APPENDIX



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APPENDIX A. BICYCLE AND PEDESTRIAN LTS METHODOLOGY

METHODOLOGY

The Bicycle LTS methodology is broken into three categories: segments (bike paths, lanes, or routes), intersection approaches (turn lanes), and intersection crossings (unsignalized intersections). Table-based criteria are applied separately for each category using the "worst case principle," meaning the worst (or highest) score among the criteria considered governs the overall LTS score for that facility.

Depending on the community context and the detail level desired, the overall methodology may be simplified based on the general consistency of facility types, as certain elements (e.g., turn lanes, bike lanes, speed limits, etc.) may not exist in a particular community. If there are no turn lanes on an approach, then this portion of the methodology is skipped. Signalized intersections do not receive an LTS score. Signalized crossings usually do not create a barrier, as the signal provides a protected crossing, and are not considered in the methodology.

SEGMENTS

Table 4.1 through **Table 4.3** display the LTS scoring criteria utilized for analyzing the level of traffic stress for the various types of roadway segments, including segments within mixed traffic, segments with bicycle lanes alongside a parking lane, and segments with bicycle lanes not alongside a parking lane. Class I shared-use paths and Class IV separated bikeways, not shown in these tables, automatically receive an LTS score of 1, because of the increased level of comfort a facility separated from vehicular traffic provides a bicyclist. These table were adapted from the criteria tables presented in the Mineta methodology, incorporating vehicle lanes as a surrogate for street width.

Bicycle LTS for roadway segments accounts for traffic volumes, speed, presence and width of a bicycle lane, presence, width of a parking lane, and bicycle lane blockage, which denotes the frequency at which a bicycle lane is blocked. If there is no known data available suggesting frequent blockage of bicycle lanes, bicycle lane blockage is assumed rare, which is consistent with the Mineta methodological approach.

Bicycle LTS criteria for analyzing segments in mixed traffic are shown in **Table 4.2**. Mixed traffic segments are roadway segments that do not have Class II bicycle lanes. Roadway segments with Class III bicycle routes are analyzed as mixed traffic segments.

Table 4.3 presents the LTS analysis criteria for segments with bicycle lanes. As shown, some criteria result in "no effect." No effect denotes that when other variables are accounted for there is no impact, or no effect, on the LTS score at that traffic stress level. For example, **Table 4.3** shows "no effect" for two of the four criteria considered at LTS 4—the combined width of the adjacent bicycle and parking lanes and bicycle lane blockage. In this example, this means that a roadway segment featuring a bicycle lane alongside a parking lane, two or more through lanes per direction, and/or speeds at or higher than 40 mph, the width of the bicycle and parking lane will have no impact on the LTS score. If the sum of the bicycle and parking lane width is below 14 feet, considering only these criteria would result in LTS 3 score. When through lanes per direction and speeds are also considered and surpass two or more lanes and 40 mph speed thresholds shown in **Table 4.3**, the

overall traffic stress of the segment would result in LTS 4. In this case, the combined bicycle/parking lane width and bicycle lane blockage would have no bearing on the overall score.

TABLE 4.1: BICYCLE LTS CRITERIA FOR SEGMENTS WITHIN MIXED TRAFFIC

| | EXISTING MILES | | | | |
|----------------|----------------|-----------|-------|--|--|
| BIKEWAY CLASS | 2-3 lanes | 4-5 lanes | 6+ | | |
| UP TO 25 MPH | LTS 1 or 2 | LTS 3 | LTS 4 | | |
| 30 MPH | LTS 2 or 3 | LTS 4 | LTS 4 | | |
| 35 MPH OR MORE | LTS 4 | LTS 4 | LTS 4 | | |

TABLE 4.2: BICYCLE LTS CRITERIA: SEGMENTS (BIKE LANES ALONGSIDE A PARKING LANE)

| | LTS 1 | LTS 1 LTS 2 LTS 3 | | LTS 4 |
|---|--------------------|-------------------|-------------------|----------------|
| THROUGH LANES PER DIRECTION | 1 No effect | | 2 or more | No effect |
| SUM OF BICYCLE LANE WIDTH AND PARKING LANE WIDTH ¹ | 15 feet or more | 14 to 15 feet | Less than 14 feet | No effect |
| SPEED LIMIT OR PREVAILING SPEED | Up to 25 mph | 30 mph | 35 mph | 40 mph or more |
| BICYCLE LANE BLOCKAGE | Rare | No Effect | Frequent | No Effect |

TABLE 4.3: BICYCLE LTS CRITERIA: SEGMENTS (BIKE LANES NOT ALONGSIDE A PARKING LANE)

| | LTS 1 | LTS 2 | LTS 3 | LTS 4 |
|---|----------------|------------------|-----------|----------------|
| THROUGH LANES PER DIRECTION | 1 | No effect | 2 or more | No effect |
| SUM OF BICYCLE LANE WIDTH AND PARKING LANE WIDTH ¹ | 6 feet or more | Less than 6 feet | No effect | No effect |
| SPEED LIMIT OR PREVAILING SPEED | Up to 30 mph | No effect | 35 mph | 40 mph or more |
| BICYCLE LANE BLOCKAGE | Rare | No Effect | Frequent | No Effect |

APPROACHES

Based on the Mineta methodology, only approaches with right turn markings were included in the LTS analysis. Right turn lanes at intersection approaches can "challenge a cyclist's normal position and create a weaving conflict" (Mineta 2012). Intersection approach scoring criteria for approaches are displayed in **Table 4.4** and **Table 4.5**.

Table 4.4 presents the scoring criteria for right-turn approaches to an intersection that are adjacent to a bicycle lane, and **Table 4.5** presents the scoring criteria for approaches adjacent to mixed traffic segments (i.e., travel lanes that include Class III or Sharrows). These criteria include length of the right turn lane, configuration of the bicycle lane in relation to the right turn lane, and the estimated speed associated with the curb radius at the intersection turn.

The length of the turn lane accounts for the time a bicyclist is exposed to right-turning vehicles—longer turn lanes result in greater exposure and increased traffic stress. The curb radius accounts for the speed of a turning vehicle. A smaller curb radius will result in a tighter turn and slower turning speeds, while a larger curb radius will allow a vehicle to make a turn at greater speeds and result in higher traffic stress.

The bicycle lane configuration at an intersection approach also greatly influences traffic stress. At approaches where bicycle lanes exist along the adjacent roadway segment and a right turn lane is introduced, bicycle lanes are often configured to shift to the left so the bicycle lane is configured to the left of the right turn pocket. In these cases, either the bicycle lane abruptly veers to the left, or the bicycle lane disappears for roughly 100 feet then reappears closer to the intersection at the left of the right turn lane. Both of these scenarios require a bicyclist to merge to the left against vehicles entering the right turn lane. This increases traffic stress given that bicyclists must look over their shoulder to navigate the potential conflict with right-turning vehicles potentially traveling at high speeds and increases user priority ambiguity.

An approach featuring a free right movement, more than one turn lane, a trapped bicycle lane or a through-right lane will also result in increased traffic stress. According to the Mineta methodology, an approach configuration where the bicycle lane continues straight will result in the lowest traffic stress, because this type of configuration will result in an unambiguous priority placed on the bicyclist and cars merge across the bicycle lane rather than vice versa.

TABLE 4.4: BICYCLE LTS CRITERIA FOR APPROACHES ALONGSIDE BICYCLE LANES

| CONFIGURATION | LTS |
|---|-------|
| SINGLE RIGHT-TURN LANE UP TO 150 FT LONG STARTING ABRUPTLY WHILE BICYCLE LANE CONTINUES STRAIGHT AND INTERSECTION ANGLE/CURB RADIUS SUCH THAT TURNING SPEED IS ≤15 MPH | LTS≥2 |
| SINGLE RIGHT-TURN LANE LONGER THAN 150 FT STARTING ABRUPTLY WHILE BICYCLE LANE CONTINUES STRAIGHT AND INTERSECTION ANGLE/CURB RADIUS SUCH THAT TURNING SPEED IS ≤15 MPH | LTS≥3 |

| CONFIGURATION | LTS |
|---|-------|
| SINGLE RIGHT-TURN LANE WITH BICYCLE LANE THAT SHIFTS TO THE LEFT AND INTERSECTION ANGLE/CURB RADIUS SUCH THAT TURNING SPEED IS ≤15 MPH | LTS≥3 |
| SINGLE RIGHT-TURN LANE WITH ANY OTHER CONFIGURATION OR DUAL RIGHT- TURN LANES OR RIGHT-TURN LANE ALONG WITH A COMBINED THROUGH/RIGHT LANE | LTS≥4 |

TABLE 4.5: BICYCLE LTS CRITERIA FOR APPROACHES ALONG MIXED TRAFFIC SEGMENTS

| CONFIGURATION | LTS |
|--|-----------|
| SINGLE RIGHT-TURN LANE UP TO 75 FT LONG AND INTERSECTION ANGLE/CURB RADIUS SUCH THAT TURNING SPEED IS ≤15 MPH | No effect |
| SINGLE RIGHT-TURN LANE BETWEEN 75 FT AND 150 FT LONG AND INTERSECTION ANGLE/CURB RADIUS SUCH THAT TURNING SPEED IS ≤15 MPH | LTS≥3 |
| ANY OTHER CONFIGURATION | LTS≥4 |

METHODOLOGY

The Pedestrian Level of Traffic Stress (LTS) methodology was developed by the Oregon Department of Transportation (ODOT). It is broken into two categories: segments (sidewalks, paths, and multiuse paths) and intersection crossings (unsignalized intersections). Table-based criteria are applied separately for each category using the "worst case principle," meaning the worst (or highest) score among the criteria considered governs the overall LTS score for that facility.

Depending on the community context and the detail level desired, the overall methodology may be simplified based on the general consistency of facility types, as certain elements (e.g., median islands, buffer type and width, sidewalk ramps, etc.) may not exist in a particular community. If there are no sidewalk ramps on a crossing, then this portion of the methodology is skipped. Signalized intersections generally do not receive an LTS score. Signalized crossings usually do not create a barrier, as the signal provides a protected crossing, and are not considered in the methodology.

SEGMENTS

Table 4.1 through **Table 4.4** display the LTS scoring criteria utilized for analyzing the level of traffic stress based on varying criteria such as sidewalk condition and total buffering width. There are four tables used to classify sidewalk segments, and the methodology follows a "worst case principle" meaning the lowest score assigned through the table criteria is applied to the segment. These tables are the criteria tables presented in the ODOT methodology.

Pedestrian LTS for sidewalk segments accounts for sidewalk condition, physical buffer type, total buffering width, and general land use. Pedestrian LTS criteria for analyzing segments based on these criteria are presented in **Tables 4.1** through **Table 4.4**

Table 4.1 presents the LTS analysis criteria for segments with bicycle lanes. As shown, some criteria do not change across changing conditions. This denotes that when other variables are accounted for there is no impact, or no effect, on the LTS score at that traffic stress level. For example, **Table 4.1** shows no change in LTS when total buffering width increases from 10 to 25 feet on a two-lane roadway. In this example, a 10-foot buffer has been found sufficient to facilitate a low stress experience on a two-lane road. This begins to change as more travel lanes are introduced and facilitate higher speeds with more traffic volume.

TABLE 4.1: PEDESTRIAN LTS CRITERIA FOR SEGMENT SIDEWALK CONDITION

| Actual/ | Effective | Sidewalk Condition | | | | | |
|----------------------------------|-----------|--------------------|--------|--------|--------------|----------------|--|
| Sidewalk Width (ft) ² | | Good | Fair | Poor | Very Poor | No Sidewalk | |
| | <4 | PLTS 4 | PLTS 4 | PLTS 4 | PLTS 4 | PLTS 4 | |
| Actual | ≥4 to <5 | PLTS 3 | PLTS 3 | PLTS 3 | PLTS 4 | PLTS 4 | |
| | ≥5 | PLTS 2 | PLTS 2 | PLTS 3 | PLTS 4 | PLTS 4 | |
| Effective | ≥64 | PLTS 1 | PLTS 1 | PLTS 2 | PLTS 3 | PLTS 4 | |

TABLE 4.2: PEDESTRIAN LTS CRITERIA: SEGMENT PHYSICAL BUFFER TYPE

| Physical Buffer Type | | | | | | |
|--------------------------|---------------------|-------------|-----------|---------|--|--|
| Buffer Type ¹ | Pr | evailing or | Posted Sp | eed | | |
| | ≤25 MPH | 30 MPH | 35 MPH | ≥40 MPH | | |
| No Buffer (curb tight) | PLTS 2 | PLTS 3 | PLTS 3 | PLTS 4 | | |
| Solid surface | PLTS 2 ² | PLTS 2 | PLTS 2 | PLTS 2 | | |
| Landscaped | PLTS 1 | PLTS 2 | PLTS 2 | PLTS 2 | | |
| Landscaped with trees | PLTS 1 | PLTS 1 | PLTS 1 | PLTS 2 | | |
| Vertical | TEIST | ILISI | ILIGI | 11132 | | |

¹Combined buffers: If two or more of the buffer conditions apply, use the most appropriate, typically the lower stress level

TABLE 4.3: PEDESTRIAN LTS CRITERIA: SEGMENT TOTAL BUFFERING WIDTH

| Total Number of Travel Lanes (both directions) | Total Buffering Width (ft) ¹ | | | | | | |
|--|---|---------------------|------------|------------|--------|--|--|
| | <5 | ≥5 to <10 | ≥10 to <15 | ≥15 to <25 | ≥25 | | |
| 2 | PLTS 2 | PLTS 2 | PLTS 1 | PLTS I | PLTS 1 | | |
| 3 | PLTS 3 | PLTS 2 | PLTS 2 | PLTS 1 | PLTS 1 | | |
| 4-5 | PLTS 4 ² | PLTS 3 | PLTS 2 | PLTS 1 | PLTS 1 | | |
| 6 | PLTS 4 ² | PLTS 4 ² | PLTS 3 | PLTS 2 | PLTS 2 | | |

¹Total Buffering Width is the summation of the width of buffer, width of parking, width of shoulder and width of the bike lane on the same side of the roadway as the pedestrian facility being evaluated.

TABLE 1. PEDESTRIAN LTS CRITERIA: SEGMENT GENERAL LAND USE

| PLTS | Overall Land Use | HDM Land Use Context |
|--------|--|--|
| PLTS 1 | Residential, central business districts (CBD), neighborhood commercial, parks and other public facilities, governmental buildings/plazas, offices/office parks | Traditional Downtown/CBD Urban Mix Residential Corridor |
| PLTS 2 | Low density development, rural subdivisions, un-incorporated communities, strip commercial, mixed employment | Suburban Fringe Rural Community |
| PLTS 3 | Light industrial, big-box/auto-oriented commercial | Commendat Condition |
| PLTS 4 | Heavy industrial, intermodal facilities, freeway interchanges | - Commercial Corridor |

CROSSINGS

Pedestrian Crossing LTS is assessed based on the criteria presented in **Tables 4.6** through **4.10**. There are 5 criteria tables, and the lowest score assessed is applied to the crossing. Crossings at signalized intersections generally receive an LTS of 1 unless engineering judgement necessitates adjustments based on factors such as illumination and crossing distance. Unsignalized intersections with median refuges and those without a median refuge are analyzed separately, as shown in **Table 4.6** and **Table 4.7**.

According to the ODOT methodology, signalized crossings are generally not analyzed as these crossing control types generally do not create a barrier to connectivity. In most cases, signalization provides adequate protection when crossing an intersection. An exception to this scoring criteria is roadways that are exceptionally wide (i.e., more than eight travel lanes), where data exists to suggest that signal timings do not provide adequate crossing time for pedestrians, or where limited sight lines on conflicting movements are insufficiently marked or illuminated.

Crossings at intersections between two roadways classified as local/residential that received LTS 1 (low-stress) scores, were also assumed to be low-stress due to low volumes and speed.

TABLE 4.4: PEDESTRIAN LTS CRITERIA ON COLLECTOR & LOCAL UNSIGNALIZED CROSSING 1,2,3,4

| Prevailing Speed or | No Medi | ian Refuge | Median Refuge Present | |
|------------------------|-----------|-------------|---|--|
| Speed Limit (mph) | Total Lar | nes Crossed | Maximum One Through/Tur Lane Crossed per Direction | |
| | 1 Lane | 2 Lanes | Lane Crossed per Direction | |
| ≤25 | PLTS 1 | PLTS 1 | PLTS 1 ⁵ | |
| 30 | PLTS 1 | PLTS 2 | PLTS 1 | |
| 35 | PLTS 2 | PLTS 2 | PLTS 2 | |
| ≥40 | PLTS 3 | PLTS 3 | PLTS 3 | |

¹For street being crossed.

TABLE 4.5: PEDESTRIAN LTS CRITERIA ON ARTERIAL UNSIGNALIZED CROSSING WITHOUT A MEDIAN REFUGE^{1,2}

| Prevailing Speed or Speed Limit (mph) | Total Lanes Crossed (Both Directions) ³ | | | | | | |
|--|--|-------------------------------------|---------------|---------------|-----------------------------------|----------------|--|
| | 2 Lanes | | | 3 Lanes | | | |
| | <5,000 vpd | 5,000- 9,000 vpd ⁴ | >9,000 vpd | <8,000 vpd | 8,000- 12,000 vpd ⁴ | >12,000 vpd | |
| ≤ 25 | PLTS 2 | PLTS 2 | PLTS 3 | PLTS 3 | PLTS 3 | PLTS 4 | |
| 30 | PLTS 2 | PLTS 3 | PLTS 3 | PLTS 3 | PLTS 3 | PLTS 4 | |
| 35 | PLTS 3 | PLTS 3 | PLTS 4 | PLTS 3 | PLTS 4 | PLTS 4 | |
| ≥ 40 | PLTS 3 | PLTS 4 | PLTS 4 | PLTS 4 | PLTS 4 | PLTS 4 | |

¹For street being crossed.

²Minimum PLTS 3 when crossing lacks standard ramps.

³Use Table 4.10 for one-way streets, when ADT exceeds 5,000, or total number of lanes exceeds 2.

⁴Street may be considered a one-lane road when no centerline is striped and when oncoming vehicles commonly yield to each other.

⁵Refuge should be at least 10 feet for PLTS 1, otherwise use PLTS 2 for refuges 6 to <10 feet.

²Minimum PLTS 3 when crossing lacks standard ramps.

³Use Table 4.10 for one-way streets. Use PLTS 4 for crossings of four or more lanes.

⁴Use these columns when ADT volumes are not available.

TABLE 4.8: PEDESTRIAN LTS ADJUSTMENTS FOR ARTERIAL CROSSWALK ENHANCEMENTS1

| Treatment ² | Adjustment | Treatment | Adjustment | |
|-------------------------------|------------|---------------------------------|------------|--|
| Markings ³ | -0.5 | In-street signs | -1.0 | |
| Roadside signage ³ | -0.5 | Curb extensions | -0.5 | |
| Illumination | -0.5 | Raised crosswalk | -1.0 | |
| PAB (e.g. RRFB) | -1.0 | Standard 12" flashing beacon | -0.5 | |

¹2.0 Maximum reduction or PLTS 2. Not intended for application at roundabouts.

TABLE 4.9: PEDESTRIAN LTS CRITERIA FOR ARTERIAL UNSIGNALIZED INTERSECTION CROSSING (1 TO 2 LANES) WITH A MEDIAN REFUGE^{1,2}

| Prevailing Speed or Speed Limit (mph) | Maximum Through/Turn Lanes Crossed per Direction | | | | | |
|--|---|---------------------|------------------------------|------------|--|--|
| | 1 Lane | 1 Lane 2 Lanes | | | | |
| | Any | <5,000 vpd | 5,000-9,000 vpd ⁴ | >9,000 vpd | | |
| ≤ 25 | PLTS 1 ³ | PLTS 1 ³ | PLTS 2 | PLTS 2 | | |
| 30 | PLTS 2 | PLTS 2 | PLTS 2 | PLTS 2 | | |
| 35 | PLTS 2 | PLTS 2 | PLTS 2 | PLTS 3 | | |
| ≥40 | PLTS 3 | PLTS 3 | PLTS 3 | PLTS 4 | | |

¹For street being crossed.

²Pedestrian hybrid beacons (PHB) are equivalent to signalized crossings.

³Not applicable for roadways with pedestrian median refuges as crosswalk markings and roadside signage assumed as part of the basic installation.

²Minimum PLTS 3 when crossing lacks standard ramps.

³Refuge should be at least 10 feet for PLTS 1, otherwise use PLTS 2 for refuges 6 to <10 feet.

⁴Use these columns when ADT volumes are not available.

TABLE 4.10: PEDESTRIAN LTS CRITERIA FOR ARTERIAL UNSIGNALIZED INTERSECTION CROSSING (3 OR MORE LANES) WITH A MEDIAN REFUGE 1,2

| Prevailing Speed or Speed Limit (mph) | Maximum Through/Turn Lanes Crossed per Direction | | | | | |
|--|--|-------------------------------|----------------|--------|--|--|
| | | 4+ Lanes | | | | |
| | <8,000 vpd | 8,000-12,000 vpd ⁴ | >12,000 vpd | Any | | |
| ≤ 25 | PLTS 1 ³ | PLTS 2 | PLTS 3 | PLTS 4 | | |
| 30 | PLTS 2 | PLTS 2 | PLTS 3 | PLTS 4 | | |
| 35 | PLTS 3 | PLTS 3 | PLTS 4 | PLTS 4 | | |
| ≥ 40 | PLTS 4 | PLTS 4 | PLTS 4 | PLTS 4 | | |

¹For street being crossed.

²Minimum PLTS 3 when crossing lacks standard ramps.

³Refuge should be at least 10 feet for PLTS 1, otherwise use PLTS 2 for refuges 6 to <10 feet.

⁴Use these columns when ADT volumes are not available.

| APPENDIX B. ACTIVE TRANSPORATION PROJECTS |
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City of Merced

| Location | From | То | Facility Type | Length | Priority | Cost Estimate |
|------------------------|-------------------|-------------------|------------------|--------|----------|---------------|
| McKee Rd | E 27th St | E Yosemite Ave | 4 | 2.05 | • | \$1,000,000 |
| Mercy Ave | Mansionette Dr | G St | 3B | 0.27 | | \$60,000 |
| Mission Ave | SR-59 | S Coffee St | 2B | 3.01 | | \$1,260,000 |
| Motel Dr | Almond Ave | Glen Ave | 4 | 0.41 | High | \$200,000 |
| N Parsons Ave | Yosemite Ave | E 27th St | 4 | 1.92 | | \$940,000 |
| O St | 26th St | 8th St | 4 | 1.39 | High | \$680,000 |
| Olive Ave | Campus Pkwy | R St | 4 | 4.52 | High | \$2,200,000 |
| Orion Dr | Twilight Ave | Horizons Ave | 3B | 0.10 | | \$20,000 |
| Orion Dr Path | R St | Twilight Ave | 1 | 0.19 | | \$930,000 |
| Pacific Dr | San Augustine Ave | Horizons Ave | 2 | 0.69 | | \$180,000 |
| R St | W Childs Ave | W Yosemite Ave | 4 | 3.23 | High | \$1,570,000 |
| Rascal Bike Path | McKee Rd | Snelling Hwy | 1 | 4.20 | High | \$20,150,000 |
| S Parsons Ave | S Coffee St | Yosemite Pkwy | 4 | 1.95 | High | \$950,000 |
| San Augustine Ave | Cassis Dr | W Yosemite Ave | 2B | 0.59 | | \$250,000 |
| San Jose Ave | Lehigh Dr | W Yosemite Ave | 2B | 0.55 | | \$230,000 |
| Sullivan Bike Path | Snelling Hwy | Devonwood Dr | 1 | 0.71 | | \$3,390,000 |
| Tyler Rd | E Mission Ave | E Childs Ave | 1 | 1.01 | | \$4,870,000 |
| V St | W 24th St | W Main St | 3B | 0.52 | | \$110,000 |
| V St | W Main St | SR-140 | 2B | 0.33 | High | \$140,000 |
| W 11th St | D St | X St | 3B | 1.82 | High | \$370,000 |
| W 13th St | B St | R St | 3B | 1.45 | High | \$300,000 |
| W 16th St | G St | V St | 2 | 1.37 | High | \$360,000 |
| W 18th St | G St | V St | 2B | 1.37 | High | \$570,000 |
| W 21st St | Glen Ave | R St | 3B | 1.58 | High | \$320,000 |
| W 8th St | MLK Jr Way | West Ave | 3B | 1.20 | High | \$250,000 |
| W Childs Ave | De Long St | N West Ave | 2B | 2.10 | High | \$880,000 |
| W <mark>Main St</mark> | G St | O St | 3B | 0.73 | High | \$150,000 |
| W Yosemite Ave | G St | San Augustine Ave | 2B | 1.66 | High | \$690,000 |
| West Ave | W Childs Ave | W 11th St | 2B | 0.94 | High | \$400,000 |

Spot Improvement Projects

| Location | Cross Street | Project Type | Cost Estimate |
|--------------|-------------------------|-----------------------|---------------|
| Heritage Dr | West Ave | Install RRFB | \$130,000 |
| Parsons Ave | Bear Creek | New Bike/Ped Bridge | \$15,000,000 |
| W 7th St | West Ave | Intersection Redesign | \$250,000 |
| W Childs Ave | Reyes Elementary School | New Crossing | \$130,000 |
| W Lopes Ave | West Ave | Install RRFB | \$130,000 |

APPENDIX C: TRANSIT AND PASSENGER RAIL INFORMATION

MERCED TRANSIT AUTHORITY

The Merced Transit Authority (MTA) operates "The Bus". The Bus runs 15 fixed routes – ten local routes and five intercity routes. Weekday service runs from 6:00 AM to 8:00 PM, and weekend service runs from 8:00 AM to 6:00 PM. **Figure 27** shows the eight routes serving the City of Merced.

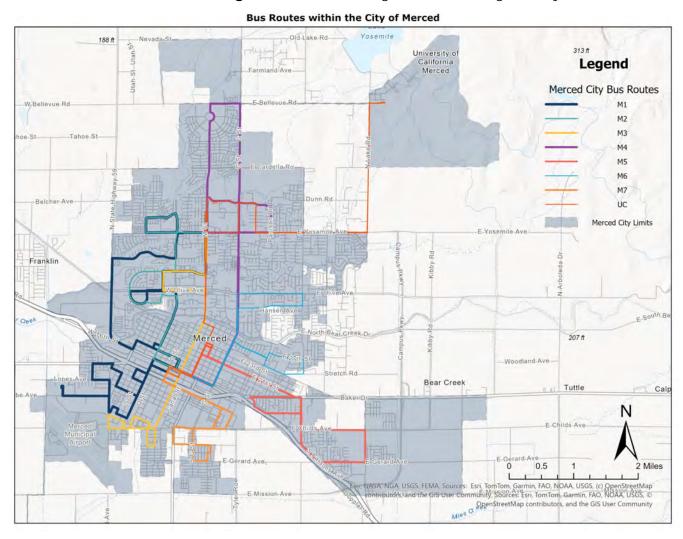


FIGURE 1: BUS ROUTES WITHIN THE CITY OF MERCED.

Source: California State Geoportal, The Bus.

Transit ridership in Merced County has faced notable fluctuations over the past several years, particularly due to the impacts of the COVID-19 pandemic. Based on unlinked passenger trips using bus, pre-pandemic ridership averaged around 65,000 trips per month through 2019. In 2020, ridership dropped sharply to approximately 20,000 monthly. Since then, ridership has gradually recovered, with current levels still climbing toward pre-2020 figures. **Figure 28** illustrates these ridership trends from 2018 through projected levels in 2025.

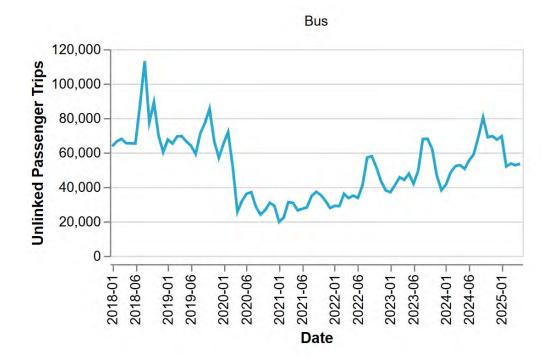


FIGURE 2: BI-YEARLY BUS RIDERSHIP, 2018 - 2025.

Source: MCAG The Bus Ridership Data.

CATTRACKS

CatTracks is a bus service operated by UC Merced. This service is offered free of charge to students, staff, and faculty. The general public may use the service for \$0.35 per ride. Seven routes are offered and connect the UC Merced campus to the city. In 2024, the MCAG Social Services Transportation Advisory Council (SSTAC) noted in their meeting minutes¹ that for FY2022-23, CatTracks ridership was 200,000. **Figure 29** shows the CatTracks network.

¹ https://www.mcagov.org/DocumentCenter/View/4726/SSTAC-Full-Agenda---July-11-2024?bidId=

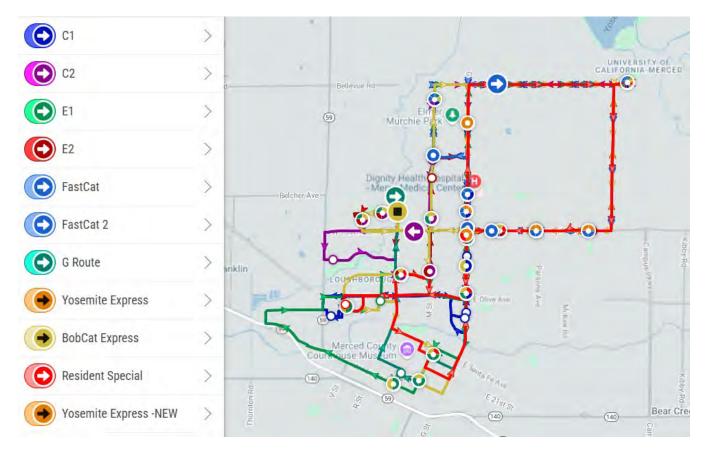


FIGURE 3: CATTRACKS BUS ROUTES FROM UC MERCED TO SURROUNDING CITY OF MERCED.

Source: UC Merced Transportation and Parking Services.

YOSEMITE AREA REGIONAL TRANSPORTATION SYSTEM

The Yosemite Area Regional Transportation System (YARTS) is a rural intercity bus program that serves communities in six counties, and in 2024, the City of Fresno. It was created in 2000 as a solution to growing congestion and pollution from visitors to Yosemite National Park. YARTS provides public transit for visitors, employees, and communities along its four routes to Yosemite National Park. **Figure 30** shows the four routes operated by YARTS.

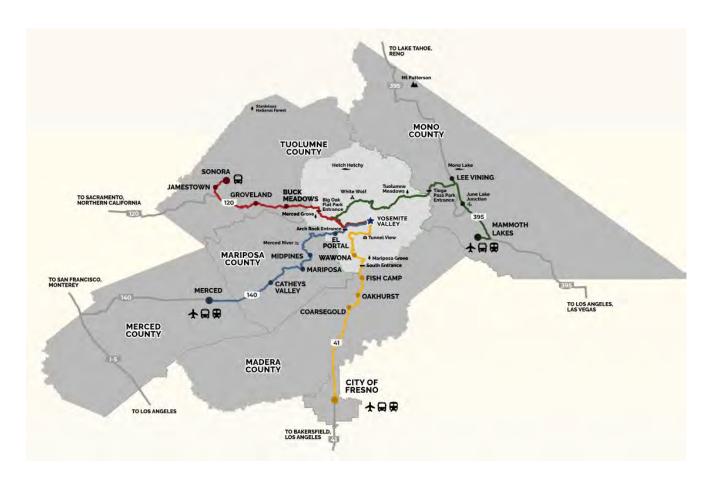


FIGURE 4: MAP OF YARTS BUS ROUTES SERVING YOSEMITE VALLEY AND SURROUNDING COUNTIES.

Source: Yosemite Area Regional Transportation System.

As shown in **Figure 31**, the Merced-HWY 140 stop has the highest number of riders compared to other YARTS stops. Since 2016, YARTS ridership has decreased by 53%, likely attributed to the effects of COVID-19.

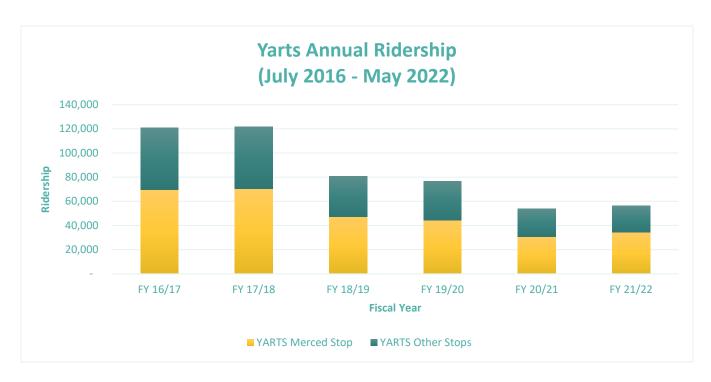


FIGURE 5. YARTS ANNUAL RIDERSHIP

Source: Mono County YARTS Ridership

PASSENGER RAIL

Passenger rail in Merced is primarily run by Amtrak, which offers a series of buses in concurrence with its rail services. However, the new California High Speed Rail would include a station stop in downtown Merced.

AMTRAK

Amtrak rail service currently provides six daily round-trip services through the San Joaquins and Merced Station. The San Joaquins is the only passenger rail provide in Merced County. Prior to the COVID-19 pandemic, the San Joaquins had seven daily round-trip services with Merced Station being the fifth busiest stop. However, service dropped to four daily round-trips during COVID-19. Burlington Northern Santa Fe (BNSF) Railroad, a freight rail provider, maintains right-of-way and shares its tracks with Amtrak. **Figure 1** shows the regional freight railroads in both the county and City of Merced. The City of Merced also hosts a number of freight rail routes. Two Class I rail routes in the city include BNSF and Union Pacific.

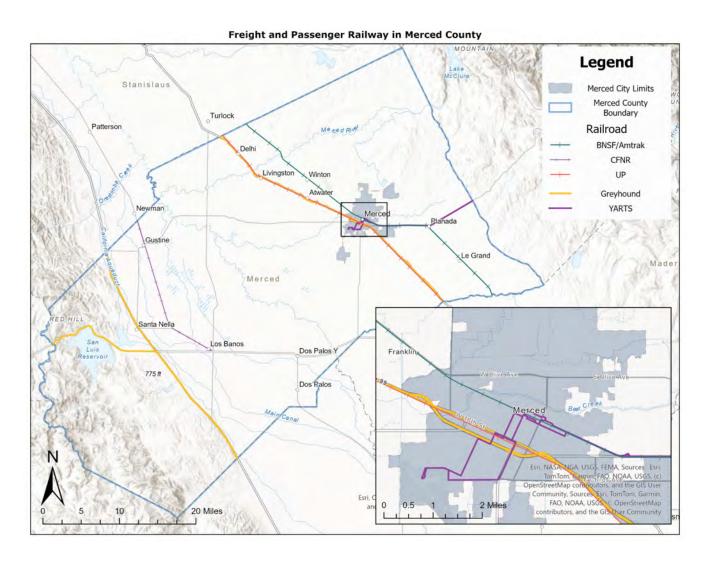


FIGURE 1: FREIGHT AND PASSENGER RAILROAD IN MERCED INCLUDING GREYHOUND AND YARTS BUS THRUWAY SERVICE.

Source: California State Geoportal

Ridership in the San Joaquins service saw a 43% decrease in ridership from 2019 and 2020. It has been steadily increasing from the COVID-19 pandemic impacts by 50% from 2020 to 2024 shown in **Figure 2**. Ridership at the Merced station follows a similar pattern to the whole system. The station saw a 41% drop in ridership from 2019 to 2020. However, as shown in **Figure 3**, ridership at the Merced station is nearing recovery to pre-pandemic levels compared to entirety of the San Joaquin network.

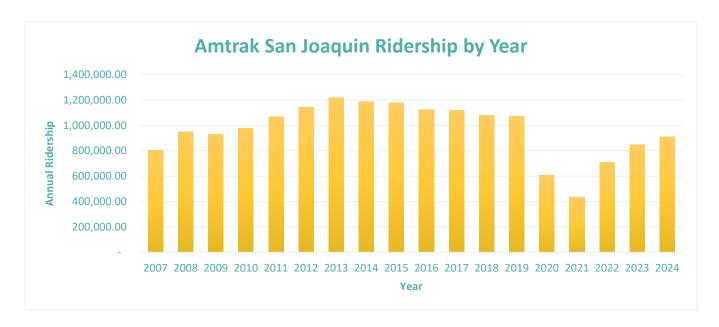


FIGURE 2: RIDERSHIP OVER TIME, SAN JOAQUINS.

Source: Amtrak Year End Ridership Fact Sheet.

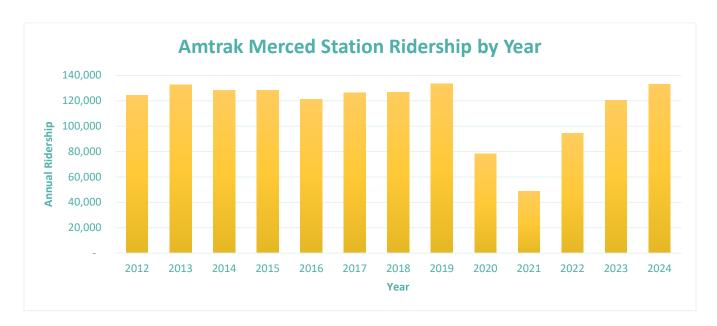


FIGURE 3: ANNUAL RIDERSHIP USING THE MERCED STATION.

Source: Amtrak Year End Ridership Fact Sheet.

HIGH SPEED RAIL

As early as 1981, planners and leadership in California have had vision of high speed, safe, reliable, and environmentally sustainable transportation from southern to northern parts of the state. Through the High-Speed Rail Development Act of 1994 and \$8 billion in funding as part of the federal American Reinvestment and Recovery Act of 2009, the rail system has been progressing with design,

engineering, and construction. In 2020, the California High Speed Rail Authority approved the final environmental documents, clearing the way for construction of the 171-mile Merced to Bakersfield segment. As of 2022, the California High-Speed Rail Authority is studying alternative locations of the Merced Station as shown in **Figure 4**.

According to the Authority's 2022 Business Plan, Merced to Bakersfield currently takes 2.5 hours by car and 3 hours by Amtrak, the HSR will reduce these travel times by 100 minutes with 18 round trips per day. The Merced HSR station will be the northern terminal of the initial Central Valley HSR segment. **Figure 5** shows the current HSR system status as of June 2024.

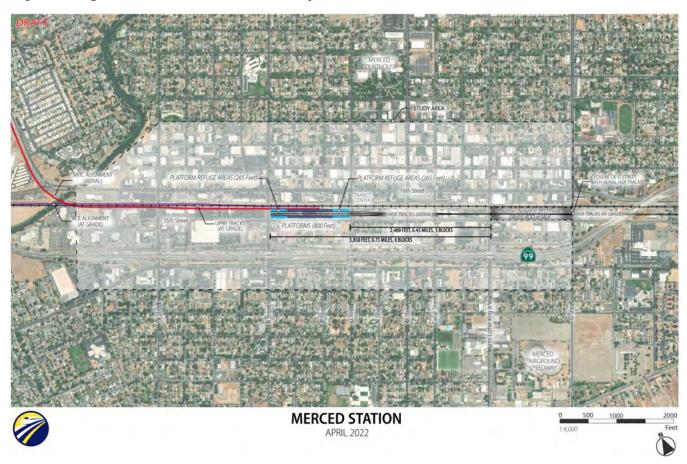


FIGURE 4: MERCED STATION MAP.

Source: California High-Speed Rail Authority.



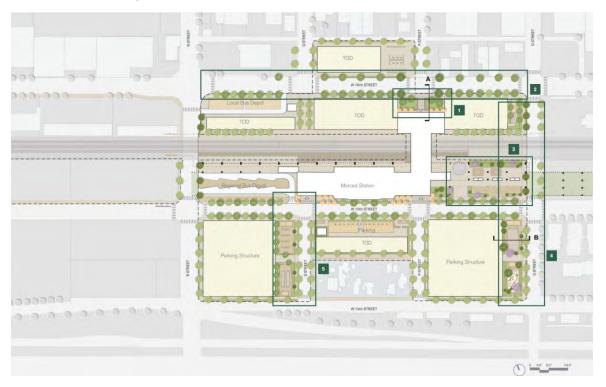
FIGURE 5: HSR 2024 PROGRESS, CALIFORNIA HIGH-SPEED RAIL.

Source: California High-Speed Rail Authority.

APPENDIX D: HIGH SPEED RAIL AUTHORITY DESIGN CONCEPT PRESENTATION

Merced Concept Plan November 2023

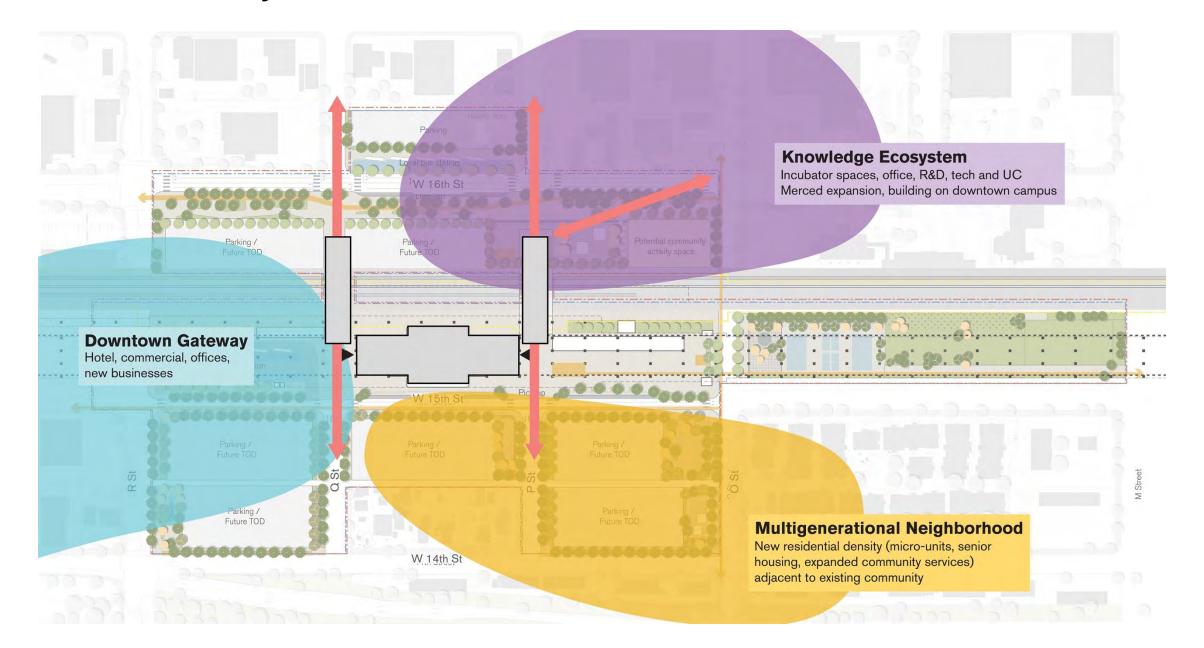
Station Option 1

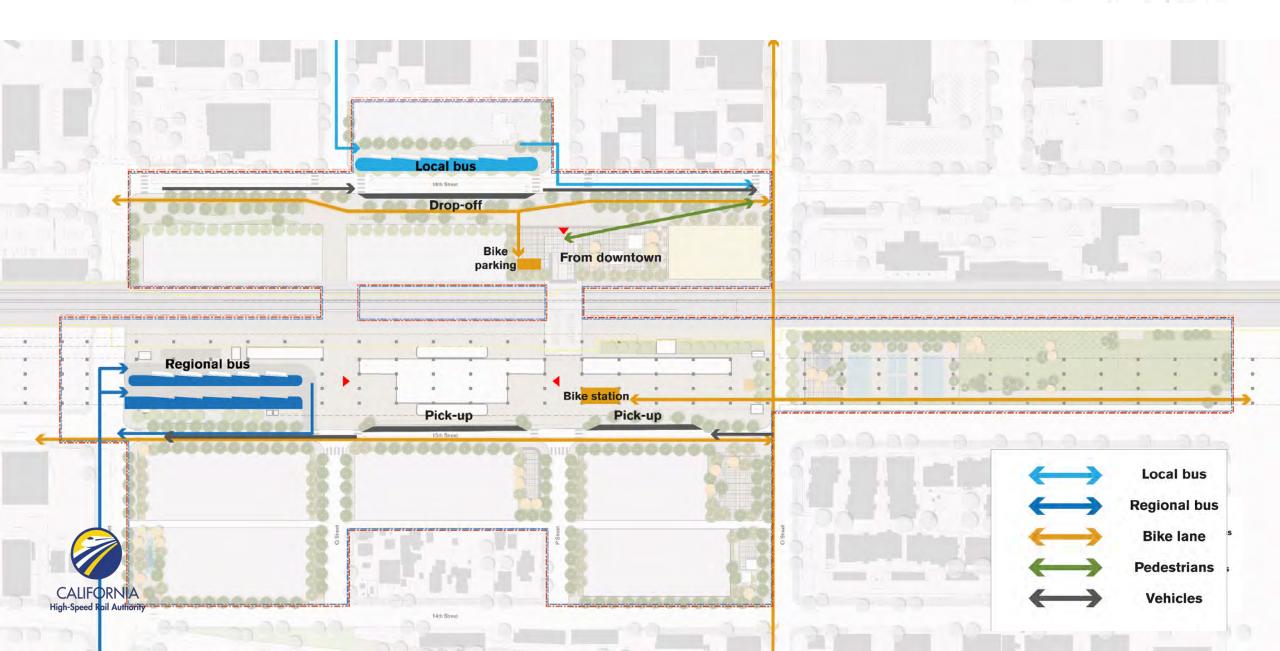


Station Option 2



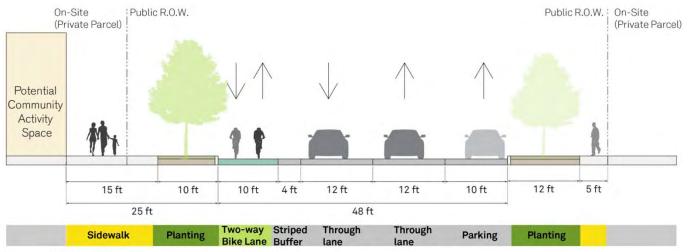






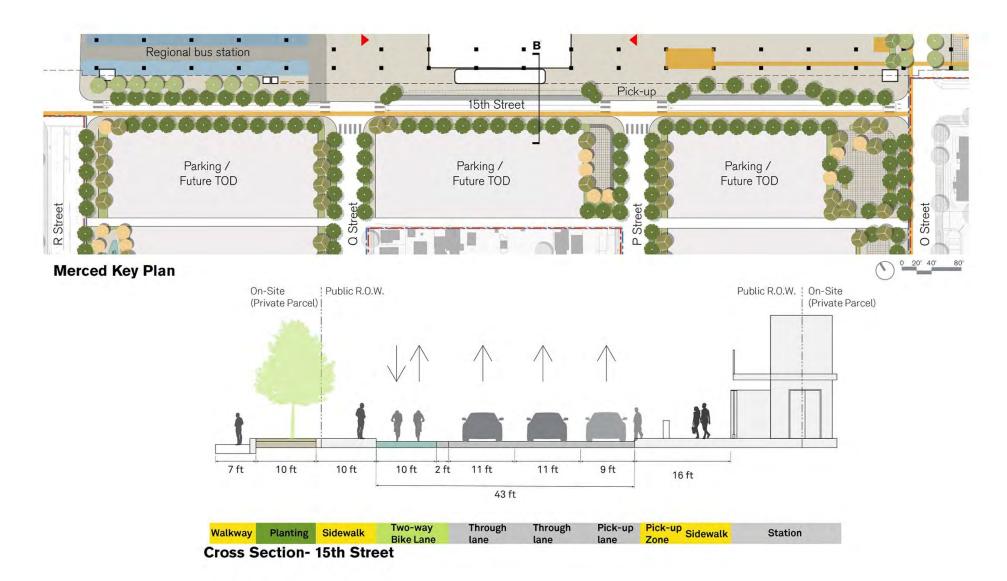
O Street



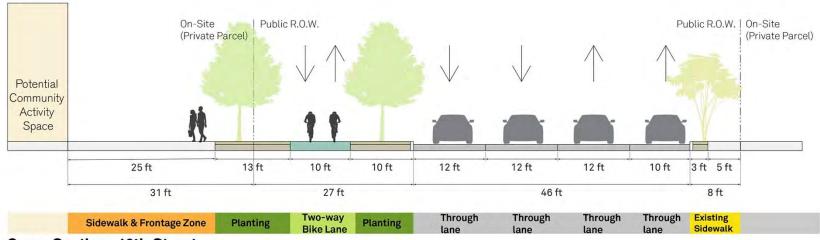




Cross Section- O Street

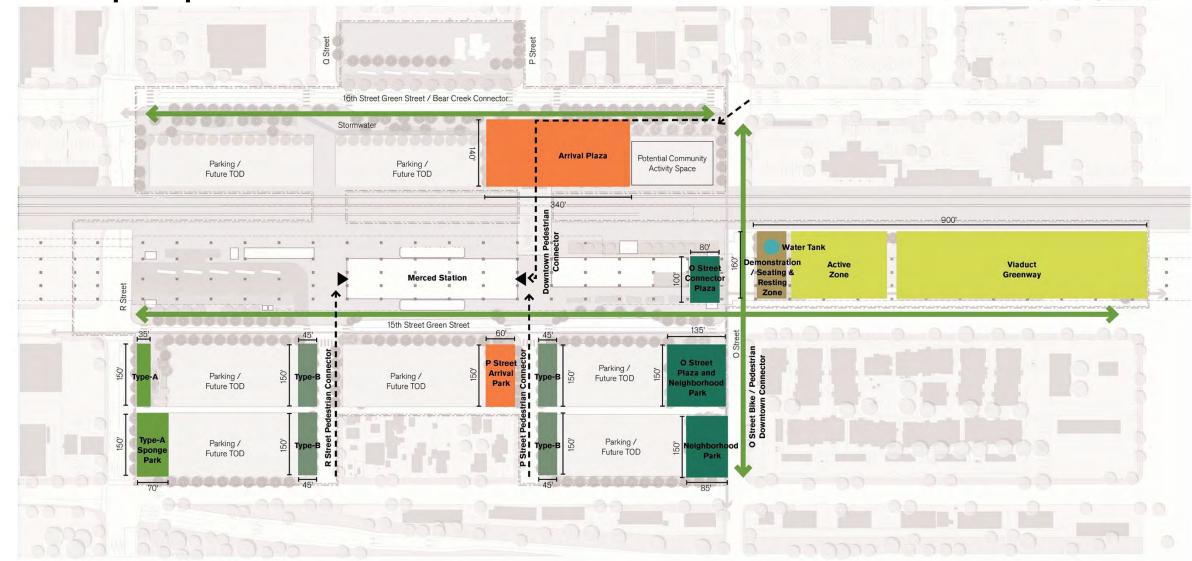








Cross Section- 16th Street



5 Bicycle Storage

6 Station Entrance

Arrival Plaza

8 TOD Spillout

Two Way Cycle Track

Stormwater Planters

Pick-up Zone

4 Cafe Plaza





Street Frontage



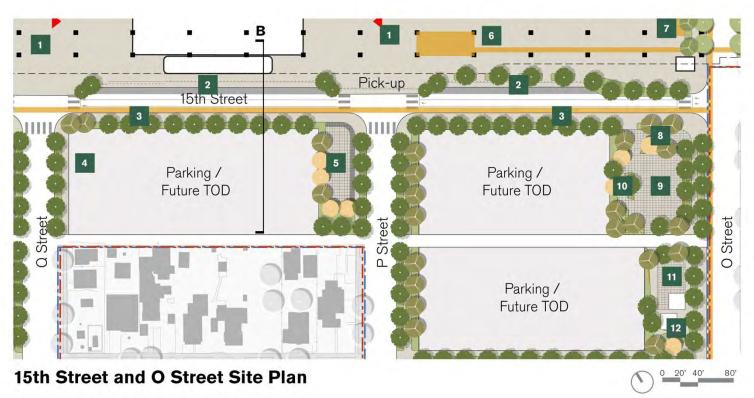
Seating Edges



Plaza



Permeable Paving & Tree Shade



- Station Entrance
- 2 Drop off Zone
- 3 Two-way Cycle Track
- 4 Station Spill Out Plaza
- Station Spill Out Park
- 6 Vendor Spill Out Zone

- 7 Bicycle Storage
- 8 Neighborhood Plaza
- 9 Neighborhood Games Court
- 10 Seating Grove
- 11 Neighborhood Park
- 12 Nature Play

O Street Open Space Network - Features



Neighborhood Park



Play Area



Gathering Spaces



Community Garden

Seating & Resting Zone

Water Tank

Active Zone

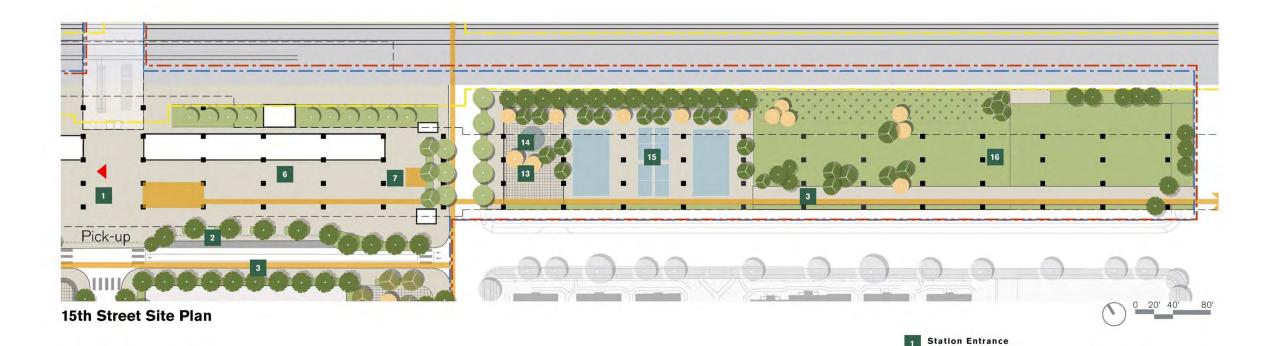
Viaduct Greenway

Drop off Zone

Bicycle Storage

Two-way Cycle Track

Vendor Spill Out Zone







Games Court



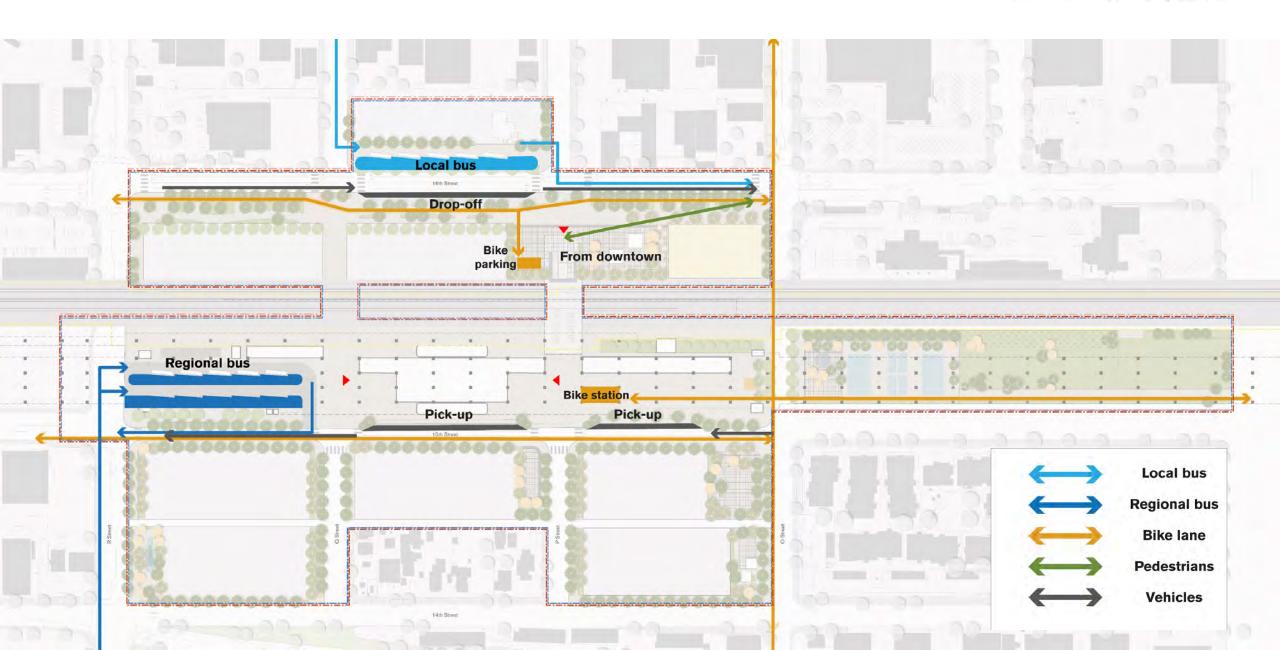
Seating and Resting Zone

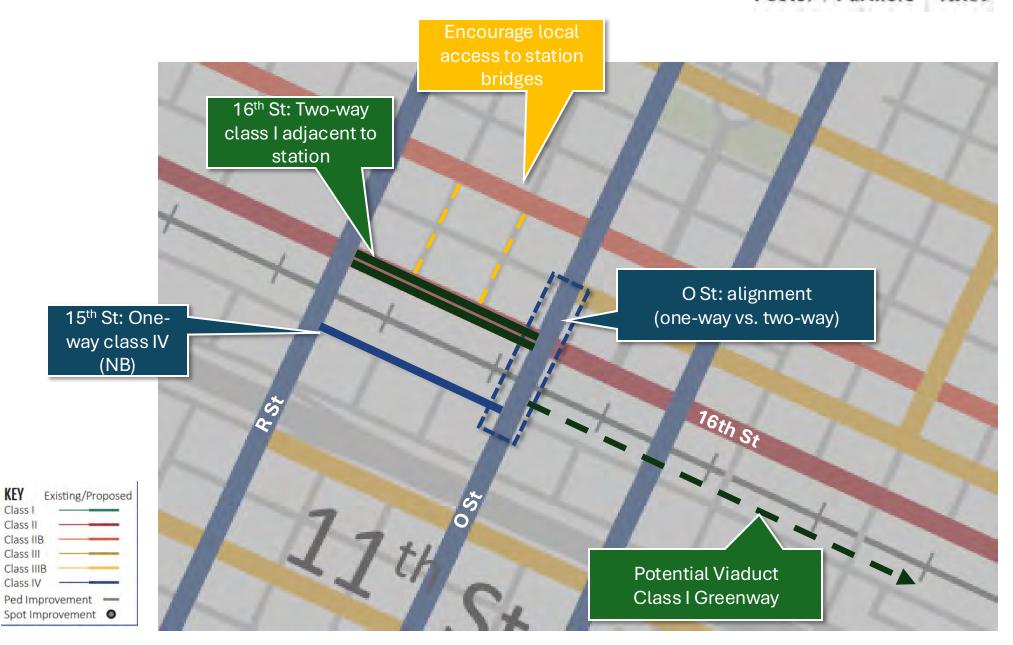


Active Zone



Greenway

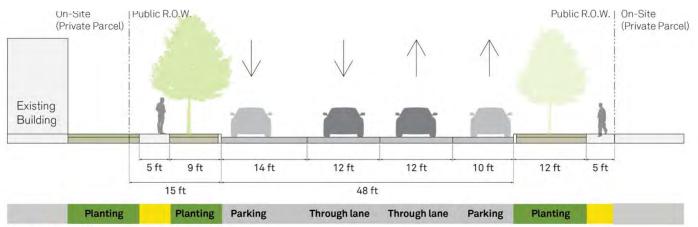




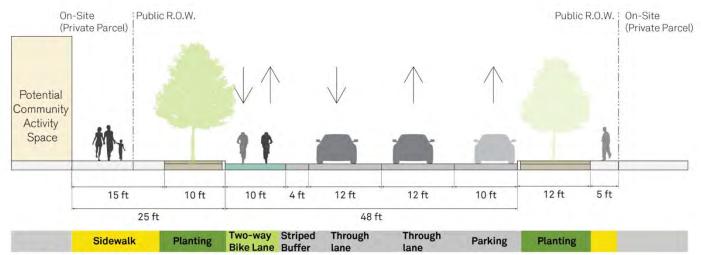


O Street

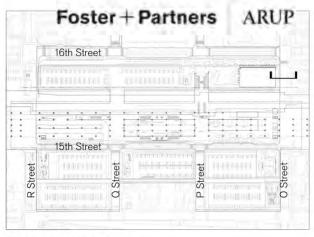
CALIFORNIA High-Speed Rail Authority



Cross Section- O Street Existing

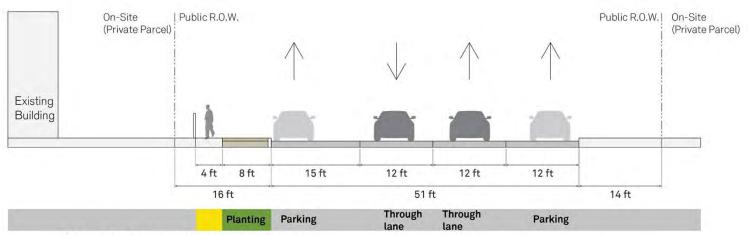


Cross Section- O Street Proposed

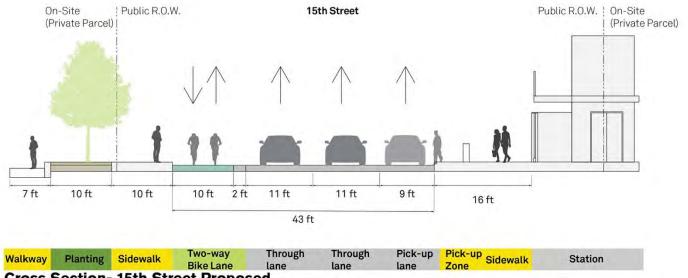


Merced Key Plan

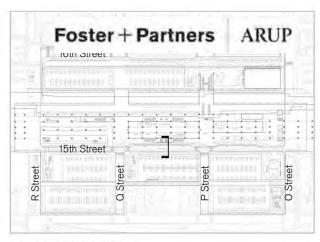
15th Street



Cross Section- 15th Street Existing



Cross Section- 15th Street Proposed



Merced Key Plan

16th Street Foster + Partners ARUP 16th Street Public R.O.W. Public R.O.W. | On-Site On-Site (Private Parcel) (Private Parc O Stre **Merced Key Plan** 10 ft 6ft 14 ft 12 ft 12 ft 12 ft 14 ft

65 ft

Center Two-Way

Left-Turn Lane

Through

lane

8 ft

Sidewalk

Through

lane

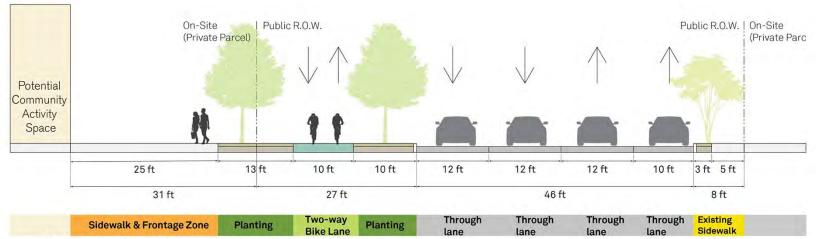
Cross Section- 16th Street Existing

16 ft

Planting

Through

lane

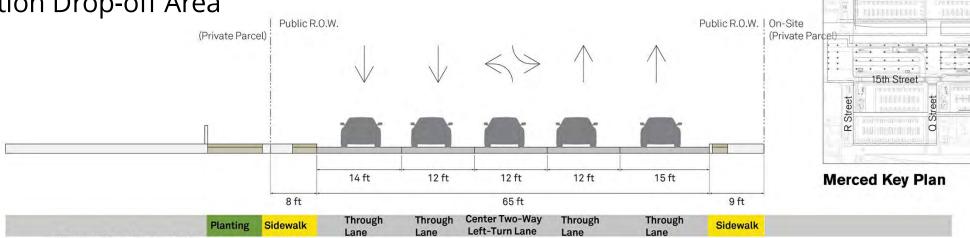


Through



Cross Section- 16th Street Proposed

16th Street At Station Drop-off Area



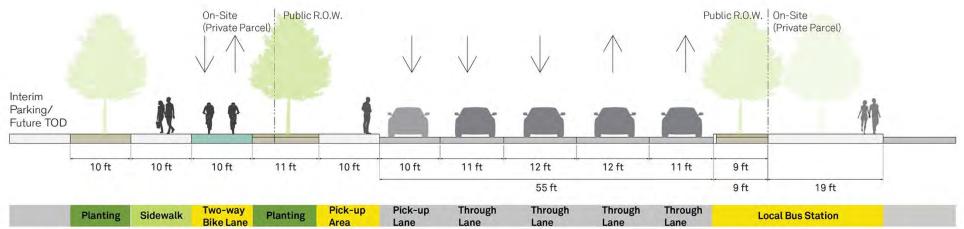
Foster + Partners

16th Street

ARUP

O Str

Cross Section- 16th Street Existing





16th Street Local Bus Access

