CITY OF AUSTIN PUBLIC WORKS

SAFE ROUTES TO SCHOOL

INFRASTRUCTURE REPORT

CITY COUNCIL DISTRICT 10

austin MOTION 2016 MOBILITY BOND

ACKNOWLEDGMENTS

December 2019

This report is made possible through the Austin 2016 Mobility Bond. For more information, please contact:

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The consultant team was led by Toole Design Group with support from Asakura Robinson, Dunaway|UDG, GGE Consulting, and Adisa Communications.

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City Council District 10

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ABOUT THIS PROJECT

PURPOSE / BACKGROUND

In November 2016, Austin voters approved the 2016 Mobility Bond which provided $27.5 million for Safe Routes to School improvements. The funding will be equally allocated for school access-related projects in Austin's ten City Council districts.

To identify projects, the City of Austin hired consultants to evaluate and prioritize improvements to streets, trails, intersections and sidewalks around 137 elementary and middle schools in the City. The City also conducted a robust public engagement effort to inform recommendations, as described later in this report. The project is taking place over two years and was divided into phases based on the school calendar, with two to three council districts in each phase.

- **Phase 1: Fall 2017** – Council Districts 1 and 10, 28 schools
- **Phase 2: Spring 2018** – Council Districts 2, 8 and 9, 40 schools
- **Phase 3: Fall 2018** – Council Districts 3, 5 and 7, 36 schools
- **Phase 4: Spring 2019** – Council Districts 4 and 6, 33 schools

This report explains the process used to develop the recommendations for schools in City Council District 10, and presents a prioritized list of projects. It also presents a map and matrix showing all the recommendations made for each school. Recommended improvements aim to address identified safety or access issues for students walking and biking to school. **Ideas presented in this document are planning-level concepts: many projects will require further feasibility study and engineering evaluation before they can be implemented. In some locations, alternate approaches to address the issue may prove more feasible or more cost effective. Specific infrastructure treatments are defined and explained in the Austin SRTS Engineering Toolkit (Appendix A).**

SCHOOL AUDITS

School audits in District 10 took place the week of November 6, 2017. Audit teams were led by a team of transportation planners and designers, as well as City of Austin staff from the Departments of Public Works and Transportation, and school representatives. School representatives typically included the principal or a designee and 1-2 parent representatives.

Most audits took place in the early morning, with a brief introductory meeting followed by an observation of school arrival. After the school bell rang, the team reconvened to

Walk Audit at Bridge Point Elementary

Walk Audit at Casis Elementary

debrief and discuss next steps. Following the summary meeting, the consultants and City staff completed the assessment of walking and biking infrastructure around the school, focusing on a half-mile radius for pedestrian facility recommendations and up to a two-mile radius for bicycle facilities. The recommendations were reviewed by City staff for consistency with other planning efforts prior to prioritization.

PUBLIC ENGAGEMENT

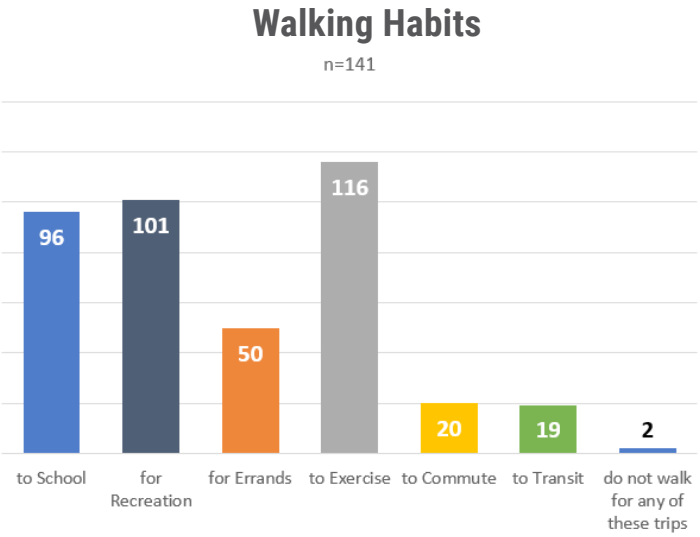
In addition to participating in the school audits, members of the public were invited to provide input via an online map and public open houses. Flyers explaining the project and promoting these opportunities were developed in English and Spanish, distributed to school contacts, and published on the City's website and social media channels.

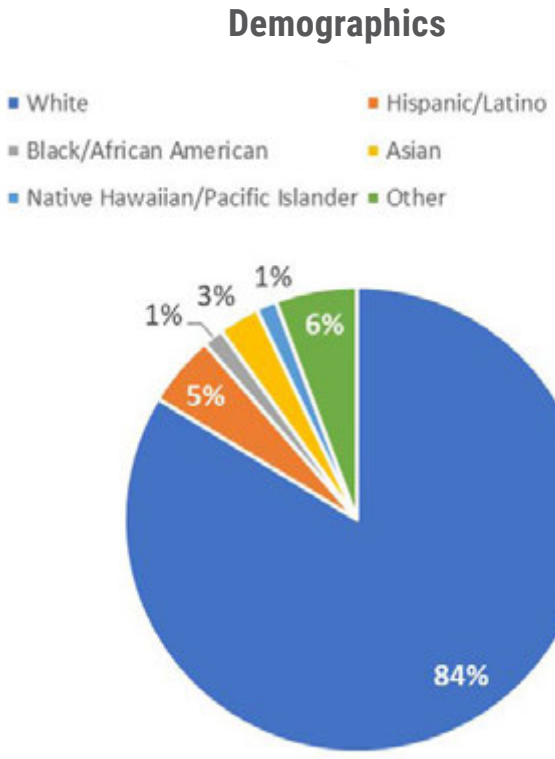
ONLINE INTERACTIVE MAP

The project team used an online interactive map to gather input from the community on the barriers to walking and biking to school. English and Spanish language versions of the online map went live in November 2017. Users could access the maps via links on the City's Safe Routes to School website. Using lines and points, map users were asked to identify barriers, routes their family currently bikes or walks, and difficult routes for biking and walking.

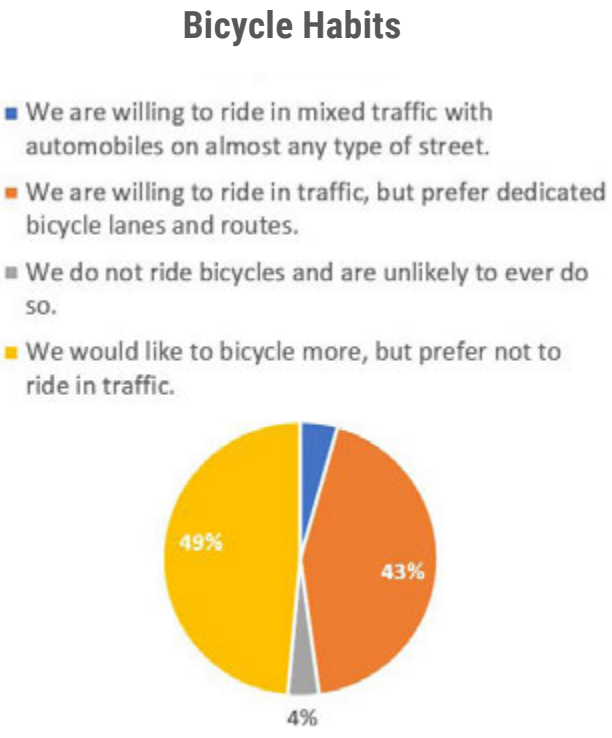
Summary of Responses

Before adding their comments to the map, users were asked to complete a short survey to help understand their background, walking and bicycling habits, and place of residence. The following is a summary of demographic characteristics from respondents from District 10, as well as a map that shows the concentrations of comments made on the map.

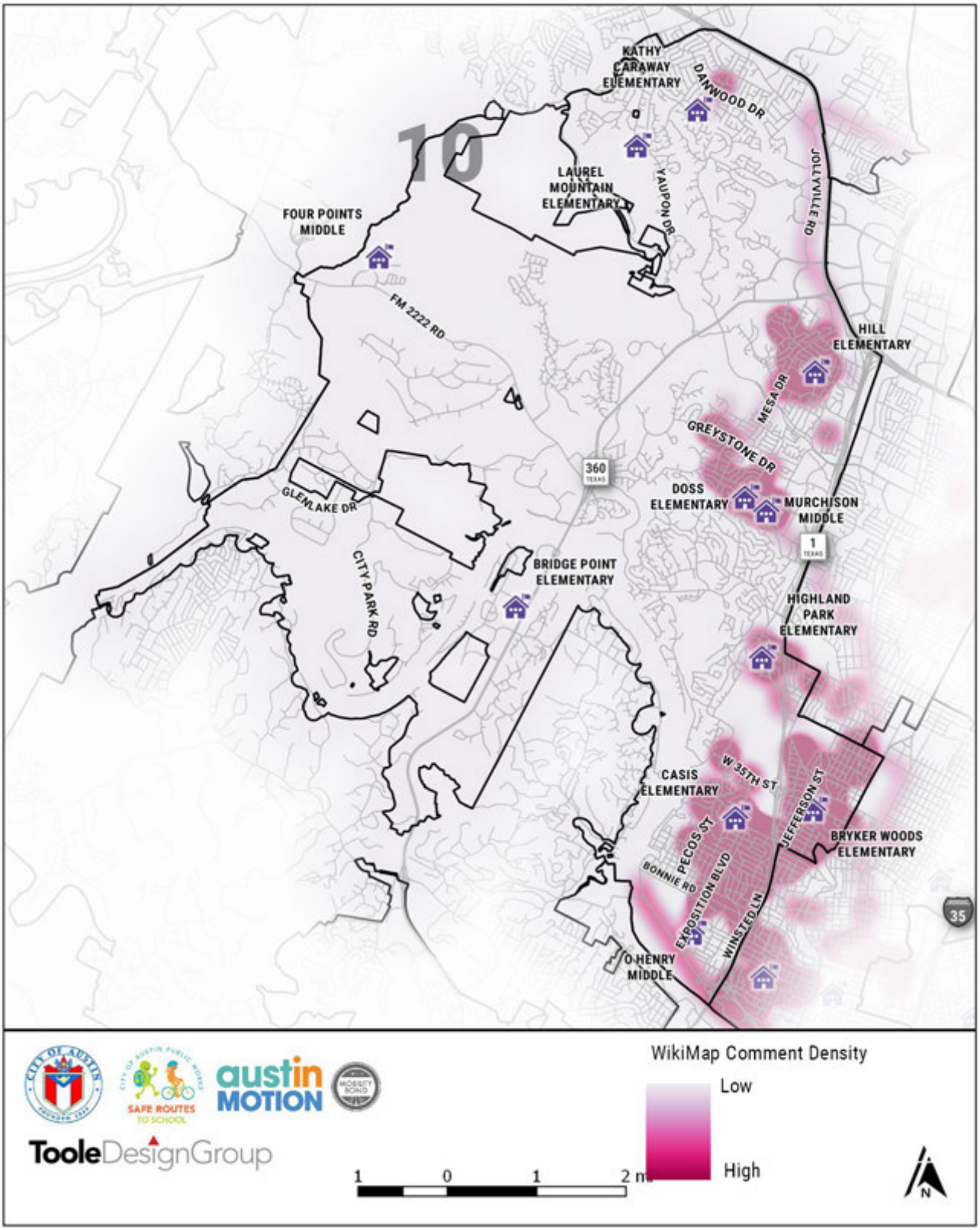




Demographics of Online Map Respondents, District 10



Survey Responses from Online Map Respondents, District 10



Heatmap of Online Map Comments, District 10

OPEN HOUSE

The Open House for District 10 was held at Murchison Middle School from 7:00 to 9:00 PM on Wednesday, December 6, 2017. The meeting was promoted through various City email listserves, posters at schools, press releases, and the City website. School principals were also informed of the Open House and asked to forward invitations to members of the school community.

At the Open House, tables were set up with maps of each school in District 10, and consultants and city staff were available to discuss concerns and recommendations. Comments received at the Open House were added to the online map and incorporated into the infrastructure recommendations.

PRIORITIZATION

Information from the school audits, online map and open houses was combined to create a list of recommended projects around each school. Then, the projects were scored using a three-step process to create a prioritized list for each council district.

Step 1: Prioritize recommendations based on potential benefit.

To calculate the potential benefit, each project was evaluated on four factors: Stakeholder Input, Safety, Demand and Equity. Using available data, the following scoring system was used to calculate a Benefit Score for each proposed project.

35%: Demand
(Schools within ¼ mile, Potential students served)
+
30%: Safety
(Crash data, Street type, Engineering judgment)
+
20%: Equity
(Free & reduced lunch rate, Poverty rate)
+
15%: Stakeholder Input
(Public comments from Open Houses and WikiMap)
=
100%: Final Benefit Score

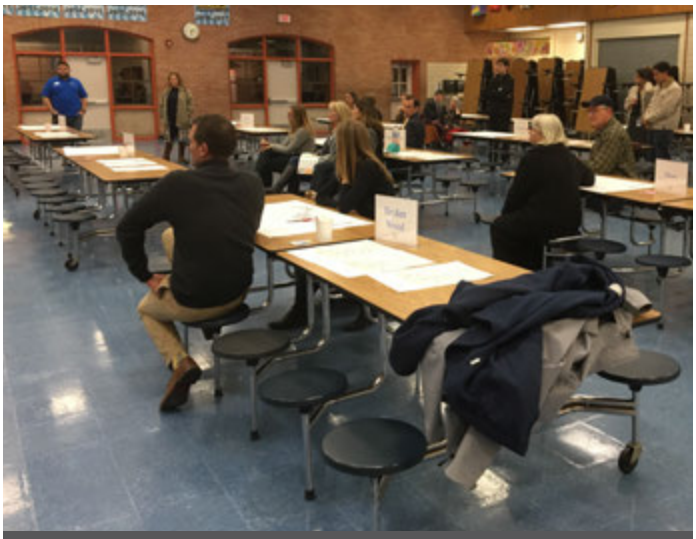
Step 2: Adjust for existing conditions.

To further prioritize projects that would create new facilities and close gaps in the existing bicycle and pedestrian networks, the Benefit Score was divided in half for recommendations that improve existing facilities (as opposed to creating new connections/facilities).

Step 3: Calculate cost benefit score.

Planning-level cost estimates for each project were developed based on bid tabulations maintained by the City of Austin. The benefit score was divided by the estimated project cost, and results were sorted into five categories to represent Cost:Benefit - very high, high, med, low, very low.

Cost opinions are order-of-magnitude, planning-level estimates based on local bid tabulations for similar project types. Planning-level cost estimates do not take into



Open House at Murchison Middle School

Kids Activities Station at the District 10 Open House

consideration localized specifics of each project such as right-of-way acquisition, significant utility relocation, etc. They are useful for aggregate-level budget planning, but individual project cost estimates will change as projects advance through further study and design.

After further feasibility study and engineering evaluation, final project cost estimates will change before they can be implemented. In some locations, alternate approaches to address the issue may prove more feasible or more cost effective.

PRIORITIZATION SUMMARY

There are a total of 405 recommended projects in City Council District 10 with a total estimated cost of $66.7 million. (Costs for projects located outside the City are not included in this figure.) The combined costs for all projects in each Overall Benefit category are shown in the table below.

Costs are planning-level estimates that will be refined as projects advance through further study and design. They can be used to evaluate the order-of-magnitude of needs at an aggregate level.

Overall Benefit Category	Combined Project Costs
1 - Very High	$12,100,000
2 - High	$15,600,000
3 - Medium	$12,800,000
4 - Low	$16,200,000
5 - Very Low	$10,000,000
District 10 Total	**$66,700,000**

NEXT STEPS

Both Overall Benefit and Estimated Cost:Benefit will be used to prioritize improvements. However, to use the Safe Routes to School's limited resources most effectively, the program is also considering other factors to determine which projects will move forward as well as project implementation order. These factors include final cost estimates, feasibility, leveraging / cost-sharing opportunities, and more.

Generally, projects will be selected for implementation using the following guiding principles:

1) Implement Projects that have a High/Very High Overall Benefit or a High/Very High Estimated Cost:Benefit,
2) Make meaningful improvements for walking and bicycling near as many schools as possible,
3) For 2016 bond funding, per council direction, balance funding equally per council district,
4) Other available sources of funding will be leveraged to implement additional projects.

The City of Austin has already started examining the feasibility of recommendations and, in some cases, has initiated design/construction for certain projects. Go to AustinTexas.gov/SafeRoutes to learn more and get updates about upcoming Safe Routes to School projects in each City Council District.

CITY COUNCIL DISTRICT 10

RECOMMENDED SAFE ROUTES TO SCHOOL PROJECTS

The following pages present maps of all recommendations, followed by detailed tables that include the Benefit and Cost: Benefit category for each project. Each recommendation has a unique identification number, which can be cross-referenced between the maps and the tables. The unique project ID is a combination of the school group code (e.g., 1C) and the project number shown on the map (e.g., 001).

Please note: Maps may include project recommendations located in nearby City Council Districts. However, tables within this report only list recommended projects for this district. Go to AustinTexas.gov/SafeRoutesProjects to learn more about citywide project recommendations.

Ideas presented in this document are planning-level concepts: many projects will require further feasibility study and engineering evaluation before they can be implemented. In some locations, alternate approaches to address the issue may prove more feasible or more cost effective.

SCHOOL GROUP 1A

MAP 1A: KATHY CARAWAY ELEMENTARY (ROUND ROCK ISD)

CITY OF AUSTIN austin MOTION 2016 MOBILITY BOND

SAFE ROUTES TO SCHOOL

TOOLE DESIGN

0 500 1000 1500 ft

- Off-Street Trail
- Bike Lane / Buffered Bike Lane / Protected Bike Lane
- Sidepath
- Neighborhood Bikeway / Traffic Calming
- New / Improved Sidewalk
- Other linear recommendation
- Traffic Control / Intersection Reconfiguration
- Ramp / Curb Extension / Crosswalk
- Over / Underpass
- Other Spot Recommendation
- Existing Trail
- School Boundary
- Council District Boundary

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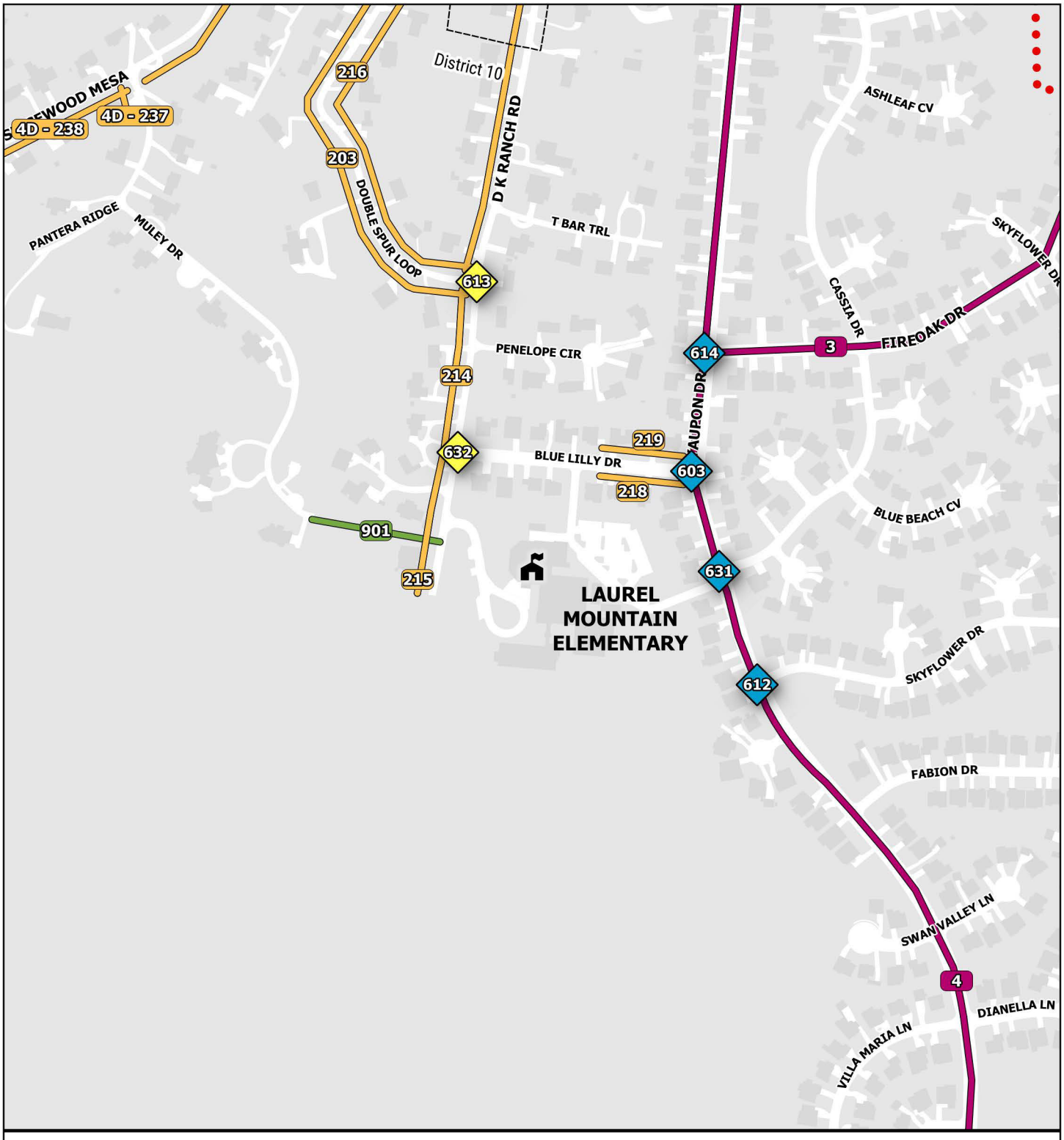
SCHOOL GROUP 1A

MAP 1A: LAUREL MOUNTAIN ELEMENTARY (ROUND ROCK ISD)



SAFE ROUTES TO SCHOOL

CITY OF AUSTIN austin MOTION 2016 MOBILITY BOND

TOOLE DESIGN

0 400 800 1200 ft

- Off-Street Trail
- Bike Lane / Buffered Bike Lane / Protected Bike Lane
- Sidepath
- Neighborhood Bikeway / Traffic Calming
- New / Improved Sidewalk
- Other linear recommendation
- Traffic Control / Intersection Reconfiguration
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- Over / Underpass
- Other Spot Recommendation
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- School Boundary
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Project ID * = some or all of project is outside COA	Project w/in 1/2 mi (ped) or 2 mi (bike) and attendance boundary of:	Location	Issue	Recommendation + = parking removal required ~ = private property acquisition required	Overall Benefit Category	Estimated Cost:Benefit Category
1A - 001	KATHY CARAWAY, CANYON VISTA	OAK VIEW DR	No bike facility, Wide ROW	Buffered Bike Lane - OAK VIEW DR from Fireoak DR to Near 6804 FIREOAK DR ~	2 - High	4 - Low
1A - 002	CANYON VISTA, KATHY CARAWAY	CARLWOOD DR	Wide ROWs encourage speeding; Lack of bike infrastructure	Neighborhood Bikeway - CARLWOOD DR from FIREOAK DR to Near 7121 VALLECITO DR	1 - Very High	1 - Very High
1A - 003	CANYON VISTA, LAUREL MOUNTAIN, KATHY CARAWAY	FIREOAK DR	No bike facility, Wide ROW	Add speed cushions - FIREOAK DR from YAUPON DR to SKYFLOWER DR, Protected Bike Lane - FIREOAK DR from CASSIA DR to SKYFLOWER DR, Buffered Bike Lane - FIREOAK DR from YAUPON DR to OAK KNOLL DR ~	1 - Very High	5 - Very Low
1A - 004	CANYON VISTA, LAUREL MOUNTAIN	YAUPON DR	No bike facility	Add speed cushions - YAUPON DR from BLUE LILLY DR to FIREOAK DR , Add protected bike lane - YAUPON DR from TEXAS PLUME RD to SPICEBRUSH DR , Lane diet (changing lane widths) & Parking one side - YAUPON DR from TEXAS PLUME RD to SPICEBRUSH DR ~	3 - Medium	5 - Very Low
1A - 202*	LAUREL MOUNTAIN	DOUBLE SPUR LOOP	Sidewalk obstructions	Fix sidewalk obstructions - DOUBLE SPUR LOOP from ROWEL DR to D K RANCH RD	5 - Very Low	5 - Very Low
1A - 203*	LAUREL MOUNTAIN	DOUBLE SPUR LOOP	Missing sidewalk	Construct new sidewalk - DOUBLE SPUR LOOP from D K RANCH RD to ROWEL DR	5 - Very Low	5 - Very Low
1A - 205	KATHY CARAWAY	OAK KNOLL DR	Vegetation blocks sidewalk	Fix sidewalk obstructions - OAK KNOLL DR from DANWOOD DR to THREE OAKS TRL	5 - Very Low	5 - Very Low
1A - 206	KATHY CARAWAY	DANWOOD DR	Missing sidewalk	Construct new sidewalk - DANWOOD DR from SHUMARD CIR to OAK KNOLL DR	5 - Very Low	5 - Very Low
1A - 207	KATHY CARAWAY	OAK VIEW DR	Missing sidewalk	Construct new sidewalk - OAK VIEW DR from FIREOAK DR to DANWOOD DR	4 - Low	4 - Low

* Indicates projects located outside or partially outside of the City of Austin limits and may not be eligible for Safe Routes to School funding.

Cost:Benefit rankings are preliminary, high-level estimates to identify cost-effective options to address safety concerns. Preliminary rankings are developed using planning-level costs for projects of this nature. Individual cost estimates will change as projects advance. See pages 4-5 of this report for more information.

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1A - 208	KATHY CARAWAY	FIREOAK DR	Missing sidewalk gap	Construct new sidewalk - FIREOAK DR from OAK KNOLL DR to OAK VIEW DR	4 - Low	4 - Low
1A - 209	KATHY CARAWAY	CARLWOOD DR	Missing sidewalk	Construct new sidewalk - CARLWOOD DR from FIREOAK DR to Near 7121 VALLECITO DR	3 - Medium	3 - Medium
1A - 210	KATHY CARAWAY	CARLWOOD DR	Missing sidewalk	Construct new sidewalk - CARLWOOD DR from VALLECITO DR to FIREOAK DR, Construct new sidewalk - CARLWOOD DR from Near 7101 CARLWOOD DR to VALLECITO DR	3 - Medium	3 - Medium
1A - 211	KATHY CARAWAY	OAK VIEW DR	Conflicts between students walking and biking to school Tree boxes narrow sidewalks	Fix sidewalk obstructions - OAK VIEW DR from ARROWPOINT CV to TOWNSHIP TRL, Widen existing sidewalk - OAK VIEW DR from ARROWPOINT CV to TOWNSHIP TRL	5 - Very Low	4 - Low
1A - 212	KATHY CARAWAY	OAK VIEW DR	Conflicts between students walking and biking to school Tree boxes narrow sidewalks	Fix sidewalk obstructions - OAK VIEW DR from OAK VIEW CV to SAGE OAK TRL, Repair existing sidewalk - OAK VIEW DR from OAK VIEW CV to SAGE OAK TRL	5 - Very Low	5 - Very Low
1A - 213	KATHY CARAWAY	BROAD OAKS DR	Missing sidewalk	Construct new sidewalk - BROAD OAKS DR from SCRUB OAK LN to FIREOAK DR	4 - Low	5 - Very Low

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1A - 214*	LAUREL MOUNTAIN, CANYON VISTA	D K RANCH RD	Missing sidewalk	Fix sidewalk obstructions - D K RANCH RD from D K RANCH CT to DOUBLE SPUR LOOP, Widen existing sidewalk - D K RANCH RD from D K RANCH CT to DOUBLE SPUR LOOP, Construct new sidewalk - D K RANCH RD from end of road to YAUPON DR	3 - Medium	5 - Very Low
1A - 215*	CANYON VISTA, LAUREL MOUNTAIN	D K RANCH RD	Missing sidewalk	Construct new sidewalk - D K RANCH RD from Near 10104 D K RANCH RD to YAUPON DR	3 - Medium	5 - Very Low
1A - 216*	LAUREL MOUNTAIN	DOUBLE SPUR LOOP	Missing sidewalk	Construct new sidewalk - DOUBLE SPUR LOOP from D K RANCH RD to D K RANCH RD	5 - Very Low	5 - Very Low
1A - 217	KATHY CARAWAY	RAIN CREEK PKWY	Missing sidewalk	Construct new sidewalk - RAIN CREEK PKWY from Near 7201 RAIN CREEK PKWY to FIREOAK DR , Construct new sidewalk - RAIN CREEK PKWY from RUDI CV to RED MAPLE CV	4 - Low	5 - Very Low
1A - 218	LAUREL MOUNTAIN	BLUE LILLY DR	Missing sidewalk	Construct new sidewalk - BLUE LILLY DR from Near 7707 BLUE LILLY DR to YAUPON DR	4 - Low	3 - Medium
1A - 219	LAUREL MOUNTAIN	BLUE LILLY DR	Missing sidewalk	Construct new sidewalk - BLUE LILLY DR from Near 7704 BLUE LILLY DR to YAUPON DR	4 - Low	3 - Medium
1A - 601	KATHY CARAWAY	DANWOOD DR / OAK VIEW DR	Missing/non-compliant curb ramps	Install 4 curb ramps +	5 - Very Low	4 - Low
1A - 602	KATHY CARAWAY	ANTIGUA DR / FIREOAK DR	Missing/non-compliant curb ramps	Install 2 curb ramps +	5 - Very Low	4 - Low

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1A - 603	LAUREL MOUNTAIN	BLUE LILLY DR / YAUPON DR	Poor sightlines,High speed crossing	Add curb extensions, Install raised crosswalk, Reconfigure lanes	3 - Medium	4 - Low
1A - 604	KATHY CARAWAY	OAK VIEW DR / WINDRIDGE DR	Missing curb ramps	Install 2 curb ramps	4 - Low	3 - Medium
1A - 605	KATHY CARAWAY	OAK VIEW CV / OAK VIEW DR	Missing curb ramps	Install 2 curb ramps	4 - Low	3 - Medium
1A - 606	KATHY CARAWAY	OAK VIEW DR / VALLECITO DR	Missing/non-compliant curb ramps	Install curb ramps +	4 - Low	2 - High
1A - 607	KATHY CARAWAY	BUCKTHORN DR / OAK VIEW DR	Missing curb ramps	Install 2 curb ramps +	4 - Low	2 - High
1A - 608	KATHY CARAWAY	NARROW OAK TRL / OAK VIEW DR	Missing curb ramps	Install 2 curb ramps +	4 - Low	2 - High
1A - 609	KATHY CARAWAY	FIREOAK DR / OAK VIEW DR	Missing/non-compliant curb ramps	Install 4 curb ramps +	4 - Low	2 - High

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1A - 612	LAUREL MOUNTAIN	SKYFLOWER DR / YAUPON DR	Difficult crossing,High speed crossing,Long crossing distance	Add median refuge island on Yaupon, Install high visibility crosswalk	4 - Low	3 - Medium
1A - 613*	LAUREL MOUNTAIN	D K RANCH RD / DOUBLE SPUR LOOP	Difficult crossing,High speed crossing	Install 2 curb ramps, Install raised crosswalk	4 - Low	3 - Medium
1A - 614	LAUREL MOUNTAIN	FIREOAK DR / YAUPON DR	Difficult Crossing	Add median refuge island on Yaupon, Install 1 curb ramp, Install high visibility crosswalk ~ +	4 - Low	3 - Medium
1A - 615	KATHY CARAWAY	CHARRED OAK DR / FIREOAK DR	Missing/non-compliant curb ramps	Install 2 curb ramps +	5 - Very Low	5 - Very Low
1A - 616	KATHY CARAWAY	DEADOAK LN / FIREOAK DR	Missing/non-compliant curb ramps	Install 2 curb ramps +	5 - Very Low	4 - Low
1A - 617	KATHY CARAWAY	OAK VIEW DR / RUSTLING OAKS TRL	Missing/non-compliant curb ramps	Install 2 curb ramps +	5 - Very Low	4 - Low

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1A - 618	KATHY CARAWAY	BROAD OAKS DR / FIREOAK DR	Missing/non-compliant curb ramps,Difficult crossing,Long crossing distance	Add median refuge island on Fireoak Dr, Install 2 curb ramps, Install high visibility crosswalk	4 - Low	3 - Medium
1A - 619	KATHY CARAWAY	FIREOAK DR / OAK VIEW DR	Missing/non-compliant curb ramps,Difficult crossing	Install 2 curb ramps, Install high visibility crosswalk	4 - Low	2 - High
1A - 620	KATHY CARAWAY	CARLWOOD DR / VALLECITO DR	Missing curb ramps	Install 2 curb ramps +	3 - Medium	2 - High
1A - 621	KATHY CARAWAY	CARLWOOD DR / DEADOAK LN	Missing curb ramps	Install 2 curb ramps +	3 - Medium	2 - High
1A - 622	KATHY CARAWAY	DANWOOD DR / FIREOAK DR	Missing/non-compliant curb ramps,Long crossing distance	Add curb extensions, Add median refuge island on Danwood Dr +	4 - Low	3 - Medium
1A - 623	KATHY CARAWAY	DANWOOD DR / OAK KNOLL DR	Difficult crossing,Long crossing distance	Add curb extensions, Add median refuge island on Danwood Dr / Oak Knoll Dr, Install high visibility crosswalk +	5 - Very Low	4 - Low
1A - 624	KATHY CARAWAY	FIREOAK DR / PRADERA DR	Missing/non-compliant curb ramps	Install 2 curb ramps +	4 - Low	2 - High

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1A - 625	KATHY CARAWAY	BARRINGTON WAY / FIREOAK DR	Missing/non-compliant curb ramps,Long crossing distance	Add curb extensions, Add median refuge island on Fireoak Dr, Install 4 curb ramps +	3 - Medium	3 - Medium
1A - 626	KATHY CARAWAY	OAK VIEW DR / TOWNSHIP TRL	Missing/non-compliant curb ramps,Long crossing distance	Add median refuge island on Oak View Dr, Install 4 curb ramps, Install stop sign +	3 - Medium	2 - High
1A - 627	KATHY CARAWAY	CARLWOOD DR / FIREOAK DR	Missing curb ramps, Difficult Crossing	Add curb extensions, Install 2 curb ramps +	3 - Medium	2 - High
1A - 628	KATHY CARAWAY	OAK VIEW DR / SAGE OAK TRL	Missing curb ramps	Install 2 curb ramps +	4 - Low	3 - Medium
1A - 629	KATHY CARAWAY	OAK VIEW DR / SPEAR OAK CV	Missing curb ramps	Install 2 curb ramps	5 - Very Low	3 - Medium
1A - 630	KATHY CARAWAY	NINE OAKS CV / OAK VIEW DR	Missing curb ramps	Install 2 curb ramps	5 - Very Low	3 - Medium
1A - 631	LAUREL MOUNTAIN	CASSIA DR / YAUPON DR	High speed crossing,Long crossing distance	Add median refuge island on Yaupon, Install 2 curb ramps, Install Rapid Rectangular Flashing Beacon, Intersection reconfiguration	2 - High	5 - Very Low
1A - 632*	LAUREL MOUNTAIN	BLUE LILLY DR / D K RANCH RD	Wide curb radii	Add curb extensions, Install 2 curb extensions on DK Ranch +	4 - Low	3 - Medium

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1A - 801	KATHY CARAWAY	Near 6810 ARROWPOINT CV	Overgrown vegetation	Clear vegetation blocking school zone signage	5 - Very Low	5 - Very Low
1A - 901*	CANYON VISTA, LAUREL MOUNTAIN	from Muley Dr to DK Ranch Rd	Desired bike/ped route	Construct new trail	3 - Medium	4 - Low
4D - 009*	CANYON VISTA, LAUREL MOUNTAIN	YAUPON DR	No bike facility	Add protected bike lane - YAUPON DR from FIREOAK DR to SPICEWOOD SPRINGS RD	2 - High	4 - Low
4D - 216*	CANYON VISTA, LAUREL MOUNTAIN	YUCCA DR	Missing sidewalk	Construct new sidewalk - YUCCA DR from POMMEL DR to Near 11312 YUCCA DR	4 - Low	5 - Very Low
4D - 217*	CANYON VISTA, LAUREL MOUNTAIN	POMMEL DR	Missing sidewalk	Construct new sidewalk - POMMEL DR from YUCCA DR to Near 8311 POMMEL DR	4 - Low	5 - Very Low
4D - 237*	LAUREL MOUNTAIN	PANTERA RIDGE	Missing sidewalk	Construct new sidewalk - PANTERA RIDGE from 10302 PANTERA RIDGE to SPICEWOOD MESA	5 - Very Low	3 - Medium
4D - 238*	LAUREL MOUNTAIN	SPICEWOOD MESA	Missing sidewalk	Construct new sidewalk - SPICEWOOD MESA from YUCCA DR to YUCCA DR	4 - Low	5 - Very Low
4D - 239*	LAUREL MOUNTAIN	YUCCA DR	Missing sidewalk	Construct new sidewalk - YUCCA DR from SPICEWOOD MESA to POMMEL DR	5 - Very Low	5 - Very Low
4D - 240*	LAUREL MOUNTAIN	ROWEL DR	Missing sidewalk	Construct new sidewalk - ROWEL DR from DOUBLE SPUR LOOP to YUCCA DR	5 - Very Low	4 - Low
4D - 241*	LAUREL MOUNTAIN	D K RANCH RD	Narrow sidewalk	Fix sidewalk obstructions - D K RANCH RD from D K RANCH CT to DOUBLE SPUR LOOP; Widen existing sidewalk - D K RANCH RD from D K RANCH CT to DOUBLE SPUR LOOP	5 - Very Low	5 - Very Low

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4D - 242	LAUREL MOUNTAIN	YAUPON DR	Portions of sidewalk have cross slope that exceeds ADA	Repair existing sidewalk - YAUPON DR from CASSIA DR to TEXAS PLUME RD	5 - Very Low	5 - Very Low
4D - 691*	LAUREL MOUNTAIN	POMMEL DR / YUCCA DR	Difficult crossing	Tighten curb radii [2]	5 - Very Low	4 - Low
4D - 695*	LAUREL MOUNTAIN	DOUBLE SPUR LOOP / ROWEL DR	Difficult crossing, Poor sightlines	Add limited sight distance signage at top of hill. Add stop bar at Double Spur Loop, Install high visibility crosswalk, Trim back trees/vegetation	5 - Very Low	3 - Medium
4D - 696*	LAUREL MOUNTAIN	D K RANCH RD / DOUBLE SPUR LOOP	High speed crossing	Install raised crosswalk	4 - Low	3 - Medium

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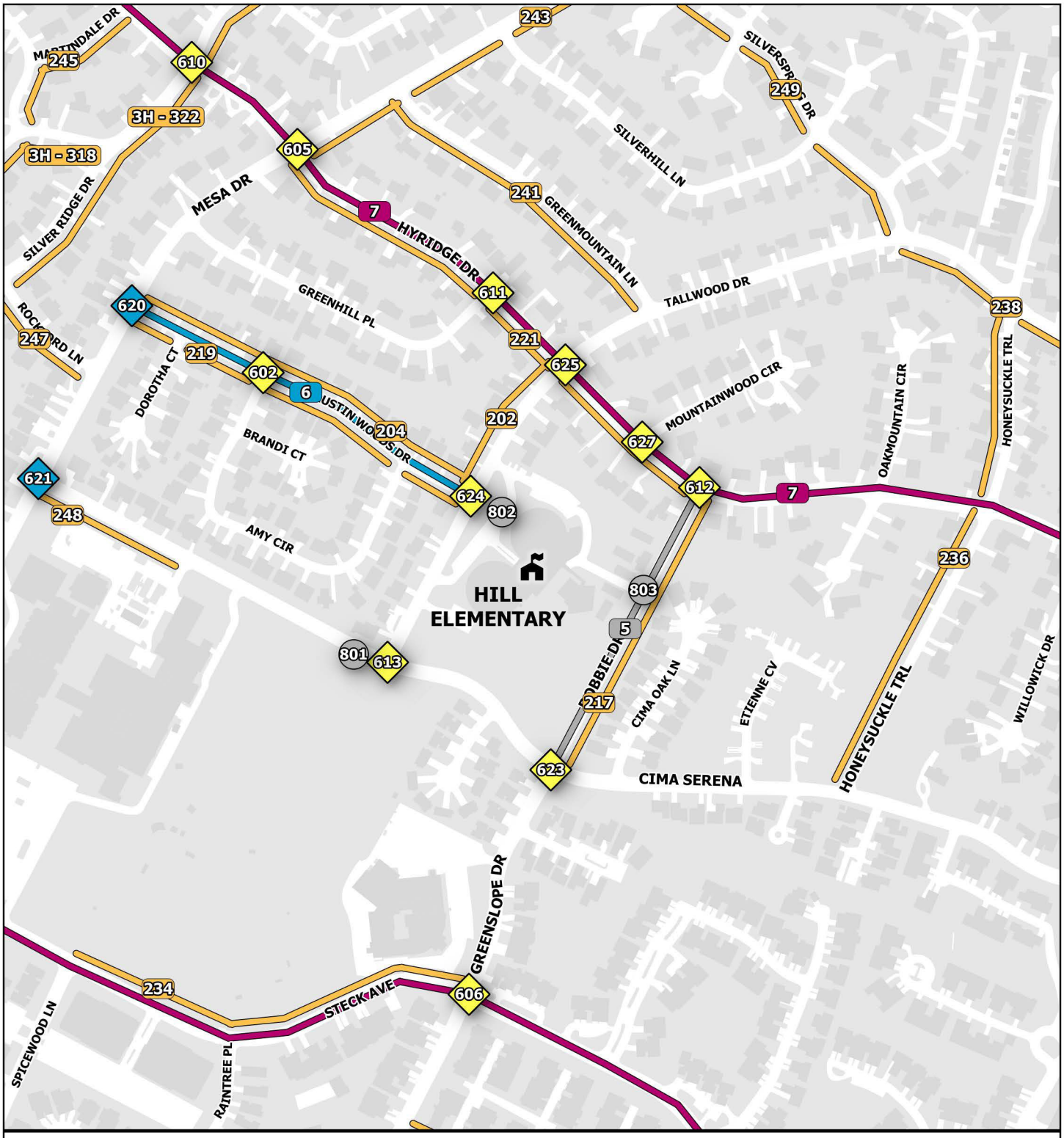
MAP 1B: HILL ELEMENTARY



CITY OF AUSTIN
austin MOTION
2016 MOBILITY BOND

SAFE ROUTES TO SCHOOL

TOOLE DESIGN

0 400 800 1200 ft

- Off-Street Trail
- Bike Lane / Buffered Bike Lane / Protected Bike Lane
- Sidepath
- Neighborhood Bikeway / Traffic Calming
- New / Improved Sidewalk
- Other linear recommendation
- Traffic Control / Intersection Reconfiguration
- Ramp / Curb Extension / Crosswalk
- Over / Underpass
- Other Spot Recommendation
- Existing Trail
- School Boundary
- Council District Boundary

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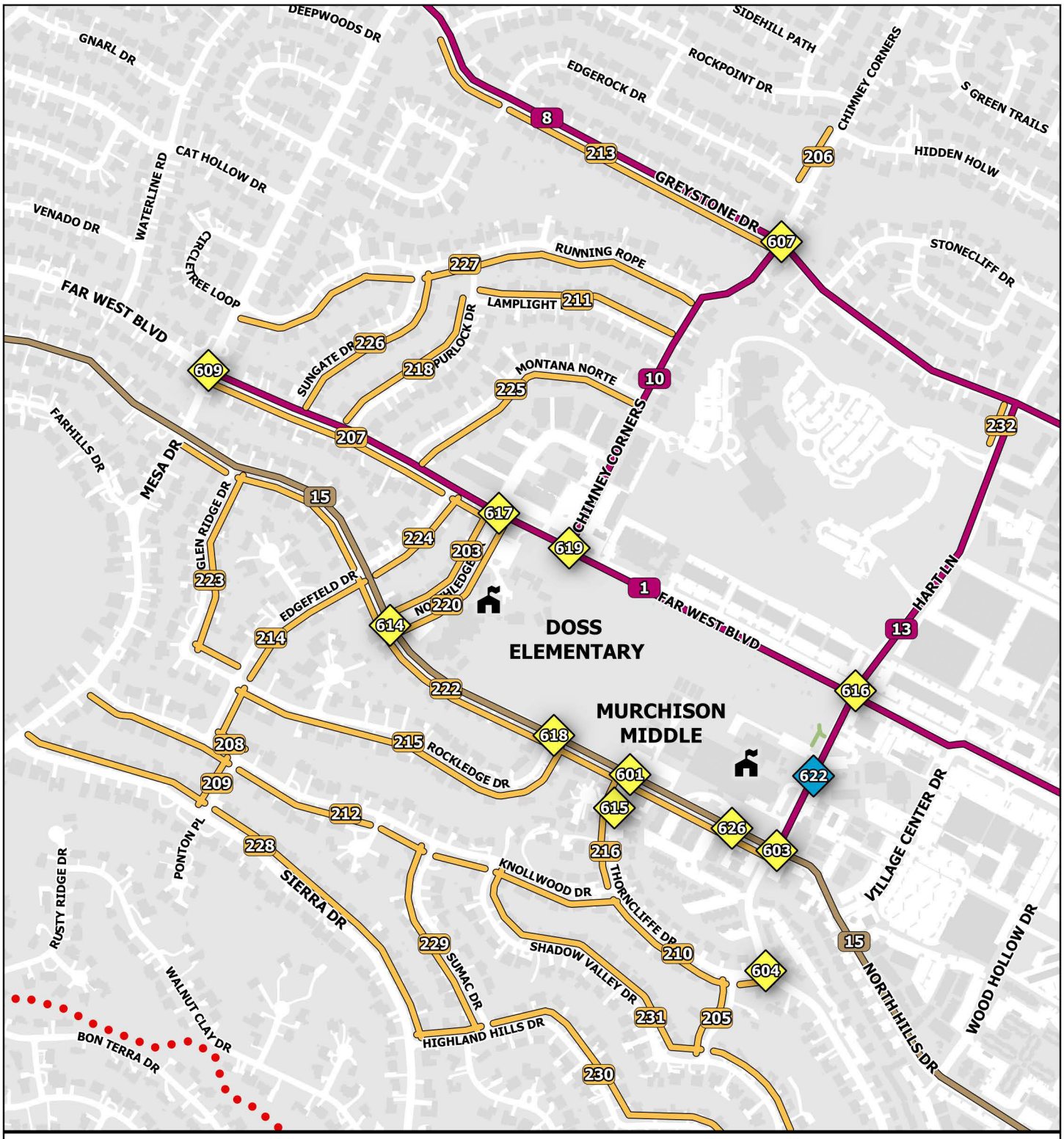
MAP 1B: DOSS ELEMENTARY / MURCHISON MIDDLE



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1B - 001	MURCHISON, DOSS	FAR WEST BLVD	Desired Bike Route	Convert existing bike lane into protected bike lane (add buffer and vertical separators) - FAR WEST BLVD from MESA DR to VILLAGE CENTER DR , Lane diet (changing lane widths) - FAR WEST BLVD from MESA DR to VILLAGE CENTER DR	1 - Very High	2 - High
1B - 003	MURCHISON, DOSS	FAR WEST BLVD	No bike facility, Wide ROW	Protected Bike Lane - FAR WEST BLVD from N MOPAC EXPY SVRD SB to VILLAGE CENTER DR	3 - Medium	3 - Medium
1B - 004	MURCHISON, HILL	ADIRONDACK TRL	No bike facility	Protected Bike Lane - ADIRONDACK TRL from OLD SPICEWOOD SPRINGS RD to HYRIDGE DR ~	2 - High	4 - Low
1B - 005	HILL	ROBBIE DR	Illegal/conflicts U-turns occuring in front of school	Add signage/markings	2 - High	1 - Very High
1B - 006	MURCHISON, HILL	AUSTIN WOODS DR	Excessive vehicle speeds	Neighborhood Bikeway - AUSTIN WOODS DR from MESA DR to TALLWOOD DR, Add chicanes - AUSTIN WOODS DR from MESA DR to TALLWOOD DR	1 - Very High	1 - Very High
1B - 007	MURCHISON, HILL	HYRIDGE DR	No bike facility	Bike Lane - HYRIDGE DR from HYRIDGE CREEK PARK DR to MOUNTAINWOOD CIR, Buffered Bike Lane - HYRIDGE DR from MOUNTAINWOOD CIR to N MOPAC EXPY SVRD SB ~ +	1 - Very High	4 - Low
1B - 008	MURCHISON, DOSS	GREYSTONE DR	Existing bike lane is unprotected	Bike Lane - GREYSTONE DR from N MOPAC EXPY SVRD SB to VALBURN DR, Buffered Bike Lane - GREYSTONE DR from ROCKPOINT DR to WOOD HOLLOW DR ~	1 - Very High	5 - Very Low

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1B - 010	MURCHISON, DOSS	CHIMNEY CORNERS	Bike lanes do not prohibit parking and thus double as parking lane.	Add parking restrictions for bike lane to prevent cars from parking here - CHIMNEY CORNERS from FAR WEST BLVD to GREYSTONE DR ~	1 - Very High	1 - Very High
1B - 011	MURCHISON, HILL	MOUNTAIN RIDGE DR	No bike facility	Protected Bike Lane - MOUNTAIN RIDGE DR from HYRIDGE DR to MOUNTAIN PATH DR ~	4 - Low	3 - Medium
1B - 012	MURCHISON, HILL	STECK AVE	Wide ROW	Protected Bike Lane - STECK AVE from HIGH OAK DR to BENT TREE RD	2 - High	4 - Low
1B - 013	DOSS, MURCHISON	HART LN	No bike facility	Add protected bike lane - HART LN from NORTH HILLS DR to GREYSTONE DR	1 - Very High	3 - Medium
1B - 015	LAMAR, GULLETT, MURCHISON, DOSS	NORTH HILLS DR	No bike facility	Add sidepath - NORTH HILLS DR from BALCONES DR to FAR WEST BLVD	1 - Very High	5 - Very Low
1B - 202	HILL	TALLWOOD DR	Missing sidewalk	Construct new sidewalk - TALLWOOD DR from AUSTIN WOODS DR to HYRIDGE DR	1 - Very High	2 - High
1B - 203	DOSS, MURCHISON	NORTHLEDGE DR	Missing sidewalk on north side of the street where parents park and cross street	Construct new sidewalk - NORTHLEDGE DR from NORTH HILLS DR to FAR WEST BLVD	1 - Very High	2 - High
1B - 204	HILL	AUSTIN WOODS DR	Missing sidewalk	Construct new sidewalk - AUSTIN WOODS DR from MESA DR to DOROTHA CT, Construct new sidewalk - AUSTIN WOODS DR from AMY CIR to DOROTHA CT, Construct new sidewalk - AUSTIN WOODS DR from DOROTHA CT to AMY CIR, Construct new sidewalk - AUSTIN WOODS DR from AMY CIR to TALLWOOD DR	1 - Very High	2 - High
1B - 205	DOSS, MURCHISON	LAUREL VALLEY DR	Missing sidewalk	Construct new sidewalk - LAUREL VALLEY DR from SHADOW VALLEY DR to THORNCLIFFE DR	4 - Low	3 - Medium

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1B - 206	DOSS	CHIMNEY CORNERS	Missing sidewalk	Construct new sidewalk - CHIMNEY CORNERS from EDGEROCK DR to HIDDEN HOLW	3 - Medium	2 - High
1B - 207	MURCHISON, DOSS	FAR WEST BLVD	Missing sidewalk	Construct new sidewalk - FAR WEST BLVD from MESA DR to EDGEFIELD DR	1 - Very High	3 - Medium
1B - 208	MURCHISON, DOSS	KNOLLWOOD DR	Missing sidewalk	Construct new sidewalk - KNOLLWOOD DR from EDGEFIELD DR to PONTON PL	5 - Very Low	3 - Medium
1B - 209	DOSS, MURCHISON	PONTON PL	Missing sidewalk	Construct new sidewalk - PONTON PL from SIERRA DR to KNOLLWOOD DR	5 - Very Low	3 - Medium
1B - 210	MURCHISON, DOSS	THORNCLIFFE DR	Missing sidewalk	Construct new sidewalk - THORNCLIFFE DR from HART LN to KNOLLWOOD DR	4 - Low	4 - Low
1B - 211	DOSS, MURCHISON	LAMPLIGHT LN	Missing sidewalk	Construct new sidewalk - LAMPLIGHT LN from SPURLOCK DR to CHIMNEY CORNERS	4 - Low	5 - Very Low
1B - 212	MURCHISON, DOSS	KNOLLWOOD DR	Missing sidewalk	Construct new sidewalk - KNOLLWOOD DR from MESA DR to THORNCLIFFE DR	3 - Medium	5 - Very Low
1B - 213	DOSS, MURCHISON	GREYSTONE DR	Missing sidewalk	Construct new sidewalk - GREYSTONE DR from CHIMNEY CORNERS to ROCKPOINT DR	4 - Low	5 - Very Low
1B - 214	MURCHISON, DOSS	EDGEFIELD DR	Missing sidewalk	Construct new sidewalk - EDGEFIELD DR from KNOLLWOOD DR to NORTH HILLS DR	3 - Medium	4 - Low
1B - 215	DOSS, MURCHISON	ROCKLEDGE DR	Missing sidewalk	Construct new sidewalk - ROCKLEDGE DR from NORTH HILLS DR to EDGEFIELD DR	3 - Medium	5 - Very Low
1B - 216	MURCHISON, DOSS	THORNCLIFFE DR	Missing sidewalk	Construct new sidewalk - THORNCLIFFE DR from KNOLLWOOD DR to NORTH HILLS DR	3 - Medium	3 - Medium
1B - 217	HILL	ROBBIE DR	Missing sidewalk	Construct new sidewalk - ROBBIE DR from HYRIDGE DR to CIMA SERENA	2 - High	3 - Medium
1B - 218	DOSS, MURCHISON	SPURLOCK DR	Missing sidewalk	Construct new sidewalk - SPURLOCK DR from FAR WEST BLVD to LAMPLIGHT LN	4 - Low	4 - Low
1B - 219	HILL	AUSTIN WOODS DR	Missing sidewalk	Construct new sidewalk - AUSTIN WOODS DR from TALLWOOD DR to MESA DR	2 - High	3 - Medium

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1B - 220	MURCHISON, DOSS	NORTHLEDGE DR	Conflicts between students walking and biking to school on south side of street	Widen existing sidewalk - NORTHLEDGE DR from FAR WEST BLVD to NORTH HILLS DR, Repair existing sidewalk - NORTHLEDGE DR from FAR WEST BLVD to NORTH HILLS DR	5 - Very Low	4 - Low
1B - 221	HILL	HYRIDGE DR	Missing sidewalk	Construct new sidewalk - HYRIDGE DR from MESA DR to ROBBIE DR	1 - Very High	3 - Medium
1B - 222	MURCHISON, DOSS	NORTH HILLS DR	conflicts between students walking and biking to school, Narrow sidewalk	Repair existing sidewalk - NORTH HILLS DR from MESA DR TO HART LN, Construct new sidewalk - NORTH HILLS DR from MESA DR TO HART LN	1 - Very High	5 - Very Low
1B - 223	DOSS, MURCHISON	GLEN RIDGE DR	Missing sidewalk	Construct new sidewalk - GLEN RIDGE DR from ROCKLEDGE DR to NORTH HILLS DR , Construct new sidewalk - ROCKLEDGE DR from GLEN RIDGE DR to EDGEFIELD DR	5 - Very Low	5 - Very Low
1B - 224	MURCHISON, DOSS	EDGEFIELD DR	Missing sidewalk	Construct new sidewalk - EDGEFIELD DR from FAR WEST BLVD to NORTH HILLS DR	5 - Very Low	4 - Low
1B - 225	MURCHISON, DOSS	MONTANA NORTE	Missing sidewalk	Construct new sidewalk - MONTANA NORTE from FAR WEST BLVD to CHIMNEY CORNERS	4 - Low	5 - Very Low
1B - 226	DOSS	SUNGATE DR	Missing sidewalk	Construct new sidewalk - SUNGATE DR from FAR WEST BLVD to RUNNING ROPE	5 - Very Low	5 - Very Low
1B - 227	DOSS, MURCHISON	RUNNING ROPE	Missing sidewalk	Construct new sidewalk - RUNNING ROPE from CHIMNEY CORNERS to MESA DR	4 - Low	5 - Very Low
1B - 228	MURCHISON, DOSS	SIERRA DR	Missing sidewalk	Construct new sidewalk - SIERRA DR from MESA DR to MOUNTAINCLIMB DR	5 - Very Low	5 - Very Low

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1B - 229	DOSS, MURCHISON	SUMAC DR	Missing sidewalk	Construct new sidewalk - SUMAC DR from HIGHLAND HILLS DR to KNOLLWOOD DR	4 - Low	5 - Very Low
1B - 230	MURCHISON, DOSS	HIGHLAND HILLS DR	Missing sidewalk	Construct new sidewalk - HIGHLAND HILLS DR from SHADOW MOUNTAIN DR to MOUNTAINCLIMB DR	4 - Low	5 - Very Low
1B - 231	DOSS, MURCHISON	SHADOW VALLEY DR	Missing sidewalk	Construct new sidewalk - SHADOW VALLEY DR from KNOLLWOOD DR to Near 6103 SHADOW VALLEY DR	4 - Low	5 - Very Low
1B - 232	MURCHISON, DOSS	HART LN	Missing sidewalk	Construct new sidewalk - HART LN from JEWISH COMMUNITY CAMPUS PARKING LOT ENTRANCE to GREYSTONE DR	2 - High	2 - High
1B - 233	HILL	STECK AVE	Missing sidewalk	Construct new sidewalk - STECK AVE from GREENSLOPE DR to SPICEWOOD LN	4 - Low	4 - Low
1B - 235	HILL	HONEYSUCKLE TRL	Missing sidewalk	Construct new sidewalk - HONEYSUCKLE TRL from CIMA SERENA to TALLWOOD DR	4 - Low	5 - Very Low
1B - 237	HILL	TALLWOOD DR	Missing sidewalk	Construct new sidewalk - TALLWOOD DR from WILLOWICK DR to SILVERSPRING DR	5 - Very Low	5 - Very Low
1B - 239	HILL	SILVERSPRING DR	Missing sidewalk	Construct new sidewalk - SILVERSPRING DR from MESA DR to TALLWOOD DR	3 - Medium	3 - Medium
1B - 240	HILL	GREENMOUNTAIN LN	Missing sidewalk	Construct new sidewalk - GREENMOUNTAIN LN from TALLWOOD DR to MESA DR	5 - Very Low	5 - Very Low
1B - 242	HILL	MESA DR	Missing sidewalk	Construct new sidewalk - MESA DR from Near 8815 MESA DR to HYRIDGE DR	4 - Low	5 - Very Low
1B - 244	HILL	GREEN VALLEY	Missing sidewalk	Construct new sidewalk - GREEN VALLEY from MARTINDALE DR to EMERALD HILL DR , Construct new sidewalk - MARTINDALE DR from HYRIDGE DR to GREEN VALLEY	5 - Very Low	5 - Very Low
1B - 246	HILL	ROCKFORD LN	Missing sidewalk	Construct new sidewalk - ROCKFORD LN from MESA DR to SILVER RIDGE DR	4 - Low	3 - Medium

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1B - 248	HILL	CIMA SERENA	Missing sidewalk	Construct new sidewalk - CIMA SERENA from eastern LC ANDERSON HIGH SCHOOL PARKING LOT ENTRANCE to MESA DR	4 - Low	3 - Medium
1B - 601	MURCHISON, DOSS	NORTH HILLS DR / THORNCLIFF E DR	Difficult Crossing	Add curb extensions, Install high visibility crosswalk ~ +	1 - Very High	1 - Very High
1B - 602	HILL	AMY CIR / AUSTIN WOODS DR	Difficult crossing	Install high visibility crosswalk	1 - Very High	1 - Very High
1B - 603	MURCHISON, DOSS	HART LN / NORTH HILLS DR	Wide curb radii	reduce corner radius. consider curb extensions +	2 - High	2 - High
1B - 604	MURCHISON, DOSS	HART LN / THORNCLIFF E DR	Wide curb radii	Add curb extensions, Install 4 curb ramps, Install high visibility crosswalk, reduce corner radius ~ +	3 - Medium	3 - Medium
1B - 605	HILL	HYRIDGE DR / MESA DR	Missing/non-compliant curb ramps,High speed crossing,Wide curb radii	Add curb extensions, Install 3 curb ramps, tighten curb radius	2 - High	2 - High
1B - 606	HILL	GREENSLOPE DR / STECK AVE	Missing/non-compliant curb ramps,Wide curb radii	Add curb extensions, Install 4 curb ramps, Install high visibility crosswalk	4 - Low	3 - Medium

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1B - 607	MURCHISON, DOSS	CHIMNEY CORNERS / GREYSTONE DR	Missing/non-compliant curb ramps	Install 3 curb ramps +	5 - Very Low	3 - Medium
1B - 608	HILL	HYRIDGE DR / WESTOVER CLUB DR	Difficult Crossing	Add curb extensions +	3 - Medium	2 - High
1B - 609	DOSS	FAR WEST BLVD / MESA DR	Difficult Crossing, Missing Curb Ramps	Add curb extensions, Install 3 curb ramps +	2 - High	2 - High
1B - 610	HILL	HYRIDGE DR / POINT WEST DR / SILVER RIDGE DR	Difficult crossing	Add curb extensions +	2 - High	2 - High
1B - 611	HILL	GREENHILL PL / HYRIDGE DR	Missing/non-compliant curb ramps	Install 2 curb ramps	5 - Very Low	3 - Medium
1B - 612	HILL	HYRIDGE DR / ROBBIE DR	Missing curb ramps, Higher vehicle speeds observed	Install 2 curb ramps, Install neighborhood traffic circle	4 - Low	2 - High

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1B - 613	HILL	CIMA SERENA / TALLWOOD DR	Missing/non-compliant curb ramps,High speed crossing,Wide curb radii	Install 4 curb ramps, Install neighborhood traffic circle +	2 - High	1 - Very High
1B - 614	MURCHISON, DOSS	NORTH HILLS DR / NORTHLEDGE DR	Difficult crossing	Add curb extensions +	2 - High	1 - Very High
1B - 615	MURCHISON, DOSS	MIA TIA CIR / THORNCLIFFE DR	Difficult crossing	Add curb extensions, Install 2 curb ramps +	2 - High	2 - High
1B - 616	MURCHISON, DOSS	FAR WEST BLVD / HART LN	High speed crossing,Wide curb radii	Install 4 curb ramps, Install high visibility crosswalk, update signal timing to reduce pedestrian wait time at intersection during school pickup/drop off hours +	1 - Very High	1 - Very High
1B - 617	MURCHISON, DOSS	FAR WEST BLVD / NORTHLEDGE DR	Difficult crossing	Add curb extensions +	1 - Very High	1 - Very High
1B - 618	MURCHISON, DOSS	NORTH HILLS DR / ROCKLEDGE DR	Difficult Crossing, Missing Curb Ramps	Install 2 curb ramps, Repaint crosswalk markings ~ +	1 - Very High	1 - Very High

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1B - 619	MURCHISON, DOSS	CHIMNEY CORNERS / FAR WEST BLVD	Missing/non-compliant curb ramps,Difficult crossing	Install 1 curb ramp, Install high visibility crosswalk +	1 - Very High	1 - Very High
1B - 620	HILL	AUSTIN WOODS DR / MESA DR	Difficult crossing	Add median refuge island on Mesa, Install 3 curb ramps	2 - High	2 - High
1B - 621	HILL	CIMA SERENA / MESA DR	High speed crossing	Add median refuge island on Mesa Dr, Install 2 curb ramps +	4 - Low	3 - Medium
1B - 622	MURCHISON, DOSS	HART LN	High speed crossing,Long crossing distance	Add median refuge island	2 - High	1 - Very High
1B - 623	HILL	CIMA SERENA / GREENSLOPE	Non-compliant curb ramps	Add curb extension; Install crosswalk	3 - Medium	2 - High
1B - 624	HILL	AUSTIN WOODS DR / TALLWOOD DR	Difficult crossing, primary access for walkers to school	Add curb extensions; Install 4 curb ramps; Install high visibility crosswalk; Raised intersection	2 - High	4 - Low
1B - 625	HILL	HYRIDGE DR / TALLWOOD DR	Difficult crossing, Parents make mid-block u-turns creating conflicts with pedestrians	Install high visibility crosswalk; Install neighborhood traffic circle	2 - High	1 - Very High

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1B - 626	MURCHISON, DOSS	Midblock - NORTH HILLS DR	Missing curb ramps	Install 4 curb ramps	2 - High	1 - Very High
1B - 627	HILL	HYRIDGE DR / MOUNTAIN WOOD CIR	Missing curb ramps	Add new curb ramp	4 - Low	2 - High
1B - 628	None (nearest school: Caraway)	GREYSTONE DR / WEST RIM DR	Difficult crossing	Add new curb ramp [4] , Install high visibility crosswalk [2] across West Rim Dr & Greystone Dr , Install Rapid Flashing Beacon [1] , Tighten curb radii [4]	4 - Low	4 - Low
1B - 801	HILL	Near 8400 TALLWOOD DR	Unclear benefit of limited left turns	Signage	5 - Very Low	4 - Low
1B - 802	HILL	Near 8601 TALLWOOD DR	No bike parking	Add bike parking	5 - Very Low	3 - Medium
1B - 803	HILL	Near 8602 CIMA OAK LN	Limited access	Add gate through fence	2 - High	1 - Very High
1B - 901	MURCHISON, DOSS	Connection between Charleston Place and Chimney Corners	Missing trail connection	Construct new trail	3 - Medium	1 - Very High

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3H - 305	HILL	SOUTH DR	Missing sidewalk	Construct new sidewalk - SOUTH DR from GREENSLOPE DR to FOREST MESA DR	5 - Very Low	4 - Low
3H - 307	HILL	CAMELIA LN	Missing sidewalk	Construct new sidewalk - CAMELIA LN from HYRIDGE DR to TALLWOOD DR	5 - Very Low	5 - Very Low
3H - 308	HILL	AZALEA TRL	Missing sidewalk	Construct new sidewalk - AZALEA TRL from HYRIDGE DR to TALLWOOD DR	5 - Very Low	5 - Very Low
3H - 309	HILL	WILLOWICK DR	Missing sidewalk	Construct new sidewalk - WILLOWICK DR from HYRIDGE DR to TALLWOOD DR	5 - Very Low	5 - Very Low
3H - 315	HILL	POINT WEST DR	Missing sidewalk	Construct new sidewalk - POINT WEST DR from SILVERSPRING DR to HYRIDGE DR , Construct new sidewalk - SILVERSPRING DR from MESA DR to POINT WEST DR	3 - Medium	4 - Low
3H - 316	HILL	WESTOVER CLUB DR	Missing sidewalk	Construct new sidewalk - WESTOVER CLUB DR from HYRIDGE DR to POINT WEST DR	4 - Low	4 - Low
3H - 318	HILL	EMERALD HILL DR	Missing sidewalk	Construct new sidewalk - EMERALD HILL DR from SILVER RIDGE DR to Near 8401 EMERALD HILL DR	4 - Low	5 - Very Low
3H - 321	HILL	GREENFLINT LN	Missing sidewalk	Construct new sidewalk - GREENFLINT LN from MESA DR to HIGH OAK DR , Construct new sidewalk - GREENFLINT LN from HIGH OAK DR to SILVER RIDGE DR	4 - Low	4 - Low
3H - 322	HILL	SILVER RIDGE DR	Missing sidewalk	Construct new sidewalk - SILVER RIDGE DR from HYRIDGE DR to STECK AVE	3 - Medium	5 - Very Low

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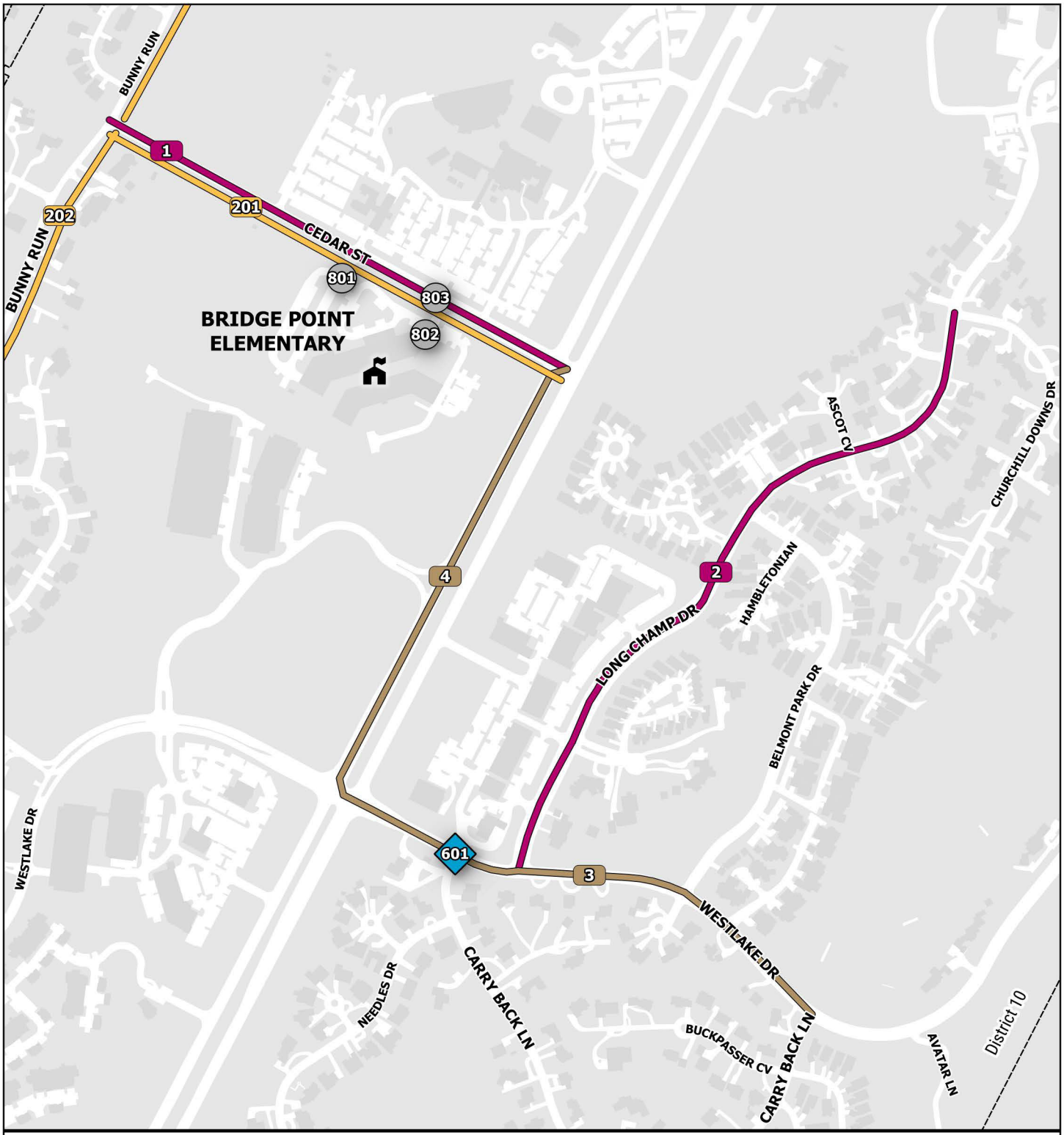
MAP 1D: BRIDGE POINT ELEMENTARY (EANES ISD)



CITY OF AUSTIN
austin MOTION
2016 MOBILITY BOND

SAFE ROUTES TO SCHOOL

TOOLE DESIGN

0 400 800 1200 ft

- Off-Street Trail
- Bike Lane / Buffered Bike Lane / Protected Bike Lane
- Sidepath
- Neighborhood Bikeway / Traffic Calming
- New / Improved Sidewalk
- Other linear recommendation
- Traffic Control / Intersection Reconfiguration
- Ramp / Curb Extension / Crosswalk
- Over / Underpass
- Other Spot Recommendation
- Existing Trail
- School Boundary
- Council District Boundary

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Project ID * = some or all of project is outside COA	Project w/in 1/2 mi (ped) or 2 mi (bike) and attendance boundary of:	Location	Issue	Recommendation + = parking removal required ~ = private property acquisition required	Overall Benefit Category	Estimated Cost:Benefit Category
1D - 001	BRIDGE POINT	CEDAR ST	No bicycle facility	Protected Bike Lane - CEDAR ST from BUNNY RUN to N CAPITAL OF TEXAS HWY SB, "2 travel lanes - CEDAR ST from BUNNY RUN to N CAPITAL OF TEXAS HWY SB, center turn lane" - CEDAR ST from BUNNY RUN to N CAPITAL OF TEXAS HWY NB, Road diet (changing number of lanes) - CEDAR ST from BUNNY RUN to N CAPITAL OF TEXAS HWY SB +	1 - Very High	2 - High
1D - 002	BRIDGE POINT	LONG CHAMP DR	No bike facility	Protected Bike Lane - LONG CHAMP DR from WESTLAKE DR to CHURCHILL DOWNS DR	4 - Low	5 - Very Low
1D - 003	BRIDGE POINT	WESTLAKE DR	No bike facility	Sidepath - WESTLAKE DR from N CAPITAL OF TEXAS HWY SB to CARRY BACK LN +	3 - Medium	5 - Very Low
1D - 004	BRIDGE POINT	N CAPITAL OF TEXAS HWY SB	No bike facility	Sidepath - N CAPITAL OF TEXAS HWY SB from WESTLAKE DR to N CAPITAL OF TEXAS HWY NB	3 - Medium	5 - Very Low
1D - 201	BRIDGE POINT	CEDAR ST	Sidewalk is not contiguous. Sidewalk has obstructions.	Construct new sidewalk - CEDAR ST from N CAPITAL OF TEXAS HWY SB to BUNNY RUN, Fix sidewalk obstructions - CEDAR ST from N CAPITAL OF TEXAS HWY SB to BUNNY RUN	3 - Medium	5 - Very Low
1D - 202*	BRIDGE POINT	BUNNY RUN	Missing sidewalk	Construct new sidewalk - BUNNY RUN from LIVEOAK DR to ROYAL APPROACH DR	3 - Medium	5 - Very Low
1D - 601	BRIDGE POINT	CARRY BACK LN / WESTLAKE DR	Difficult crossing,High speed crossing,Long crossing distance	Add median refuge island on Westlake, Install high visibility crosswalk	3 - Medium	2 - High

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1D - 801	BRIDGE POINT	Near 6401 CEDAR ST	Conflicts between pedestrians and drop off vehicles	New parking lot entrance	4 - Low	3 - Medium
1D - 802	BRIDGE POINT	Near 6401 CEDAR ST (in the school parking lot)	Difficult crossing	Add/reconstruct curb ramps, high vis xwalk consider raised xing	4 - Low	2 - High
1D - 803	BRIDGE POINT	Near 6401 CEDAR ST	Difficult crossing of Cedar Ave	Add/reconstruct curb ramps, median, RRFB	2 - High	2 - High

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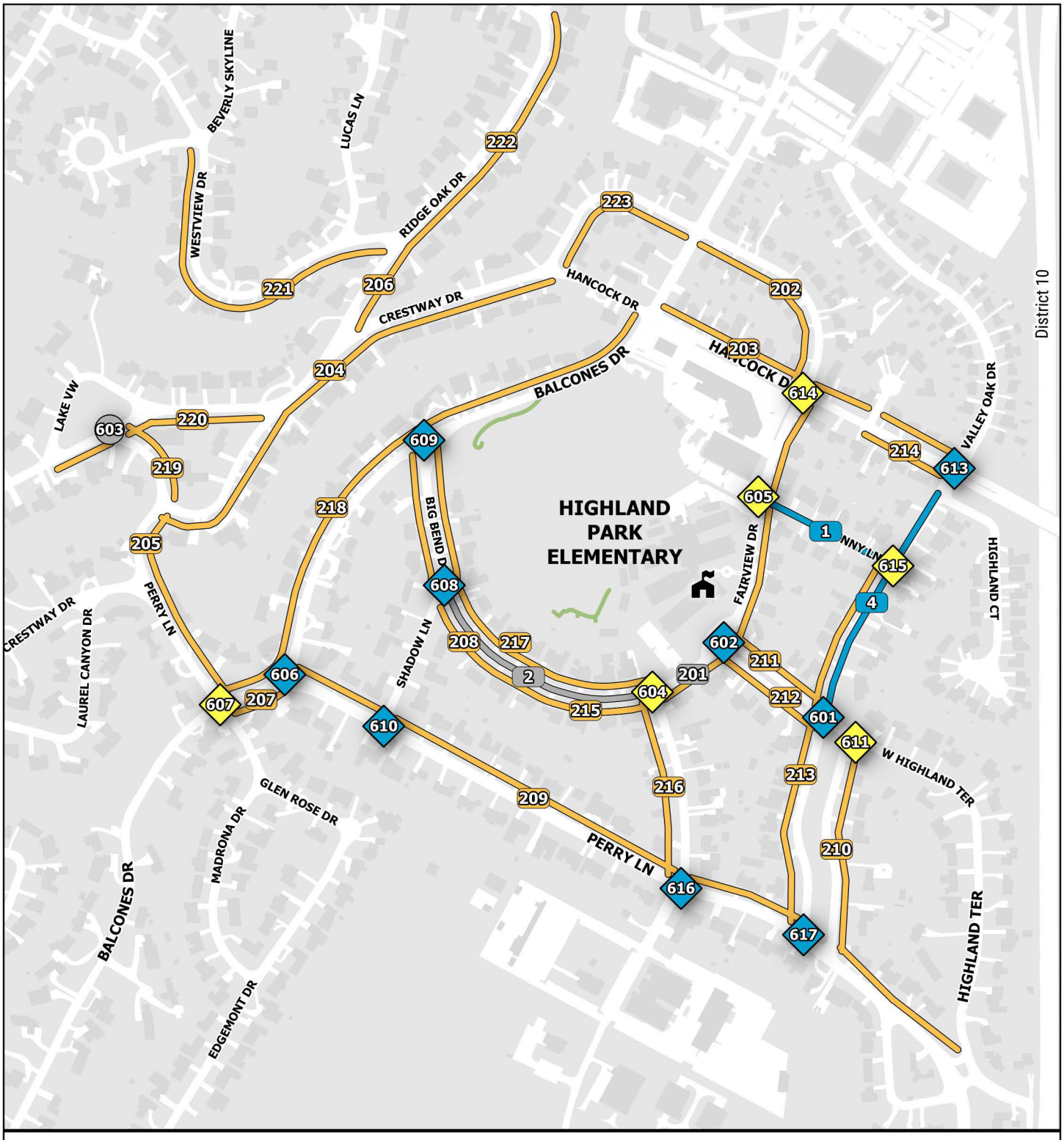
MAP 1E: HIGHLAND PARK ELEMENTARY



Project ID * = some or all of project is outside COA	Project w/in 1/2 mi (ped) or 2 mi (bike) and attendance boundary of:	Location	Issue	Recommendation + = parking removal required ~ = private property acquisition required	Overall Benefit Category	Estimated Cost:Benefit Category
1E - 001	HIGHLAND PARK, LAMAR	SUNNY LN	Desired bike route, No bike facility	Neighborhood Bikeway - SUNNY LN from FAIRVIEW DR to VALLEY OAK DR	3 - Medium	2 - High
1E - 002	HIGHLAND PARK	BIG BEND DR	Concerns about vehicle speeds	Add School pavement markings - BIG BEND DR from SHADOW LN to FAIRVIEW DR	3 - Medium	2 - High
1E - 004	LAMAR, HIGHLAND PARK	VALLEY OAK DR	Major bike route to school	Neighborhood Bikeway - VALLEY OAK DR from W HIGHLAND TER to HIGHLAND CT	4 - Low	2 - High
1E - 201	HIGHLAND PARK	FAIRVIEW DR	Missing sidewalk	Fix sidewalk obstructions - FAIRVIEW DR from W HIGHLAND TER to BIG BEND DR	5 - Very Low	4 - Low
1E - 202	HIGHLAND PARK	FAIRVIEW DR	Missing sidewalk	Construct new sidewalk - FAIRVIEW DR from HANCOCK DR to CRESTWAY DR	4 - Low	4 - Low
1E - 203	HIGHLAND PARK	HANCOCK DR	Missing sidewalk	Construct new sidewalk - HANCOCK DR from BALCONES DR to VALLEY OAK DR	4 - Low	4 - Low
1E - 204	HIGHLAND PARK	CRESTWAY DR	Missing sidewalk	Construct new sidewalk - CRESTWAY DR from HANCOCK DR to PERRY LN	5 - Very Low	5 - Very Low
1E - 205	HIGHLAND PARK	PERRY LN	Missing sidewalk	Construct new sidewalk - PERRY LN from Crestway to Balcones	5 - Very Low	5 - Very Low
1E - 206	HIGHLAND PARK	RIDGE OAK DR	Missing sidewalk	Construct new sidewalk - RIDGE OAK DR from WESTVIEW DR to CRESTWAY DR	5 - Very Low	5 - Very Low
1E - 207	HIGHLAND PARK	PERRY LN	Missing sidewalk	Construct new sidewalk - PERRY LN from BALCONES DR to MADRONA DR	4 - Low	3 - Medium
1E - 208	HIGHLAND PARK	BIG BEND DR	Sidewalk is not accessible	Repair existing sidewalk - BIG BEND DR from FAIRVIEW DR to SHADOW LN, Contruct level driveways - BIG BEND DR from FAIRVIEW DR to SHADOW LN	5 - Very Low	5 - Very Low
1E - 209	HIGHLAND PARK	PERRY LN	Missing sidewalk	Construct new sidewalk - PERRY LN from CRESTWAY DR to VALLEY OAK DR, Construct new sidewalk - PERRY LN from VALLEY OAK DR to HIGHLAND TER	4 - Low	5 - Very Low

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1E - 210	HIGHLAND PARK	VALLEY OAK DR	Missing sidewalk	Construct new sidewalk - VALLEY OAK DR from W HIGHLAND TER to PERRY LN	4 - Low	4 - Low
1E - 211	HIGHLAND PARK	W HIGHLAND TER	No sidewalk on north side of the street	Construct new sidewalk - W HIGHLAND TER from FAIRVIEW DR to VALLEY OAK DR	4 - Low	3 - Medium
1E - 212	HIGHLAND PARK	W HIGHLAND TER	Sidewalk is not accessible	Repair existing sidewalk - W HIGHLAND TER from VALLEY OAK DR to FAIRVIEW DR	5 - Very Low	5 - Very Low
1E - 213	HIGHLAND PARK	VALLEY OAK DR	Missing sidewalk	Construct new sidewalk - VALLEY OAK DR from PERRY LN to SUNNY LN	5 - Very Low	5 - Very Low
1E - 214	HIGHLAND PARK	HANCOCK DR	Crumbling sidewalk on south side of street	Repair existing sidewalk - HANCOCK DR from VALLEY OAK DR to EVERGREEN CT	5 - Very Low	5 - Very Low
1E - 215	HIGHLAND PARK	FAIRVIEW DR	Missing sidewalk, Poor condition	Repair existing sidewalk - BIG BEND DR from BALCONES DR to FAIRVIEW DR , Repair existing sidewalk - FAIRVIEW DR from BIG BEND DR to W HIGHLAND TER , Construct new sidewalk - FAIRVIEW DR from W HIGHLAND TER to HANCOCK DR	3 - Medium	5 - Very Low
1E - 216	HIGHLAND PARK	FAIRVIEW DR	Missing sidewalk	Construct new sidewalk - FAIRVIEW DR from PERRY LN to BIG BEND DR	5 - Very Low	5 - Very Low
1E - 217	HIGHLAND PARK	BIG BEND DR	Missing sidewalk	Construct new sidewalk - BIG BEND DR from BALCONES DR to FAIRVIEW DR	3 - Medium	4 - Low
1E - 218	HIGHLAND PARK	BALCONES DR	Missing sidewalk	Construct new sidewalk - BALCONES DR from HANCOCK DR to PERRY LN	4 - Low	5 - Very Low
1E - 219	HIGHLAND PARK	PERRY LN	Missing sidewalk	Construct new sidewalk - PERRY LN from RIDGE OAK DR to CRESTWAY DR	5 - Very Low	5 - Very Low

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1E - 220	HIGHLAND PARK	RIDGE OAK DR	Missing sidewalk	Construct new sidewalk - RIDGE OAK DR from CRESTWAY DR to LAKE VW	5 - Very Low	5 - Very Low
1E - 221	HIGHLAND PARK	WESTVIEW DR	Missing sidewalk	Construct new sidewalk - WESTVIEW DR from RIDGE OAK DR to BEVERLY SKYLINE	5 - Very Low	5 - Very Low
1E - 222	HIGHLAND PARK	RIDGE OAK DR	Missing sidewalk	Construct new sidewalk - RIDGE OAK DR from WESTVIEW DR to WESTERN HILLS DR	5 - Very Low	5 - Very Low
1E - 223	HIGHLAND PARK	CRESTWAY DR	Missing sidewalk	Construct new sidewalk - CRESTWAY DR from FAIRVIEW DR to HANCOCK DR	5 - Very Low	5 - Very Low
1E - 601	HIGHLAND PARK	VALLEY OAK DR / W HIGHLAND TER	Missing/non-compliant curb ramps,Difficult crossing,Poor sightlines,Long crossing distance,Wide curb radii	Add median refuge island on Highland Terrace, Install 3 curb ramps, Install high visibility crosswalk, Tighten curb radii; extend median on Highland Terrace +	3 - Medium	3 - Medium
1E - 602	HIGHLAND PARK	FAIRVIEW DR / W HIGHLAND TER	Missing/non-compliant curb ramps,Long crossing distance,Wide curb radii	Add four curb extensions, Install high visibility crosswalk	2 - High	2 - High
1E - 603	HIGHLAND PARK	PERRY LN / RIDGE OAK DR	Long crossing distance,Wide curb radii	Tighten curb radii	5 - Very Low	4 - Low
1E - 604	HIGHLAND PARK	BIG BEND DR / FAIRVIEW DR	Missing/non-compliant curb ramps,Wide curb radii	Install 1 curb ramp, Tighten curb radii	3 - Medium	2 - High

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1E - 605	HIGHLAND PARK	FAIRVIEW DR / SUNNY LN	Missing/non-compliant curb ramps,Faded crosswalk markings	Add raised crosswalk, Install 3 curb ramps	3 - Medium	2 - High
1E - 606	HIGHLAND PARK	BALCONES DR / PERRY LN	Missing/non-compliant curb ramps,Difficult crossing,High speed crossing,Long crossing distance,Wide curb radii	Add curb extensions, Add median refuge island on Perry Ln, Eliminate slip lane, Install high visibility crosswalk +	4 - Low	5 - Very Low
1E - 607	HIGHLAND PARK	BALCONES DR / MADRONA DR / PERRY LN	Wide curb radii	Add curb extensions, Tighten curb radii +	4 - Low	3 - Medium
1E - 608	HIGHLAND PARK	BIG BEND DR / SHADOW LN	Missing/non-compliant curb ramps,Long crossing distance,Wide curb radii	Eliminate slip lane, Install 2 curb ramps, Install high visibility crosswalk, Intersection reconfiguration +	4 - Low	5 - Very Low

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1E - 609	HIGHLAND PARK	BALCONES DR / BIG BEND DR	High speed crossing,Long crossing distance,Wide curb radii	Eliminate slip lane, Install high visibility crosswalk, Intersection reconfiguration +	4 - Low	5 - Very Low
1E - 610	HIGHLAND PARK	PERRY LN / SHADOW LN	Missing/non-compliant curb ramps,High speed crossing,Long crossing distance	Add median refuge island on Perry Ln, Install 1 curb ramp, Tighten curb radii	4 - Low	3 - Medium
1E - 611	HIGHLAND PARK	VALLEY OAK DR / W HIGHLAND TER	Missing/non-compliant curb ramps,Faded crosswalk markings,Poor sightlines,Long crossing distance,Wide curb radii	Install 2 curb ramps, Tighten curb radii	4 - Low	3 - Medium
1E - 612	None (nearest school: Highland Park)	BULL CREEK RD / W 49TH HALF ST / W 50TH ST	Difficult crossing	Add curb extensions, Add median refuge island on Bull Creek Rd, W 50th St, Install high visibility crosswalk	4 - Low	3 - Medium

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1E - 613	HIGHLAND PARK	HANCOCK DR / VALLEY OAK DR	Poor sightlines,High speed crossing,Wide curb radii, Confusing bicycle routing	Add median refuge island on Valley Oak, Install high visibility crosswalk, Intersection reconfiguration	3 - Medium	5 - Very Low
1E - 614	HIGHLAND PARK	FAIRVIEW DR / HANCOCK DR	Missing curb ramps; Difficult intersection	Install 4 curb ramps; Install high visibility crosswalk	3 - Medium	2 - High
1E - 615	HIGHLAND PARK	SUNNY LN / VALLEY OAK DR	Missing curb ramps; Difficult intersection	Install 2 curb ramps; Install high visibility crosswalk	4 - Low	2 - High
1E - 616	HIGHLAND PARK	FAIRVIEW DR / PERRY LN	Difficult crossing	Add median refuge island on Perry Ln , Add new curb ramp [4] , Install high visibility crosswalk [3] , Tighten curb radii [4]	5 - Very Low	5 - Very Low
1E - 617	HIGHLAND PARK	PERRY LN / VALLEY OAK DR	Difficult crossing	Intersection reconfiguration	5 - Very Low	5 - Very Low
1E - 801	None (nearest school: Highland Park)	Near 4816 SHOAL CREEK BLVD	Limited access	Construct over/underpass	4 - Low	5 - Very Low

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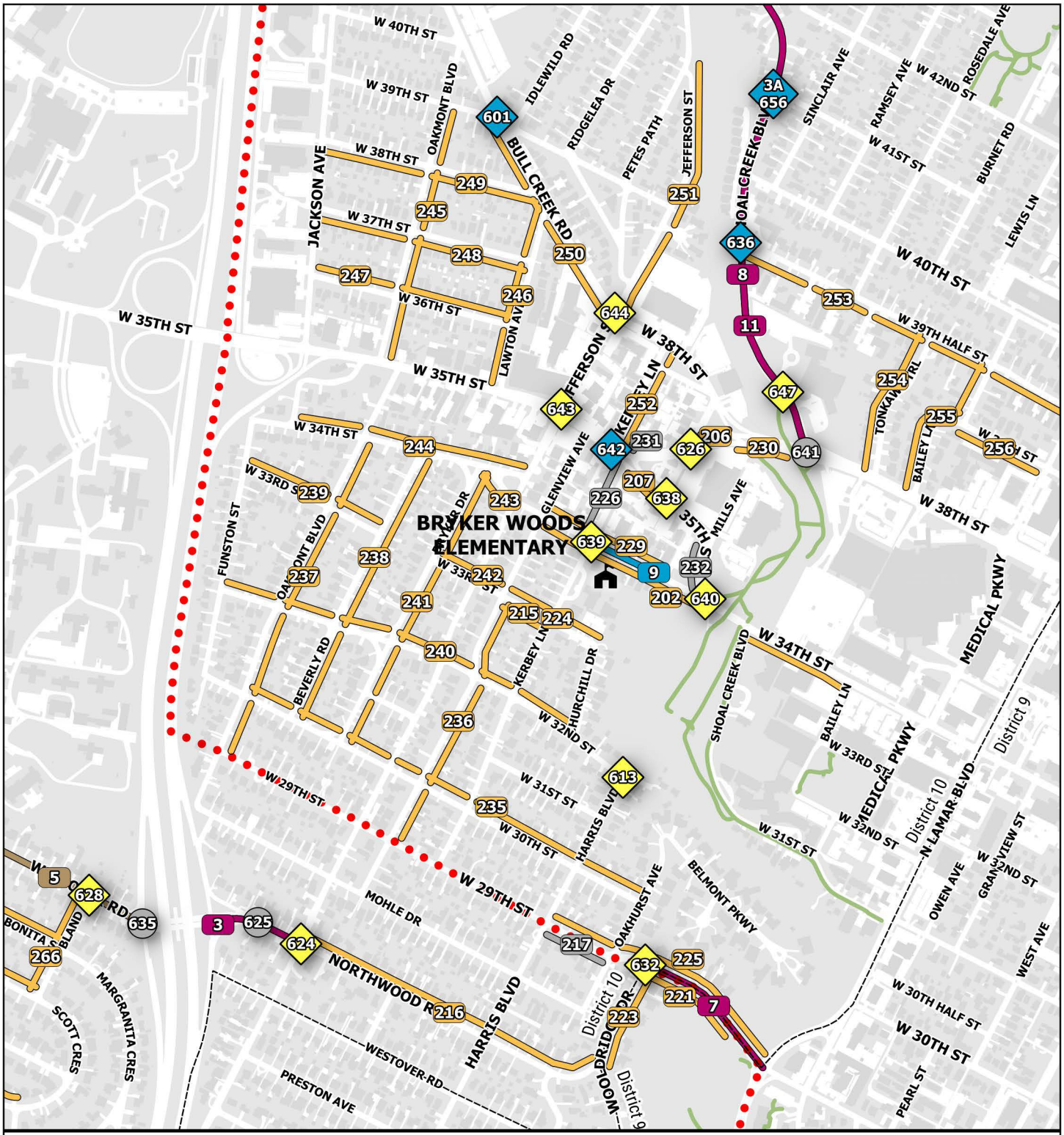
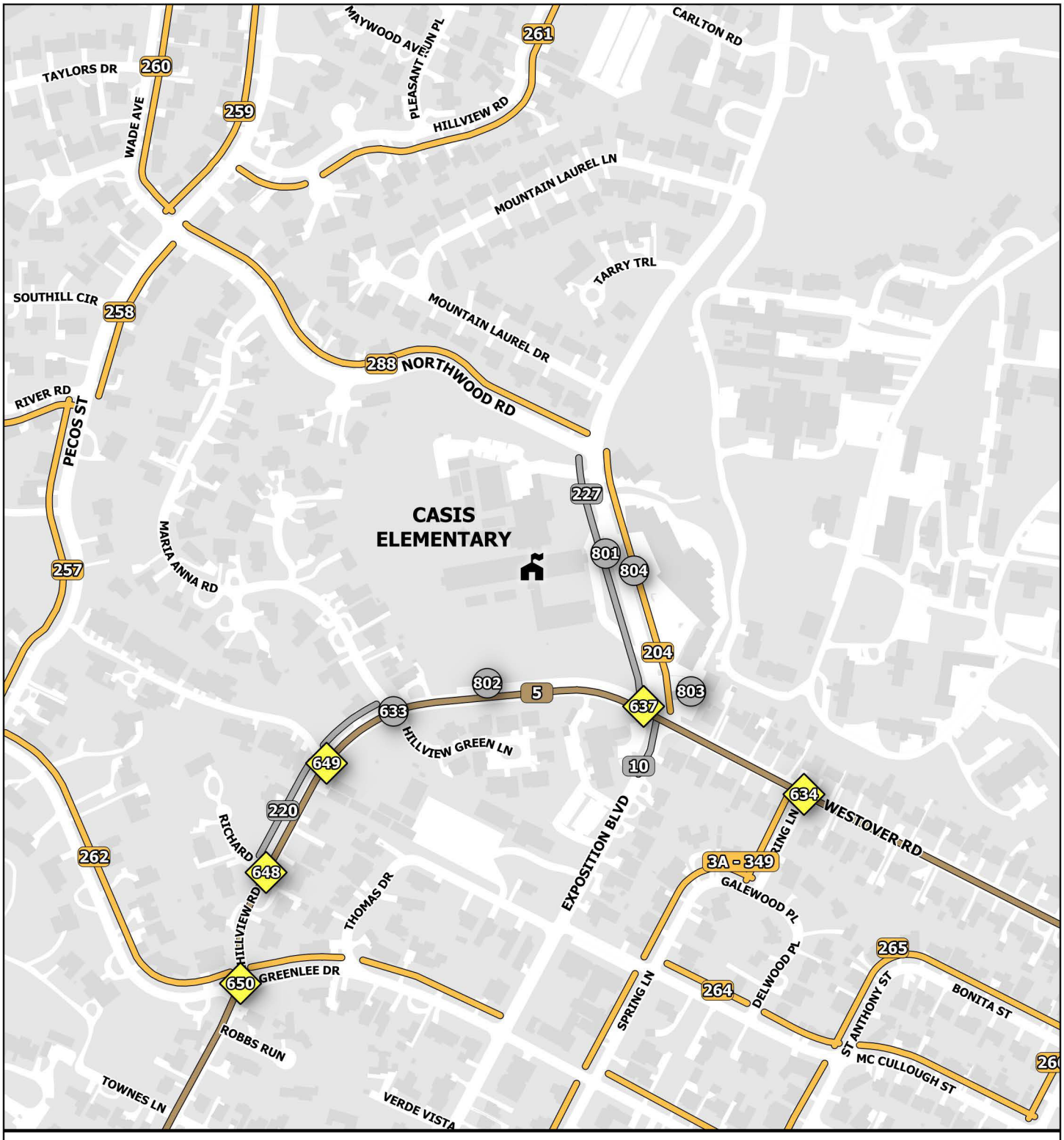
MAP 1H: BRYKER WOODS ELEMENTARY



MAP 1H: CASIS ELEMENTARY



CITY OF AUSTIN austin MOTION 2016 MOBILITY BOND

SAFE ROUTES TO SCHOOL

TOOLE DESIGN

0 400 800 1200 ft

- Off-Street Trail
- Bike Lane / Buffered Bike Lane / Protected Bike Lane
- Sidepath
- Neighborhood Bikeway / Traffic Calming
- New / Improved Sidewalk
- Other linear recommendation
- Traffic Control / Intersection Reconfiguration
- Ramp / Curb Extension / Crosswalk
- Over / Underpass
- Other Spot Recommendation
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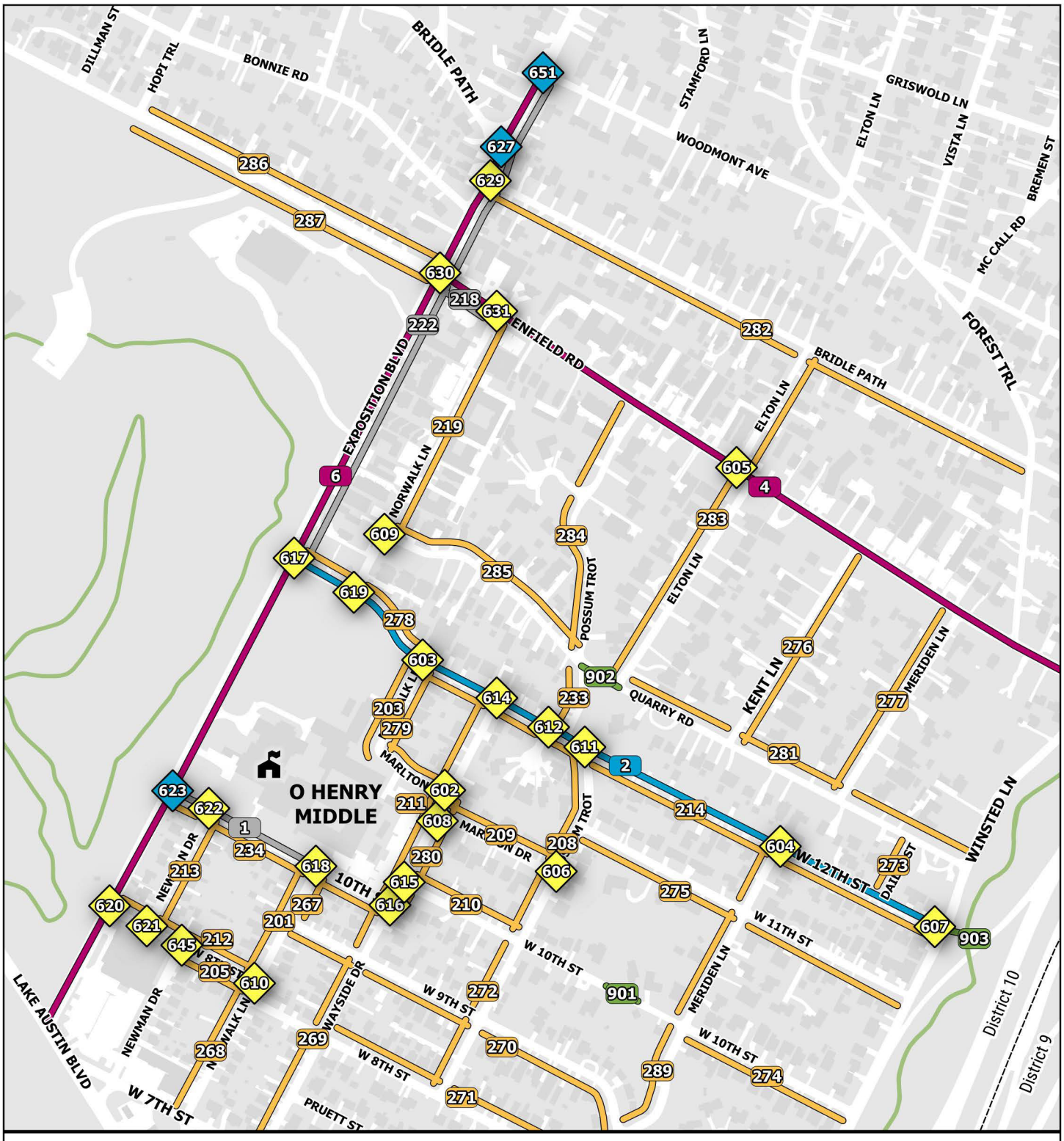
MAP 1H: O HENRY MIDDLE



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1H - 001	O HENRY	W 10TH ST	On-street parking creates conflicts at student drop-off and pick-up	Add School pavement markings - W 10TH ST from EXPOSITION BLVD to NORWALK LN ~	1 - Very High	1 - Very High
1H - 002	CASIS, O HENRY, PEASE	W 12TH ST	Desired bike route	Neighborhood Bikeway - W 12TH ST from EXPOSITION BLVD to WINSTED LN +	2 - High	2 - High
1H - 003	O HENRY, CASIS, PEASE	NORTHWOOD RD	Desired bike route	Buffered Bike Lane - NORTHWOOD RD from OAKMONT BLVD to JEFFERSON ST	2 - High	2 - High
1H - 004	CASIS, O HENRY, PEASE	ENFIELD RD	Desired bike route, no comfortable bike facility	bike lanes" - ENFIELD RD from EXPOSITION BLVD to WINSTED LN, "2 travel lanes - ENFIELD RD from EXPOSITION BLVD to WINSTED LN, center turn lane - ENFIELD RD from EXPOSITION BLVD to WINSTED LN, Lane diet (changing lane widths) - ENFIELD RD from EXPOSITION BLVD to WINSTED LN, Bike Lane - ENFIELD RD from EXPOSITION BLVD to WINSTED LN	2 - High	3 - Medium
1H - 005	O HENRY, CASIS, PEASE	HILLVIEW RD	Desired bike route, No bike facility	Sidepath - HILLVIEW RD from WINDSOR RD to EXPOSITION BLVD, Sidepath - WESTOVER RD from HILLVIEW RD to WESTOVER TO MOPAC SB RAMP ~ +	1 - Very High	5 - Very Low
1H - 006	O HENRY, CASIS, PEASE	EXPOSITION BLVD	Desired bike route, no comfortable bike facility	Protected Bike Lane - EXPOSITION BLVD from LAKE AUSTIN BLVD to W 12TH ST, Road diet (changing number of lanes) - EXPOSITION BLVD from W 12TH ST to ENFIELD RD, Buffered Bike Lane - EXPOSITION BLVD from W 12TH ST to ENFIELD RD, Sidepath - EXPOSITION BLVD from ENFIELD RD to WOODMONT AVE	1 - Very High	5 - Very Low

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1H - 007	O HENRY, BRYKER WOODS, PEASE	W 29TH ST	Bike lane obstructions	Remove obstructions from bike lane	5 - Very Low	3 - Medium
1H - 008	BRYKER WOODS	SHOAL CREEK BLVD	Desired bike route, Excessive vehicle speeds	Add speed cushions - SHOAL CREEK BLVD from W 39TH HALF ST to W 40TH ST, Protected Bike Lane - SHOAL CREEK BLVD from W 38TH ST to W 41ST ST	2 - High	3 - Medium
1H - 009	BRYKER WOODS	W 34TH ST	Excessive speed in school zone	Add speed cushions - W 34TH ST from KERBEY LN to MILLS AVE	1 - Very High	1 - Very High
1H - 010	CASIS	EXPOSITION BLVD	Excessive vehicle speeds	add School Zone Ahead sign - EXPOSITION BLVD from HILLVIEW RD to Near 2636 EXPOSITION BLVD	3 - Medium	2 - High
1H - 011	BRYKER WOODS	SHOAL CREEK BLVD	Desired bike route, Excessive vehicle speeds, No bike facility	Add protected bike lane - SHOAL CREEK BLVD from W 45TH ST to W 38TH ST	3 - Medium	4 - Low
1H - 201	O HENRY	NORWALK LN	Sidewalk gap	Construct new sidewalk - NORWALK LN from W 8TH ST to W 10TH ST	2 - High	2 - High
1H - 202	BRYKER WOODS	W 34TH ST	Conflict with bicycles, Narrow sidewalk	Widen existing sidewalk - W 34TH ST from W 35TH ST to GLENVIEW AVE, Construct new sidewalk - W 34TH ST from BAILEY LN to SHOAL CREEK BLVD	1 - Very High	2 - High
1H - 203	O HENRY	NORWALK LN	Sidewalk gap	Construct new sidewalk - NORWALK LN from MARLTON DR to W 12TH ST	2 - High	2 - High
1H - 204	CASIS	EXPOSITION BLVD	Barriers along existing sidewalks, No sidewalk	Construct new sidewalk - EXPOSITION BLVD from NORTHWOOD RD to HILLVIEW RD	1 - Very High	1 - Very High

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1H - 205	O HENRY	W 8TH ST	Missing sidewalk	Construct new sidewalk - W 8TH ST from NORWALK LN to NEWMAN DR	5 - Very Low	4 - Low
1H - 206	BRYKER WOODS	W 35TH ST CTOF	Missing sidewalk	Construct new sidewalk - W 35TH ST CTOF from CRAWFORD AVE to W 38TH ST	2 - High	1 - Very High
1H - 207	BRYKER WOODS	W 35TH ST	Sidewalk inaccessible	Construct new sidewalk - W 35TH ST from CRAWFORD AVE to KERBEY LN	2 - High	1 - Very High
1H - 208	O HENRY	POSSUM TROT	Missing sidewalk	Construct new sidewalk - POSSUM TROT from W 10TH ST to W 12TH ST	4 - Low	4 - Low
1H - 209	O HENRY	MARLTON DR	Missing sidewalk	Construct new sidewalk - MARLTON DR from WAYSIDE DR to POSSUM TROT	3 - Medium	2 - High
1H - 210	O HENRY	W 10TH ST	Missing sidewalk	Construct new sidewalk - W 10TH ST from WAYSIDE DR to POSSUM TROT	4 - Low	3 - Medium
1H - 211	O HENRY	WAYSIDE DR	Missing sidewalk	Construct new sidewalk - WAYSIDE DR from near 904 WAYSIDE DR to W 12TH ST	3 - Medium	3 - Medium
1H - 212	O HENRY	W 8TH ST	Missing sidewalk	Construct new sidewalk - W 8TH ST from EXPOSITION BLVD to NEWMAN DR, Construct new sidewalk - W 8TH ST from Near 2608 8TH ST to Near 800 NEWMAN DR, Construct new sidewalk - W 8TH ST from Near 800 NEWMAN DR to Near 2608 8TH ST, Construct new sidewalk - W 8TH ST from NEWMAN DR to NORWALK LN	3 - Medium	3 - Medium
1H - 213	O HENRY	NEWMAN DR	Missing sidewalk	Construct new sidewalk - NEWMAN DR from W 10TH ST to W 8TH ST	3 - Medium	2 - High
1H - 214	O HENRY	W 12TH ST	Missing sidewalk	Construct new sidewalk - W 12TH ST from WINSTED LANE to NORWALK LN	2 - High	4 - Low
1H - 215	BRYKER WOODS	W 33RD ST	Missing sidewalk	Construct new sidewalk - W 33RD ST from KERBEY LN to GLENVIEW AVE	4 - Low	3 - Medium

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1H - 216	None (nearest school: Casis)	NORTHWOOD RD	Missing sidewalk	Construct new sidewalk - NORTHWOOD RD from JEFFERSON ST to WOOLDRIDGE DR	3 - Medium	4 - Low
1H - 217	None (nearest school: Bryker Woods)	W 29TH ST	Sidewalk inaccessible	Fix sidewalk obstructions - W 29TH ST from OAKHURST AVE to HARRIS BLVD	5 - Very Low	5 - Very Low
1H - 218	O HENRY	ENFIELD RD	Barriers along existing sidewalks	Fix sidewalk obstructions - ENFIELD RD from NORWALK LN to EXPOSITION BLVD	5 - Very Low	3 - Medium
1H - 219	O HENRY	NORWALK LN	Missing sidewalk	Construct new sidewalk - NORWALK LN from ENFIELD RD to QUARRY RD	2 - High	3 - Medium
1H - 220	CASIS	HILLVIEW RD	Driveway crossings not accessible.	Fix sidewalk obstructions - HILLVIEW RD from RICHARD LN to MARIA ANNA RD	4 - Low	3 - Medium
1H - 221	None (nearest school: Bryker Woods)	W 29TH ST	Missing sidewalk	Construct new sidewalk - W 29TH ST from near N LAMAR BLVD to WOOLDRIDGE DR	4 - Low	3 - Medium
1H - 222	O HENRY	EXPOSITION BLVD	Barriers along existing sidewalks, No sidewalk	Fix sidewalk obstructions - EXPOSITION BLVD from W 12TH ST to BRIDLE PATH	4 - Low	5 - Very Low
1H - 223	None (nearest school: Casis)	WOOLDRIDGE DR	Missing sidewalk	Construct new sidewalk - WOOLDRIDGE DR from W 29TH ST to NORTHWOOD RD	4 - Low	4 - Low
1H - 224	BRYKER WOODS	W 33RD ST	Missing sidewalk	Construct new sidewalk - W 33RD ST from GLENVIEW AVE to CHURCHILL DR, reconstruct driveways - W 33RD ST from KERBEY LN to CHURCHILL DR	2 - High	2 - High
1H - 225	BRYKER WOODS	W 29TH ST	Missing sidewalk	Construct new sidewalk - W 29TH ST from HARRIS BLVD to N LAMAR BLVD	3 - Medium	4 - Low
1H - 226	BRYKER WOODS	KERBEY LN	Sidewalk inaccessible	Fix sidewalk obstructions - KERBEY LN from W 34TH ST to W 35TH ST	5 - Very Low	3 - Medium

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1H - 227	CASIS	EXPOSITION BLVD	Utility pole in sidewalk	Fix sidewalk obstructions - EXPOSITION BLVD from HILLVIEW RD to NORTHWOOD RD	4 - Low	2 - High
1H - 229	BRYKER WOODS	W 34TH ST	Missing sidewalk	Construct new sidewalk - W 34TH ST from GLENVIEW AVE to MILLS AVE	1 - Very High	2 - High
1H - 230	BRYKER WOODS	W 38TH ST	Buffer area between edge of sidewalk and road is very steep with large elevation change	Reconstruct sidewalk to be at curb level and build tall curb/short retaining wall along edge of parking lot. - W 38TH ST from Near 1400 38TH ST to W 35TH ST CTOF	4 - Low	4 - Low
1H - 231	BRYKER WOODS	W 35TH ST	Sidewalk inaccessible	Fix sidewalk obstructions - W 35TH ST from Near 1514 35TH ST to Near 1514 35TH ST	5 - Very Low	3 - Medium
1H - 232	BRYKER WOODS	W 35TH ST	Sidewalk inaccessible	Fix sidewalk obstructions - W 35TH ST from W 34TH ST to MILLS AVE	5 - Very Low	3 - Medium
1H - 233	O HENRY	POSSUM TROT	Missing sidewalk	Construct new sidewalk - POSSUM TROT from W 12TH ST to QUARRY RD	3 - Medium	2 - High
1H - 234	O HENRY	W 10TH ST	Missing sidewalk	Construct new sidewalk - W 10TH ST from WAYSIDE DR to EXPOSITION BLVD	2 - High	2 - High
1H - 235	BRYKER WOODS	W 30TH ST	Missing sidewalk	Construct new sidewalk - W 30TH ST from OAKHURST AVE to OAKMONT BLVD	4 - Low	5 - Very Low
1H - 236	BRYKER WOODS	GLENVIEW AVE	Missing sidewalk	Construct new sidewalk - GLENVIEW AVE from W 29TH ST to W 33RD ST	4 - Low	5 - Very Low
1H - 237	BRYKER WOODS	OAKMONT BLVD	Missing sidewalk	Construct new sidewalk - OAKMONT BLVD from W 34TH ST to W 29TH ST	4 - Low	5 - Very Low
1H - 238	BRYKER WOODS	BEVERLY RD	Missing sidewalk	Construct new sidewalk - BEVERLY RD from W 34TH ST to W 30TH ST	5 - Very Low	5 - Very Low
1H - 239	BRYKER WOODS	W 33RD ST	Missing sidewalk	Construct new sidewalk - W 33RD ST from FUNSTON ST to BEVERLY RD	5 - Very Low	5 - Very Low

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1H - 240	BRYKER WOODS	W 32ND ST	Missing sidewalk	Construct new sidewalk - W 32ND ST from FUNSTON ST to CHURCHILL DR	4 - Low	5 - Very Low
1H - 241	BRYKER WOODS	BRYKER DR	Missing sidewalk	Construct new sidewalk - BRYKER DR from W 34TH ST to W 30TH ST	5 - Very Low	5 - Very Low
1H - 242	BRYKER WOODS	W 33RD ST	Missing sidewalk	Construct new sidewalk - W 33RD ST from BRYKER DR to GLENVIEW AVE	5 - Very Low	4 - Low
1H - 243	BRYKER WOODS	W 34TH ST	Missing sidewalk	Construct new sidewalk - W 34TH ST from JEFFERSON ST to BRYKER DR	5 - Very Low	4 - Low
1H - 244	BRYKER WOODS	W 34TH ST	Missing sidewalk	Construct new sidewalk - W 34TH ST from JEFFERSON ST to HAPPY HOLLOW LN	4 - Low	5 - Very Low
1H - 245	BRYKER WOODS	OAKMONT BLVD	Missing sidewalk	Construct new sidewalk - OAKMONT BLVD from W 39TH ST to W 35TH ST	5 - Very Low	5 - Very Low
1H - 246	BRYKER WOODS	LAWTON AVE	Missing sidewalk	Construct new sidewalk - LAWTON AVE from BULL CREEK RD to W 35TH ST	4 - Low	4 - Low
1H - 247	BRYKER WOODS	W 36TH ST	Missing sidewalk	Construct new sidewalk - W 36TH ST from LAWTON AVE to JACKSON AVE	5 - Very Low	5 - Very Low
1H - 248	BRYKER WOODS	W 37TH ST	Missing sidewalk	Construct new sidewalk - W 37TH ST from LAWTON AVE to JACKSON AVE	5 - Very Low	5 - Very Low
1H - 249	BRYKER WOODS	W 38TH ST	Missing sidewalk	Construct new sidewalk - W 38TH ST from BULL CREEK RD to JACKSON AVE	5 - Very Low	5 - Very Low
1H - 250	BRYKER WOODS	BULL CREEK RD	Missing sidewalk	Construct new sidewalk - BULL CREEK RD from W 38TH ST to W 39TH ST	5 - Very Low	5 - Very Low
1H - 251	BRYKER WOODS	JEFFERSON ST	Missing sidewalk	Construct new sidewalk - JEFFERSON ST from BULL CREEK RD to PETES PATH	4 - Low	5 - Very Low
1H - 252	BRYKER WOODS	KERBEY LN	Missing sidewalk	Construct new sidewalk - KERBEY LN from W 35TH ST to W 38TH ST	4 - Low	4 - Low
1H - 253	BRYKER WOODS	W 39TH HALF ST	Missing sidewalk	Construct new sidewalk - W 39TH HALF ST from SHOAL CREEK BLVD to MEDICAL PKWY	3 - Medium	4 - Low

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1H - 254	BRYKER WOODS	TONKAWA TRL	Missing sidewalk	Construct new sidewalk - TONKAWA TRL from W 39TH HALF ST to W 38TH ST	4 - Low	4 - Low
1H - 255	BRYKER WOODS	BAILEY LN	Missing sidewalk	Construct new sidewalk - BAILEY LN from W 39TH HALF ST to W 38TH ST	5 - Very Low	4 - Low
1H - 256	BRYKER WOODS	W 39TH ST	Missing sidewalk	Construct new sidewalk - W 39TH ST from MEDICAL PKWY to BAILEY LN	5 - Very Low	4 - Low
1H - 257	CASIS	PECOS ST	Missing sidewalk	Construct new sidewalk - PECOS ST from RIVER RD to GREENLEE DR	4 - Low	5 - Very Low
1H - 258	CASIS	PECOS ST	Missing sidewalk	Construct new sidewalk - PECOS ST from RIVER RD to WADE AVE	4 - Low	4 - Low
1H - 259	CASIS	PECOS ST	Missing sidewalk	Construct new sidewalk - PECOS ST from WOODBRIDGE DR to NORTHWOOD RD , Construct new sidewalk - PECOS ST from WOODBRIDGE DR to WARREN ST	4 - Low	5 - Very Low
1H - 260	CASIS	WADE AVE	Missing sidewalk	Construct new sidewalk - WADE AVE from SCENIC DR to PECOS ST	4 - Low	5 - Very Low
1H - 261	CASIS	HILLVIEW RD	Missing sidewalk	Construct new sidewalk - HILLVIEW RD from W 35TH ST to PECOS ST	5 - Very Low	5 - Very Low
1H - 262	CASIS	GREENLEE DR	Missing sidewalk	Construct new sidewalk - GREENLEE DR from EXPOSITION BLVD to PECOS ST	4 - Low	5 - Very Low
1H - 263	CASIS	GREENLEE DR	Missing sidewalk	Construct new sidewalk - GREENLEE DR from SPRING LN to DORMARION LN	4 - Low	5 - Very Low
1H - 264	CASIS	MC CULLOUGH ST	Missing sidewalk	Construct new sidewalk - MC CULLOUGH ST from SPRING LN to BLAND ST	3 - Medium	3 - Medium
1H - 265	CASIS	ST ANTHONY ST	Missing sidewalk	Construct new sidewalk - ST ANTHONY ST from GREENLEE DR to BONITA ST , Construct new sidewalk - BONITA ST from BLAND ST to ST ANTHONY ST	4 - Low	5 - Very Low

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1H - 266	CASIS	BLAND ST	Missing sidewalk	Construct new sidewalk - BLAND ST from WESTOVER RD to MC CULLOUGH ST	4 - Low	3 - Medium
1H - 267	O HENRY	NORWALK LN	Missing sidewalk	Construct new sidewalk - NORWALK LN from W 9TH ST to W 10TH ST	3 - Medium	2 - High
1H - 268	O HENRY	NORWALK LN	Missing sidewalk	Construct new sidewalk - NORWALK LN from W 7TH ST to W 8TH ST	5 - Very Low	4 - Low
1H - 269	O HENRY	WAYSIDE DR	Missing sidewalk	Construct new sidewalk - WAYSIDE DR from W 7TH ST to W 10TH ST	3 - Medium	3 - Medium
1H - 270	O HENRY	W 9TH ST	Missing sidewalk	Construct new sidewalk - W 9TH ST from NORWALK LN to MERIDEN LN	3 - Medium	4 - Low
1H - 271	O HENRY	W 8TH ST	Missing sidewalk	Construct new sidewalk - W 8TH ST from MERIDEN LN to WAYSIDE DR	5 - Very Low	5 - Very Low
1H - 272	O HENRY	POSSUM TROT	Missing sidewalk	Construct new sidewalk - POSSUM TROT from W 8TH ST to W 10TH ST	5 - Very Low	4 - Low
1H - 273	O HENRY	DAILEY ST	Missing sidewalk	Construct new sidewalk - DAILEY ST from W 12TH ST to QUARRY RD	5 - Very Low	5 - Very Low
1H - 274	O HENRY	W 10TH ST	Missing sidewalk	Construct new sidewalk - W 10TH ST from MERIDEN LN to WINSTED LN	4 - Low	4 - Low
1H - 275	O HENRY	W 11TH ST	Missing sidewalk	Construct new sidewalk - W 11TH ST from POSSUM TROT to WINSTED LN	4 - Low	5 - Very Low
1H - 276	O HENRY	KENT LN	Missing sidewalk	Construct new sidewalk - KENT LN from QUARRY RD to ENFIELD RD	5 - Very Low	5 - Very Low
1H - 277	O HENRY	MERIDEN LN	Missing sidewalk	Construct new sidewalk - MERIDEN LN from ENFIELD RD to QUARRY RD	5 - Very Low	5 - Very Low
1H - 278	O HENRY	W 12TH ST	Missing sidewalk	Construct new sidewalk - W 12TH ST from EXPOSITION BLVD to NORWALK LN	2 - High	2 - High

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1H - 279	O HENRY	MARLTON DR	Missing sidewalk	Construct new sidewalk - NORWALK LN from W 12TH ST to MARLTON DR , Construct new sidewalk - MARLTON DR from WAYSIDE DR to NORWALK LN	3 - Medium	3 - Medium
1H - 280	O HENRY	WAYSIDE DR	Missing sidewalk	Construct new sidewalk - WAYSIDE DR from MARLTON DR to W 10TH ST	3 - Medium	2 - High
1H - 281	O HENRY	QUARRY RD	Missing sidewalk	Construct new sidewalk - QUARRY RD from WINSTED LN to ELTON LN	5 - Very Low	5 - Very Low
1H - 282	O HENRY	BRIDLE PATH	Missing sidewalk	Construct new sidewalk - BRIDLE PATH from EXPOSITION BLVD to FOREST TRL	4 - Low	5 - Very Low
1H - 283	O HENRY	ELTON LN	Missing sidewalk	Construct new sidewalk - ELTON LN from QUARRY RD to BRIDLE PATH	4 - Low	4 - Low
1H - 284	O HENRY	POSSUM TROT	Missing sidewalk	Construct new sidewalk - POSSUM TROT from QUARRY RD to ENFIELD RD	4 - Low	4 - Low
1H - 285	O HENRY	QUARRY RD	Missing sidewalk	Construct new sidewalk - QUARRY RD from POSSUM TROT to NORWALK LN	5 - Very Low	5 - Very Low
1H - 286	O HENRY	ENFIELD RD	Missing sidewalk	Construct new sidewalk - ENFIELD RD from HOPI TRL to EXPOSITION BLVD	5 - Very Low	5 - Very Low
1H - 287	O HENRY	ENFIELD RD	Missing sidewalk	Construct new sidewalk - ENFIELD RD from EXPOSITION BLVD to HOPI TRL	5 - Very Low	5 - Very Low
1H - 288	CASIS	NORTHWOOD RD	Missing sidewalk	Construct new sidewalk - NORTHWOOD RD from EXPOSITION BLVD to PECOS ST	2 - High	4 - Low
1H - 289	O HENRY	MERIDEN LN	Missing sidewalk	Construct new sidewalk - MERIDEN LN from W 12TH ST to W 7TH ST	4 - Low	5 - Very Low
1H - 290	O HENRY	HEARN ST	Missing sidewalk	Construct new sidewalk - HEARN ST from W 8TH ST to W 7TH ST	5 - Very Low	5 - Very Low
1H - 291	O HENRY	HEARN ST	Missing sidewalk	Construct new sidewalk - HEARN ST from JOHNSON ST to LAKE AUSTIN BLVD	5 - Very Low	4 - Low

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1H - 601	BRYKER WOODS	BULL CREEK RD / W 39TH ST	Difficult crossing	Add median refuge island on Bull Creek Rd, Install 2 curb ramps, Install high visibility crosswalk, Install Rapid Rectangular Flashing Beacon +	4 - Low	3 - Medium
1H - 602	O HENRY	MARLTON DR / WAYSIDE DR	Missing/non-compliant curb ramps,Difficult crossing	Install 2 curb ramps, Install high visibility crosswalk	2 - High	1 - Very High
1H - 603	O HENRY	NORWALK LN / W 12TH ST	Difficult crossing	Install high visibility crosswalk	1 - Very High	1 - Very High
1H - 604	O HENRY	MERIDEN LN / W 12TH ST	Missing/non-compliant curb ramps,Difficult crossing	Install 2 curb ramps, Install high visibility crosswalk	5 - Very Low	3 - Medium
1H - 605	O HENRY	ELTON LN / ENFIELD RD	Difficult Intersection, missing curb ramps	Install 2 curb ramps, Install high visibility crosswalk, Install Pedestrian Hybrid Beacon	3 - Medium	3 - Medium
1H - 606	O HENRY	MARLTON DR / POSSUM TROT	Missing/non-compliant curb ramps,Difficult crossing	Install 2 curb ramps, Install high visibility crosswalk	4 - Low	2 - High
1H - 607	O HENRY	W 12TH ST / WINSTED LN	Difficult crossing	Install high visibility crosswalk, Install Pedestrian Hybrid Beacon	5 - Very Low	5 - Very Low

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1H - 608	O HENRY	MARLTON DR / WAYSIDE DR	Difficult Intersection, missing curb ramps	Install 2 curb ramps, Install high visibility crosswalk	3 - Medium	1 - Very High
1H - 609	O HENRY	NORWALK LN / QUARRY RD	Missing/non-compliant curb ramps,Difficult crossing	Install 2 curb ramps, Install high visibility crosswalk	2 - High	1 - Very High
1H - 610	O HENRY	NORWALK LN / W 8TH ST	Difficult Intersection, missing curb ramps	Install 2 curb ramps, Install high visibility crosswalk	5 - Very Low	3 - Medium
1H - 611	O HENRY	POSSUM TROT / W 12TH ST	Missing/non-compliant curb ramps,Difficult crossing	Install 2 curb ramps, Install high visibility crosswalk	3 - Medium	2 - High
1H - 612	O HENRY	HERITAGE WAY / W 12TH ST	Missing/non-compliant curb ramps,Difficult crossing	Install 2 curb ramps, Install high visibility crosswalk	2 - High	1 - Very High
1H - 613	BRYKER WOODS	HARRIS BLVD / W 32ND ST	Missing curb ramps	Install 2 curb ramps	4 - Low	2 - High
1H - 614	O HENRY	W 12TH ST / WAYSIDE DR	Missing/non-compliant curb ramps,Difficult crossing	Add curb extensions, Install 2 curb ramps, Install high visibility crosswalk ~	2 - High	2 - High

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1H - 615	O HENRY	W 10TH ST / WAYSIDE DR	Difficult Intersection, missing curb ramps	Install 2 curb ramps, Install high visibility crosswalk	2 - High	1 - Very High
1H - 616	O HENRY	W 10TH ST / WAYSIDE DR	Difficult Intersection, missing curb ramps	Install 2 curb ramps, Install high visibility crosswalk	2 - High	1 - Very High
1H - 617	O HENRY	EXPOSITION BLVD / W 12TH ST	Difficult crossing,Wide curb radii	Add curb extensions, Install raised crosswalk	2 - High	2 - High
1H - 618	O HENRY	NORWALK LN / W 10TH ST	Missing/non-compliant curb ramps,Difficult crossing,Long crossing distance	Add curb extensions, Install 2 curb ramps, Install high visibility crosswalk	2 - High	2 - High
1H - 619	O HENRY	NORWALK LN / W 12TH ST	Missing/non-compliant curb ramps,Difficult crossing	Add curb extensions, Install 1 curb ramp, Install high visibility crosswalk	2 - High	2 - High
1H - 620	O HENRY	EXPOSITION BLVD / W 8TH ST	Difficult Intersection, missing curb ramps	Install 2 curb ramps, Install high visibility crosswalk +	2 - High	1 - Very High
1H - 621	O HENRY	NEWMAN DR / W 8TH ST	Difficult Intersection, missing curb ramps	Install 2 curb ramps, Install high visibility crosswalk	2 - High	1 - Very High

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1H - 622	O HENRY	NEWMAN DR / W 10TH ST	Missing/non-compliant curb ramps,Difficult crossing,Long crossing distance	Add curb extensions, Install 2 curb ramps, Install high visibility crosswalk ~	2 - High	2 - High
1H - 623	O HENRY	EXPOSITION BLVD / W 10TH ST	Missing/non-compliant curb ramps,Faded crosswalk markings,Long crossing distance	Add median refuge island on Exposition Blvd, Install 1 curb ramp, Install Pedestrian Hybrid Beacon, Repaint crosswalk markings	2 - High	3 - Medium
1H - 624	None (nearest school: Casis)	JEFFERSON ST / NORTHWOOD RD	Missing/non-compliant curb ramps	Install 3 curb ramps, Install high visibility crosswalk	3 - Medium	1 - Very High
1H - 625	None (nearest school: Casis)	NORTHWOOD RD midblock between JEFFERSON ST and OAKMONT	High speed crossing	Eliminate slip lane +	3 - Medium	5 - Very Low
1H - 626	BRYKER WOODS	CRAWFORD AVE / W 35TH ST CTOF	Difficult crossing	Install 3 curb ramps, Install high visibility crosswalk, Install Pedestrian Hybrid Beacon	2 - High	3 - Medium

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1H - 627	O HENRY	BRIDLE PATH / EXPOSITION BLVD	Missing/non-compliant curb ramps,Difficult crossing,Long crossing distance,Wide curb radii	Add median refuge island on Bridle Path, Install 2 curb ramps, Install high visibility crosswalk	2 - High	2 - High
1H - 628	CASIS	BLAND ST / WESTOVER RD	Missing curb ramps	Install 1 curb ramp	2 - High	1 - Very High
1H - 629	O HENRY	BRIDLE PATH / EXPOSITION BLVD	Missing/non-compliant curb ramps,Difficult crossing	Install 2 curb ramps, Install high visibility crosswalk	2 - High	1 - Very High
1H - 630	O HENRY	ENFIELD RD / EXPOSITION BLVD	Difficult Intersection, missing curb ramps	Install 4 curb ramps, Repaint crosswalk markings	2 - High	1 - Very High
1H - 631	O HENRY	ENFIELD RD / NORWALK LN	Difficult crossing	Install 2 curb ramps, Install high visibility crosswalk	2 - High	1 - Very High
1H - 632	BRYKER WOODS	W 29TH ST / WOOLDRIDGE DR	Difficult Intersection, missing curb ramps	Add curb extensions, tighten curb radii +	4 - Low	3 - Medium

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Project ID * = some or all of project is outside COA	Project w/in 1/2 mi (ped) or 2 mi (bike) and attendance boundary of:	Location	Issue	Recommendation + = parking removal required ~ = private property acquisition required	Overall Benefit Category	Estimated Cost:Benefit Category
1H - 633	CASIS	HILLVIEW GREEN LN / HILLVIEW RD / MARIA ANNA RD	Missing/non-compliant curb ramps,Difficult crossing,Wide curb radii	Tighten curb radii	2 - High	2 - High
1H - 634	CASIS	SPRING LN / WESTOVER RD	Difficult Intersection, missing curb ramps	Add curb extensions, Install 3 curb ramps, Install high visibility crosswalk, Signs ~	1 - Very High	1 - Very High
1H - 635	CASIS	N MOPAC SB TO WESTOVER RAMP / WESTOVER RD / WESTOVER TO MOPAC SB RAMP	Difficult Intersection	Eliminate slip lane, Long term: roundabouts	1 - Very High	4 - Low
1H - 636	BRYKER WOODS	SHOAL CREEK BLVD / W 39TH HALF ST	Difficult crossing	Add median refuge island on Shoal Creek Blvd, Install 2 curb ramps, Install high visibility crosswalk, Install Rapid Flash Beacon +	3 - Medium	2 - High

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1H - 637	CASIS	EXPOSITION BLVD / HILLVIEW RD / WESTOVER RD	Missing/non-compliant curb ramps,High speed crossing,Wide curb radii, Bikes mixing with turning vehicles Westover WB; potential conflicts with pedestrians and turning vehicles	Adjust signal timing to provide protected left turns, Install 4 curb ramps, Install/update pedestrian push buttons, Reduce curb radius on SE corner with SUP implementation; Repaint crosswalk markings ~ +	1 - Very High	5 - Very Low
1H - 638	BRYKER WOODS	CRAWFORD AVE / W 35TH ST	Difficult crossing	Install high visibility crosswalk, Install Pedestrian Hybrid Beacon +	3 - Medium	3 - Medium
1H - 639	BRYKER WOODS	KERBEY LN / W 34TH ST	Poor sightlines	Add curb extensions, Install 2 curb ramps, Restrict turns during the peak 20-30 minutes of pickup/drop off	2 - High	5 - Very Low
1H - 640	BRYKER WOODS	W 34TH ST / W 35TH ST	Difficult crossing	Add curb extensions, Install high visibility crosswalk	2 - High	2 - High
1H - 641	BRYKER WOODS	SHOAL CREEK BLVD / W 38TH ST	Wide curb radii	Eliminate slip lane	1 - Very High	2 - High
1H - 642	BRYKER WOODS	KERBEY LN / W 35TH ST	Poor sightlines,High speed crossing	Install 2 curb ramps, Install/update pedestrian push buttons, Install/update pedestrian signal heads, Intersection reconfiguration +	2 - High	5 - Very Low

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1H - 643	BRYKER WOODS	JEFFERSON ST / W 35TH ST	Difficult crossing	Install high visibility crosswalk	3 - Medium	1 - Very High
1H - 644	BRYKER WOODS	BULL CREEK RD / JEFFERSON ST / W 38TH ST	Difficult crossing	Add curb extensions; Install high visibility crosswalk; Install/update pedestrian push buttons; Repaint crosswalk marking	2 - High	3 - Medium
1H - 645	O HENRY	NEWMAN DR / W 8TH ST	Missing curb ramps; Difficult intersection	Install 1 curb ramp; Install high visibility crosswalk	5 - Very Low	3 - Medium
1H - 647	BRYKER WOODS	Midblock - SHOAL CREEK BLVD	Connection not aparent; Missing curb ramp	Add wayfinding; Install 2 curb ramps +	3 - Medium	2 - High
1H - 648	CASIS	HILLVIEW RD / RICHARD LN	Non-compliant curb ramps, Wide curb radii	Replace existing curb ramp [2] , Tighten curb radii [2]	3 - Medium	2 - High
1H - 649	CASIS	HILLVIEW RD / TARRYHOLLOW DR	Non-compliant curb ramps, Wide curb radii	Replace existing curb ramp [2] , Tighten curb radii [2]	3 - Medium	2 - High
1H - 650	CASIS	GREENLEE DR / HILLVIEW RD	Non-compliant curb ramps, Wide curb radii	Replace existing curb ramp [2] , Tighten curb radii [2]	4 - Low	2 - High

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1H - 651	None (nearest school: O Henry)	Near 1704 EXPOSITION BLVD	Missing curb ramps, Difficult Crossing	Install 2 curb ramps, Install 1 crosswalk across Exposition, Install 1 Pedstrian Hybrid Beacon	2 - High	3 - Medium
1H - 801	CASIS	Near 2727 EXPOSITION BLVD	Difficult Intersection	Daylight Crossing, Add curb extension, Main crossing in front of school- daylight / remove parking; consider raised crosswalk; consider Exposition changes ~	1 - Very High	1 - Very High
1H - 802	CASIS	HILLVIEW in front of the school	Difficult Intersection	Shorten crossing distance with curb extension; consider raised crosswalk? Consider addressing as part of school reconstruction ~	2 - High	1 - Very High
1H - 803	CASIS	Near 2701 EXPOSITION BLVD	Uncomfortable biking conditions	Restrict parking on northeast corner between last residential driveway and gas station ~	1 - Very High	1 - Very High
1H - 804	CASIS	Near 2727 EXPOSITION BLVD	Too many conflict points between pedestrians and turning vehicles	Access management at shopping center	4 - Low	3 - Medium
1H - 901	O HENRY, CASIS	Connect W 10th St E of O Henry	Lack of connectivity	Construct new trail	2 - High	2 - High
1H - 902	CASIS, O HENRY	Connection of Quarry Rd from Elton Ln to Possum Trot St	Lack of connectivity	Construct new trail	2 - High	2 - High

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1H - 903	O HENRY, CASIS	connection from W. 12th to Johnson Creek Trail	Lack of connectivity	Construct new trail	3 - Medium	2 - High
3A - 339	CASIS	PECOS ST	Missing sidewalk	Construct new sidewalk - PECOS ST from BOWMAN AVE to GREENLEE DR	5 - Very Low	5 - Very Low
3A - 346	CASIS	RIVER RD	Missing sidewalk	Construct new sidewalk - RIVER RD from MOONLIGHT BND to PECOS ST	5 - Very Low	5 - Very Low
3A - 347	CASIS	GREENLEE DR	Missing sidewalk	Construct new sidewalk - TANGLEWOOD TRL from DALI LN to GREENLEE DR , Construct new sidewalk - GREENLEE DR from PECOS ST to TANGLEWOOD TRL	5 - Very Low	4 - Low
3A - 349	CASIS	SPRING LN	Missing sidewalk	Construct new sidewalk - SPRING LN from BOWMAN AVE to GALEWOOD PL , Construct new sidewalk - GALEWOOD PL from SPRING LN to SPRING LN , Construct new sidewalk - SPRING LN from WESTOVER RD to GALEWOOD PL	2 - High	4 - Low
3A - 656	None (nearest school: O Henry, Bryker Woods)	SHOAL CREEK BLVD / W 41ST ST	Difficult crossing	Add median refuge island on Shoal Creek Blvd , Add new curb ramp [2] , Install high visibility crosswalk [1] across Shoal Creek Blvd	4 - Low	3 - Medium

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Project ID * = some or all of project is outside COA	Project w/in 1/2 mi (ped) or 2 mi (bike) and attendance boundary of:	Location	Issue	Recommendation + = parking removal required ~ = private property acquisition required	Overall Benefit Category	Estimated Cost:Benefit Category
3G - 018	LAMAR, HIGHLAND PARK	FM 2222 RD	No bike facility	Add sidepath - FM 2222 RD from MESA DR to HIGHLAND CREST DR , Add sidepath - NORTHLAND DR from FM 2222 RD to BALCONES DR	2 - High	5 - Very Low
3G - 696	None (nearest school: Lamar, Highland Park)	FM 2222 RD / HIGHLAND CREST DR / NORTHLAND DR / PARKCREST DR	Difficult crossing	Adjust signal timing	3 - Medium	1 - Very High
4D - 010	LAUREL MOUNTAIN, CANYON VISTA	SPICEWOOD SPRINGS RD	No bike facility	Add sidepath - SPICEWOOD SPRINGS RD from WEXFORD DR to BINTLIFF DR	2 - High	5 - Very Low
4D - 213	CANYON VISTA	SHAKESPEAREAN WAY	Missing sidewalk	Construct new sidewalk - SHAKESPEAREAN WAY from GREENWICH MERIDIAN to SPICEWOOD SPRINGS RD	5 - Very Low	5 - Very Low
4D - 214	CANYON VISTA	SHAKESPEAREAN WAY	Missing sidewalk	Construct new sidewalk - SHAKESPEAREAN WAY from GREENWICH MERIDIAN to SPICEWOOD SPRINGS RD	5 - Very Low	5 - Very Low
4D - 215*	CANYON VISTA	SPICEWOOD SPRINGS RD	No lighting	Add lighting - SPICEWOOD SPRINGS RD from QUEENS WAY to BINTLIFF DR	5 - Very Low	4 - Low
4D - 218*	CANYON VISTA	MELLOW LN	Missing sidewalk	Construct new sidewalk - MELLOW LN from TEXAS PLUME RD to POMMEL DR	5 - Very Low	5 - Very Low
4D - 219*	CANYON VISTA	MELLOW LN	Missing sidewalk	Construct new sidewalk - MELLOW LN from POMMEL DR to TEXAS PLUME RD	5 - Very Low	5 - Very Low

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4D - 229*	CANYON VISTA	YAUPON DR	Missing sidewalk	Construct new sidewalk - YAUPON DR from D K RANCH RD to SPICEWOOD SPRINGS RD	2 - High	4 - Low
4D - 610*	CANYON VISTA	CLIFFVIEW DR / YUCCA DR	Missing curb ramps	Add new curb ramp [2]	5 - Very Low	3 - Medium
4D - 631*	CANYON VISTA	CLIFFSAGE AVE / YUCCA DR	Missing curb ramps	Add new curb ramp [2]	5 - Very Low	3 - Medium
4D - 647	CANYON VISTA	RUSTIC ROCK DR / SPICEWOOD SPRINGS RD	Non-compliant curb ramps	Replace existing curb ramp [2]	4 - Low	3 - Medium
4D - 651	CANYON VISTA	SPICEWOOD SPRINGS RD / SWEET CHERRY DR	Difficult crossing, Non-compliant curb ramps	Install high visibility crosswalk [1] across Sweet Cherry Dr. , Replace existing curb ramp [2]	5 - Very Low	3 - Medium
4D - 652*	CANYON VISTA	MELLOW LN / POMMEL DR	Difficult crossing, Missing curb ramps	Add new curb ramp [2] , Install high visibility crosswalk [2] across Mellow Ln & Pommel Dr. , Tighten curb radii [2] +	5 - Very Low	4 - Low
4D - 654*	CANYON VISTA	TEXAS PLUME RD / YUCCA DR	Difficult crossing, Missing curb ramps	Add new curb ramp [2] , Add signage , Install high visibility crosswalk [3] across west side of Texas Plume Rd & Yucca Dr.	5 - Very Low	3 - Medium

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4D - 655	CANYON VISTA	SPICEWOOD SPRINGS RD / TEXAS PLUME RD	Difficult crossing	Install high visibility crosswalk & Repaint crosswalk markings [2] across Texas Plume Rd & Spicewood Springs	2 - High	1 - Very High
4D - 671	CANYON VISTA	SABER CREEK TRL / SPICEWOOD SPRINGS RD	Difficult crossing, Non-compliant curb ramps	Install high visibility crosswalk [2] across Saber Creek Trail , Replace existing curb ramp [4]	2 - High	1 - Very High
4D - 673	CANYON VISTA	FOUR IRON DR / HEATHROW DR / SPICEWOOD SPRINGS RD	Difficult crossing	Install high visibility crosswalk [4] across Spicewood Springs Rd & 4 Iron Dr. & Heathrow Dr.	2 - High	1 - Very High
4D - 675*	CANYON VISTA	MELLOW LN / TEXAS PLUME RD	Difficult crossing	Add new curb ramp [3] , Install high visibility crosswalk [2] across Texas Plume Rd & Mellow Ln	5 - Very Low	4 - Low
4D - 677*	CANYON VISTA	D K RANCH RD / TEXAS PLUME RD	Difficult crossing, Non-compliant curb ramps	Install high visibility crosswalk [4] across D-K Ranch Rd & Texas Plume Rd , Replace existing curb ramp [3]	5 - Very Low	4 - Low
4D - 678*	CANYON VISTA	D K RANCH RD / YAUPON DR	Difficult crossing, Non-compliant curb ramps	Install high visibility crosswalk [2] across Yaupon Dr , Replace existing curb ramp [3]	3 - Medium	2 - High

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4F - 851	DAVIS	Near 11707 RESEARCH BLVD	No lighting	Add lighting and placemaking	5 - Very Low	4 - Low
4G - 002	RIVER PLACE	SITIO DEL RIO BLVD	Excessive vehicle speeds	Study new school zone - SITIO DEL RIO BLVD from FM 2222 RD to 6500 SITIO DEL RIO	5 - Very Low	4 - Low
4G - 003	RIVER PLACE	MC NEIL DR	No bike facility	Add sidepath - MC NEIL DR from RIBELIN RANCH DR to FM 2222 RD	3 - Medium	5 - Very Low
4G - 201	RIVER PLACE	SITIO DEL RIO BLVD	No lighting	Add lighting - SITIO DEL RIO BLVD from FM 2222 RD to end	5 - Very Low	4 - Low
4G - 202	RIVER PLACE	SITIO DEL RIO BLVD	No lighting	Add lighting - SITIO DEL RIO BLVD from FM 2222 RD to Near 6503 SITIO DEL RIO BLVD	5 - Very Low	4 - Low
4G - 601	RIVER PLACE	FM 2222 RD / SITIO DEL RIO BLVD	Faded crosswalk markings, High speed crossing, Long crossing distance, Missing curb ramps, Missing sidewalks	Create accessible route from end of sidewalk to signal footing on SW corner; move crosswalk and pedestrian signal to west leg , Install high visibility crosswalk [2] across Sitio del Rio; FM 2222	2 - High	1 - Very High
4G - 604	RIVER PLACE	Midblock - SITIO DEL RIO BLVD	Difficult crossing, High speed crossing, Long crossing distance, Wide curb radii	Add new curb ramp [4] , Install high visibility crosswalk [1] across Sitio del Rio , Install neighborhood traffic circle	4 - Low	3 - Medium
4G - 605	RIVER PLACE	Midblock - SITIO DEL RIO BLVD	Difficult crossing, Poor sightlines	Improve sight lines by moving fence back from SW corner , Install high visibility crosswalk [1] across School driveway/Sitio del Rio ~	2 - High	1 - Very High

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4G - 901	RIVER PLACE	Near 10104 2222 RD	No trail connection	Construct new shared use path ~	2 - High	5 - Very Low

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CITY OF AUSTIN PUBLIC WORKS

SAFE ROUTES TO SCHOOL

APPENDIX A: ENGINEERING TOOLKIT

ENGINEERING TOOLKIT

INTRODUCTION

This Toolkit was developed in support of the City of Austin Safe Routes to School (SRTS). It presents the most common engineering treatments used to improve pedestrian and bicyclist safety, with a focus on supporting healthy, safe, and active travel to school. The Toolkit can be used by consultants, City staff, and the public in ongoing discussions about traffic safety and school access.

While this Toolkit represents common engineering solutions that can be used, it is not an exhaustive list of every design solution that may be applicable in a school environment. Solutions to specific local challenges must be evaluated by City staff through field work and, when appropriate, engineering studies and/or public engagement. All projects will be designed using applicable City, State and Federal design manuals and guidelines.

ENGINEERING TOOLKIT

The Toolkit is organized into four sections: Crossing Treatments, Street Treatments, Traffic Calming and Other. The page number for each treatment in the Toolkit is shown below.

CROSSING TREATMENTS

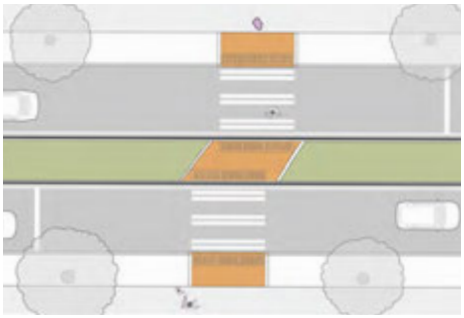
STREET TREATMENTS

TRAFFIC CALMING

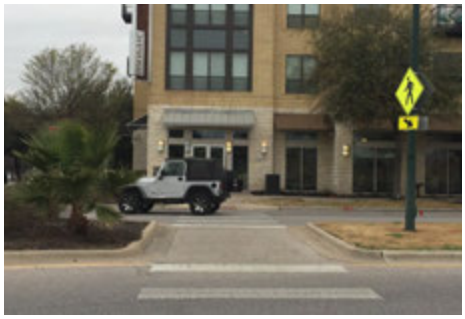
OTHER

REFUGE ISLANDS

Refuge islands (also called pedestrian refuges or center islands) are delineated or raised areas in the middle of the street at intersections or mid-block crossings that provide a designated place for people walking and biking to wait for an opportunity to cross the other half of the street.



Typical crossing island



Landscaping beautifies the refuge island

Refuge islands also help people on bicycles cross the street

What is the purpose of a refuge island?

- Makes the crossing more visible to people driving.
- Allows people to cross the street in two stages, making it easier to find gaps in traffic by only having to cross one direction of travel at a time.
- Reduces the amount of time a person crossing the street is exposed to traffic by providing a designated place to wait in the middle of the crossing.
- Makes the street easier to cross for kids, older adults, people with disabilities, and others who may need more time to cross or have more difficulty judging gaps in traffic.
- Reduces speeding as drivers approach the crossing through visual narrowing of the travel lane.

How does COA decide where to install a refuge island?

- Refuge islands may be an effective crossing treatment in situations where it is difficult to cross the street due to long crossing distances or few gaps in traffic.
- There must be adequate width (6-ft minimum) in the middle of the road to install the refuge island. Generally, streets with a two-way center turn lane or few or no left turns by people driving provide opportunities to install a refuge island.
- We also consider including additional safety improvements like crossing beacons along with the refuge island to make the crossing even more visible to people driving. Any added vegetation should be low-lying as to not affect sight distance.
- At crossings frequently used by people on bikes, such as Neighborhood Bikeway crossings, we consider creating individual crossings that separate people biking and people walking.

How much does a refuge island cost?

$$-$$$: A small asphalt or concrete refuge island can be fairly inexpensive, typically in the range of $10K to $20K to install. Lower cost materials such as flexible posts can also be used to delineate the refuge island in certain situations. Larger projects that include landscaping and drainage structures can increase construction and maintenance costs.

How long does it take to install a refuge island?

1-2 years or less: A simple project can be designed in six months and constructed easily by City crews. More time is required to design larger refuge islands or refuge islands at busy intersections. COA may use contractors to install these types of projects instead of City crews, which can add more time.

References and Resources

Pedestrian Crossing Guidelines for Texas

Pedestrian Safety Guide and Countermeasure Selection System (PEDSAFE): Refuge islands

NACTO Urban Bikeway Design Guide: Median Refuge Island

FHWA Proven Safety Countermeasures: Medians and Pedestrian Refuge islands

Example in Austin

Mueller Boulevard and Aldrich Street

CURB EXTENSIONS

Curb extensions are created by extending the curb line into the roadway at a corner or mid-block. They shorten the distance for people walking across the street and improve visibility between people walking and driving. By visually and physically narrowing the roadway, curb extensions also help reduce speeding.

Mid-block curb extension

Easy-to-install materials such as paint, turtle bumps, and flex posts may be used to create curb extensions

Curb extensions may provide space for landscaping

What is the purpose of a curb extension?

- Improves safety by reducing the distance and time required to cross the street.
- Improves visibility between people driving and people walking across the street.
- Provides additional space in constrained locations for installing curb ramps.
- Improves safety at corners by slowing turning motorists through a tighter turning radius.
- Prevents people from parking too close to a crosswalk or from blocking a curb ramp or crosswalk.
- Provides space for seating, public art, bike racks, rain gardens or other public amenities.

How does COA decide where to install a curb extension?

- We consider installing curb extensions at locations that would benefit from improved visibility between people walking and driving, such as at school crosswalks.
- Curb extensions can be installed:
  - at most locations with a legal crosswalk, whether marked or unmarked, provided there is adequate width,
  - on streets with all day on-street parking, and
  - at locations where they do not extend into travel lanes or bike lanes. Before considering installing a curb extension, we check the Austin Bicycle Master Plan to make sure that a new curb extension would not prevent installation of a bike lane in the future.

How much does a curb extension cost?

$$-$$$: Curb extensions typically involve roadway and sidewalk removal and may require replacement / relocation of stormwater drainage inlets. Installing curb extensions as part of larger capital projects such as street repaving, or when using low cost materials such as paint and pre-fabricated platforms (a.k.a. turtle bumps), costs can be reduced.

How long does it take to install a curb extension?

1-2 years: Typically design is completed in 6-12 months and construction is completed by a contractor the following year.

References and Resources

Austin Street Design Guide (DRAFT)
Pedestrian Crossing Guidelines for Texas
Pedestrian Safety Guide and Countermeasure Selection System: Curb Extensions
NACTO Urban Street Design Guide: Curb Extensions
AASHTO Guide for the Planning, Design and Operation of Pedestrian Facilities, 2015

Examples in Austin

Aldrich Street and McBee Street
6th Street and Waller Street

CURB RAMPS

Curb ramps are sloped areas located at intersection corners and crossings that connect the street to the sidewalk. They create a barrier-free environment for everyone when crossing streets that have curbs and sidewalks.

Curbs limit universal accessibility and are barriers for transitioning from the sidewalk to the street

A sidewalk retrofitted with a curb ramp and a tactile warning strip

Each corner should have two curb ramps, one for each crossing

What is the purpose of a curb ramp?

- Provides a comfortable transition from the street to the sidewalk for all people, including people with disabilities, kids on bikes, and caretakers pushing strollers.

How does COA decide where to install a new curb ramp?

- To the extent that resources are available, new curb ramp installations are coordinated with sidewalk rehabilitation and applicable street alterations. In addition to street maintenance resurfacing projects performed by Public Works, many other City Departments resurface the streets, which also requires coordinated curb ramp installations.
- We use the City's Sidewalk Master Plan and ADA Transition Plan to select and prioritize curb ramp retrofits. Schools are included as a major component in the Sidewalk Master Plan prioritization model.
- Residents can request curb ramps through the city's 3-1-1 system.

How much does a new curb ramp cost?

$-$$: The Federal Americans with Disabilities Act (ADA) lays out very specific requirements for how curb ramps must be constructed, including level landings and gentle grades. Curb ramps built by COA are built per City Standards, which comply with ADA. When standards are not applicable, curb ramps are field-engineered to follow ADA requirements.

How long does it take to install a curb ramp?

Varies: If a curb ramp is a small scale, stand-alone project, it can be completed within several months. If it is part of a larger resurfacing or reconstruction project, it can take a year or more.

Additional information

The City of Austin has a curb ramp program that routinely installs or upgrades curb ramps throughout the city. Residents can request curb ramps through the city's 3-1-1 system.

References and Resources

2016 Sidewalk Master Plan & ADA Transition Plan

United States Access Board Proposed Guidelines for Pedestrian Facilities in the Public Right-of-Way (PROWAG)

MARKED CROSSWALKS

Crosswalks exist at every intersection, whether marked or unmarked. Marked crosswalks are used to raise driver awareness of people crossing the street and to direct people who are walking to the best place to cross the street.

Marked crosswalk at an intersection

Raised crosswalks slow down people driving

Advanced stop bars increase visibility of people crossing the street

Raised Crosswalks

Benefits:

- **Raised crosswalks keep the crosswalk at the same height as the sidewalk.**
- **They act as a speed table and slow people driving as they approach the crosswalk.**
- **They also make people walking more visible to people driving.**

Design Considerations:

- **Raised crosswalks may require modifications to stormwater drainage structures in the street, increasing construction costs.**
- **COA ensures that emergency vehicles and buses aren't affected by a raised crosswalk.**

Example in Austin

Simond Avenue and Aldrich Street

Raised Intersections

- **Raised intersections slow people driving and encourage them to yield to people walking across the street.**
- **Raised intersections can be installed in neighborhood intersections to make the public space more comfortable and inviting for people to walk and bike.**

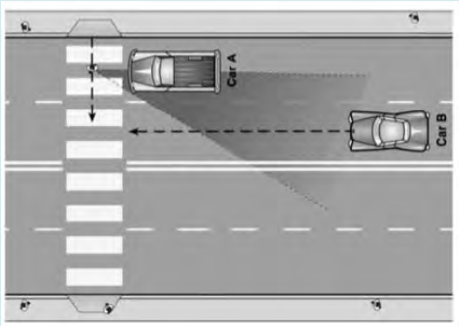
What is the purpose of a marked crosswalk?

- Direct school kids who are walking to the best place to cross the street.
- Indicate the walking route to school.
- People driving are made more aware of where to expect school kids to cross the street.

How does COA decide where to mark a crosswalk?

- Crosswalks will always be marked at signals or PHBs, and at intersections in the Central Business District.
- Crosswalks will typically be marked at stop-controlled locations if there is high vehicular volume, and will be marked if feasible at uncontrolled locations if they satisfy the criteria outlined on this page.
- We consider the following factors when deciding whether to mark a crosswalk at uncontrolled locations:
  - Average hourly traffic over 300 vehicles per hour in any hour
  - Adequate stopping or sight distance
  - More than 20 pedestrian crossings in any one hour of the day, or more than 10 children or elderly persons in any one hour
  - There is no existing marked crosswalk with 300-ft of the location in question
  - The crosswalk is located on a trail, shared-use path, designated safe route to school, or provides direct access to a transit stop, or other pedestrian destinations
  - The crosswalk is located on a High or Very High score on the Pedestrian Safety Priority Network, as determined by the Pedestrian Safety Action Plan
  - Presence of curb ramps
  - Presence of lighting

MARKED CROSSWALKS



Multiple Threat

A multiple threat is a situation where a driver in one lane (car A) stops for a person crossing the street, but the driver in the next lane (car B) doesn't see the person and doesn't stop. If we mark a crosswalk on streets with multiple traffic lanes or high traffic volumes, we consider installing additional safety improvements like crossing beacons, pedestrian signals, refuge islands, curb extensions, or advanced stop lines to minimize the multiple threat.

- Other things we consider include:
  - The total distance a person walking would have to cross. If there is more than one lane of traffic in each direction, then we consider adding additional features to supplement the crosswalk and minimize the potential multiple threat. These treatments could include elements like crossing beacons, pedestrian signals, refuge islands, curb extensions, or advanced stop lines.
  - Volume and speed of people driving. If the street is very busy and speeds are high, then we consider adding additional features to supplement the marked crosswalk.
- If we mark a new crosswalk, we may also install crosswalk signs. If it's a crosswalk mostly used by kids, then we make it a school crosswalk with school crosswalk signs. Otherwise, we use regular crosswalk signs. Flexible in-street bollards may also be used to draw additional attention to the crossing.
- We use a very durable, reflective material to mark crosswalks. Over time, the crosswalk markings may need to be refreshed. We prioritize crosswalk maintenance based on the condition of all the crosswalks in the city. If you're concerned about the condition of a crosswalk, submit a 3-1-1 request.

How long does it take to install a marked crosswalk?

Varies. In some cases, it can take 1-2 months or less to install a new marked crosswalk. If we need to install new curb ramps or other safety improvements in addition to the marked crosswalk, then it can take 1-2 years or longer to complete the work.

How much does a new marked crosswalk cost?

$: If a potential new marked crosswalk location does not require any additional safety treatments, then marking the crosswalk is relatively inexpensive and straightforward.

$$: If we need to install other safety improvements, the cost can be higher.

References and Resources

Pedestrian Crossing Guidelines for Texas

Pedestrian Safety Guide and Countermeasure Selection System: Marked Crosswalks and Enhancements

Pedestrian Safety Guide and Countermeasure Selection System: Raised Pedestrian Crossings

City of Austin Crossing Guidelines and Crossing Decision Tree

RECTANGULAR RAPID FLASHING BEACONS

Rectangular Rapid Flashing Beacons (RRFB) are pedestrian-activated flashing lights on the side of the street that make a crosswalk more visible to people driving and alert them to the presence of a person trying to cross the street.

RRFB with passive detection

RRFB with push button at a school crosswalk

RRFB at a neighborhood bikeway crossing

What is the purpose of a RRFB?

- Makes the presence of a person trying to cross the street known to people driving, since they only flash when someone pushes the button or activates an automatic sensor.
- Studies have shown that people driving are more likely to stop for people trying to cross the street when they activate a rectangular rapid flashing beacon. The highly visible flash of RRFBs is very eye-catching to motorists.

When would COA install a RRFB?

- The Federal Highway Administration (FHWA) provides warrants and guidance for the installation of RRFBs. For more information, see https://mutcd.fhwa.dot.gov/resources/interim_approval/ialistreq.htm#ia11
- COA considers the volume and speed of traffic on the street as well as the total distance a person walking or biking has to cross.
- RRFBs can be installed at crosswalks that have other safety improvements, like a crossing island.

How much does a RRFB cost?

$$: RRFBs are a relatively inexpensive way to improve safety for people crossing the street. The cost to install RRFBs can increase if the crossing doesn't already have a marked crosswalk with curb ramps that meet Federal Americans with Disabilities Act requirements.

How long does it take to install a RRFB?

Varies. If the existing crossing already has marked crosswalks and curb ramps that meet ADA requirements, RRFB can be installed in a few months. If other improvements are needed at the location, it may take 1-2 years.

References and Resources

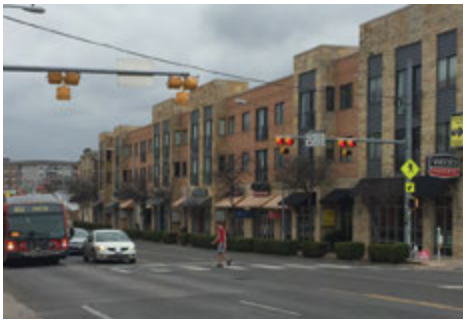
Interim Approval for Optional Use of RRFBs (FHWA)

Pedestrian Safety Guide and Countermeasure Selection System: RRFB

FHWA Intersection Safety Technologies

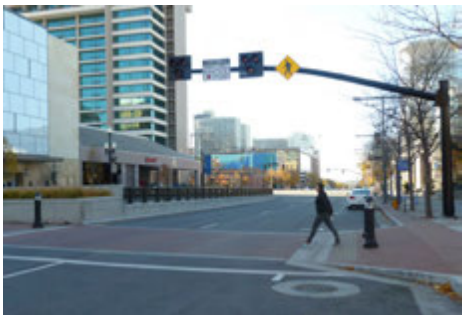
PEDESTRIAN HYBRID BEACONS

Pedestrian Hybrid Beacons (PHB) are pedestrian-activated traffic control devices which help pedestrians safely cross major roadways where there is no traffic signal. PHBs are also known as High Intensity Activated Crosswalks, or HAWK signals.



Pedestrian hybrid beacon

Pedestrian hybrid beacon on a divided roadway



Pedestrian hybrid beacon on a downtown street

What is the purpose of a PHB?

- Makes the presence of a person trying to cross the street known to people driving, since the beacon is only activated when someone pushes the button.
- The beacon consists of two red lights above a single yellow light. The beacon head is "dark," or unilluminated, until a pedestrian activates the device. The pedestrian pushes a button that activates the beacon. After displaying brief flashing and then steady yellow intervals, the device displays a steady red indication to drivers and a "WALK" indication to pedestrians, allowing them to cross while traffic is stopped.
- The solid red signal face on a PHB has the same meaning as and should be treated like a traffic signal showing a red light. Once the red light starts flashing it should be treated like a stop sign, where the driver is to stop and make sure it is clear before proceeding.

When does COA install a PHB?

- The City follows the Texas Manual on Uniform Traffic Control Devices guidelines and warrants when studying a location for a PHB.
- We use data to understand the volume and speed of people driving on the street as well as the number of traffic lanes a person has to cross.
- We consider the safety history of the crossing in addition to environmental and community issues at a given location.
- PHB must be located more than 300-ft from existing signals.
- PHB should be reserved for roads with at least three travel lanes.
- PHB can be installed at crosswalks that have other safety improvements, like a crossing island.

How much does a PHB cost?

$$$$: Relatively expensive due to electrical components that often require temporarily removing sidewalk to access underground electrical lines and the reconstruction of any sidewalk removed during construction. The cost can range from $75,000 to $150,000.

How long does it take to install a PHB?

1-2 years: Traffic studies and signal design must be completed before installation can begin

References and Resources

City of Austin: Pedestrian Hybrid Beacons

Pedestrian Safety Guide and Countermeasure Selection System: Pedestrian Hybrid Beacon

FHWA Intersection Safety Technologies

Texas Manual on Uniform Traffic Control Devices: Chapter 4

Examples in Austin

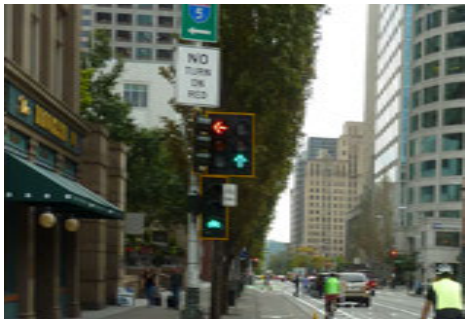
Guadalupe Street and 31st Street

Mairo Street and S 1st Street

TRAFFIC SIGNALS

Traffic signals coordinate the flow of traffic at intersections, including people driving, walking, and biking.

Bicycle signal detection



Reflective back plate makes the signal more visible

"No Turn on Red" sign

What is the purpose of a traffic signal?

- Controls the flow of traffic and provides coordinated movement of people driving, walking, and biking.
- Provides a safer, more comfortable environment for people walking and biking to cross the street or streets with high traffic volumes or speeds. People driving have to completely stop at red signals when it's the pedestrian's or bicyclist's turn to cross the street.
- When there is a steady stream of traffic, it can be difficult for people walking or biking to find a gap in traffic to cross the street. Traffic signals create gaps in traffic that allow people biking or walking to cross the street.

How does COA decide where to install a traffic signal?

- We use the Texas Manual on Uniform Traffic Control Devices (TMUTCD) to determine if the safety and traffic flow at an intersection would be improved by installing a new traffic signal. The TMUTCD outlines minimum thresholds for vehicle and pedestrian traffic and collisions that should be considered before installing a traffic signal.
- We conduct a traffic engineering study to determine if a location meets the TMUTCD thresholds, further analyze traffic patterns, and conclude whether a new signal would improve safety or the flow of traffic.
- At some intersections near schools, we can adjust the signal timing and flashing pattern during school arrival and dismissal hours to create fewer conflicts between people walking and people driving.
- Providing a dedicated phase for people to cross the street followed by a separate phase for left turning vehicles reduces potential conflicts between pedestrians and motorists. By prohibiting left turns during the WALK phase, pedestrians in the crosswalk do not have to worry about turning motorists yielding to them.
- At some intersections, including some locations in downtown, people driving aren't allowed to make a right turn when the traffic signal is red. This design makes it safer for people walking across the street by reducing the number of potential conflicts with people turning right on red.
- Traffic signals are more convenient for people walking when the WALK sign is displayed automatically when it's their turn to cross the street, a strategy referred to as automatic recall. Signals in areas of Austin with high pedestrian volumes are programed to show the walk signal automatically. In situations with very low pedestrian volumes, this design may not be appropriate, so many traffic signals have push buttons for people to activate the WALK phase.
- At intersections that are frequently used by people on bikes, COA has installed equipment to detect when a bicyclist is present. This equipment tells the signal to give the bicyclist a green light. This detection can be in the pavement or on the signal pole/arm. COA has recently installed bike signals at 12 intersections throughout the city.

TRAFFIC SIGNALS

How much does a traffic signal cost?

$$$$: Installing a new traffic signal is a very costly safety improvement. When possible, we try to find more cost-effective safety improvements that achieve the same safety objectives so that we achieve more with limited city resources.

How long does it take to install a traffic signal?

2-4 years: We construct a limited number of new signals per year because they are so costly. They take a long time to design and construct because they are complex systems.

4+ years: If the new signal is on a state route, then the City coordinates with the Texas Department of Transportation, which adds time to the process.

Pedestrian Countdown Signals and Leading Pedestrian Intervals (LPI)

A pedestrian countdown signal shows the number of seconds remaining before the WALK phase is over. This feature helps people walking know how much time they have remaining to cross the street and can help reduce the number of people in the crosswalk near the end of the WALK phase. It's safest for people walking to be out of the crosswalk when the signal turns green for people driving in the opposite direction.

A Leading Pedestrian Interval (LPI) gives people walking the WALK indication 3-5 seconds before people driving in the same direction get a green signal. Because people walking are already in the crosswalk when people driving begin to turn left or right, people driving are more likely to yield to people walking.

What is the purpose of an LPI?

- The LPI signal timing technique allows pedestrians to establish themselves in the intersection in front of turning vehicles, increasing visibility between all modes.

How does COA decide where to implement an LPI?

- The LPI can be used at intersections with high volumes of pedestrians and conflicting turning vehicles and at locations with a large population of elderly or school children who tend to walk more slowly.
- The LPI should be at least three seconds to allow pedestrians to cross at least one lane of traffic to establish their position ahead of turning traffic.

How much do LPIs cost?

$: An LPI is typically added where there is already a signal, so the cost is minimal.

How long does it take to install an LPI?

A few months. An LPI is typically added where there is already a signal, so this reflects the time to redesign the signal cycle and time for a technician to adjust it at the control center or in the field.

With a Leading Pedestrian Interval, motorists have a red signal for the first 3-5 seconds of the WALK phase.

References and Resources

City of Austin: Traffic Signals

Texas Manual on Uniform Traffic Control Devices, Part 4

Pedestrian Safety Guide and Countermeasure Selection System: **Traffic Signals**

Federal Highway Administration Proven Safety Countermeasures

Bike Signal Examples in Austin

4th Street and Red River Street

Rio Grande Street and W 24th Street

North Lamar Boulevard and Morrow Street

STOP SIGNS

Stop signs are a traffic control device used at intersections with three or more approaches, and where application of the normal right-of-way rule would not be expected to provide reasonable compliance with the law.

Stop sign with stop line at an all-way stop

Stop sign oriented to traffic crossing a neighborhood bikeway

Stop sign at intersection between a neighborhood street and a busier street

What is the purpose of a stop sign?

- Controls traffic movements between people driving, walking, and biking by assigning right of way at an intersection.
- May be used to control one direction of traffic while allowing the other direction to flow freely or can be used to control all directions of traffic.

How does COA decide where to install a stop sign?

- We use the Texas Manual on Uniform Traffic Control Devices (TMUTCD) to determine if the safety of an intersection would be improved by controlling one or more directions of traffic with a stop sign. The TMUTCD outlines certain minimum thresholds of motorist, pedestrian, and bicyclist traffic and collisions that should be considered before installing a stop sign.
- If the volumes of people driving, walking, and biking at each direction of the intersection are approximately equal and meet the minimum thresholds, we will consider installing stop signs for all directions of travel.
- If the volumes of people driving, walking, and biking from each direction are unequal, the street with the lower volume of people traveling should be stop-controlled unless there are reasons to provide an advantage to one direction of travel (e.g. neighborhood bikeways).
- Other things we consider include:
  - direction of school walking routes,
  - visibility and sight distance on different sides of the intersection, and
  - providing advantage to one direction of travel over another, e.g. neighborhood bikeway or major trail connection.
- Stop signs may be accompanied by stop lines, which indicate to people driving where to stop their car before the intersection.

How much does a stop sign cost?

$: Stops signs are a relatively low-cost and effective way of controlling traffic at intersections.

How long does it take to install a stop sign?

<1 year: If we determine that an intersection should have one or more new stop signs, they can be installed relatively quickly.

References and Resources

Texas Manual for Uniform Traffic Control Devices
AASHTO Guide for the Development of Bicycle Facilities

SIDEWALKS

Sidewalks are the building blocks of the pedestrian network. There are currently more than 2,400 miles of sidewalks in Austin, yet many areas in the city do not have sidewalks at all. Sidewalks provide the greatest benefit to people when they are wide enough for two people to walk side-by-side, maintained in good condition with few bumps or cracks, kept clear of debris and overgrowing plants, and built with curbs.

Severe cracking creates uneven and hazardous walking surfaces

New sidewalk remains level across driveway

Alternative sidewalk design

What is the purpose of a sidewalk?

- Improves safety and comfort of people walking by separating pedestrians from people moving faster on bikes or in cars.
- Provides a dedicated space away from car traffic for children to walk, play, and learn to ride a bike.

How does COA decide where to build a new sidewalk?

- The City's Sidewalk Master Plan and ADA Transition Plan Update provides an objective mechanism for prioritizing new sidewalk construction and existing sidewalk repair and rehabilitation projects.
- Developers often have to build new sidewalks or repair existing sidewalks with new development.
- Sidewalk prioritization is determined by the following criteria:
  - Where people need and want to walk, not only today but in the future
  - Equity factors, like where people with lower incomes or low-car households live
  - Whether adjacent streets provide comfortable, continuous sidewalks
  - The number of students served
- We prioritize providing a sidewalk on at least one side of residential streets. School routes may be locations where sidewalks should be installed on both sides of residential streets to provide for direct access from homes to school, as well as to areas used for off-site drop-off and pick-up.
- Along existing sidewalks, we look for opportunities to remove barriers such as light poles or other obstructions, aiming to maintain a 4-ft clear zone. We also look for opportunities to limit or narrow driveways (a.k.a. curb cuts), which can create conflicts between people walking and people driving.

How much does a new sidewalk cost?

$$-$$$$: Building new sidewalks can be an expensive and challenging engineering project. We often must coordinate with nearby property owners. In addition, driveways connecting to private property may need to be redesigned and rebuilt, encroachments of private property onto public property removed, and new stormwater infrastructure constructed.

How long does it take to get a new sidewalk installed?

1-2 Years: Design and outreach must be completed before construction can begin.

Additional Information

When building conventional sidewalks is not feasible, other strategies may be considered for creating safer walking routes to school, such as Shared Streets, reallocating road space to create dedicated walking space, and alternative surfacing materials.

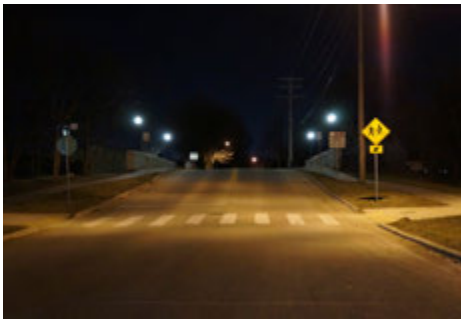
References and Resources

2016 Sidewalk Master Plan & ADA Transition Plan Update

United States Access Board Proposed Guidelines for Pedestrian Facilities in the Public Right-of-Way (PROWAG)

LIGHTING

Lighting is an essential element in street design. It is used to increase visibility and safety for people walking, biking, and driving at night and during dawn/twilight hours. Guidelines for placement, size, and wattage of lighting is a key element of creating pedestrian-friendly streets.



Well-lit crossing at night

Pedestrian scale lighting along a shared use path

Cobra style lights illuminate the street, but not the pedestrian realm

What is the purpose of lighting?

- Increases visibility and feelings of safety on a street, at an intersection/crosswalk, in a neighborhood, or along a trail.
- Creates a welcoming public realm and promotes active transportation options at nightime and winter when daylight hours are shorter.
- Highlights certain locations and elements in a neighborhood as focal points or landmarks which provides wayfinding support.
- Can have a traffic calming effect when pedestrian scale lighting is used.

How does COA decide where to install a lighting element?

- COA follows lighting recommendations included in the Illuminating Engineering Society Of North America, Roadway Lighting. Any applications are to meet or exceed these recommendations.
- We aim to create uniformity of lighting on the street by using lower fixture heights and greater fixture density.
- We place lighting fixtures in a way that minimizes clutter and takes other streetscape elements into consideration. To acheive these goals COA has identified the following guidelines:
  - Pedestrian lighting is placed at a 12-ft mounting height
  - Placed at 88-ft on center from each other
  - We use subject lighting, which is directional and can be aimed at important crossings (such as primary school crossings)
- In addition to these guidelines, lighting should be studied on a case by case basis starting with a photometric analysis, and designed to match the character of the surrounding area.

How much does lighting cost?

$$: Lighting costs can vary depending on the type of fixtures and poles. COA specifies the types of fixtures to be used along public streets and bike paths.

How long does it take to install lighting?

Few months to 1 year: This can vary depending on whether the installation is part of a larger streetscape project.

BIKE FACILITIES

Bike facilities are routes or road design features made for people on bikes. On-street bike facilities include bike lanes, buffered bike lanes, protected bike lanes, and intersection treatments such as protected intersection designs or green pavement markings.

Protected two-way bike lane

Bike markings

Bike box

What is the purpose of a bike facility?

- Encourages more people to feel comfortable riding a bike to different locations, including to school.
- Provides safety and predictability by separating people biking from people driving.
- Makes biking a viable transportation option with many benefits including avoiding traffic congestion, reducing parking costs, decreasing the time spent commuting, and helping reduce emissions that contribute to climate change.
- Providing safe and comfortable ways for children to bicycle to school is important because it extends the distance that a child can realistically arrive to school using active transportation. While a typical walk-shed is only 1/2 mile around a school, a bike-shed can be up to 2 miles or more, depending on the student's age.

How does COA decide where to install a bike facility?

- The Austin Bicycle Master Plan and implementation planning prioritizes the locations where bikeways are built every year. Current funding levels, traffic and safety data, and leveraging opportunities are all considered to decide when and where bike facilities are built.
- The Austin Bicycle Master Plan's main network recommendations are based on a street's speed, volume, and connectivity. The bicycle plan also recommends bicycle facility connections to local destinations, including schools, that are outside of the main network but important due to both the traffic intensity during pick-up and drop-off and safety needs of kids.
- Bike lanes that are more separated from car traffic, like protected bike lanes with additional intersection treatments, are more appropriate and comfortable for kids biking to school.

How much does a bike facility cost?

$-$$$$: The cost of a bike facility depends on the type. Simpler projects cost much less than protected bike lanes.

How long does it take to install a bike facility?

Varies: Installing a bike facility depends significantly on the length of the route and scope of the project. Timelines typically range from eight months to a year for the planning, design, and construction phases, but can take longer, especially if there are changes to parking and a public process must be initiated. In addition, many projects include a data collection period up to one year after installation to evaluate the performance of the facility.

Examples in Austin

Berkman Drive

4th Street and Red River Street

References and Resources

City of Austin Bicycle Master Plan

NACTO Urban Bikeway Design Guide

AASHTO Guide for the Development of Bicycle Facilities, 2012

BIKESAFE Bicycle Countermeasure Selection System

NCHRP Guidelines for Analysis of Investments in Bicycle Facilities

BIKE LANES

A bike lane is defined as a portion of the roadway that has been designated by striping, signage, and pavement markings for exclusive use by bicyclists.

What is the purpose of a bike lane?

- Enable bicyclists to ride at their preferred speed without interference from traffic.
- Facilitate more predictable behavior and interactions between bicyclists and motorists.

How does COA decide where to install a bike lane?

- The installation of a bike lane requires an analysis of traffic volumes and speeds, as well as motorist behaviors.
- Bike lanes are typically found on both sides of a two-way street and one side of a one-way street.
- Bike lanes typically run in the same direction as traffic; sometimes they are installed in a “contra-flow” direction on low-traffic one-way corridors when it is necessary to maintain bicycle connectivity.
- Bike lanes should facilitate access to schools, public transportation, shopping centers, parks, and residential areas.
- Bike lanes are best suited for roadways with:
  - Speeds less than 30 mph and traffic volumes of 3,000 – 9,999 vehicles per day, or
  - Speeds of 31-40 mph and traffic volumes less than 3,000 vehicles per day. At higher speeds and volumes, protected bicycle lanes are preferred.
- On streets with constrained street widths or right-of-ways bicycle lanes may be installed outside of these recommendations
- In Austin, the minimum bike lane width is 5-ft. The preferred bike lane width is wider and can be 6-ft to 8-ft. If there is space to provide a bicycle lane greater than 7-ft, consider a buffered bicycle lane or a protected bicycle lane.
- Other factors affecting the placement of a bike lane include on-street parking, parking frequency, delivery activity, multiple travel lanes, transit service, and route continuity such as completing gaps in off-street urban trails.
- We also consider buffered bike lanes in locations where greater separation is desired between people driving and biking. Buffers consist of diagonal pavement markings that are at least 2-ft wide, located between the travel lane and bike lane.

How much do bike lanes cost?

$: Implementation of bike lanes can take place as part of roadway restriping projects. Roadway repaving is typically not required unless current conditions do not allow for easy bicycling.

How long do they take to install?

>1 year: Installation of bike lanes requires analysis of existing traffic conditions and identification of how the bike lane will augment and improve the existing or future bicycle network. Design of bike lanes typically takes 6 months to a year, followed by implementation.

PROTECTED BIKE LANES

A protected bike lane is an exclusive bicycle facility that provides a greater level of separation and comfort for bike riders, compared to a conventional bike lane. A protected bike lane includes physical, vertical separation from motor vehicle traffic. This physical separation may be in the form of a flex post, bollard, or curb. In situations where on-street parking is allowed, separated bike lanes are sometimes located on the curb side of parking.

What is the purpose of a protected bike lane?

- Provide a higher level of comfort and safety for users due to the physical separation.
- Attract users of all ages and abilities.
- Data from surveys suggest that if the City of Austin were able to implement an all ages and abilities bicycle network with facilities such as separated bike lanes, then 55 to 60% of the population say they would feel safe enough to bicycle on the roadways.

How does COA decide where to implement a protected bike lane?

- Protected bike lanes require more on-street right-of-way width than conventional bike lanes
- Protected bike lanes are generally recommended for roadways with:
  - Average daily traffic volumes of 10,000+
  - 41-50 mph and average daily traffic volumes of 3,000-9,999+
  - Over 50 mph and average daily traffic volumes of less than 3,000
- Protected bike lanes may be considered below these threshold levels as a treatment along bicycle routes to school since young children may need more separation than adults to feel comfortable bicycling on the street.
- Other factors affecting the placement of a protected bike lane include curbside activity, on-street double parking, parking frequency, delivery activity, multiple travel lanes, transit service, and route continuity such as completing gaps in off-street urban trails.
- Generally, the preferred clear width of a one-way protected bike lane is 7-ft, not including the width of physical separation. For a two-way facility, the typical clear width is 10-ft.

How much does a protected bike lane cost?

$$-$$$: Costs can vary. Protected bike lanes can be implemented as part of routine resurfacing projects using low-cost materials, or as part of reconstruction projects using curbing and grade separation.

How long does a protected bike lane take to install?

1-3 years. Like conventional bike lanes, separated bike lanes require traffic analysis and identification of any spatial constraints. Depending on the separation type and material chosen, design of separated bike lanes can take 6 to 18 months, followed by implementation.

NEIGHBORHOOD BIKEWAYS

Neighborhood Bikeways are streets that have slow speeds and low volumes of people driving, in order for people of all ages and abilities to feel comfortable biking on the street.

Residential streets are great for Neighborhood Bikeways

Neighborhood Bikeway

Intersection design is an important consideration at arterial street crossings

What is the purpose of a Neighborhood Bikeway?

- Encourages more people to walk and bike by keeping car volumes and speeds low and by providing high quality crossing treatments at busy streets.
- Provides safer, more comfortable routes to school for kids on foot or on bikes.
- Provides better connections for all ages and abilities to bike to other places in their neighborhood, like parks, libraries, and community centers.

How does COA decide where to install a Neighborhood Bikeway?

- The Austin Bicycle Master Plan prioritizes the general location where Neighborhood Bikeways are built. Current funding levels, traffic and safety data, and leveraging opportunities are all considered when deciding where Neighborhood Bikeways are implemented.
- Some elements we consider when selecting a specific route include:
  - Residential streets that connect people to neighborhood destinations such as schools, parks, shops and restaurants, among others,
  - Streets with low volumes of people driving and slow speeds. An ideal street for a Neighborhood Bikeway has fewer than 1,500 cars per day and speeds close to 20 MPH,
  - Relatively flat streets that are comfortable for people to walk or bike,
  - How to make the most of existing infrastructure to help people cross busy streets, such as traffic signals at busy intersections, and
  - New safety improvements at intersections of busy streets, such as refuge islands and crossing beacons.
- Typical elements of a Neighborhood Bikeway may include:
  - Speed limit of 20 MPH,
  - Signs and pavement markings to help people find their way,
  - Some combination of curb extensions, crossing beacons, crosswalks, refuge islands, or traffic signals at busy intersections,
  - Traffic diversion or channelization,
  - Right of way priority.

NEIGHBORHOOD BIKEWAYS

Refuge islands help Neighborhood Bikeway users cross busier streets

Signage and pavement markings help direct Neighborhood Bikeway users to destinations

How much does a Neighborhood Bikeway cost?

$-$$$: The cost to build a new Neighborhood Bikeway can vary based on how much work needs to be done to make crossings of busy streets safer.

How long does it take to install a Neighborhood Bikeway?

>1 year: Once a new Neighborhood Bikeway project has been funded, it can take one to two years to install. During the early phases of a Neighborhood Bikeway project, we collect and analyze traffic data to understand existing conditions. We gather public feedback through community outreach, which helps us select the most promising route. Once a route is chosen, the design phase and some pre-construction work may occur. Every Neighborhood Bikeway design is unique depending on local characteristics.

References and Resources

Austin Bicycle Master Plan
Local Area Traffic Management Program
NACTO Urban Bikeway Design Guide

SCHOOL ZONES

School Zones are designated on the immediate blocks around a school with reduced speed limits and pedestrian crossing signage to facilitate safer crossings for children walking and biking to school.

Trained crossing guards improve school zone safety


School crossing sign


In road signage reinforces pedestrian priority at school crossings

What is the purpose of a school zone?

- The best way to achieve a safe and low-stress school zone is through the uniform application of policies, practices, and standards developed through engineering judgement or studies.

What treatments define a school zone?

- Flashing school zone signs are used to reduce speed limits during school arrival and dismissal hours.
- School crossing signs should be used on key crossings located within the school zone. Other enhanced crossing treatments may be appropriate, depending on the volumes of pedestrian and motor vehicle traffic.
- Signs may include School Crossing, Speed Limit, School Bus Stop.
- Beacons may be used to supplement signage.

What other treatments should also be considered to improve safety in a school zone?

- Adequate sidewalks and crosswalk markings.
- Crossing guards with proper equipment and training.
- Traffic control devices including pedestrian activated signals.

How does COA decide where to implement a school zone?

- The beginning point of a reduced school speed limit zone should be at least 200-ft in advance of the school grounds, a school crossing, or other school related activities; however, this 200-ft distance should be increased if the reduced school speed limit is 30 mph or higher.
- Signage and pavement markings are not frequently used on neighborhood streets, though we consider the speed of traffic and anticipated number of students walking along the route. This also applies if the approach is a state highway or major arterial.
- Additional information on school zone signage and markings can be found in Part 7 of the TMUTCD.

How much do school zone improvements cost?

$: Pavement markings and signage are relatively inexpensive. Costs increase if sidewalk construction, road alterations, and traffic signals are also needed.

References and Resources

Texas MUTCD Traffic Control for School Areas
New Jersey School Zone Design Guide
Arizona Traffic Safety for School Zones Manual

DYNAMIC SPEED DISPLAY DEVICES

Dynamic Speed Display Devices (DSDD), also known as speed feedback signs, use radar to detect and display the speed of people driving. These signs help slow down people driving by reminding them of their speed compared to the posted speed limit.

Speed feedback sign displays a driver's speed compared to the speed limit

Solar-powered speed radar sign

Speed feedback signs may also flash a "slow down" message

What is the purpose of a dynamic speed display device?

- Raises awareness of the speed a person is driving and encourages them to slow down if they are driving above the speed limit.

How does COA decide where to install a dynamic speed display device?

- The city uses the following criteria when installing a DSDD:
  - The street must be owned and maintained by the City of Austin,
  - The street must provide access to abutting residential properties and/or places of community interest such as parks, libraries, community centers, educational institutions, etc.
  - The street must be a residential street or a minor collector street with no more than one moving lane of traffic in each direction,
  - The street must have a speed limit of 35 miles per hour or less, and
  - The DSDD cannot be installed in a school zone.

How much does a dynamic speed display device sign cost?

$-$$: Both portable and fixed-location DSDD units are available. Portable units are typically placed at a location on a roadway for a relatively short time period and then relocated to a different location. Fixed-location units are used for the long-term display of vehicle speeds at a given location.

How long does it take to install a dynamic speed display device?

The Austin Transportation Department has a Rotating DSDD Pilot Program with six portable DSDD units. Each DSDD unit is left in place for four weeks at a time, during which it collects real-time data on vehicular speeds and volumes. The locations for DSDD are determined on a first-come, first-serve basis based on citizen requests.

References and Resources

ATD Rotating DSDD Pilot Program

Example in Austin

Guadalupe Street and 23rd Street

LANE RECONFIGURATION

On multi-lane streets, a lane reconfiguration can improve safety for all roadway users. Modification of on-street parking can also give flexibility to constrained streets. Depending on the needs of the street, which are determined by careful analysis and a strong public process, general purpose lanes, parking or turn lanes may be repurposed for other uses such as wider sidewalks, street trees, bike lanes, or more efficient transit.

Street before lane reconfiguration

Street after lane reconfiguration

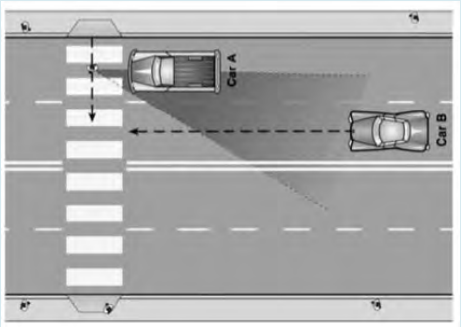
Street after lane reconfiguration

What is the purpose of a lane reconfiguration?

- Makes it easier and safer for people to cross busy streets by reducing the number of traffic lanes a person has to cross. When people cross streets with more than one lane in each direction they encounter a 'multiple threat.'
- Reallocate space on the street to widen sidewalks, plant street trees, add curb extensions, or install protected bike lanes.
- Slows people driving, which makes the street safer for everyone. When there's one lane in each direction, a person driving can only go as fast as the person in front of them.
- Makes it safer for people driving to make a left turn when a center turn lane is added, and a single lane of traffic helps manage drivers cutting in and out of lanes, which helps reduce collisions.
- Narrowing the width of travel lanes can also slow people driving and create space on the street to make it safer and more comfortable for people walking and biking.

How does COA decide where to do a lane reconfiguration?

- When a street is being resurfaced or reconstructed, there is an opportunity to change the configuration of lanes on the street. COA evaluates traffic conditions and crash records to identify whether a road or lane diet is needed and if parking can be modified.
- Streets that are good candidates for lane reconfigurations typically have lower volumes than would be expected for a street with the existing configuration. A lane reconfiguration may be considered for streets with under 25,000 vehicles per day.
- For all lane reconfiguration projects, the flow of traffic is carefully analyzed to make sure a lane reduction wouldn't cause back-ups at traffic signals, and public process is conducted to discuss tradeoffs with the public.
- For parking lane reconfigurations, parking use and supply is carefully studied and inform the proposed designs that are vetted through a public process before moving forward.



Multiple Threat

A multiple threat is a situation where a driver in one lane (car A) stops for a person crossing the street, but the driver in the next lane (car B) doesn't see the person and doesn't stop. If we mark a crosswalk across more than two lanes of traffic, we consider installing additional safety improvements like crossing beacons, pedestrian signals, refuge islands, curb extensions, or advanced stop lines to minimize the multiple threat.

LANE RECONFIGURATION

A three-lane to two-lane reconfiguration

Lane reconfiguration

Center turn lane narrowed to provide space for bike lanes

How much does a lane reconfiguration cost?

$-$$$$: The cost of a lane reconfiguration is highly variable; it may involve removing the lane lines from the street and repainting new lane lines, which is often done at night or on weekends to minimize traffic disruptions. When a lane reduction is done as part of a larger project to resurface or reconstruct a street, it can be accomplished for relatively low costs.

How long does it take to do a lane reduction?

>1 year: We generally host one or two open houses to gather community input and influence design decisions in the first year, and construction typically follows the year after.

References and Resources

Austin Street Design Guide (DRAFT)

Redesigning the Street: A Report on Right Sizing Projects in Austin, TX 1999-2014

Pedestrian Safety Guide and Countermeasure Selection System: Lane Reduction (Road Diet)

FHWA Proven Safety Countermeasures: Road Diet (Roadway Reconfiguration

Examples in Austin

Duval Road from West Cow Path to Aspendale

Shoal Creek Blvd from Steck to 183

51st Street from Berkman to Manor

SPEED CUSHIONS

Speed cushions are traffic calming features that encourage people driving to slow down. Speed cushions are raised areas that extend across the street with wheel cutouts to allow large vehicles, like buses or emergency vehicles, to pass through unaffected.

Speed cushion

Speed cushions allow for larger vehicles such as fire trucks to pass through unimpeded

Speed cushions installed on hills may include a cut for downhill bicyclists

What is the purpose of speed cushions?

- Slow people driving to make streets safer and more comfortable for people walking and biking.
- Speed cushions are usually installed on neighborhood streets.

How does COA decide where to install speed cushions?

- Any request for speed cushions has to go through the Local Area Traffic Management (LATM) program which is a request-based program that installs speed mitigating devices, such as speed cushions, on neighborhood streets.
- ATD ranks requests based on speed data, neighborhood support, and geometric and environmental factors.
- Once accepted into the program, the request competes for funding with all other LATM requests.
- Speed cushions may also be funded through SRTS if identified in the SRTS Infrastructure Plan.

How much does a speed cushion cost?

$: Speed humps and cushions are a low-cost way to slow people driving.

How long does it take to install a speed cushion?

1-2 years: Priority streets with high speeds are usually identified one year and construction happens the next year.

References and Resources

Local Area Traffic Management Program

Examples can be found throughout Austin

TRAFFIC CIRCLES

Traffic circles guide motor vehicles through an intersection in one direction around a central island. They are usually installed at intersections of neighborhood streets. Traffic circles are very effective at slowing people driving and reducing collisions. When installed in a series along a corridor, they are even more effective at reducing motor vehicle speeds along the length of the corridor.

The horizontal deflection of chicanes and traffic circles force drivers to slow down

Traffic circles create more comfortable conditions for people walking and biking

Traffic circle at a school crossing

What is the purpose of a traffic circle?

- Slows people driving and reduces the likelihood of collisions to make neighborhood streets safer and more comfortable for people walking, biking, and driving.
- Provides an opportunity to beautify a neighborhood street by adding trees, plants, and flowers.

How does COA decide where to install a traffic circle?

- COA is currently working with the Austin Fire Department to address their concerns about neighborhood traffic circles. The use of this treatment will be carefully reviewed.
- COA uses data to understand the volume and speeds of people driving on a street and how many collisions have happened at that location in recent years.
- We may consider installing a traffic circle at intersections that have had five or more collisions in the past three years.
- Before we design and construct a traffic circle, we identify neighbors who will volunteer to maintain the plants in the traffic circle.

How much does a traffic circle cost?

$$-$$$: Traffic circles are lower in cost to install if no other curbline changes in the intersection are needed. If curbs must be adjusted, and there are changes to drainage structures and curb ramps, the cost will be higher.

How long does it take to install a traffic circle?

1-2 years: Priority intersections are usually identified one year and construction happens the next year.

References and Resources

Local Area Traffic Management Program

Examples can be found throughout Austin

Rio Grande Street and 8th Street

Rainey Street and River Street

URBAN TRAILS

Urban trails, also known as a shared or multi-use paths, create active transportation corridors that provide expanded travel choices. Urban trails can be built independent from the road network or alongside a roadway where traffic volumes and speeds are too high, or where there is not sufficient space for bicycle lanes in the existing street space.

Urban trail in Alexandria, VA

Urban trail in San Antonio, TX

Lance Armstrong Bikeway, Austin, TX

What is the purpose of an urban trail?

- Serves both transportation and recreation users,
- Can accommodate two-way pedestrian and bicycle use,
- May include connections to the on-street bicycle and sidewalk network
- Should be aesthetically appealing and feel safe to use, and
- May provide opportunities for economic development along the trail corridor.

How does COA decide where to install an urban trail?

- Prioritization criteria based on proximity to destinations, residential populations, connectivity, and community support all contribute to the trail-siting process.
- We look for potential integration of trails in proposed development projects, as well as outreach and education opportunities for local bicycle, pedestrian, and environmental advocacy groups.
- We recommend a 12 ft-wide hard surface path, but may need to narrow the trail under constrained circumstances. In areas where a higher volume of both pedestrians and bicyclists are anticipated, we consider providing separate facilities or a wider path (up to 18-ft) with designated space for each mode.
- **Sometimes, we will work with private property owners to install a new gate between a neighborhood/apartment complex and a public street, particularly if that connection would shorten the route for people walking to school or similar destinations. This new connection eliminates a barrier and serves as a type of urban trail, linking homes with public streets, sidewalks, and local destinations.**

How much does an urban trail cost?

$$$: Costs for urban trails vary, but are typically among the most expensive types of bicycle and pedestrian facilities. Components of urban trail design and construction include:

- Right-of-way
- Surface material
- Lighting
- Landscaping
- Terrain grading
- Retaining walls
- Pavement markings
- Fencing/rails
- Multi-use bridges
- Maps and signage
- Trail furniture

How long does it take to install an urban trail?

Varies. Planning, public input, design, engineering, and construction are all components of the installation process. Many urban trails will take 5 to 10 years to be fully implemented. However, shorter segments that close gaps in the network or eliminate barriers can often be installed in a shorter timeframe.

References and Resources

City of Austin Bicycle Master Plan
Austin Urban Trails Master Plan
NACTO Urban Bikeway Design Guide

BICYCLE PARKING

Bicycle parking can be a single rack or a group of racks and can be installed on school grounds, on the sidewalk, or in the street.

Bike racks on the sidewalk

Bike corral

Covered bike parking

What is the purpose of bicycle parking near schools?

- Gives students and school staff a place to secure their bike during the day while they're at school.
- Encourages students and school staff to ride their bikes to school.
- When located near the main entrance, bike parking makes it inviting for people who get to school by bike.
- Sends the message that the school encourages bicycling.

How does COA decide where to install bike parking?

- We want to make sure that every school has enough bike parking to meet the day-to-day needs of students and staff.
- When deciding where to install bike racks, COA considers locations where the racks are:
  - noticeable immediately when arriving at school,
  - visible from nearby windows and the street to make sure bikes are secure,
  - sheltered from the elements, and
  - publicly accessible.
- We install bike racks that allow one or both wheels to be locked to prevent bikes from falling down and that can fit different types and sizes of bicycles, like small children's bikes or long family bikes.

How much does bike parking cost?

$: Bike parking is relatively inexpensive.

Bike corrals

Sometimes the best place to install bike parking is on the street. A bike corral can be installed in place of on-street parking and can provide parking for 6 to 12 bikes in place of one car.

A corral can also be placed in locations where parking isn't allowed, like 30 feet from an intersection or marked crosswalk. This helps make the crosswalk safer by ensuring no one parks their car illegally and blocks visibility of the crosswalk or intersection, while also adding parking spaces for people on bikes.

How long does it take to install bike parking?

< 1 year: We can generally install new bike parking at a school in less than one year.

Examples in Austin

Highland Park Elementary School

Adam L Chapa Sr Street at E Cesar Chavez Street

References and Resources

Austin Bicycle Master Plan

Safe Routes to School National Partnership

Association of Pedestrian and Bicycle Professionals: Bicycle Parking Guidelines

CITY OF AUSTIN PUBLIC WORKS

SAFE ROUTES
TO SCHOOL

austintexas.gov/saferoutes