



Hillsborough TPO
Transportation
Planning Organization



Hillsborough
County Florida

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:



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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.

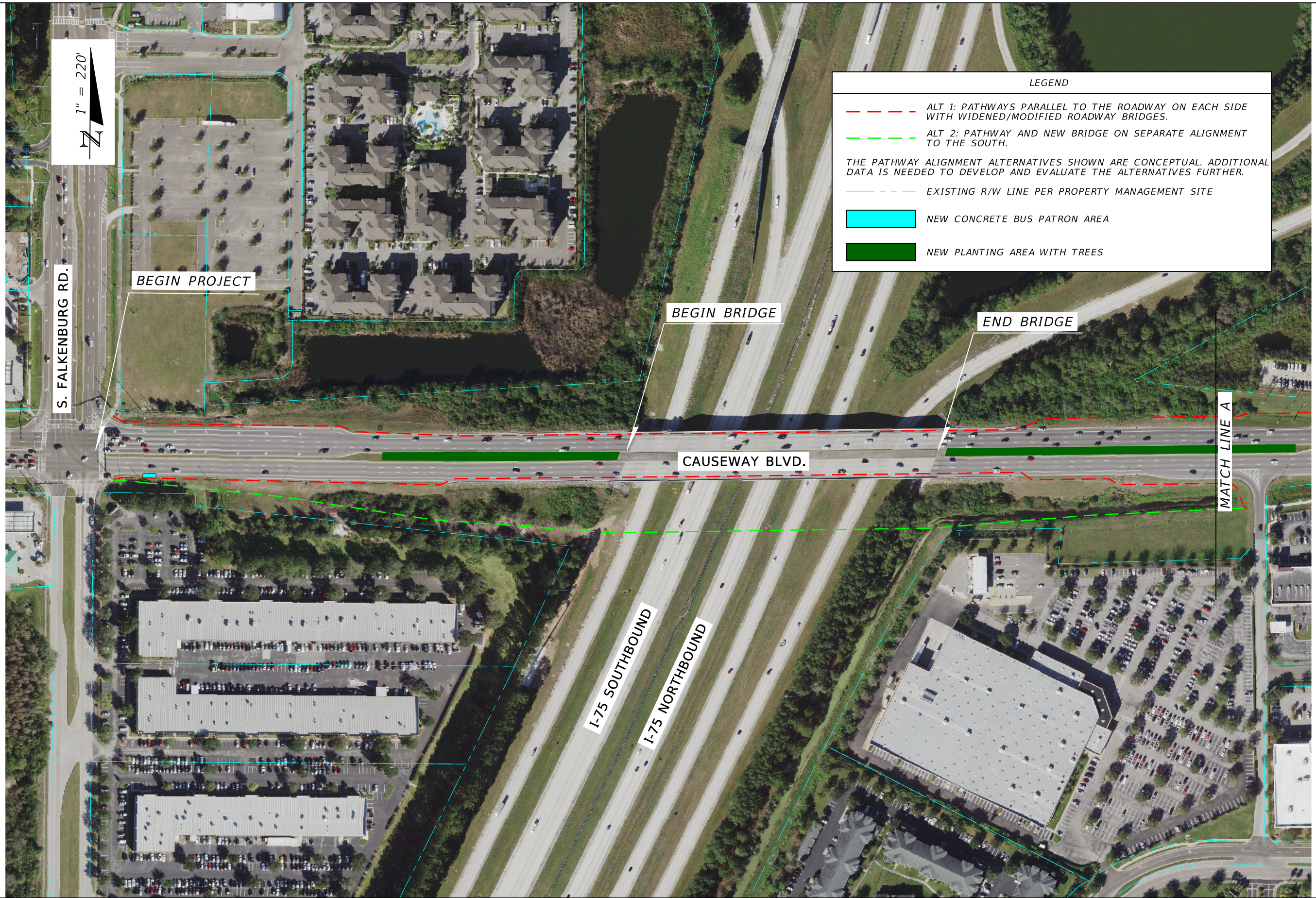
The addition of Leading Pedestrian Intervals (LPI) and bicycle detection equipment to intersections with existing traffic signals may require replacement of the traffic controller cabinet if required to enable that capability.

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.

The cover features a dark blue background with a diagonal band of light green. The top portion of the cover is a solid, vibrant green. The text is positioned in the bottom right corner of the dark blue area.

Appendix A
Design Concept Plans



1" = 220'

LEGEND

- ALT 1: PATHWAYS PARALLEL TO THE ROADWAY ON EACH SIDE WITH WIDENED/MODIFIED ROADWAY BRIDGES.
- ALT 2: PATHWAY AND NEW BRIDGE ON SEPARATE ALIGNMENT TO THE SOUTH.

THE PATHWAY ALIGNMENT ALTERNATIVES SHOWN ARE CONCEPTUAL. ADDITIONAL DATA IS NEEDED TO DEVELOP AND EVALUATE THE ALTERNATIVES FURTHER.

- EXISTING R/W LINE PER PROPERTY MANAGEMENT SITE
- NEW CONCRETE BUS PATRON AREA
- NEW PLANTING AREA WITH TREES

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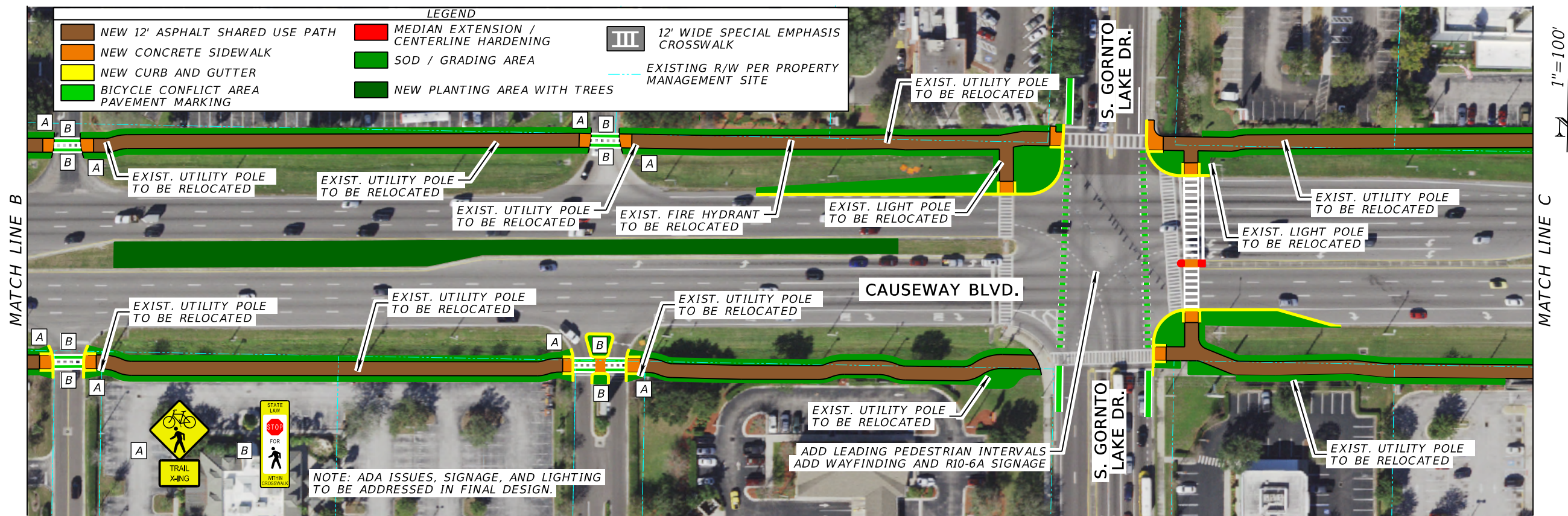
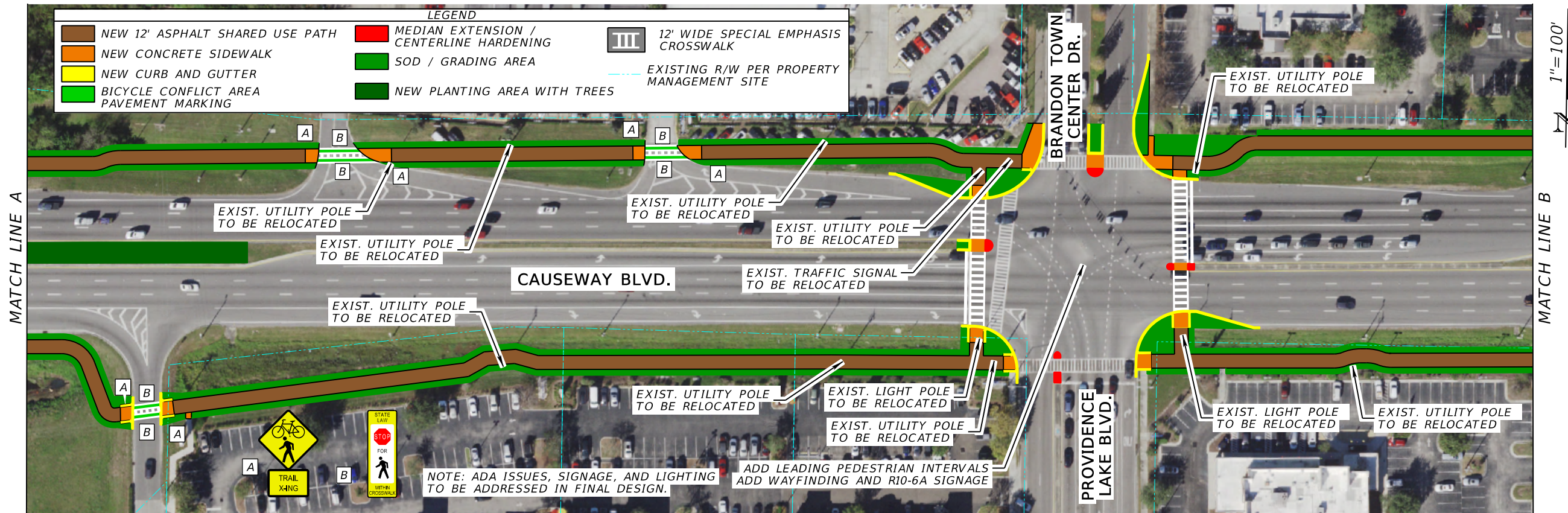
REVISIONS			
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HILLSBOROUGH COUNTY
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BICYCLE NETWORK PLAN
CAUSEWAY / LUMSDEN PLANS

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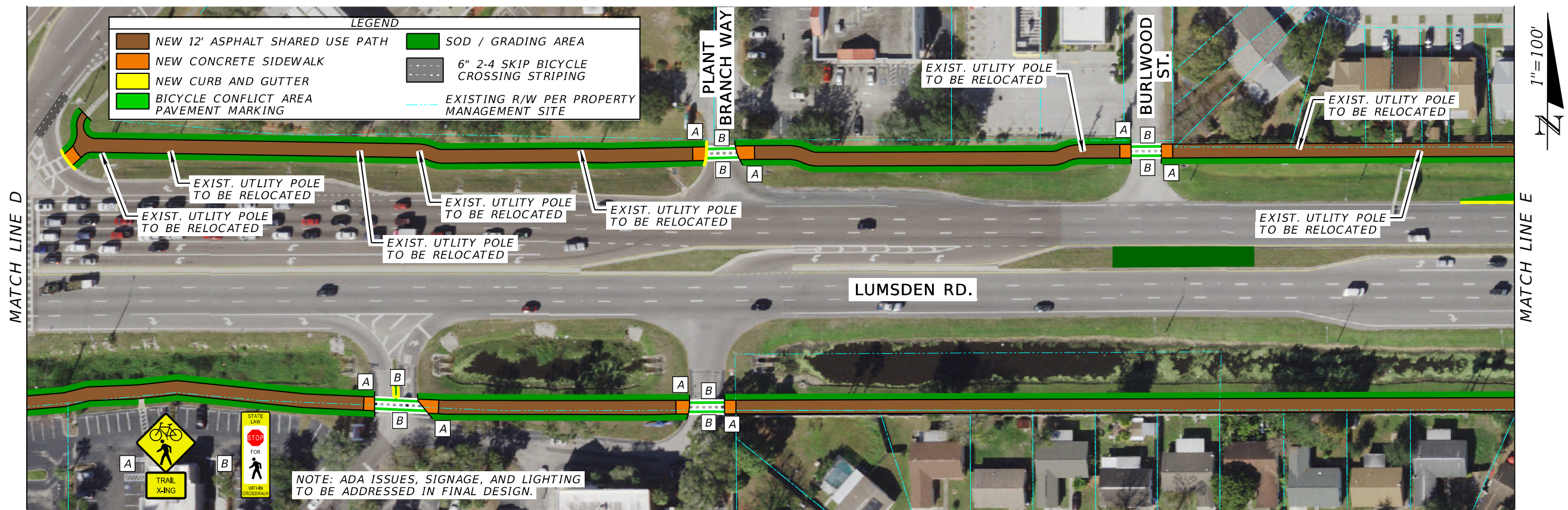
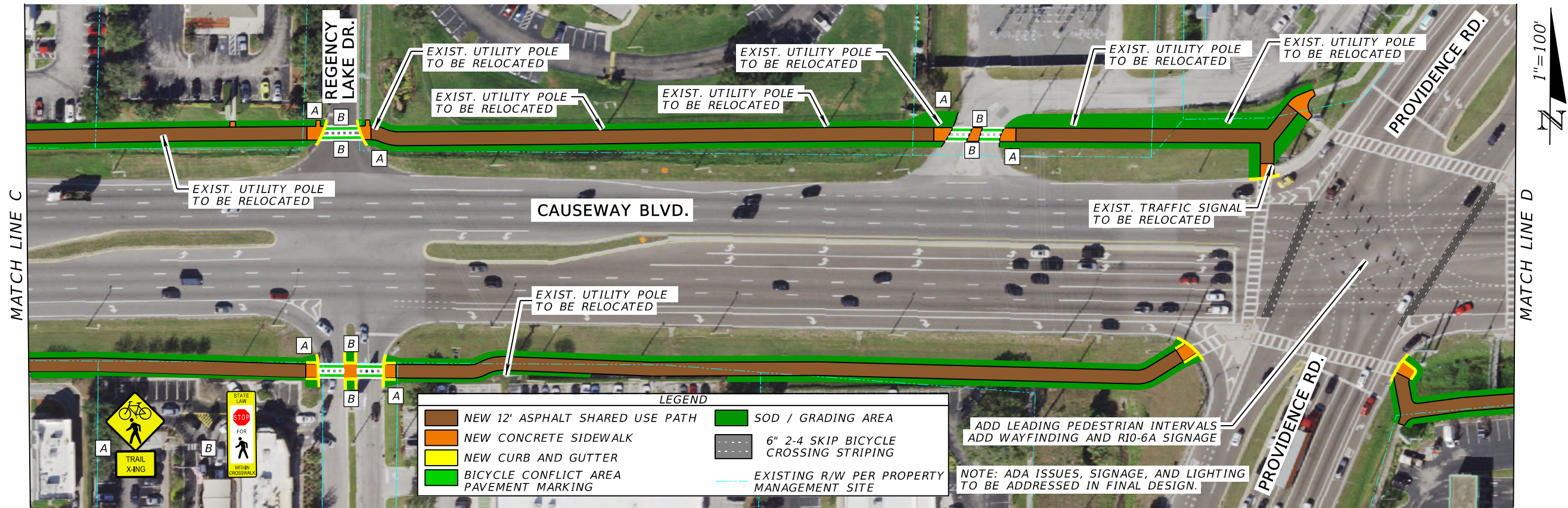
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BICYCLE NETWORK PLAN
 CAUSEWAY / LUMSDEN PLANS

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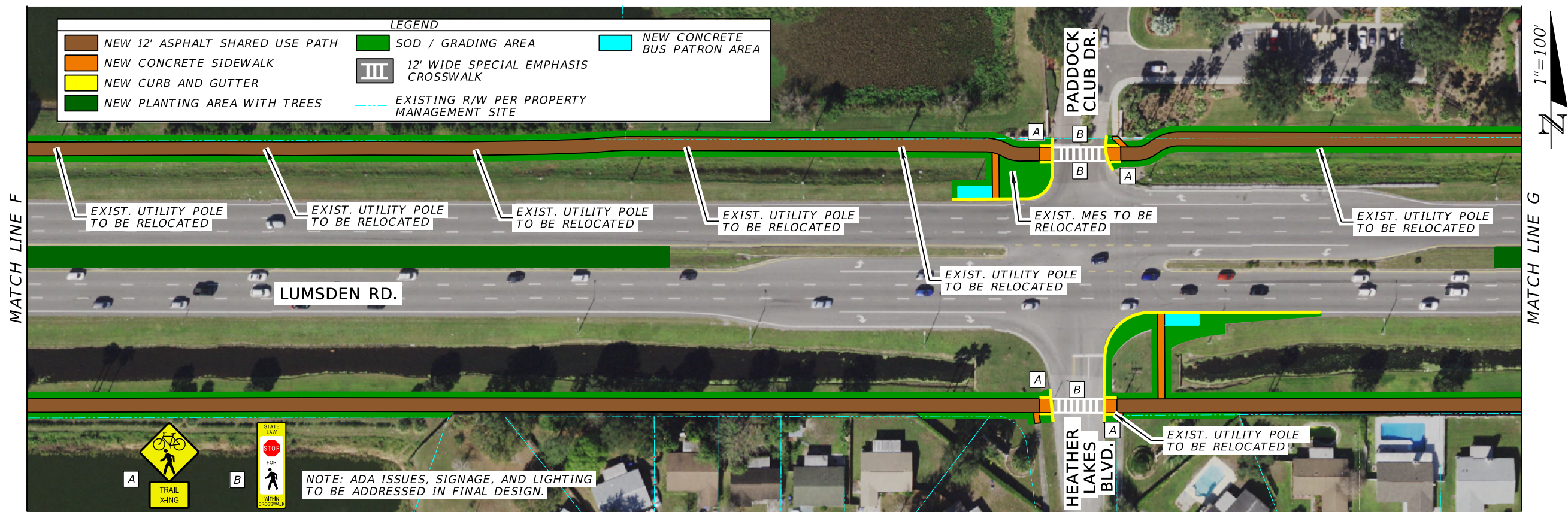
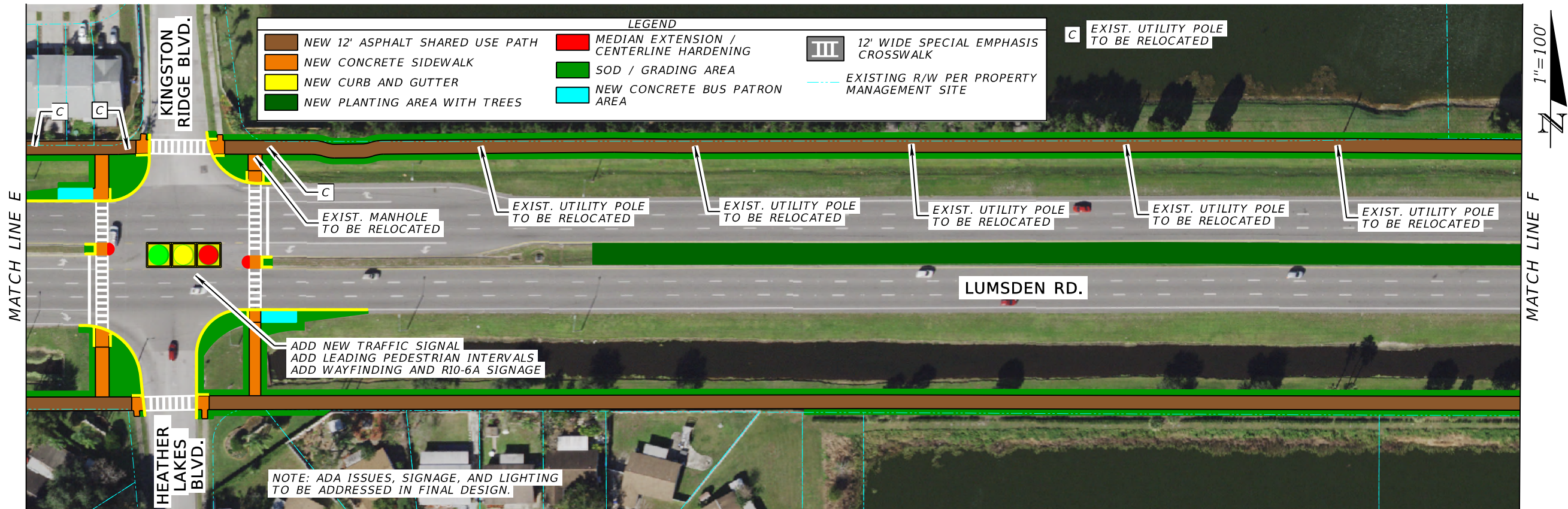
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BICYCLE NETWORK PLAN
CAUSEWAY / LUMSDEN PLANS

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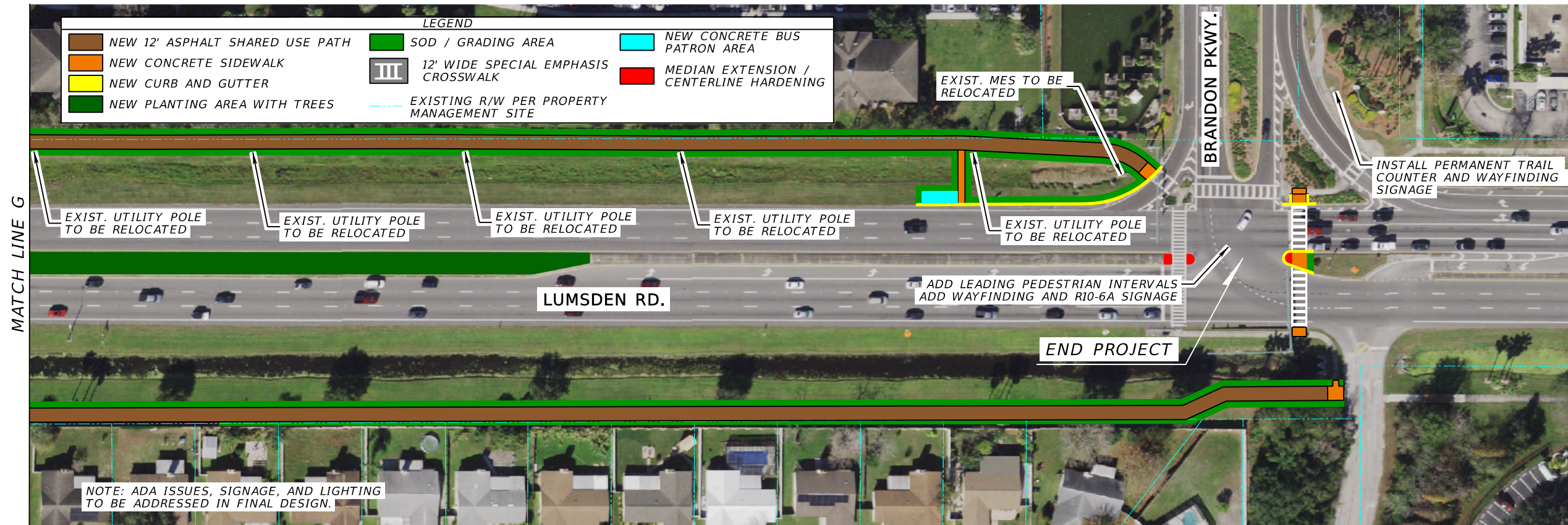
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BICYCLE NETWORK PLAN
 CAUSEWAY / LUMSDEN PLANS

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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			CONTINGENCY			DESIGN (25%)	CEI (15%)	Total Cost	Cost Estimate Notes		
			Cost	MOT (20%)	Sub-Total	MOB (15%)	Sub-Total	(30%)					Sub-Total	
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 assemblies 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 \$400,000 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			CONTINGENCY			DESIGN (25%)	CEI (15%)	Total Cost	Cost Estimate Notes		
			Cost	MOT (20%)	Sub-Total	MOB (15%)	Sub-Total	(30%)					Sub-Total	
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 Historical 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			CONTINGENCY			DESIGN (25%)			CEI (15%)	Total Cost	Cost Estimate Notes
				Cost	MOT (20%)	Sub-Total	MOB (15%)	Sub-Total	(30%)	Sub-Total					
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.