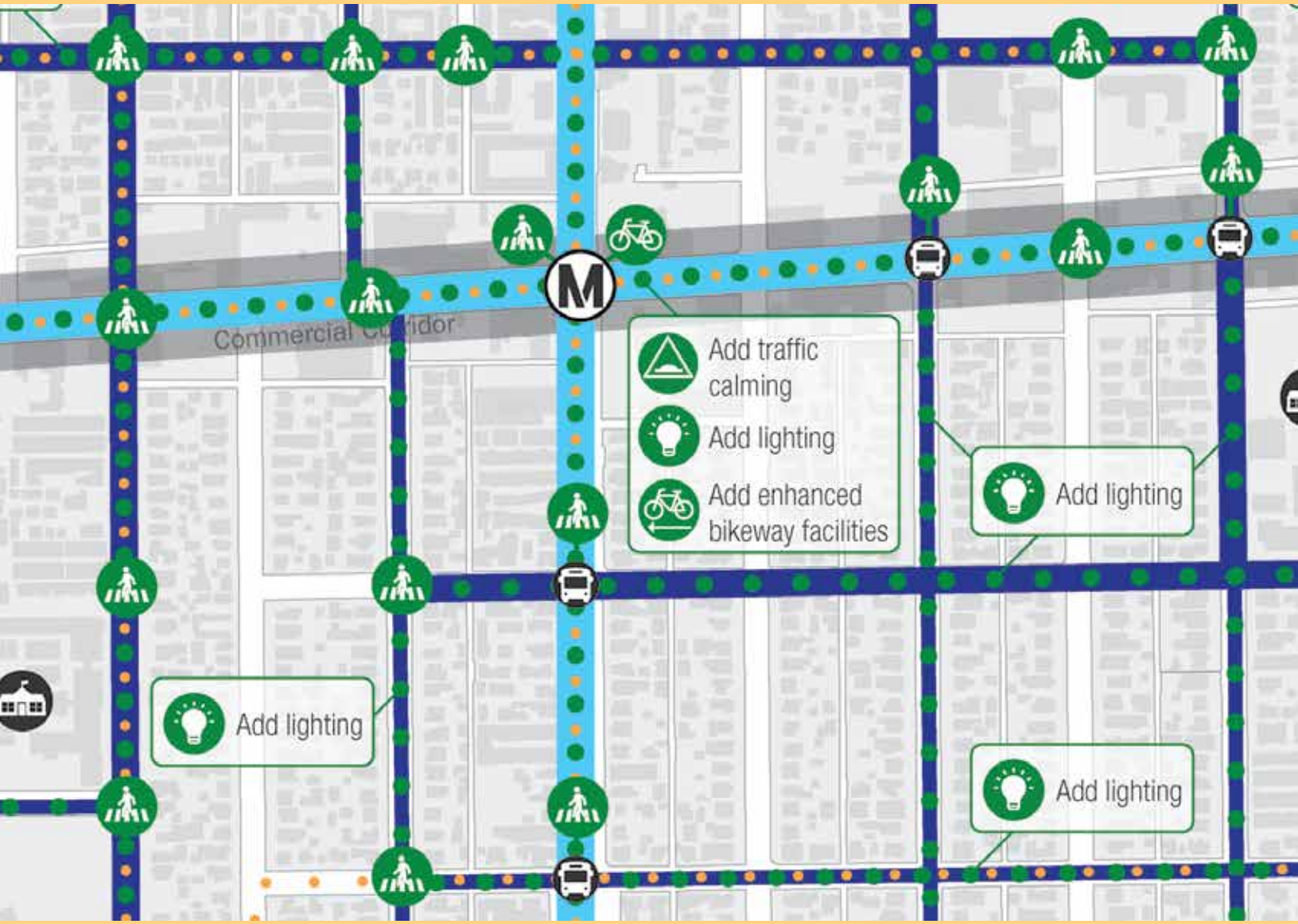
# ATSP CASE STUDIES

## Volume II

## February 2016




Metro

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# TABLE OF CONTENTS

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# INTRODUCTION

This volume presents examples on how to conduct first last mile analysis around transit stations and stops. The case studies provide a valuable reference for those interested in pursuing first last mile accessibility improvements in their own community. These case studies reflect the diversity of transit areas, geographies, demographics, land uses, building and population densities, and subregions of Los Angeles County.

The case studies are presented in two parts: 1) An existing conditions analysis shows assets and barriers to first last mile accessibility, and 2) Key recommendations to improve accessibility, based on the existing conditions analysis. The methodology used to conduct this study is based on Metro's First Last Mile Strategic Plan and the Active Transportation Strategic Plan Volume I. The examples take into consideration local conditions while addressing challenges that are seen in across the County. Use these examples to build a scope that could be applied to a transit station or stop in your community.

Although these case studies pertain to specific locations, place labels have been omitted in order to highlight the fact that the challenges shown in each study area are universal and countywide.

# FIVE STEPS TO CASE STUDY ANALYSIS

## 1. Preliminary Station Analysis

- Studied existing conditions analysis summaries provided at the online portal available at: www.http://gis.fehrandpeers.com/metroatsp

## 2. Planning the site visit route

- Determined walking route based on elements from the existing conditions analysis summary (see above)
- Included destinations and points of interest such as parks, institutions, and regional attractions


## 3. Site Visit and Checklist

- Conducted site visit and took photographs and notes of barriers and assets to first last mile accessibility
- Filled out station area checklist

## 4. Identification of issues and opportunities

- Referred to the First Last Mile Strategic Plan to identify typical barriers and assets in LA County
- Identified key barriers and assets based on the preliminary station analysis, site visits, and checklist survey results

## 5. Key recommendations

- Created a Pathway Network, referring to the First Last Mile Strategic Plan
- Chose improvements from the First Last Mile Strategic Plan that relate to identified issues

# ACCESSIBILITY SCORES

As part of step 3, an "accessibility score" was determined to provide a snapshot of each study area's support of first last mile accessibility. Scores were calculated during each study area visit via a checklist survey of key urban design elements encompassing safety, accessibility, and aesthetics.

The sample checklist survey can be used by any community to help determine its own challenges and opportunities for first last mile access. The survey can be found in the First Last Mile Strategic Plan.

# QUICK REFERENCE GUIDE

The guide below helps communities identify useful case studies that may apply to their own analysis of first last mile accessibility. General categories include the type of station/stop, land use characteristics, and the number of existing bicycle facilities.

## WHAT IS THE TRANSIT STATION/STOP TYPE?

| | Multi-modal or Multi-agency Hub or Stop | Metrolink | Bus Rapid Transit | Metro Rail | | | Rapid or Regional Bus Stop | Local Bus Stop |
|---|---|---|---|---|---|---|---|---|
| | | | | *Above-grade* | *Subterranean* | *At-grade* | | |
| CASE STUDY | 3, 4, 10, 14, 18 | 3, 18 | 16 | 9, 17 | 1, 12, 13 | 2, 8, 15, 20 | 5, 7, 11 | 5, 6, 7, 11, 19 |

## WHAT ARE SOME OF THE MAIN IDENTIFYING FEATURES?

| | Human-scale Retail and/or Commercial | Industrial uses | Long blocks and limited or unenhanced crossings | Transit corridor barrier | | | Major regional destinations | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | *Freeway* | *Rail* | *BRT* | *Institutional or Civic* | *Retail* | *Tourist* |
| CASE STUDY | 3, 4, 5, 6, 7, 9, 13 | 8, 15, 16, 18, 20 | 4, 5, 6, 7, 8, 9, 11 | 1, 2, 6, 9, 10, 12, 16, 17, 19 | 7, 15, 18 | 16 | 3, 7, 14, 16 | 3, 4, 5, 7, 10, 12, 13 | 3, 5, 7, 12, 13 |

## HOW WALKABLE IS THE STUDY AREA*?

**Highly Un-Walkable** — **Highly Walkable**

| | |
|---|---|
| CASE STUDY | 18, 14, 9, 20, 17, 19, 2, 8, 16, 11, 6, 10, 5, 1, 4, 3, 7, 8, 13, 12 |

*Based on station area Walk Score which can be found in the existing conditions analysis in the online portal.

## HOW BIKABLE IS THE STUDY AREA*?

**Highly un-bikable** — **Highly Bikable**

| | |
|---|---|
| CASE STUDY | 2, 3, 6, 19, 7, 11, 18, 10, 4, 17, 14, 16, 15, 13, 12, 9, 20, 14, 8, 12, 5, 1, 8 |

*Based on number of existing bicycle facilities as well as station area Bike Score, which can be found in the existing conditions analysis in the online portal.

# VISUAL GLOSSARY

The Active Transportation Strategic Plan (ATSP) Case Studies document uses a unique visual language that is consistent in each of the 20 case studies. Although the visuals are meant to be easily understood, referring to this visual glossary can be helpful when analyzing the case studies. These can also be copied and used to conduct your first last mile analysis.

## EXISTING CONDITIONS VISUALS

| | Symbol | Term | Further Description |
|---|---|---|---|
| LOCATIONS |  | Metro Transit Station or Stop | N/A |
| |  | Non-Metro Transit Station or Stop | N/A |
| |  | Public Open Space | N/A |
| |  | School | N/A |
| |  | Public Institution | N/A |
| |  | Other Destination | N/A |
| |  | Destination Area | N/A |
| |  | Existing Bus Stop | N/A |
| |  | Existing Bikeway | N/A |
| ACCESS BARRIERS |  | Gaps in the Bicycle Network | Street segment where an existing bikeway could extend to and strengthen connections to the larger bicycle network |
| |  | Street Conditions Barrier | Element along a street segment that is a barrier to and from the station such as speeding traffic |
| |  | Specific Barrier | Element at a specific location that is a barrier to and from the station such as a discontinuous sidewalk |
| |  | Area Barrier | Element within a parcel or area that is a barrier to and from the station |
| |  | Connectivity Gap | Barrier that is completely inaccessible due to a physical element in the public realm such as a freeway |
| ACCESS STRENGTHS |  | Corridor Asset | Element along a street segment that enhances accessibility to and from the station such as lighting or landscaping |
| |  | Specific Asset | Element at a specific location that enhances accessibility to and from the station such as an enhanced crossing |
| |  | Area Asset | Element within a parcel or area that enhances accessibility to and from the station such as a park-and-ride lot |

## PATHWAY NETWORK VISUALS

| | Symbol | Term | Further Description |
|---|---|---|---|
| LOCATIONS |  | Existing Bikeway | N/A |
| |  | Extension to Regional Active Transportation Network | Extension from an existing bikeway that connects to the Regional Active Transportation Network identified in the Active Transportation Strategic Plan |
| PATHWAY NETWORK |  | Pathway Arterial | Route that extends from the transit station or stop and supports maximized throughput and efficiency for active transportation users |
| |  | Pathway Collector 1 | Routes that feed into Arterials and support crossing movements and general station area permeability; Collector 1s have a greater capacity to accommodate people walking and bicycling compared to Collector 2s |
| |  | Pathway Collector 2 | |
| |  | Cut-Through | Supporting paths, often used as shortcuts that feed into Arterials and Collectors |
| |  | Proposed Bikeway | Bikeways are proposed in municipal and regional plans |
| |  | Extension to Regional Active Transportation Network | Extension to a proposed bikeway that connects with the ATSP Regional Network |

## PATHWAY NETWORK VISUALS (CONTINUED)

| | Symbol | Term | Further Description |
|---|---|---|---|
| KEY RECOMMENDATIONS |  | Bike Share Station | Provides numerous strategic locations where users can rent bicycles for short-term use; bike share stations located at transit stations and stops make bicycling a convenient option for first last mile trips; other stations are typically placed at strategic locations close to destinations; corporate sponsorships and other public-private coordination can help make bike share a relatively inexpensive intervention for municipalities |
| |  | Sidewalk Widening or Addition | Improves safety, comfort and convenience for people of all ages and abilities; wider sidewalks create more room for streetscape elements that enhance comfort and convenience, such as street furniture, bus waiting areas, landscaping, and trees |
| |  | Enhanced Pedestrian Crossings | Protects transit users by increasing their visibility to motorists; crossing times can be longer and occur more often; in addition to enhancing existing crosswalks, adding new, well-marked crosswalks at unsignalized intersections and at midblock locations can improve convenience and safety; pedestrian flashing beacons may be considered |
| |  | Enhanced Bicycle Facility | Improves safety and increase comfort for people bicycling; these include bicycle lanes physically separated from vehicular traffic, such as buffered lanes, cycle tracks, painted bicycle lanes, conflict zone markings at/approaching intersections, bicycle boxes, and bicycle-prioritized signalization |
| |  | Curb Extensions at Intersections | Improves safety by shortening crossing distances, increasing visibility of people walking, and slowing vehicles that are turning; it can also provide room for amenities such as seating areas, bioswales, stormwater management, and other planted areas |
| |  | Traffic Calming | Decreases speeds along streets with heavy, fast-moving traffic in order to increase safety and comfort for all users of the street; traffic calming treatments include physical measures such as curb extensions to narrow the roadway, narrowed travel lanes to promote slower driving speeds, and diverters to limit vehicle cut-through traffic on neighborhood streets |
| |  | Enhanced Bus Waiting Areas | Improves the safety and comfort of a bus rider's journey; potential enhancements could include benches, shelters, lighting, signage, wi-fi hotspot, mobile device chargers, etc. |
| |  | Freeway Underpass and Overpass Enhancements | Traveling to the transit station stop by foot or bike would be more convenient and comfortable if the underpasses were safer, cleaner, better illuminated, and visually engaging. |

## PATHWAY NETWORK VISUALS (CONTINUED)

| | Symbol | Term | Further Description |
|---|---|---|---|
| KEY RECOMMENDATIONS |  | New Connection Across Barrier | Designing a new connection across the railroad crossings can improve connectivity to the station; this can manifest as an at-grade signalized crosswalk for people walking and bicycling; a well-designed connection should consider the safety of all people |
| |  | Medallion Signage | Medallion signage is an affordable type of wayfinding, or directional tool, that can be installed on utility poles and streetlights; the addition of medallion signage can help to increase awareness of station proximity, especially along Arterials and Collectors that connect to the schools, parks and commercial areas |
| |  | Street Furniture | Provides amenities to make active transportation users comfortable while traveling and provide resting places; waste receptacles, pedestrian-scale lighting, water fountains, and bicycle parking are other elements that enhance the sidewalk environment |
| |  | Landscaping and Shade | Improves aesthetics, provide pleasant and safe pathways, and offer an attractive buffer between the sidewalk and the roadway; trees and shade structures provide refuge from the sun for people walking, resting, or waiting |
| |  | Lighting | Increases safety and aid in night navigation for people walking or bicycling along Pathway routes; install lighting rhythmically and consistently in coordination with tree canopies as not to block the light; consider installing lights that are efficient and/or motion activated/self powered in areas where constant light is not needed |
| |  | Car Share | Provides numerous strategic locations where users can rent vehicles for a short term use; vehicle pick-up/drop-off spaces should be located conveniently nearby the transit station or stop at a highly-visible and location |
| |  | Bicycle Services | Includes secure bicycle parking, bicycle hubs, bicycle repair stations, and/or bike share |
| |  | Park-and-Ride | Park and Ride lots provide easy vehicular parking and encourage transit ridership for motorists using their vehicles for first last mile trips; the addition of a dedicated drop-off zone immediately adjacent to the station would help to improve accessibility, safety and convenience at the station |
| |  | Key Recommendation Along Corridor | Key recommendations that extend throughout the entire length of the corridor |

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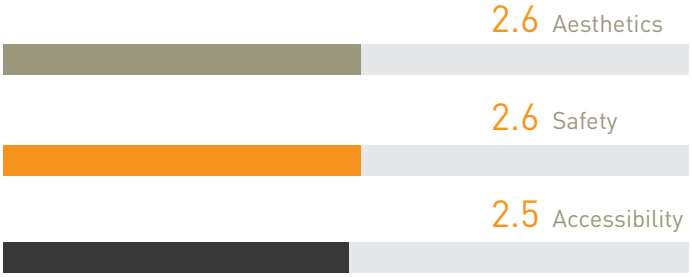
# CASE STUDY 1

## METRO RAIL STATION (SUBTERRANEAN)

- Major streets have primarily commercial land uses, while the bulk of the study area is residential
- Some commercial corridors are highly walkable, while others are oriented to the automobile
- Some enhanced bicycle facilities

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### Aesthetics

The study area has a strong sense of place, but lacks pleasant landscaping and strategically-placed pedestrian amenities in many places. Some sidewalk areas contain unpleasant blank walls and trash.

### Safety

The high level of pedestrian activity and the orientation of most buildings toward the public realm give a perceived sense of safety. However, the study area lacks sufficient maintenance, characterized by some broken and uneven sidewalks. Commercial streets lack a strong safety buffer for pedestrians, and traffic speeds are high. Safety for people bicycling on the primary east-west corridor is enhanced by a colored bicycle lane with conflict zone pavement markings.

### Accessibility

Pedestrian and bicycle amenities at the station facilitate mode transfer, but the station lacks high-quality signage and a streamlined approach to parking and drop-off. Many sidewalks (both commercial and residential streets) are narrow. Curb ramps are provided at almost all intersection crossings.

# EXISTING CONDITIONS

## CASE STUDY 1


## LEGEND

### Locations

- Metro Station
- Key Destination
- Destination Area
- Existing Bus Stop
- Existing Bikeway

### Access Barriers and Strengths

- Gap in the Bicycle Network
- Street Conditions Barrier
- Specific Barrier
- Area Barrier
- Connectivity Gap
- Corridor Asset
- Specific Asset



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# CRITICAL ACCESS BARRIERS

## Bus waiting area

Most of the bus waiting areas within the site lack protection from natural elements such as the sun and rain.

## Freeway underpass

The freeway is a major barrier that disconnects the station from the residents to the west. Two underpasses in the study area can feel unsafe at night, and an overpass can be unpleasant to walk across.

## School crossings

Some crosswalks near schools have low visibility, long crossing distances, short crossing times, and long waiting times.

## Wayfinding and informational signage


Transit-supportive signage is limited to the immediate station area. Outside the station plaza, however, there is no directional signage informing pedestrians, bicyclists and transit users of station proximity or location.

## No park-and-ride lot or dedicated passenger drop-off zone

There is no existing parking or drop-off facility for those arriving to or departing from the station via automobile.

# OTHER EXISTING CONDITIONS

## Enhanced bicycle lane

Bicycle lanes provide a safe route for bicyclists traveling along the primary east-west corridor. Approaching and after intersections, the lanes are painted with green paint and conflict zone markings to help make the “mixing zone” safer for bicyclists and motorists.

## Street furniture

In general, the station area lacks well-maintained street furniture such as seating, waste receptacles, and landscape planters.

## Curb Bulbouts and Extensions

Temporary curb extensions on one commercial street improve safety and enhances the overall pedestrian experience.

## Narrow Sidewalks

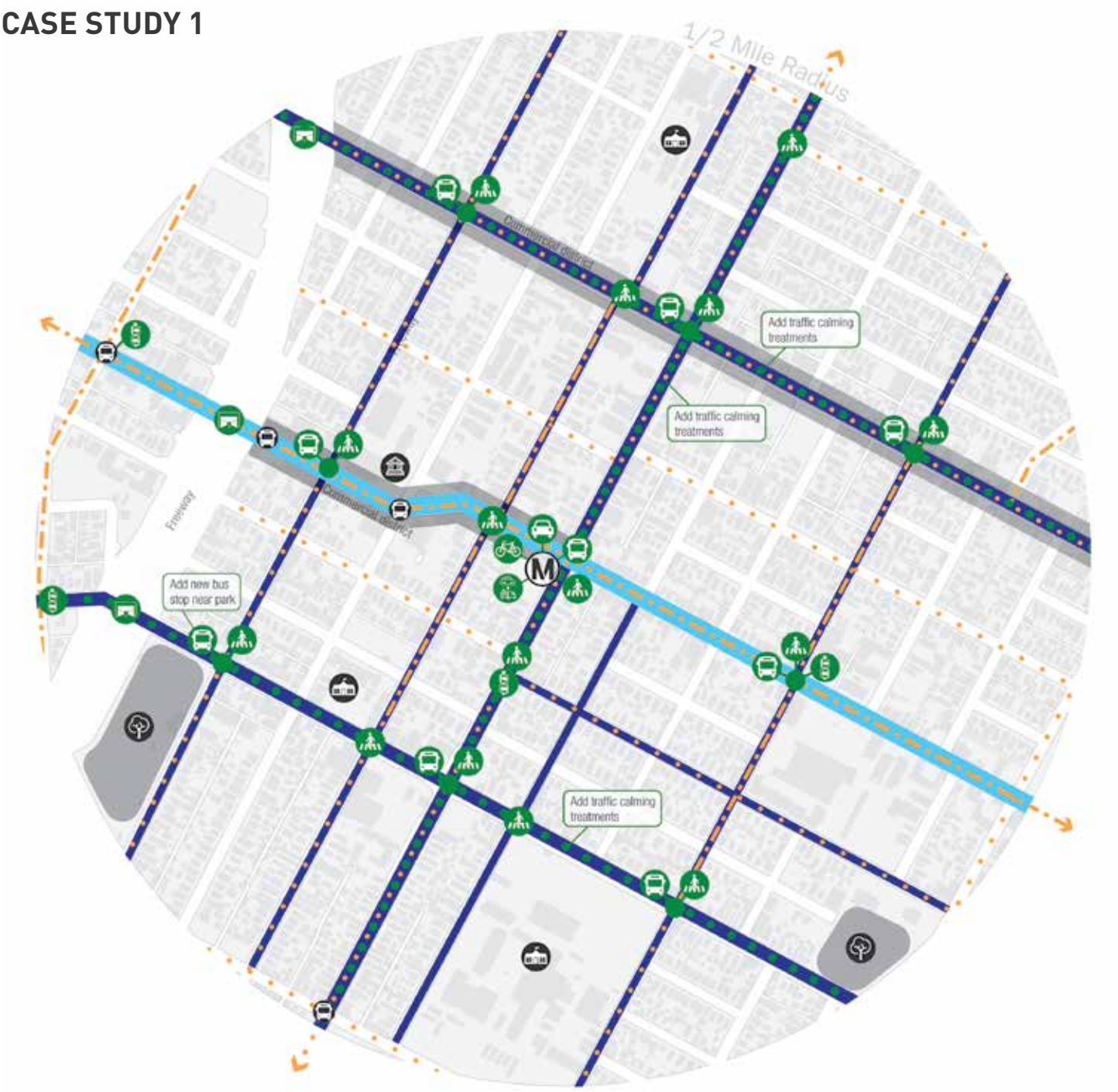
Most sidewalks in the station area are in good condition with sufficient width. However, in a few residential locations, narrow widths create a potential access barrier.

## Bicycle Parking

Bicycle racks and lockers are located on the station plaza in view of the station portal. Safe, secure and convenient bicycle parking encourages transit riders to choose bicycling as a means to get to/from transit stations.

# PATHWAY NETWORK

## CASE STUDY 1




## LEGEND

### Locations

- Metro Rail Station
- Key Destination
- Destination Area
- Bus Stop

### Pathway Network

- Pathway Arterial
- Pathway Collector 1
- Pathway Collector 2
- Bikeway (existing)
- Bikeway (proposed)
- Extension to Regional Network
- Bicycle Services
- Key Recommendation (corridor)
- Key Recommendation (specific location)



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# KEY RECOMMENDATIONS

## Enhanced Bus Waiting Areas

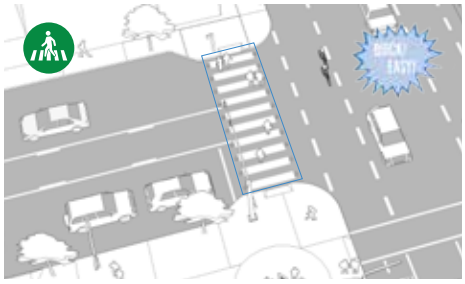
Enhancing the bus waiting areas along the Pathway Arterials and Collectors can improve the safety and comfort of a bus rider's journey. Potential enhancements could include benches, shelters, lighting, signage, a wi-fi hotspot, mobile device chargers, etc.


## Freeway Underpass & Overpass Enhancements

Residents might be more likely to travel to the station if the underpasses and overpass were safer, cleaner, better illuminated and visually engaging.


## Enhanced Pedestrian Crossings

Enhancing existing crossings can help protect station users by increasing their visibility to motorists. Crossing times can be made longer and to occur more often. In addition to enhancing existing crosswalks, adding well-marked crosswalks at unsignalized intersections and at midblock locations can improve convenience and safety.




## Medallion Signage

Medallion signage is an affordable type of wayfinding, or directional tool, that can be installed on utility poles and streetlights. The addition of medallion signage can help to increase awareness of station proximity, especially along Arterials and Collectors that connect to the schools, parks and commercial areas.

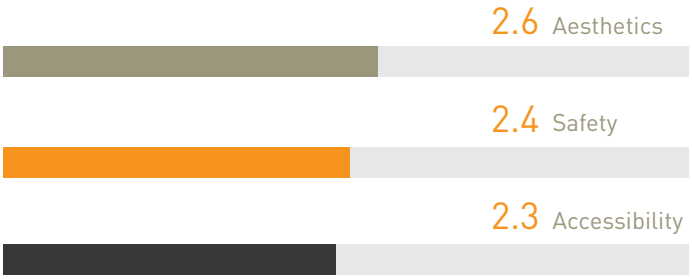

## Park-and-Ride and Drop-off Zone

Park & Ride lots provide easy vehicular parking and encourage transit ridership for motorists using their vehicles for first last mile trips. The addition of a dedicated kiss & ride zone immediately adjacent to the station would help to improve accessibility, safety and convenience at the station.

# CASE STUDY 2

## METRO RAIL STATION (AT GRADE)

- Neighborhood-serving commercial corridor surrounded by mostly single-family residential uses
- Freeway bisects the southern portion of the study area, which limits connectivity
- Transit stop has bus shelters for several local and regional bus lines
- Limited park and recreation space




**2.4**

### Aesthetics

The commercial corridor has pleasant landscaping, strategically-placed seating and waste receptacles, and is well maintained. However, there is a general lack of amenities elsewhere in the study area. Most of the residential areas are also well landscaped and well maintained. However, the study area lacks unique characteristics and landmarks that distinguishes a sense of place.

### Safety

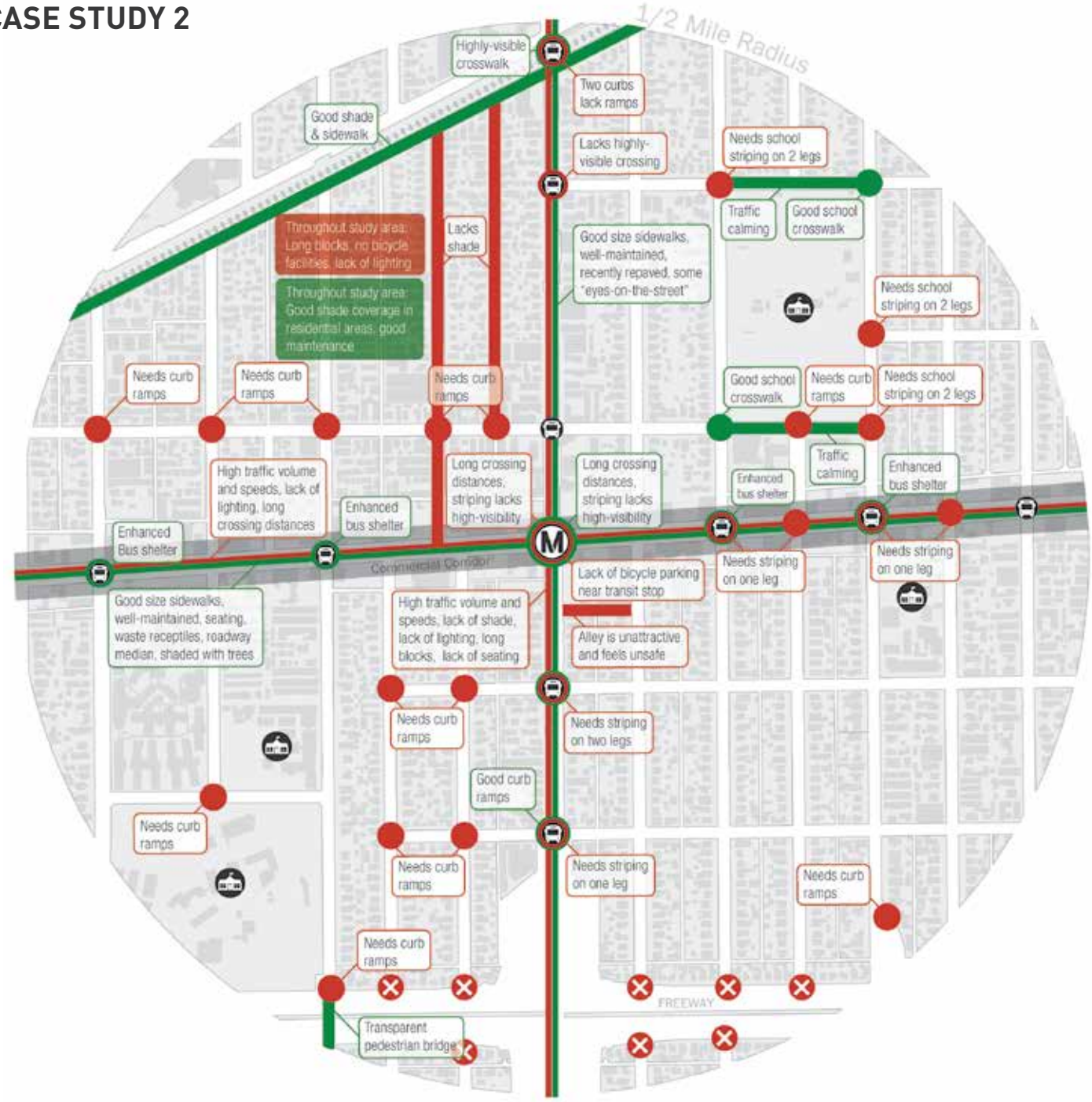
The study area is well maintained and clean. However, the lack of bicycle facilities, traffic signage, "eyes-on-the-street", and adequately-scaled lighting lowers the overall sense of safety. Thousands of collisions have been reported in recent years, many of them involving people walking or bicycling.

### Accessibility

There are high-quality sidewalks throughout the study area. However, several intersections lack curb ramps and highly visible crosswalk striping. There are no bicycle facilities, resulting in many people preferring to ride their bicycle on the sidewalk where collisions involving people walking can occur. Most people commute to work either by driving alone or carpooling, although there is a high percentage of bus riders in the study area as well.

# EXISTING CONDITIONS

## CASE STUDY 2




## LEGEND

### Locations

- Transit Stop
- Key Destination
- Destination Area
- Existing Bus Stop

### Access Barriers and Strengths

- Corridor Barrier
- Specific Barrier
- Connectivity Gap
- Corridor Asset
- Specific Asset



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# CRITICAL ACCESS BARRIERS

## Lack of curb ramps and long blocks

Several intersections lack curb ramps, especially in residential areas. This limits accessibility for mobility-impaired individuals and people transporting goods on wheels. Also, many of the street blocks are very long with no crosswalks.

## Fast-moving traffic on major arterials


There is fast-moving traffic on the major north-south and east-west corridors, with some segments of the street with posted speeds of over 35 mph. As a result, many motorists speed and do not abide by traffic rules and manners.

## No bicycle facilities

There are currently no bicycle facilities to buffer people bicycling from fast-moving traffic. This encourages many people to bicycle on the sidewalk, which can result in collisions with people walking.

## Lack of adequately-scaled lighting

Although there is an abundance of street lighting that illuminates the roadway, there is a lack of adequately-scaled lighting to help guide people walking, especially at night.

## Lack of landscaping and shade

Although most of the study area is well shaded with tress, there are some areas that lack protection from the sun. During a hot day, this can lower a person's sense of comfort.

# OTHER EXISTING CONDITIONS

## Traffic calming nearby schools


There are some locations where markings are the roadway signify drivers to slow down and watch for people crossing the street.

## Alley network

The study area has a large alley network that is primarily used by vehicles to enter residences. Some people do use these alleys as a shortcut, but several alleys are not well lit and lack "eyes-on-the-street".

## Well-maintained trees in most residential areas

Most of the residential streets have well-maintained landscaping that is aesthetically pleasing and provides shade.

## Railway to the north and freeway to the south

The railway to the north and the freeway to the south limit accessibility just outside of the study area where centers of industry are located. There are a few connections, but most accommodate motorists rather than people walking or bicycling.

## Bus waiting areas with bus shelters

Many of the bus waiting areas, especially along the main commercial corridor have bus shelters that provide shade. These bus shelters also have benches and sometimes waste receptacles.

# PATHWAY NETWORK

## CASE STUDY 2


## LEGEND

### Locations

- Metro Rail Station
- Key Destination
- Destination Area
- Bus Stop

### Pathway Network

- Pathway Arterial
- Pathway Collector 1
- Pathway Collector 2
- Bikeway (proposed)

- Extension to Regional Network
- Bicycle Services
- Key Recommendation (corridor)
- Key Recommendation (specific location)



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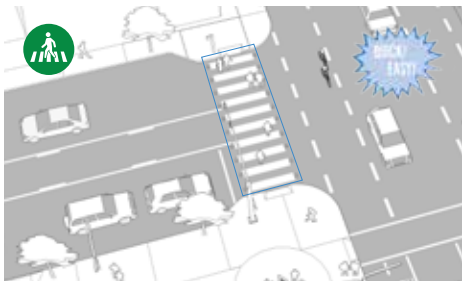
# KEY RECOMMENDATIONS

## Enhanced Pedestrian Crossings

Enhancing existing crossings can help protect station users by increasing their visibility to motorists. Crossing times can be made longer and to occur more often. In addition to enhancing existing crosswalks, adding well-marked crosswalks at unsignalized intersections and at midblock locations can improve convenience and safety.




Los Angeles

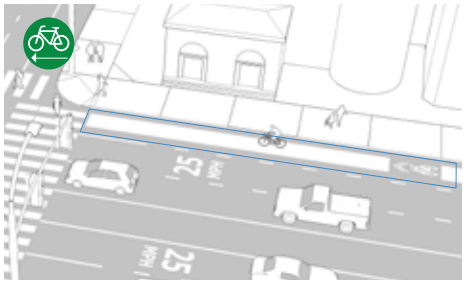
## Traffic Calming

Traffic calming decreases speeds along streets with heavy, fast-moving traffic in order to increase safety and comfort for all users of the street. Traffic calming treatments include physical measures such as curb extensions to narrow the roadway, narrowed travel lanes to promote slower driving speeds, and diverters to limit vehicle cut-through traffic on neighborhood streets.


Pomona

## Enhanced Bicycle Facilities

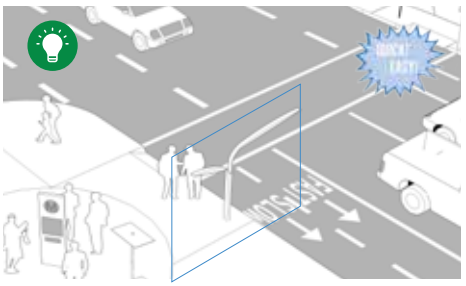
A variety of roadway and signalization improvements can improve safety and increase comfort for people bicycling. These include bicycle lanes physically separated from vehicular traffic, such as buffered lanes, cycle tracks, painted bicycle lanes, conflict zone markings at/approaching intersections, bicycle boxes, and bicycle-prioritized signalization.




Long Beach

## Lighting

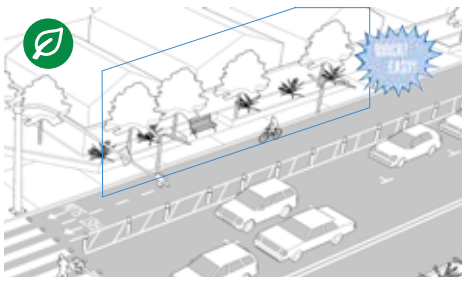
Adding lighting can increase safety and aid in night navigation for people walking or bicycling along Pathway routes. Install lighting rhythmically and consistently in coordination with tree canopies as not to block the light. Consider installing lights that are efficient and/or motion activated/ self powered in areas where constant light is not needed.




Pasadena

## Landscaping and Shade

Trees and landscaping improve aesthetics, provide pleasant and safe pathways, and offer an attractive buffer between the sidewalk and the roadway. Trees and shade structures provide refuge from the sun for people walking, resting, or waiting.




Inglewood

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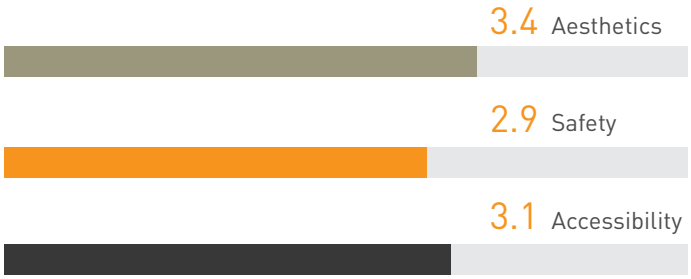
# CASE STUDY 3

## METROLINK STATION AND MULTI-MODAL TRANSIT HUB

- Multi-modal transportation center featuring highly-amenitized rail and bus hubs
- "Small town" downtown location
- Commercial, residential, municipal, and limited industrial land uses
- Commercial historic district south of the station
- Residential historic neighborhoods north of the station




**3.1**

### Aesthetics

The station plaza is landscaped and well maintained. The commercial district to the south of the station has attractive historic architecture and pleasant streetscapes that contribute to a strong sense of place. However, other commercial corridors lack sufficient landscaping, shade, and pedestrian amenities. Residential areas are generally very pleasant, with attractive landscaping and well-maintained residences.

### Safety

Most of the station area has high levels of activity affording a perceived sense of safety, but alcoves and the pedestrian overpass feel somewhat unsafe because of the lack of human activity and poor lighting. In the commercial and municipal district to the south, activity from people on the street and the orientation of most buildings toward the public realm give a perceived sense of safety. Sidewalks are well maintained throughout the study area, and pedestrians are generally buffered from roadway traffic. The safety score is negatively affected by high traffic speeds on some streets, as well as the lack of any bikeway facilities.

### Accessibility

At the station, mode transfer is facilitated by an adequate park-and-ride lot as well as amenities for people walking and bicycling. However, poorly-marked pathways make navigating to and from the station more difficult and less intuitive. The accessibility score is negatively affected by the lack of bicycle facilities, insufficient wayfinding signage, and some problematic pedestrian crossings.

# EXISTING CONDITIONS

## CASE STUDY 3


## LEGEND

### Locations

- Station
- Key Destination
- Destination Area
- Existing Bus Stop

### Access Barriers and Strengths

- Corridor Barrier
- Specific Barrier
- Area Barrier
- Connectivity Gap
- Corridor Asset
- Other Asset
- Area Asset



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# CRITICAL ACCESS BARRIERS

## Lack of bicycle facilities

There are no bicycle facilities in the study area. As a result, people bicycling choose to ride on the sidewalk rather than the roadway.

## Fast-moving traffic

Traffic on the commercial streets moves at high speeds, often above the speed limit, which detracts from the comfort and safety of people walking and bicycling. In addition, a couple of residential streets have fast-moving cut-through traffic.

## Unpleasant pedestrian underpass

The underpass under the rail line is long, dark, and lacks decorative treatments. A positive feature is its separation from the roadway by a grade difference and metal fence.

## Unenhanced crosswalks or lack of crosswalks

Some long roadway segments along busy commercial streets are without crosswalks. Existing crosswalks are generally unenhanced and inadequately marked, without such features as continental striping or advance stop lines. In addition, several crossings in the study area are without curb cuts.

## Lack of landscaping and shade

The residential neighborhood in the study area's southeast quadrant lacks tree cover, and parkway strips are sometimes not well maintained. The two east-west commercial streets lack shade and landscaping.

# OTHER EXISTING CONDITIONS

## Active and pleasant commercial district

The downtown area to the south of the station is a vibrant, historic commercial district that is a regional attraction. Outdoor dining and transparent store windows contribute to an inviting people-friendly environment.

## High-quality street furniture

In the downtown commercial district, an east-west promenade has an attractive streetscape with amenities such as seating, shade, bicycle racks, and traffic-calming measures. Along the promenade, street furniture is consistent in its design and orientation toward the sidewalk.

## Pedestrian bridge

The architecturally-attractive pedestrian bridge provides a direct connection from the transit station to the downtown commercial district. It is somewhat unpleasant due to poor upkeep. In addition, a user's sense of safety is compromised by the low level of activity during much of the day.

## Well-shaded, pedestrian-scale residential streets

In the northern half of the study area, streets are generally well shaded, often with mature tree cover. Appropriately-scaled lighting further contributes to a people-friendly environment.

## Curb bulbouts

Curb bulbouts located at some downtown intersections shorten pedestrian crossing distances and provide space for amenities such as bicycle racks, seating, and pedestrian lighting. Bulbouts also have a traffic-calming effect because motorists must make tighter, slower turns.

# PATHWAY NETWORK

## CASE STUDY 3


## LEGEND

### Locations

- Station
- Key Destination
- Destination Area
- Bus Stop

### Pathway Network

- Pathway Arterial
- Pathway Collector 1
- Pathway Collector 2
- Cut-Through
- Bikeway (proposed)
- Extension to Regional Network
- Bicycle Services
- Key Recommendation (corridor)
- Key Recommendation (specific location)



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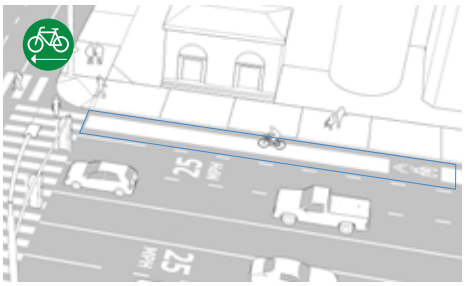
# KEY RECOMMENDATIONS

## Enhanced Bicycle Facilities

A variety of roadway and signalization improvements can improve safety and increase comfort for people bicycling. These include bicycle lanes physically separated from vehicular traffic, such as buffered lanes, cycle tracks, painted bicycle lanes, conflict zone markings at/approaching intersections, bicycle boxes, and bicycle-prioritized signalization.




## Traffic Calming

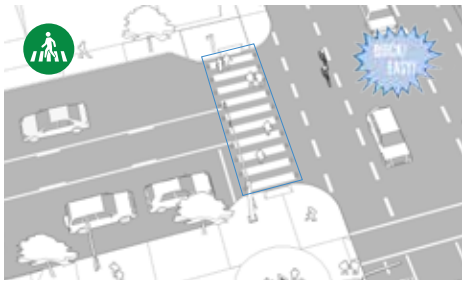
Traffic calming decreases speeds along streets with heavy, fast-moving traffic in order to increase safety and comfort for all users of the street. Traffic calming treatments include physical measures such as curb extensions to narrow the roadway, narrowed travel lanes to promote slower driving speeds, and diverters to limit vehicle cut-through traffic on neighborhood streets.


## Underpass/Overpass Enhancements

Transit riders might be more likely to travel to the station if the pedestrian overpass across the rail line and the underpass adjacent to the station were safer, cleaner, better illuminated, and visually engaging.

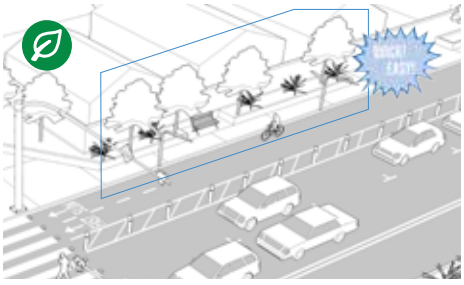

## Enhanced Pedestrian Crossings

Enhancing existing crossings can help protect station users by increasing their visibility to motorists. Crossing times can be made longer and to occur more often. In addition to enhancing existing crosswalks, adding well-marked crosswalks at unsignalized intersections and at midblock locations can improve convenience and safety.




## Landscaping and Shade

Trees and landscaping improve aesthetics, provide pleasant and safe pathways, and offer an attractive buffer between the sidewalk and the roadway. Trees and shade structures provide refuge from the sun for people walking, resting, or waiting.



# CASE STUDY 4

## MULTI-AGENCY BUS STOP

- Central downtown location of a Los Angeles suburban community
- Active commercial corridors, with some people walkable districts and other areas that are more oriented to the automobile
- Large regional shopping mall south of the bus stop
- Primarily single-family residential neighborhoods outside commercial area


**3.9**

### Aesthetics

The study area is generally well landscaped and well maintained. Residential areas commonly have mature trees providing substantial tree cover. People-friendly commercial streets provide well-maintained and inviting pedestrian amenities such as seating. However, two commercial corridors located toward the edges of the study area lack landscaping, shade, and pedestrian amenities.

### Safety

In the commercial district along the study area's primary commercial corridors, activity from people on the street and the orientation of most buildings toward the public realm give a perceived sense of safety. Sidewalks are well maintained throughout the study area, and pedestrians are generally buffered from roadway traffic. The safety score is negatively affected by high traffic speeds on some streets, as well as the lack of any bicycle facilities.

### Accessibility

Sidewalk quality is generally very good, and most pedestrian crosswalks on the primary commercial corridors are clearly marked. Curb ramps are consistently of good quality and ADA accessible. However, the lack of wayfinding signage makes locating destinations more difficult. The accessibility score is negatively affected by the lack of bicycle facilities, insufficient wayfinding signage, unenhanced pedestrian crossings located on two commercial streets, and the lack of crosswalks at some intersections.

# EXISTING CONDITIONS

## CASE STUDY 4


## LEGEND

### Locations

- Bus Stop
- Key Destination
- Destination Area
- Existing Bus Stop
- Existing Bikeway

### Access Barriers and Strengths

- Gap in the Bicycle Network
- Corridor Barrier
- Specific Barrier
- Area Barrier
- Connectivity Gap
- Corridor Asset
- Other Asset



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# CRITICAL ACCESS BARRIERS

## Lack of bicycle facilities

There are few bicycle facilities in the study area. As a result, people bicycling often choose to ride on the sidewalk rather than the roadway.

## Lack of further bicycle amenities

Although bicycle parking is abundant in the study area, the area can greatly benefit from a bike share system that allows people to conveniently bicycle to and from the bus stop.

## Fast-moving traffic

With relatively wide streets and wide travel lanes, some commercial streets have high traffic speeds, often above the speed limit, which detracts from the comfort and safety of people walking and bicycling. Some smaller streets have significant cut-through traffic with high speeds.

## Poorly marked (or lack of) crosswalks

While most crosswalks in the walkable commercial district are clearly marked, some crosswalks in the study area (especially on other commercial corridors) are generally unenhanced and sometimes inadequately marked, without such features as continental striping and advance stop lines.

## Lack of shade on some commercial corridors

While much of the study area is well shaded with mature trees, sections of commercial streets lack tree cover. In addition, some residential streets are lined with palm trees, which do not provide shade.

# OTHER EXISTING CONDITIONS

## Active and pleasant commercial district

The commercial district near the bus stop has high levels of activity, attractive street furniture, distinctive pavement markings, shade-providing trees, large sidewalk widths, and other amenities such as bicycle racks and adequately-scaled lighting.

## Well-marked midblock crossings

Midblock crossings throughout the walkable commercial district are well marked with either pedestrian flashing beacons or full signalization.

## High-quality amenities at some bus waiting areas

Bus waiting areas in the walkable commercial district contain amenities such as shelters, seating, trees, and bike racks. Street furniture is distinctively designed and well maintained.

## Public Art

Painted utility boxes provide whimsical and colorful assets to the streetscape. They are an integral component of the study area's attractive commercial streetscape.

## Well-shaded residential areas

Residential neighborhoods are pleasantly landscaped and well shaded. Some municipal uses provide added green space.

# PATHWAY NETWORK

## CASE STUDY 4


## LEGEND

### Locations

- Bus Stop
- Key Destination
- Destination Area
- Bus Stop

### Pathway Network

- Pathway Arterial
- Pathway Collector 1
- Pathway Collector 2
- Cut-Through
- Bikeway (existing)
- Bikeway (proposed)
- Extension to Regional Network
- Bicycle Services
- Key Recommendation (corridor)
- Key Recommendation (specific location)



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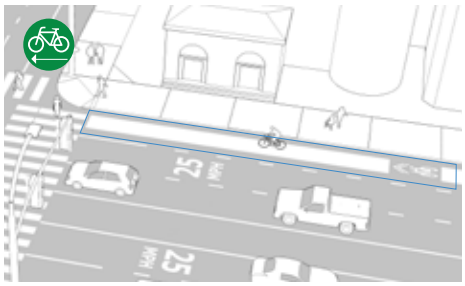
# KEY RECOMMENDATIONS

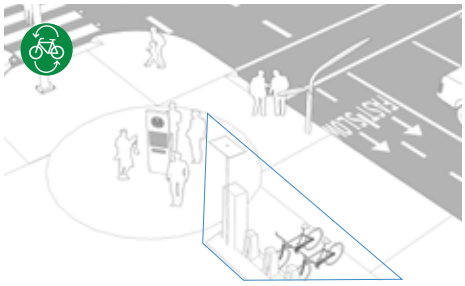
## Enhanced Bicycle Facilities

A variety of roadway and signalization improvements can improve safety and increase comfort for people bicycling. These include bicycle lanes physically separated from vehicular traffic, such as buffered lanes, cycle tracks, painted bicycle lanes, conflict zone markings at/approaching intersections, bicycle boxes, and bicycle-prioritized signalization.




## Bike Share Stations

Bike share provides numerous strategic locations where users can rent bicycles for short-term use. Bike share stations located at transit stations and stops make bicycling a convenient option for first last mile trips. Other stations are typically placed at strategic locations close to destinations. Corporate sponsorships and other public-private coordination can help make bike share a relatively inexpensive intervention.

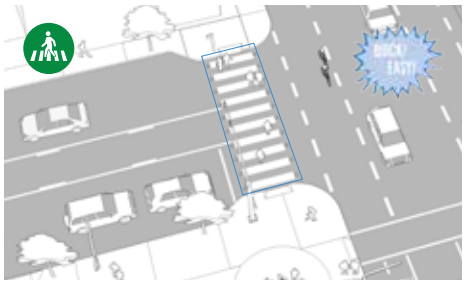



## Traffic Calming

Traffic calming decreases speeds along streets with heavy, fast-moving traffic in order to increase safety and comfort for all users of the street. Traffic calming treatments include physical measures such as curb extensions to narrow the roadway, narrowed travel lanes to promote slower driving speeds, and diverters to limit vehicle cut-through traffic on neighborhood streets.

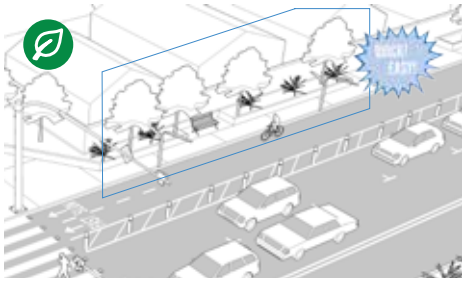

## Enhanced Pedestrian Crossings

Enhancing existing crossings can help protect station users by increasing their visibility to motorists. Crossing times can be made longer and to occur more often. In addition to enhancing existing crosswalks, adding well-marked crosswalks at unsignalized intersections and at midblock locations can improve convenience and safety.




## Landscaping and Shade

Trees and landscaping improve aesthetics, provide pleasant and safe pathways, and offer an attractive buffer between the sidewalk and the roadway. Trees and shade structures provide refuge from the sun for people walking, resting, or waiting.



# CASE STUDY 5

## METRO RAPID AND LOCAL BUS STOP

- Active, walkable commercial district (to the east and south of the bus stop) that is a regional attraction
- Residential neighborhoods in the northern half of the study area
- Popular linear park overlooking the ocean
- Publicly accessible beach with multi-use paths


**4.1**

### Aesthetics

The study area has a strong sense of place befitting its coastal location. Commercial and residential districts are generally pleasant and well shaded, and landscaping is well maintained.

### Safety

The very high level of activity from people on the street and in public spaces elicits a strong sense of safety. Residential streets and some commercial streets provide a landscape buffer between the sidewalk and the roadway. Many bicycle facilities incorporate safety buffers to guide bicyclists away from the "door zone" beside parked vehicles. However, there has been a disproportionate number of severe automobile collisions involving people walking and bicycling.

### Accessibility

The transit stop has no designated passenger drop-off location, bicycle parking, shelter, or seating, even though it is a major stop. Bicycle lanes and routes are abundant throughout the study area, and some routes have enhanced bicycle lanes. Sidewalks in the study area are generally in very good condition, and most crosswalks are enhanced. The midblock crossings around the commercial core improve accessibility. Compared to the rest of the county, the study area has a relatively high number of people commuting to work by walking, bicycling, or taking transit.

# EXISTING CONDITIONS

## CASE STUDY 5


## LEGEND

### Locations

- Transit Stop
- Key Destination
- Destination Area
- Existing Bus Stop
- Existing Bikeway

### Access Barriers and Strengths

- Corridor Barrier
- Specific Barrier
- Connectivity Gap
- Corridor Asset
- Other Asset



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# CRITICAL ACCESS BARRIERS

## Difficult access to the oceanfront

The beach can be accessed via one of three pedestrian bridges in the study area. However, each requires navigating steep terrain and steps. The upcoming completion of a large roadway project will provide a more accessible route to and from the beach for bicyclists and individuals with mobility impairments.

## Lack of amenities at some bus stops

While the quality of bus stop amenities is generally good, there are some locations without shelters or shade-providing elements. The bus stop at the center of this study does not have any sheltering elements, seating, or bicycle parking.

## Long crossing distances on a commercial street

A primary street in the study area is about 80 feet wide, resulting in long crossing distances for people walking. There are no median refuge islands.

## Lack of shade on some streets

While much of the study area is well shaded with mature trees, sections of commercial streets lack tree cover. In addition, some residential streets are lined with palm trees, which do not provide shade.

## Wayfinding signage

There is some wayfinding and directional signage in the commercial core around the shopping promenade. However, they focus on cultural and retail destinations rather than offering directions to transit stops and bicycle facilities.

# OTHER EXISTING CONDITIONS

## Enhanced Bus Shelters

Where bus shelters exist, they generally provide adequate shade and seating. Some have pleasant landscaping elements and seating options that are far different from the typical bus bench.

## No crosswalks on some residential streets

Midblock crossings – some signalized – are located on many streets in the commercial district (top image). However, some busy residential intersections are without any crosswalk markings (lower image).

## Alley cut-through paths

Alleys that run parallel to some commercial streets provide additional routes of travel for people walking and bicycling, in addition to their utilitarian use for commercial loading. They are relatively popular routes today, sometimes as quiet alternatives to the hustle and bustle of the surrounding streets.

## Buffered/Colored Bicycle Lanes

Enhanced bicycle facilities provide safer and more comfortable routes for people bicycling. Additional striped markings (top) guide people to bicycle outside of the dangerous "door zone" and provide a spatial buffer from traffic. A colored lane (bottom) provides enhanced visual cues.

## Enhanced crosswalks

Almost all intersections in the commercial area have enhanced crosswalks with continental striping and advanced stop lines.

# PATHWAY NETWORK

## CASE STUDY 5


## LEGEND

### Locations

- Transit Stop
- Key Destination
- Destination Corridor
- Bus Stop

### Pathway Network

- Pathway Arterial
- Pathway Collector 1
- Pathway Collector 2
- Cut-Through
- Bikeway (existing)
- Bikeway (proposed)
- Extension to Regional Network
- Bicycle Services
- Key Recommendation (corridor)
- Key Recommendation (specific location)



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# KEY RECOMMENDATIONS

## New Connection Across Barrier

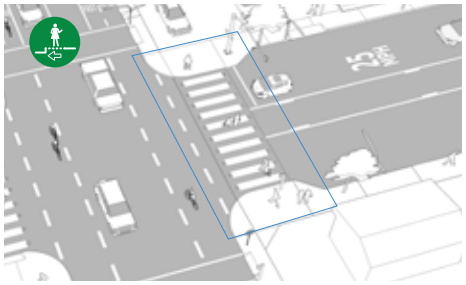
Designing new connections to the beach can improve connectivity to and from the station. A well-designed connection, such as a fully- accessible pedestrian bridge, should consider the safety of all people.


## Enhanced Bus Waiting Areas

Enhancing the bus waiting areas along the Pathway Arterials and Collectors can improve the safety and comfort of a bus rider's journey. Potential enhancements could include benches, shelters, lighting, signage, a wi-fi hotspot, mobile device chargers, etc.

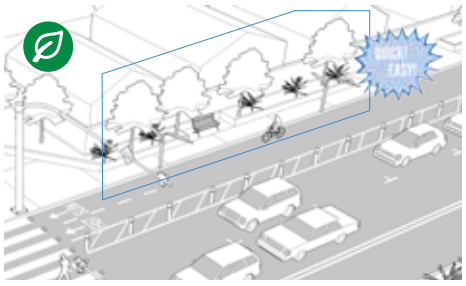

## Curb Extensions at Intersections

Extending the curb at intersections improves safety by shortening crossing distances, increasing visibility of people walking, and slowing vehicles that are turning. It can also provide room for amenities such as seating areas, bioswales, stormwater management, and other planted areas.




## Landscaping and Shade

Trees and landscaping improve aesthetics, provide pleasant and safe pathways, and offer an attractive buffer between the sidewalk and the roadway. Trees and shade structures provide refuge from the sun for people walking, resting, or waiting.



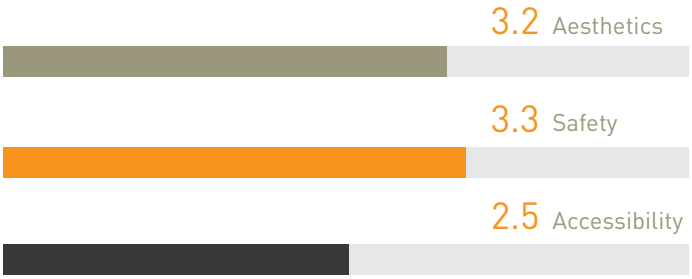

## Medallion Signage

Medallion signage is an affordable type of wayfinding, or directional tool, that can be installed on utility poles and streetlights. The addition of medallion signage can help to increase awareness of station proximity, especially along Arterials and Collectors that connect to the schools, parks and commercial areas.

# CASE STUDY 6

## METRO LOCAL BUS STOP

- Well-maintained commercial corridor that serves as the community's central artery for circulation, commerce, employment, and social activity
- Highly diverse land uses
- Freeway divides the study area with connections only on two streets
- Lack of bicycle facilities




**3.0**

### Aesthetics

The study area is generally well landscaped with only a few residential streets without trees and planting. The station lacks strategically-placed amenities, such as pedestrian-scaled lighting, which help to enhance overall aesthetics.

### Safety

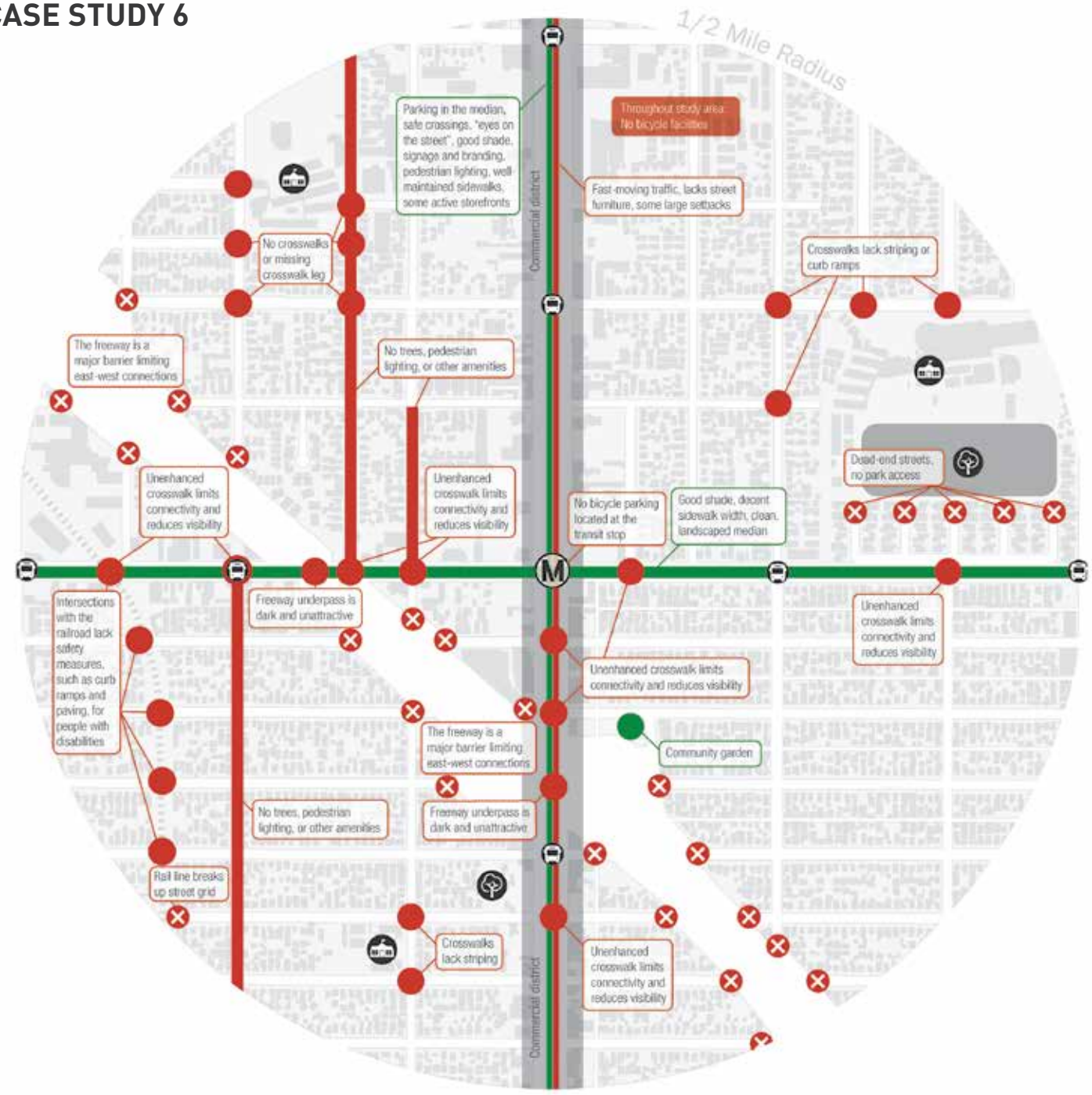
The study area is generally safe due to adequate maintenance of the public realm and sufficient "eyes on the street". However, the lack of bicycle facilities can make bicycling to and from the station unsafe for all users of the street, especially with fast-moving cars. There are several collisions that have recently happened in the area with a disproportionately high number occurring to people who are walking.

### Accessibility

Most of the study area, especially near the transit stop, has high-quality sidewalks and curb ramps with either scoring or truncated domes. This makes walking to and from the station relatively easy and comfortable. However, the lack of bicycle facilities and drop-off areas discourages people bicycling or driving to travel to and from the transit stop. As a result, approximately 92% of people in the site area get to work by automobile.

# EXISTING CONDITIONS

## CASE STUDY 6




## LEGEND

### Locations

- Transit Stop
- Key Destination
- Destination Area
- Existing Bus Stop

### Access Barriers and Strengths

- Street Conditions Barrier
- Specific Barrier
- Connectivity Gap
- Corridor Asset
- Specific Asset

## CRITICAL ACCESS BARRIERS

### No bicycle facilities

There are currently no bicycle facilities in the study area. People who are bicycling often ride on the sidewalk or alongside fast-moving cars, which can be unsafe for all users of the road.

### Freeway underpasses

The freeway is a major barrier that disconnects the station from the residents to the south and the west. Underpasses can feel unsafe during the night.

### Crossings at the rail line

While most of the crosswalks in the study area are designed better than most in the County, important crossings along the rail line, the primary east-west street, and routes to school lack high visibility, accessibility, or safety amenities.

### Dead ends caused by the freeway


Traveling from the southwest region of the study area to the transit stop is constrained as the freeway cuts through the street grid, resulting in dead ends that limit connectivity.

### Lack of lighting

Although the north-south street has pedestrian-scaled lighting, several residential streets and underpasses do not. This lack of lighting can make traveling to the station feel unsafe.

## OTHER EXISTING CONDITIONS

### Well-maintained sidewalks

The sidewalk conditions on the primary east-west street are well-maintained, landscaped, shaded, illuminated, branded, and well-monitored. This offers a pleasant experience for people traveling along the corridor.

### Alley network

There are several alleys in the residential parts of the study area that are not well-lit or maintained, creating an unpleasant environment for people to walk or bicycle, especially at night.

### Parking at commercial corridors

There is an abundance of parking along the commercial corridors that make driving to the commercial area convenient. In addition to short-term curbside parking, there is parking in the roadway median.

### Safe crosswalks and new paving

Throughout the study area, crosswalks are generally well designed and highly visible. Curbs have ramps with either scoring or truncated domes, accommodating for the safety of all users. Several streets have also been recently repaved.

### Local community garden

A community garden provides the opportunity for residents without gardening space to maintain an individual plot in a community space.

# PATHWAY NETWORK

## CASE STUDY 6


## LEGEND

### Locations

- Transit Stop
- Key Destination
- Destination Area
- Bus Stop

### Pathway Network

- Pathway Arterial
- Pathway Collector 1
- Pathway Collector 2
- Bikeway (existing)
- Bikeway (proposed)
- Extension to Regional Network
- Bicycle Services
- Key Recommendation (corridor)
- Key Recommendation (specific location)



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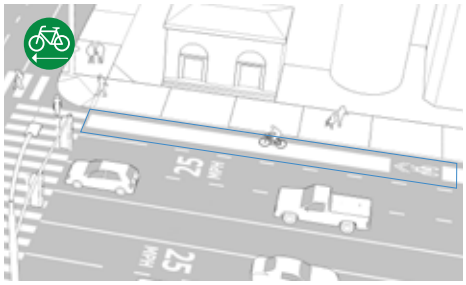
# KEY RECOMMENDATIONS

## Enhanced Bicycle Facilities

A variety of roadway and signalization improvements can improve safety and increase comfort for people bicycling. These include bicycle lanes physically separated from vehicular traffic, such as buffered lanes, cycle tracks, painted bicycle lanes, conflict zone markings at/approaching intersections, bicycle boxes, and bicycle-prioritized signalization.

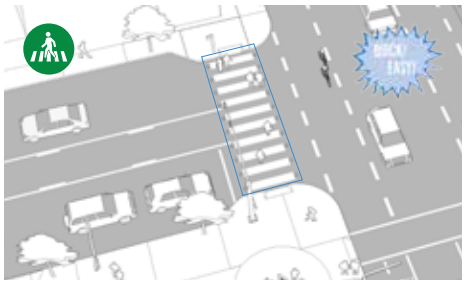



## Freeway Underpass & Overpass Enhancements

Residents might be more likely to travel to the station if the underpasses were safer, cleaner, better illuminated and visually engaging.


## Enhanced Pedestrian Crossings

Enhancing existing crossings can help protect station users by increasing their visibility to motorists. Crossing times can be made longer and to occur more often. In addition to enhancing existing crosswalks, adding well-marked crosswalks at unsignalized intersections and at midblock locations can improve convenience and safety.

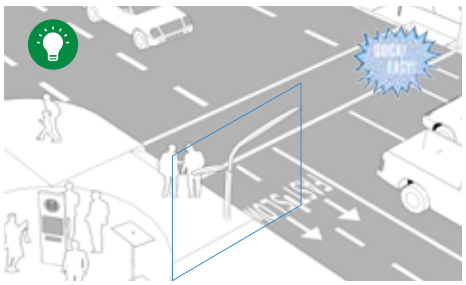



## New Connection Across Barrier

Designing a new connection across the railroad crossings can improve connectivity to the station. This can manifest as an at-grade signalized crosswalk for people walking and bicycling. A well-designed connection should consider the safety of all people.


## Lighting

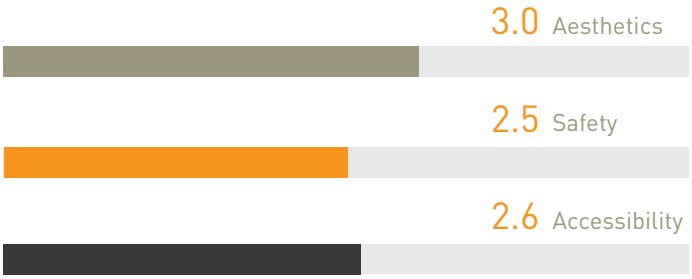
Adding lighting can increase safety and aid in night navigation for people walking or bicycling along Pathway routes. Install lighting rhythmically and consistently in coordination with tree canopies as not to block the light. Consider installing lights that are efficient and/or motion activated/ self powered in areas where constant light is not needed.



# CASE STUDY 7

## METRO RAPID AND LOCAL BUS STOP

- Located at the heart of a walkable downtown commercial district
- Elsewhere in the study area, development on commercial corridors is oriented more to the automobile than to other modes
- Residential neighborhoods located behind commercial corridors
- Rail line running diagonally across the study area limits connectivity
- Lack of bicycle facilities




**2.7**

### Aesthetics

The study area has a relatively strong sense of place, primarily along the primary north-south corridor. However, commercial streets generally lack adequate tree cover, landscaping, waste receptacles and seating. Residential areas are pleasant, with mature shade-providing trees in many locations.

### Safety

Around the bus stop, the high level of activity from people on the street and the orientation of most buildings toward the public realm give a perceived sense of safety. While pedestrians on the primary north-south street are buffered from traffic by diagonal vehicular parking, other commercial streets have little or no buffer from the roadway. The smaller residential streets generally provide a landscape buffer between the sidewalk and the roadway. Also, there have been severe collisions reported recently in the study area.

### Accessibility

There are no bicycle facilities in the study area. The primary north-south street has enhanced midblock crossings with curb extensions and signalization, while many other crossings are unenhanced with long crossing distances. Sidewalks are generally in good condition, although some are narrow and contain physical obstructions. In the study area, nearly 20% of people commute to work by bus, while approximately 30% either walk, bicycle, or ride transit.

# EXISTING CONDITIONS

## CASE STUDY 7


## LEGEND

### Locations

- Transit Stop
- Key Destination
- Destination Area
- Existing Bus Stop

### Access Barriers and Strengths

- Street Conditions Barrier
- Specific Barrier
- Area Barrier
- Connectivity Gap
- Specific Asset



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# CRITICAL ACCESS BARRIERS

## Narrow sidewalks

Some streets have narrow sidewalks with no buffer from the roadway. In many locations, the pedestrian pathway is further obstructed by bus benches, signage poles, and/or public utilities, making some areas inaccessible for mobility-impaired individuals.

## Long pedestrian crossing distances

Crossing distances on the primary north-south street are as long as 90 feet. At some intersections, corner bulbouts slightly reduce crossing distances, yet crossing distances at these locations are still long. A successful approach is seen at midblock locations where wide curb extensions reduce crossing distances to approximately 60 feet.

## Lack of bicycle facilities

There are currently no bicycle facilities in the study area. People who are bicycling often ride on the sidewalk or alongside fast-moving cars, which can be unsafe for all users of the road.

## Lack of amenities at some bus stops

Many bus stops lack adequate shelters or shade-providing elements, and some are without any seating. Bus stops generally do not have nearby bicycle parking. Insufficient sidewalk widths add challenges when making enhancements to existing bus stops.

## Lack of landscaping and shade

Commercial streets lack adequate landscaping and shade. While the primary commercial street has adequate space for the addition of landscaping and trees, other commercial streets do not have adequate existing sidewalk widths to accommodate new landscaping and trees.

# OTHER EXISTING CONDITIONS

## Railroad right-of-way

The railroad crossings are signalized or have stop signs. Some residential streets lack a dedicated crossing although there is no fencing to prohibit people from crossing over the tracks. Metro is currently exploring options for east-west mobility for people who walk and bicycle within this corrido to connect rail stations to the Los Angeles River.

## Parklets - Pacific Boulevard

Parklets at three locations expand the pedestrian realm and provide valuable outdoor space for dining and seating. (The site was visited early in the morning, hence the empty parklet)

## Midblock bus shelters and enhanced crossings

Midblock curb extensions contain bus shelters, bus benches, shade-providing trees, and additional seating. A four-block segment of the primary north-south street contains signalized midblock crossings, although most do not have enhanced crosswalk markings such as continental striping.

## Cultural signage

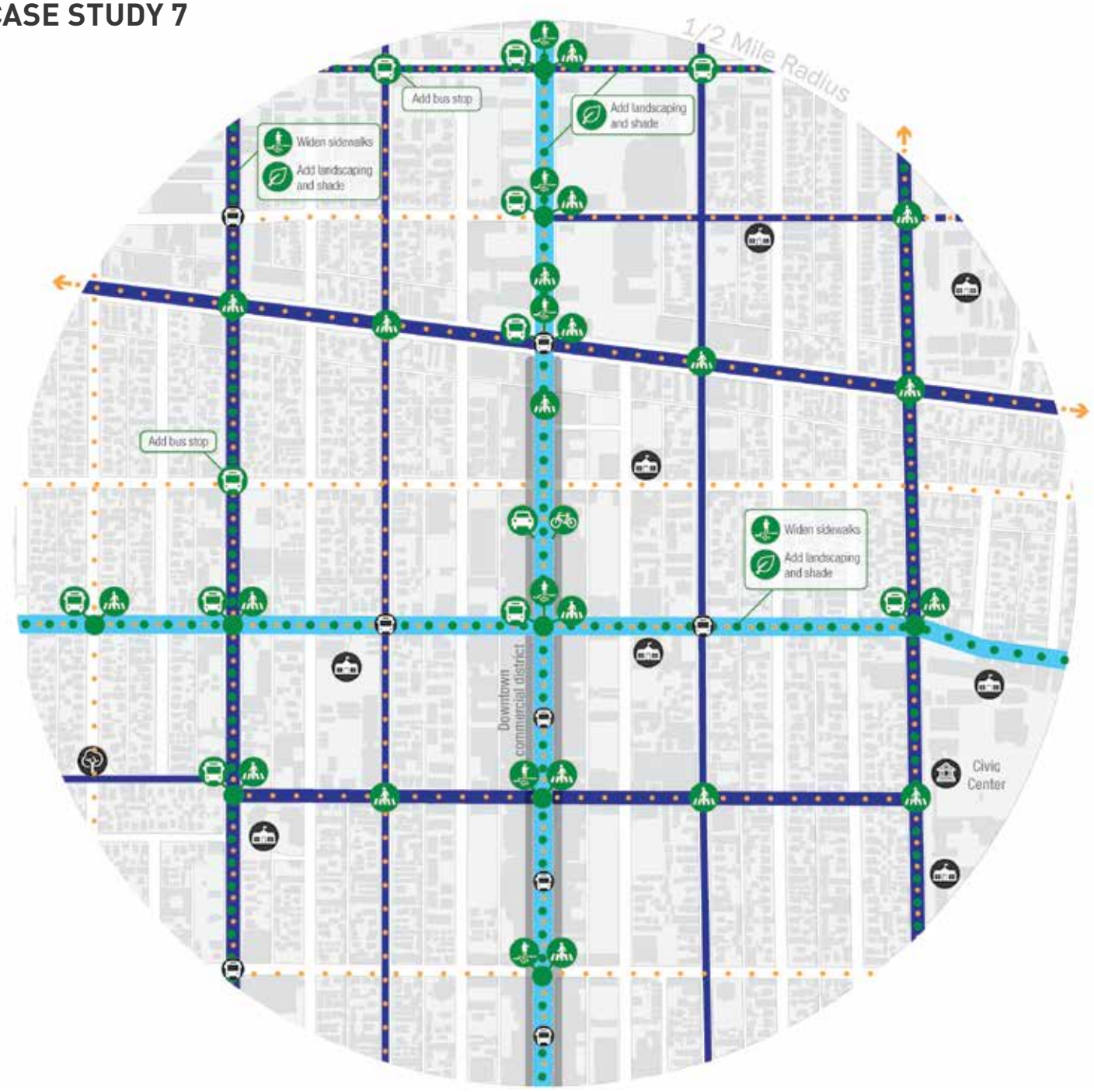

As a cultural hub for the community, the downtown hosts numerous festivals and events. Utility pole banners along the primary commercial street publicize these events and add to the neighborhood's sense of place.

## Shaded residential streets

The street environment in residential areas is generally pleasant, with mature shade-providing street trees and well-maintained landscaping. In some locations, however, the parkway width is too narrow to plant trees.

# PATHWAY NETWORK

## CASE STUDY 7




## LEGEND

### Locations

- Transit Stop
- Key Destination
- Destination Area
- Bus Stop

### Pathway Network

- Pathway Arterial
- Pathway Collector 1
- Pathway Collector 2
- Cut-Through
- Bikeway (existing)
- Bikeway (proposed)
- Extension to Regional Network
- Bicycle Services
- Car Share
- Key Recommendation (corridor)
- Key Recommendation (specific location)



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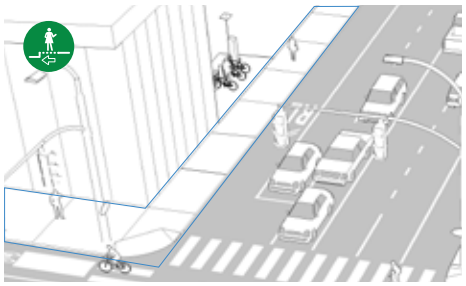
# KEY RECOMMENDATIONS

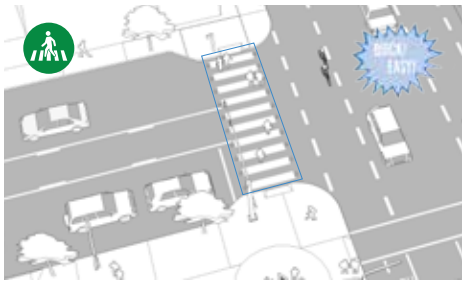
## Sidewalk Addition or Widening

Widening or adding sidewalks improves safety, comfort and convenience for people of all ages and abilities. Wider sidewalks create more room for streetscape elements that enhance comfort and convenience, such as street furniture, bus waiting areas, landscaping, and trees.



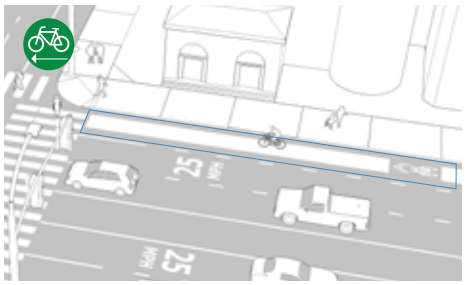

## Enhanced Pedestrian Crossings

Enhancing existing crossings can help protect station users by increasing their visibility to motorists. Crossing times can be made longer and to occur more often. In addition to enhancing existing crosswalks, adding well-marked crosswalks at unsignalized intersections and at midblock locations can improve convenience and safety.




## Enhanced Bicycle Facilities

A variety of roadway and signalization improvements can improve safety and increase comfort for people bicycling. These include bicycle lanes physically separated from vehicular traffic, such as buffered lanes, cycle tracks, painted bicycle lanes, conflict zone markings at/approaching intersections, bicycle boxes, and bicycle-prioritized signalization.

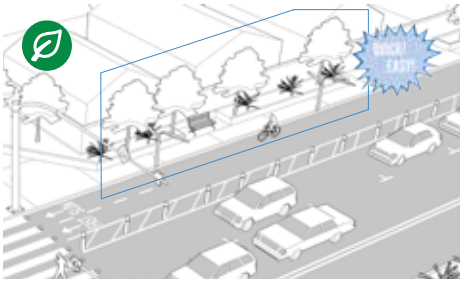



## Enhanced Bus Waiting Areas

Enhancing the bus waiting areas along the Pathway Arterials and Collectors can improve the safety and comfort of a bus rider's journey. Potential enhancements could include benches, shelters, lighting, signage, a wi-fi hotspot, mobile device chargers, etc.


## Landscaping and Shade

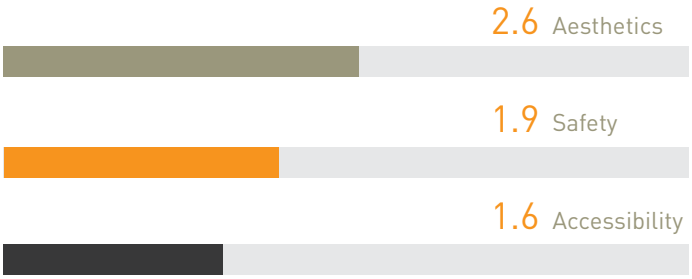
Trees and landscaping improve aesthetics, provide pleasant and safe pathways, and offer an attractive buffer between the sidewalk and the roadway. Trees and shade structures provide refuge from the sun for people walking, resting, or waiting.



# CASE STUDY 8

## METRO RAIL STATION (AT GRADE)

- Study area has a single-family residential character with a heavy industrial corridor
- Freeway divides the study area and is connected by four unattractive underpasses
- Station configuration and design creates barriers to entry and access




**2.0**

### Aesthetics

The study area transitions between single-family homes and a heavy industrial corridor. Key arterial connections lack landscaping and amenities for people walking or riding a bicycle.

### Safety

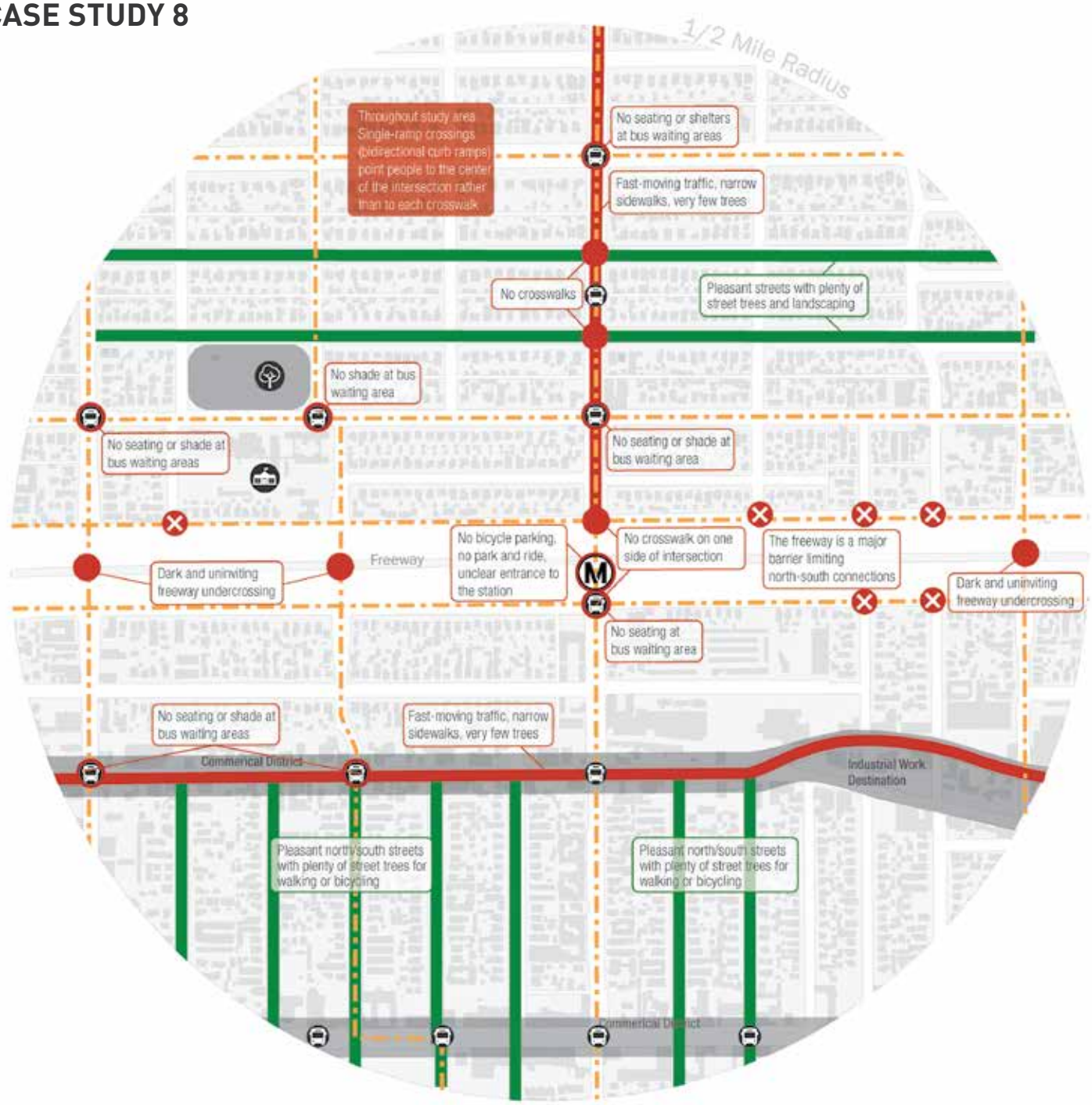
On the larger vehicular-oriented corridors, small sidewalks and setbacks create an unsafe atmosphere due to fast-moving traffic and lack of a safety buffer for people walking or bicycling. There have been several severe collisions reported recently in the study area, many of which involve people walking and bicycling.

### Accessibility

The station area is located near a freeway on- and off-ramp, creating a difficult access barrier for transit users. Additionally, the station lacks high-quality signage and a streamlined approach to parking and drop-off. Compared to the rest of the county, this study area has a fair amount of people (approximately 15-20%) commuting to work by walking, bicycling, or taking public transportation.

# EXISTING CONDITIONS

## CASE STUDY 8




## LEGEND

### Locations

- Metro Rail Station
- Key Destination
- Destination Area
- Existing Bus Stop
- Existing Bikeway

### Access Barriers and Strengths

- Corridor Barrier
- Specific Barrier
- Connectivity Gap
- Corridor Asset



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## CRITICAL ACCESS BARRIERS

### Freeway undercrossings

The freeway serves as a barrier that separates the north and south residential neighborhoods. Freeway undercrossings on several streets are not lit, and do not provide ample separation from fast-moving cars.

### Industrial blocks with limited landscaping

The street arterials are made up of a mix of residential and commercial/industrial uses. High speeds, along with limited landscaping and shade, create an unpleasant pathway to and from the station.

### Long crossings

Crossings just outside of the station are long and do not provide a median refuge island for people walking.

### Lack of signage and amenities at transit station

The Metro portals not signed or visible from perpendicular streets. The entry portal itself is not porous, and the bus station in front does not include seating or amenities for mode transfers.

### Unenhanced bus waiting areas - next to station portal

Many bus waiting areas, including right next to the station are unenhanced and can benefit from the addition of seating and real-time arrival information.

## OTHER EXISTING CONDITIONS

### Landscaped neighborhood streets

Many streets that run north and south in the community are well landscaped, provide adequate shade for people walking, and have sufficient lighting and parkways, separating people from vehicles.

### Sidewalk maintenance

In general, some areas may benefit from enhanced maintenance. This image shows a mature tree that is jutting out into the sidewalk, making it more difficult for people with mobility impairments to maneuver.

### Existing bicycle couplet

Bicycle lanes are provided on two adjacent east/west streets (each one-way), serving as a couplet system for riders.

### Narrow sidewalks and freeway barrier

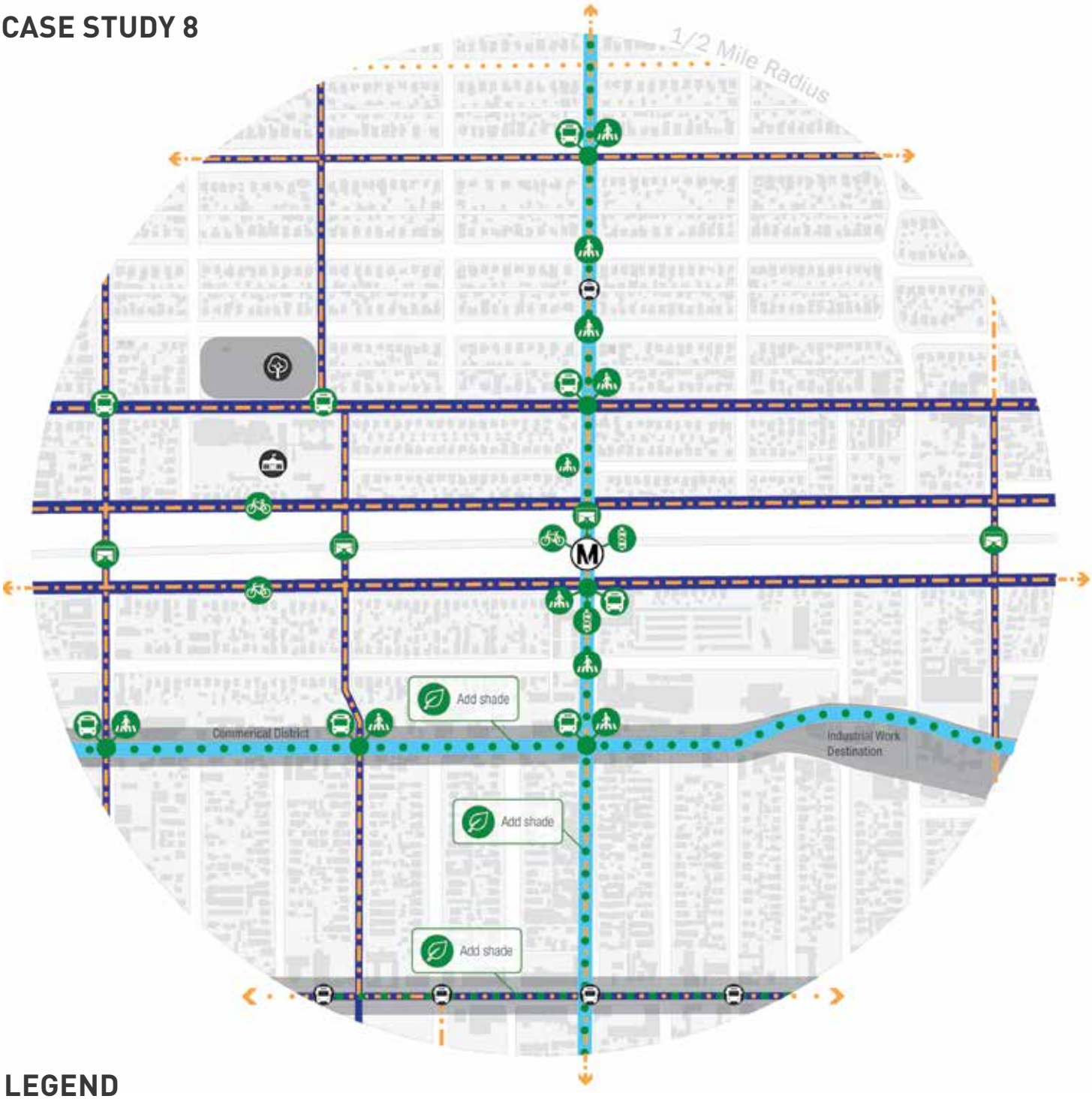
Narrow sidewalks occur along the streets that front the freeway. Additionally, there are only roadway lights, with no pedestrian-oriented lighting along these routes.

### Station area underpass lighting

Directly adjacent to the station portal are a number of pedestrian-scale lighting fixtures, which help provide a sense of safety and comfort for transit users.

# PATHWAY NETWORK

## CASE STUDY 8




## LEGEND

### Locations

- Metro Rail Station
- Key Destination
- Destination Area
- Bus Stop

### Pathway Network

- Pathway Arterial
- Pathway Collector 1
- Pathway Collector 2
- Bikeway (existing)
- Bikeway (proposed)
- Extension to Regional Network
- Bicycle Services
- Key Recommendation (corridor)
- Key Recommendation (specific location)



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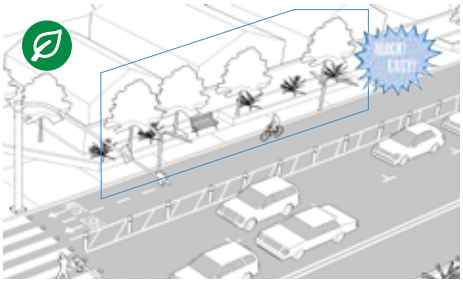
# KEY RECOMMENDATIONS

## Freeway Underpass & Overpass Enhancements

Residents might be more likely to travel to the station if the underpasses were safer, cleaner, better illuminated and visually engaging.

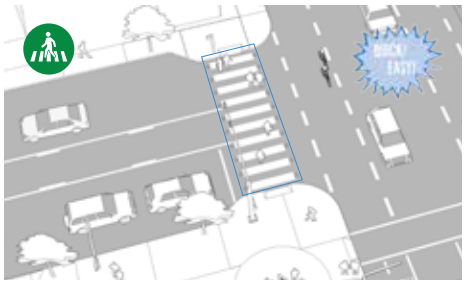

## Landscaping and Shade

Trees and landscaping improve aesthetics, provide pleasant and safe pathways, and offer an attractive buffer between the sidewalk and the roadway. Trees and shade structures provide refuge from the sun for people walking, resting, or waiting.




## Enhanced Pedestrian Crossings

Enhancing existing crossings can help protect station users by increasing their visibility to motorists. Crossing times can be made longer and to occur more often. In addition to enhancing existing crosswalks, adding well-marked crosswalks at unsignalized intersections and at midblock locations can improve convenience and safety.




## Medallion Signage

Medallion signage is an affordable type of wayfinding, or directional tool, that can be installed on utility poles and streetlights. The addition of medallion signage can help to increase awareness of station proximity, especially along Arterials and Collectors that connect to the schools, parks and commercial areas.

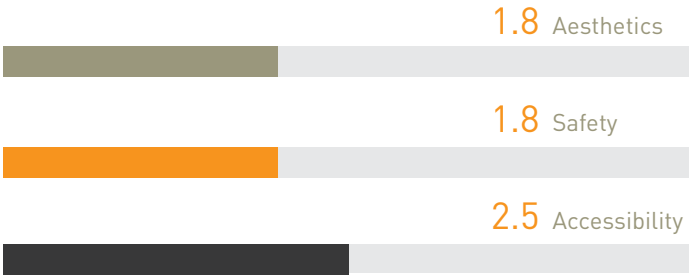

## Enhanced Bus Waiting Areas

Enhancing the bus waiting areas along the Pathway Arterials and Collectors can improve the safety and comfort of a bus rider's journey. Potential enhancements could include benches, shelters, lighting, signage, a wi-fi hotspot, mobile device chargers, etc.

# CASE STUDY 9

## METRO RAIL STATION (ABOVE GRADE)

- Neighborhood-serving commercial corridor surrounded by residential and public institutional land uses
- Freeway divides the study area, limiting connections to three streets
- Several bus lines meet at the station with a nearby park-and-ride lot
- Lack of landscaping and maintenance
- Several gaps in the bicycle network




**2.1**

### Aesthetics

Residential areas lack well-maintained parkways. There is a lack of trees that provide shade for people traveling on the sidewalk. Trash dumping is also common on the sidewalks as well as in undeveloped parcels.

### Safety

In the study area, there are not enough lights to safely illuminate the sidewalk and roadway for people walking to and from the station. There is a lack of safety buffers against fast-moving traffic. The study area has a very high number of collisions involving people commuting to work by automobile, walking, bicycling, or taking transit.

### Accessibility

At the station, mode transfer is facilitated by an adequate park-and-ride lot. Several bus lines stop in front of the station entrance. However there is a general lack of well-maintained infrastructure for people walking or bicycling to the station. There are major gaps in the bicycle network, and sidewalks are either cracked or do not provide enough of a buffer from the roadway. Most people commute to work by driving alone, carpooling, riding the bus, or riding the Metro rail line.

# EXISTING CONDITIONS

## CASE STUDY 9


## LEGEND

### Locations

- Metro Rail Station
- Key Destination
- Destination Area
- Existing Bus Stop
- Existing Bikeway

### Access Barriers and Strengths

- Gap in the Bicycle Network
- Corridor Barrier
- Specific Barrier
- Connectivity Gap
- Corridor Asset
- Specific Asset
- Area Asset

## CRITICAL ACCESS BARRIERS

### Lack of lighting throughout the entire study area

Although there are some street lights, there are no lights at a scale that is adequate for people traveling on the sidewalk. The lack of lighting decreases the sense of safety, especially at night.

### Lack of shade and amenities for people walking

There is a general lack of shade-providing trees in the study area. The parkway strip between the sidewalk and the roadway is generally unmaintained. In terms of other amenities, there are some bus benches, but there are no other seating options.

### Several unenhanced crosswalks, especially near schools

Throughout the study area, several crossings are not sufficiently painted. Many of the curbs have ramps, but they can be further enhanced. Crossings over the railroad are also difficult to use.

### Unattractive and trashed underpasses and overpasses

Overpasses are unattractive to travel across and do not provide a good buffer from fast-moving automobiles. The underpass in the study area is dark and filled with trash.

### Lack of station identity and difficulty navigating

The station acts as a landmark for people immediately within view of the station. However, navigating to the station can be difficult as there is no Metro signage except at the park-and-ride area.

## OTHER EXISTING CONDITIONS

### Broken or no sidewalks

Throughout the study area, there are several sidewalks that are broken. There are also a few sidewalks missing near the freeway and across the railroad.

### Enhanced school crossings

This crosswalk is newly painted and highly enhanced. This serves as a great example for how other crosswalks in the study area, especially near schools, should be designed.

### Major gaps in the bicycle network

There are several gaps in the bicycle network, particularly south of the station, that can discourage people to ride their bicycle to and from the station. Also, there is a lack of safe facilities to park your bicycle at the station.

### Metro park-and-ride nearby the station

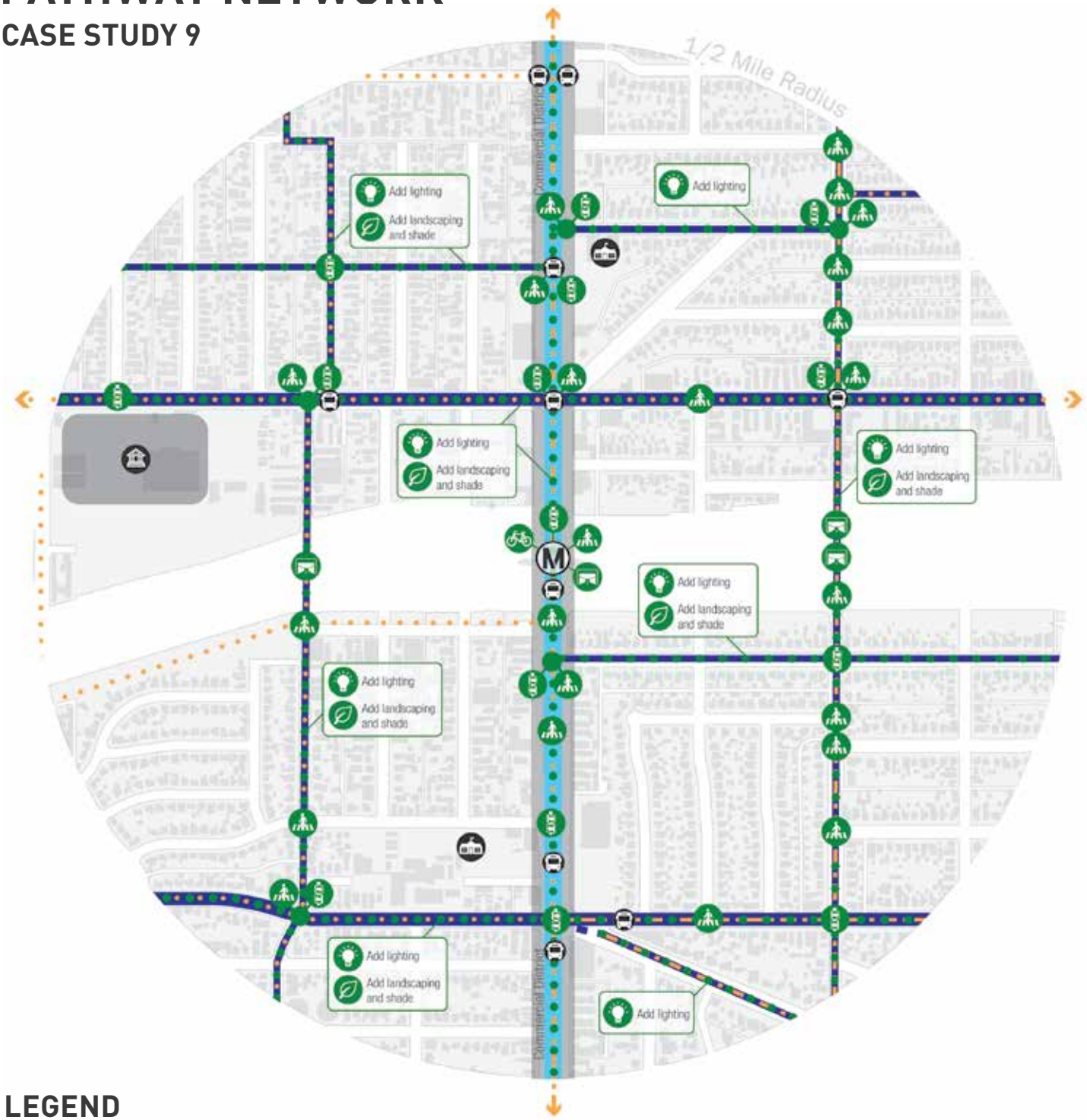
There are 155 park-and-ride spaces just north of the station terminus. This gives the opportunity for drivers to conveniently park their car safely and walk or roll to the station.

### Underutilized median

The roadway median on the study area's main arterial is very wide and underutilized. Currently there are a few trees, but there are opportunities to transform this space into a green open space, which the study area lacks.

# PATHWAY NETWORK

## CASE STUDY 9




## LEGEND

### Locations

- Metro Rail Station
- Key Destination
- Destination Corridor

### Pathway Network

- Pathway Arterial
- Pathway Collector 1
- Pathway Collector 2
- Cut-Through
- Bikeway (existing)
- Bikeway (proposed)
- Extension to Regional Network
- Bicycle Services
- Car Share
- Key Recommendation (corridor)
- Key Recommendation (specific location)



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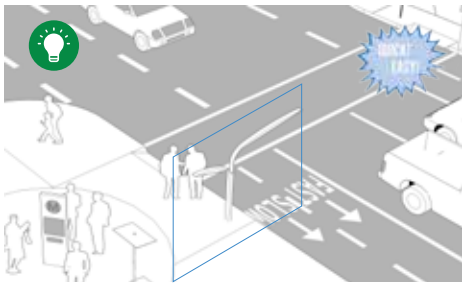
# KEY RECOMMENDATIONS

## Lighting

Adding lighting can increase safety and aid in night navigation for people walking or bicycling along Pathway routes. Install lighting rhythmically and consistently in coordination with tree canopies as not to block the light. Consider installing lights that are efficient and/or motion activated/ self powered in areas where constant light is not needed.




## Landscaping and Shade

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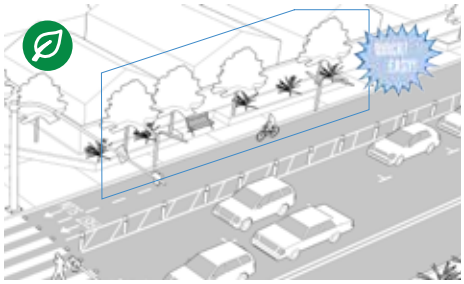
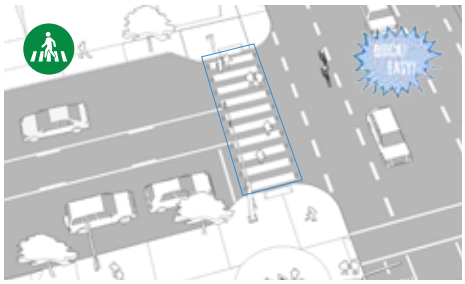



## Enhanced Pedestrian Crossings

Enhancing existing crossings can help protect station users by increasing their visibility to motorists. Crossing times can be made longer and to occur more often. In addition to enhancing existing crosswalks, adding well-marked crosswalks at unsignalized intersections and at midblock locations can improve convenience and safety.




## Freeway Underpass & Overpass Enhancements

Residents might be more likely to travel to the station if underpasses are safer, cleaner, better- illuminated and visually engaging.

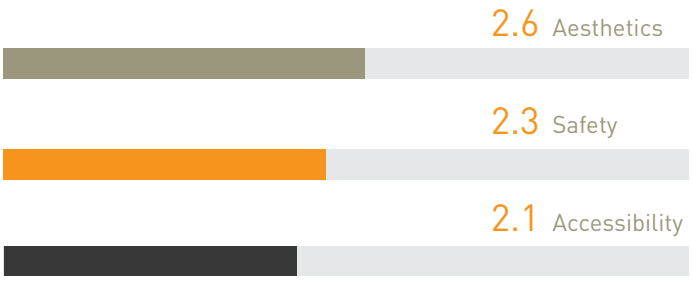

## Enhanced Bus Waiting Areas

Enhancing the bus waiting areas along the Pathway Arterials and Collectors can improve the safety and comfort of a bus rider's journey. Potential enhancements could include benches, shelters, lighting, signage, a wi-fi hotspot, mobile device chargers, etc.

# CASE STUDY 10

## MULTI-MODAL TRANSIT CENTER

- Major transit hub hosting several local and regional bus lines
- Highly-commercialized study area with a regional shopping destination
- Two freeways dividing the study area, limiting connectivity to the station
- Mostly well-maintained and attractively landscaped public realm
- Lack of bicycle facilities




**2.3**

### Aesthetics

The study area has pleasant landscaping, including trees and plantings, that provide shade and aesthetic appeal. However, the study area lacks other strategically placed amenities for people walking or bicycling, such as benches, lighting, or waste receptacles.

### Safety

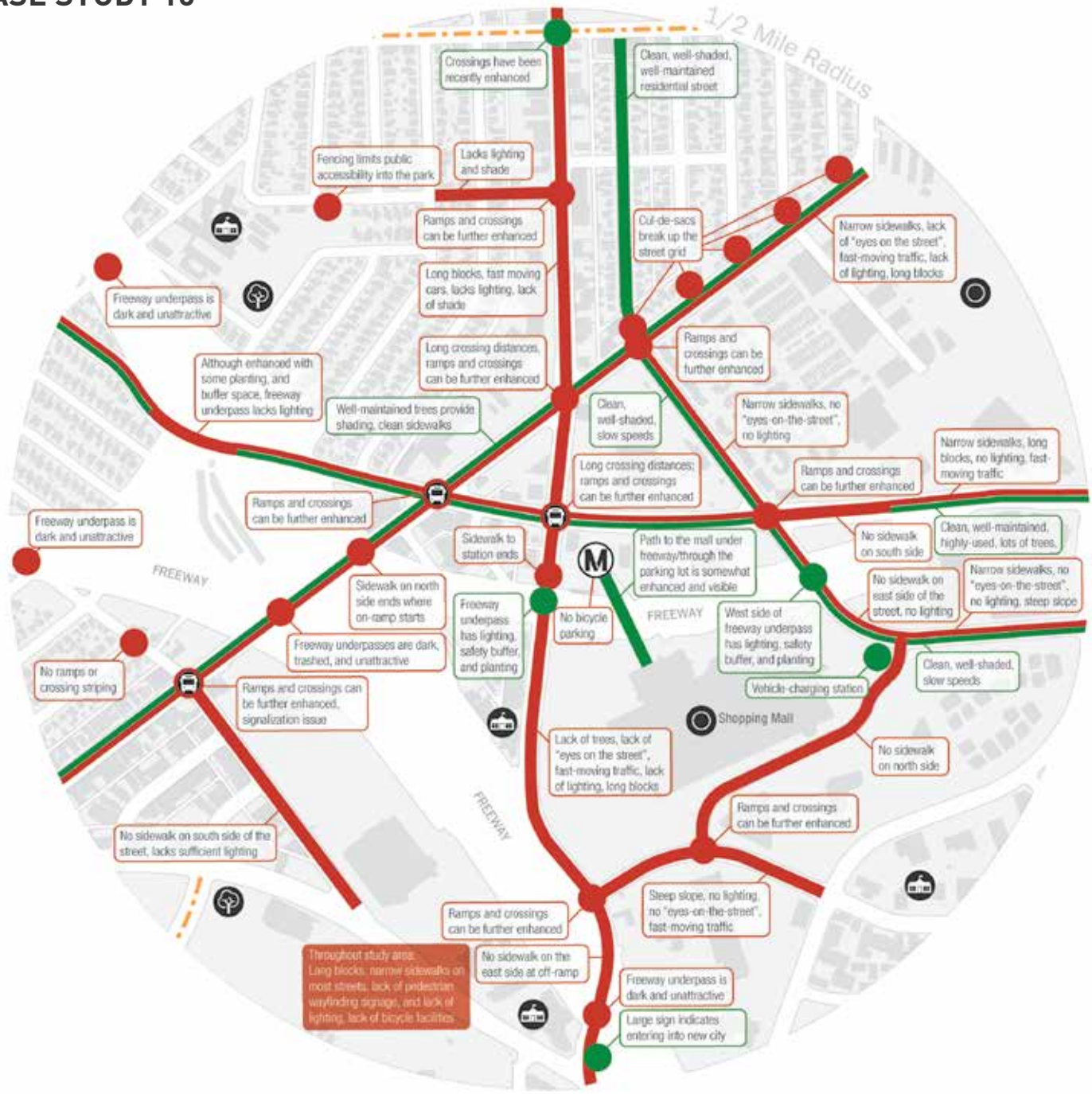
In the study area, the public realm is clean and well maintained. However, the lack of a safety buffer for people bicycling as well as the lack of lighting, especially under freeways, lowers the perceived sense of safety. Some areas lack sidewalks which also makes walking to and from the station feel dangerous. Several collisions have recently occurred in the study area, most of them involving automobiles.

### Accessibility

There are high-quality sidewalks throughout the study area, but they do not provide enough width for people to comfortably pass one another or walk side-by-side. Some areas lack sidewalks altogether. There is also a general lack of bicycle facilities throughout the study area. There is no bicycle parking or park-and-ride areas that are streamlined. As a result, approximately 88% of people in the study area commute to work by driving alone.

# EXISTING CONDITIONS

## CASE STUDY 10




## LEGEND

### Locations

- Transit Center
- Key Destination
- Existing Bus Stop
- Existing Bikeway

### Access Barriers and Strengths

- Street Conditions Barrier
- Specific Barrier
- Corridor Asset
- Specific Asset



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# CRITICAL ACCESS BARRIERS

## Sidewalk widths are narrow throughout the study area

Although most of the sidewalks are well maintained and of high quality, there is often little room to maneuver given the placement utilities and trees.

## Unenhanced crossings at important intersections

Many of the intersections lack highly visible striping to signify drivers of approaching stops. Some curbs do not have ramps, especially around the industrial areas. Also, because many street blocks are long, people often jaywalk at midblock locations.

## Freeway underpasses

Although some of the freeway underpasses have enhancements, such as planting and sidewalk buffers, the lack of lighting and other amenities makes the underpass feel unsafe, especially during the night.

## Unpleasant bus waiting areas throughout the site

There are several bus stops in the study area, but only a few of them have benches, waste receptacles, and shade to make it comfortable for people waiting.

## Lack of station identity and difficulty navigating

The transit center is difficult to see from the street or sidewalk and there are only a few identifying markers or landmarks around the area. The curvilinear design of the streets also makes navigating to and from the station difficult unless you know where you are going.

# OTHER EXISTING CONDITIONS

## Broken or no sidewalks

Throughout the study area, some sidewalks are broken. There are also a few sidewalks missing near the freeway and the industrial areas.

## Some underpass improvements

Some of the freeway underpasses, especially near the shopping mall, have improvements such as a sidewalk buffer and planting. The addition of adjacent parking also provides a sense of safety knowing that people are nearby.

## Well-maintained public realm

Most of the streets are clean and well maintained. There are also many trees and planting that provide shade and improve the overall aesthetics of the study area.

## Lack of "eyes-on-the-street"

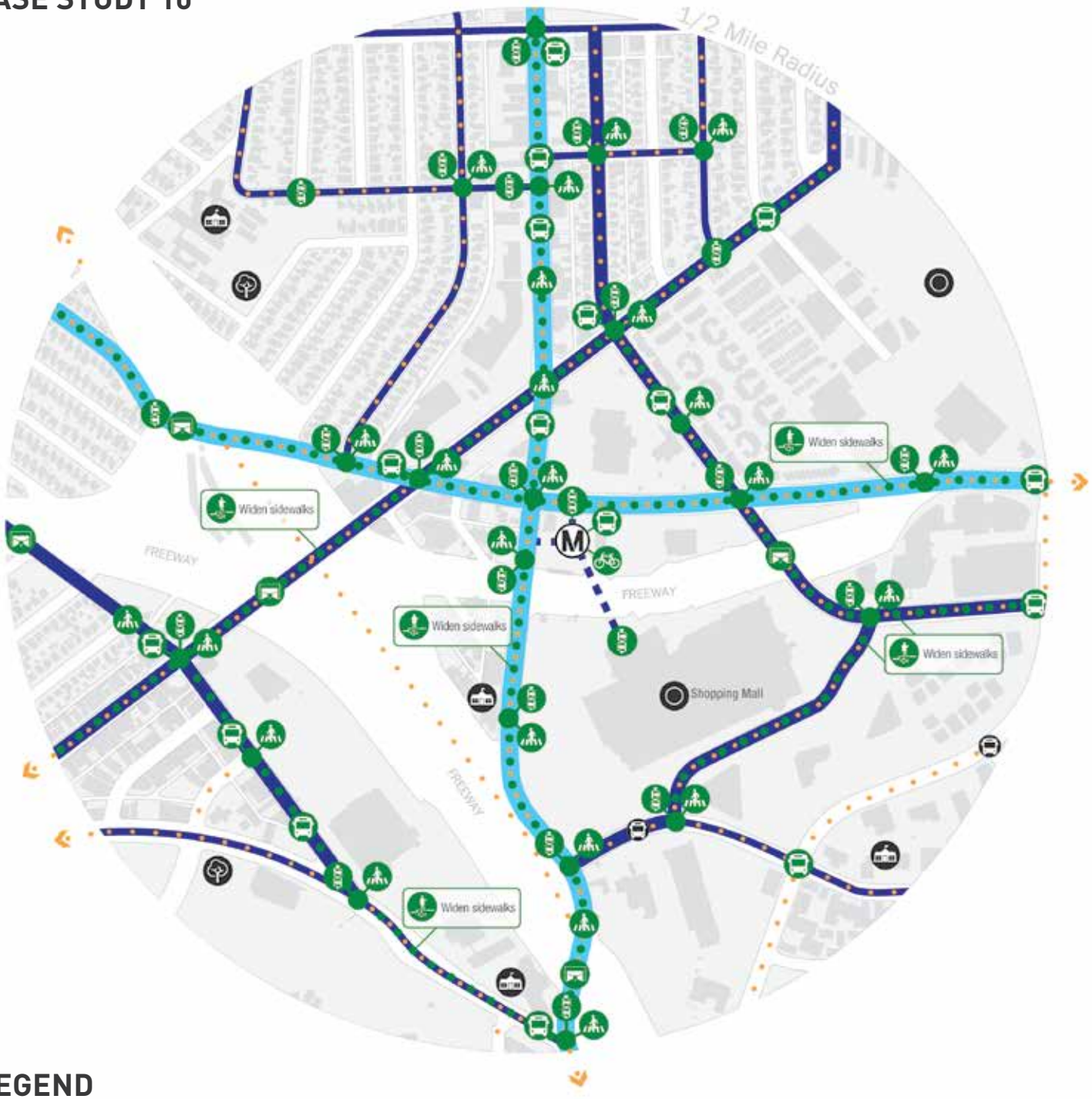
Currently, there is a low level of pedestrian activity on the street, which is partially due to the orientation of the commercial, industrial, and residential buildings facing away or set back far from the street.

## Vehicle-charging station

There is a vehicle charging station for automobiles at the shopping mall.

# PATHWAY NETWORK

## CASE STUDY 10




## LEGEND

### Locations

- Transit Center
- Key Destination
- Bus Stop

### Pathway Network

- Pathway Arterial
- Pathway Collector 1
- Pathway Collector 2
- Cut-Through
- Bikeway (proposed)
- Extension to Regional Network
- Bicycle Services
- Key Recommendation (corridor)
- Key Recommendation (specific location)



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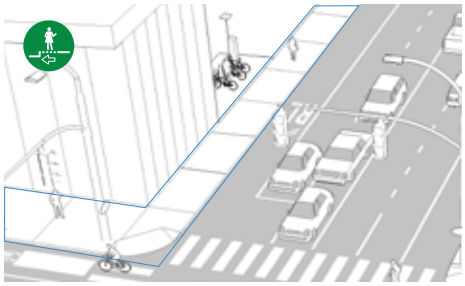
# KEY RECOMMENDATIONS

## Sidewalk Addition or Widening

Widening or adding sidewalks improves safety, comfort and convenience for people of all ages and abilities. Wider sidewalks create more room for streetscape elements that enhance comfort and convenience, such as street furniture, bus waiting areas, landscaping, and trees.

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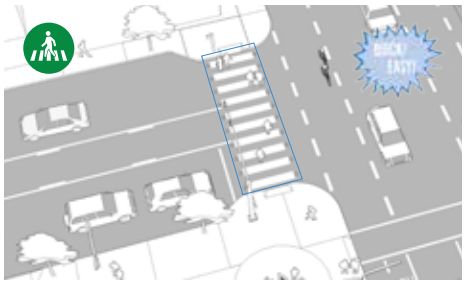


## Freeway Underpass & Overpass Enhancements

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## Medallion Signage

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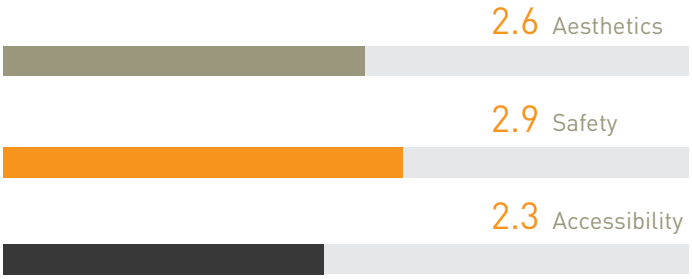
# CASE STUDY 11

## METRO LOCAL BUS STOP

- Intersection with bus shelters for several local and regional bus lines
- Two commercial corridors surrounded by single-family residential land uses
- Transmission tower right-of-way with some portions being adapted for other uses
- Lack of bicycle facilities




**2.6**

### Aesthetics

The study area is mostly clean and well-maintained, providing a pleasant experience for people traveling on the sidewalk. However, there is a general lack of shade-providing elements, such as trees and bus shelters.

### Safety

The orientation of most buildings in both the commercial and residential areas are located close to the sidewalk and directly face the public realm. This creates a sense of safety by having "eyes-on-the-streets". The addition of traffic calming signage and striping have fostered a culture of people-friendly traffic speeds and manners. However, the study area lacks bicycle facilities and sufficient lighting, which can make getting to and from the transit stop feel unsafe. There is a high proportion of collisions involving all transit modes in the study area compared to the rest of the County.

### Accessibility

There are high-quality sidewalks throughout most of the study area, especially on the primary commercial corridor, which has enhanced paving. However, some areas lack sidewalks altogether. The study area lacks bicycle facilities and a park-and-ride area. As a result, approximately 87% of people in the study area commute to work by carpooling or driving alone.

# EXISTING CONDITIONS

## CASE STUDY 11


## LEGEND

### Locations

- Transit Stop
- Key Destination
- Destination Area
- Existing Bus Stop

### Access Barriers and Strengths

- Corridor Barrier
- Specific Barrier
- Area Barrier
- Corridor Asset
- Specific Asset



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# CRITICAL ACCESS BARRIERS

### Crosswalks lack visible striping/enhanced ramps

There are several crosswalks throughout the study area that lack highly visible crossings to alert drivers of people crossing the street. Although most crosswalks have curb ramps, they can be improved upon with the addition of truncated domes and unidirectional curb ramps.

### Narrow or missing sidewalks throughout the study area

There are some portions of sidewalk that are too narrow to adequately accommodate people walking. Some of the residential areas to the north lack sidewalks altogether, which means people have to travel alongside fast-moving traffic without a protective buffer.

### Lack of shade

Several streets lack sufficient shading from the sun. Many of these streets are common routes to schools.

### Lack of station identity and difficulty navigating


Currently, there is a large sign in the median of the primary east-west street welcoming people as they drive. Other than this landmark, there is no signage that signifies that the transit stop is nearby.

### Insufficient lighting throughout the study area

Although there are some street lights, there is a general lack of lighting at the scale that is suitable for people walking, bicycling, or rolling. This discourages people to travel to and from the transit stop, especially at night.

# OTHER EXISTING CONDITIONS

### Green median

In the center median of the roadway, there is a well-maintained and attractively designed open space that is well utilized by the surrounding residential community.

### Transmission tower right-of way

West of the transit stop, there is a transmission tower right-of-way that is underutilized. Some parcels use this area as a public park or a plant nursery.

### Active/well-maintained public realm

Most buildings are built to the edge of the sidewalk and face the public realm; this orientation creates a sense of enclosure and activity by having “eyes-on-the-street”. In most areas, the sidewalks are well maintained and wide enough to accommodate several people at once.

### Lack of facilities for bus riders and people bicycling

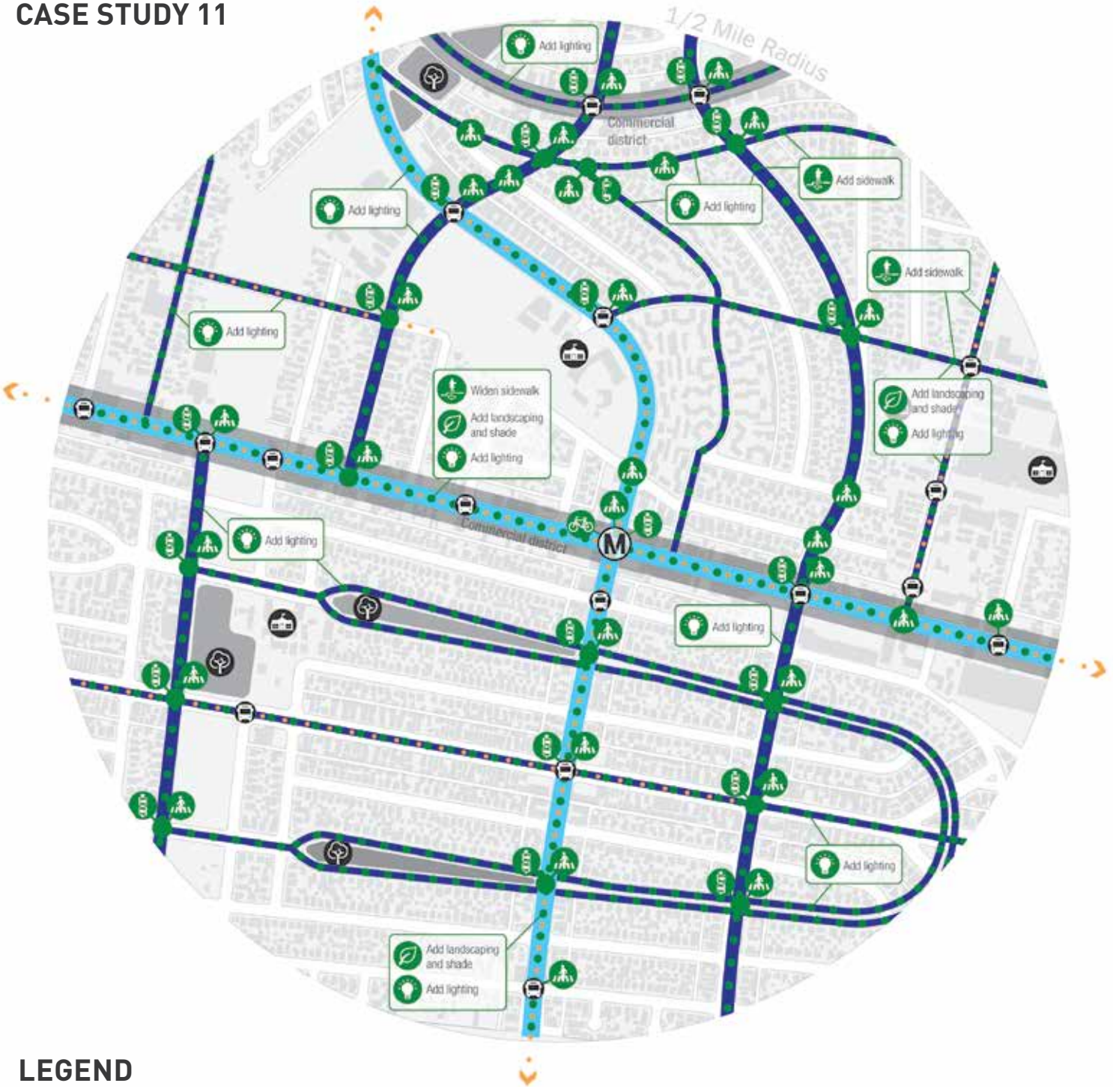
There are no bicycle facilities at the transit stop or in the study area. This discourages people from bicycling on the street and creates an unsafe environment if they choose to ride on the sidewalk. The lack of protection against the sun at nearby bus stops can make waiting for the bus uncomfortable.

### Landscaping and shade - commercial and residential areas

In some parts of the study area, trees provide shade for people traveling on the sidewalks, especially in the residential neighborhood.

# PATHWAY NETWORK

## CASE STUDY 11




## LEGEND

### Locations

- Transit Stop
- Key Destination
- Destination Area
- Bus Stop

### Pathway Network

- Pathway Arterial
- Pathway Collector 1
- Pathway Collector 2
- Bikeway (proposed)

- Extension to Regional Network
- Bicycle Services
- Key Recommendation (corridor)
- Key Recommendation (specific location)



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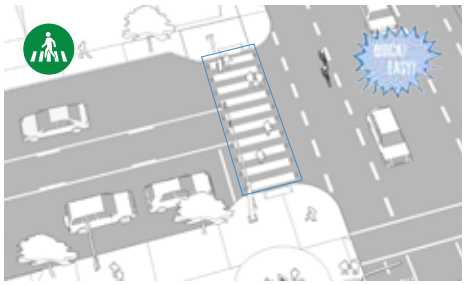
# KEY RECOMMENDATIONS

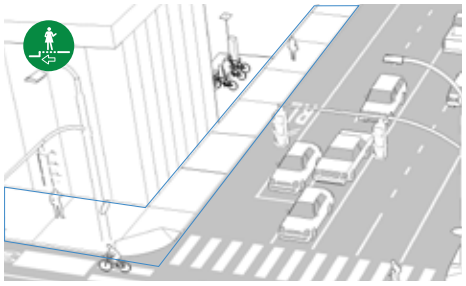
## Enhanced Pedestrian Crossings

Enhancing existing crossings can help protect station users by increasing their visibility to motorists. Crossing times can be made longer and to occur more often. In addition to enhancing existing crosswalks, adding well-marked crosswalks at unsignalized intersections and at midblock locations can improve convenience and safety.



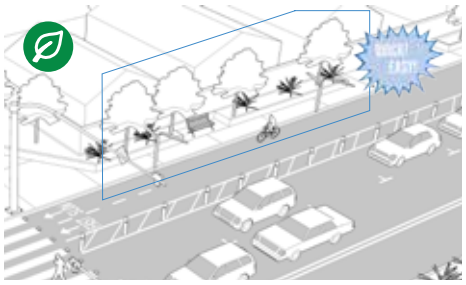

## Sidewalk Addition or Widening

Widening or adding sidewalks improves safety, comfort and convenience for people of all ages and abilities. Wider sidewalks create more room for streetscape elements that enhance comfort and convenience, such as street furniture, bus waiting areas, landscaping, and trees.




## Landscaping and Shade

Trees and landscaping improve aesthetics, provide pleasant and safe pathways, and offer an attractive buffer between the sidewalk and the roadway. Trees and shade structures provide refuge from the sun for people walking, resting, or waiting.

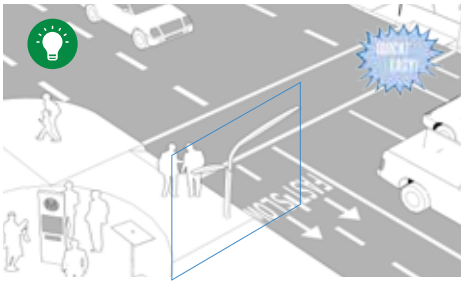



## Medallion Signage

Medallion signage is an affordable type of wayfinding, or directional tool, that can be installed on utility poles and streetlights. The addition of medallion signage can help to increase awareness of station proximity, especially along Arterials and Collectors that connect to the schools, parks and commercial areas.


## Lighting

Adding lighting can increase safety and aid in night navigation for people walking or bicycling along Pathway routes. Install lighting rhythmically and consistently in coordination with tree canopies as not to block the light. Consider installing lights that are efficient and/or motion activated/ self powered in areas where constant light is not needed.



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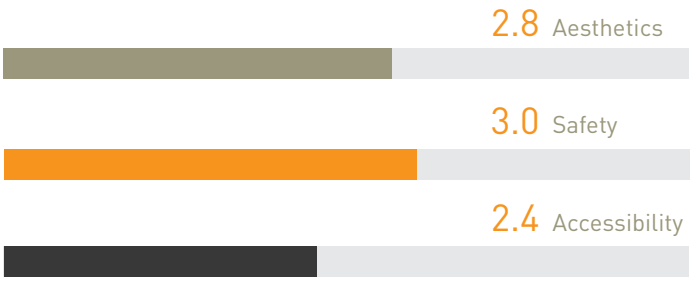
# CASE STUDY 12

## METRO RAIL STATION (SUBTERRANEAN)

- High-density downtown character with multiple land uses including retail commercial, office commercial and residential
- A freeway bisects the study area, limiting connections to the station
- No vehicular or bicycle parking at the station
- Several unenhanced bus and bicycle facilities
- Several regional destinations




**2.7**

### Aesthetics

The study area has a unique urban character that creates a strong sense of place. However, the general lack of pleasant landscaping, maintenance, and cleanliness lowers the overall aesthetics of the study area.

### Safety

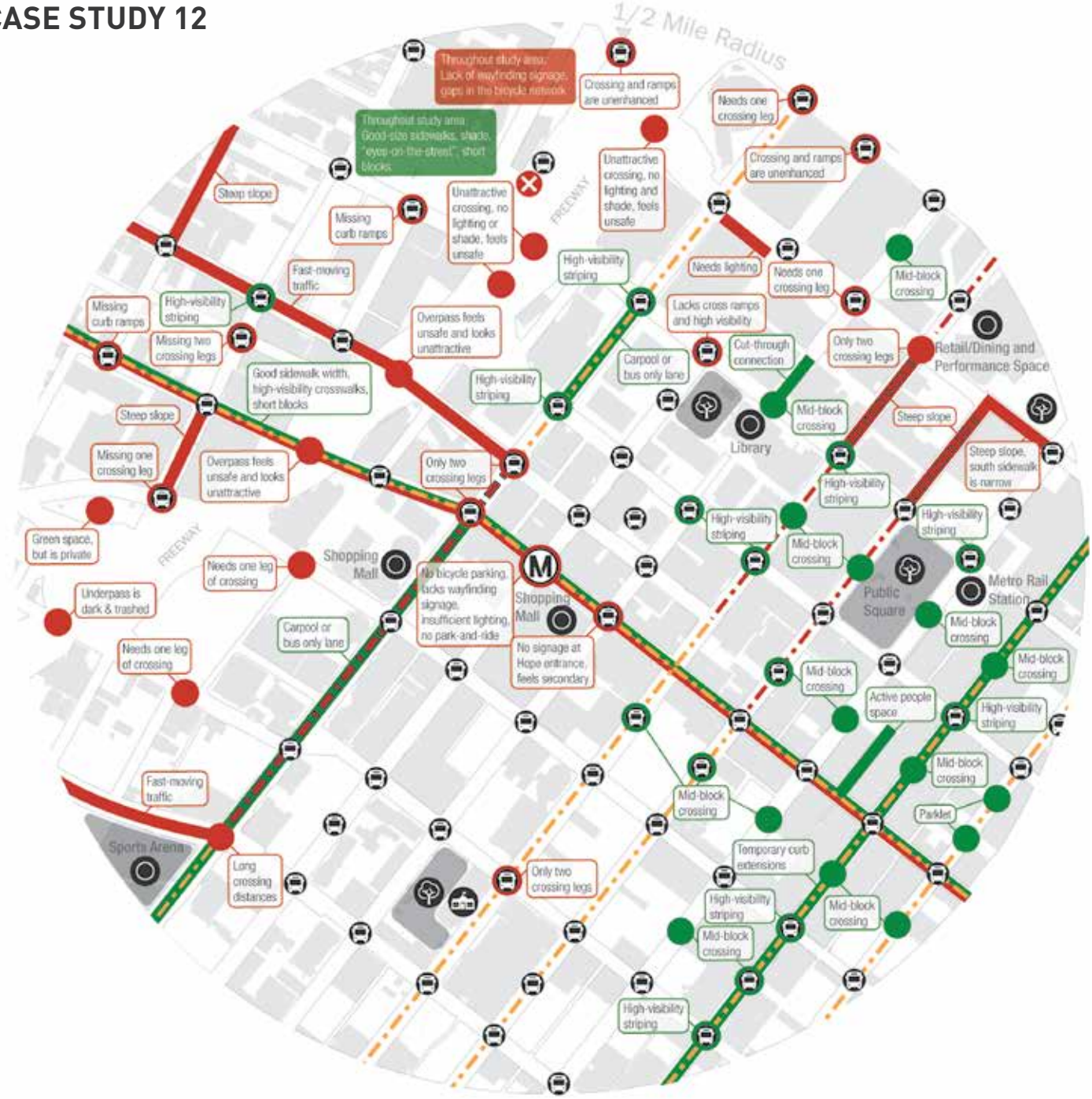
The study area generally has smooth and unbroken sidewalks and safe crosswalks. However, the gaps in the bicycle network, insufficient infrastructure to facilitate transit mode transfers, and lack of high-quality signage can make getting to and from the station difficult for many people. There is a relatively high number of people that walk, bicycle, or ride the bus to work as compared to the rest of the County, partially due to the diversity of transportation alternatives.

### Accessibility

The high level of activity as well as appropriately scaled lighting fosters a sense of safety, especially at night. However, the lack of bicycle facilities, safety signage, and a well-maintained public realm can discourage people from using active transportation if they feel unsafe. There have been hundreds of reported collisions involving people walking, bicycling, or driving in the study area, with several of them resulting in death or severe injury.

# EXISTING CONDITIONS

## CASE STUDY 12




## LEGEND

### Locations

- Metro Rail Station
- Key Destination
- Destination Area
- Existing Bus Stop
- Existing Bikeway

### Access Barriers and Strengths

- Gap in the Bicycle Network
- Corridor Barrier
- Specific Barrier
- Connectivity Gap
- Corridor Asset
- Specific Asset



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# CRITICAL ACCESS BARRIERS

## Underpasses and overpasses over the freeway

The freeway divides the study area, but most of the streets connect via an overpass or an underpass. However, overpasses and underpasses are often dark, unattractive, or not well-shaded. This can lower the perception of safety and discourage people from traveling to and from the station.

## Unenhanced bus waiting areas

Almost at every intersection, there are bus stops that host several local and regional bus lines. However, most of these bus stops are unenhanced, lacking seating, lighting, shade protection, and other amenities.

## Unenhanced crosswalks

Several crosswalks lack high-visibility striping, curb ramps, and/or lighting. Given the high volume of people crossing at these intersections, there is a need for better crosswalks in the study area.

## Inconsistent and lack of wayfinding

There are many signs that help direct people to destinations in the study area. However, there lacks consistent signage to guide people to the station, and the station entrance itself is hard to locate.

## Lack of bicycle facilities at major destinations

There are major gaps in the bicycle network and a general lack of bicycle parking. This can discourage people to bicycle to and from the station if there are not enough places to safely secure their bicycle.

# OTHER EXISTING CONDITIONS

## Enhancements to the roadway and sidewalks

Several recent enhancements to the public realm include temporary curb extensions, public art, and roadway reconfigurations.

## Utilities on the sidewalk

Some portions of the sidewalk are obstructed by utility poles or other public utilities. This makes maneuvering on the sidewalk difficult, especially for people with mobility impairments.

## Some enhanced crosswalks

Throughout the study area, some crosswalks are enhanced with highly-visible striping, long crossing times, and curb ramps. Some of these crosswalks are designed with best practices.

## Lack of signage at the station

The entrance to the station is not highly visible and lacks sufficient signage to orient people to its location. The elevator entrance to the station is set back from the street and is hard to find.

## Lack of clean and well-maintained public realm

The high volume of activity and the lack of maintenance create an unpleasant experience walking or bicycling to and from the station.

# PATHWAY NETWORK

## CASE STUDY 12


## LEGEND

### Locations

- Metro Rail Station
- Key Destination
- Destination Area
- Bus Stop

### Pathway Network

- Pathway Arterial
- Pathway Collector 1
- Pathway Collector 2
- Cut-Through
- Bikeway (existing)
- Bikeway (proposed)
- Extension to Regional Network
- Bicycle Services
- Key Recommendation (corridor)
- Key Recommendation (specific location)



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# KEY RECOMMENDATIONS

## Freeway Underpass & Overpass Enhancements

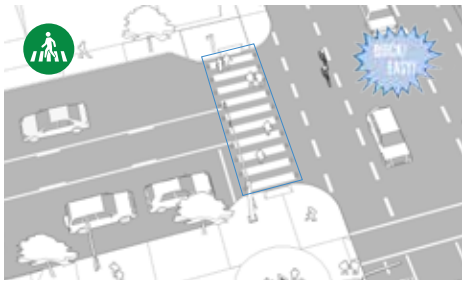
Traveling to the station by foot or bicycle would be more convenient and comfortable if the underpasses were safer, cleaner, better illuminated, and visually engaging.


## Enhanced Bus Waiting Areas

Enhancing the bus waiting areas along the Pathway Arterials and Collectors can improve the safety and comfort of a bus rider's journey. Potential enhancements could include benches, shelters, lighting, signage, a wi-fi hotspot, mobile device chargers, etc.

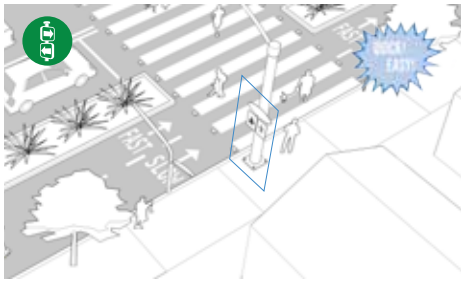

## Enhanced Pedestrian Crossings

Enhancing existing crossings can help protect station users by increasing their visibility to motorists. Crossing times can be made longer and to occur more often. In addition to enhancing existing crosswalks, adding well-marked crosswalks at unsignalized intersections and at midblock locations can improve convenience and safety.



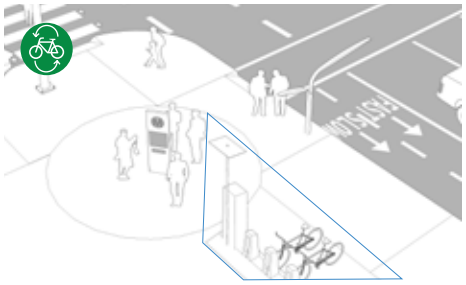

## Medallion Signage

Medallion signage is an affordable type of wayfinding, or directional tool, that can be installed on utility poles and streetlights. The addition of medallion signage can help to increase awareness of station proximity, especially along Arterials and Collectors that connect to the schools, parks and commercial areas.




## Bike Share Stations

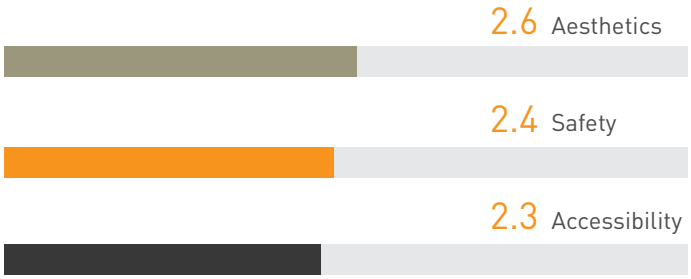
Bike share provides numerous strategic locations where users can rent bicycles for short-term use. Bike share stations located at transit stations and stops make bicycling a convenient option for first last mile trips. Other stations are typically placed at strategic locations close to destinations. Corporate sponsorships and other public-private coordination can help make bike share a relatively inexpensive intervention.



# CASE STUDY 13

## METRO RAIL STATION (SUBTERRANEAN)

- Bustling business, cultural and tourist district (near the transit station) with active streetfronts and high levels of pedestrian activity
- Commercial corridors that emphasize vehicular travel over other modes
- Attractive residential neighborhoods adjacent to commercial corridors
- Limited park and recreation space




**2.4**

### Aesthetics

The study area has a strong sense of place within the thriving cultural and tourist district near the transit station. Commercial streets generally lack adequate tree cover, landscaping, waste receptacles and seating. Residential areas are generally pleasant, well shaded, and well maintained.

### Safety

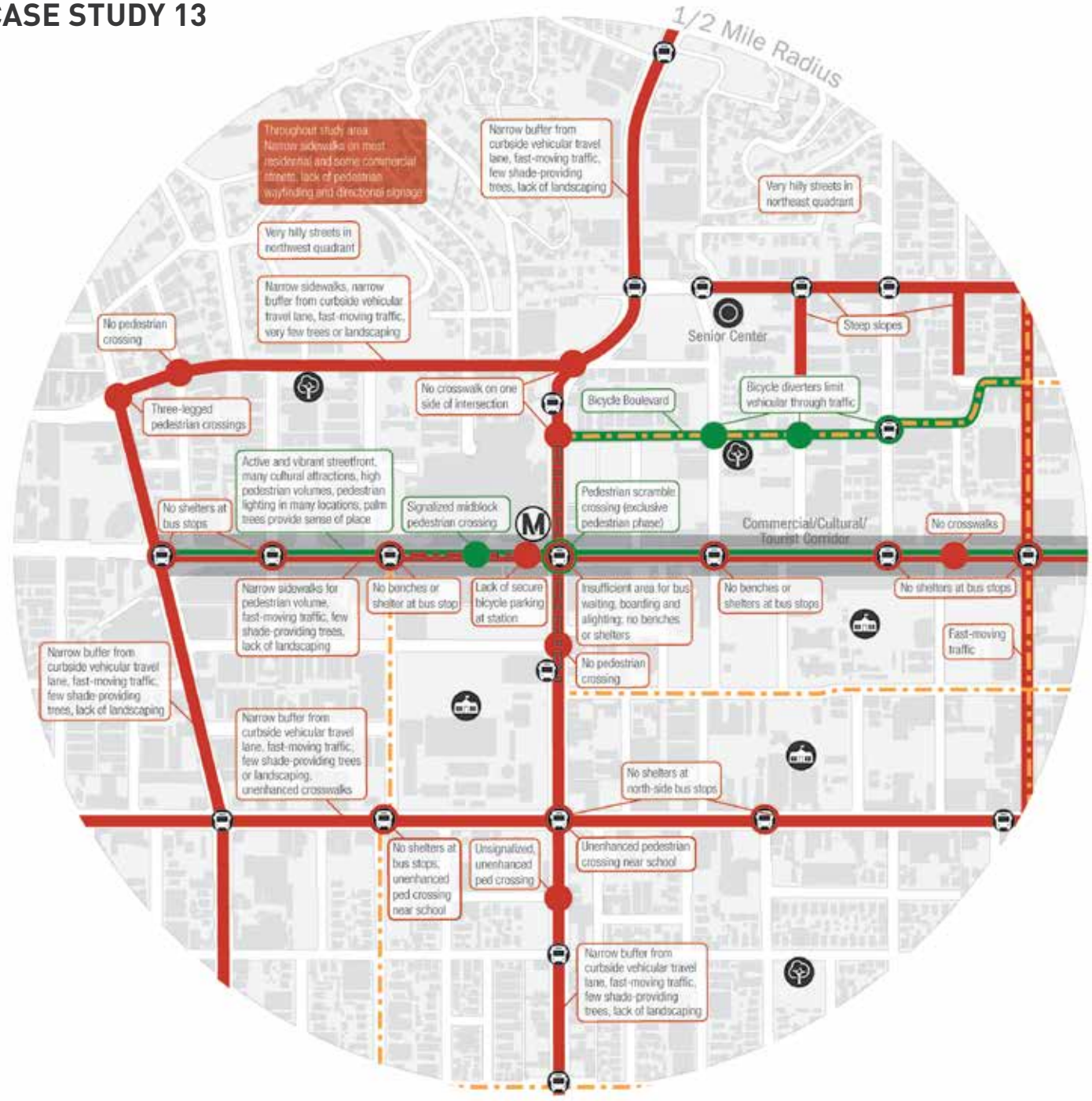
Around the transit station, the high level of activity from people on the street and the orientation of most buildings toward the public realm give a perceived sense of safety. A "Bicycle Boulevard" (located in a residential area east of the transit station) is a model of innovative bicycle facility design; however, all other bicycle routes in the study area contain only shared lane markings (sharrows). Most larger streets have little or no pedestrian buffer from vehicular traffic, while smaller residential streets generally provide a landscape buffer between the sidewalk and the roadway.

### Accessibility

There are limited bicycle facilities in the study area, with a significant gap in the bicycle network right around the station. Sidewalks are generally in good condition, although many are narrow and contain physical obstructions.

# EXISTING CONDITIONS

## CASE STUDY 13




## LEGEND

### Locations

- Metro Rail Station
- Key Destination
- Destination Area
- Existing Bus Stop
- Existing Bikeway

### Access Barriers and Strengths

- Gap in the Bicycle Network
- Corridor Barrier
- Specific Barrier
- Corridor Asset
- Other Asset

# CRITICAL ACCESS BARRIERS

## Narrow sidewalks and lack of buffer from roadway

Many streets - both residential and commercial - have narrow sidewalks with little or no buffer from the roadway. In some locations, the pedestrian pathway is further obstructed by utility poles and boxes, making some areas inaccessible for mobility-impaired individuals.

## Pedestrian crossings

Many crossings across busy commercial streets do not have effective markings such as continental crosswalks and advance stop lines. In addition, curb ramps are generally bidirectional (leading people walking toward the center of the intersection) rather than unidirectional (leading to the direction of the crosswalk path).

## Few enhanced bicycle facilities

Almost all bicycle routes consist of shared lane markings (sharrows) that provide no physical separation from vehicular traffic. The bicycle network has significant gaps.

## Fast-moving traffic

Vehicle speeds (and rates of speeding) are high on many larger commercial streets and some residential streets. At peak hours, roadway congestion can lead to lower speeds, but peak-hour curbside travel lanes bring vehicular traffic closer to the sidewalk and make bicycling on the roadway hazardous.

## Lack of amenities at bus stops

Many bus stops lack amenities such as shelters, bicycle parking, and shade-providing elements, and some are without seating (including the bus stop just outside the station area). Many bus waiting areas are in locations without sufficient sidewalk width to accommodate amenities.

# OTHER EXISTING CONDITIONS

## Sidewalk conditions

Sidewalk conditions are generally good in the study area, but some residential streets have uneven and/or broken sidewalks.

## Pedestrian scramble

This enhanced crossing is located near the station portal in the heart of the cultural and tourist district. Dedicated traffic signals for people walking greatly reduce conflicts with turning vehicles, improving safety and comfort for people walking, while providing easier right turns for motorists.

## Diverters along bicycle boulevard

The bicycle boulevard is the only enhanced bicycle route in the study area. Roadway diverters prevent vehicular through traffic but allow bicyclists to continue along the street. This greatly decreases vehicular traffic volumes and provides a safer route for people bicycling and walking.

## High traffic levels and backups

Roadway congestion and traffic backups result in increased car exhaust and can encourage aggressive motorist behavior. In addition, heavy traffic makes bicycling more difficult and reduces safety for people walking.

## Pedestrian-oriented signage

Tourist areas have some pedestrian-oriented signage that provides historical information on local attractions, but there is a general lack of signage directing road users to destinations (including the Metro station).

# PATHWAY NETWORK

## CASE STUDY 13


## LEGEND

### Locations

- Metro Rail Station
- Key Destination
- Destination Corridor
- Bus Stop

### Pathway Network

- Pathway Arterial
- Pathway Collector 1
- Pathway Collector 2
- Cut-Through
- Bikeway (existing)
- Bikeway (proposed)
- Extension to Regional Network
- Bicycle Services
- Car Share
- Key Recommendation (corridor)
- Key Recommendation (specific location)



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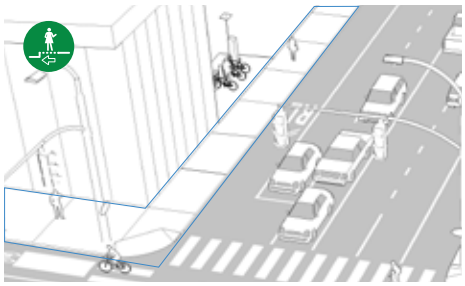
# KEY RECOMMENDATIONS

## Sidewalk Addition or Widening

Widening or adding sidewalks improves safety, comfort and convenience for people of all ages and abilities. Wider sidewalks create more room for streetscape elements that enhance comfort and convenience, such as street furniture, bus waiting areas, landscaping, and trees.



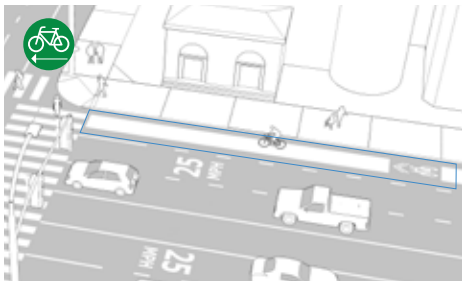

## Traffic Calming

Traffic calming decreases speeds along streets with heavy, fast-moving traffic in order to increase safety and comfort for all users of the street. Traffic calming treatments include physical measures such as curb extensions to narrow the roadway, narrowed travel lanes to promote slower driving speeds, and diverters to limit vehicle cut-through traffic on neighborhood streets.



## Enhanced Bicycle Facilities

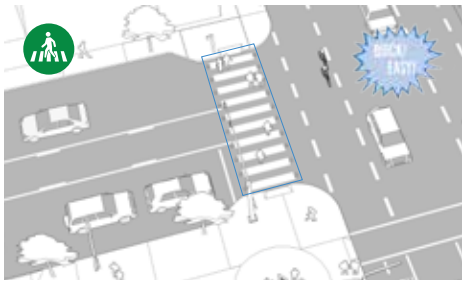
A variety of roadway and signalization improvements can improve safety and increase comfort for people bicycling. These include bicycle lanes physically separated from vehicular traffic, such as buffered lanes, cycle tracks, painted bicycle lanes, conflict zone markings at/approaching intersections, bicycle boxes, and bicycle-prioritized signalization.





## Enhanced Pedestrian Crossings

Enhancing existing crossings can help protect station users by increasing their visibility to motorists. Crossing times can be made longer and to occur more often. In addition to enhancing existing crosswalks, adding well-marked crosswalks at unsignalized intersections and at midblock locations can improve convenience and safety.




## Enhanced Bus Waiting Areas

Enhancing the bus waiting areas along the Pathway Arterials and Collectors can improve the safety and comfort of a bus rider's journey. Potential enhancements could include benches, shelters, lighting, signage, a wi-fi hotspot, mobile device chargers, etc.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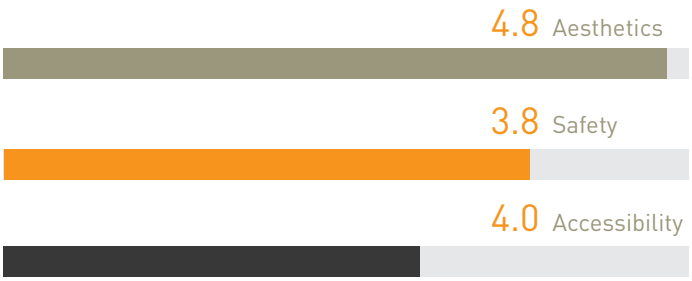
# CASE STUDY 14

## MULTI-AGENCY BUS STOP

- Centrally located in a highly walkable and bicycle-friendly university campus
- Land uses are primarily institutional, including the university campus and a large medical complex
- Streets outside of the campus are primarily automobile-oriented
- Many vacant/underutilized land parcels and large parking lots limit connectivity
- Residential land uses located around the perimeter of the study area




**4.2**

### Aesthetics

The university campus has a strong sense of place, pleasant and well-maintained landscaping, and strategically-placed pedestrian amenities in many locations. The overall ambiance within the study area is very good, though aesthetic qualities are lower toward the edges of the study area.

### Safety

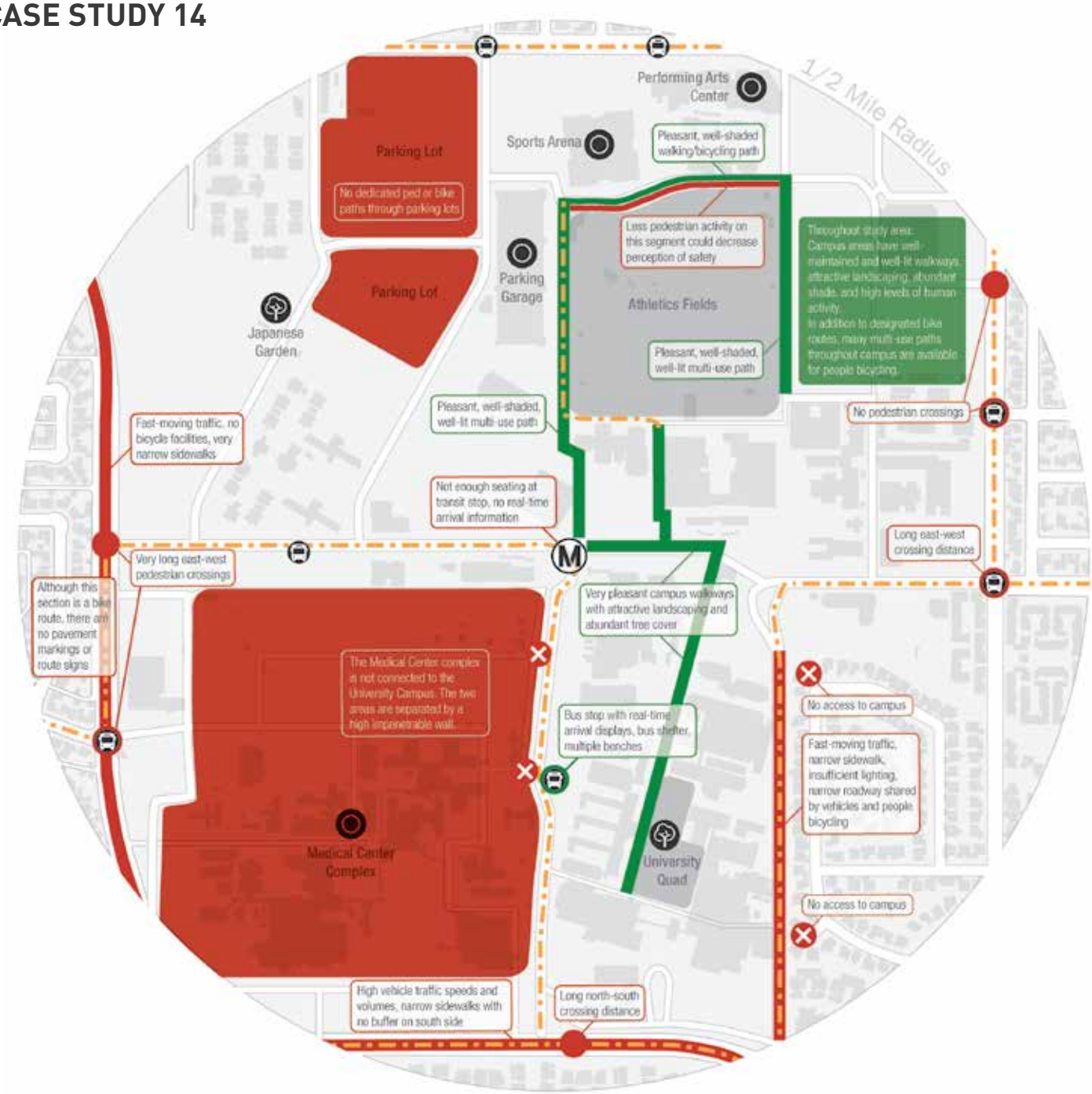
The high level of pedestrian activity within the central campus give a perceived sense of safety. Walking and bicycling paths on the campus are generally well-lit. The campus provides a safe environment for people bicycling and walking, while some streets outside of campus do not have enhanced bicycle facilities and provide pedestrians with little to no buffer from the roadway.

### Accessibility

Pedestrian and bicycle amenities at the station facilitate mode transfer, but the station lacks high-quality signage and a streamlined approach to parking and drop-off. Sidewalks are generally in very good condition. Pedestrian crossings within the campus are well-marked, while some outside of campus lack sufficient markings. Separated bicycle paths within the campus provide safe and convenient access for people bicycling.

# EXISTING CONDITIONS

## CASE STUDY 14




## LEGEND

### Locations

- Transit Stop
- Key Destination
- Destination Area
- Existing Bus Stop
- Existing Bikeway

### Access Barriers and Strengths

- Corridor Barrier
- Specific Barrier
- Area Barrier
- Corridor Asset
- Specific Asset
- Area Asset



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# CRITICAL ACCESS BARRIERS

## Connectivity Barrier

The Medical Center is located adjacent to the University campus, but it is not accessible from the campus. A tall, continuous brick wall separates the two areas.

## Wayfinding and informational Signage

Wayfinding signage is placed inconsistently along walking and bicycling routes throughout the campus, and is sometimes located away from primary routes of travel.

## Unenhanced crossing and long crossing distance

The crossing in this image is located at the southern entrance to the campus. Crossing distance is long, the pedestrian crossing interval is short, and crosswalk striping is unenhanced. In addition, a single curb cut (slightly visible in the foreground) is oriented away from the crosswalk.

## Unenhanced bicycle routes

Although it is a designated bicycle route, this roadway segment (near the west campus entrance) has no dedicated space for bicyclists. On streets south of campus, bicycle lanes are standard curbside bicycle lanes with inconsistent striping at intersections.

## Fast-moving traffic

Traffic speeds on major streets are high. In addition, on a campus roadway(left), people bicycling share narrow lanes with vehicles that often travel over the speed limit. Comfort and safety for people walking is reduced by the lack of a buffer between the sidewalk and roadway.

# OTHER EXISTING CONDITIONS

## Attractive, well-maintained, shady campus

Much of the campus has mature trees that provide protection from the sun, especially at the central sections of campus.

## Lack of shade in some areas

Although much of the campus is well shaded, some open plaza areas could benefit from the addition of shade.

## Multi-use paths

Separated paths for people walking and bicycling provide safe and comfortable routes through campus.

## Busy bus stop with real-time arrival information

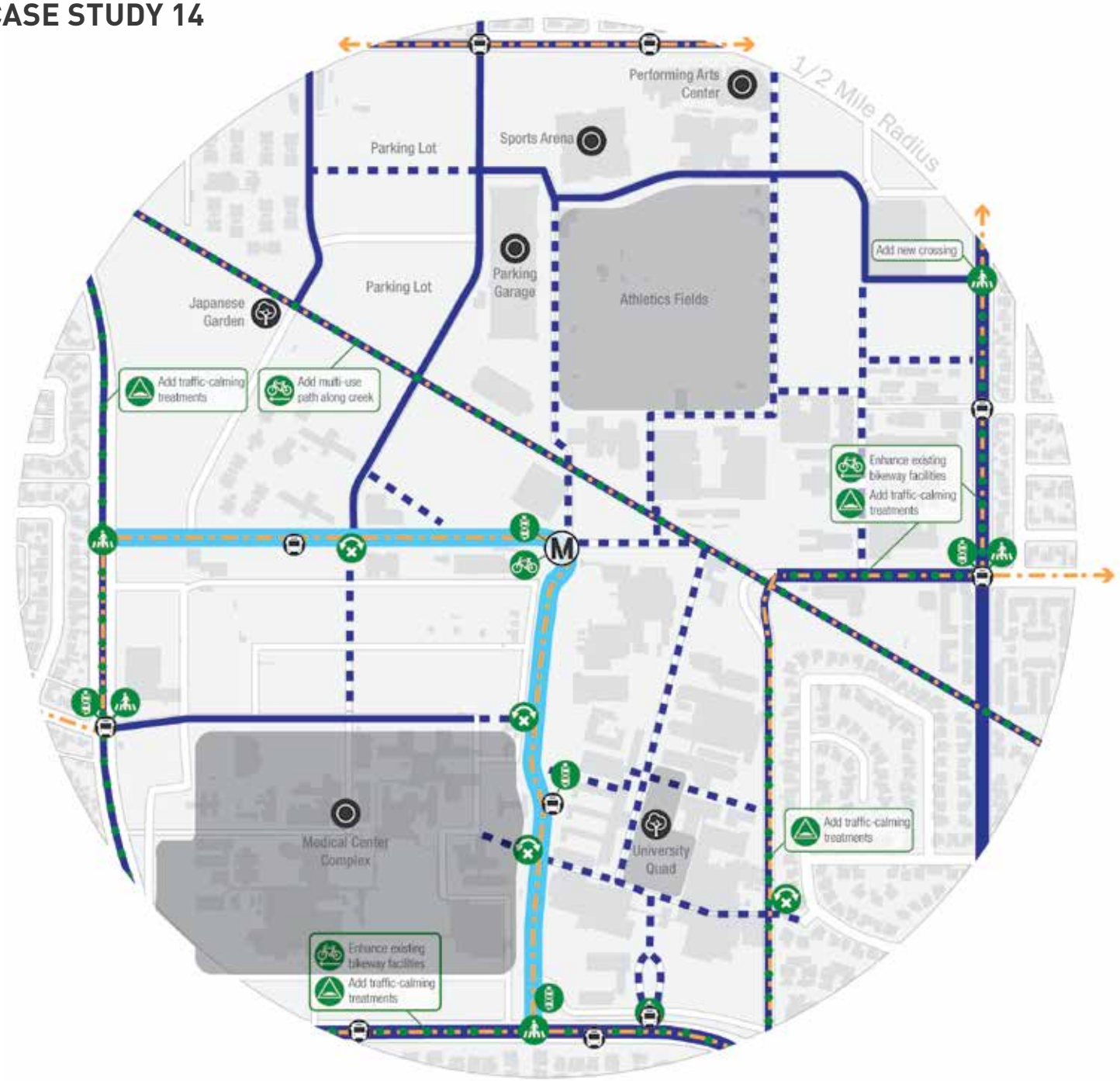
A busy bus stop (south of the study area's central bus stop) contains real-time arrival displays, adding convenience for transit riders.

## Lack of seating at main bus stop

The main bus stop at the center of the study area is located on a plaza with few seating opportunities. An expanded bus shelter and/or other seating would provide a desired amenity for transit riders.

# PATHWAY NETWORK

## CASE STUDY 14




## LEGEND

### Locations

- Transit Stop
- Key Destination
- Destination Area
- Bus Stop

### Pathway Network

- Pathway Arterial
- Pathway Collector 1
- Pathway Collector 2
- Cut-Through
- Bikeway (existing)
- Bikeway (proposed)
- Extension to Regional Network
- Bicycle Services
- Key Recommendation (corridor)
- Key Recommendation (specific location)



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# KEY RECOMMENDATIONS

## New Connection Across Barrier

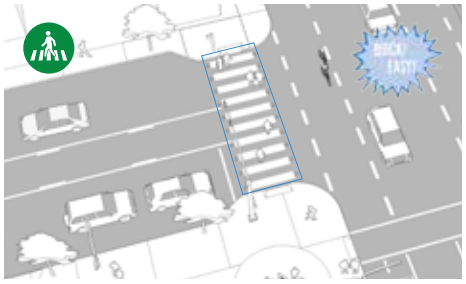
Designing a new connection between the university campus and the health center can greatly improve connectivity to the station.


## Medallion Signage

Medallion signage is an affordable type of wayfinding, or directional tool, that can be installed on utility poles and streetlights. The addition of medallion signage can help to increase awareness of station proximity, especially along Arterials and Collectors that connect to the schools, parks and commercial areas.

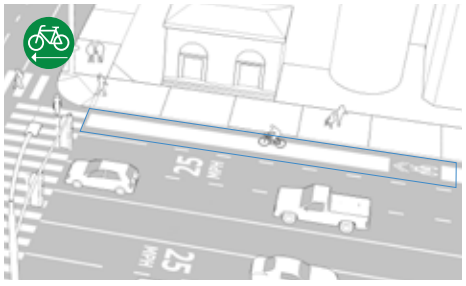

## Enhanced Pedestrian Crossings

Enhancing existing crossings can help protect station users by increasing their visibility to motorists. Crossing times can be made longer and to occur more often. In addition to enhancing existing crosswalks, adding well-marked crosswalks at unsignalized intersections and at midblock locations can improve convenience and safety.




## Enhanced Bicycle Facilities

A variety of roadway and signalization improvements can improve safety and increase comfort for people bicycling. These include bicycle lanes physically separated from vehicular traffic, such as buffered lanes, cycle tracks, painted bicycle lanes, conflict zone markings at/approaching intersections, bicycle boxes, and bicycle-prioritized signalization.




## Traffic Calming

Traffic calming decreases speeds along streets with heavy, fast-moving traffic in order to increase safety and comfort for all users of the street. Traffic calming treatments include physical measures such as curb extensions to narrow the roadway, narrowed travel lanes to promote slower driving speeds, and diverters to limit vehicle cut-through traffic on neighborhood streets.

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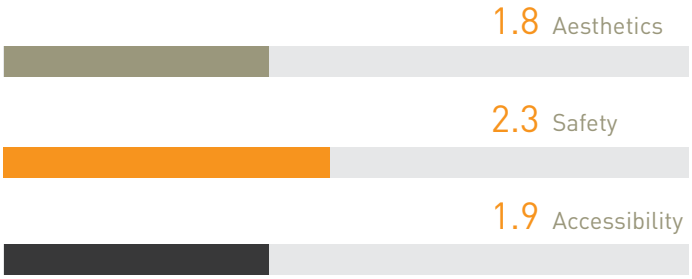
# CASE STUDY 15

## METRO RAIL STATION (AT GRADE)

- Industrial uses along the rail corridor
- Single-family and some multifamiily residential land uses to the south of the station
- Commercial and single-family residential land uses to the north of the station
- Commercial corridors are oriented more to the automobile than to other modes
- The rail line limits north-south connectivity
- Very limited park and recreational space

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### Aesthetics

The study area does not have many unique characteristics or landmarks to give it a sense of place. Commercial streets generally lack adequate tree cover, landscaping, waste receptacles and seating. Residential areas are generally pleasant, often enhanced by trees and landscaping.

### Safety

The station area itself is well-utilized during most times of the day and gives riders a better sense of safety. However, the area immediately adjacent to the transit station does not have a high level of activity, so perceived sense of safety may be limited. Traffic on the commercial corridors moves at high speeds, and pedestrians have little to no safety buffer from vehicular traffic. The primary north-south corridor has peak-hour curbside travel lanes that further lower the perceived sense of safety for people walking or bicycling. The lack of bicycle lanes forces bicyclists to ride on the sidewalks. Sidewalks are generally in good condition. The smaller residential streets generally provide a landscape buffer between the sidewalk and the roadway. There are a significant number of collisions at intersections, with a high percentage taking place at midblock locations where there are no marked crossings.

### Accessibility

Bicycle facilities in the study area are limited to standard (unenhanced) bicycle lanes on the street adjacent to the rail corridor. Many intersections along the commercial corridors are without marked crossings. In the study area, the number of people commuting to work by mass transit is higher than average, while rates of walking and bicycling are low.

# EXISTING CONDITIONS

## CASE STUDY 15


## LEGEND

### Locations

- Metro Rail Station
- Key Destination
- Existing Bus Stop
- Existing Bikeway

### Access Barriers and Strengths

- Corridor Barrier
- Specific Barrier
- Connectivity Gap
- Corridor Asset
- Specific Asset



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# CRITICAL ACCESS BARRIERS

## Fast-moving traffic

Vehicle speeds are high on many of the larger commercial streets and on some residential streets. Peak-hour curbside travel lanes on some streets bring fast-moving vehicular traffic closer to the sidewalk, decreasing the pedestrian buffer as well as making bicycling on the roadway hazardous.

## Pedestrian Crossings

Many existing crosswalks do not have adequately maintained striping, and are without enhancements such as continental striping or advance limit lines. Long stretches along some commercial boulevards are without pedestrian crossings. A few crossings in residential areas are without curb ramps.

## Few enhanced bicycle facilities

There is only one bicycle lane in the study area. In many cases, people bicycling on the roadway are required to navigate between parked vehicles and narrow travel lanes. Many people choose to bicycle on the sidewalk.

## Lack of shade

While some residential areas are abundantly shaded, the majority of the study area has insufficient tree cover to provide protection from the sun.

## Lack of street furniture

There are few comfortable seating opportunities in the study area, and waste receptacles are placed sparingly. Seating opportunities are limited to bus benches at bus stops.

# OTHER EXISTING CONDITIONS

## Pleasant, well-shaded residential streets

In residential areas, the street environment is generally pleasant, with well-maintained landscaping and residences. While tree cover is generally limited, some streets are shaded by mature street trees.

## Inefficient, confusing transition

Navigation from the transit platforms to adjacent streets is complicated by a jumble of physical structures, pavement patterns, and small areas to wait for walk signals.

## Pedestrian-oriented lighting

A segment of a commercial corridor has pedestrian-oriented lights attached to roadway light poles, providing a more pleasant nighttime pedestrian environment.

## Fencing and blank walls

On main streets, some vacant parcels and parking lots impair the aesthetic experience and comfort of people walking.

## Narrow right-of-ways

Many collector streets do not have sufficient right-of-way width to accommodate bicycle lanes or curb extensions.

# PATHWAY NETWORK

## CASE STUDY 15


## LEGEND

### Locations

- Metro Rail Station
- Key Destination
- Existing Bus Stop

### Pathway Network

- Pathway Arterial
- Pathway Collector 1
- Pathway Collector 2
- Bikeway (existing)
- Bikeway (proposed)
- Extension to Regional Network
- Bicycle Services
- Key Recommendation (corridor)
- Key Recommendation (specific location)

# KEY RECOMMENDATIONS

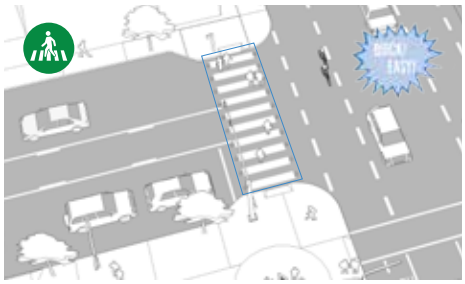
## Traffic Calming

Traffic calming decreases speeds along streets with heavy, fast-moving traffic in order to increase safety and comfort for all users of the street. Traffic calming treatments include physical measures such as curb extensions to narrow the roadway, narrowed travel lanes to promote slower driving speeds, and diverters to limit vehicle cut-through traffic on neighborhood streets.



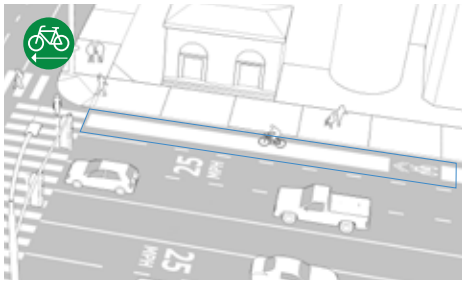
## Enhanced Pedestrian Crossings

Enhancing existing crossings can help protect station users by increasing their visibility to motorists. Crossing times can be made longer and to occur more often. In addition to enhancing existing crosswalks, adding well-marked crosswalks at unsignalized intersections and at midblock locations can improve convenience and safety.




## Enhanced Bicycle Facilities

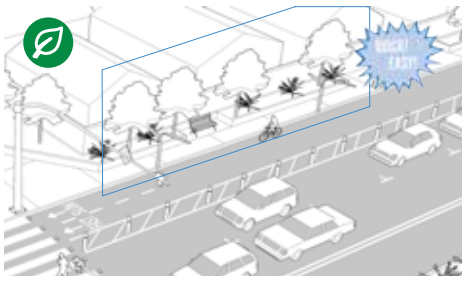
A variety of roadway and signalization improvements can improve safety and increase comfort for people bicycling. These include bicycle lanes physically separated from vehicular traffic, such as buffered lanes, cycle tracks, painted bicycle lanes, conflict zone markings at/approaching intersections, bicycle boxes, and bicycle-prioritized signalization.





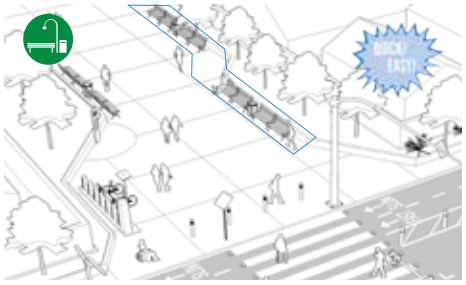
## Landscaping and Shade

Trees and landscaping improve aesthetics, provide pleasant and safe pathways, and offer an attractive buffer between the sidewalk and the roadway. Trees and shade structures provide refuge from the sun for people walking, resting, or waiting.




## Street Furniture

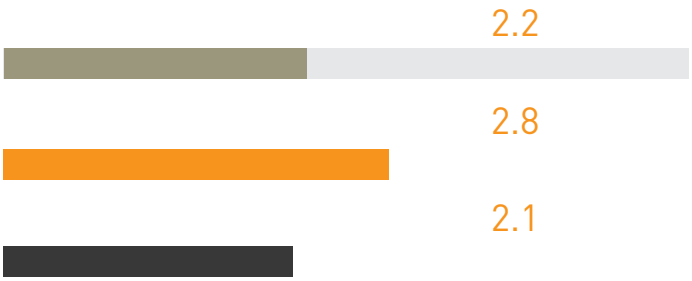
Street furniture provides amenities to make active transportation users comfortable while traveling and provide resting places. Waste receptacles, pedestrian-scale lighting, water fountains, and bicycle parking are other elements that enhance the sidewalk environment.



# CASE STUDY 16

## METRO BUS RAPID TRANSIT (BRT) STATION

- Large civic center with numerous public services located to the north of the stop
- Dedicated right-of-way for the BRT line limits connectivity
- Industrial uses along the BRT right-of-way (formerly a freight rail line)
- Arterial streets are primarily lined with commercial uses, while block interiors are mostly single-family residential.
- The primary north-south commercial corridor is walkable, while other commercial corridors are automobile-oriented




**2.4**

### Aesthetics

The study area lacks a strong sense of place. Residential districts are pleasantly shaded and landscaped, while commercial districts lack sufficient landscaping and well-maintained amenities for people walking.

### Safety

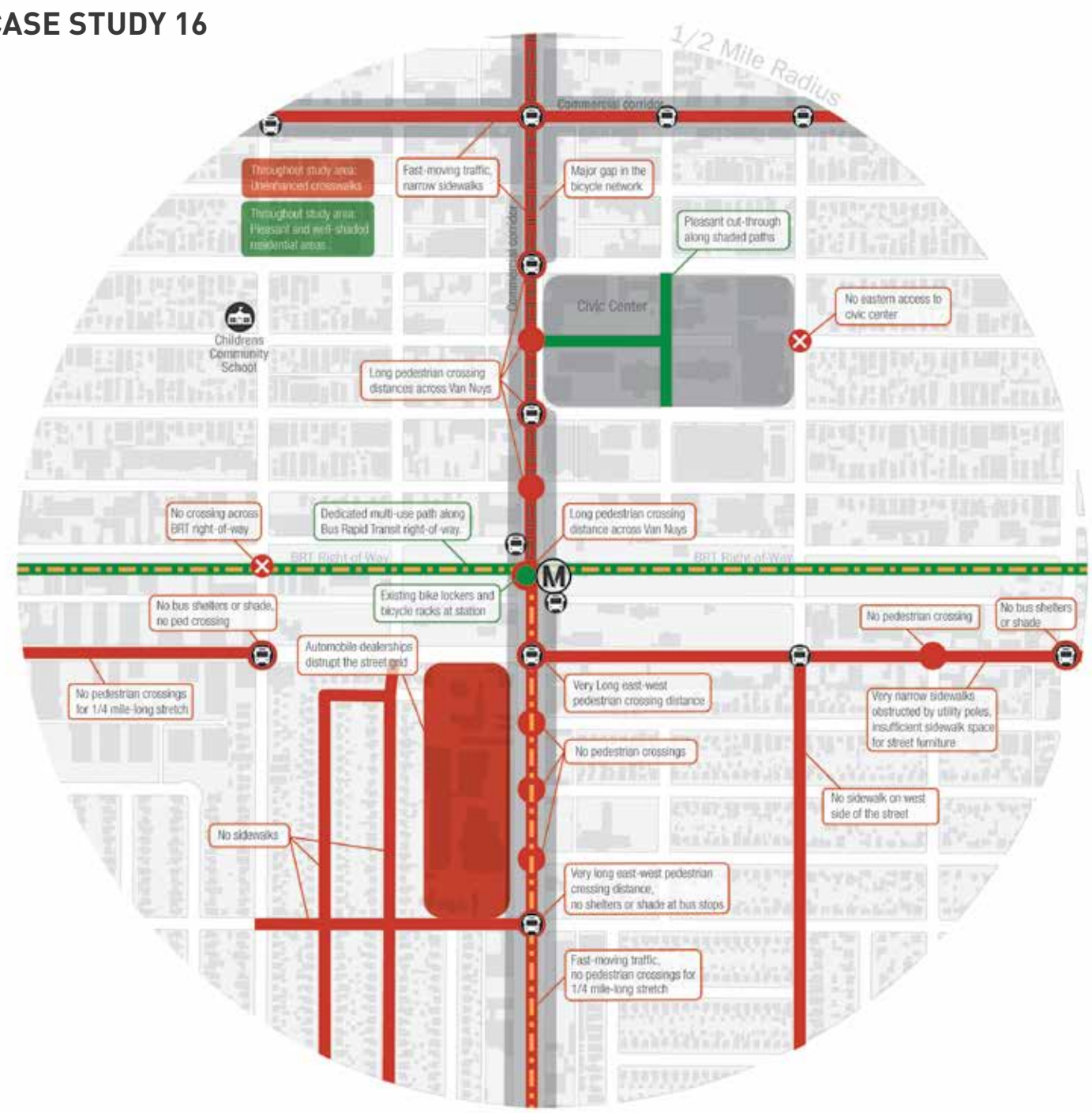
To the north of the station, the high level of activity from people on the street and the orientation of most buildings toward the public realm give a perceived sense of safety. Residential streets and some commercial streets provide a landscape buffer between the sidewalk and the roadway. The multi-use path along the BRT corridor provides a safe car-free route for people walking and bicycling. Recently, there have been several reports of severe collisions involving all modes of transportation.

### Accessibility

At the station, mode transfer is facilitated by an adequate park and ride lot as well as amenities for people walking and bicycling. Sidewalks in the study area are generally in good condition. The area lacks high-quality wayfinding and directional signage to the station and to area destinations. Compared to the rest of the County, this study area has a relatively high number of people commuting to work by walking, bicycling, or taking public transportation.

# EXISTING CONDITIONS

## CASE STUDY 16




## LEGEND

### Locations

- Metro BRT Station
- Key Destination
- Destination Area
- Existing Bus Stop
- Existing Bikeway

### Access Barriers and Strengths

- Gap in the Bicycle Network
- Corridor Barrier
- Specific Barrier
- Area Barrier
- Connectivity Gap
- Corridor Asset
- Specific Asset



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# CRITICAL ACCESS BARRIERS

## Lack of sidewalks / narrow sidewalks

Several residential streets do not have sidewalks. Some commercial corridors have narrow sidewalks with no landscape buffer from the roadway. Sidewalks are sometimes obstructed by infrastructural elements such as utility poles, utility boxes and fire hydrants.

## Lack of shade and amenities for people walking

Sidewalk environments along the main commercial corridors generally lack landscaping and shade-providing trees. Sidewalk pavement conditions are generally good, although there is a lack of street furniture and lighting for people who walk.

## Lack of pedestrian crossings at some intersections

Many unsignalized intersections lack crosswalks, resulting in long stretches (up to 1/4 mile) without any crosswalks.

## Unenhanced bicycle lane

The existing bicycle lanes are not buffered from vehicular traffic. As shown above, they drop off at intersection approaches and lack pavement markings in conflict zones.

## Unenhanced bus waiting areas

Many of the bus waiting areas within the station area lack amenities such as sufficient seating, shelters, and shade trees.

# OTHER EXISTING CONDITIONS

## Pleasant residential streets

In residential areas, the street environment is generally pleasant, with mature shade-providing street trees and well-maintained landscaping. Nighttime safety may be a concern in residential areas south of the station due to the lack of street lighting on many streets.

## Long crossing distances

Crossing distances along the commercial corridors are generally long. The primary north-south corridor south of the station is especially wide, resulting in crossing distances as long as 120 feet.

## Enhanced crosswalks

The main commercial corridor to the north of the station contains recently-enhanced crosswalks with continental striping and advance limit lines.

## Multi-use path and bicycle facilities

This well-lit and shaded multi-use path provides a dedicated right-of-way for people walking and bicycling. The 18 mile-long path runs parallel to the BRT corridor, providing a convenient east-west regional connection. Bicycle racks and lockers at the station support multimodal transfers.

## Attractive Civic Center Area

The Civic Center is an important regional destination. This area has well-maintained landscaping, pleasant walking paths, and comfortable seating areas.

# PATHWAY NETWORK

## CASE STUDY 16


## LEGEND

### Locations

- Metro BRT Station
- Key Destination
- Destination Area
- Existing Bus Stop

### Pathway Network

- Pathway Arterial
- Pathway Collector 1
- Pathway Collector 2
- Cut-Through
- Bikeway (existing)
- Bikeway (proposed)
- Extension to Regional Network
- Bicycle Services
- Key Recommendation (corridor)
- Key Recommendation (specific location)



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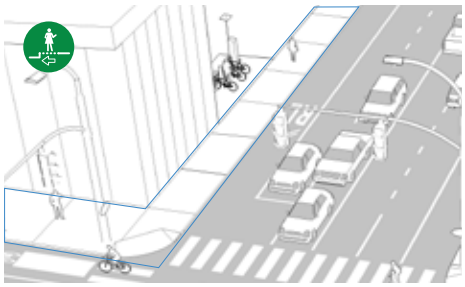
# KEY RECOMMENDATIONS

## Sidewalk Addition or Widening

Widening or adding sidewalks improves safety, comfort and convenience for people of all ages and abilities. Wider sidewalks create more room for streetscape elements that enhance comfort and convenience, such as street furniture, bus waiting areas, landscaping, and trees.




## Landscaping and Shade

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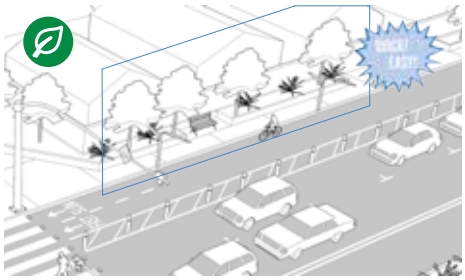
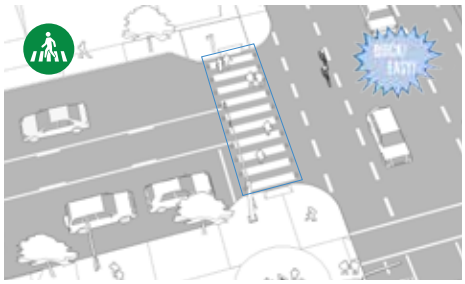


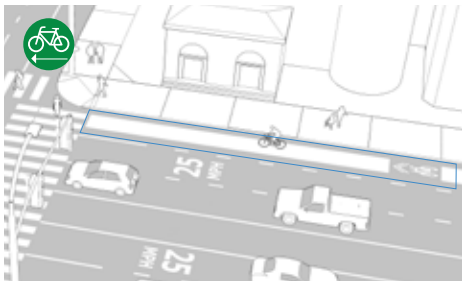

## Enhanced Pedestrian Crossings

Enhancing existing crossings can help protect station users by increasing their visibility to motorists. Crossing times can be made longer and to occur more often. In addition to enhancing existing crosswalks, adding well-marked crosswalks at unsignalized intersections and at midblock locations can improve convenience and safety.




## Enhanced Bicycle Facilities

A variety of roadway and signalization improvements can improve safety and increase comfort for people bicycling. These include bicycle lanes physically separated from vehicular traffic, such as buffered lanes, cycle tracks, painted bicycle lanes, conflict zone markings at/approaching intersections, bicycle boxes, and bicycle-prioritized signalization.




## Enhanced Bus Waiting Areas

Enhancing the bus waiting areas along the Pathway Arterials and Collectors can improve the safety and comfort of a bus rider's journey. Potential enhancements could include benches, shelters, lighting, signage, a wi-fi hotspot, mobile device chargers, etc.

# CASE STUDY 17

## METRO RAIL STATION (ABOVE GRADE)

- Active commercial corridors surrounded by mostly single-family residential uses
- Freeway bisects the study area, which limits connectivity
- Recently enhanced sidewalks and crosswalks
- Highly-amenitized transit station with nearby park-and-ride lot for convenient transfers
- Limited park and recreational space


**ACCESSIBILITY SCORE 4.1**

### Aesthetics

Overall, the study area is well-maintained and clean. There is pleasant landscaping, including trees and plantings, that provide shade and aesthetic appeal. There are also several amenities, such as waste receptacles, bus shelters, and seating areas, which are strategically located.

### Safety

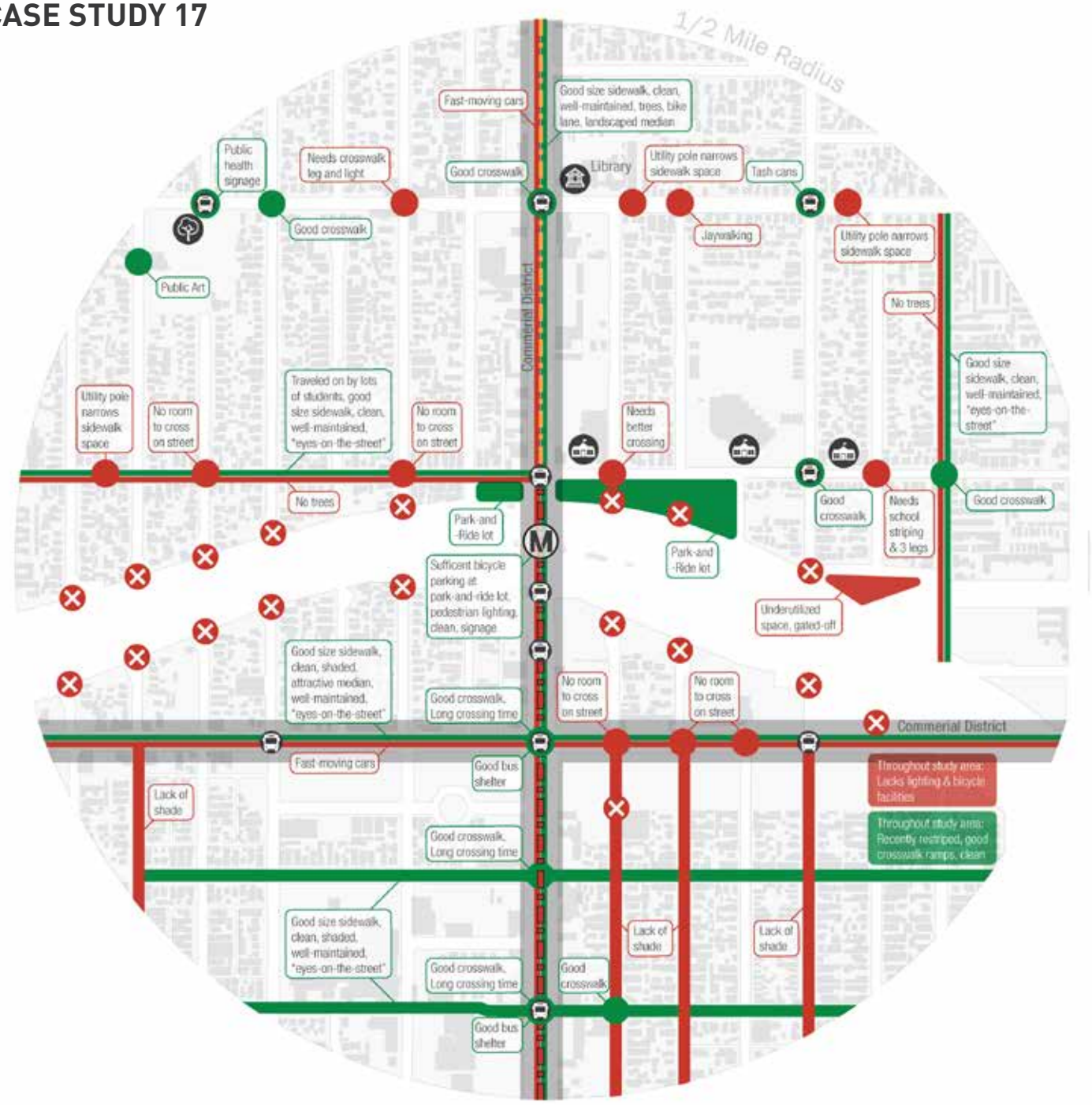
The public realm is clean and well-maintained. The orientation and design of the buildings add "eyes-on-the-street", which gives a perceived sense of safety. However, the lack of a safety buffer for people bicycling, and the lack of sufficient lighting lowers the perceived sense of safety, especially at night. There are several collisions that have recently happened in the area, with a large proportion of them involving people walking or bicycling.

### Accessibility

There are high-quality sidewalks throughout the study area, but some utility poles create barriers for people traveling on the sidewalk. Crosswalks have been recently enhanced to be safer and more convenient for all users. Parking and drop off for vehicles is streamlined with the addition of a well-maintained park-and-ride lot. However, the freeway divides the study area and the only connection is along the major north-south arterial. There is also a general lack of bicycle facilities, although there is bicycle parking located at the park-and-ride locations. Although most people travel to work by driving or carpooling, many people utilize the Metro rail line, which offers another transportation alternative.

# EXISTING CONDITIONS

## CASE STUDY 17




## LEGEND

### Locations

- Metro Rail Station
- Key Destination
- Destination Area
- Existing Bus Stop
- Existing Bikeway

### Access Barriers and Strengths

- Gap in the Bicycle Network
- Corridor Barrier
- Specific Barrier
- Area Barrier
- Connectivity Gap
- Corridor Asset
- Specific Asset
- Area Asset



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# CRITICAL ACCESS BARRIERS

## Unenhanced crossings at some intersections

At some intersections, there is a lack of sufficient crosswalk striping, creating unsafe crossing conditions. At certain locations, the stop limit line leaves no room for people to safely walk across when a vehicle is present.

## Gaps in the bicycle network

The only bicycle lane in the study area does not fully connect to the station and other major destinations. The lane is separated from fast-moving traffic only by paint. The lack of bike facilities forces many people to ride on the sidewalk, creating unsafe environments for people walking.

## Insufficient lighting throughout most of the study area

Most of the study area, except at the station, lacks sufficient lighting for people walking and bicycling. The lack of illumination can discourage many people from getting to and from the station, especially during the night.

## Lack of shade in some residential areas

Although most of the study area has well-maintained trees and bus shelters that offer shade, some residential areas lack this protection from the sun.

## Fast-moving traffic along major commercial streets

There is fast-moving traffic along the major commercial streets, which making bicycling on the road feel unsafe. People may also feel uncomfortable crossing the street with these conditions.

# OTHER EXISTING CONDITIONS

## Enhanced crossings at most intersections

Most of the intersections within the study area have crosswalks that have been recently enhanced to be safe and accessible for all users of the sidewalk. This is especially true for large arterial streets that have highly-enhanced crosswalk ramps, long crossing times, and highly-visible striping.

## Utility poles on the sidewalk

At several locations throughout the study area, there are utility poles misplaced in the center of the sidewalk, leaving little space for people to travel, especially by wheelchair.

## Park-and-ride lots near the station

There are park-and-ride lots just to the north of the station on both sides of the street that have hundreds of parking spaces. These lots are well-maintained and patrolled, which can encourage drivers to use transit.

## Fence with no doors limits connectivity

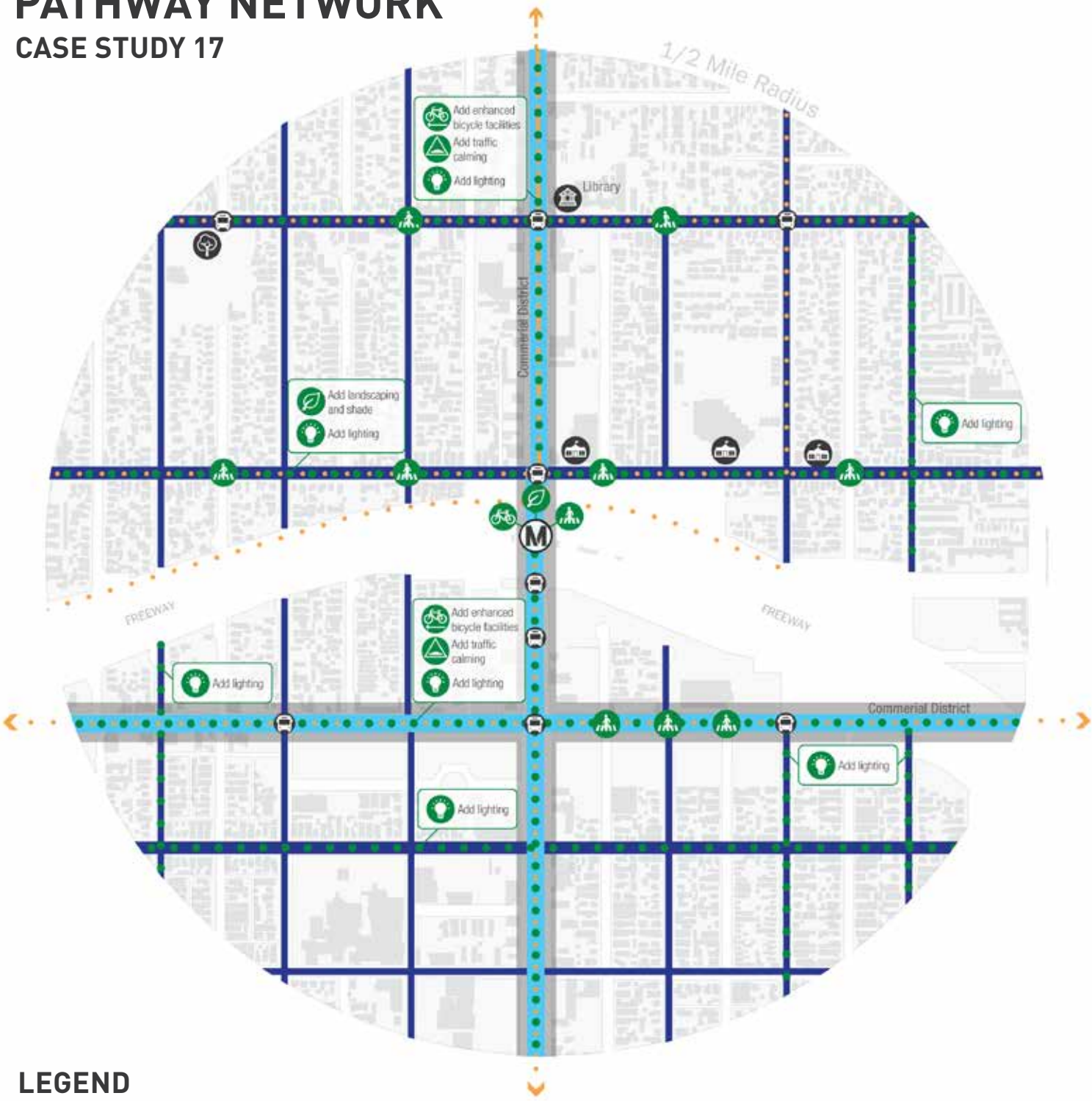
There is a gate that restricts access for vehicles as well as people walking and bicycling. This makes it difficult for people traveling to and from the station to get to their destination.

## Public art facing the public realm

Located at the northwest corner of the study area, a community-designed mural fronts the sidewalk. The mural is well-maintained and is aesthetically pleasing for people traveling on the sidewalk.

# PATHWAY NETWORK

## CASE STUDY 17




## LEGEND

### Locations

- Metro Rail Station
- Key Destination
- Destination Area
- Bus Stop

### Pathway Network

- Pathway Arterial
- Pathway Collector 1
- Pathway Collector 2
- Bikeway (existing)
- Bikeway (proposed)

- Extension to Regional Network
- Bicycle Services
- Key Recommendation (corridor)
- Key Recommendation (specific location)



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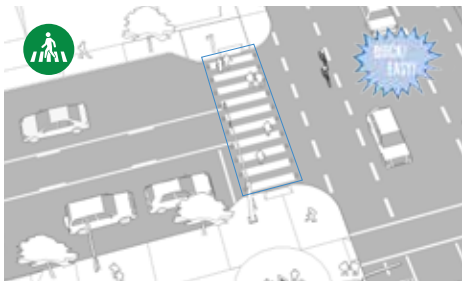
# KEY RECOMMENDATIONS

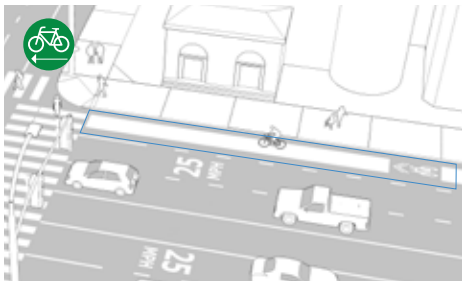
## Enhanced Pedestrian Crossings

Enhancing existing crossings can help protect station users by increasing their visibility to motorists. Crossing times can be made longer and to occur more often. In addition to enhancing existing crosswalks, adding well-marked crosswalks at unsignalized intersections and at midblock locations can improve convenience and safety.



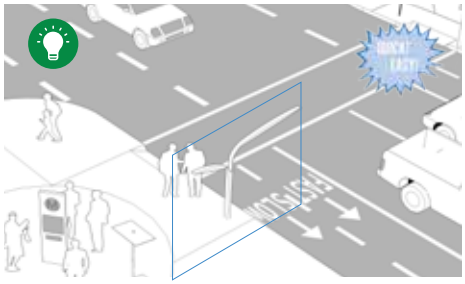

## Enhanced Bicycle Facilities

A variety of roadway and signalization improvements can improve safety and increase comfort for people bicycling. These include bicycle lanes physically separated from vehicular traffic, such as buffered lanes, cycle tracks, painted bicycle lanes, conflict zone markings at/approaching intersections, bicycle boxes, and bicycle-prioritized signalization.




## Lighting

Adding lighting can increase safety and aid in night navigation for people walking or bicycling along Pathway routes. Install lighting rhythmically and consistently in coordination with tree canopies as not to block the light. Consider installing lights that are efficient and/or motion activated/ self powered in areas where constant light is not needed.




## Landscaping and Shade

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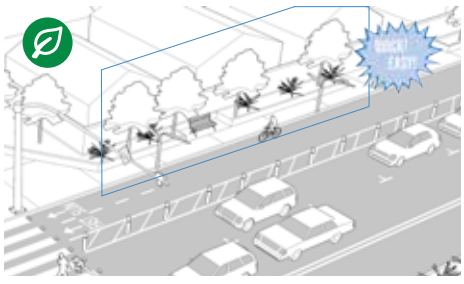


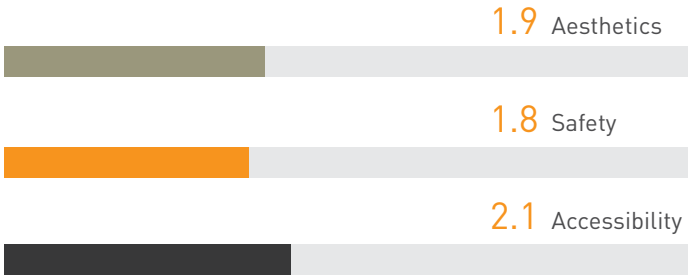

## Traffic Calming

Traffic calming decreases speeds along streets with heavy, fast-moving traffic in order to increase safety and comfort for all users of the street. Traffic calming treatments include physical measures such as curb extensions to narrow the roadway, narrowed travel lanes to promote slower driving speeds, and diverters to limit vehicle cut-through traffic on neighborhood streets.

# CASE STUDY 18

## METROLINK STATION AND MULTI-MODAL TRANSIT HUB

- Multi-modal transportation center featuring highly-amenitized rail and bus hubs
- Residential, industrial, and municipal land uses
- Large undeveloped parcels of land
- Limited connectivity due to rail line and long blocks

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### Aesthetics

Although the station is aesthetically pleasing, the surrounding study area lacks elements such as strategically placed amenities for people walking or bicycling, sufficient landscaping, and a strong sense of place.

### Safety

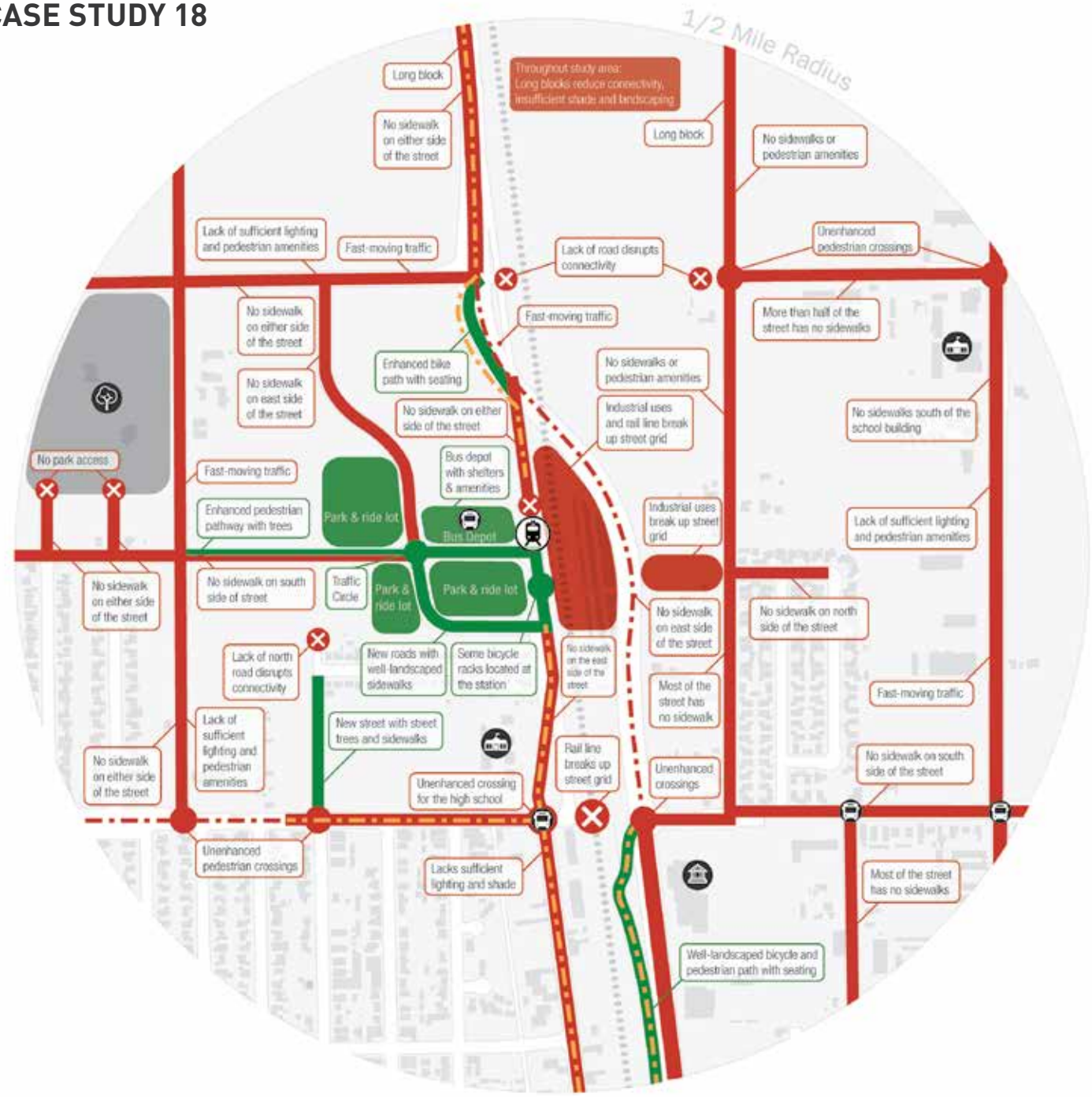
The lack of elements such as sidewalks, adequate lighting, and sufficient "eyes-on-the-street", coupled with fast-moving traffic, makes the study area feel unsafe for people walking or bicycling to the station.

### Accessibility

At the station, parking and drop-off is streamlined and transfers between transit modes are almost seamless. Navigating throughout the study area is a different story. The lack of sidewalks, crosswalks, bicycle facilities, and other essential amenities severely constrains accessibility. Furthermore, people coming from east of the rail line can only access the station at one point on a major highway.

# EXISTING CONDITIONS

## CASE STUDY 18




## LEGEND

### Locations

- Metrolink Station & Transit Center
- Key Destination
- Destination Area
- Existing Bus Stop
- Existing Bikeway

### Access Barriers and Strengths

- Gap in the Bicycle Network
- Corridor Barrier
- Specific Barrier
- Area Barrier
- Connectivity Gap
- Corridor Asset
- Other Asset
- Area Asset



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# CRITICAL ACCESS BARRIERS

## Little connectivity getting to and from the station

Currently, a person walking or bicycling from east of the station has only one access point to get to the station. Without establishing greater connectivity, any design recommendation east of the rail line will not help to encourage people to walk or bicycle to the station.

## Lack of sidewalks throughout

Many of the parcels in the study area are undeveloped and lack sidewalks. As a result, there is no buffer from fast-moving vehicles. This is especially unsafe for mobility-impaired individuals.

## Lack of protection against the weather

The study area experiences extreme weather conditions, including temperatures over 100°F during the summer. There is a general lack of trees and landscaping in the public realm, which makes walking to and from the station feel uncomfortable.

## Long blocks throughout

People walking to and from the station must travel long distances, sometimes traveling past their destination, because there are no signalized places to cross the street. This discourages people from walking and encourages jaywalking.

## Lack of lighting

Many of the streets lack adequate street lighting for people walking and bicycling. This reduces visibility making it feel unsafe for all users of the road.

# OTHER EXISTING CONDITIONS

## Abundant park-and-ride spaces

There are over 500 park-and-ride spaces at the station, including accessible and motorcycle spaces. There is security that monitors the lot during the day.

## Gaps in the bicycle network


Although there are well-landscaped bicycle paths, there are some gaps in the bicycle network that limit accessibility. There also is greater need for more bicycle parking at the station.

## Abundance of station amenities

Overall, the transportation center has several desirable amenities such as bus shelters, wayfinding signage, kiss-and-ride zone, drought-tolerant landscaping, seating, real-time arrival information, bicycle parking, etc.

## Walking and bicycle paths

There are well-maintained walking and bicycle paths running parallel to the main highway. A nearby park has pleasant walking paths and is a popular regional destination.

## Local community garden

A community garden provides an opportunity for residents without gardening space to maintain an individual plot in a community space.

# PATHWAY NETWORK

## CASE STUDY 18


## LEGEND

### Locations

- Metrolink Station & Transit Center
- Key Destination
- Destination Area
- Bus Stop

### Pathway Network

- Pathway Arterial
- Pathway Collector 1
- Pathway Collector 2
- Cut-Through
- Bikeway (existing)
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- Extension to Regional Network
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- Key Recommendation (corridor)
- Key Recommendation (specific location)



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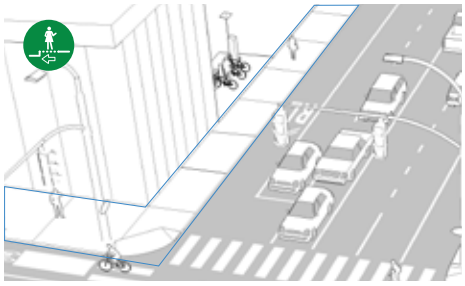
# KEY RECOMMENDATIONS

## New Connection Across Barrier

Designing a new connection across the main highway can improve connectivity to the station from the east. This can manifest as a bridge or an at-grade signalized crosswalk for people walking and bicycling. A well-designed connection should consider the safety of all people.


## Sidewalk Addition or Widening

Widening or adding sidewalks improves safety, comfort and convenience for people of all ages and abilities. Wider sidewalks create more room for streetscape elements that enhance comfort and convenience, such as street furniture, bus waiting areas, landscaping, and trees.




## Landscaping and Shade

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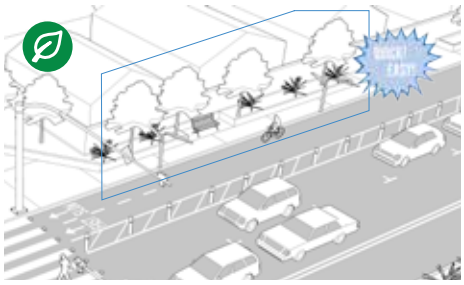


## Enhanced Pedestrian Crossings

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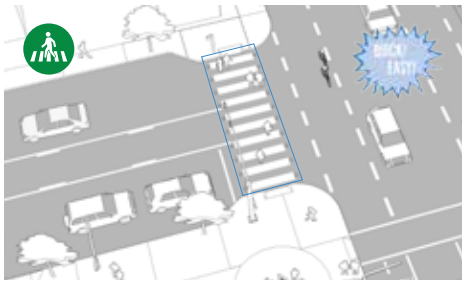


## Lighting

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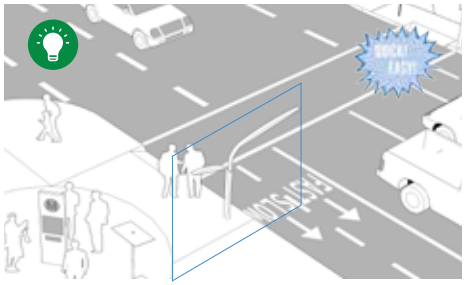
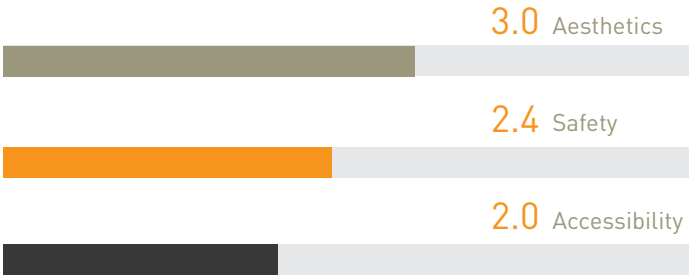


# CASE STUDY 19

## METRO LOCAL BUS STOP

- Commercial corridors surrounded primarily by single-family residential neighborhoods
- A freeway bisects the study area, which limits connectivity
- Limited park and recreational space
- No bicycle facilities
- Many residential streets lack continuous paved sidewalks

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### Aesthetics

The study area does not have many unique characteristics or landmarks to give it a sense of place. Commercial streets generally lack adequate tree cover and landscaping. Residential areas are generally pleasant, often enhanced by trees and landscaping. Parkway strips are sometimes unplanted and poorly maintained, and blank walls and fencing mar the pedestrian environment.

### Safety

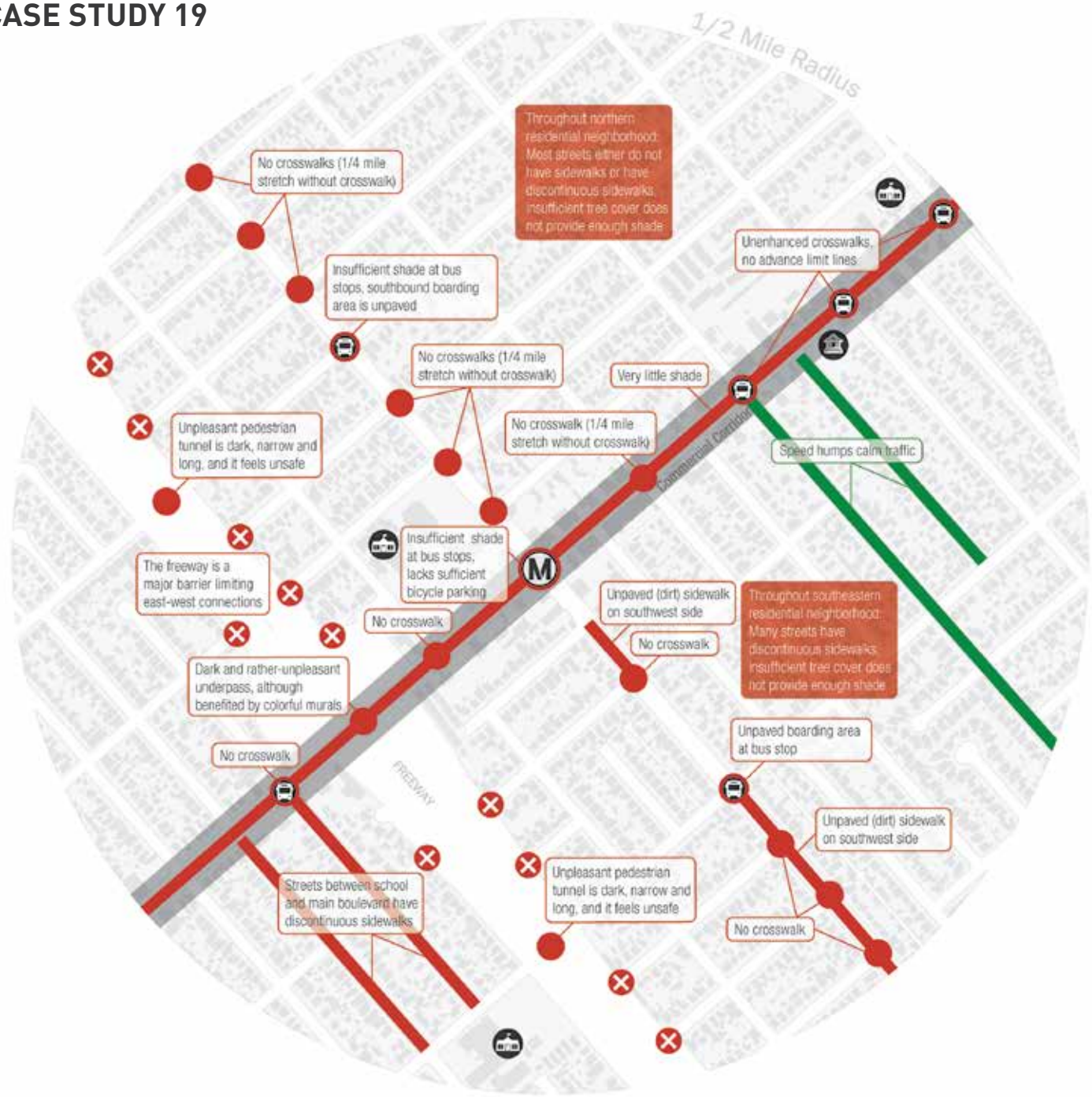
The public realm is relatively clean and well maintained. However, many street segments do not have sidewalks. The lack of bicycle facilities further lowers the safety score. A significant number of severe and fatal collisions in the study area involve pedestrians or bicyclists.

### Accessibility

Sidewalks (where they exist) are generally in good condition. However, there are many locations without sidewalks or with discontinuous sidewalks. The freeway divides the study area, and east-west connectivity is limited to three locations for pedestrians to pass underneath. There is also a general lack of bicycle facilities. Although most people travel to work by driving or carpooling, about 4% utilize mass transit.

# EXISTING CONDITIONS

## CASE STUDY 19




## LEGEND

### Locations

- Transit Stop
- Key Destination
- Destination Area
- Existing Bus Stop

### Access Barriers and Strengths

- Corridor Barrier
- Specific Barrier
- Connectivity Gap
- Corridor Asset



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# CRITICAL ACCESS BARRIERS

## Unpleasant pedestrian undercrossings

Two pedestrian-only undercrossings provide valuable east-west connections for people walking and bicycling. Unfortunately, they are long, narrow, and dark, and they feel particularly unsafe at night. The freeway underpass on the main commercial corridor is also unpleasant (see description to the right).

## Lack of (or discontinuous) sidewalks in residential areas

Many street segments in the residential neighborhoods lack paved sidewalks. The resulting pathway is usually dirt or trampled grass, creating a significant accessibility barrier for people with mobility impairments. Sometimes there is no sidewalk space at all, so people walk in the roadway.

## Lack of bicycle facilities

There are few bicycle facilities in the study area. As a result, people bicycling often choose to ride on the sidewalk rather than the roadway.

## Unenhanced crossings

Many crosswalks lack enhanced features such as continental striping and advance stop lines. Some crosswalks along the primary commercial corridor have decorative pavements that have faded and provide no enhanced visibility.

## Lack of landscaping and shade

Many sections of the study area lack landscaping. Streets generally lack mature and consistent tree cover.

# OTHER EXISTING CONDITIONS

## Freeway underpass

The underpass along the primary commercial corridor is dark, lacks aesthetic improvements, and lacks a buffer between the sidewalk and the roadway.

## Pedestrian amenities and street activity

The primary commercial corridor has some pedestrian-oriented amenities such as bus shelters and waste receptacles. Some informal vending and informational booths provide activity in the pedestrian realm.

## Visual clutter from utility poles and power lines


In some locations, utility poles and power lines have a negative effect on the aesthetics of the streetscape.

## Long street segments without crosswalks

Long street segments without crosswalks invite jay walking. In addition, several intersections across arterial streets are without crosswalks.

## Traffic calming treatments

A few speed humps are located in the residential neighborhoods, but, overall, there are not a significant number of traffic calming treatments such as speed humps, curb extensions, speed feedback signs, etc.

# PATHWAY NETWORK

## CASE STUDY 19


## LEGEND

### Locations

- Transit Stop
- Key Destination
- Destination Area
- Bus Stop

### Pathway Network

- Pathway Arterial
- Pathway Collector 1
- Pathway Collector 2
- Bikeway (proposed)
- Extension to Regional Network
- Bicycle Services
- Key Recommendation (corridor)
- Key Recommendation (specific location)

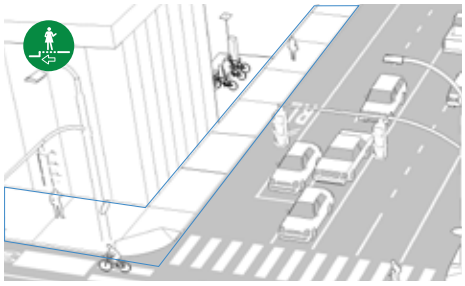
# KEY RECOMMENDATIONS

## Freeway Underpass & Overpass Enhancements

Residents might be more likely to travel to the station if the underpasses were safer, cleaner, better illuminated and visually engaging.

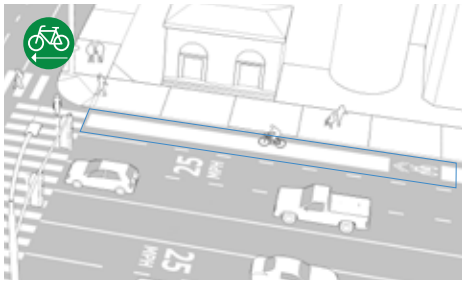

## Sidewalk Addition or Widening

Widening or adding sidewalks improves safety, comfort and convenience for people of all ages and abilities. Wider sidewalks create more room for streetscape elements that enhance comfort and convenience, such as street furniture, bus waiting areas, landscaping, and trees.



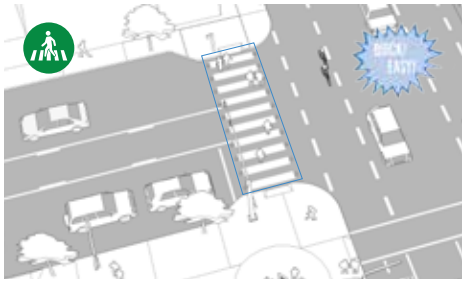

## Enhanced Bicycle Facilities

A variety of roadway and signalization improvements can improve safety and increase comfort for people bicycling. These include bicycle lanes physically separated from vehicular traffic, such as buffered lanes, cycle tracks, painted bicycle lanes, conflict zone markings at/approaching intersections, bicycle boxes, and bicycle-prioritized signalization.



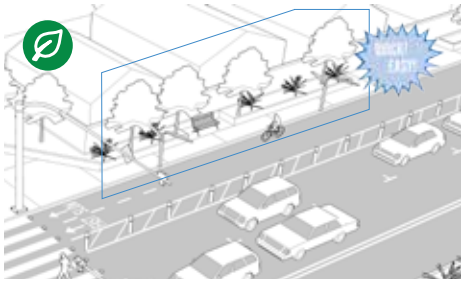

## Enhanced Pedestrian Crossings

Enhancing existing crossings can help protect station users by increasing their visibility to motorists. Crossing times can be made longer and to occur more often. In addition to enhancing existing crosswalks, adding well-marked crosswalks at unsignalized intersections and at midblock locations can improve convenience and safety.




## Landscaping and Shade

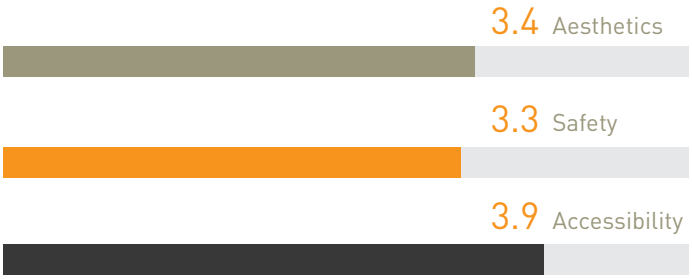
Trees and landscaping improve aesthetics, provide pleasant and safe pathways, and offer an attractive buffer between the sidewalk and the roadway. Trees and shade structures provide refuge from the sun for people walking, resting, or waiting.



# CASE STUDY 20

## METRO RAIL STATION (AT GRADE)

- Primarily residential land uses (single-family and low-density multifamily)
- Some neighborhood-serving retail along major streets, and some industrial uses adjacent to the rail line
- Freeway and rail line bisect the study area, which limits connectivity
- Highly-amenitized transit station with nearby park-and-ride parking structure for convenient transfers
- Limited bicycle facilities




**3.5**

### Aesthetics

New streetscape projects around the transit station include landscaping and shade trees, as well as attractive and functional street furniture. However, some segments of the commercial streets do not have adequate landscaping or pedestrian amenities. Residential areas are attractive and well maintained, with plenty of trees and landscaping.

### Safety

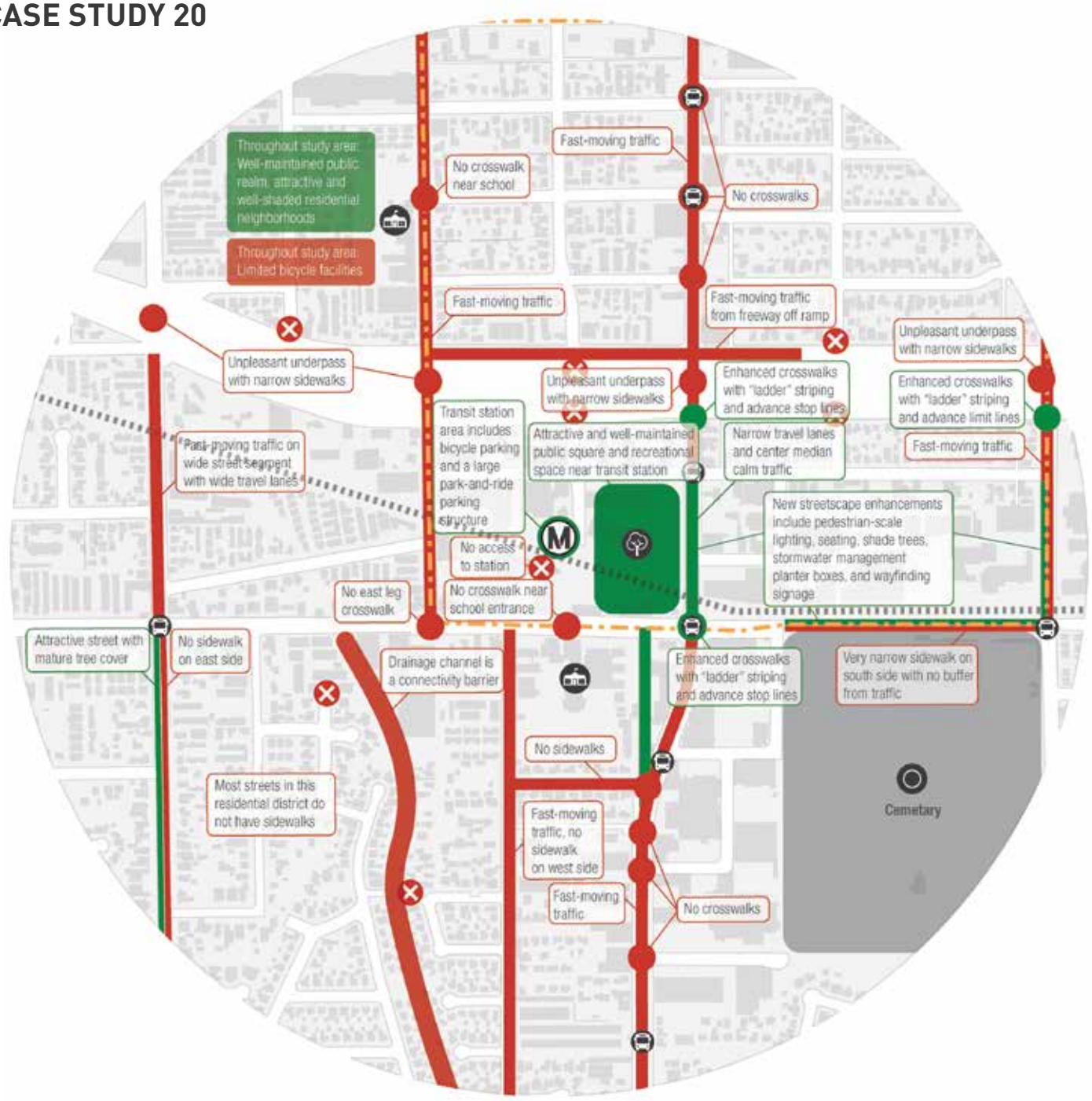
The public realm is generally clean and well maintained. Recent enhancements to pedestrian crossings around the station provide a safe environment for people walking. The relatively high level of human activity around the station contributes to a positive perception of safety. The limited number of bicycle facilities lowers the safety score. The number of reported collisions involving people walking or bicycling is low.

### Accessibility

Transferring between bus and light rail is supported by an attractive bus waiting area (right near the station) with abundant seating and shelter. Vehicle parking and drop-off are also streamlined at the station. Sidewalks are in good condition and are equipped with curb ramps at intersections. However, some sidewalks are narrow, and many residential streets in the southern half of the study area do not have sidewalks. The freeway and rail line divide the study area, limiting north-south connectivity. There is also a general lack of bicycle facilities. Most people travel to work by driving alone, with about 8% using mass transit. (This data is reflective of transportation choices before the light rail station was operating.)

# EXISTING CONDITIONS

## CASE STUDY 20




## LEGEND

### Locations

- Metro Rail Station
- Key Destination
- Destination Area
- Existing Bus Stop

### Access Barriers and Strengths

- Corridor Barrier
- Specific Barrier
- Connectivity Gap
- Corridor Asset
- Specific Asset
- Area Asset



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# CRITICAL ACCESS BARRIERS

## Unpleasant freeway underpasses

Freeway underpasses are dark, lack aesthetic improvements, and lack buffers between the sidewalk and the roadway.

## Limited bicycle facilities

There are very few bicycle facilities in the study area. As a result, people bicycling often choose to ride on the sidewalk rather than the roadway.

## Narrow sidewalks (and no sidewalks in some locations)

Sidewalks in the study area are generally narrow (on both commercial and residential streets). This image shows a very attractive streetscape environment, but the narrow right-of-way limits sidewalk width. Many street segments in the residential neighborhoods lack paved sidewalks.

## Fast-moving traffic

Traffic speeds are high on some sections of commercial streets and there is fast-moving cut-through traffic on a couple residential streets.

## Lack of crosswalks along some street segments

Some long street segments along commercial streets are without controlled intersections or pedestrian crosswalks.

# OTHER EXISTING CONDITIONS

## Wayfinding signage near station


Wayfinding signage is placed in strategic locations around the station area. However, no pedestrian-oriented signage is located elsewhere in the study area.

## Pleasant, well-shaded residential neighborhoods

As part of the recent renovations to the transit station area, Metro has developed a small park that provides valuable open space and attractive places to sit.

## Attractive pedestrian environment near the station

Near the station, attractively-planted bioswales and medians contribute to a pleasant street environment. In addition to landscaping, the area around the station includes pedestrian amenities such as seating, wayfinding signage, and pedestrian lighting.

## Enhanced crossings

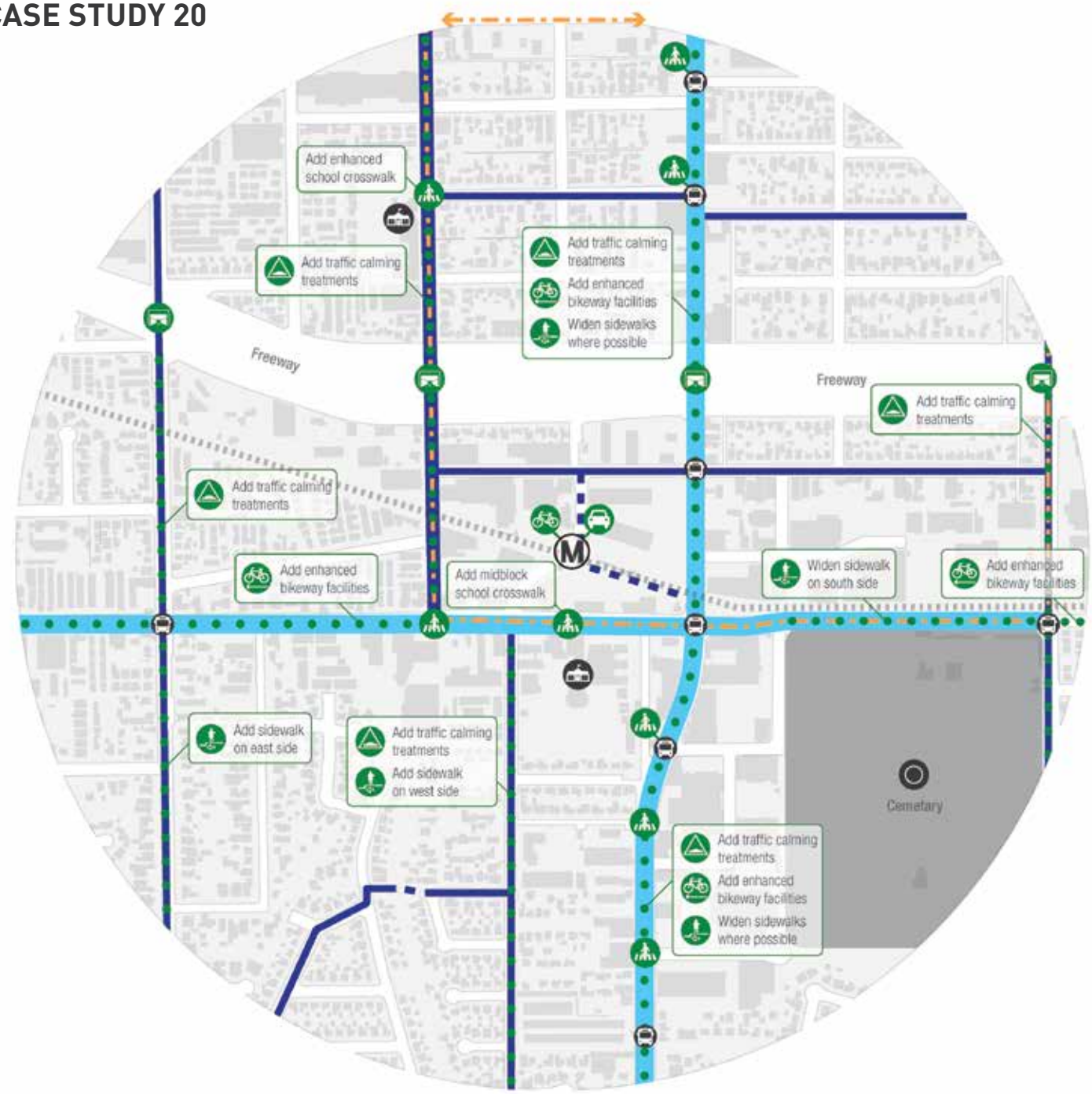
New crosswalks and curb ramps near the station improve accessibility and visibility.

## Some lack of landscaping and shade

Although the study area is generally well landscaped, some segments of the two primary commercial streets are lacking in landscaping and shade-providing trees.

# PATHWAY NETWORK

## CASE STUDY 20




## LEGEND

### Locations

- Metro Rail Station
- Key Destination
- Destination Area
- Bus Stop

### Pathway Network

- Pathway Arterial
- Pathway Collector 1
- Pathway Collector 2
- Cut-Through
- Bikeway (existing)
- Extension to Regional Network
- Bicycle Services
- Car Share
- Key Recommendation (corridor)
- Key Recommendation (specific location)



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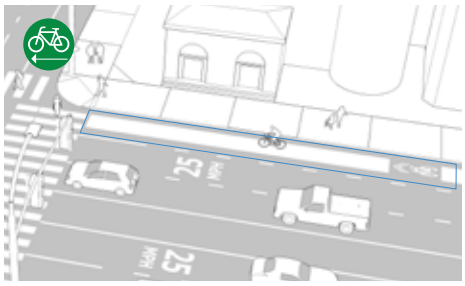
# KEY RECOMMENDATIONS

## Freeway Underpass & Overpass Enhancements

Residents might be more likely to travel to the station if the underpasses were safer, cleaner, better illuminated and visually engaging.

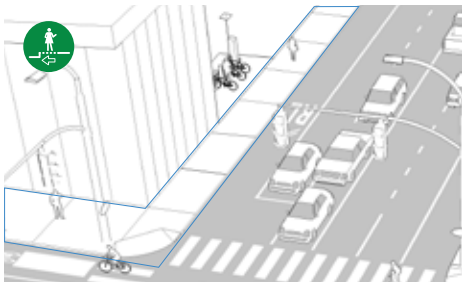

## Enhanced Bicycle Facilities

A variety of roadway and signalization improvements can improve safety and increase comfort for people bicycling. These include bicycle lanes physically separated from vehicular traffic, such as buffered lanes, cycle tracks, painted bicycle lanes, conflict zone markings at/approaching intersections, bicycle boxes, and bicycle-prioritized signalization.




## Sidewalk Addition or Widening

Widening or adding sidewalks improves safety, comfort and convenience for people of all ages and abilities. Wider sidewalks create more room for streetscape elements that enhance comfort and convenience, such as street furniture, bus waiting areas, landscaping, and trees.

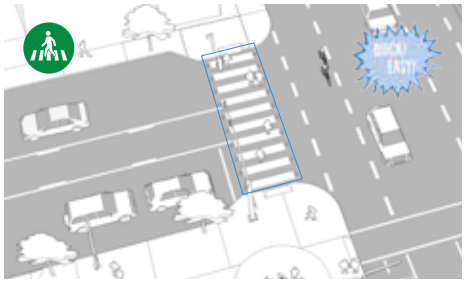



## Traffic Calming

Traffic calming decreases speeds along streets with heavy, fast-moving traffic in order to increase safety and comfort for all users of the street. Traffic calming treatments include physical measures such as curb extensions to narrow the roadway, narrowed travel lanes to promote slower driving speeds, and diverters to limit vehicle cut-through traffic on neighborhood streets.


## Enhanced Pedestrian Crossings

Enhancing existing crossings can help protect station users by increasing their visibility to motorists. Crossing times can be made longer and to occur more often. In addition to enhancing existing crosswalks, adding well-marked crosswalks at unsignalized intersections and at midblock locations can improve convenience and safety.



# COST ESTIMATES

The following tables present the cost estimates for six of the 20 case studies. These estimates can help guide the costing of your own first-last mile project and inform its feasibility. The six case studies were chosen randomly, but represent a wide range of existing conditions.

## CASE STUDY 3

| | Item Number | Item Description | Unit | Unit Cost | Estimated Quantities | Item Cost |
|---|---|---|---|---|---|---|
| PEDESTRIAN | 1.1 | New Traffic Signal - Single Post | EA | $6,000 | | $0 |
| | 1.2 | New Traffic Signal - Post & Mast Arm | EA | $25,000 | | $0 |
| | 1.3 | New Traffic Signal | EA | $250,000 | 1 | $250,000 |
| | 1.4 | Signal Modification (protected lefts) | EA | $40,000 | 2 | $80,000 |
| | 1.5 | RRFB Flashing Beacon (Solar) | EA | $15,000 | 6 | $90,000 |
| | 1.6 | Pedestrian Scramble Phase | EA | $50,000 | 4 | $200,000 |
| | 1.7 | Pedestrian (Countdown) Signal | EA | $900 | 128 | $115,200 |
| | 1.8 | Pedestrian Push Button with Sign (includes new post) | EA | $1,400 | 2 | $2,800 |
| | 1.9 | Pedestrian Push Button with Sign (attach to exist pole) | EA | $700 | 2 | $1,400 |
| | 1.10 | Crosswalk (Striped Continental) | EA | $4,000 | 50 | $200,000 |
| | 1.11 | Crosswalk (In-Pavement Flashing Markers) | EA | $35,000 | 6 | $210,000 |
| | 1.12 | Thermoplastic Pavement Marking (Symbols, Arrows, Letters, etc.) | EA | $250 | 30 | $7,500 |
| | 1.13 | Curb Ramp (incl detectable warning surface) | EA | $5,000 | 164 | $820,000 |
| | 1.14 | Remove Existing Tree | EA | $900 | 2 | $1,800 |
| | 1.15 | Construct Sidewalk | SF | $10 | 15,200 | $152,000 |
| | 1.16 | Construct Curb and Gutter | LF | $24 | 500 | $12,000 |
| | 1.17 | Remove Concrete Curb and Gutter | LF | $16 | 500 | $8,000 |
| | 1.18 | Remove Sidewalk | SF | $3 | 2,000 | $6,000 |
| | 1.19 | Trees / Landscape | Block | $40,000 | 32 | $1,280,000 |
| | 1.20 | 60 Day Maintenance | EA | $3,500 | 16 | $56,000 |
| | 1.21 | Street Lighting | EA | $3,000 | 108 | $324,000 |
| | 1.22 | Wayfinding Signs | EA | $900 | 40 | $36,000 |
| | 1.23 | Bus Shelter | EA | $12,000 | 12 | $144,000 |
| | 1.24 | Bench | EA | $1,600 | 40 | $64,000 |
| | 1.25 | Trash Receptacle | EA | $1,400 | 52 | $72,800 |
| | | Pedestrian Subtotal | | | | $4,130,000 |
| BICYCLE | 2.1 | Bicycle Parking (Inverted-U rack) | EA | $500 | 32 | $16,000 |
| | 2.2 | Bicycle Parking (7-bicycle wave rack) | EA | $750 | 22 | $16,500 |
| | 2.3 | Wayfinding Signs | EA | $900 | 48 | $43,200 |
| | 2.4 | One-way Cycle Track w/5' raised median - includes Pavement reconstruction and C&G, signing, and striping | Mile | $1,710,000 | | $0 |
| | 2.5 | One-way Cycle Track w/3' striped buffer - includes Pavement reconstruction and C&G, signing, and striping | Mile | $890,000 | 1.0 | $890,000 |
| | 2.6 | One-way Cycle Track w/5' raised median - includes signing and striping (no pavement reconstruction) | Mile | $930,000 | 2 | 1,860,000 |
| | 2.7 | One-way Cycle Track w/3' striped buffer - includes signing and striping (no pavement reconstruction) | Mile | $100,000 | 8 | $800,000 |
| | 2.8 | Class II Bike Lanes (Signing, Striping, & Pavement Reconstruction) | Mile | $655,000 | 1 | $655,000 |
| | 2.9 | Class II Bike Lanes (Signing and Striping Only) | Mile | $56,000 | 3.0 | $168,000 |
| | 2.10 | Class III Bike Route (Signing and Striping Only) | Mile | $17,000 | 2.0 | $34,000 |
| | 2.11 | Bicycle Signal (added to exist signalized intersection) | EA | $25,000 | 16 | $400,000 |
| | 2.12 | Bicycle Signal (added to exist unsignalized intersection) | EA | $250,000 | 1 | $250,000 |

# CASE STUDY 3 (CONTINUED)

| | Item Number | Item Description | Unit | Unit Cost | Estimated Quantities | Item Cost |
|---|---|---|---|---|---|---|
| BICYCLE | 2.13 | Bicycle Loop Detection | EA | $2,500 | 48 | $120,000 |
| | 2.14 | Bicycle Push Button (attach to exist pole) | EA | $700 | 32 | $22,400 |
| | 2.15 | Bicycle and Pedestrian Bridge | SF | $250 | | $0 |
| | | Bicycle Subtotal | | | | $5,280,000 |
| TRAFFIC CALMING | 3.1 | Median Refuge Islands | SF | $15 | 6,400 | $96,000 |
| | 3.2 | Curb Extensions (w/directional curb ramps) | EA | $30,000 | 20 | $600,000 |
| | 3.3 | Neighborhood Traffic Circles | EA | $25,000 | 8 | $200,000 |
| | 3.4 | Speed Treatments (humps) | EA | $2,500 | 27 | $67,500 |
| | 3.5 | Diverters | EA | $20,000 | 12 | $240,000 |
| | 3.6 | Chicanes | EA | $10,000 | 8 | $80,000 |
| | 3.7 | Bollards (Metal) | EA | $800 | 32 | $25,600 |
| | 3.8 | Stop Sign | EA | $300 | 6 | $1,800 |
| | | Traffic Calming Subtotal | | | | $1,310,000 |
| | | - Subtotal - | | | | $10,720,000 |
| MOBILI-ZATION | 4.1 | Mobilization (10% Items 1 to 3) | | | | $1,070,000 |
| | | PROJECT SUBTOTAL (Items 1 to 4) | | | | $11,790,000 |
| OTHER PROJECT SUPPORT | 5.1 | R/W Allowance (20% Project Subtotal) | | | | $2,350,000 |
| | 5.2 | Utility Relocations (10% Project Subtotal) | | | | $1,170,000 |
| | 5.3 | Contingency (25% Project Subtotal + R/W + Utilities) | | | | $3,820,000 |
| | 5.4 | Planning/Design/Environmental/CM (25% Project Subtotal) | | | | $2,940,000 |
| | 5.5 | NPDES/Water Quality/BMPs (3% Project Subtotal) | | | | $350,000 |
| | | Other Project Support Subtotal | | | | $10,630,000 |
| | | PROJECT TOTAL (per square mile) | | | | $22,400,000 |

Assuming Traffic Calming (3) cost evenly split for Pedestrian (1) and Bicycle (2), and other Project Support (5) cost is split proportionally:

| | |
|---|---|
| PEDESTRIAN GRAND TOTAL (per square mile) | $10,000,000 |
| BICYCLE GRAND TOTAL (per square mile) | $12,400,000 |

# CASE STUDY 4

| | Item Number | Item Description | Unit | Unit Cost | Estimated Quantities | Item Cost |
|---|---|---|---|---|---|---|
| PEDESTRIAN | 1.1 | New Traffic Signal - Single Post | EA | $6,000 | | $0 |
| | 1.2 | New Traffic Signal - Post & Mast Arm | EA | $25,000 | | $0 |
| | 1.3 | New Traffic Signal | EA | $250,000 | 0 | $0 |
| | 1.4 | Signal Modification (protected lefts) | EA | $40,000 | 2 | $80,000 |
| | 1.5 | RRFB Flashing Beacon (Solar) | EA | $15,000 | 2 | $30,000 |
| | 1.6 | Pedestrian Scramble Phase | EA | $50,000 | 9 | $450,000 |
| | 1.7 | Pedestrian (Countdown) Signal | EA | $900 | 256 | $230,400 |
| | 1.8 | Pedestrian Push Button with Sign (includes new post) | EA | $1,400 | 2 | $2,800 |
| | 1.9 | Pedestrian Push Button with Sign (attach to exist pole) | EA | $700 | 4 | $2,800 |
| | 1.10 | Crosswalk (Striped Continental) | EA | $4,000 | 88 | $352,000 |
| | 1.11 | Crosswalk (In-Pavement Flashing Markers) | EA | $35,000 | 4 | $140,000 |
| | 1.12 | Thermoplastic Pavement Marking (Symbols, Arrows, Letters, etc.) | EA | $250 | 24 | $6,000 |
| | 1.13 | Curb Ramp (incl detectable warning surface) | EA | $5,000 | 188 | $940,000 |
| | 1.14 | Remove Existing Tree | EA | $900 | 2 | $1,800 |
| | 1.15 | Construct Sidewalk | SF | $10 | 5,200 | $52,000 |
| | 1.16 | Construct Curb and Gutter | LF | $24 | 500 | $12,000 |
| | 1.17 | Remove Concrete Curb and Gutter | LF | $16 | 500 | $8,000 |
| | 1.18 | Remove Sidewalk | SF | $3 | 1,000 | $3,000 |
| | 1.19 | Trees / Landscape | Block | $40,000 | 12 | $480,000 |
| | 1.20 | 60 Day Maintenance | EA | $3,500 | 6 | $21,000 |
| | 1.21 | Street Lighting | EA | $3,000 | 27 | $81,000 |
| | 1.22 | Wayfinding Signs | EA | $900 | 32 | $28,800 |
| | 1.23 | Bus Shelter | EA | $12,000 | 15 | $180,000 |
| | 1.24 | Bench | EA | $1,600 | 40 | $64,000 |
| | 1.25 | Trash Receptacle | EA | $1,400 | 55 | $77,000 |
| | | Pedestrian Subtotal | | | | $3,240,000 |
| BICYCLE | 2.1 | Bicycle Parking (Inverted-U rack) | EA | $500 | 32 | $16,000 |
| | 2.2 | Bicycle Parking (7-bicycle wave rack) | EA | $750 | 24 | $18,000 |
| | 2.3 | Wayfinding Signs | EA | $900 | 48 | $43,200 |
| | 2.4 | One-way Cycle Track w/5' raised median - includes Pavement reconstruction and C&G, signing, and striping | Mile | $1,710,000 | | $0 |
| | 2.5 | One-way Cycle Track w/3' striped buffer - includes Pavement reconstruction and C&G, signing, and striping | Mile | $890,000 | 2 | $1,780,000 |
| | 2.6 | One-way Cycle Track w/5' raised median - includes signing and striping (no pavement reconstruction) | Mile | $930,000 | 2 | $1,860,000 |
| | 2.7 | One-way Cycle Track w/3' striped buffer - includes signing and striping (no pavement reconstruction) | Mile | $100,000 | 3 | $300,000 |
| | 2.8 | Class II Bike Lanes (Signing, Striping, & Pavement Reconstruction) | Mile | $655,000 | | $0 |
| | 2.9 | Class II Bike Lanes (Signing and Striping Only) | Mile | $56,000 | 3.0 | $168,000 |
| | 2.10 | Class III Bike Route (Signing and Striping Only) | Mile | $17,000 | 4.0 | $68,000 |
| | 2.11 | Bicycle Signal (added to exist signalized intersection) | EA | $25,000 | 16 | $400,000 |
| | 2.12 | Bicycle Signal (added to exist unsignalized intersection) | EA | $250,000 | | $0 |

# CASE STUDY 4 (CONTINUED)

| | Item Number | Item Description | Unit | Unit Cost | Estimated Quantities | Item Cost |
|---|---|---|---|---|---|---|
| BICYCLE | 2.13 | Bicycle Loop Detection | EA | $2,500 | 32 | $80,000 |
| | 2.14 | Bicycle Push Button (attach to exist pole) | EA | $700 | 28 | $19,600 |
| | 2.15 | Bicycle and Pedestrian Bridge | SF | $250 | | $0 |
| | 2.16 | Bike Share Station | EA | $40,000 | 9 | $360,000 |
| | | Bicycle Subtotal | | | | $5,110,000 |
| TRAFFIC CALMING | 3.1 | Median Refuge Islands | SF | $15 | 6,400 | $96,000 |
| | 3.2 | Curb Extensions (w/directional curb ramps) | EA | $30,000 | 16 | $480,000 |
| | 3.3 | Neighborhood Traffic Circles | EA | $25,000 | 12 | $300,000 |
| | 3.4 | Speed Treatments (humps) | EA | $2,500 | 18 | $45,000 |
| | 3.5 | Diverters | EA | $20,000 | 16 | $320,000 |
| | 3.6 | Chicanes | EA | $10,000 | 32 | $0 |
| | 3.7 | Bollards (Metal) | EA | $800 | 6 | $25,600 |
| | 3.8 | Stop Sign | EA | $300 | 8 | $1,800 |
| | | Traffic Calming Subtotal | | | | $1,270,000 |
| | | - Subtotal - | | | | $9,620,000 |
| MOBILI-ZATION | 4.1 | Mobilization (10% Items 1 to 3) | | | | $960,000 |
| | | PROJECT SUBTOTAL (Items 1 to 4) | | | | $10,580,000 |
| OTHER PROJECT SUPPORT | 5.1 | R/W Allowance (20% Project Subtotal) | | | | $2,110,000 |
| | 5.2 | Utility Relocations (10% Project Subtotal) | | | | $1,050,000 |
| | 5.3 | Contingency (25% Project Subtotal + R/W + Utilities) | | | | $3,430,000 |
| | 5.4 | Planning/Design/Environmental/CM (25% Project Subtotal) | | | | $2,640,000 |
| | 5.5 | NPDES/Water Quality/BMPs (3% Project Subtotal) | | | | $310,000 |
| | | Other Project Support Subtotal | | | | $9,540,000 |
| | | PROJECT TOTAL (per square mile) | | | | $20,100,000 |

Assuming Traffic Calming (3) cost evenly split for Pedestrian (1) and Bicycle (2), and other Project Support (5) cost is split proportionally:

| | |
|---|---|
| PEDESTRIAN GRAND TOTAL (per square mile) | $7,600,000 |
| BICYCLE GRAND TOTAL (per square mile) | $12,500,000 |

# CASE STUDY 6

| | Item Number | Item Description | Unit | Unit Cost | Estimated Quantities | Item Cost |
|---|---|---|---|---|---|---|
| PEDESTRIAN | 1.1 | New Traffic Signal - Single Post | EA | $6,000 | | $0 |
| | 1.2 | New Traffic Signal - Post & Mast Arm | EA | $25,000 | | $0 |
| | 1.3 | New Traffic Signal | EA | $250,000 | 1 | $250,000 |
| | 1.4 | Signal Modification (protected lefts) | EA | $40,000 | 2 | $80,000 |
| | 1.5 | RRFB Flashing Beacon (Solar) | EA | $15,000 | 4 | $60,000 |
| | 1.6 | Pedestrian Scramble Phase | EA | $50,000 | 2 | $100,000 |
| | 1.7 | Pedestrian (Countdown) Signal | EA | $900 | 128 | $115,200 |
| | 1.8 | Pedestrian Push Button with Sign (includes new post) | EA | $1,400 | 6 | $8,400 |
| | 1.9 | Pedestrian Push Button with Sign (attach to exist pole) | EA | $700 | | $0 |
| | 1.10 | Crosswalk (Striped Continental) | EA | $4,000 | 52 | $208,000 |
| | 1.11 | Crosswalk (In-Pavement Flashing Markers) | EA | $35,000 | 4 | $140,000 |
| | 1.12 | Thermoplastic Pavement Marking (Symbols, Arrows, Letters, etc.) | EA | $250 | 22 | $5,500 |
| | 1.13 | Curb Ramp (incl detectable warning surface) | EA | $5,000 | 185 | $926,400 |
| | 1.14 | Remove Existing Tree | EA | $900 | 8 | $7,200 |
| | 1.15 | Construct Sidewalk | SF | $10 | 48,600 | 486,000 |
| | 1.16 | Construct Curb and Gutter | LF | $24 | 1,000 | $24,000 |
| | 1.17 | Remove Concrete Curb and Gutter | LF | $16 | 1,000 | $16,000 |
| | 1.18 | Remove Sidewalk | SF | $3 | 5,000 | $15,000 |
| | 1.19 | Trees / Landscape | Block | $40,000 | 6 | $240,000 |
| | 1.20 | 60 Day Maintenance | EA | $3,500 | 3 | $10,500 |
| | 1.21 | Street Lighting | EA | $3,000 | 74 | $222,000 |
| | 1.22 | Wayfinding Signs | EA | $900 | 64 | $57,600 |
| | 1.23 | Bus Shelter | EA | $12,000 | 26 | $312,000 |
| | 1.24 | Bench | EA | $1,600 | 20 | $32,000 |
| | 1.25 | Trash Receptacle | EA | $1,400 | 46 | $64,400 |
| | | Pedestrian Subtotal | | | | $3,380,000 |
| BICYCLE | 2.1 | Bicycle Parking (Inverted-U rack) | EA | $500 | 64 | $32,000 |
| | 2.2 | Bicycle Parking (7-bicycle wave rack) | EA | $750 | 16 | $12,000 |
| | 2.3 | Wayfinding Signs | EA | $900 | 48 | $43,200 |
| | 2.4 | One-way Cycle Track w/5' raised median - includes Pavement reconstruction and C&G, signing, and striping | Mile | $1,710,000 | | $0 |
| | 2.5 | One-way Cycle Track w/3' striped buffer - includes Pavement reconstruction and C&G, signing, and striping | Mile | $890,000 | 1 | $890,000 |
| | 2.6 | One-way Cycle Track w/5' raised median - includes signing and striping (no pavement reconstruction) | Mile | $930,000 | 2 | $1,860,000 |
| | 2.7 | One-way Cycle Track w/3' striped buffer - includes signing and striping (no pavement reconstruction) | Mile | $100,000 | 1 | $100,000 |
| | 2.8 | Class II Bike Lanes (Signing, Striping, & Pavement Reconstruction) | Mile | $655,000 | 1 | $655,000 |
| | 2.9 | Class II Bike Lanes (Signing and Striping Only) | Mile | $56,000 | 2 | $112,000 |
| | 2.10 | Class III Bike Route (Signing and Striping Only) | Mile | $17,000 | 9.0 | $153,000 |
| | 2.11 | Bicycle Signal (added to exist signalized intersection) | EA | $25,000 | 16 | $400,000 |
| | 2.12 | Bicycle Signal (added to exist unsignalized intersection) | EA | $250,000 | | $0 |

# CASE STUDY 6 (CONTINUED)

| | Item Number | Item Description | Unit | Unit Cost | Estimated Quantities | Item Cost |
|---|---|---|---|---|---|---|
| BICYCLE | 2.13 | Bicycle Loop Detection | EA | $2,500 | 32 | $80,000 |
| | 2.14 | Bicycle Push Button (attach to exist pole) | EA | $700 | 36 | $25,200 |
| | 2.15 | Bicycle and Pedestrian Bridge | SF | $250 | 35,700 | $8,925,000 |
| | | Bicycle Subtotal | | | | $13,290,000 |
| TRAFFIC CALMING | 3.1 | Median Refuge Islands | SF | $15 | 6,400 | $96,000 |
| | 3.2 | Curb Extensions (w/directional curb ramps) | EA | $30,000 | 8 | $240,000 |
| | 3.3 | Neighborhood Traffic Circles | EA | $25,000 | 16 | $400,000 |
| | 3.4 | Speed Treatments (humps) | EA | $2,500 | 27 | $67,500 |
| | 3.5 | Diverters | EA | $20,000 | 2 | $40,000 |
| | 3.6 | Chicanes | EA | $10,000 | | $0 |
| | 3.7 | Bollards (Metal) | EA | $800 | 32 | $25,600 |
| | 3.8 | Stop Sign | EA | $300 | 8 | $2,400 |
| | | Traffic Calming Subtotal | | | | $870,000 |
| | | - Subtotal - | | | | $17,540,000 |
| MOBILI-ZATION | 4.1 | Mobilization (10% Items 1 to 3) | | | | $1,750,000 |
| | | PROJECT SUBTOTAL (Items 1 to 4) | | | | $19,290,000 |
| OTHER PROJECT SUPPORT | 5.1 | R/W Allowance (20% Project Subtotal) | | | | $3,850,000 |
| | 5.2 | Utility Relocations (10% Project Subtotal) | | | | $1,920,000 |
| | 5.3 | Contingency (25% Project Subtotal + R/W + Utilities) | | | | $6,260,000 |
| | 5.4 | Planning/Design/Environmental/CM (25% Project Subtotal) | | | | $4,820,000 |
| | 5.5 | NPDES/Water Quality/BMPs (3% Project Subtotal) | | | | $570,000 |
| | | Other Project Support Subtotal | | | | $17,420,000 |
| | | PROJECT TOTAL (per square mile) | | | | $36,700,000 |

Assuming Traffic Calming (3) cost evenly split for Pedestrian (1) and Bicycle (2), and other Project Support (5) cost is split proportionally:

| | |
|---|---|
| PEDESTRIAN GRAND TOTAL (per square mile) | $7,700,000 |
| BICYCLE GRAND TOTAL (per square mile) | $29,000,000 |

# CASE STUDY 8

| | Item Number | Item Description | Unit | Unit Cost | Estimated Quantities | Item Cost |
|---|---|---|---|---|---|---|
| PEDESTRIAN | 1.1 | New Traffic Signal - Single Post | EA | $6,000 | | $0 |
| | 1.2 | New Traffic Signal - Post & Mast Arm | EA | $25,000 | | $0 |
| | 1.3 | New Traffic Signal | EA | $250,000 | 1 | $250,000 |
| | 1.4 | Signal Modification (protected lefts) | EA | $40,000 | 4 | $160,000 |
| | 1.5 | RRFB Flashing Beacon (Solar) | EA | $15,000 | 4 | $160,000 |
| | 1.6 | Pedestrian Scramble Phase | EA | $50,000 | 2 | $100,000 |
| | 1.7 | Pedestrian (Countdown) Signal | EA | $900 | 128 | $115,200 |
| | 1.8 | Pedestrian Push Button with Sign (includes new post) | EA | $1,400 | 2 | $2,800 |
| | 1.9 | Pedestrian Push Button with Sign (attach to exist pole) | EA | $700 | 2 | $1,400 |
| | 1.10 | Crosswalk (Striped Continental) | EA | $4,000 | 28 | $112,000 |
| | 1.11 | Crosswalk (In-Pavement Flashing Markers) | EA | $35,000 | 4 | $140,000 |
| | 1.12 | Thermoplastic Pavement Marking (Symbols, Arrows, Letters, etc.) | EA | $250 | 22 | $5,500 |
| | 1.13 | Curb Ramp (incl detectable warning surface) | EA | $5,000 | 88 | $440,000 |
| | 1.14 | Remove Existing Tree | EA | $900 | 2 | $1,800 |
| | 1.15 | Construct Sidewalk | SF | $10 | 11,600 | $116,000 |
| | 1.16 | Construct Curb and Gutter | LF | $24 | 500 | $12,000 |
| | 1.17 | Remove Concrete Curb and Gutter | LF | $16 | 500 | $8,000 |
| | 1.18 | Remove Sidewalk | SF | $3 | 1,000 | $3,000 |
| | 1.19 | Trees / Landscape | Block | $40,000 | 17 | $680,000 |
| | 1.20 | 60 Day Maintenance | EA | $3,500 | 9 | $29,750 |
| | 1.21 | Street Lighting | EA | $3,000 | 92 | $276,000 |
| | 1.22 | Wayfinding Signs | EA | $900 | 40 | $36,000 |
| | 1.23 | Bus Shelter | EA | $12,000 | 16 | $192,000 |
| | 1.24 | Bench | EA | $1,600 | 30 | $48,000 |
| | 1.25 | Trash Receptacle | EA | $1,400 | 46 | $64,400 |
| | | Pedestrian Subtotal | | | | $2,950,000 |
| BICYCLE | 2.1 | Bicycle Parking (Inverted-U rack) | EA | $500 | 32 | $16,000 |
| | 2.2 | Bicycle Parking (7-bicycle wave rack) | EA | $750 | 16 | $12,000 |
| | 2.3 | Wayfinding Signs | EA | $900 | 56 | $50,400 |
| | 2.4 | One-way Cycle Track w/5' raised median - includes Pavement reconstruction and C&G, signing, and striping | Mile | $1,710,000 | | $0 |
| | 2.5 | One-way Cycle Track w/3' striped buffer - includes Pavement reconstruction and C&G, signing, and striping | Mile | $890,000 | | $0 |
| | 2.6 | One-way Cycle Track w/5' raised median - includes signing and striping (no pavement reconstruction) | Mile | $930,000 | | $0 |
| | 2.7 | One-way Cycle Track w/3' striped buffer - includes signing and striping (no pavement reconstruction) | Mile | $100,000 | | $0 |
| | 2.8 | Class II Bike Lanes (Signing, Striping, & Pavement Reconstruction) | Mile | $655,000 | | $0 |
| | 2.9 | Class II Bike Lanes (Signing and Striping Only) | Mile | $56,000 | 3.0 | $168,000 |
| | 2.10 | Class III Bike Route (Signing and Striping Only) | Mile | $17,000 | 12.0 | $204,000 |
| | 2.11 | Bicycle Signal (added to exist signalized intersection) | EA | $25,000 | 16 | $400,000 |
| | 2.12 | Bicycle Signal (added to exist unsignalized intersection) | EA | $250,000 | 1 | $250,000 |

# CASE STUDY 8 (CONTINUED)

| | Item Number | Item Description | Unit | Unit Cost | Estimated Quantities | Item Cost |
|---|---|---|---|---|---|---|
| BICYCLE | 2.13 | Bicycle Loop Detection | EA | $2,500 | 32 | $80,000 |
| | 2.14 | Bicycle Push Button (attach to exist pole) | EA | $700 | 8 | $5,600 |
| | 2.15 | Bicycle and Pedestrian Bridge | SF | $250 | | $0 |
| | | Bicycle Subtotal | | | | $1,190,000 |
| TRAFFIC CALMING | 3.1 | Median Refuge Islands | SF | $15 | 6,400 | $96,000 |
| | 3.2 | Curb Extensions (w/directional curb ramps) | EA | $30,000 | 18 | $540,000 |
| | 3.3 | Neighborhood Traffic Circles | EA | $25,000 | 8 | $200,000 |
| | 3.4 | Speed Treatments (humps) | EA | $2,500 | 18 | $45,000 |
| | 3.5 | Diverters | EA | $20,000 | 4 | $80,000 |
| | 3.6 | Chicanes | EA | $10,000 | 2 | $20,000 |
| | 3.7 | Bollards (Metal) | EA | $800 | 32 | $25,600 |
| | 3.8 | Stop Sign | EA | $300 | 6 | $1,800 |
| | | Traffic Calming Subtotal | | | | $1,010,000 |
| | | - Subtotal - | | | | $5,150,000 |
| MOBILI-ZATION | 4.1 | Mobilization (10% Items 1 to 3) | | | | $510,000 |
| | | PROJECT SUBTOTAL (Items 1 to 4) | | | | $5,660,000 |
| OTHER PROJECT SUPPORT | 5.1 | R/W Allowance (20% Project Subtotal) | | | | $1,130,000 |
| | 5.2 | Utility Relocations (10% Project Subtotal) | | | | $560,000 |
| | 5.3 | Contingency (25% Project Subtotal + R/W + Utilities) | | | | $1,830,000 |
| | 5.4 | Planning/Design/Environmental/CM (20% Project Subtotal) | | | | $1,410,000 |
| | 5.5 | NPDES/Water Quality/BMPs (3% Project Subtotal) | | | | $160,000 |
| | | Other Project Support Subtotal | | | | $5,090,000 |
| | | PROJECT TOTAL (per square mile) | | | | $10,800,000 |

Assuming Traffic Calming (3) cost evenly split for Pedestrian (1) and Bicycle (2), and other Project Support (5) cost is split proportionally:

| | |
|---|---|
| PEDESTRIAN GRAND TOTAL (per square mile) | $7,400,000 |
| BICYCLE GRAND TOTAL (per square mile) | $3,400,000 |

# CASE STUDY 16

| | Item Number | Item Description | Unit | Unit Cost | Estimated Quantities | Item Cost |
|---|---|---|---|---|---|---|
| PEDESTRIAN | 1.1 | New Traffic Signal - Single Post | EA | $6,000 | | $0 |
| | 1.2 | New Traffic Signal - Post & Mast Arm | EA | $25,000 | | $0 |
| | 1.3 | New Traffic Signal | EA | $250,000 | 1 | $250,000 |
| | 1.4 | Signal Modification (protected lefts) | EA | $40,000 | 4 | $160,000 |
| | 1.5 | RRFB Flashing Beacon (Solar) | EA | $15,000 | | $0 |
| | 1.6 | Pedestrian Scramble Phase | EA | $50,000 | | $0 |
| | 1.7 | Pedestrian (Countdown) Signal | EA | $900 | 128 | $115,200 |
| | 1.8 | Pedestrian Push Button with Sign (includes new post) | EA | $1,400 | 4 | $5,600 |
| | 1.9 | Pedestrian Push Button with Sign (attach to exist pole) | EA | $700 | 44 | $0 |
| | 1.10 | Crosswalk (Striped Continental) | EA | $4,000 | 3 | $176,000 |
| | 1.11 | Crosswalk (In-Pavement Flashing Markers) | EA | $35,000 | 12 | $105,000 |
| | 1.12 | Thermoplastic Pavement Marking (Symbols, Arrows, Letters, etc.) | EA | $250 | 138 | $3,000 |
| | 1.13 | Curb Ramp (incl detectable warning surface) | EA | $5,000 | 8 | $690,800 |
| | 1.14 | Remove Existing Tree | EA | $900 | 100,200 | $7,200 |
| | 1.15 | Construct Sidewalk | SF | $10 | 7,000 | $1,002,000 |
| | 1.16 | Construct Curb and Gutter | LF | $24 | 7,000 | $168,000 |
| | 1.17 | Remove Concrete Curb and Gutter | LF | $16 | 10,000 | $112,000 |
| | 1.18 | Remove Sidewalk | SF | $3 | 8 | $30,000 |
| | 1.19 | Trees / Landscape | Block | $40,000 | 4 | $320,000 |
| | 1.20 | 60 Day Maintenance | EA | $3,500 | 86 | $14,000 |
| | 1.21 | Street Lighting | EA | $3,000 | 64 | $258,000 |
| | 1.22 | Wayfinding Signs | EA | $900 | 16 | $57,600 |
| | 1.23 | Bus Shelter | EA | $12,000 | 8 | $192,000 |
| | 1.24 | Bench | EA | $1,600 | 24 | $12,800 |
| | 1.25 | Trash Receptacle | EA | $1,400 | 46 | $33,600 |
| | | Pedestrian Subtotal | | | | $3,710,000 |
| BICYCLE | 2.1 | Bicycle Parking (Inverted-U rack) | EA | $500 | 64 | $32,000 |
| | 2.2 | Bicycle Parking (7-bicycle wave rack) | EA | $750 | 4 | $3,000 |
| | 2.3 | Wayfinding Signs | EA | $900 | 32 | $28,800 |
| | 2.4 | One-way Cycle Track w/5' raised median - includes Pavement reconstruction and C&G, signing, and striping | Mile | $1,710,000 | | $0 |
| | 2.5 | One-way Cycle Track w/3' striped buffer - includes Pavement reconstruction and C&G, signing, and striping | Mile | $890,000 | 2 | $1,780,000 |
| | 2.6 | One-way Cycle Track w/5' raised median - includes signing and striping (no pavement reconstruction) | Mile | $930,000 | | $0 |
| | 2.7 | One-way Cycle Track w/3' striped buffer - includes signing and striping (no pavement reconstruction) | Mile | $100,000 | | $0 |
| | 2.8 | Class II Bike Lanes (Signing, Striping, & Pavement Reconstruction) | Mile | $655,000 | | $0 |
| | 2.9 | Class II Bike Lanes (Signing and Striping Only) | Mile | $56,000 | 2 | $112,000 |
| | 2.10 | Class III Bike Route (Signing and Striping Only) | Mile | $17,000 | 4 | $68,000 |
| | 2.11 | Bicycle Signal (added to exist signalized intersection) | EA | $25,000 | 16 | $400,000 |
| | 2.12 | Bicycle Signal (added to exist unsignalized intersection) | EA | $250,000 | 1 | $250,000 |

# CASE STUDY 16 (CONTINUED)

| | Item Number | Item Description | Unit | Unit Cost | Estimated Quantities | Item Cost |
|---|---|---|---|---|---|---|
| BICYCLE | 2.13 | Bicycle Loop Detection | EA | $2,500 | 32 | $80,000 |
| | 2.14 | Bicycle Push Button (attach to exist pole) | EA | $700 | 32 | $22,400 |
| | 2.15 | Bicycle and Pedestrian Bridge | SF | $250 | | $0 |
| | | Bicycle Subtotal | | | | $2,780,000 |
| TRAFFIC CALMING | 3.1 | Median Refuge Islands | SF | $15 | 12,800 | $192,000 |
| | 3.2 | Curb Extensions (w/directional curb ramps) | EA | $30,000 | 4 | $120,000 |
| | 3.3 | Neighborhood Traffic Circles | EA | $25,000 | 8 | $200,000 |
| | 3.4 | Speed Treatments (humps) | EA | $2,500 | 27 | $67,500 |
| | 3.5 | Diverters | EA | $20,000 | 2 | $40,000 |
| | 3.6 | Chicanes | EA | $10,000 | | $0 |
| | 3.7 | Bollards (Metal) | EA | $800 | 88 | $70,400 |
| | 3.8 | Stop Sign | EA | $300 | 6 | $1,800 |
| | | Traffic Calming Subtotal | | | | $690,000 |
| | | - Subtotal - | | | | $7,180,000 |
| MOBILI-ZATION | 4.1 | Mobilization (10% Items 1 to 3) | | | | $710,000 |
| | | PROJECT SUBTOTAL (Items 1 to 4) | | | | $7,890,000 |
| OTHER PROJECT SUPPORT | 5.1 | R/W Allowance (20% Project Subtotal) | | | | $1,570,000 |
| | 5.2 | Utility Relocations (10% Project Subtotal) | | | | $780,000 |
| | 5.3 | Contingency (25% Project Subtotal + R/W + Utilities) | | | | $2,560,000 |
| | 5.4 | Planning/Design/Environmental/CM (20% Project Subtotal) | | | | $1,570,000 |
| | 5.5 | NPDES/Water Quality/BMPs (3% Project Subtotal) | | | | $230,000 |
| | | Other Project Support Subtotal | | | | $6,710,000 |
| | | PROJECT TOTAL (per square mile) | | | | $14,600,000 |

Assuming Traffic Calming (3) cost evenly split for Pedestrian (1) and Bicycle (2), and other Project Support (5) cost is split proportionally:

| | |
|---|---|
| PEDESTRIAN GRAND TOTAL (per square mile) | $8,200,000 |
| BICYCLE GRAND TOTAL (per square mile) | $6,500,000 |

# CASE STUDY 18

| | Item Number | Item Description | Unit | Unit Cost | Estimated Quantities | Item Cost |
|---|---|---|---|---|---|---|
| PEDESTRIAN | 1.1 | New Traffic Signal - Single Post | EA | $6,000 | | $0 |
| | 1.2 | New Traffic Signal - Post & Mast Arm | EA | $25,000 | | $0 |
| | 1.3 | New Traffic Signal | EA | $250,000 | 8 | $2,000,000 |
| | 1.4 | Signal Modification (protected lefts) | EA | $40,000 | 2 | $80,000 |
| | 1.5 | RRFB Flashing Beacon (Solar) | EA | $15,000 | 4 | $60,000 |
| | 1.6 | Pedestrian Scramble Phase | EA | $50,000 | 8 | $0 |
| | 1.7 | Pedestrian (Countdown) Signal | EA | $900 | 2 | $7,200 |
| | 1.8 | Pedestrian Push Button with Sign (includes new post) | EA | $1,400 | 56 | $2,800 |
| | 1.9 | Pedestrian Push Button with Sign (attach to exist pole) | EA | $700 | 6 | $0 |
| | 1.10 | Crosswalk (Striped Continental) | EA | $4,000 | 26 | $224,000 |
| | 1.11 | Crosswalk (In-Pavement Flashing Markers) | EA | $35,000 | 268 | $210,000 |
| | 1.12 | Thermoplastic Pavement Marking (Symbols, Arrows, Letters, etc.) | EA | $250 | 449,960 | $6,500 |
| | 1.13 | Curb Ramp (incl detectable warning surface) | EA | $5,000 | 21,000 | $1,340,000 |
| | 1.14 | Remove Existing Tree | EA | $900 | 4,200 | $0 |
| | 1.15 | Construct Sidewalk | SF | $10 | 9,000 | $4,499,600 |
| | 1.16 | Construct Curb and Gutter | LF | $24 | 72 | $504,000 |
| | 1.17 | Remove Concrete Curb and Gutter | LF | $16 | 36 | $67,200 |
| | 1.18 | Remove Sidewalk | SF | $3 | 354 | $27,000 |
| | 1.19 | Trees / Landscape | Block | $40,000 | 72 | $2,880,000 |
| | 1.20 | 60 Day Maintenance | EA | $3,500 | 56 | $126,000 |
| | 1.21 | Street Lighting | EA | $3,000 | 40 | $1,062,000 |
| | 1.22 | Wayfinding Signs | EA | $900 | 76 | $64,800 |
| | 1.23 | Bus Shelter | EA | $12,000 | 26 | $672,000 |
| | 1.24 | Bench | EA | $1,600 | 20 | $64,000 |
| | 1.25 | Trash Receptacle | EA | $1,400 | 46 | $106,400 |
| | | Pedestrian Subtotal | | | | $14,000,000 |
| BICYCLE | 2.1 | Bicycle Parking (Inverted-U rack) | EA | $500 | 20 | $10,000 |
| | 2.2 | Bicycle Parking (7-bicycle wave rack) | EA | $750 | 10 | $7,500 |
| | 2.3 | Wayfinding Signs | EA | $900 | 56 | $50,400 |
| | 2.4 | One-way Cycle Track w/5' raised median - includes Pavement reconstruction and C&G, signing, and striping | Mile | $1,710,000 | 1 | $1,710,000 |
| | 2.5 | One-way Cycle Track w/3' striped buffer - includes Pavement reconstruction and C&G, signing, and striping | Mile | $890,000 | 3.0 | $2,670,000 |
| | 2.6 | One-way Cycle Track w/5' raised median - includes signing and striping (no pavement reconstruction) | Mile | $930,000 | | $0 |
| | 2.7 | One-way Cycle Track w/3' striped buffer - includes signing and striping (no pavement reconstruction) | Mile | $100,000 | 2 | $150,000 |
| | 2.8 | Class II Bike Lanes (Signing, Striping, & Pavement Reconstruction) | Mile | $655,000 | 1.5 | $982,500 |
| | 2.9 | Class II Bike Lanes (Signing and Striping Only) | Mile | $56,000 | 1.0 | $56,000 |
| | 2.10 | Class III Bike Route (Signing and Striping Only) | Mile | $17,000 | 3.0 | $51,000 |
| | 2.11 | Bicycle Signal (added to exist signalized intersection) | EA | $25,000 | 1 | $25,000 |
| | 2.12 | Bicycle Signal (added to exist unsignalized intersection) | EA | $250,000 | 8 | $2,000,000 |

# CASE STUDY 18 (CONTINUED)

| | Item Number | Item Description | Unit | Unit Cost | Estimated Quantities | Item Cost |
|---|---|---|---|---|---|---|
| BICYCLE | 2.13 | Bicycle Loop Detection | EA | $2,500 | | $0 |
| | 2.14 | Bicycle Push Button (attach to exist pole) | EA | $700 | | $0 |
| | 2.15 | Bicycle and Pedestrian Bridge | SF | $250 | | $0 |
| | | Bicycle Subtotal | | | | $7,710,000 |
| TRAFFIC CALMING | 3.1 | Median Refuge Islands | SF | $15 | 3,200 | $48,000 |
| | 3.2 | Curb Extensions (w/directional curb ramps) | EA | $30,000 | 20 | $600,000 |
| | 3.3 | Neighborhood Traffic Circles | EA | $25,000 | 8 | $200,000 |
| | 3.4 | Speed Treatments (humps) | EA | $2,500 | 27 | $67,500 |
| | 3.5 | Diverters | EA | $20,000 | 12 | $240,000 |
| | 3.6 | Chicanes | EA | $10,000 | 12 | $120,000 |
| | 3.7 | Bollards (Metal) | EA | $800 | 16 | $12,800 |
| | 3.8 | Stop Sign | EA | $300 | 8 | $2,400 |
| | 3.9 | Construct street segment | LF | $190 | 2,900 | $551,000 |
| | | Traffic Calming Subtotal | | | | $1,290,000 |
| | | - Subtotal - | | | | $23,000,000 |
| MOBILI-ZATION | 4.1 | Mobilization (10% Items 1 to 3) | | | | $2,300,000 |
| | | PROJECT SUBTOTAL (Items 1 to 4) | | | | $25,300,000 |
| OTHER PROJECT SUPPORT | 5.1 | R/W Allowance (10% Project Subtotal) | | | | $2,530,000 |
| | 5.2 | Utility Relocations (10% Project Subtotal) | | | | $2,530,000 |
| | 5.3 | Contingency (25% Project Subtotal + R/W + Utilities) | | | | $7,590,000 |
| | 5.4 | Planning/Design/Environmental/CM (25% Project Subtotal) | | | | $6,320,000 |
| | 5.5 | NPDES/Water Quality/BMPs (3% Project Subtotal) | | | | $750,000 |
| | | Other Project Support Subtotal | | | | $19,720,000 |
| | | PROJECT TOTAL (per square mile) | | | | $45,000,000 |

Assuming Traffic Calming (3) cost evenly split for Pedestrian (1) and Bicycle (2), and other Project Support (5) cost is split proportionally:

| | |
|---|---|
| PEDESTRIAN GRAND TOTAL (per square mile) | $28,900,000 |
| BICYCLE GRAND TOTAL (per square mile) | $16,100,000 |