank out sign use $40,000 ea. Mast Arm upgrade use $500,000 ea.
F	Install bicycle counter equipment on the Brandon Pkwy Trail.	Generalized cost estimate for two permanent counters. Model and location to be determined in design phase. Note that additional funds will be required for ongoing operations, communications service, and maintenance.	$ 25,800	$ 15,000	$ -	$ 15,000	$ 2,250	$ 17,250	$ 5,175	$ 22,425	$ -	$ 3,364	$ 25,789	Roadsys typical counter pedestal, pneumatic tubes, grout estimated at $7,500 per location. Self contained and off street, so no MOT or design cost. Two locations.
		Total Costs for Tier 1:	$ 515,000	$ 230,847	$ 36,169	$ 267,016	$ 34,802	$ 301,819	$ 80,046	$ 381,865	$ 81,110	$ 52,030	$ 515,004	

	Tier 2	Implementation Notes	Final Cost Estimate	Construction Cost	MOT (20%)	Sub-Total	MOB (15%)	Sub-Total	CONTINGENCY (30%)	Sub-Total	DESIGN (25%)	CEI (15%)	Total Cost	Cost Estimate Notes
A	Install full traffic signal at intersection of Heather Lakes Blvd (south side)/Kensington Ridge Blvd (north side), including a smaller radius at the northwest and southeast corners.	Traffic study and warrant analysis to be completed. Elements include median modifications, concrete sidewalk, curb and gutter, sod, crosswalk ramps and markings, traffic signal heads, and mast arms.	$ 1,588,600	$ 632,500	$ 126,500	$ 759,000	$ 113,850	$ 872,850	$ 261,855	$ 1,134,705	$ 283,676	$ 170,206	$ 1,588,587	$550,000 full traffic signal. Added 15% for tightened radii
B	Modify intersection at Brandon Town Center Dr to include marked crosswalks on all four legs, realign sidewalks, and match the number of lanes entering and leaving the intersection to shorten pedestrian crossing distances.	Elements include concrete sidewalk, curb and gutter, sod, crosswalk ramps and markings. NW Corner - narrow pavement to 3 WB lanes leaving intersection. NE corner - narrow pavement to 2 NB lanes leaving intersection. SE corner - narrow pavement to 2 EB lanes leaving intersection.	$ 165,800	$ 65,995	$ 13,199	$ 79,194	$ 11,879	$ 91,073	$ 27,322	$ 118,395	$ 29,599	$ 17,759	$ 165,753	Obtained the construction cost from the design file.
D	Modify intersection at Gornto Lake Rd. to realign sidewalks and match the number of lanes entering and leaving the intersection to shorten pedestrian crossing distances.	Elements include concrete sidewalk, curb and gutter, sod, crosswalk ramps and markings. NW Corner - narrow pavement to 3 WB lanes leaving intersection. NE corner - tighten radius. SE corner - narrow pavement to 3 EB lanes leaving intersection.	$ 149,200	$ 59,396	$ 11,879	$ 71,275	$ 10,691	$ 81,966	$ 24,590	$ 106,556	$ 26,639	$ 15,983	$ 149,178	Obtained the construction cost from the design file for Brandon Town Center Dr. with assumed 10% reduction
D	Install bus stop pads, amenities, and connecting sidewalks at: Falkenburg Rd. southeast corner, Paddock Club Dr. northwest and southeast corners, and Brandon Pkwy northwest corner.	Planning-level cost estimated to add the following bus stop elements: 30 ft x 10 ft concrete pad, typical HART shelter, curb and gutter, 6 ft wide concrete sidewalk, and grading/drainage modifications.	$ 317,700	$ 126,510	$ 25,302	$ 151,812	$ 22,772	$ 174,584	$ 52,375	$ 226,959	$ 56,740	$ 34,044	$ 317,743	$10,000 for aluminum bus shelter. 15,302 construction cost from the design file. 5 locations.
E.1	Install shared use path across Interstate 75.	Alt 1 - Install pathway and separate bridge on alignment to the south of the roadway bridges. Planning-level cost estimate includes pedestrian bridge 750' long and 14' wide, plus trail approaches on each side.	$ 7,836,200	$ 3,120,000	$ 624,000	$ 3,744,000	$ 561,600	$ 4,305,600	$ 1,291,680	$ 5,597,280	$ 1,399,320	$ 839,592	$ 7,836,192	Used 240 dollars per sf with a bridge length of 750 and a width of 14 ft. Additional 300,000 per trail approach proportional to cost for trail in Tier 3-A. One structure, two approaches
E.2		Alt 2 - Install new pathway and reconfigure roadway to continue pathways across existing bridges on both sides of the roadway. Planning-level cost estimate includes bridge widening on each side 750' long and 12' wide, plus pathway on all four approaches. ***Amount excluded from Tier 2 and Corridor Totals.*	$ 12,959,900	$ 5,160,000	$ 1,032,000	$ 6,192,000	$ 928,800	$ 7,120,800	$ 2,136,240	$ 9,257,040	$ 2,314,260	$ 1,388,556	$ 12,959,856	Used 220 dollars per sf with a bridge length of 750 and a width of 14 ft. Additional 300,000 per trail approach proportional to Tier 3-A. Two structures, four approaches
F	Install landscaping with trees where possible.	Feasible areas shown on plans. Tree placement to be determined during final design.	$ 170,500	$ 67,900	$ 13,580	$ 81,480	$ 12,222	$ 93,702	$ 28,111	$ 121,813	$ 30,453	$ 18,272	$ 170,538	Used a lump sum pay item 580 1 2 Landscape Complete - Large Plants. This covers the entire project limits. The construction cost was determined from the FDOT Histrical Averages.
G	Install bike lane markings through intersections and merges, including green through conflict areas.	Typical configuration is to continue the bike lane width through the intersection with 2 ft-4 ft skip through conflict areas, adding green within those skips and 40 ft solid green before and after conflict areas. Note that green is not included in the markings interior to the Providence Rd. intersection because there are no conflicting movements due to the islands and the signal phasing.	$ 82,700	$ 32,918	$ 6,584	$ 39,502	$ 5,925	$ 45,427	$ 13,628	$ 59,055	$ 14,764	$ 8,858	$ 82,677	Obtained the construction cost from the design file.

H	Install R10-6a "Stop Here on Red" signs at all signalized intersections to improve right turning driver yielding compliance.	Sign placement to be determined during final design. Planning-level cost estimate included for four sign assemblies per signalized intersection.	$ 25,700	$ 10,240	$ 2,048	$ 12,288	$ 1,843	$ 14,131	$ 4,239	$ 18,371	$ 4,593	$ 2,756	$ 25,719	Using 700 1 11 assembly. Original Cost of Sign = $512. 24 total signs.
I	Conduct speed study to reduce posted speed limit.	Planning-level cost estimate for required speed study and replacement signage. Not shown on design plans.	$ 76,000	$ 16,340	$ 3,268	$ 19,608	$ 2,941	$ 22,549	$ 6,765	$ 29,314	$ 7,328	$ 4,397	$ 76,040	Flat rate of $35,000 for the study. Using 700 1 12 assembly. Original Cost of Sign = $1,634. 10 total signs.
J	Install bicycle detection at signal-controlled intersections.	Planning-level cost estimate for new microwave detection equipment.	$ 83,300	$ 33,166	$ 6,633	$ 39,799	$ 5,970	$ 45,769	$ 13,731	$ 59,500	$ 14,875	$ 8,925	$ 83,300	Use 1 (660 3 11) at a cost of $4,252 and 2 (660 3 12) at a cost of $12,331 pay items per intersection. 2 intersections.
		Total Costs for Tier 2:	$ 10,495,700	$ 9,324,965	$ 1,864,993	$ 11,189,957	$ 1,678,494	$ 12,868,451	$ 3,860,535	$ 16,728,986	$ 4,182,247	$ 2,509,348	$ 23,455,581	

	Tier 3	Implementation Notes	Final Cost Estimate	Construction Cost	MOT (20%)	Sub-Total	MOB (15%)	Sub-Total	CONTINGENCY (30%)	Sub-Total	DESIGN (25%)	CEI (15%)	Total Cost	Cost Estimate Notes
A	Install asphalt path on both sides of the study corridor to replace the existing sidewalks. Segments east of the I-75 bridge and pathways in Tier 2.	Estimate includes new 12' asphalt pathway, utility relocations, grading, drainage, sod, and removal of existing sidewalk.	$ 6,143,000	$ 2,445,850	$ 489,170	$ 2,935,020	$ 440,253	$ 3,375,273	$ 1,012,582	$ 4,387,855	$ 1,096,964	$ 658,178	$ 6,142,997	Obtained the construction cost from the design file.
B	Install lighting at all signalized intersections and crossings.	Planning-level cost estimate for lighting at each intersection and crossing, both existing and added in Tier 2. Not shown on design plans.	$ 3,164,600	$ 1,260,000	$ 252,000	$ 1,512,000	$ 226,800	$ 1,738,800	$ 521,640	$ 2,260,440	$ 565,110	$ 339,066	$ 3,164,616	$70,000 for lighting at each crossing based on a previous LRE. 18 crossings.
C	Install pedestrian-scale lighting throughout the corridor.	Planning-level cost estimate for pedestrian-scale lighting on both sides, spaced at 50' on center. Additional right-of-way or easements to be acquired prior to final design. Not shown on design plans.	$ 2,637,200	$ 1,050,000	$ 210,000	$ 1,260,000	$ 189,000	$ 1,449,000	$ 434,700	$ 1,883,700	$ 470,925	$ 282,555	$ 2,637,180	$300,000 per mile based on a previous LRE. 3.5 miles.
		Total Costs for Tier 3:	$ 11,944,800	$ 4,755,850	$ 951,170	$ 5,707,020	$ 856,053	$ 6,563,073	$ 1,968,922	$ 8,531,995	$ 2,132,999	$ 1,279,799	$ 11,944,793	
		Total Costs for All Tiers:	**$ 22,955,500**	**$ 14,311,662**	**$ 2,852,332**	**$ 17,163,994**	**$ 2,569,349**	**$ 19,733,343**	**$ 5,909,503**	**$ 25,642,846**	**$ 6,396,355**	**$ 3,841,177**	**$ 35,915,378**	

	Adjacent & Supplemental Projects	Implementation Notes
A	S. Falkenburg Rd, Providence Rd, S GorntoLakes Rd, Provident Lakes Blvd - Convert Bike Lane to Buffered/Protected Bike lanes	Coincident with those changes, remove the keyhole bike lanes from Lumsden where the bike lanes are not anticipated to continue to each side of the intersections.
B	Identify additional speed management and traffic calming treatments throughout the corridor to facilitate the desired Target Speed of 35 MPH	Corridor signal timing coordination to approach desired speeds. Remove accel/decel tapers along roadway edge to moderate speeds.
C	Encourage and fund installation of bicycle racks at major commercial, civic or service destinations within the corridor	N/A
D	Providence Rd - remove bike lanes and move curbs in, re-using the gained ROW width for sidepaths and trees	North of Lumsden - reconfigure Samuel Rd. intersection. Remove right turn lanes on east side.
E	Regency Lake Dr and similar locations - narrow pavement to have same number of lanes entering and leaving	Add right turn lanes downstream of intersection, rather than within the intersections.

APPENDIX E – SHELL POINT ROAD CORRIDOR DESIGN CONCEPTS

BICYCLE NETWORK PLAN: CORRIDOR DESIGN CONCEPTS

Hillsborough County

Shell Point Rd. – US Highway 41 to 24th St. NE

January 2023

PREPARED BY:

PATEL, GREENE AND ASSOCIATES
12570 Telecom Drive
Temple Terrace, FL 33637

Table of Contents

List of Appendices

INTRODUCTION

Committed to improving the mobility and safety of all residents, Hillsborough County, and the Transportation Planning Organization (TPO) have identified, evaluated, and prioritized bicycle facility needs along the County's roadway transportation network. The data-driven methodology addresses the mobility and safety needs of people on bicycles. The resulting plan will assist Hillsborough County in realizing the commitment and desire to provide a safe, connected, and inviting network of bicycle facilities.

The planning process identified four high priority corridors that are geographically dispersed across the county for further evaluation. Review and analysis of each corridor yielded a range of potential project opportunities to add or improve bicycle facilities. The recommended improvements have been grouped into tiers based on priority and screened for feasibility. This design report introduces conceptual design plans, cost estimates, and implementation considerations to construct the recommendations for Shell Point Rd. between US Highway 41 and 24th St. NE.

Shell Point Rd. in the project corridor is a two-lane roadway in the community of Ruskin. The corridor is primarily residential with commercial clusters at each end. The posted speed limit is 40 mph with open drainage and intermittent sidewalks. There is a cluster of school campuses at the eastern end of the corridor where there is curb and gutter and a concrete pathway along the north side. The 2.0 miles long segment is intermittently widened to add turn lanes at intersections and destinations, and there is a railroad crossing near the middle of the corridor.

There are no dedicated bicycle facilities and no fixed route transit service along the corridor. In addition to serving local bicyclists, the corridor connects several major attractors for bicyclists. To the west is the Gulf of Mexico, the mouth of the Little Manatee River, and Bahia Beach Nature Preserve. To the east is the South Coast Greenway Trail, a segment of the Southwest Coastal Regional Trail that connects Tampa Bay to Naples and is a link of the statewide SUN Trail network.

RECOMMENDATIONS

The primary recommendation to improve conditions for bicyclists is to build a continuous concrete shared use path along the north side of the roadway. Most of the recommendations are supportive of the new pathway and safety for all roadway users through a reduction of traffic speeds. The recommendations improve access to the new pathway with the addition of enhanced crossings and selected segments of sidewalks. Additional recommendations add elements to improve the overall safety and comfort of roadway users including updated pavement markings, signage, landscaping, and lighting.

The recommendations have been split into three tiers and are summarized in the tables below. Conceptual design plans showing the recommendations are included in Appendix A.

Table 1: Tier 1 Recommendations

	Recommendation	Implementation Notes	Cost Estimate
A	Install edge stripe to narrow the travel lanes to 10 ft and encourage slower speeds.	Water-blast existing edge stripe. Add new edge stripe to establish consistent 10 ft travel lanes as measured from the centerline. Not shown on design plans.	$53,100

B	Install school zone beacons, markings, and signage to include Thompson Elementary School at 200 ft from school grounds per the applicable County and MUTCD standards.	Sign assembly content and placement to be determined during final design. Planning-level cost estimate included.	$81,100
C	Install high visibility pedestrian crossing markings at all intersections, midblock crossings, and major driveways.	Locations shown on design plans.	$19,300
D	Install bike lane markings through intersection at US 41, including green through conflict areas and in bike boxes.	Need concurrence and coordination with FDOT. Typical configuration is to continue the bike lane width with 2 ft-4 ft skip through conflict areas, adding green within those skips and 40 ft solid green before and after conflict areas. These modifications should be done at the time of resurfacing, though not included in cost estimate.	$68,900
E	Install wayfinding signage at US 41, Interchange St, and 24th St NE to the following destinations: South Coast Trail, schools, and Firehouse Cultural Center.	Sign assembly content and placement to be determined during final design. Planning-level cost estimate included.	$98,500

Table 2: Tier 2 Recommendations

	Recommendation	Implementation Notes	Cost Estimate
A	Install concrete shared use path along the north side of the corridor.	Estimate includes new 12 ft wide concrete pathway, concrete driveway aprons, utility relocations, curb and gutter, grading, drainage, sod, and removal of existing sidewalk. Narrow right-of-way and open drainage will require property owner coordination.	$8,637,600
B	Install enhanced crosswalk with RRFB at 2nd St, to include missing segment of sidewalk on south side of the block.	Posted speed limit to be reduced to 35 mph prior to RRFB installation. Elements include RRFB equipment, concrete sidewalk, curb and gutter, sod, crosswalk ramps, and markings.	$191,700
C	Install enhanced crosswalk with RRFB at 6th St.	Posted speed limit to be reduced to 35 mph prior to RRFB installation. Elements include RRFB equipment, concrete sidewalk, curb and gutter, sod, crosswalk ramps, and markings.	$50,200

D	Install enhanced crosswalk with RRFB and median refuge at 15th St.	Posted speed limit to be reduced to 35 mph prior to RRFB installation. Elements include median refuge, RRFB equipment, concrete sidewalk, curb and gutter, sod, crosswalk ramps, and markings.	$100,500
E	Install enhanced crosswalk with RRFB at 21st St.	Posted speed limit to be reduced to 35 mph prior to RRFB installation. Elements include RRFB equipment, concrete sidewalk, curb and gutter, sod, crosswalk ramps, and markings.	$50,200
F	Install landscaping with trees where possible.	Feasible areas shown on plans. Tree placement to be determined during final design.	$170,500
G	Conduct speed study to reduce posted speed limit.	Planning-level cost estimate for required speed study and replacement signage. Not shown on design plans.	$76,000
H	Install bicycle detection at signal-controlled intersection with US 41.	Need concurrence and coordination with FDOT. Planning-level cost estimate for new microwave detection equipment.	$41,600
I	Install barriers, signage, and markings at the railroad crossing following the current design standards.	Need concurrence and coordination with the railroad owner. Elements include barrier arms, signage, and markings.	$131,367

Table 3: Tier 3 Recommendations

	Recommendation	Implementation Notes	Cost Estimate
A	Install sidewalk on south side of E Shell Point Rd. between 6th St and Interchange St.	Elements include 6' wide concrete sidewalk, concrete driveway aprons, curb and gutter, sod, crosswalk ramps, and markings.	$692,300

B	Install enhanced crosswalk with RRFB at Interchange St.	Posted speed limit to be reduced to 35 mph prior to RRFB installation. Elements include RRFB equipment, concrete sidewalk, curb and gutter, sod, crosswalk ramps, and markings.	$50,200
C	Install lighting at crossings.	Planning-level cost estimate for lighting at all intersections and crossings added in Tier 2. Not shown on design plans.	$1,230,700
D	Install pedestrian-scale lighting throughout the corridor.	Planning-level cost estimate for pedestrian-scale lighting along pathway added in Tier 2 to be spaced at 50' on center. Additional right-of-way or easements to be acquired prior to final design. Not shown on design plans.	$2,938,600

COST ESTIMATES SUMMARY

Cost estimates for each recommendation are included above in Tables 1-3. The estimates have been developed using pay items and expected unit costs sourced from District 7 of the Florida Department of Transportation, the Department's Long Range Estimating (LRE) system, and engineering judgement. The planning-level estimates include percentage-based multipliers applied to the construction costs as shown in Table 4. Any needed right-of-way acquisition is not included in the estimates. An overview of the cost estimates aggregated by tier are shown in Table 5. Cost estimate details for each recommendation are provided in Appendix B.

Table 4: Cost Estimates Assumptions

Cost Element	Multiplier
Maintenance of Traffic (MOT)	20%
Mobilization (MOB)	15%
Contingency	30%
Design	25%
CEI	15%

Table 5: Cost Estimates by Tier

Implementation Tier	Cost Estimates
Tier 1	$320,900
Tier 2	$9,449,667
Tier 3	$4,911,800
Total	$14,682,367

IMPLEMENTATION GUIDANCE

The recommendations for bicycle facilities on the corridor were developed in collaboration with Hillsborough County staff and subsequently screened for feasibility. The screening for feasibility and development of design plans included conformance with the applicable local, state, and federal design standards and guidance. The designs applied engineering judgement and contemporary best practices for the safety of all users within the right-of-way. Implementation notes are included for each recommendation in the tables above. The following content identifies general issues and considerations to be addressed along the entire corridor as the recommendations are advanced through the forthcoming stages of design and implementation.

RIGHT-OF-WAY, DRAINAGE, AND UTILITIES

The right-of-way information used to develop the design concept is based on Hillsborough County's GIS data and field investigation. The next stage of project development will require survey to verify property lines, topography, and utilities.

The unconstrained minimum width for a shared use path parallel to a roadway is 19 ft including the following elements: 5 ft sod or landscaped buffer from the roadway edge, 12 ft pathway, and 2 ft clear zone to the outside. That width is not available for most of the corridor, so while the pathway alignment shown minimizes the encroachment outside the public right-of-way, additional right-of-way acquisition or easements will be required. The width of right-of-way needed will be greater than shown where required for the relocation of impacted utilities or to tie the outside pathway shoulder to the existing grade; otherwise, additional grading and railings will be required.

The following elements are included in the conceptual design to minimize the footprint of the pathway: a decreased buffer width, curb and gutter, and replacement of open drainage ditches with enclosed pipes and inlets. Decreasing the buffer width to less than 5 ft requires the installation of curb and gutter and technically classifies that segment of the pathway as a wide sidewalk, though that is preferable to no facility. Where 5 ft buffer width can be provided, the design still includes curb and gutter to deter encroachment by vehicles for the improved safety and comfort of path users.

Utility relocations, adjustment, or additions may be required to install the recommended RRFBs and lighting.

ADDITIONAL CONSIDERATIONS

ADA-compliant curb ramps are to be included at all crosswalks. They are not specifically shown on the conceptual design plans, though they are included in the cost estimate for the corresponding recommendation. The width of each curb ramp and detectable warning pads are to match the corresponding path or sidewalk width.

A speed study will be required prior to advancing the recommendation to lower the posted speed limit. Relatedly, the posted speed limit must be reduced to 35 mph or lower prior to installation of RRFBs as a part of the recommended crossings.

Field assessment of ADA compliance is required to identify any needed associated modifications.

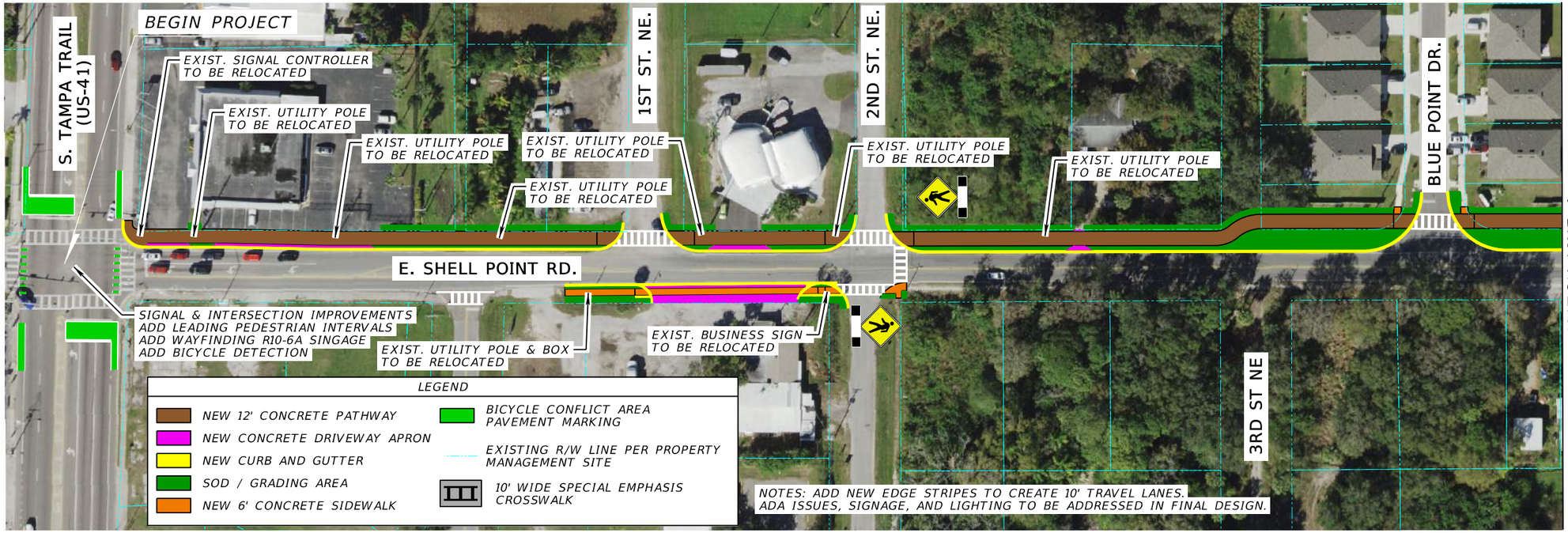
The addition of Leading Pedestrian Intervals (LPI) and bicycle detection equipment to intersections with existing traffic signals may require replacement of the traffic controller cabinet if required to enable that capability.

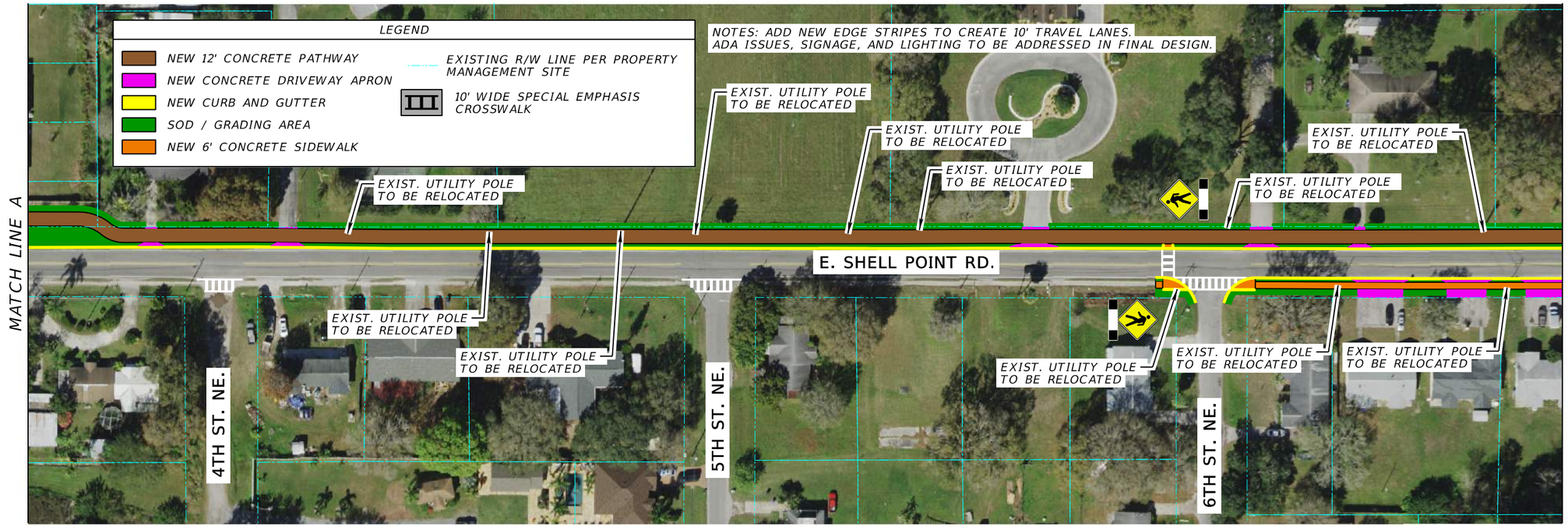
The recommended lighting will require assessment of existing lighting conditions and impacts to trees.

All pavement markings should be thermoplastic.

Appendix A

Design Concept Plans





REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

PATEL, GREENE & ASSOCIATES, LLC
12570 TELECOM DRIVE
TEMPLE TERRACE, FL 33637
PHONE: 813-978-3100
LUCAS CRUSE

HILLSBOROUGH COUNTY
601 E. KENNEDY BLVD. TAMPA, FLORIDA 33602

BICYCLE NETWORK PLAN

E. SHELL POINT PLANS

SHEET NO. 1

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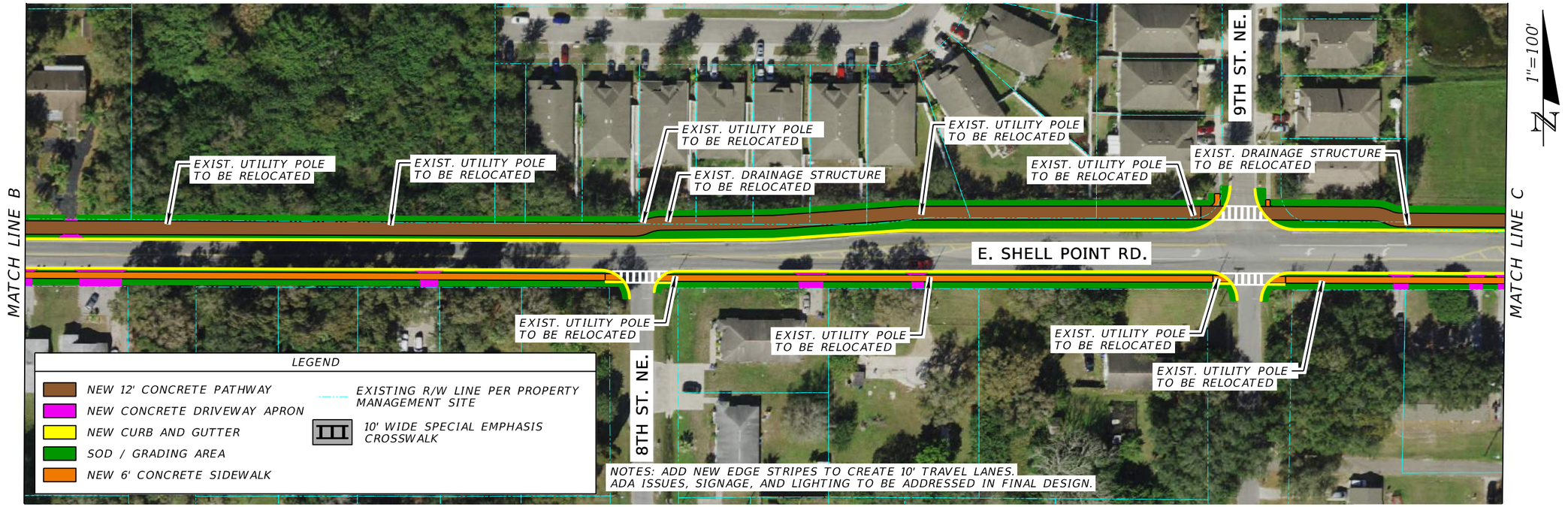

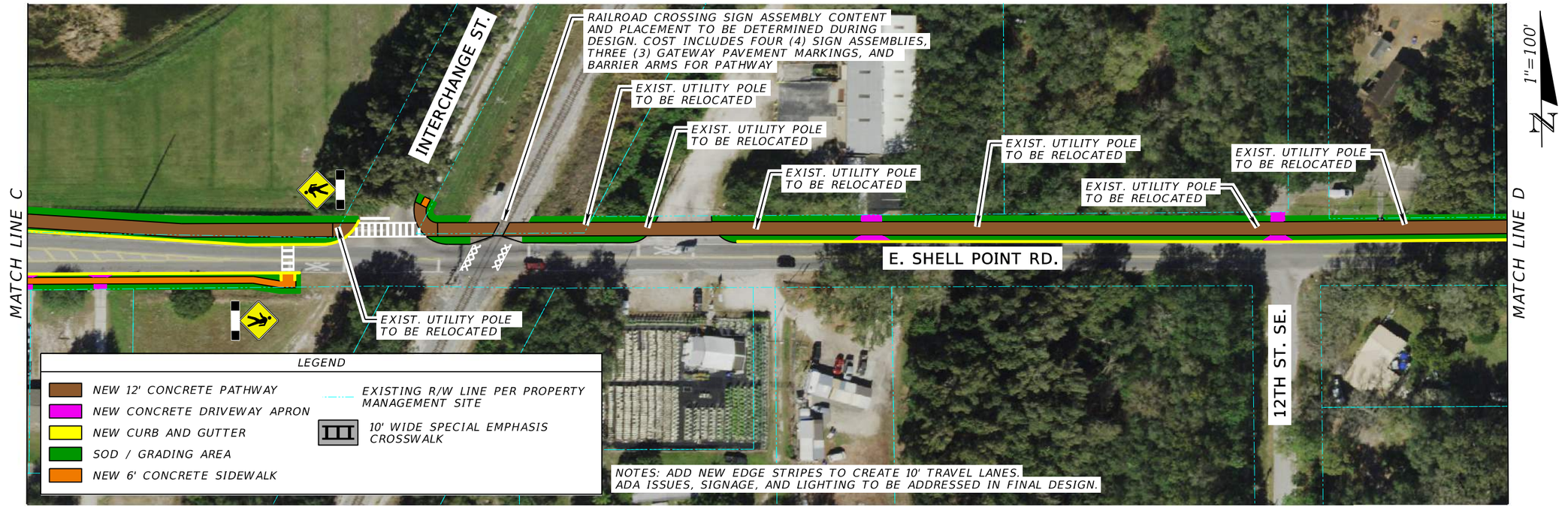

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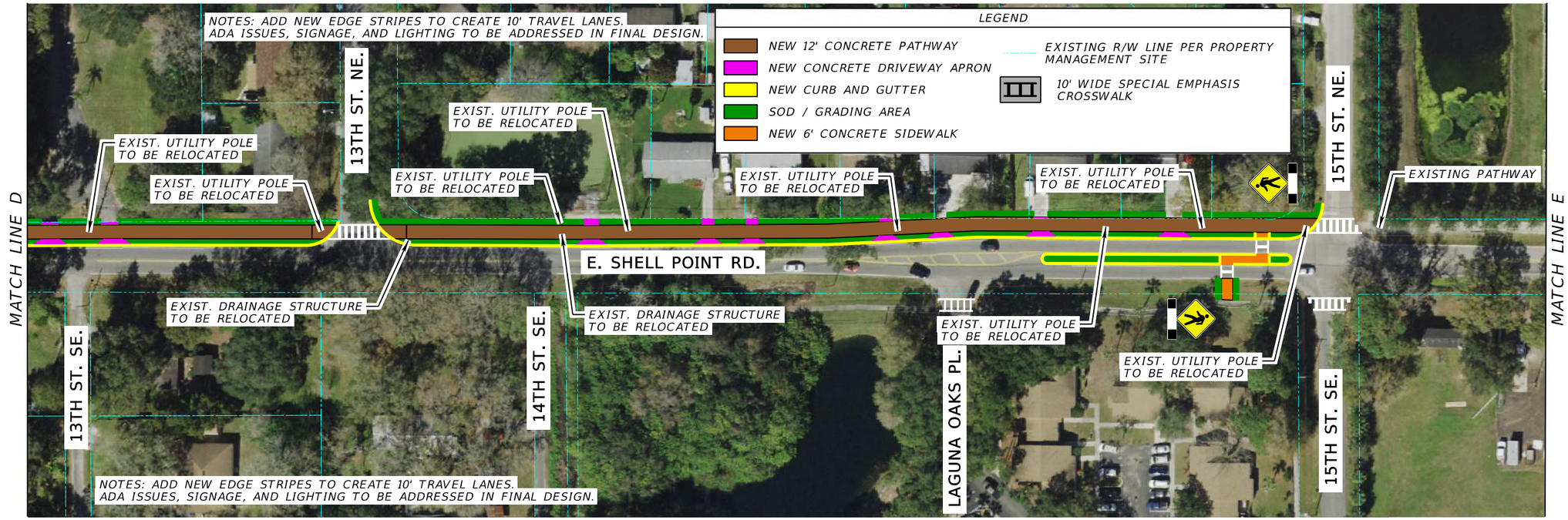
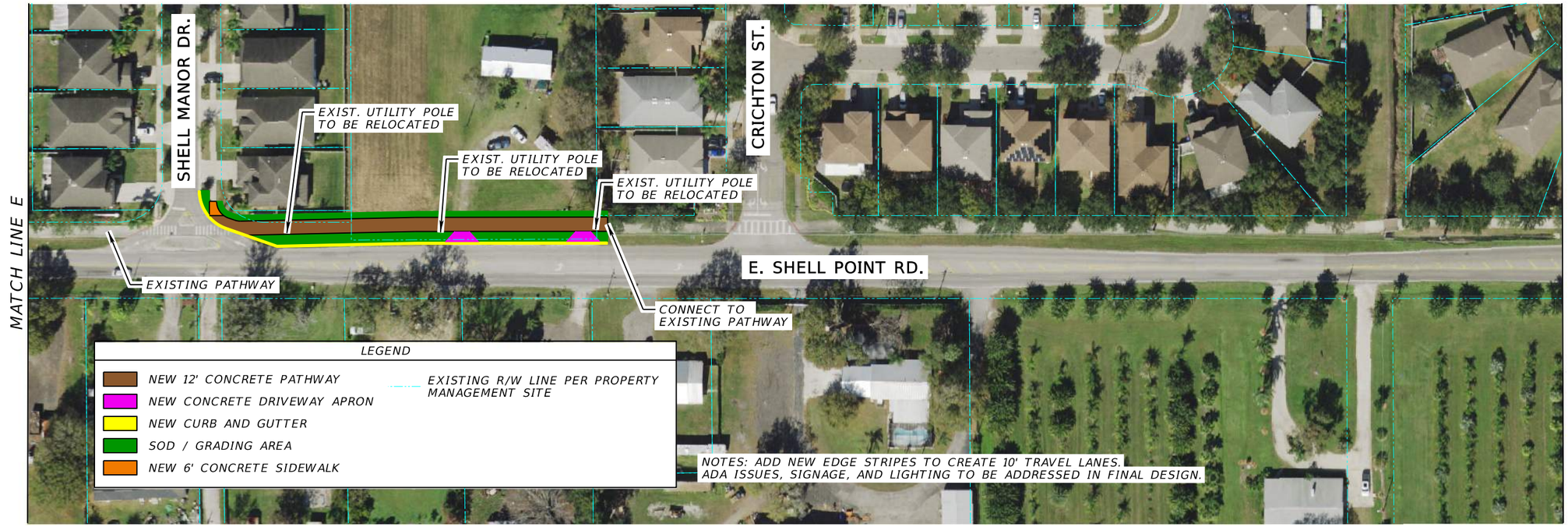
BICYCLE NETWORK PLAN

E. SHELL POINT PLANS

SHEET NO. 2





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BICYCLE NETWORK PLAN

E. SHELL POINT PLANS

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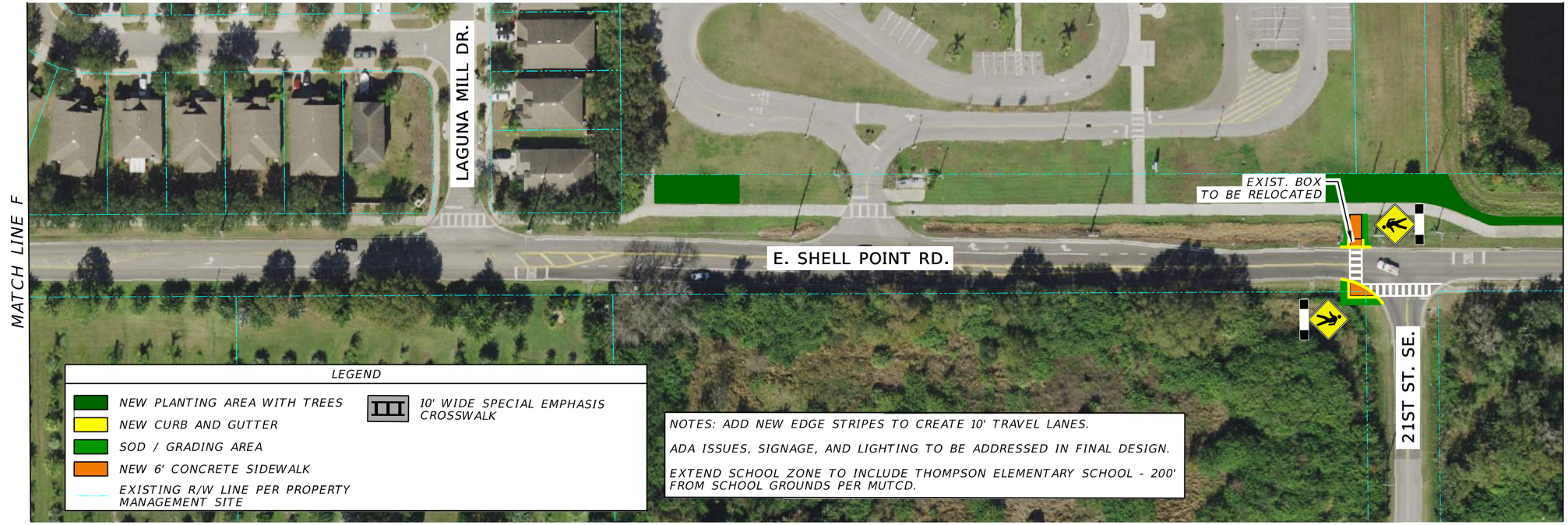

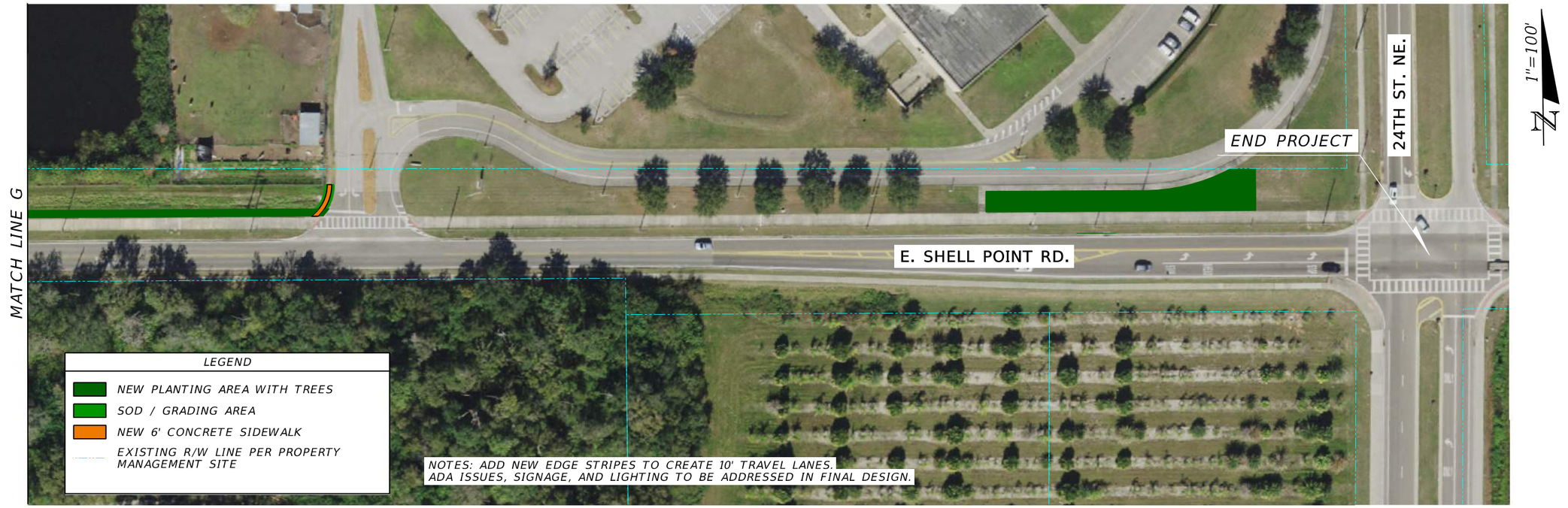

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BICYCLE NETWORK PLAN

E. SHELL POINT PLANS

SHEET NO. 4

Appendix B

Cost Estimates Details

Hillsborough County Bike Network - Conceptual Design Notes
E. Shell Point Rd - US-41 to 24th Street NE

	Tier 1	Implementation Notes	Final Cost Estimate	Construction Cost	MOT (20%)	Sub-Total	MOB (15%)	Sub-Total	CONTINGENCY (30%)	Sub-Total	DESIGN (25%)	CEI (15%)	Total Cost	Cost Estimate Notes
A	Install edge stripe to narrow the travel lanes to 10 ft and encourage slower speeds.	Water-blast existing edge stripe. Add new edge stripe to establish consistent 10 ft travel lanes as measured from the centerline. Not shown on design plans.	$ 53,100	$ 21,128	$ 4,226	$ 25,353	$ 3,803	$ 29,156	$ 8,747	$ 37,903	$ 9,476	$ 5,685	$ 53,064	The length of the project for both sides is 20,560 ft with markings costing 5,425.75 per gross mile.
B	Install school zone beacons, markings, and signage to include Thompson Elementary School at 200 ft from school grounds per the applicable County and MUTCD standards.	Sign assembly content and placement to be determined during final design. Planning-level cost estimate included.	$ 81,100	$ 32,304	$ 6,461	$ 38,765	$ 5,815	$ 44,580	$ 13,374	$ 57,953	$ 14,488	$ 8,693	$ 81,135	Beacons $20,000, six signs assemblies (700 1 12) $1,634 ea., and $2,500 for pavement markings.
C	Install high visibility pedestrian crossing markings at all intersections, midblock crossings, and major driveways.	Locations shown on design plans.	$ 19,300	$ 7,689	$ 1,538	$ 9,227	$ 1,384	$ 10,611	$ 3,183	$ 13,794	$ 3,449	$ 2,069	$ 19,312	Obtained the construction cost from the design file.
D	Install bike lane markings through intersection at US 41, including green through conflict areas and in bike boxes.	Need concurrence and coordination with FDOT. Typical configuration is to continue the bike lane width with 2 ft-4 ft skip through conflict areas, adding green within those skips and 40 ft solid green before and after conflict areas. These modifications should be done at the time of resurfacing, though not included in cost estimate.	$ 68,900	$ 27,441	$ 5,488	$ 32,929	$ 4,939	$ 37,869	$ 11,361	$ 49,229	$ 12,307	$ 7,384	$ 68,921	Obtained the construction cost from the design file.
E	Install wayfinding signage at US 41, Interchange St, and 24th St NE to the following destinations: South Coast Trail, schools, and Firehouse Cultural Center.	Sign assembly content and placement to be determined during final design. Planning-level cost estimate included.	$ 98,500	$ 39,216	$ 7,843	$ 47,059	$ 7,059	$ 54,118	$ 16,235	$ 70,354	$ 17,588	$ 10,553	$ 98,495	Using 700 1 12 assembly. Original Cost of Sign = $1,634. 24 total signs.
		Total Costs for Tier 1:	$ 320,900	$ 127,778	$ 25,556	$ 153,333	$ 23,000	$ 176,333	$ 52,900	$ 229,233	$ 57,308	$ 34,385	$ 320,926	

	Tier 2	Implementation Notes	Final Cost Estimate	Construction Cost	MOT (20%)	Sub-Total	MOB (15%)	Sub-Total	CONTINGENCY (30%)	Sub-Total	DESIGN (25%)	CEI (15%)	Total Cost	Cost Estimate Notes
A	Install concrete shared use path along the north side of the corridor.	Estimate includes new 12 ft wide concrete pathway, concrete driveway aprons, utility relocations, curb and gutter, grading, drainage, sod, and removal of existing sidewalk. Narrow right-of-way and open drainage will require property owner coordination.	$ 8,637,600	$ 3,439,094	$ 687,819	$ 4,126,913	$ 619,037	$ 4,745,950	$ 1,423,785	$ 6,169,735	$ 1,542,434	$ 925,460	$ 8,637,628	Obtained the construction cost from the design file.
B	Install enhanced crosswalk with RRFB at 2nd St, to include missing segment of sidewalk on south side of the block.	Posted speed limit to be reduced to 35 mph prior to RRFB installation. Elements include RRFB equipment, concrete sidewalk, curb and gutter, sod, crosswalk ramps, and markings.	$ 191,700	$ 76,308	$ 15,262	$ 91,570	$ 13,735	$ 105,305	$ 31,592	$ 136,897	$ 34,224	$ 20,534	$ 191,655	$20,000 for crossing with RRFB and no median. Obtained the construction cost from the design file for the sidewalk.
C	Install enhanced crosswalk with RRFB at 6th St.	Posted speed limit to be reduced to 35 mph prior to RRFB installation. Elements include RRFB equipment, concrete sidewalk, curb and gutter, sod, crosswalk ramps, and markings.	$ 50,200	$ 20,000	$ 4,000	$ 24,000	$ 3,600	$ 27,600	$ 8,280	$ 35,880	$ 8,970	$ 5,382	$ 50,232	$20,000 for crossing with RRFB and no median.
D	Install enhanced crosswalk with RRFB and median refuge at 15th St.	Posted speed limit to be reduced to 35 mph prior to RRFB installation. Elements include median refuge, RRFB equipment, concrete sidewalk, curb and gutter, sod, crosswalk ramps, and markings.	$ 100,500	$ 40,000	$ 8,000	$ 48,000	$ 7,200	$ 55,200	$ 16,560	$ 71,760	$ 17,940	$ 10,764	$ 100,464	$40,000 for crossing with RRFB and median.
E	Install enhanced crosswalk with RRFB at 21st St.	Posted speed limit to be reduced to 35 mph prior to RRFB installation. Elements include RRFB equipment, concrete sidewalk, curb and gutter, sod, crosswalk ramps, and markings.	$ 50,200	$ 20,000	$ 4,000	$ 24,000	$ 3,600	$ 27,600	$ 8,280	$ 35,880	$ 8,970	$ 5,382	$ 50,232	$20,000 for crossing with RRFB and no median.
F	Install landscaping with trees where possible.	Feasible areas shown on plans. Tree placement to be determined during final design.	$ 170,500	$ 67,900	$ 13,580	$ 81,480	$ 12,222	$ 93,702	$ 28,111	$ 121,813	$ 30,453	$ 18,272	$ 170,538	Used a lump sum pay item 580 1 2 Landscape Complete - Large Plants. This covers the entire project limits. The construction cost was determined from the FDOT Histrical Averages.
G	Conduct speed study to reduce posted speed limit.	Planning-level cost estimate for required speed study and replacement signage. Not shown on design plans.	$ 76,000	$ 16,340	$ 3,268	$ 19,608	$ 2,941	$ 22,549	$ 6,765	$ 29,314	$ 7,328	$ 4,397	$ 76,040	Flat rate of $35,000 for the study. Using 700 1 12 assembly. Original Cost of Sign = $1,634. 10 total signs.
H	Install bicycle detection at signal-controlled intersection with US 41.	Need concurrence and coordination with FDOT. Planning-level cost estimate for new microwave detection equipment.	$ 41,600	$ 16,583	$ 3,317	$ 19,900	$ 2,985	$ 22,885	$ 6,865	$ 29,750	$ 7,437	$ 4,462	$ 41,650	Use 1 (660 3 11) at a cost of $4,252 and 2 (660 3 12) at a cost of $12,331 pay items per intersection. 1 intersection

I	Install barriers, signage, and markings at the railroad crossing following the current design standards.	Need concurrence and coordination with the railroad owner. Elements include barrier arms, signage, and markings.	$ 131,367	$ 52,304	$ 10,461	$ 62,765	$ 9,415	$ 72,180	$ 21,654	$ 93,833	$ 23,458	$ 14,075	$ 131,367	Pedestrian barricade arm $25,000, six signs assemblies (700 1 12) $1,634 ea., $2,500 for pavement markings, and $15,000 for flange filler.
		Total Costs for Tier 2:	$ 9,449,667	$ 3,748,529	$ 749,706	$ 4,498,235	$ 674,735	$ 5,172,970	$ 1,551,891	$ 6,724,861	$ 1,681,215	$ 1,008,729	$ 9,449,805	

	Tier 3	Implementation Notes	Final Cost Estimate	Construction Cost	MOT (20%)	Sub-Total	MOB (15%)	Sub-Total	CONTINGENCY (30%)	Sub-Total	DESIGN (25%)	CEI (15%)	Total Cost	Cost Estimate Notes
A	Install sidewalk on south side of E Shell Point Rd. between 6th St and Interchange St.	Elements include 6' wide concrete sidewalk, concrete driveway aprons, curb and gutter, sod, crosswalk ramps, and markings.	$ 692,300	$ 275,660	$ 55,132	$ 330,792	$ 49,619	$ 380,411	$ 114,123	$ 494,534	$ 123,634	$ 74,180	$ 692,348	Obtained the construction cost from the design file.
B	Install enhanced crosswalk with RRFB at Interchange St.	Posted speed limit to be reduced to 35 mph prior to RRFB installation. Elements include RRFB equipment, concrete sidewalk, curb and gutter, sod, crosswalk ramps, and markings.	$ 50,200	$ 20,000	$ 4,000	$ 24,000	$ 3,600	$ 27,600	$ 8,280	$ 35,880	$ 8,970	$ 5,382	$ 50,232	$20,000 for crossing with RRFB and no median.
C	Install lighting at crossings.	Planning-level cost estimate for lighting at all intersections and crossings added in Tier 2. Not shown on design plans.	$ 1,230,700	$ 490,000	$ 98,000	$ 588,000	$ 88,200	$ 676,200	$ 202,860	$ 879,060	$ 219,765	$ 131,859	$ 1,230,684	$70,000 for lighting at each crossing based on a previous LRE. 7 crossings.
D	Install pedestrian-scale lighting throughout the corridor.	Planning-level cost estimate for pedestrian-scale lighting along pathway added in Tier 2 to be spaced at 50' on center. Additional right-of-way or easements to be acquired prior to final design. Not shown on design plans.	$ 2,938,600	$ 1,170,000	$ 234,000	$ 1,404,000	$ 210,600	$ 1,614,600	$ 484,380	$ 2,098,980	$ 524,745	$ 314,847	$ 2,938,572	$300,000 per mile based on a previous LRE. 3.9 miles.
		Total Costs for Tier 3:	$ 4,911,800	$ 1,955,660	$ 391,132	$ 2,346,792	$ 352,019	$ 2,698,811	$ 809,643	$ 3,508,454	$ 877,114	$ 526,268	$ 4,911,836	
		Total Costs for All Tiers:	**$ 14,682,367**	**$ 5,831,967**	**$ 1,166,393**	**$ 6,998,360**	**$ 1,049,754**	**$ 8,048,114**	**$ 2,414,434**	**$ 10,462,548**	**$ 2,615,637**	**$ 1,569,382**	**$ 14,682,567**	

	Adjacent & Supplemental Projects	Implementation Notes
A	Identify additional speed management and traffic calming treatments throughout the corridor to facilitate the desired Target Speed of 35 MPH	Recommend one permanent Speed Feedback Sign in each direction.
B	Encourage and fund installation of bicycle racks at major commercial, civic or service destinations within the corridor	N/A
C	Install trail user volume counting equipment along the South Coast Greenway Trail	Model and location to be determined in design phase. Note that additional funds will be required for ongoing operations, communications service, and maintenance.

APPENDIX F – BALM RIVERVIEW ROAD CORRIDOR DESIGN CONCEPTS

BICYCLE NETWORK PLAN: CORRIDOR DESIGN CONCEPTS

Hillsborough County

Balm Riverview Rd. – Boyette Rd. to McMullen Rd.

January 2023

PREPARED BY:

PATEL, GREENE AND ASSOCIATES
12570 Telecom Drive
Temple Terrace, FL 33637

Table of Contents

List of Appendices

INTRODUCTION

Committed to improving the mobility and safety of all residents, Hillsborough County, and the Transportation Planning Organization (TPO) have identified, evaluated, and prioritized bicycle facility needs along the County's roadway transportation network. The data-driven methodology addresses the mobility and safety needs of people on bicycles. The resulting plan will assist Hillsborough County in realizing the commitment and desire to provide a safe, connected, and inviting network of bicycle facilities.

The planning process identified four high priority corridors that are geographically dispersed across the county for further evaluation. Review and analysis of each corridor yielded a range of potential project opportunities to add or improve bicycle facilities. The recommended improvements have been grouped into tiers based on priority and screened for feasibility. This design report introduces conceptual design plans, cost estimates, and implementation considerations to construct the recommendations for Balm Riverview Rd. between Boyette Rd. and McMullen Rd.

Balm Riverview Rd. in the project corridor is a two-lane roadway in the community of Riverview. The corridor is primarily residential with open drainage and piecemeal sidewalks. School campuses are at each end of the corridor with sections of curb and gutter. The 1.9 miles long segment has a posted speed limit of 40 mph and intermittently widened sections to add turn lanes at intersections and destinations. There are no dedicated bicycle facilities and no transit service along the corridor.

RECOMMENDATIONS

The primary recommendation to improve conditions for bicyclists is to build a continuous asphalt shared use path along the east side of the roadway. The recommendations are supportive of the new pathway and safety for all roadway users through elements that encourage a reduction of traffic speeds. The recommendations improve access to the new pathway with the addition of enhanced crossings. Additional recommendations add elements to improve the overall safety and comfort of roadway users including updated pavement markings, signage, landscaping, and lighting.

The recommendations have been split into three tiers and are summarized in the tables below. Conceptual design plans showing the recommendations are included in Appendix A.

Table 1: Tier 1 Recommendations

	Recommendation	Implementation Notes	Cost Estimate
A	Install high visibility pedestrian crossing markings at all intersections, midblock crossings, and major driveways.	Locations shown on design plans.	$39,900
B	Install school zone beacons, markings, and signage to include Riverview High School and Kids Community College Southeast at 200 ft from school grounds per the applicable County and MUTCD standards.	Sign assembly content and placement to be determined during final design. Planning-level cost estimate included.	$81,100

C	Realign Tucker Rd. intersection to reduce crossing distance and introduce a safer intersection angle.	Elements include concrete sidewalk, curb and gutter, sod, crosswalk ramps, and markings.	$25,900
D	Identify and repair areas of sidewalk damage and ADA compliance issues.	Quantities and locations to be determined following ADA inventory. Planning-level cost estimate included. Not shown on design plans.	$90,000

Table 2: Tier 2 Recommendations

	Recommendation	Implementation Notes	Cost Estimate
A	Install enhanced crosswalk with RRFB and median refuge at Black Forest Trl.	Posted speed limit to be reduced to 35 mph prior to RRFB installation. Elements include median refuge, RRFB equipment, concrete sidewalk, curb and gutter, sod, crosswalk ramps, and markings.	$139,500
B	Install enhanced crosswalk with RRFB at Shady Ln.	Posted speed limit to be reduced to 35 mph prior to RRFB installation. Elements include RRFB equipment, concrete sidewalk, curb and gutter, sod, crosswalk ramps, and markings.	$50,200
C	Install enhanced crosswalk with RRFB and median refuge at Irish Moss Ave., including removal of extended right turn only lane.	Posted speed limit to be reduced to 35 mph prior to RRFB installation. Elements include median refuge, RRFB equipment, concrete sidewalk, curb and gutter, sod, crosswalk ramps, and markings.	$231,300
D	Install enhanced crosswalk with RRFB and median refuge at Symmes Rd., including removal of extended right turn only lane.	Posted speed limit to be reduced to 35 mph prior to RRFB installation. Elements include median refuge, RRFB equipment, concrete sidewalk, curb and gutter, sod, crosswalk ramps, and markings.	$274,000
E	Install asphalt shared use path along the east side of the corridor.	Estimate includes concrete approaches at intersections, concrete driveway aprons, 12 ft wide asphalt pathway, utility relocations, curb and gutter, grading, drainage, sod, and removal of existing sidewalk. Narrow right-of-way and open drainage will require property owner coordination.	$10,324,500

F	Install bike lane markings through intersection at Boyette Rd., including green through conflict areas.	Typical configuration is to continue the bike lane width through the intersection with 2 ft-4 ft skip through conflict areas, adding green within those skips and 40 ft solid green before and after conflict areas. These modifications are likely to be done at the time of resurfacing, though not included in cost estimate.	$41,300
G	Install wayfinding signage at Boyette Rd, Symmes Rd., and McMullen Rd.	Sign assembly content and placement to be determined during final design. Planning-level cost estimate included.	$123,100
H	Install landscaping with trees where possible.	Feasible areas shown on plans. Tree placement to be determined during final design.	$170,500
I	Install bike detection at signal-controlled intersection with Boyette Rd.	Planning-level cost estimate for microwave detection equipment.	$41,600

Table 3: Tier 3 Recommendations

	Recommendation	Implementation Notes	Cost Estimate
A	Install lighting at each end and at all crossings.	Planning-level cost estimate for lighting at all intersections and crossings added in Tier 2. Not shown on design plans.	$1,230,700
B	Install pedestrian-scale lighting throughout the corridor.	Planning-level cost estimate for pedestrian-scale lighting on both sides, spaced at 50' on center. Additional right-of-way or easements to be acquired prior to final design. Not shown on design plans.	$2,787,900
C	Install raised crosswalk at Shady Ln.	Posted speed limit to be reduced to 30 mph and warrant analysis completed prior to raised crosswalk installation. Cost estimate based on FDOT Developmental Standard D520-30.	$62,800

D	Modify specified driveways to decrease radii and extend median noses to roadway edge to provide pedestrian refuge areas.	Safety elements for new shared use path on east side. Locations: Paddock Manor Ave., Whispering Creek Rd., and KCC school entrance.	$33,700

COST ESTIMATES SUMMARY

Cost estimates for each recommendation are included above in Tables 1-3. The estimates have been developed using pay items and expected unit costs sourced from District 7 of the Florida Department of Transportation, the Department's Long Range Estimating (LRE) system, and engineering judgement. The planning-level estimates include percentage-based multipliers applied to the construction costs as shown in Table 4. Any needed right-of-way acquisition is not included in the estimates. An overview of the cost estimates aggregated by tier are shown in Table 5. Cost estimate details for each recommendation are provided in Appendix B.

Table 4: Cost Estimates Assumptions

Cost Element	Multiplier
Maintenance of Traffic (MOT)	20%
Mobilization (MOB)	15%
Contingency	30%
Design	25%
CEI	15%

Table 5: Cost Estimates by Tier

Implementation Tier	Cost Estimates
Tier 1	$236,900
Tier 2	$11,396,000
Tier 3	$4,115,100
Corridor Total	$15,748,000

IMPLEMENTATION GUIDANCE

The recommendations for bicycle facilities on the corridor were developed in collaboration with Hillsborough County staff and subsequently screened for feasibility. The screening for feasibility and development of design plans included conformance with the applicable local, state, and federal design standards and guidance. The designs applied engineering judgement and contemporary best practices for the safety of all users within the right-of-way. Implementation notes are included for each recommendation in the tables above. The following content identifies general issues and considerations to be addressed along the entire corridor as the recommendations are advanced through the forthcoming stages of design and implementation.

RIGHT-OF-WAY, DRAINAGE, AND UTILITIES

The right-of-way information used to develop the design concept is based on Hillsborough County's GIS data and field investigation. The next stage of project development will require survey to verify property lines, topography, and utilities.

The unconstrained minimum width for a shared use path parallel to a roadway is 19 ft including the following elements: 5 ft sod or landscaped buffer from the roadway edge, 12 ft pathway, and 2 ft clear zone to the outside. That width is not available for most of the corridor, so while the pathway alignment shown minimizes the encroachment outside the public right-of-way, additional right-of-way acquisition or easements will be required. The width of right-of-way needed will be greater than shown where required for the relocation of impacted utilities or to tie the outside pathway shoulder to the existing grade, otherwise additional grading and railings will be required.

The following elements are included in the conceptual design to minimize the footprint of the pathway: a decreased buffer width, curb and gutter, and replacement of open drainage ditches with enclosed pipes and inlets. Decreasing the buffer width to less than 5 ft requires the installation of curb and gutter and technically classifies that segment of the pathway as a wide sidewalk, though that is preferable to no facility. Where 5 ft buffer width can be provided, the design still includes curb and gutter to deter encroachment by vehicles for the improved safety and comfort of path users.

Utility relocations, adjustment, or additions may be required to install the recommended RRFBs and lighting.

ADDITIONAL CONSIDERATIONS

ADA-compliant curb ramps are to be included at all crosswalks. They are not specifically shown on the conceptual design plans, though they are included in the cost estimate for the corresponding recommendation. The width of each curb ramp and detectable warning pads are to match the corresponding path or sidewalk width.

A speed study will be required prior to advancing the recommendation to lower the posted speed limit. Relatedly, the posted speed limit must be reduced to 35 mph or lower prior to installation of RRFBs as a part of the recommended crossings.

Field assessment of ADA compliance is required to identify any needed associated modifications.

The addition of Leading Pedestrian Intervals (LPI) and bicycle detection equipment to intersections with existing traffic signals may require replacement of the traffic controller cabinet if required to enable that capability.

The recommended lighting will require assessment of existing lighting conditions and impacts to trees.

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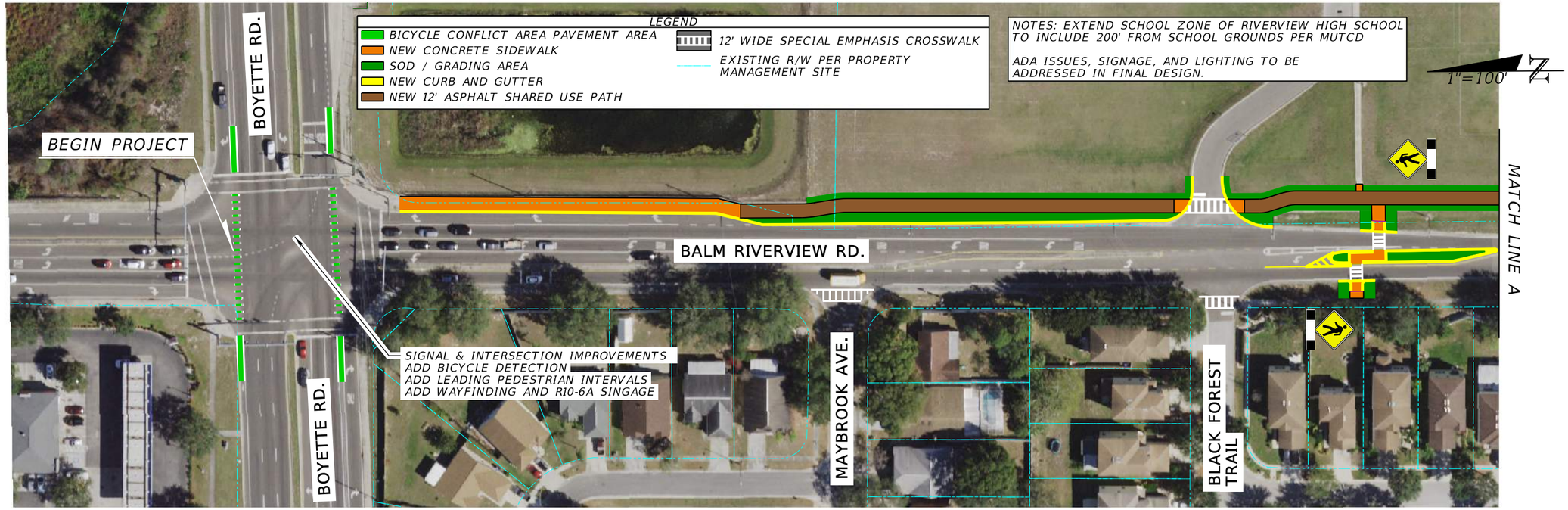

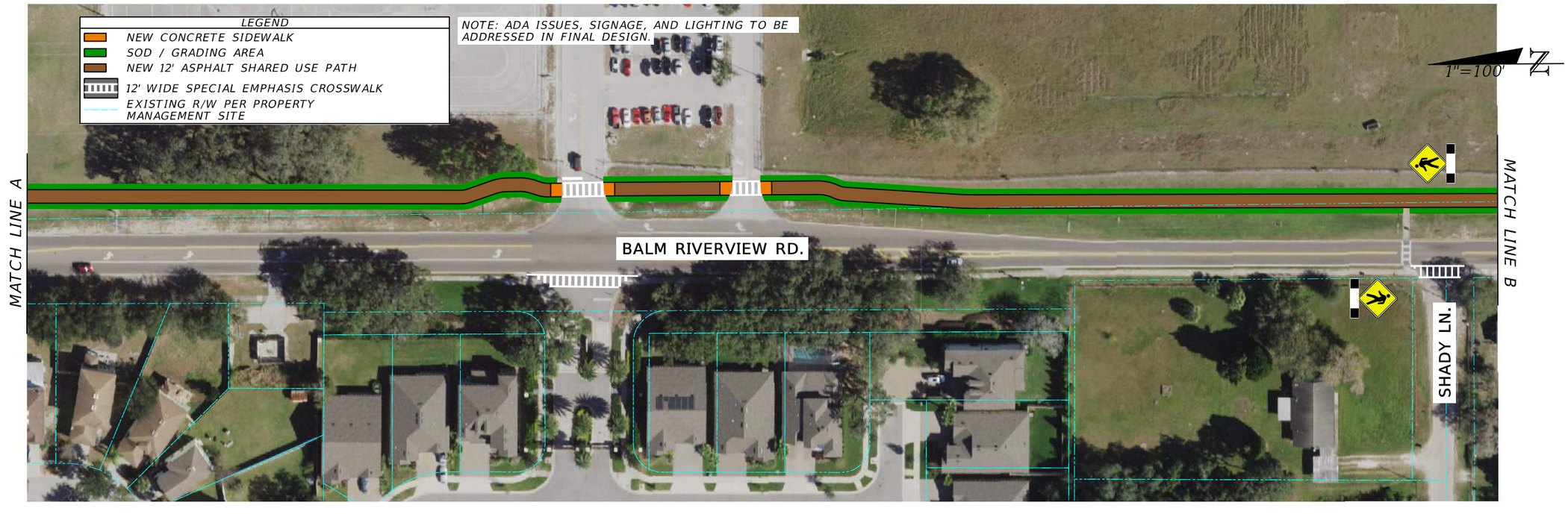

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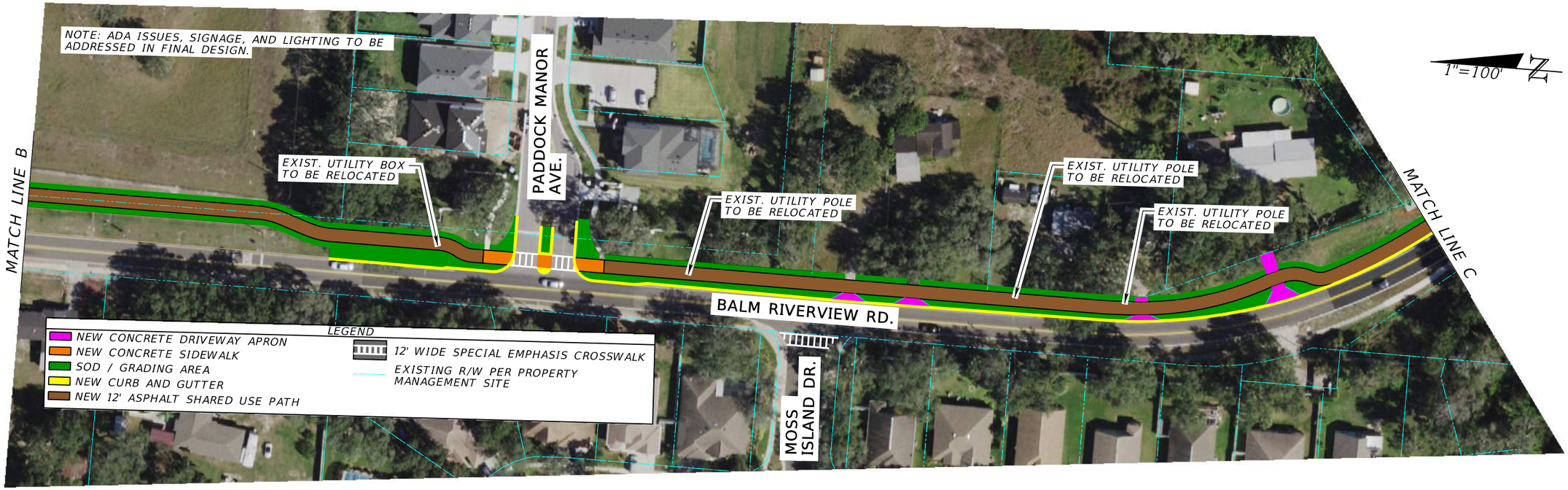
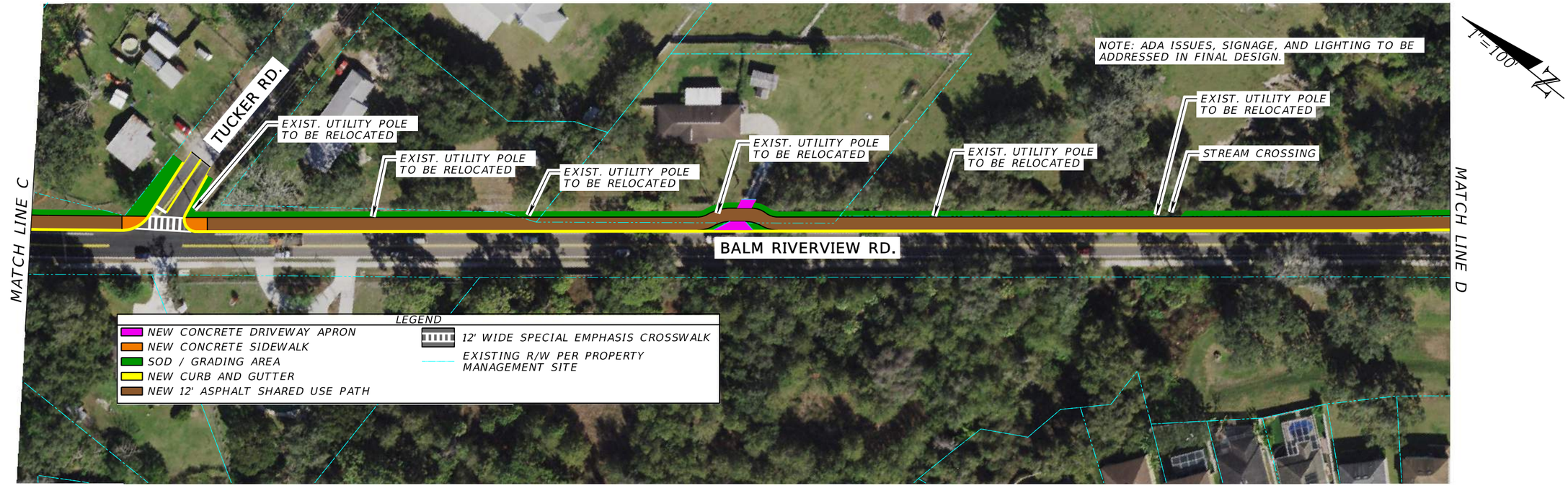
601 E. KENNEDY BLVD. TAMPA, FLORIDA 33602

BICYCLE NETWORK PLAN

BALM RIVERVIEW RD. PLANS

SHEET NO. 1





REVISIONS			
DATE	DESCRIPTION	DATE	DESCRIPTION

PATEL, GREENE & ASSOCIATES, LLC
12570 TELECOM DRIVE
TEMPLE TERRACE, FL 33637
PHONE: 813-978-3100
LUCAS CRUSE

HILLSBOROUGH COUNTY
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BICYCLE NETWORK PLAN

BALM RIVERVIEW RD. PLANS

SHEET NO. 2

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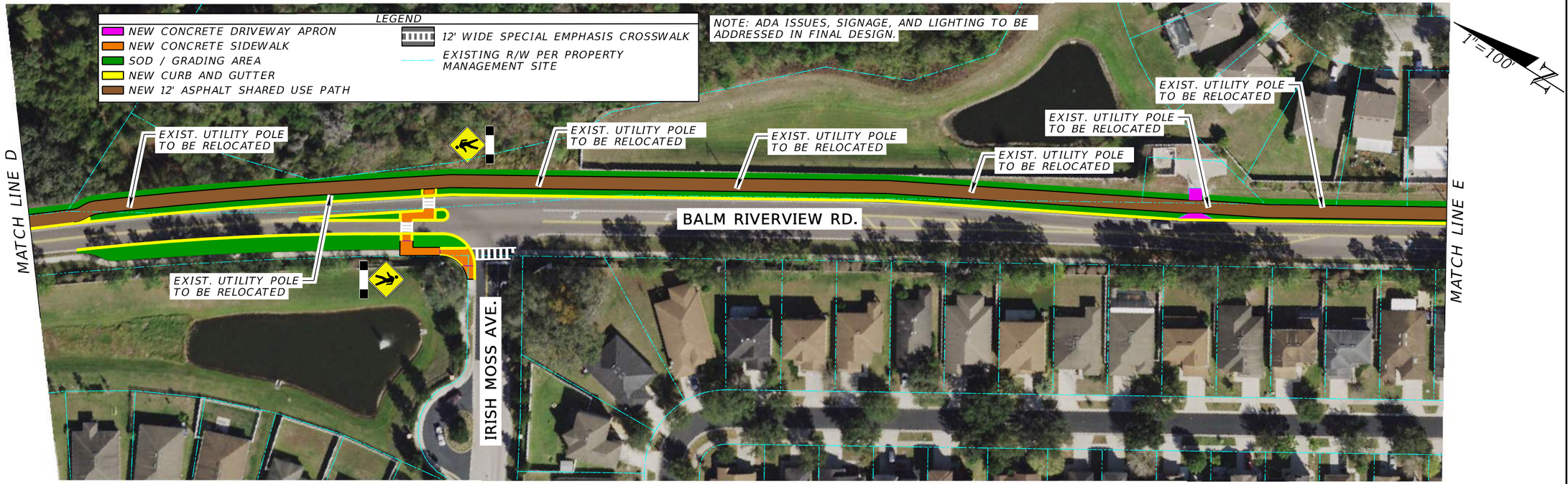

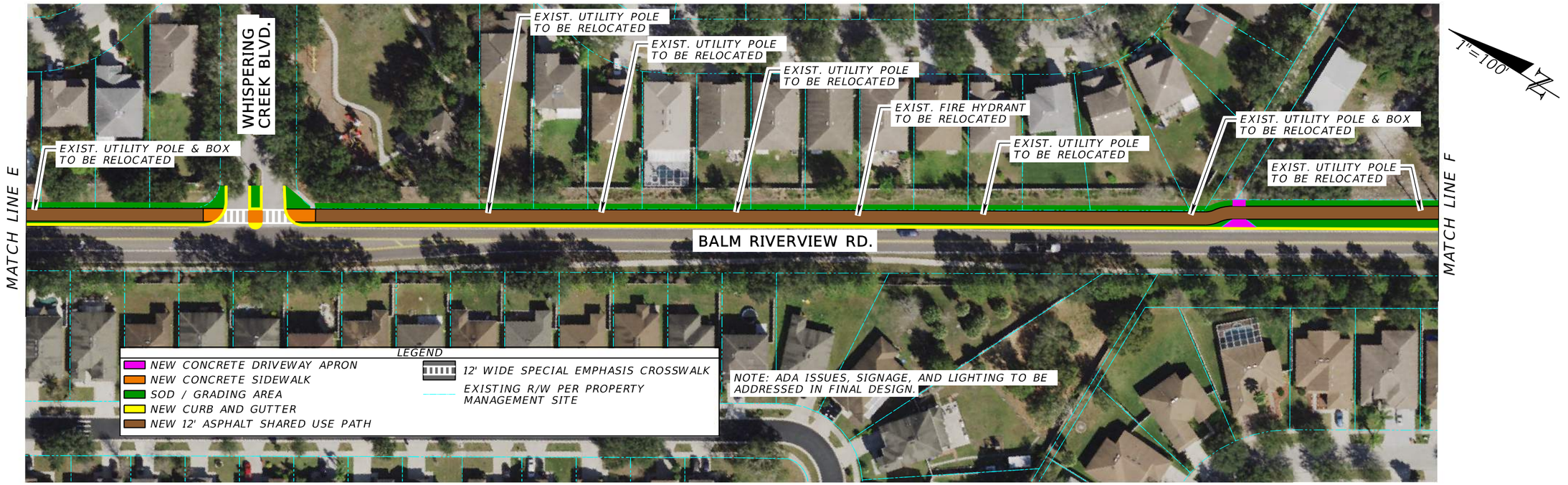

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BICYCLE NETWORK PLAN

BALM RIVERVIEW RD. PLANS

SHEET NO. 3

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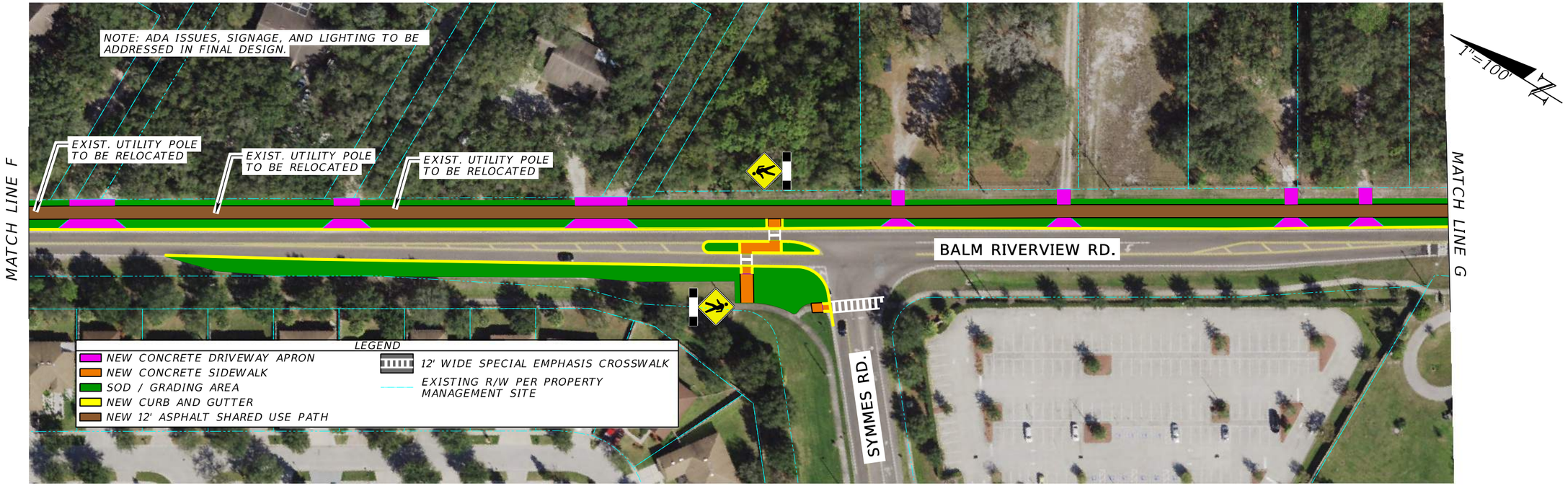

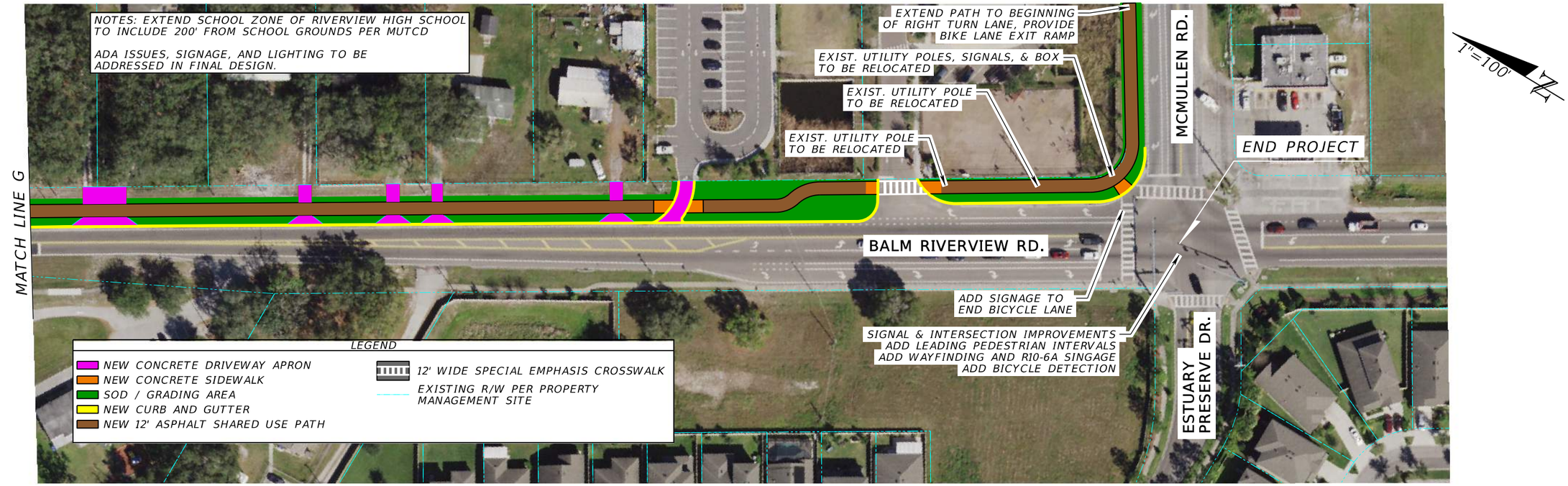

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BICYCLE NETWORK PLAN

BALM RIVERVIEW RD. PLANS

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Appendix B

Cost Estimates Details

Hillsborough County Bike Network - Conceptual Design Notes
Balm Riverview Rd - Boyette Rd to McMullen Rd

	Tier 1	Implementation Notes	Final Cost Estimate	Construction Cost	MOT (20%)	Sub-Total	MOB (15%)	Sub-Total	CONTINGENCY (30%)	Sub-Total	DESIGN (25%)	CEI (15%)	Total Cost	Cost Estimate Notes
A	Install high visibility pedestrian crossing markings at all intersections, midblock crossings, and major driveways.	Locations shown on design plans.	$ 39,900	$ 15,880	$ 3,176	$ 19,056	$ 2,858	$ 21,914	$ 6,574	$ 28,489	$ 7,122	$ 4,273	$ 39,884	Obtained the construction cost from the design file.
B	Install school zone beacons, markings, and signage to include Riverview High School and Kids Community College Southeast at 200 ft from school grounds per the applicable County and MUTCD standards.	Sign assembly content and placement to be determined during final design. Planning-level cost estimate included.	$ 81,100	$ 32,304	$ 6,461	$ 38,765	$ 5,815	$ 44,580	$ 13,374	$ 57,953	$ 14,488	$ 8,693	$ 81,135	Beacons $20,000, six signs assemblies (700 1 12) $1,634 ea., and $2,500 for pavement markings.
C	Realign Tucker Rd. intersection to reduce crossing distance and introduce a safer intersection angle.	Elements include concrete sidewalk, curb and gutter, sod, crosswalk ramps, and markings.	$ 25,900	$ 10,300	$ 2,060	$ 12,360	$ 1,854	$ 14,214	$ 4,264	$ 18,478	$ 4,620	$ 2,772	$ 25,869	Obtained the construction cost from the design file.
D	Identify and repair areas of sidewalk damage and ADA compliance issues.	Quantities and locations to be determined following ADA inventory. Planning-level cost estimate included. Not shown on design plans.	$ 90,000	$ 35,838	$ 7,168	$ 43,006	$ 6,451	$ 49,456	$ 14,837	$ 64,293	$ 16,073	$ 9,644	$ 90,011	Assumed 5% of project length. Project length is 19,536ft in both directions with a 5 ft width. 6" concrete is 66 dollars a SY.
		Total Costs for Tier 1:	$ 236,900	$ 94,322	$ 18,864	$ 113,186	$ 16,978	$ 130,164	$ 39,049	$ 169,214	$ 42,303	$ 25,382	$ 236,899	

	Tier 2	Implementation Notes	Final Cost Estimate	Construction Cost	MOT (20%)	Sub-Total	MOB (15%)	Sub-Total	CONTINGENCY (30%)	Sub-Total	DESIGN (25%)	CEI (15%)	Total Cost	Cost Estimate Notes
A	Install enhanced crosswalk with RRFB and median refuge at Black Forest Trl.	Posted speed limit to be reduced to 35 mph prior to RRFB installation. Elements include median refuge, RRFB equipment, concrete sidewalk, curb and gutter, sod, crosswalk ramps, and markings.	$ 139,500	$ 55,549	$ 11,110	$ 66,659	$ 9,999	$ 76,658	$ 22,997	$ 99,655	$ 24,914	$ 14,948	$ 139,517	Obtained the construction cost from the design file. $20,000 for RRFB equipment.
B	Install enhanced crosswalk with RRFB at Shady Ln.	Posted speed limit to be reduced to 35 mph prior to RRFB installation. Elements include RRFB equipment, concrete sidewalk, curb and gutter, sod, crosswalk ramps, and markings.	$ 50,200	$ 20,000	$ 4,000	$ 24,000	$ 3,600	$ 27,600	$ 8,280	$ 35,880	$ 8,970	$ 5,382	$ 50,232	$20,000 for crossing with RRFB and no median.
C	Install enhanced crosswalk with RRFB and median refuge at Irish Moss Ave., including removal of extended right turn only lane.	Posted speed limit to be reduced to 35 mph prior to RRFB installation. Elements include median refuge, RRFB equipment, concrete sidewalk, curb and gutter, sod, crosswalk ramps, and markings.	$ 231,300	$ 92,081	$ 18,416	$ 110,497	$ 16,575	$ 127,072	$ 38,122	$ 165,193	$ 41,298	$ 24,779	$ 231,271	Obtained the construction cost from the design file. $20,000 for RRFB equipment.
D	Install enhanced crosswalk with RRFB and median refuge at Symmes Rd., including removal of extended right turn only lane.	Posted speed limit to be reduced to 35 mph prior to RRFB installation. Elements include median refuge, RRFB equipment, concrete sidewalk, curb and gutter, sod, crosswalk ramps, and markings.	$ 274,000	$ 109,082	$ 21,816	$ 130,898	$ 19,635	$ 150,533	$ 45,160	$ 195,693	$ 48,923	$ 29,354	$ 273,970	Obtained the construction cost from the design file. $20,000 for RRFB equipment.
E	Install asphalt shared use path along the east side of the corridor.	Estimate includes concrete approaches at intersections, concrete driveway aprons, 12 ft wide asphalt pathway, utility relocations, curb and gutter, grading, drainage, sod, and removal of existing sidewalk. Narrow right-of-way and open drainage will require property owner coordination.	$ 10,324,500	$ 4,110,707	$ 822,141	$ 4,932,848	$ 739,927	$ 5,672,776	$ 1,701,833	$ 7,374,608	$ 1,843,652	$ 1,106,191	$ 10,324,452	Obtained the construction cost from the design file.
F	Install bike lane markings through intersection at Boyette Rd., including green through conflict areas.	Typical configuration is to continue the bike lane width through the intersection with 2 ft-4 ft skip through conflict areas, adding green within those skips and 40 ft solid green before and after conflict areas. These modifications are likely to be done at the time of resurfacing, though not included in cost estimate.	$ 41,300	$ 16,457	$ 3,291	$ 19,748	$ 2,962	$ 22,711	$ 6,813	$ 29,524	$ 7,381	$ 4,429	$ 41,333	Obtained the construction cost from the design file.
G	Install wayfinding signage at Boyette Rd, Symmes Rd., and McMullen Rd.	Sign assembly content and placement to be determined during final design. Planning-level cost estimate included.	$ 123,100	$ 49,020	$ 9,804	$ 58,824	$ 8,824	$ 67,648	$ 20,294	$ 87,942	$ 21,985	$ 13,191	$ 123,119	Using 700 1 12 assembly. Original Cost of Sign = $1,634. 30 total signs.
H	Install landscaping with trees where possible.	Feasible areas shown on plans. Tree placement to be determined during final design.	$ 170,500	$ 67,900	$ 13,580	$ 81,480	$ 12,222	$ 93,702	$ 28,111	$ 121,813	$ 30,453	$ 18,272	$ 170,538	Used a lump sum pay item 580 1 2 Landscape Complete - Large Plants. This covers the entire project limits. The construction cost was determined from the FDOT Histrical Averages.
I	Install bike detection at signal-controlled intersection with Boyette Rd.	Planning-level cost estimate for microwave detection equipment.	$ 41,600	$ 16,583	$ 3,317	$ 19,900	$ 2,985	$ 22,885	$ 6,865	$ 29,750	$ 7,437	$ 4,462	$ 41,650	Use 1 (660 3 11) at a cost of $4,252 and 2 (660 3 12) at a cost of $12,331 pay items per intersection. 1 intersection
		Total Costs for Tier 2:	$ 11,396,000	$ 4,537,379	$ 907,476	$ 5,444,855	$ 816,728	$ 6,261,583	$ 1,878,475	$ 8,140,058	$ 2,035,014	$ 1,221,009	$ 11,396,081	

	Tier 3	Implementation Notes	Final Cost Estimate	Construction Cost	MOT (20%)	Sub-Total	MOB (15%)	Sub-Total	CONTINGENCY (30%)	Sub-Total	DESIGN (25%)	CEI (15%)	Total Cost	Cost Estimate Notes
A	Install lighting at each end and at all crossings.	Planning-level cost estimate for lighting at all intersections and crossings added in Tier 2. Not shown on design plans.	$ 1,230,700	$ 490,000	$ 98,000	$ 588,000	$ 88,200	$ 676,200	$ 202,860	$ 879,060	$ 219,765	$ 131,859	$ 1,230,684	$70,000 for lighting at each crossing based on a previous LRE. 7 crossings.

B	Install pedestrian-scale lighting throughout the corridor.	Planning-level cost estimate for pedestrian-scale lighting on both sides, spaced at 50' on center. Additional right-of-way or easements to be acquired prior to final design. Not shown on design plans.	$ 2,787,900	$ 1,110,000	$ 222,000	$ 1,332,000	$ 199,800	$ 1,531,800	$ 459,540	$ 1,991,340	$ 497,835	$ 298,701	$ 2,787,876	$300,000 per mile based on a previous LRE. 3.7 miles.
C	Install raised crosswalk at Shady Ln.	Posted speed limit to be reduced to 30 mph and warrant analysis completed prior to raised crosswalk installation. Design to comply with FDOT Developmental Standard D520-30.	$ 62,800	$ 25,000	$ 5,000	$ 30,000	$ 4,500	$ 34,500	$ 10,350	$ 44,850	$ 11,213	$ 6,728	$ 62,790	$25,000 for raised crossing.
D	Modify specified driveways to decrease radii and extend median noses to roadway edge to provide pedestrian refuge areas.	Safety elements for new shared use path on east side. Locations: Paddock Manor Ave., Whispering Creek Rd., and KCC school entrance.	$ 33,700	$ 13,431	$ 2,686	$ 16,117	$ 2,418	$ 18,535	$ 5,560	$ 24,095	$ 6,024	$ 3,614	$ 33,733	Obtained the construction cost from the design file. 3 locations.
		Total Costs for Tier 3:	$ 4,115,100	$ 1,638,431	$ 327,686	$ 1,966,117	$ 294,918	$ 2,261,035	$ 678,310	$ 2,939,345	$ 734,836	$ 440,902	$ 4,115,083	
		Total Costs for All Tiers:	**$ 15,748,000**	**$ 6,270,132**	**$ 1,254,026**	**$ 7,524,158**	**$ 1,128,624**	**$ 8,652,782**	**$ 2,595,835**	**$ 11,248,617**	**$ 2,812,154**	**$ 1,687,293**	**$ 15,748,064**	

	Adjacent & Supplemental Projects	Implementation Notes
A	Modify configurations of Boyette Rd, McMullen Rd, and SymmesRd to include buffered or separated bike lanes.	N/A
B	Identify additional speed management and traffic calming treatments throughout the corridor to facilitate the desired Target Speed of 35 MPH	Recommend one permanent Speed Feedback Sign in each direction
C	Encourage and fund installation of bicycle racks at major commercial, civic, schools or service destinations within the corridor	N/A
D	Where sidepaths are installed or planned, remove keyhole bike lanes where the bike lanes do not exist to either side of the intersection and end bike lanes with proper transitions. For example, reconstruct the north leg at McMullen Rd to remove bike lanes that will not continue, moving the curbs in and adding buffer to the sidewalk with the reclaimed space.	N/A