SAN JOAQUIN REGIONAL RAIL COMMISSION STATION/FACILITIES DEVELOPMENT COMMITTEE TELECONFERENCE MEETING

November 12, 2021 – 9:00 am

Call-In Information: +1 (646) 749-3335 Access Code: 810-666-973
GoToMeeting Link: https://global.gotomeeting.com/join/810666973

SPECIAL NOTICE
Coronavirus COVID-19

In accordance with Assembly Bill 361 (AB 361), San Joaquin Regional Rail Commission Station/Facilities Development Committee (Committee) Members will be attending this meeting via teleconference or videoconference. Members of the public may observe the meeting by dialing +1 (646) 749-3335 with access code: 810-666-973 or log-in using a computer, tablet or smartphone at GoToMeeting.com using link: https://global.gotomeeting.com/join/810666973

Please note that all members of the public will be placed on mute until such times allow for public comments to be made. If a person wishes to make a public comment during the meeting, to do so they must either 1) use GoToMeeting and will have the option to notify SJRRC staff by alerting them via the "Chat" function or they can 2) contact SJRRC staff via email at publiccommentssfdcommittee@acerail.com in which staff will read the comment aloud during the public comment period. Emailed public comments should be limited to approximately 240 words as comments will be limited to two (2) minutes per comment.

This Agenda shall be made available upon request in alternative formats to persons with a disability, as required by the Americans with Disabilities Act of 1990 (42 U.S.C. § 12132) and the Ralph M. Brown Act (California Government Code § 54954.2). Persons requesting a disability related modification or accommodation in order to participate in the meeting should contact San Joaquin Regional Rail Commission (SJRRC) staff, at (209) 944-6220, during regular business hours, at least twenty-four hours prior to the time of the meeting.

All proceedings before the Committee are conducted in English. Anyone wishing to address the Committee is advised to have an interpreter or to contact SJRRC during regular business hours at least 48 hours prior to the time of the meeting so that SJRRC can provide an interpreter. Any writings or documents provided to a majority of the Committee regarding any item on this agenda will be made available upon request in both English and Spanish for public inspection at the Office of the Executive Director located at 949 East Channel Street, Stockton, California, 95202 during normal business hours or by calling (209) 944-6220. The Agenda is available on the San Joaquin Regional Rail Commission website: https://www.sjrrc.com/station-facilities-development-committee/.

1. Call to Order, Roll Call Chair Zuber

Roll Call: Chiesa, Hume, Vice Chair Hothi, Chair Zuber

2. Public Comments

Persons wishing to address the Committee on any item of interest to the public regarding rail shall state their names and addresses and make their presentation. Please limit presentations to two minutes. The Committee cannot take action on matters not on the agenda unless the action is authorized by Section 54954.2 of the Government Code. Materials related to an item on the Agenda submitted to the Committee after distribution of the agenda packet are available for the public inspection in the Commission Office at 949 E. Channel Street during normal business hours. These documents are also available on the San Joaquin Regional Rail Commission website at https://www.sjrrc.com/ subject to staff's ability to post the documents prior to the meeting.

3. Consent Calendar

3.1 Minutes of Committee Meeting September 10, 2021 **ACTION**

3.2 Approve a Resolution of the San Joaquin Regional Rail Commission Station/Facilities Development Committee (Committee) Determining to Conduct Meetings of the Committee Using Teleconferencing Pursuant to Government Code 54953 as Amended by AB 361 for the Period November 12, 2021 to December 12, 2021 **ACTION**

4. Approve a Resolution of the San Joaquin Regional Rail Commission Station/Facilities Development Committee Approving the Valley Rail Station Design Guidelines to Include the Following Design Areas and Direct how time sensitive changes to the Guidelines will be made: **ACTION**

Site Circulation
Landscape
Vertical Circulation
Platform
Wayfinding
Facilities
Infrastructure
(David Lipari)

5. Valley Rail Program Update **INFORMATION**
(Stacey Mortensen)

6. Committee Member Comments

7. Adjournment

The next regular meeting is scheduled for:
December 10, 2021 – 9:00 am

SAN JOAQUIN REGIONAL RAIL COMMISSION
STATION/FACILITIES DEVELOPMENT COMMITTEE
Meeting of November 12, 2021

Item 3.1 **ACTION**

Minutes of Committee Meeting September 10, 2021

The meeting of the Station/Facilities Development Committee was held at 9:00 a.m., September 10, 2021 via teleconference.

1 Call to Order, Roll Call

Chair Zuber called the meeting to order at 9:00 a.m.

Members Present: Chiesa, Hume, Vice-Chair Hothi, Chair Zuber

Members Absent: None

2 Public Comments

There were no public comments.

3 Consent Calendar

3.1 Minutes of Committee Meeting August 13, 2021 **ACTION**

There were no comments on this item.

M/S/C (Hume/Chiesa) to Approve items 3.1 of the Consent Calendar.

Passed and Adopted by the San Joaquin Regional Rail Commission Station/Facilities Development Committee on the 10th day of September 2021 by the following vote to wit:

AYES:	4	Chiesa, Hume, Hothi, Zuber
NOES:	0	
ABSTAIN:	0	
ABSENT:	0	

4 **Overview of Valley Rail Station Vertical Circulation** **INFORMATION**

David Lipari gave a presentation on this item.

Chair Zuber inquired about limiting the non-elevator access to stairs only.

Member Hume commented on lighting and suggested installing lower pedestrian lighting as opposed to can lighting to prevent disruption in surrounding residents' backyards.

Bryan Pennino explained that dark sky fixtures are being considered.

Mr. Lipari explained that minimizing the structural components is important for the sight line and aesthetically pleasing ways to obstruct the view from surrounding residents while keeping it open to have a sense of security for people on the walkway are being considered.

Chair Zuber inquired about walking distance through an exit tunnel.

Mr. Lipari explained that the tunnel structure is 17 feet below grade and is about 50 percent less.

Chair Zuber inquired about elevator crossings and wheelchair users being limited to using the ramp.

Mr. Lipari explained that the recommendation is that there are no elevators for the under crossings and that the slopes of the ramps will be gentler than the code requires.

Ms. Mortensen added that the step count is just as important and that there is some more assessment that needs to be done.

Member Hothi inquired about similarity in station type costs.

Mr. Lipari explained that the over and under platforms are far more expensive than a side platform.

Mr. Ripperda explained that the under crossings are a little bit more expensive than the over crossings due to the excavations involved.

Ms. Mortensen inquired about the number of stations that have a side loaded platform.

Mr. Ripperda explained that there are five stations that will include a side loaded platform.

5 **Overview of Valley Rail Station Site Circulation** **INFORMATION**

David Lipari gave a presentation on this item.

Ms. Mortensen suggested that thought be put into the infrastructure for people to walk when exiting the station to the parking lot and their vehicles.

6 **Overview of Valley Rail Station Area/Landscape** **INFORMATION**

David Lipari gave a presentation on this item.

7 **Committee Member Comments**

Chair Zuber thanked staff for the work that they have done and commented that this is an impressive start.

8 **Adjournment**

The meeting was adjourned at 9:57 am.

The next regular meeting is scheduled for:
November 12, 2021 – 9:00 am

SAN JOAQUIN REGIONAL RAIL COMMISSION
STATION/FACILITIES DEVELOPMENT COMMITTEE
Meeting of November 12, 2021

STAFF REPORT

Item 3.2 **ACTION**

Approve a Resolution of the San Joaquin Regional Rail Commission Station/Facilities Development Committee (Committee) Determining to Conduct Meetings of the Committee Using Teleconferencing Pursuant to Government Code 54953 as Amended by AB 361 for the Period November 12, 2021 to December 12, 2021

Background:

On March 4, 2020, Governor Newsom declared a State of Emergency to make additional resources available, formalize emergency actions already underway across multiple state agencies and departments, and help the State prepare for a broader spread of COVID-19. On March 17, 2020, in response to the COVID-19 pandemic, Governor Newsom issued Executive Order N-29-20, which suspended certain provisions of the Ralph M. Brown Act in order to allow local legislative bodies to conduct meetings electronically without a physical meeting place.

On June 11, 2021, Governor Newsom issued Executive Order N-08-21, which among other things, rescinded his prior Executive Order N-29-20, effective October 1, 2021. At that point, agencies would have transitioned back to public meetings held in full compliance with the preexisting Brown Act teleconference rules. Since the Governor issued Executive Order N-08-21, the Delta variant has emerged, causing a spike in cases throughout the state. As a result, the Governor's proclaimed State of Emergency remains in effect, and state and local officials, including San Joaquin Public Health Services, the California Department of Public Health, and the Department of Industrial Relations, have imposed or recommended measures to promote social distancing.

On September 16, 2021, Governor signed Assembly Bill (AB) 361 into law, effective October 1, 2021, to allow agencies to use teleconferencing for public meetings during proclaimed state of emergencies without requiring the teleconference locations to be accessible to the public or a quorum of the members of the legislative body of the agency to participate from locations within the boundaries of the agency's jurisdiction. AB 361 will sunset on January 31, 2024.

Under AB 361, a local agency will be allowed to meet remotely without complying with prior Brown Act teleconference requirements when:

a. The local agency holds a meeting during a state of emergency declared by the Governor, and either
b. State or local health officials have imposed or recommended measures to promote social distancing, or
c. The legislative body finds that meeting in person would present imminent risks to the health or safety of attendees.

As discussed above, the state of emergency is currently in effect and state and local officials continue to recommend social distancing. Therefore, the Committee may continue to conduct meetings via teleconference, as long as it adheres to the following emergency requirements under Government Code Section 54953(e)(2), added by AB 361:

1. The legislative body gives notice and posts agendas as otherwise required by the Brown Act, including directions for how the public can access the meeting.
2. The legislative body does not take formal action on any item whenever there is a disruption in the meeting broadcast.
3. The public is allowed to provide comment in real time.
4. The legislative body allows time during a public comment period for members of the public to register with any internet website required to submit public comment.

On November 12, 2021, the SJRRC Committee held its regular meeting via teleconference for the first time under AB 361. In accordance with Government Code Section 54953(e)(1), the Commission must make the AB 361 finding within 30 days of the first time it uses AB 361. The resolution accompanying this staff report makes those findings. As a result, any Committee meetings occurring November 12, 2021, through December 12, 2021, use the teleconferencing option under AB 361.

For upcoming teleconference meetings, the Committee can continue to follow the AB 361 requirements by declaring every 30 days that it has reconsidered the circumstances of the state of emergency and either (1) the state of emergency continues to directly impact the ability of the members to meet safely in person, or (2) state or local officials continue to impose or recommend measures to promote social distancing. Resolutions making those findings will be presented at future meetings for consideration.

These findings can be made through the consent calendar.

Fiscal Impact:
There is no fiscal impact.

Recommendation:
Approve a Resolution of the San Joaquin Regional Rail Commission Station/Facilities Development Committee (Committee) Determining to Conduct Meetings of the Committee Using Teleconferencing Pursuant to Government Code 54953 as Amended by AB 361 for the Period November 12, 2021 to December 12, 2021.

SAN JOAQUIN REGIONAL RAIL COMMISSION STATION/FACILITIES DEVELOPMENT COMMITTEE RESOLUTION 21/22 -

RESOLUTION OF THE SAN JOAQUIN REGIONAL RAIL COMMISSION STATION/FACILITIES DEVELOPMENT COMMITTEE (COMMITTEE) DETERMINING TO CONDUCT MEETINGS OF THE COMMITTEE USING TELECONFERENCING PURSUANT TO GOVERNMENT CODE 54953 AS AMENDED BY AB 361 FOR THE PERIOD NOVEMBER 12, 2021 TO DECEMBER 12, 2021

WHEREAS, San Joaquin Regional Rail Commission (SJRRC) is committed to preserving and nurturing public access and participation in meetings of the Station/Facilities Development Committee; and

WHEREAS, all meetings of the SJRRC's legislative bodies are open and public, as required by the Ralph M. Brown Act (Cal. Gov. Code 54950 – 54963), so that any member of the public may attend, participate, and watch the District's legislative bodies conduct their business; and

WHEREAS, the Brown Act, Government Code section 54953(e), as amended by AB 361 (2021), makes provisions for remote teleconferencing participation in meetings by members of a legislative body, without compliance with the requirements of Government Code section 54953(b)(3), subject to the existence of certain conditions; and

WHEREAS, a required condition is that a state of emergency is declared by the Governor pursuant to Government Code section 8625, proclaiming the existence of conditions of disaster or of extreme peril to the safety of persons and property within the state caused by conditions as described in Government Code section 8558; and

WHEREAS, it is further required that state or local officials have imposed or recommended measures to promote social distancing, or, the legislative body meeting in person would present imminent risks to the health and safety of attendees; and

WHEREAS, on March 4, 2020, the Governor proclaimed a State of Emergency to exist in California as a result of the threat of COVID-19; and

WHEREAS, Cal-OSHA adopted emergency regulations (Section 3205) imposing requirements on California employers, including measures to promote social distancing; and

WHEREAS, one or more of the counties within the SJRRC's boundaries remain under a Local Health Emergency due to the COVID-19 pandemic, acknowledging that close contact to other persons increases the risk of transmission; and

WHEREAS, currently the dominant strain of COVID-19 in the country is more transmissible than prior variants of the virus, may cause more severe illness, and that even fully vaccinated individuals can spread the virus to others resulting in rapid and

alarming rates of COVID-19 cases and hospitalizations, therefore, meeting in person would present imminent risks to the health or safety of attendees.

WHEREAS, on November 12, 2021, the SJRRC Station/Facilities Development Committee held its regular meeting remotely by teleconference/video conference for the first time in accordance with Government Code Section 54953(e) and hereby desires to adopt this resolution within 30 days of that meeting as required by said section in order to continue to use remote teleconference/videoconference for the 30 days thereafter.

NOW, THEREFORE, THE STATION/FACILITIES DEVELOPMENT COMMITTEE OF SJRRC DOES HEREBY RESOLVE AS FOLLOWS:

Section 1. Recitals. The Recitals set forth above are true and correct and are incorporated into this Resolution by this reference.

Section 2. Finding of Imminent Risk to Health or Safety of Attendees. The SJRRC Committee members do hereby find that the current dominant strain of COVID-19 in the country is more transmissible than prior variants of the virus, may cause more severe illness, and that even fully vaccinated individuals can spread the virus to others resulting in rapid and alarming rates of COVID-19 cases and hospitalizations has caused, and will continue to cause, conditions of peril to the safety of persons, thereby presenting an imminent risk to health and/or safety to SJRRC's employees and other representatives, and attendees of SJRRC's public meetings; and

Section 3. Teleconference Meetings. The Members of the Committee do hereby determine as a result of the State of Emergency proclaimed by the Governor, and the recommended measures to promote social distancing made by State and local officials that the SJRRC Committee may conduct their meetings without compliance with paragraph (3) of subdivision (b) of Government Code section 54953, as authorized by subdivision (e)(1)(A) and (B) of section 54953, and shall comply with the requirements to provide the public with access to the meetings as prescribed in paragraph (2) of subdivision (e) of section 54953; and

Section 4. Direction to Staff. The Executive Director and SJRRC staff are hereby authorized and directed to take all actions necessary to carry out the intent and purpose of this Resolution including, conducting open and public meetings in accordance with Government Code section 54953(e) and other applicable provisions of the Brown Act.

Section 5. Effective Date of Resolution. This Resolution shall take effect immediately and cover the period through December 12, 2021.

PASSED AND ADOPTED, by the San Joaquin Regional Rail Commission Station/Facilities Development Committee this 12th day of November 2021, by the following vote:

AYES:
NOES:
ABSENT:
ABSTAIN:

ATTEST:

SAN JOAQUIN REGIONAL RAIL COMMISSION STATION/FACILITIES DEVELOPMENT COMMITTEE

_____
STACEY MORTENSEN, Secretary

_____
LEO ZUBER, Chair

SAN JOAQUIN REGIONAL RAIL COMMISSION
STATION/FACILITIES DEVELOPMENT COMMITTEE
Meeting of November 12, 2021

STAFF REPORT

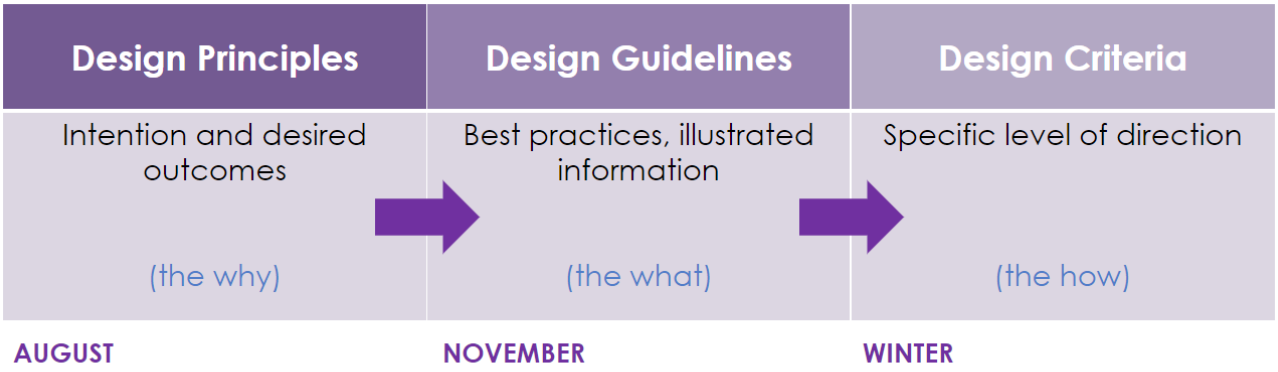
Item 4 **ACTION**

Approve a Resolution of the San Joaquin Regional Rail Commission Station/Facilities Development Committee Approving the Valley Rail Station Design Guidelines to Include the Following Design Areas and Direct how time sensitive changes to the Guidelines will be made:

1. **Site Circulation**
2. **Landscape**
3. **Vertical Circulation**
4. **Platform**
5. **Wayfinding**
6. **Facilities**
7. **Infrastructure**

Overview:
Designing a multi-modal transit station requires many decisions and requirements to be considered. To guide the designing of the Valley Rail Stations, staff has assembled a team to work together to provide design Principles, Guidelines, and Criteria to ensure consistency, efficiency, and prioritize the passenger experience, as well as ensure equitable access to the stations. At the August 13, 2021, Stations/Facilities Development Committee Meeting, the committee approved the "Design Principles". Based upon the "Design Principles", Design Guidelines have been drafted and included as an attachment to this item.

The Process:
The process to determine overarching direction to unify the individual station designs is a three-step process: Principles, Guidelines, and Criteria. Each step builds upon the previous step to provide the Why, What, and How to design a Valley Rail Station.



Principles: Establish the core principles that embody our commitment to people centric design, making passenger experience a priority, reflecting the goals to create a safe, accommodating, and positive total transit experience through enjoyable, sustainable, and resilient facilities.

Guidelines: Define the core transit system and facility elements performance attributes purposefully, prioritized for safety, passenger accommodation, and equity. Guidelines embrace both the system-wide elements of continuity as well as the elements of distinction that reflect the local context and community.

Criteria: Establish specific directives and standards incorporating a best value approach for the lowest total cost of facility ownership accounting for the costs of acquiring, operating, and maintaining facilities while sustaining their performance.

The Guidelines:
The Second Step in this process is to establish and approve the 'Design Guidelines'. The Design Guidelines are based on the Design Principles and will help the station design teams to advance the station designs of the Valley Rail Station Program. It is essential to consider the 'What'. The Design Guidelines identify a comprehensive list of work areas necessary for SJRRC and SJJPA to design and construct a Valley Rail Station. Ultimately, Valley Rail exists for the passenger to provide a new unified passenger experience with expanding travel options. The Design Guidelines include the following station design areas: Site Circulation, Landscape, Vertical Circulation, Platform, Wayfinding, Facilities, and Infrastructure. The detailed 'Design Guideline' document discusses each station design area providing context and direction for the station designers.

Fiscal Impact:
There is no fiscal impact.

Recommendation:
Approve a Resolution of the San Joaquin Regional Rail Commission Station/Facilities Development Committee Approving the Valley Rail Station Design Guidelines to Include the Following Design Areas and Direct how time sensitive changes to the Guidelines will be made:

1. Site Circulation
2. Landscape
3. Vertical Circulation
4. Platform
5. Wayfinding
6. Facilities
7. Infrastructure

VALLEY RAIL STATION DESIGN GUIDELINES

DRAFT 2021

ACE ALTAMONT CORRIDOR EXPRESS

AMTRAK SAN JOAQUINS℠

SAN JOAQUIN REGIONAL RAIL COMMISSION

San Joaquin Joint Powers Authority

Prepared for:
The San Joaquin Regional Rail Commission (SJRRC)

949 E. Channel St.
Stockton, CA
95202

Station/Facilities Development Committee
Leo Zuber - Chair
Mikey Hothi – Vice Chair
Patrick Hume -Member
Vito Chiesa - Member

SJJPA
Stacey Mortensen
Dan Leavitt
Tamika Smith
David Lipari
David Ripperda

Consultant Team
VIA Architecture
O'Dell Engineering
AECOM
Pennino Management Group

Table of Contents

Abbreviations:

AASHTO	American Association of State Highway and Transportation Officials
ACE	Altamont Corridor Express
ACS	American Community Survey
ADA	Americans with Disabilities Act
AHJ	Authorities Having Jurisdiction
ALPR	Automated License Plate Readers
APBP	Association of Pedestrians and Bicycle Professionals
APS	Accessible Pedestrian Signals
BNSF	Burlington Northern Santa Fe Railway
CA MUTCD	California Manual on Uniform Traffic Control Devices
CBC	California Building Code
CCTV	Closed Circuit Television (Video Surveillance)
CPTED	Crime Prevention Through Environmental Design
FEIR	Final Environmental Impact Report
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
IESNA	Illuminating Engineering Society of North America
LOS	Level of Service
NACTO	National Association of City Transportation Officials
NFPA	National Fire Protection Association
PTZ	Pan, Tilt, Zoom
ROW	Right-of-Way
SJJPA	San Joaquin Joint Powers Authority
SJRRC	San Joaquin Regional Rail Commission
UPRR	Union Pacific Railroad

1 INTRODUCTION

1.1 BACKGROUND

Valley Rail is a joint program by the San Joaquin Joint Powers Authority (SJJPA) and the San Joaquin Regional Rail Commission (SJRRC) to dramatically improve passenger rail service to the Central Valley, the Sacramento region and the Bay Area with both Amtrak San Joaquins and Altamont Corridor Express (ACE) service. The Valley Rail project will implement a **new transportation vision** for serving the Northern San Joaquin Valley, Sacramento region, and the Bay Area with integrated intercity and commuter rail service. The grant funds will help perform track improvements on the existing Union Pacific Railroad (UPRR) Sacramento subdivision freight corridor that runs just east of Interstate 5, and Fresno Subdivision south of Stockton, to make it usable for passenger service. In total sixteen stations will be built or upgraded to better serve customers and promote greater transit connectivity.

Valley Rail **improves geographic equity by connecting key locations** in the Central Valley including Sacramento, San Joaquin, Stanislaus, Merced, Madera, and Fresno Counties to each other and beyond to the Bay Area and the greater California rail network via three future high-speed rail (HSR) connections in Merced and San Jose.

This transformative, megaregional project helps further the State's vision for an integrated rail network and provides direct mobility and air quality benefits to citizens in nine counties, including over 30% of the disadvantaged communities in California.

The Valley Rail Program consists of two segments one South and one North of Stockton. Each segment includes several projects each with individual costs and schedules.

The Northern segment extends ACE service from Stockton to Natomas and includes additional San Joaquins service with stations in Lodi, Elk Grove, Sacramento City College, Sacramento Midtown, Old North Sacramento, and Natomas which will include a shuttle connection to the Sacramento International Airport. The Northern segment does not follow the current San Joaquins rail alignment but provides new ACE and San Joaquins service on a new rail alignment closer to Interstate 5. The Southern segment extends ACE service to Ceres/Merced.

The Southern Segment extends ACE service to Ceres, eventually Merced. This segment includes stations at Lathrop, Manteca, Ripon, Modesto, Ceres, Turlock, Livingston, and Merced. The Southern Segment follows the more central UP Fresno Subdivision corridor.

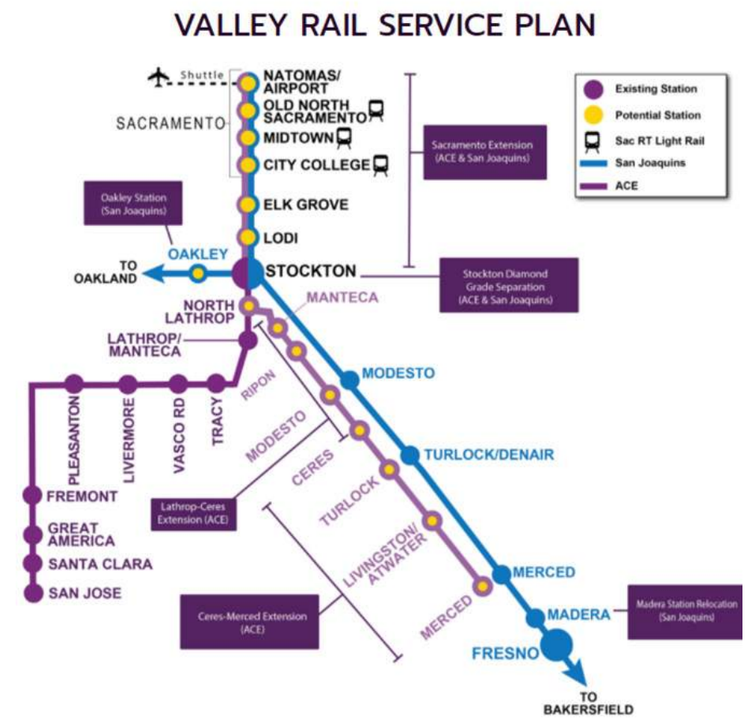


Figure 1.1 Valley Rail Service Plan with shared ACE and San Joaquins stations between Stockton and Natomas, ACE stations for the extension from Lathrop to Ceres/Merced, and San Joaquins stations at Oakley and Madera. *(Source: ACE Rail)*

"The State of California recognizes the important part the SJRRC plays in connecting the Central Valley, Bay Area and State Capital, and we are grateful for their support," - Steve Dresser, former Chair, San Joaquin Regional Rail Commission

Source: https://sjjpa.com/wp-content/uploads/SJJPA_SJRRC_TIRCP-Grant-Announcement-Press-Release_4-26-18-Revised.pdf

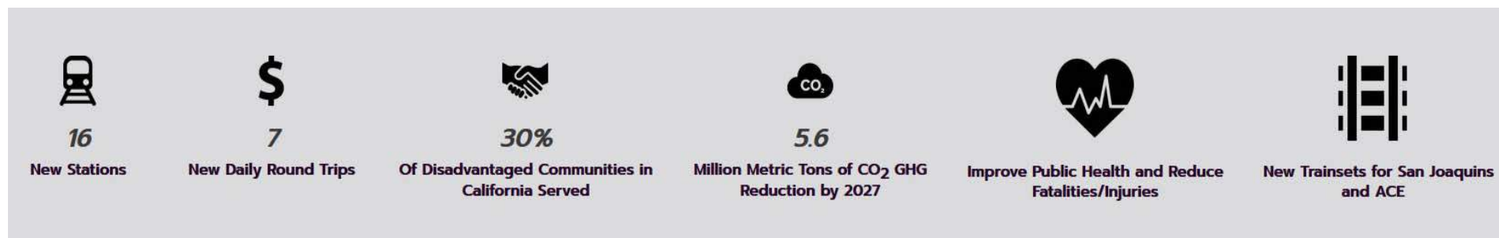


Figure 1.2 Project Highlights - for more information go to https://acerail.com/valley_rail

1.2 STATION DESIGN GUIDELINES & CRITERIA

OBJECTIVE

Valley Rail will consist of shared ACE and San Joaquins stations between Stockton and Natomas, ACE stations for the extension from Lathrop to Ceres/Merced, and San Joaquins stations at Oakley and Madera. As SJJPA/SJRRC have made passenger experience a priority, there is a strong need for blended policies to guide elements of station design and delivery. Additionally, as the program will be implemented through multiple station design projects, with different design teams and over a duration of time, the agency felt there was need for unified principles, guidelines and criteria. These will help guide station and system designs for visibility, safety, and passenger accommodation while reflecting quality design and relating to their local environment. The overall design goal is to balance consistent system-wide functional continuity, while providing distinctive elements that are reflective of surrounding neighborhood character.

The **Valley Rail Design Guidelines and Criteria** will be developed to support station specific Design Teams working on the various new stations along the alignment. These guidelines and criteria will be developed such that they can also easily be augmented ***in the future*** to address the renovations to SJJPA/SJRRC's existing stations.

Design Principles establish the core principles that embody the commitment to making passenger experience a priority, reflecting the goals to create a safe, accommodating and positive total transit experience through enjoyable, sustainable and resilient facilities.

Design Guidelines: Define the core transit system and facility elements and attributes purposefully, designing for safety, passenger accommodation, equity and sustainability. Guidelines embrace both the system-wide elements of continuity as well as the elements of distinction, that reflect the local context and community. The **Design Guidelines** (this document), will include Design Principles and Design Guidelines, and will be formatted as a PDF so that can be shared with the design teams.

Figure 1.3 Design Guidelines Process

Design Criteria: Establish specific directives and standards, incorporating a best value approach for the lowest total cost of facility ownership taking into account the costs of acquiring, operating, and maintaining facilities while sustaining their performance. Design Criteria will provide the basis for design decisions which include detailed specificity with regards to each of the elements, along with identifying the applicable standards, codes or regulations. The criteria are intended to be used in the design of the SJJPA/SJRRC's capital projects for platforms, stations, and all other facilities.

PROCESS

The Design Guidelines team has been working directly with the SJRRC Station Elements working group, and has held a series of integrated workshops in order to work collaboratively. The consultant team has walked through each of the station elements that make up the transit system, in order to understand project and program constraints, test design assumptions, and ensure commitment to broader SJJPA/SJRRC and goals.

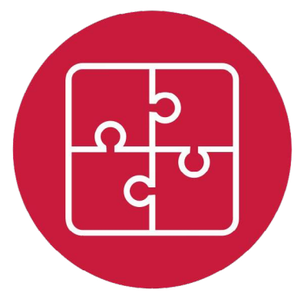
These sessions have ensured representation from SJJPA/SJRRC's leadership, management, marketing, operations and maintenance, engineering and delivery groups. Members of those groups, in turn have shared and presented these materials to the SJRRC Station/Facilities Development Committee for their engagement, involvement and approval. The Valley Rail Design Principles were presented at the September meeting and approved by the Committee.

"Improved passenger rail is an integral part of Sacramento and the Valley's regional transportation network. It is essential to support travel and economic growth in this interconnected economy, and connect communities in ways that are convenient and sustainable." - Vito Chiesa, Stanislaus County Supervisor, SJJPA Board Member

Source: https://sjjpa.com/wp-content/uploads/SJJPA_SJRRC_TIRCP-Grant-Announcement-Press-Release_4-26-18-Revised.pdf

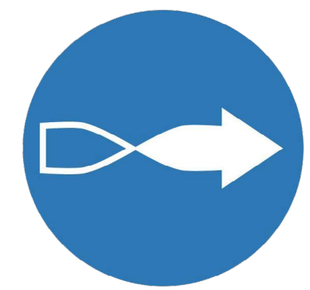
PEOPLE-FIRST APPROACH

SERVING ALL COMMUNITIES



DESIGN CONTINUITY

DURABLE AND RESILIENT



ADAPTABLE FOR THE FUTURE

EQUITY is an overarching value for the program to ensure regional, mobility and economic equity are prioritized throughout the project elements.

1.3 PROJECT PRINCIPLES

The vision for the system is for a ***"new unified passenger experience with expanded travel options"***. The SJJPA/SJRRC has determined that the guiding priority is the passenger focus, along with quality design, and ensuring an equity lens throughout this process. These sessions were used to determine the core project principles that will form the foundation for SJJPA/SJRRC's system design.

By establishing the intentions and desired outcomes of the design of the station and system elements, the design teams for all stations will have access to consistent information in an accessible and timely manner, leading to management efficiencies through provision of clear direction.

There is a well-established understanding of how different system elements age over the course of their useful life and lessons learned from a maintenance and operations perspective. This leads to a best value approach looking for the lowest total cost of facility ownership taking into account the costs of acquiring, operating, and maintaining facilities while sustaining their performance.

Additionally, the SJJPA/SJRRC seeks to achieve an efficiency of maintenance, achieved by designing capital investments that minimize maintenance effort and expense, operating expense, overall life-cycle costs, energy consumption, water consumption, integrated with existing local facilities, both public and private, including maximizing the utility and visual aesthetics of the project elements.

The SJRRC Station Elements working group identified **Equity as an overarching value**, which could encompass a number of different aspects such as regional equity, economic equity or racial equity. The design guidelines apply special emphasis on the "abilities" of our diverse riders, further elaborated under Universal Design (Chapter 2), ensuring all ages and abilities can access and enjoy the station and system. Modal Hierarchy (Chapter 2) also looks at prioritizing station access via other modes than driving - through siting and locating bus drop-offs to be as close to the stations as possible, to ensure seamless transfers; connecting existing/planned bike lanes to the station to facilitate convenient access by bikes; and clear and comfortable provision for pedestrian access. For wayfinding and signage (Chapter 6) SJJPA/SJRRC is considering a bi-lingual system-wide signage policy. Throughout the continuous development of the Guidelines, these and other facets of equity will be incorporated within the Valley Rail system.

"This project would not be possible without SB1," said Vito Chiesa, Stanislaus Country Supervisor. "With this funding, we will be able to move quickly in implementing an incredibly important transportation project that will better connect communities, improve mobility, reduce congestion, improve air quality and support a good quality of life."

Source: https://sjjpa.com/wp-content/uploads/SJJPA_SJRRC_TIRCP-Grant-Announcement-Press-Release_4-26-18-Revised.pdf

1. PEOPLE FIRST APPROACH

A core objective for the Valley Rail extension is to increase passenger rail ridership, and provide consistency of customer experience in terms of station approach, access and function resulting in a convenient and comfortable experience.

- **Safe -** Crime Prevention Through Environmental Design
- **Convenient -** Direct Connections to Facilities, Services, and Networks
- **Comfortable -** Protection from Sun, Heat, Wind
- **Enjoyable -** Inviting, Attractive Spaces
- **Intuitive -** Easy to Navigate

2. SERVING ALL COMMUNITIES

The project aims to serve ***all communities*** by providing equal access to the facilities and services for all customers inclusive of those with disabilities, supporting all cultural, racial, and minority communities and facilitating multimodal access. Design stations with an understanding of their unique context and integrating them into their communities to enhance their local identity.

- **Accessible -** Equal Access to Facilities and Services for Customers of All Abilities
- **Equitable -** Recognizing and Welcoming of All Community Cultural and Racial Identities
- **Multimodal -** Accommodating of All Modes, Prioritized for People Walking, Bicycling, and Taking Transit

3. DESIGN CONTINUITY

Identify station elements across the ACE and San Joaquin services that can be standardized using a "kit-of-parts" approach, resulting in system- wide cost savings.

- **Elements of Continuity -** Consistent System-wide Elements, Services, and Quality
- **Elements of Distinction -** Responsive to Individual Site Context
- **Unified Systems -** Coordinated Visual and Operational Systems
- **Kit of Parts -** Modular Systems Approach

4. DURABLE AND RESILIENT

A core objective is to create a positive total transit experience for passengers through sustainable and resilient facilities.

- **Long Term Value -** Life-Cycle Costing
- **Maintainable -** Materials, Standards
- **Sustainable -** Materials, Water and Energy Usage, and Environmental Footprint

5. ADAPTABLE FOR THE FUTURE

The guidelines will follow best practices and proven principles that allow for the application of innovative thinking and technologies that may prove to further minimize total life cycle cost while improving passenger experience and levels of service.

- **Innovative -** Anticipate and Accommodate Change
- **Flexible -** Best Practices in Materials, Systems, and Technology

1.4 PROJECT CONTEXT

The Valley Rail stations are located in diverse environments, ranging from urban city centers, to sub-urban, and rural or urbanizing locations. Each site's context informs the station design in several ways; for example, SJJPA/SJRRC may desire to close station and parking areas during non-revenue hours to promote station security. This won't be feasible for urban city centers such as Midtown Sacramento, and Modesto, but could be considered at other more suburban locations.

Station context also influences elements of the stations and platforms including general configurations, elevators, under crossings, on-platform amenities, off-platform amenities, and passenger access and accommodations. The Design Guidelines document will provide illustrated examples of system and station elements including Site Circulation, Landscape, Vertical Circulation, Platforms, Wayfinding, Facilities and Infrastructure – as indicated the document structure on the following page. The document also refers to elements of continuity that are desired for standardization across all of the stations and elements of distinction, that promote station specific identification and integration with their local communities.

Elements of Continuity address standardized systems and components that respond to the need for consistency in operations, maintenance and repair, user experience, safety, and regulatory requirements. Elements of Continuity establish identity, familiarity, quality and performance. For the platforms, a "kit-of parts" approach incorporates standard elements or modularized components defined by establishing prototypical details for the station design teams.

Elements of Distinction address unique architectural and/or identity elements that can be used to distinguish the individual stations to express its unique place and context. Examples of these custom site-specific treatments include applied art on windscreen panels, distinctive sections of the railings and fencing or platform and station area paving treatments, essentially, modifications to the design aesthetic that can be integrated into existing infrastructure.

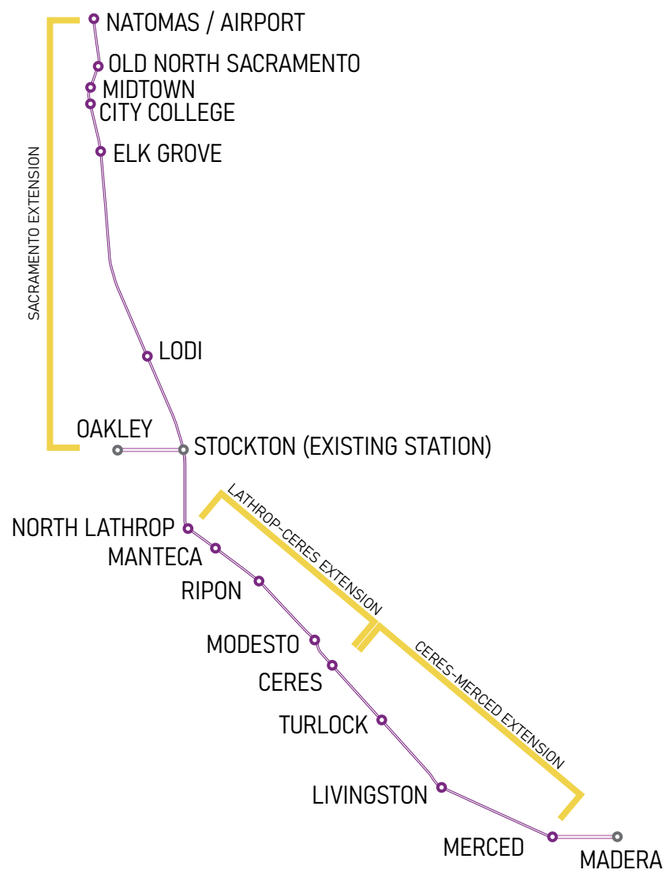
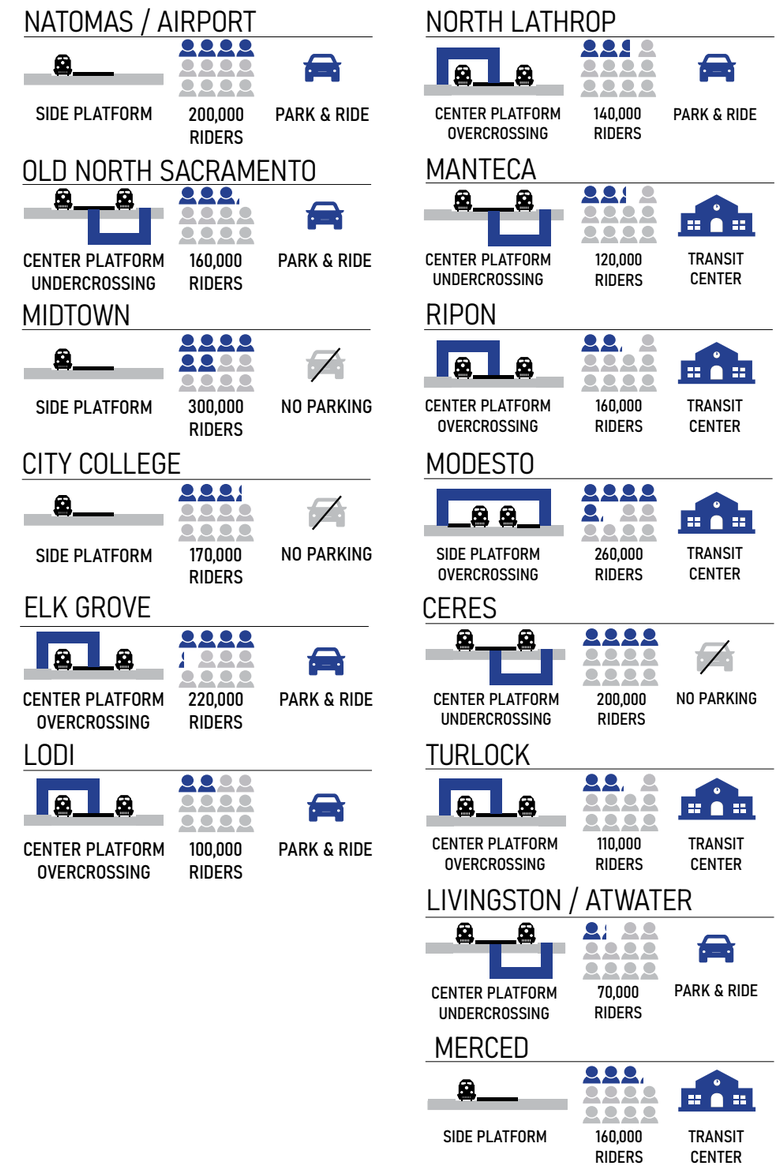


Figure 1.4 System Map and Stations Overview

Other examples are integrated and stand-alone art, such as canopy design and lighting features, which can also be part of elements of distinction.

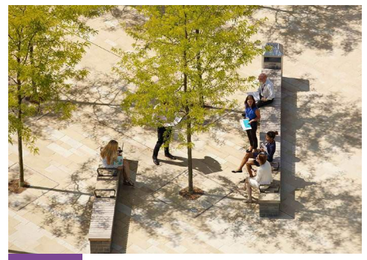
In order to establish system-wide elements and determine the appropriate elements of distinction, it is important to understand the context of the stations within the system. This visual matrix illustrates at a glance, the key program elements, the platform configuration, 2040 ridership projections and provision of parking for each station (Refer to Appendix A).



1.5 DOCUMENT STRUCTURE

2 SITE CIRCULATION

- Modal Hierarchy
- Sidewalks & Crosswalks
- Bike Parking and Storage
- Micromobility Accommodation
- Bus Bays
- Pick-Up & Drop-Off
- Vehicle Parking



3 LANDSCAPE

- Plaza Components
- Hardscape
- Softscape
- Planting
- Trees
- Lighting
- Site Furniture
- Stormwater

4 VERTICAL CIRCULATION

- Stairs
- Ramps
- Elevators
- Bridge Structures
- Under Crossings

5 PLATFORM

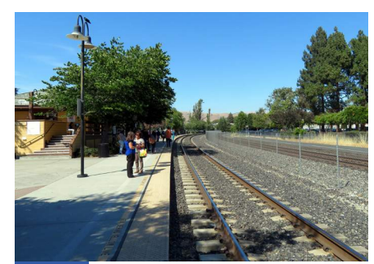
- Surface
- Signage
- Ticketing
- System
- Safety / Security
- Amenity

6 WAYFINDING

- Identification Signage
- Directional Signage
- Maps & Information
- Real-Time Information
- Regulatory Signage

7 FACILITIES

- Public Facilities
- Maintenance Facilities



8 INFRASTRUCTURE

- Track
- Stations

A APPENDICES

A. Station Ridership Projections
B. Reference Standards

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2 SITE CIRCULATION

SAFE
CONVENIENT
ENJOYABLE
INTUITIVE

ACCESSIBLE
MULTIMODAL

FLEXIBLE

2 SITE CIRCULATION

2.1 OVERVIEW

Successful design of station areas centers on a positive passenger experience as a means for a safe and accessible journey for all rail passengers. Site circulation should be organized to provide efficiency in pedestrian, bicycle, and vehicle movements in a clear and cohesive experience. Key design strategies to achieve these goals include applying Crime Prevention Through Environmental Design (CPTED) design principles, universal design principles, applying appropriate user dimensions, and adopting a modal hierarchy.

2.1.1 SITE SECURITY & CPTED

Crime Prevention Through Environmental Design (CPTED) promotes intentional design and effective use of the built environment to reduce the incidence and occurrence of crime. Planners, architects, owners, and operators all play an important role in enhancing the safety and security of facilities by integrating CPTED principles into the design and management of the physical environment. The core CPTED principles (Refer to Chapter 3 Landscape) can be translated into various planning and design strategies that enhance site security:

- Allow for clear sight lines
- Provide sufficient lighting
- Provide clear signs and information
- Organize paths of travel
- Avoid entrapment
- Avoid isolated spaces and routes
- Use activity generators
- Create a sense of ownership through maintenance and management
- Create overall high quality design of the built environment

The decision of which strategy or combination of strategies to apply will depend on the site condition, the functional requirements the desired programming of the space, as well as the design intent. CPTED may be viewed as a subset of the total set of security measures required for effective crime prevention and control. CPTED promotes high quality and visually pleasing design solutions as first responses that aim to enhance the legitimate use of space.

Crime detection and enforcement measures are other core strategies critical for overall site security. Video surveillance systems, or CCTV, should be installed to provide visual coverage of all parking, plaza, access, and platform areas. Video surveillance can perform multiple functions, including a 360-degree view of a site, 24/7 motion-recording, long-range thermal detection, and advanced analytics. Some site locations may also be monitored live by the ACE operation center who can directly address unlawful activity by directly contacting local authorities or law enforcement.

It is critical to monitor all site entrances and exits with effective surveillance security measures. Provide automated license plate readers to clearly identify vehicles as they enter and exit station facilities. Similarly, provide proper lighting at platform points of access and egress to allow clear surveillance and serve as an effective enforcement tool and deterrent to crime.

The threat of crimes like theft, break-ins, and assault are serious concerns for both transit patrons and the communities that the stations serve. Moreover, certain groups of people can be more vulnerable to crime, in particular, elderly, disabled, or youth. Successful site security measures can function as effective crime deterrents by incorporating a series of approaches to enhance both the physical security of people and property as well as contribute to a greater sense of security to reduce the stress of fear of criminal activity.

2.1.2 UNIVERSAL DESIGN

Universal Design principles guide the design and composition of the environment as accessible, easily understood, and usable by people of all ages, sizes, abilities and disabilities. Use of these principles should guide the design of station areas to holistically create enjoyable and passenger experiences regardless of physical, sensory, mental health, or intellectual impairments. Consideration should be given to smooth and level pavements, ramp access, grade transitions with reasonable slopes, adequate clearances, direct circulation paths, signage and wayfinding with clear and simple messaging, and accessible site furnishings.

2.1.3 USER DIMENSIONS

Providing appropriate space for people walking, bicycling, using a wheelchair or other mobility devices is critical for the safe and functional use of a station. While the dimensions listed in the figure above are the minimum physical operating widths, larger space should be given to walking and bicycle space where possible for a more inviting environment including landscape buffers, and opportunity to travel in groups. See also **Figures 2.4**, **2.7** and **2.8** for sidewalk, bikeway, and shared use path widths.

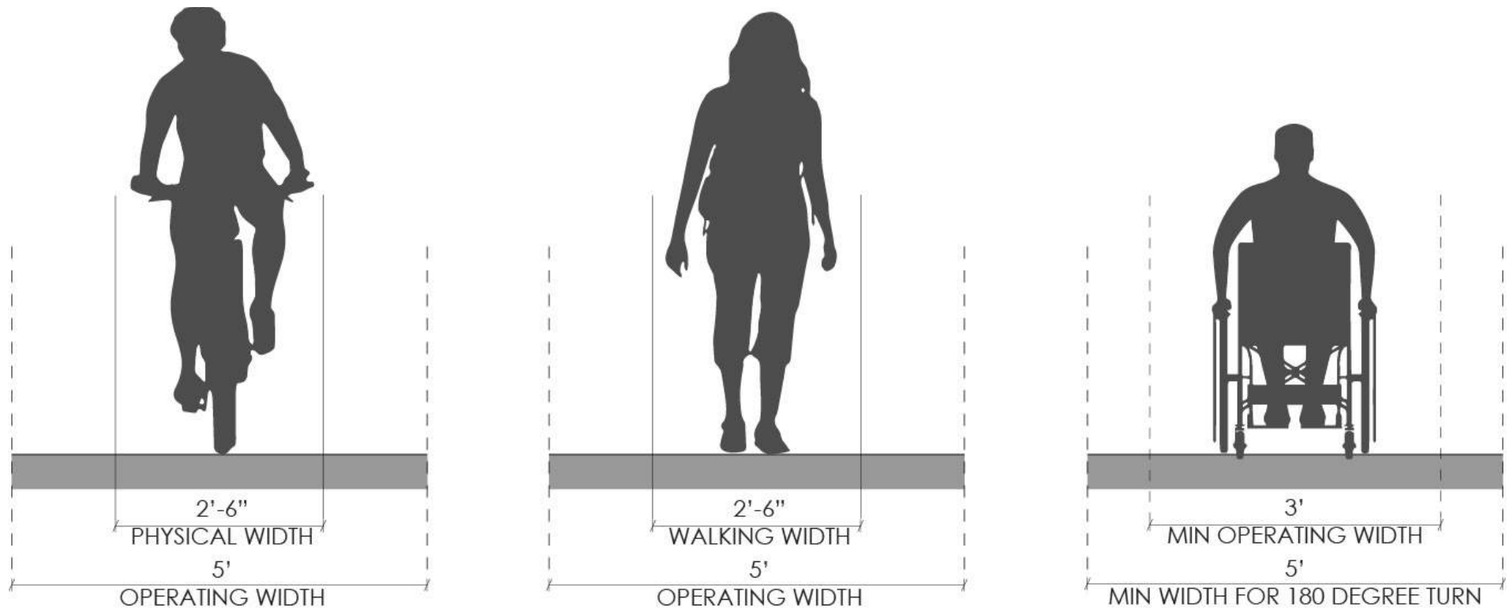

Figure 2.1 Typical User Dimensions

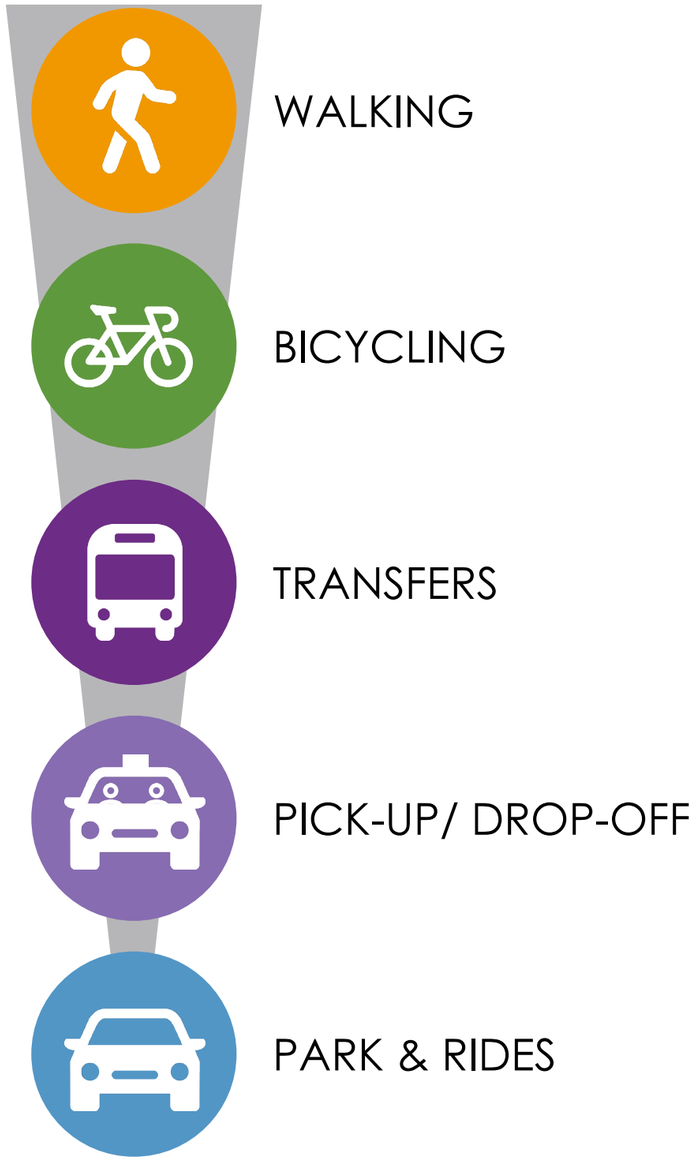

Figure 2.2 Station Modal Hierarchy

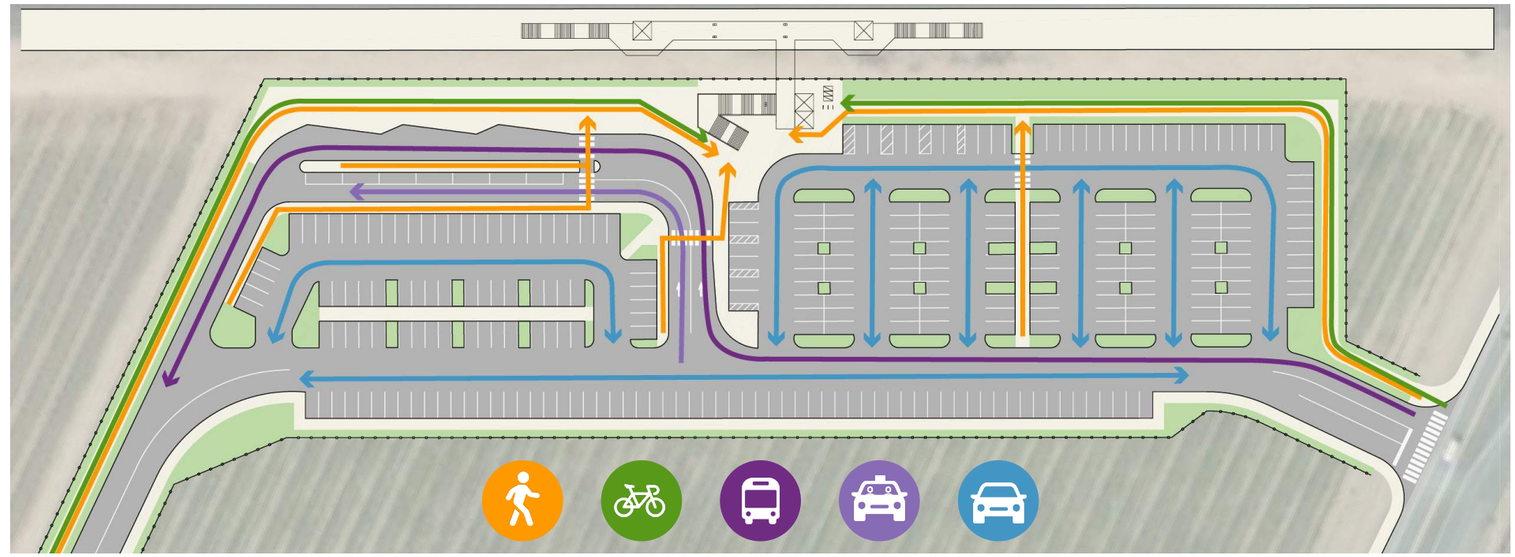

Figure 2.3 Typical Parking Lot Layout

2.2 MODAL HIERARCHY

Each station will have a mix of mobility solutions to connect riders to and from the rail station. Station designers should consider access both for the present and the future with evolving modal options (walking, biking, micromobility, bus, rideshare, and other transit options). A modal hierarchy introduces priority for preferred ways to access stations, to enable more affordable means of travel for customers of all income levels. Station access and circulation should be most convenient first for pedestrians, followed by people riding bikes or other micromobility users, then transit transfers, then vehicular pick-up and drop off, and lastly individual park and ride users. This represents a change from only prioritizing vehicular access, but is necessary to allow **equitable access** for customers. Consideration should be given to individual station context in implementing a station hierarchy, as some modes may not be present at a particular station.

2.3 PEDESTRIANS

Pedestrians have the highest station access priority as the most vulnerable station users. Prioritize pedestrian safety and accessibility when considering walking distances, accessible paths of travel, and to improve station access in addition to enhancing the pedestrian realm. Particular attention should be paid to avoid pedestrian/vehicular and bus conflicts in site circulation.

- Provide connected walkways to the platform from pedestrian arrival points to the site including adjoining streets and intersections, and transit stops. New on-site walkways should directly connect to existing sidewalks, crosswalks, multi-use paths, or other designated pedestrian paths of travel wherever possible.
- Walkways from arrival points to the platform should be arranged as direct as possible from station parking areas to the platform to follow pedestrian desire lines, minimize out of direction travel, and encourage use.
- Where direct paths of pedestrian travel cannot be accommodated and walking is discouraged, such as crossing vehicle lanes or bus lanes outside of crosswalks, low shrub landscaping and/or a low pedestrian fence may be considered. (Refer to Chapter 3: Landscape, Section 3.9.3 Pedestrian Fence.)
- Walkways should be a minimum of 8' wide consisting of a 6' clear path of travel and 2' buffer and curb to vehicle traffic. This buffer may be a physical barrier, landscaping, or stormwater feature. Where regular bi-directional flows of pedestrians are anticipated, walkways should be a minimum of 8' clear path of travel, 10' preferred, with added 2' buffer to vehicle traffic. **See Figure 2.4**.
- Site furniture on or adjacent to walkways should be located to not obstruct pedestrian flows, maintaining the minimum of 6' clear walking space.
- Walkways should be step-free with smooth transitions at all changes of pavements and materials.

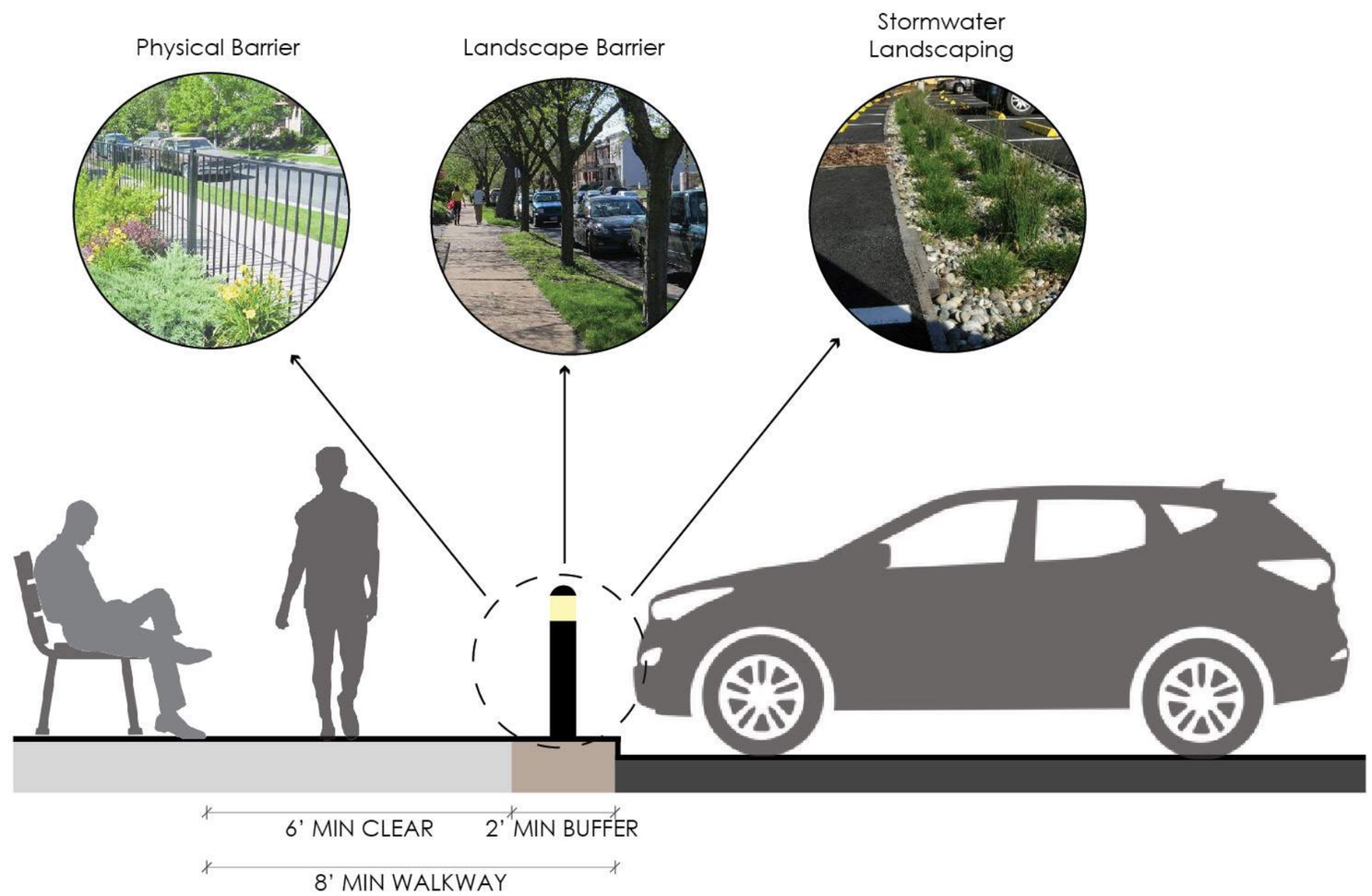

Figure 2.4 Minimum Sidewalk and Buffer Widths, Buffer Types

- Walkways should be illuminated with pedestrian scale lighting at an intensity where the access and walkways can be used at night by customers.
- On walkways where change in elevation is required, a continuous ramp without intermediate landings is preferred, with a 5% maximum slope. Where shorter ramps are required, an 8% slope can be used with intermittent landings and handrails per ADA ramp standards. Where ramps are used for changes in elevation greater than 6 feet, ramps with intermediate landings and a maximum slope of 6.8% is preferred. (Refer to Chapter 4: Vertical Circulation, Section 4.6.3 Ramps.)
- Where walkways cross vehicle paths of travel, clearly indicate the crossing with high visibility crosswalk pavement markings. High contrast truncated domes must be provided on both ends of the crosswalk to provide indication for visually-impaired pedestrians that they are entering a vehicular crossing.
- Raised crosswalks should be provided at walkway crossing locations with anticipated high volumes of pedestrians, outside of bus circulation paths. **Refer to Figure 2.5**.
- Align crosswalks at points of shorter crossing distances to minimize the amount of pedestrian exposure in vehicle paths of travel. Crosswalks should be a minimum of 10' wide, 12' preferred.
- Pedestrian crossings adjoining the site from collector or arterial roadways must have accessible curb ramps with tactile warning surfaces. Pedestrian crossings should be clearly marked with high visibility crosswalk pavement markings, and may be controlled with signalization.
- At signalized crossings adjoining the site, signals or beacons requiring pedestrian actuation shall have accessible pedestrian signal (APS) pushbuttons. APS pushbuttons provide information to people with low vision or no vision by a raised tactile arrow indicating crossing direction, auditory activation confirmation, and the pushbuttons will vibrate to indicate when it is time to cross. **Refer to Figure 2.6**.

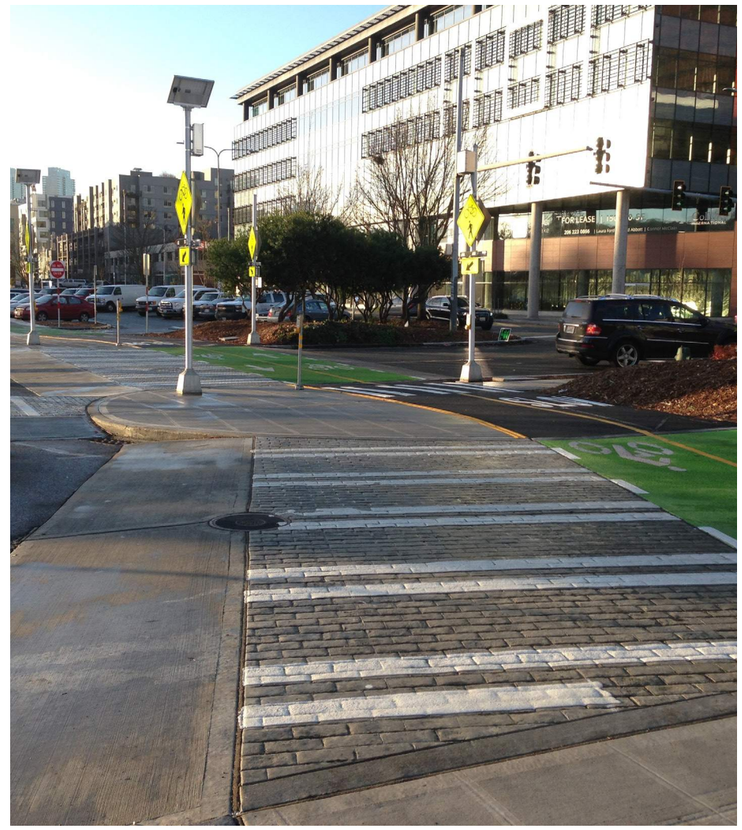

Figure 2.5 Raised Crossing for Sidewalk and Two-Way Bicycle Path

Figure 2.6 APS Pushbutton

2.4 BICYCLES & MICROMOBILITY

2.4.1 BICYCLE ACCESS & CIRCULATION

Bicycle riders should be provided designated paths of travel and infrastructure for safe and comfortable access from local street networks to the station. Connections to local bikeways may include a range of designs and treatments. Refer to NACTO Urban Bikeway Design Guide and FHWA Bikeway Selection Guide for bikeway facility selection, and standards.

- Where the station site is adjacent to an existing or planned bike facility, provide a designated bikeway to connect from the surrounding bike network to the bike parking at the station. Bikeways should be as direct as possible to follow desire lines, minimize out of direction travel, and encourage use.
- Bikeways should be either multi-use paths shared with (or separated from) pedestrians, or when in roadways with vehicles, a designated bikeway with physical separation from vehicles wherever possible.
- Shared use paths should be a minimum of 10' wide, 12' preferred, with 2' shoulders on both sides of the path. **See Figure 2.7**. Where shared use paths are adjacent to roadways, there should be a minimum 5' buffer between the path and the roadway, or a physical barrier for reduced buffer widths per AASHTO shared use path standards.
- Where multi-use paths are configured as a separated use path, the walkway portion should be a minimum of 5' wide, 6' preferred. The bikeway portion should be 8' wide, 10' preferred with a dashed yellow centerline to allow two-way travel. **See Figure 2.8.** The bikeway and walkway portions of the path may be separated by an elevation difference with a rolled curb, landscape buffer, or linear tactile strip.
- One way bikeways should be a minimum of 6' wide with additional 2' minimum buffer width for physical separation from vehicle lanes.

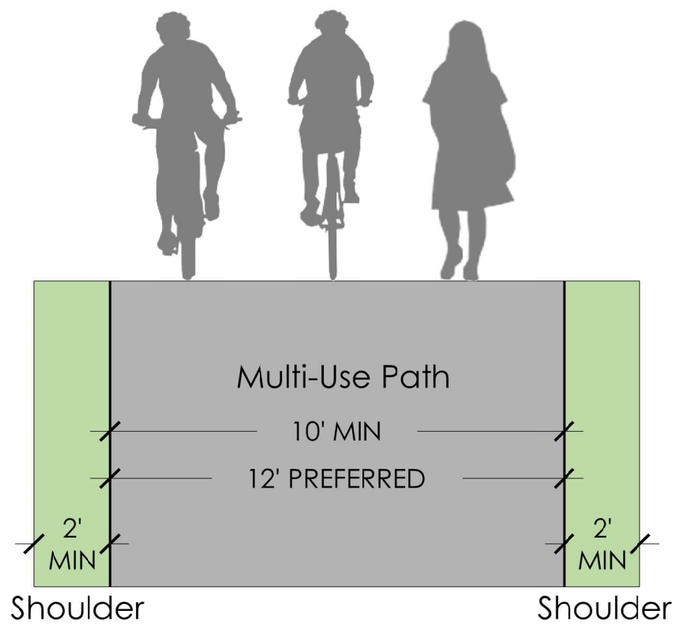

Figure 2.7 Shared Use Pathway

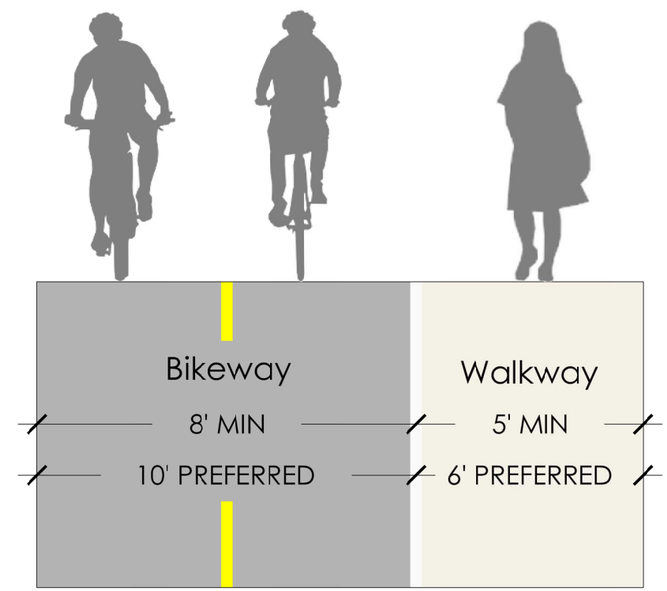

Figure 2.8 Separated Use Pathway (Sidewalk and Bikeway)

- Where bikeways cross vehicle paths of travel though intersections, clearly indicate bicycle crossing with green and white crossbike pavement markings. Where bikeways cross vehicle driveways, clearly indicate the crossing point with solid green pavement marking and CA MUTCD standard white bicycle stencil.
- Provide bicycle oriented wayfinding to station bicycle parking and courtesy "walk your bike" signage beyond the bicycle parking towards the platform.
- For bicycle riders that take their bikes on a train, provide a stair "runnel" for these riders to be able to roll a bicycle up and down stairs. (Refer Chapter 4: Vertical Circulation, Section 4.6.2 Stair Bike Runnels.)

2.4.2 BICYCLE PARKING

Bicycle parking should be provided at every station as close as practical to platform access points. Bike parking should be near, but outside the main pedestrian paths of travel, queue zones, or areas that would impede pedestrian flows. Three types of bike parking should be considered at each station; open racks, secure bike lockers, and third party bike share accommodations at urban stations.

- Provide designated bicycle parking areas that are clearly visible and accessible by riding a bicycle from a designated bicycle route.
- Bicycle parking should be located in a well illuminated area central to the platform access to be convenient for transfer to and from the train, and to provide safety for both bicycle storage and the rider accessing their bicycle during night time hours by being located in an area with passive surveillance.
- Provide a combination of bike lockers for long term, frequent users, and bike racks for infrequent or short term use. Co-locate lockers and racks within a designated bicycle parking area.
- The number of bicycle parking spaces should consider projected ridership and surrounding bicycle network context on a station by station basis. At a minimum, provide 3 racks and 4 lockers per station to provide the option of short term or long term parking for an average 1% of the anticipated ridership, which corresponds to the average bicycle to work commute share for communities along the Valley Rail line per 2019 American Community Survey (ACS) data.
- Racks and lockers should be monitored with CCTV surveillance. Racks should be shaded where possible.

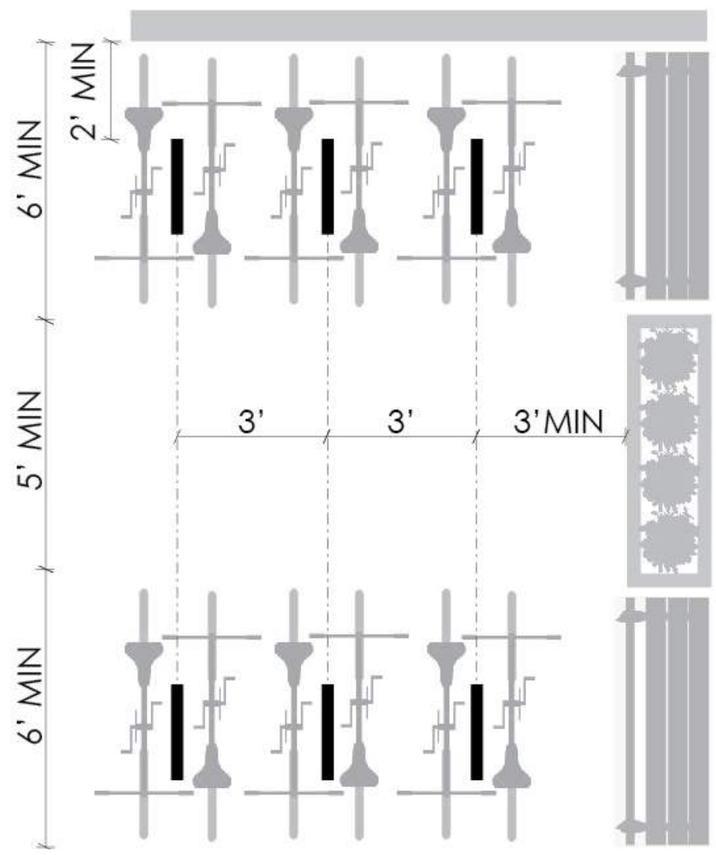

Figure 2.9 Short-term Bicycle Parking (Rack) Layout Clearances

- Bike racks should be arranged to have a minimum of 3' spacing between racks, and 5' spacing between opposing bikes to allow adequate maneuvering and storage space for an average bicycle of 2' wide by 6' long. Any portion of a rack should be no closer than 2' to a curb, wall, landscape area, site furniture or other barrier, 3' clearance preferred. **See Figure 2.9.**

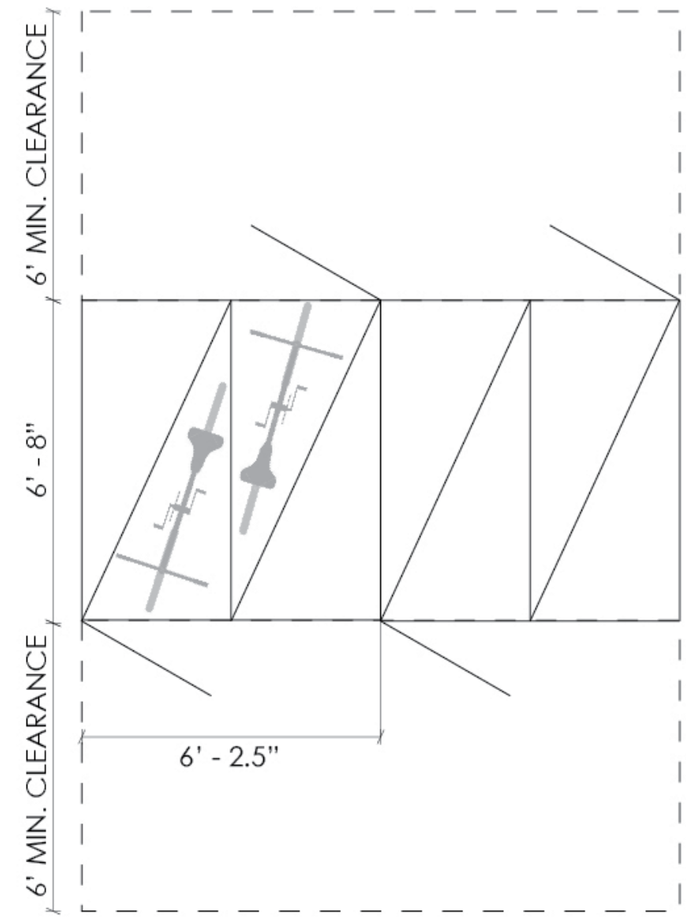

Figure 2.10 Long-term Bicycle Parking (Locker) Layout Clearances

- Bike lockers should allow a minimum of 6' clearance space in front of the locker doors, 7' preferred. Dual sided lockers should have clearance on both sides of the lockers for door opening and user access.
- Lockers should be e-lockers to allow greater user flexibility and turnover. Lockers should be arranged as a single tier rather than a "stacked" configuration to avoid CPTED concerns of hiding spaces or interrupted sightlines, and need for lift assisted rack devices within the locker.

2.4.3 MICROMOBILITY PARKING

Micromobility refers to personal, manually or electrically powered vehicles. Micromobility examples include bicycles, electric pedal assisted bicycles, bike share, electric scooters, motorized skateboards, and other small, human- or battery-powered low-speed alternatives to the automobile. The provision of micromobility facilities should support increased usage of smaller vehicles that require less space for parking and storage compared to larger motor vehicles. Sites within higher density and urban neighborhoods, are encouraged to provide facilities that support micromobility.

- Provide designated micromobility parking areas that are clearly visible, located in a well illuminated area, and accessible by riding from a designated bicycle route.
- A designated micromobility parking area should be conveniently located either in an on-street corral, in the station vehicle parking area or on-street parking space as applicable; or on the sidewalk at the station central plaza area. Parking areas at the sidewalk level are preferred.
- Micromobility parking solutions include painted boxes, bicycle racks, lockers, or other stands. **Refer to Figures 2.11-2.14**.
- Provide signage to clearly direct micromobility riders to use the bikeways or multi-use paths in accessing and circulating through the station area.

Figure 2.11 Temporary Scooter Parking at the 2016 National Bike Summit. (*Image Source: Henry Dunbar)*

Figure 2.12 Designated Parking Area for "Dockless" Shared Bicycles in Bellevue, WA.

Figure 2.13 On-street bike corral

Figure 2.14 Designated Parking Area for Shared Mobility. (*Image Source: City of Santa Monica)*

2.5 BUSES

- Bus service should be prioritized and optimized for income equity. Bus circulation should be separated to avoid bus/vehicle/pedestrian conflicts wherever possible. Bus circulation should be separated from vehicle circulation including pick-up/drop-off and park and ride circulation to minimize transit delay and maintain schedules.
- Buses should be able to circulate on station area sites to avoid unnecessary movements on local streets. This minimizes travel times for the buses and reduces the buses' effects on local traffic.
- Space for internal circulation should be designed to accommodate the design vehicle, coordinated with local and regional transit operators. Bus movements should be confirmed with an autoturn analysis and/or field verification.

2.5.1 BUS BAYS

- Bus bays should be prioritized to be as close as possible to the "main platform access plaza" to better encourage and support those using transit .
- The number of bus bays should be determined on a station-by-station basis. In general, bus bays should accommodate local transit, airport shuttles, and Amtrak bus services. **Bus bays should be coordinated with local and regional transit operators.**
- Stations may be designed with parallel bus bays, or sawtooth bays. Sawtooth bays provide less flexibility in bay assignments as they typically are pre-assigned to specific routes.
- It is expected that not every bus will be able to access a specific individual bay at any time, but rather that multiple bays will be utilized dynamically with some first-in/first-out limitation. To avoid significant operating impacts from unplanned incidents or delays, no more than two buses should be assigned dynamically to any one first-in/first-out configuration grouping.

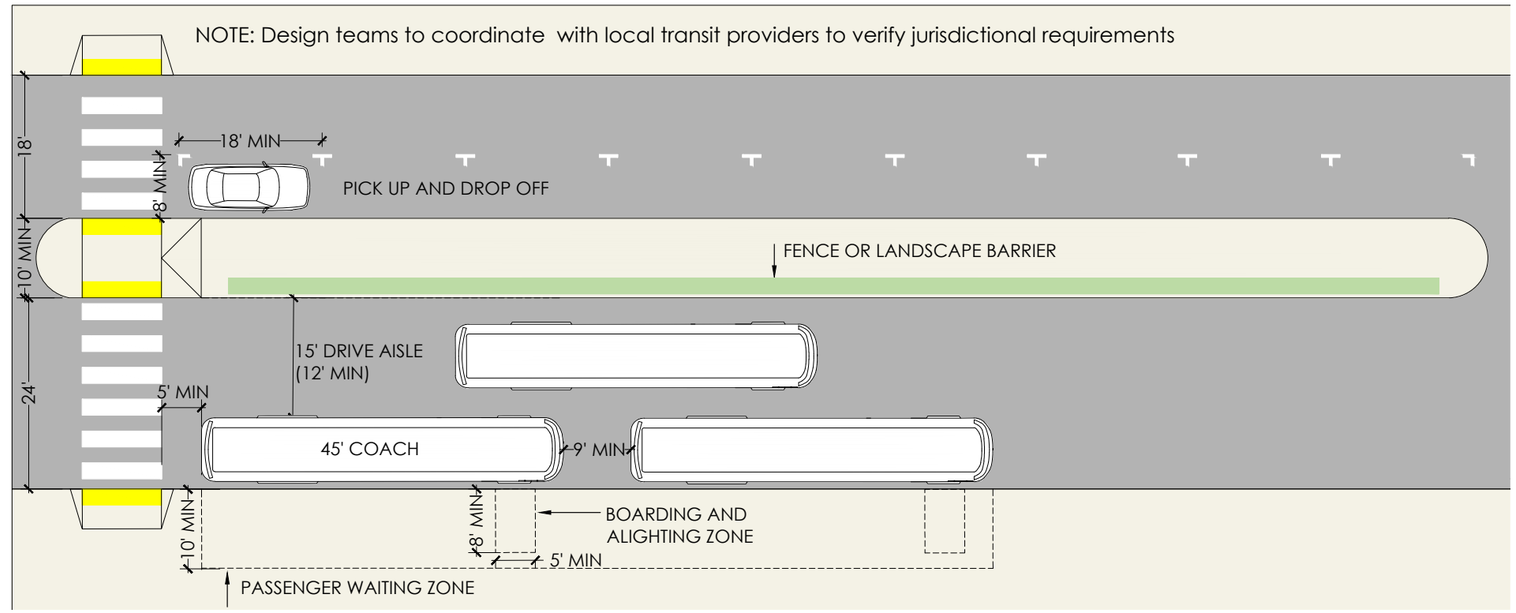

Figure 2.15 Parallel Bus Bay Clearances

- For any straight curb bus aisles with more than two bus bays, sufficient curb should be provided to allow independent bus ingress and egress movements at least every two bays. Bus movements should be confirmed with an autoturn analysis and/or field verification.
- For straight curb bays, at least 9' of curb length should be provided between buses for adequate clearance. If bays need to be accessed by buses without obstructing other bus movements (i.e. avoiding first-in/first-out operations), an additional 30' of linear curb space should be provided between buses.
- Bays adjacent to crosswalks should provide at least 5' between the front or back of the bus and the crosswalk.
- Bus drive aisle widths should be 12' minimum, 15' preferred.
- Curb returns for bus turning movements should be designed with a minimum 30' radius.
- In the future, local transit providers will be required to convert to a fully electrified bus fleet. However, the specific requirements for bus charging at the SJRRC stations are not yet known. This should be considered so as not to be precluded for future design phases of the project.

2.5.2 BUS PASSENGER WAITING

- Bus bays adjoining passenger areas must be designed to meet ADA Transportation Facility requirements. Provide bus stop boarding and alighting areas with a clear length of 96" minimum, measured perpendicular to the curb or vehicle roadway edge, and a clear width of 60" minimum, measured parallel to the vehicle roadway. **See Figures 2.15 and 2.16.** These areas shall have the same parallel slope as the roadway to the maximum extent practicable, and the perpendicular slope shall not be steeper than 1:48. These boarding and alighting areas must be connected to sidewalks or pedestrian paths by an accessible route.
- Bus loading and unloading areas should be a minimum of 10' wide. Pedestrian paths of travel should be considered outside of the bus loading areas.
- Shelters should be provided at all bus platform designated waiting areas to protect customers from inclement weather, wind, and provide shade. The equivalent of one shelter per bus bay should be provided. Shelters may be combined structures to serve adjacent bus bays.
- The shelter should provide a minimum covered protection at least 36 inches wide by 9 feet long for both seated and standing passengers, 48 inches by 10 feet preferred. Within this space, provide seating space for a minimum of three people along with a minimum clear space of 30 inches by 48 inches for people in wheelchairs as required within the shelter per ADA regulations.
- Shelters should be provided with all ADA clearances to support accessible paths of travel and movements boarding and alighting buses.
- The farthest extension of the shelter structure facing the curb should have a minimum clearance of 2 feet from the curb face to avoid being damaged by vehicles.

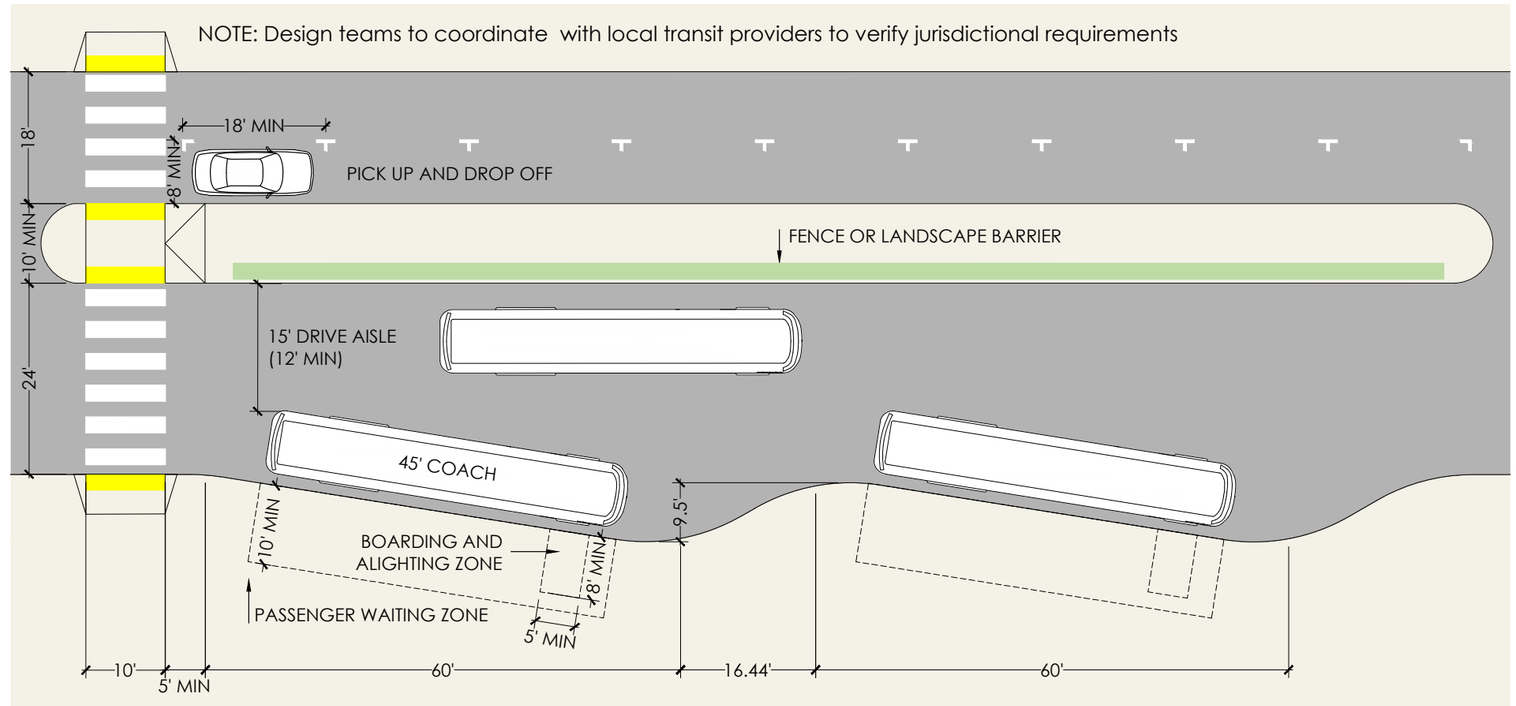

Figure 2.16 Sawtooth Bus Bay Clearances

- Shelters should be constructed of resilient, weather-and-vandal resistant materials. All components should be standard parts that are replaceable to facilitate maintenance.
- Provide at least one trash and one recycling receptacle per passenger waiting area.

2.6 PARATRANSIT/SHUTTLES/MICRO-TRANSIT

Most local jurisdictions have paratransit or transit shuttles available, and consideration should also be given to growing micro-transit service. Shuttle drop off should be prioritized to be as close as possible to the "main platform access plaza" to better encourage and support those using transit.

- Designated curb space area(s) for paratransit, shuttles and micro-transit should be provided with adequate loading and unloading space for wheelchair users. This can be shared space with the passenger drop off isles, or designated ADA van parking locations.
- Curb space for at least one 25' vehicle should be accommodated. The preferred placement of this curb space is near the pick-up/drop-off curb space or regular bus bays to allow for additional capacity if needed.

2.7 PICK-UP & DROP-OFF/RIDESHARE (UBER/LYFT)

- Designate curb space area(s) for passenger "kiss and ride" pick up and drop off, and rideshare (Uber/Lyft/Taxi) with adequate loading and unloading space for wheelchair users on adjacent walkways. Allocated curb space should be 18 linear feet per each designated pick-up/drop-off or rideshare space. **Priority should be given to pick-up/drop-off spaces over rideshare.**
- Designated pick-up/drop-off or rideshare areas should be indicated with signage, **see Figure 2.18.**

Figure 2.17 On Demand Shuttle Service SmaRT *(Image Source: Via)*

Figure 2.18 Pick-Up and Drop-Off Signage Example *(Image Source: Boise Airport)*

2.8 VEHICLES

Parking lot design is a critical factor in the success of each facility. In considering the layout for parking areas, the following guidelines are provided for factoring into the design: ingress and egress with considerations for mitigating possible conflicts with street traffic; pedestrian and vehicular conflicts; on-site circulation and service vehicle zones; and the overall configuration and appearance of the parking area.

- Locate vehicle site entries to minimize pedestrian/ vehicular conflicts.
- Parking access points should be located as far as possible from street intersections to allow adequate queuing space. Each parking lot should have at least two points of ingress/egress for adequate circulation.
- Provide fire access lanes coordinated with the local authorities having jurisdiction (AHJs).
- Interior circulation of parking areas should indicate clear direction of vehicle travel.
- Design for low vehicle speeds in station area parking lots by using minimum curb radii.
- Provide separate vehicular and pedestrian circulation systems in the station area. Pedestrian linkages between parking and adjoining pedestrian paths of travel should be emphasized, including distinct pedestrian access from parking areas.
- Design parking areas so that pedestrians walk parallel to moving cars. Minimize the need for the pedestrian to cross parking aisles and landscape areas.
- Where parking spaces abut a walkway, avoid vehicle encroachment onto pedestrian walkway spaces from parked vehicles by using high-contrast wheel stops placed 2' from the head of parking stalls, or by adding 2' of buffer width to the walkway.

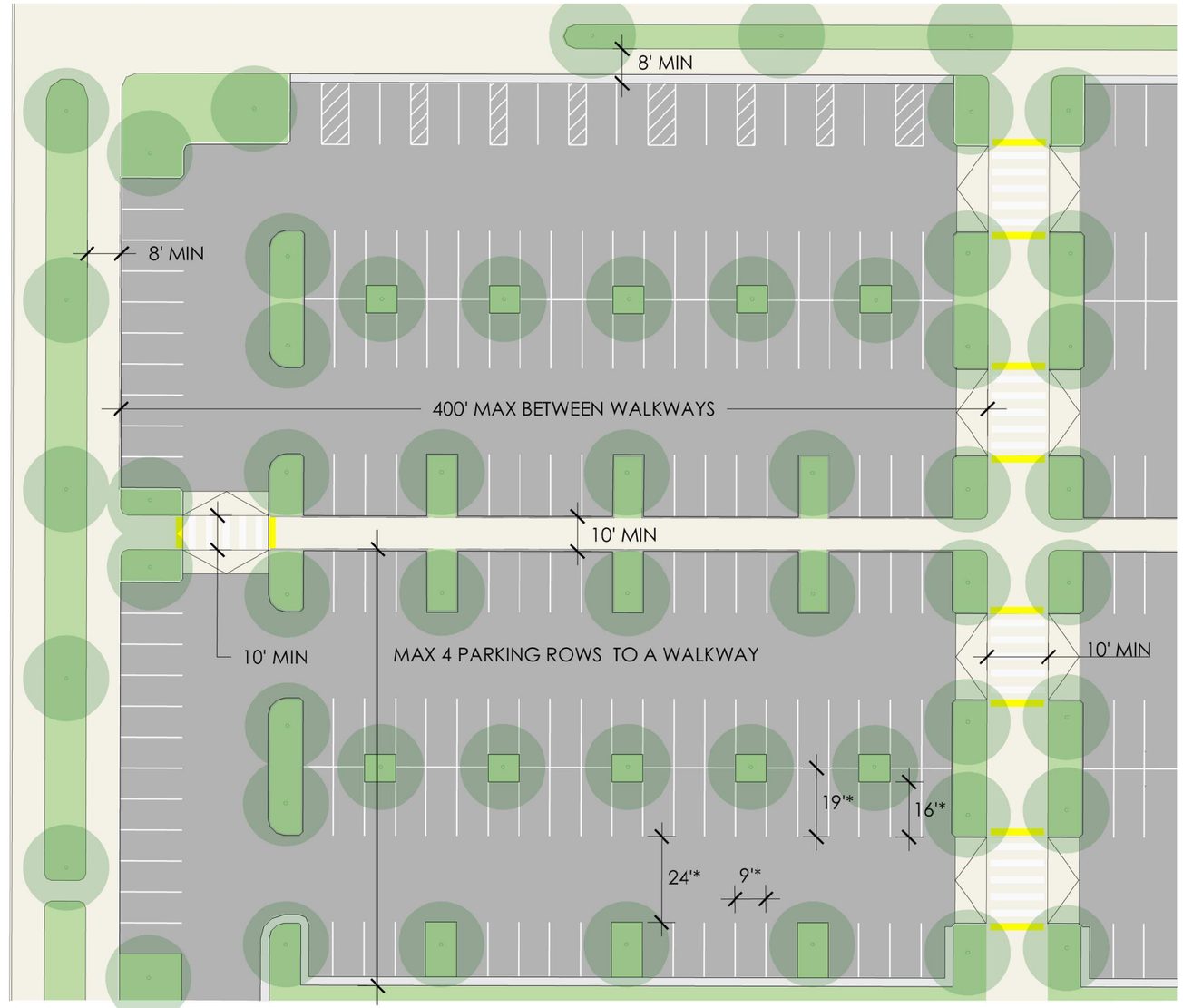

Figure 2.19 Typical Parking Lot and Walkways Layout, Local AHJ Requirements for Parking Spaces and Aisles will Supersede

- Walkways running parallel to the parking rows should be provided at a minimum of every four parking rows; and walkways running perpendicular to the parking rows should be provided on at least one end of each parking row. **See Figure 2.19**.
- Access to a walkway from any point in a parking lot should be no further than 20 parking spaces (200'). **See Figure 2.19.**
- Parking areas and pedestrian walkways should be visible from the main plazas to the greatest degree possible for passive surveillance.
- Parking areas should be illuminated with lighting at an intensity where the access and walkways can be used at night by the passengers and employees.
- Angled or perpendicular (90 degree) parking stalls are acceptable configurations. Refer to local jurisdictions for parking stall and aisle width requirements.
- Provide compact spaces as appropriate for each site condition to reduce overall parking lot size. Refer to local jurisdictions for requirements for accommodating compact cars.
- Parking areas which accommodate a significant number of vehicles should be divided into a series of connected smaller lots. Landscaping and offsetting portions of the lot are effective in reducing the visual impact of large parking areas.

2.8.1 ACCESSIBLE PARKING

- Accessible parking spaces should be located on the shortest possible accessible path of travel to the platform. Wherever practical, the accessible route of travel should not cross lanes of vehicular traffic. Where crossing traffic lanes is necessary, the route of travel should be designated and marked as a crosswalk.
- Accessible parking spaces should be constructed in concrete in order to achieve the minimum slopes required for these spaces.
- Accessible parking spaces should meet all local and ADA parking standards. In any case, they should be no less than 9 feet wide and should have an adjacent access aisle no less than 5 feet wide. Where two adjacent accessible spaces are provided, the access aisle may be shared between the two spaces. Access aisles should be marked so that the aisles will not be used as parking space. Provide van accessible spaces per local and ADA criteria. Provide at a minimum of two accessible van spaces that have an adjacent access aisle no less than 8 feet wide or a total width of 17 feet including the parking space.
- Accessible spaces must be identified by signs with the international symbol of accessibility (ISA). Signs identifying van spaces must include the term "van accessible." Signs must be at least 60 inches high measured from the ground surface to the bottom edge of the sign so that they are visible while vehicles are parked in a space.

Figure 2.20 California State Standard Accessible Parking Signage *(Source: Caltrans)*

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Image Source: Simon Vine

3 LANDSCAPE

SAFE
COMFORTABLE
ENJOYABLE

ELEMENTS OF
CONTINUITY
ELEMENTS OF
DISTINCTION

LONG TERM
VALUE
MAINTAINABLE
SUSTAINABLE

INNOVATIVE
FLEXIBLE

3.1 OVERVIEW

The intent of this section is to inform design teams of SJRRC's current standards and requirements guiding the design of the station area site landscape architecture. Guiding principles for this work include implementing long term sustainable and resilient environments that enhance the passenger experience in all of the station areas governed by the SJRRC.

It is the responsibility of the station landscape architects and designers to implement plans that conserve natural resources, optimize the site for circulation and access, coordinate with civil engineers to find best ways to manage storm water, and follow best management practices of the current California Landscape Industry Standards. It is the intent of these guidelines to establish a thoughtful approach to site development related to design of the station area and all of its related components.

3.1.1 CLIMATE CONTEXT: DURABLE AND RESILIENT DESIGN

The station area plans should create sustainable, well-designed landscapes that demonstrate the best approaches to implementing green infrastructure. Key outcomes from these design guidelines are to minimize negative impacts on the environment, reduce water consumption, create optimal conditions for an enduring landscape, reduce the urban heat island effect, and enhance the natural site conditions.

Overall landscape design guidelines include:

- Protect and conserve water through plant selection and stormwater management techniques.
- Source local materials wherever possible.
- Use regionally appropriate plant and tree palettes.

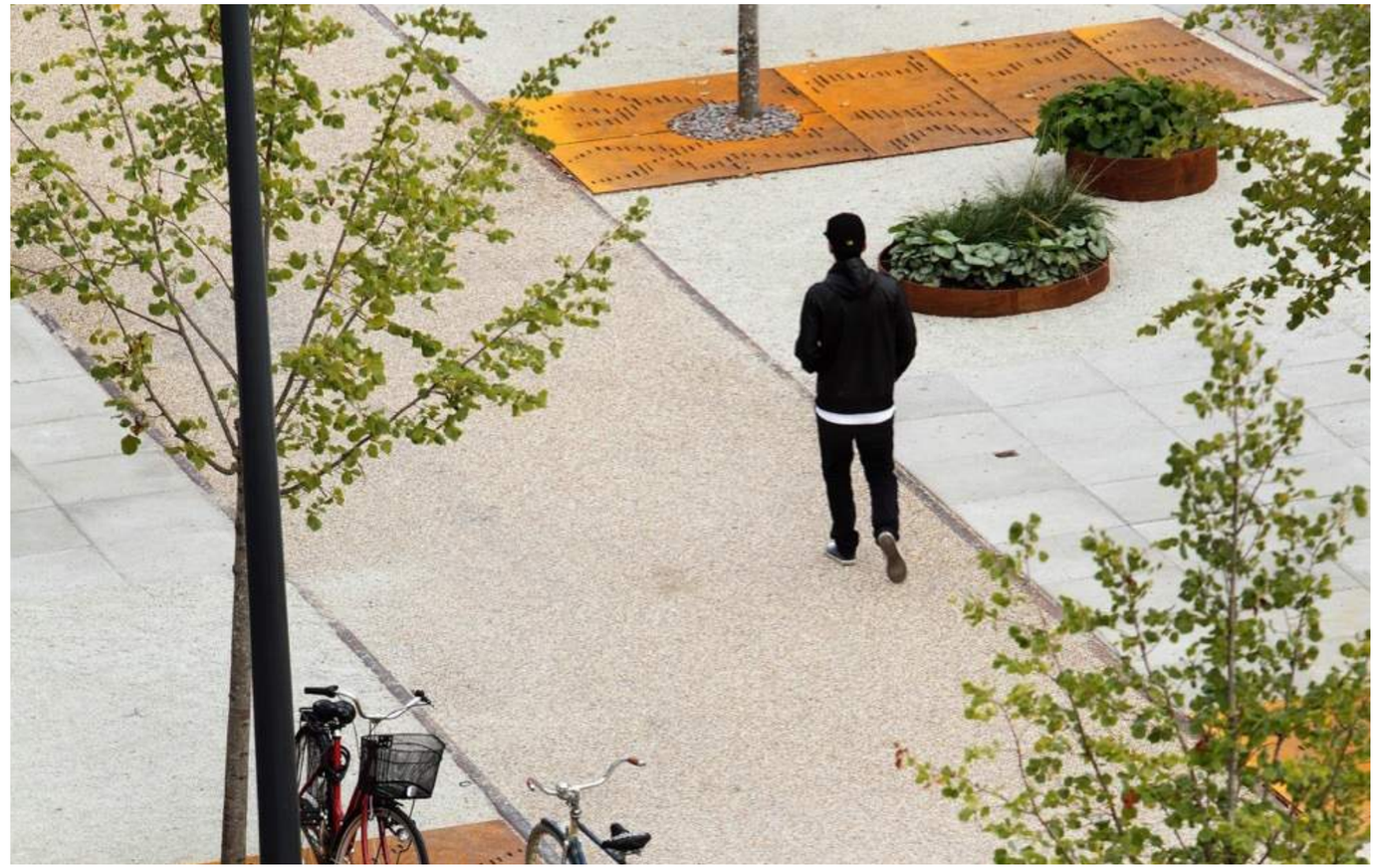

Figure 3.1 Water Conserving Landscapes using Simple Materials with A Contemporary Approach. *(Image Source: Stephan Estassy / AJ Landskap)*

- Provide site shading through trees and solar canopies without compromising natural site visibility and surveillance.
- Optimize future maintenance by tree and plant selections with low maintenance requirements.
- Use durable site furnishings which consider life cycle costs.
- Minimize the project's overall contribution to carbon emissions.

Wherever possible, the station area plans should be able to respond to the impacts of a changing climate and create resilient environments for the future. Consideration should be given to opportunities for recharging the ground water within the station site, protecting passengers from extreme weather events, and providing a safe environment.

3.1.2 COMMUNITY CONTEXT: PLACEMAKING

Further, the station landscape design has the opportunity to express unique qualities of each place, using materials and forms that represent the local community. While the station system as a whole must incorporate consistent system-wide elements at the regional scale, each station should respond to and provide its own sense of identity with unique elements of distinction – either through local art, landscape, or materials that reflect facets if local culture and as a memorable place.

- Station designs should endeavor to incorporate local art and materials where possible to encourage distinctive place making elements at the station.
- Landscape design is encouraged to integrate special details in the paving or planting areas that reflect unique community aspirations.
- Designs should incorporate what is unique and different about each location relative to other stations, contributing to crafting a distinctive place while maintaining elements of continuity.

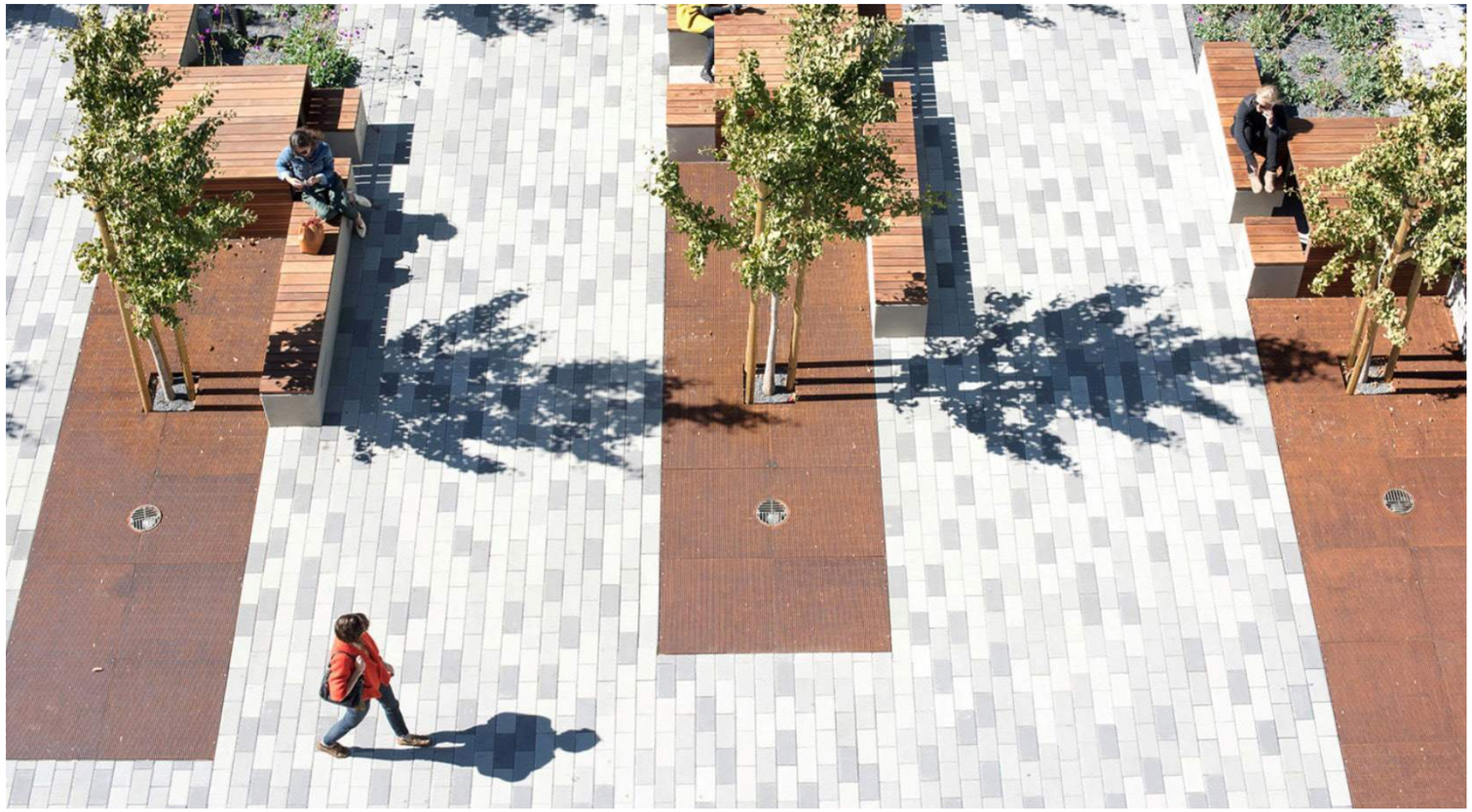

Figure 3.2 The Composition of Ground Plane Elements conveys Texture and Sense of Place in the Public Realm. *(Image Source: MSLA, Waller Park)*

3.2 STATION PLAZAS

A pedestrian plaza should be provided at stations areas in an easy to find, central location near a platform access point to provide an identifiable sense of place, ample queuing areas for elevators, ramps and stairways, wayfinding, bike parking, and gathering places for passengers. Station area plaza locations should be closely coordinated with the **Site Circulation Guidelines**. Visitors and passengers arriving at the station should be able to follow a clear and logical path of travel from the plaza to the parking areas, drop off zones, and station platform without having to negotiate a circuitous route around site obstacles. This plaza should be welcoming, well lit, landscaped, and have high-quality design elements that are clean and well maintained to convey respect and value to passengers.

- Station area plaza areas should have clear visibility across the space.
- A 20' clear zone should be maintained at elevator and stair entrances for pedestrian circulation. This ensures that dominant pedestrian paths of travel from parking areas to the platform and other modal transfer areas are visual. Refer to **Vertical Circulation Guidelines.**
- Plaza site furniture components should typically include adequate benches, bike parking, tree grates, waste and recycling bins, pedestrian scale lighting and clear directional signage.
- Plazas should have attractive passenger amenities including additional seating, shade tree, shrub, and groundcover planting, special paving at key areas, pedestrian scale lighting, a drinking fountain, and public art locations.
- Plazas should also provide flexible space to add future station components.

Figure 3.3 Conceptual View of Station Area Plaza with Drop-Off Elevator Towers, Pedestrian Bridge and Overcrossing

3.2.1 PLAZA DESIGN COMPONENTS

Pedestrian plaza spaces should be able to accommodate increasing capacity and growth of transit in the future, with ample space for passenger movement and waiting between transfers.

The plan diagram on the right illustrates site components typically found in a pedestrian plaza adjacent to a station platform. These areas need to accommodate station infrastructure such as elevators and stair towers for overcrossing stations, or ramps and stairs to underground tunnels for undercrossing stations. Ample space should be available to accommodate passengers in front of the elevators and stairs with no site furniture such as benches or trash receptacles to impede pedestrian flow. See also, **Vertical Circulation** chapter for elevator and stair clearances.

Plazas also need to accommodate the evolving forms of micromobility, such as designated parking areas for scooters and shared bikes, that passengers increasingly use to access stations in urban areas. Refer to **Site Circulation** chapter for bicycle and micromobility parking.

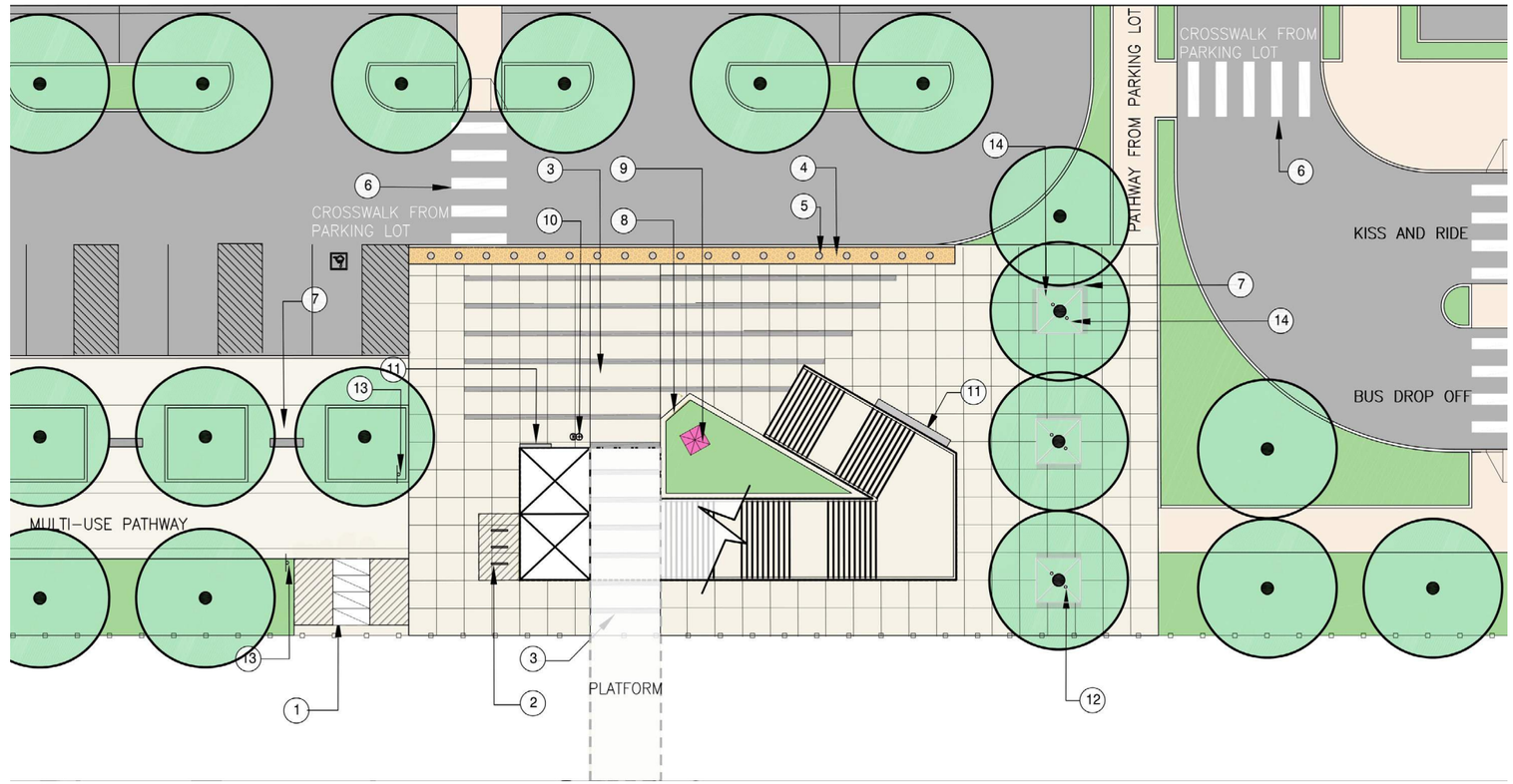

Figure 3.4 Typical Station Area Plaza Plan

LEGEND

1. (3) BIKE LOCKERS (6 BIKES)
2. (3) BIKE RACKS (6 BIKES)
3. ACCENT PAVING AT STATION ENTRIES OR BOLLARD LIGHTING 1' WIDE AND 5' SPACING TO IDENTIFY KEY PATHS OF TRAVEL AND STATION ENTRIES
4. 3' WIDE DETECTABLE WARNING BAND
5. BOLLARDS (6' O.C.)/FLUSH OR ROLLED CURBS
6. CONNECTING CROSSWALKS 10' MIN WIDTH
7. BENCHES/SEATWALLS
8. RAIN GARDEN/ORNAMENTAL PLANTING
9. PUBLIC ART: POTENTIAL LOCATION
10. TRASH AND RECYCLING BINS
11. STATION SIGNAGE
12. ACCENT LIGHTING (TREE UPLIGHTING)
13. BIKE SIGNAGE ("WALK YOUR BIKE")
14. TREE GRATE
    PLAZA SHADE TREES IN WELLS OR RAISED PLANTERS. 25' O.C.(MIN. 20% SHADE COVER REQUIRED, PER CALGREEN)

3.2.2 PUBLIC ART IN STATION AREA PLAZAS

All elements that make up the system fall under one of two categories:

1. **Elements of continuity**, which are the same throughout the system and help achieve a consistent look-and-feel, leading to familiarity and comfort. For the Valley Rail program, an element of continuity, under discussion, is an integrated "clock" that can be located at every station as a an additional system identifier or landmark, that passengers can readily recognize from a distance, further assisting in station wayfinding.

2. **Elements of distinction**, that reflect unique aspects of the local context and community, so passengers have a greater sense of orientation and cue about where they are along the system; and can foster a sense of civic pride for the community at that location.

Public art is an essential means to accomplish this goal, as station area art can take many forms and scales, including larger visually distinctive features that "mark" the station from a distance, and smaller forms integrated within the station area to create memorable places. Art also allows the opportunity to enhance the local culture, and work with local artists making it easier to recognize an individual station across a broader system.

For the Valley Rail program, SJJPA/SJRRC are considering the inclusion of integrated public art; or unique architectural and/or identity elements that can distinguish individual stations and express their unique place and context. Examples of these custom site-specific treatments include applied art on windscreen panels, distinctive sections of the railings and fencing or platform and station area paving treatments. These are essentially modifications to the design aesthetic that can be seamlessly integrated into the existing programmed infrastructure elements.

Figure 3.5 Glass Canopy as Public Art

Figure 3.6 Iconic existing Clock Tower at Lodi Station

Stand-alone art, such as overhead canopy design, lighting features, or sculptures at the station, which can also be part of elements of distinction are currently not included within the project budget; however, SJJPA/SJRRC would like to engage with local Authorities Having Jurisdiction to secure additional funding for those opportunities. Opportunities for both temporary and permanent art should be considered. Design teams should include an allowance for these on individual stations.

Site specific guidance for public art is as follows:

- Public artwork should contribute to providing a welcoming environment, conveying both a feeling of familiarity and uniqueness.
- Public art should be integrated within each station area where possible.
- Art location should not impede pedestrian flow to and from the station platforms.
- Art should be well lit during the evening hours and may include feature lighting.
- The art selection process should be closely coordinated with local stakeholders.

3.3 PARKING AREAS

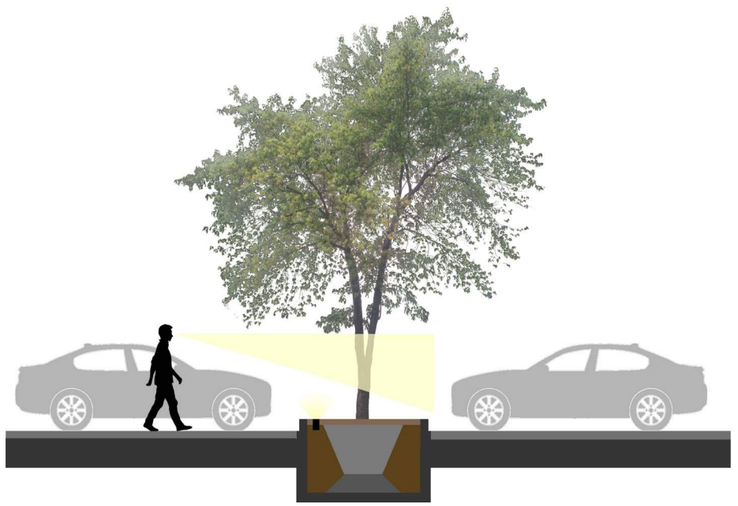

Figure 3.7 Tree Planter Section at Parking

Figure 3.8 Parking Stormwater Planter. *(Image Source: Caltrans)*

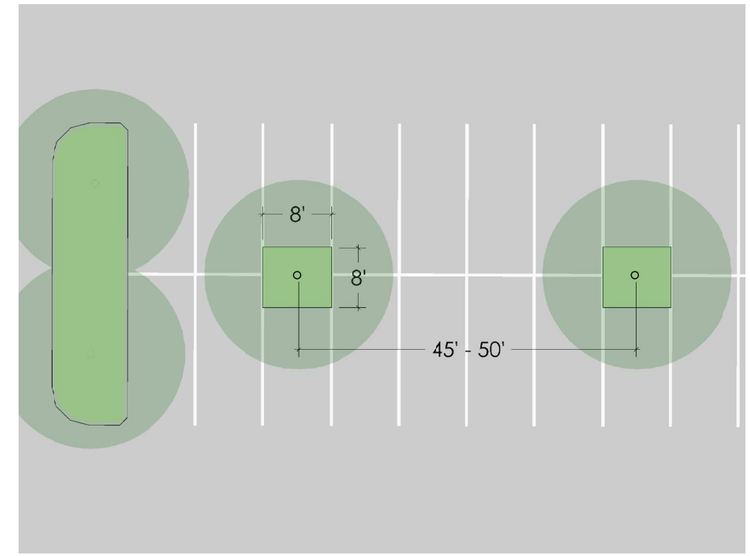

Figure 3.9 Tree Planter in Parking Lot Diagram

Station parking lots are present at the majority of the station sites, and should be planned with a clear circulation pattern (refer to Chapter 2: Site Circulation.) Landscaping should be provided within parking areas to reduce the amount of impermeable surfaces, mitigate the heat island effect, and improve overall site aesthetics to both produce a durable and resilient site design, and well as create an inviting people-first experience.

- Trees should be located throughout station parking areas to achieve a 50% shade coverage of paved surface areas within 10-15 years; refer to CALGreen shading requirements. The addition of future solar canopies in the parking areas (as funding becomes available) can also help contribute to this shading requirement.
- Parking lot shade calculations should be provided on planting plans.
- Tree placement within parking areas should allow for the future integration of solar canopies for site shading, as well as space for charging electric vehicles. **See Section 3.3.1 Future Solar Canopies.**
- The number of trees, tree sizes, and tree spacing requirements within station parking areas must adhere to local jurisdiction requirements. At a minimum, trees should be spaced approximately 50' on center with a balanced distribution across the parking rows.
- Trees should be selected and placed to allow clear sightlines across parking areas and not impede CCTV coverage. Refer to **Figure 3.7**.
- Parking rows should be arranged with tree and shrub planters at each end. Planters should have corner radii that accommodate car turning movements to drive aisles.
- Tree planters within the parking rows are preferably 8' square, centered between two adjoining parking rows. Tree planters should be spaced at least in front of every fifth parking space, so trees are approximately 50' on center for shading. Compact parking spaces should be designated in front of these tree planters. Provide wheel stops at the head of spaces to protect the tree planters from vehicle encroachment. Refer to **Figures 3.8 and 3.9.**
- Alternatively, tree planters may take up one full parking space, 8' wide x 18' long, alternating between adjoining rows. If this planting layout concept is followed, it should be used throughout the parking lot rows.

Image Source: Structure Solar

Image Source: move-on.it

Image Source: Structural Solar

Figure 3.10 Solar Canopy with Vehicle Charging Stations Examples

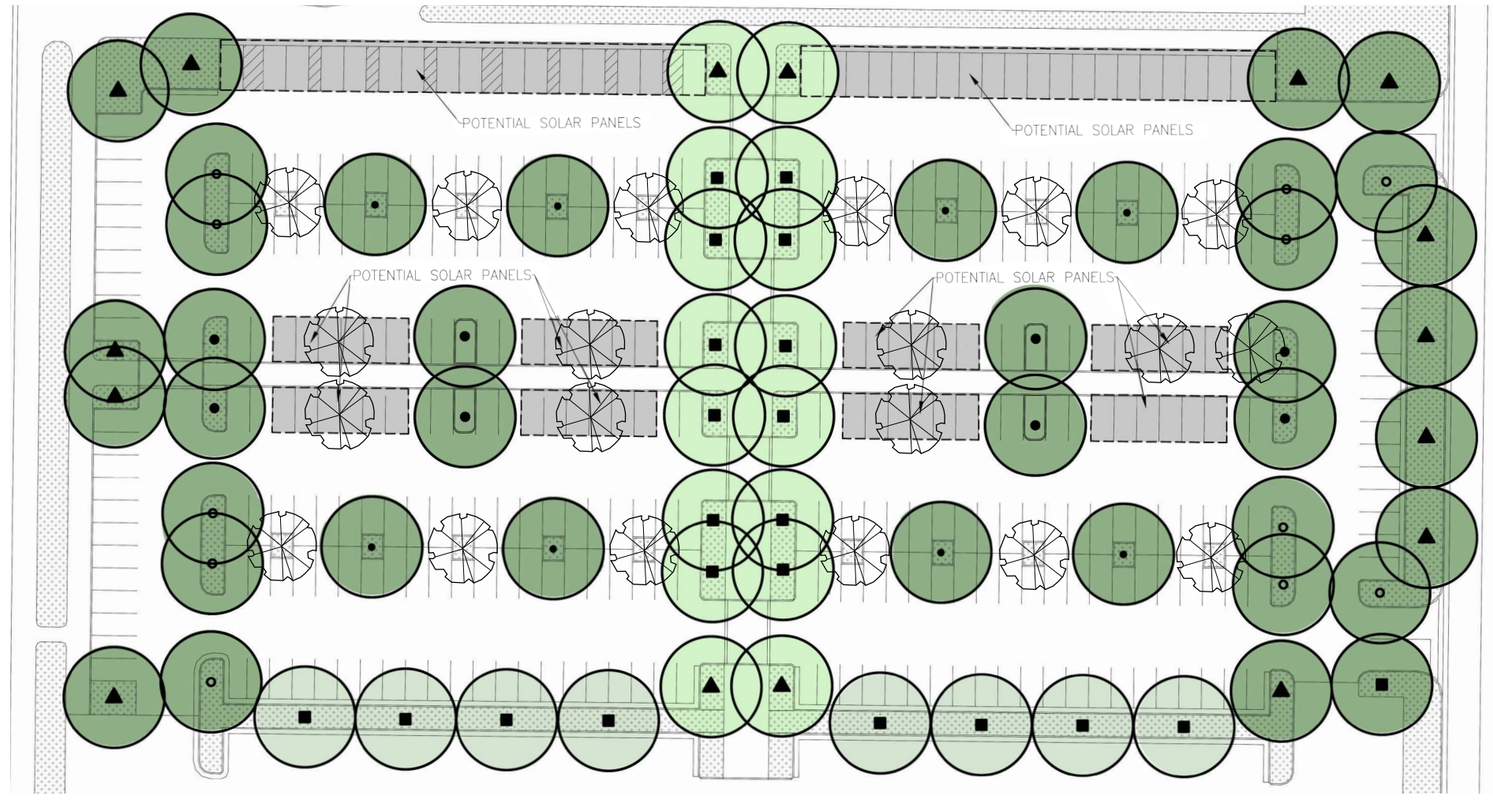

Figure 3.11 Parking Shading with Solar Canopies

Initial Tree Planting

Future Solar Canopy Location

Future Tree Location if Canopies are not Installed

3.3.1 FUTURE SOLAR CANOPIES

- Solar canopies should be planned for future implementation in parking areas where possible as funding becomes available. Where Solar Canopies can be located, the parking area that they cover can be subtracted from the overall parking area when calculating the required shade ratios (50% coverage in 15 years).
- Provisions for future tree planting to achieve the 50% shade requirement should be considered in the event that solar canopies are not installed within the 15 year timeframe.
- Planning for electrical vehicle charging should be considered in conjunction with the location of future solar canopies.
- Larger solar canopies should be considered for energy collection, cost and construction efficiencies.

3.4 HARDSCAPE

Pedestrian paving may express variations in hardscape color, pattern, or material to mark transition areas, accent or highlight paths of travel, or define key spaces. These surfaces may consist of sawcut concrete paving, unit pavers such as precast concrete, brick, or stone; gravel or crushed granite, or approved permeable pavement systems.

- Paving shall be ADA compliant, stable, firm, and slip-resistant.
- Use pavement materials and textures that reduce glare and mitigate the urban heat island effect.
- Use consistent colors, materials, surfaces, and finishes.
- Impermeable surfaces shall slope to divert water into on-site drains, permeable paving, landscape areas, or other stormwater management systems. Allow for curb cuts or other methods for smooth sheet flow drainage.
- Paving surfaces should be easily cleaned and maintained using conventional maintenance practices and incorporate graffiti resistant coatings.

3.4.1 CONCRETE PAVING

- Concrete paving should be able to be poured in place with a broom finish. Paving thickness should be a minimum of 4" for pedestrian areas, depending on subgrade conditions, and should be verified by geotechnical recommendations and the project civil engineer.
- Expansion joint spacing should be verified by geotechnical recommendations and the project civil engineer based on subgrade conditions.
- Concrete paving may have a surface treatment or texture such as a medium to heavy sandblast to expose aggregate in accent areas.
- Integral color should be used on a site-by-site basis to emphasize pedestrian areas and help reduce glare. Natural color tones are preferred. Painted or stained concrete is not acceptable.

Figure 3.12 Precast Paving Examples. *(Image Source: Wausau Tile)*

3.4.2 UNIT PAVERS

- Unit pavers should be considered in areas of high pedestrian activity or visual interest such as a central plaza, near station elevators, stairs, and or shelters.
- Unit pavers should contained by a concrete or metal framing edge to reduce separation and settlement over time.
- Install pavers per manufacturer and geotechnical recommendations with tightly secured joints to avoid tripping hazards.
- Select pavers without tapered/ beveled edges to minimize uneven surfaces. Pavers should have tight joints to avoid tripping hazards.
- No more than 2/3 of a unit paver should be cut for site installation.

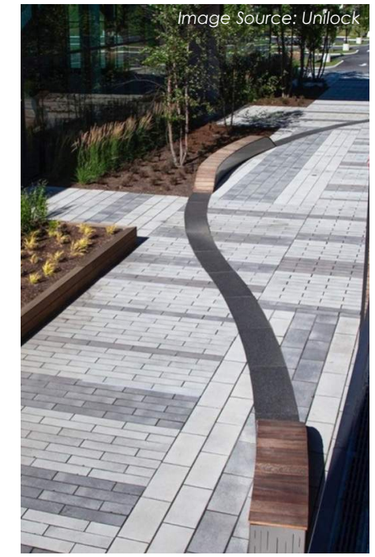

Figure 3.13 Permeable Paving Examples

3.4.3 PERMEABLE PAVING

- Permeable paving should be considered in areas with more sandy soils and only if infiltration conditions allow per geotechnical review.
- Permeable paving should be considered adjacent to landscaped areas, where possible.
- Porous asphalt mixes, if verified by geotech engineering may be considered when constructing or resurfacing parking lots.
- Enhanced paving materials such as permeable interlocking pavers, pervious concrete, or porous asphalt that support stormwater infiltration and/or achieve a superior appearance should be considered for walkways or bikeways.
- Flexipave may be considered for tree pits in high pedestrian traffic areas.

Figure 3.14 Truncated Dome Paving at Raised Crossings.

Figure 3.15 Truncated Dome Paving at Station Platform. *(Image Source: Wausau Tile)*

Figure 3.16 Gravel Landscape Example

Figure 3.17 Crushed Granite in Landscape Planting Bed

3.4.4 TRUNCATED DOME PAVING

- Provide standard yellow color truncated dome surfaces per ADA requirements where pedestrian walkways intersect with vehicular lanes of traffic and on curb ramps.

3.4.5 GRAVEL & CRUSHED GRANITE

- For non-ADA compliant informal walkways or surfaces such as seating or landscape areas, crushed granite may be used. When used for walking surfaces, the surface should be compacted and stabilized with a binding agent per manufacture recommendation.
- Acceptable aggregate size for informal walkways with gravel or crushed granite is 1/4", up to 1". Gravel landscape areas should be set at least 1/2" below the walking surface to contain the gravel from spilling onto walkways.
- Consider use of decorative gravel or stone mulch within landscaped areas to reduce the amount of plant material or irrigation required for maintenance. Cool or natural warm earth toned colors are acceptable. Gravel is not to exceed 1" in diameter, and larger decorative stones 8" or larger should be embedded, for a natural appearance in the landscape.

3.5 SITE WALLS

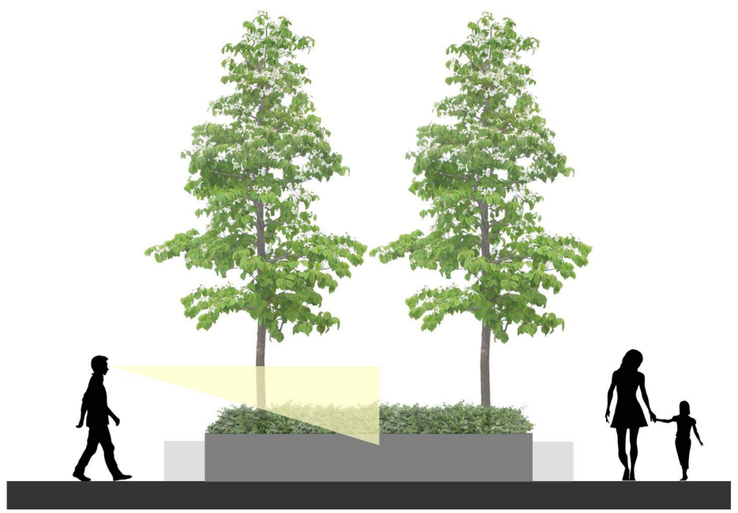

Figure 3.18 Planter Walls Visibility Diagram

Figure 3.19 Seat Wall Example. *(Image Source: Streetlife)*

Figure 3.20 Integral Skate Deterrent Example. *(Image Source: Gustafson Porter)*

3.5.1 PLANTER WALLS

Planter walls may be used where necessary, but should be designed with low growing plant material to avoid disrupting sightlines across plaza areas.

- Acceptable materials:
  - Poured in place concrete, light sandblast finish
  - Precast concrete
  - Corten steel with anti-washout coating

3.5.2 SEAT WALLS

Seat walls should be considered at central plaza areas for informal seating.

- Seat walls should be cast in place or precast concrete for durability.
- Integral skate deterrents, such as indentations within the concrete form, should be provided on seatwalls.
- Consider integrating seatwall recessed lighting.

3.6 SOFTSCAPE

Figure 3.21 Japanese Zelkova Serrata Trees. *(Image Source: leafland.co.nz)*

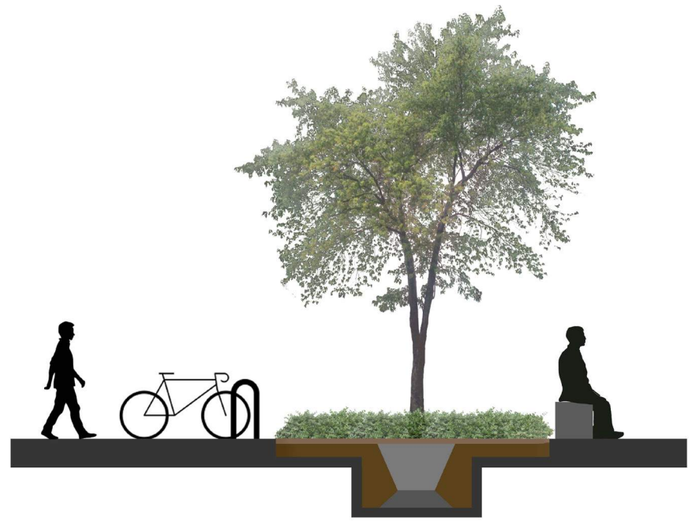

Figure 3.22 Tree Planting Section

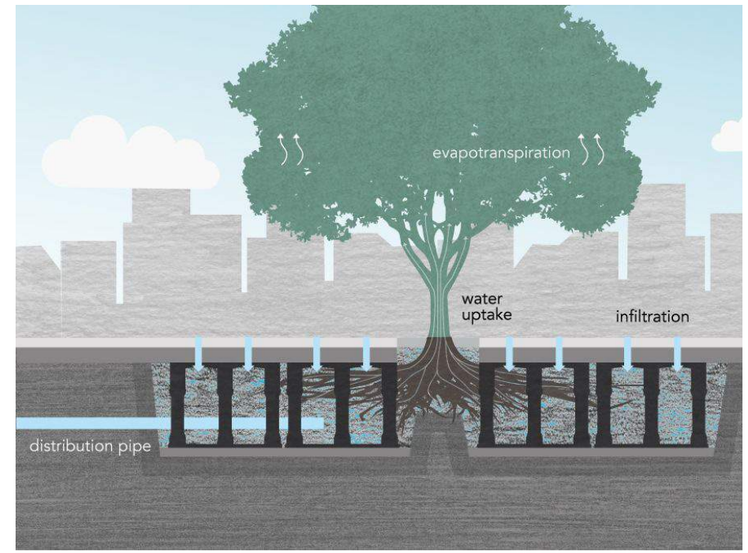

Figure 3.23 Structural Soil Cell Example. (*Image Source: DeepRoot)*

3.6.1 TREES

Trees within the station area site reduce the urban heat island effect, provide shade and cooler air temperatures, reduce stormwater runoff, and contribute to station aesthetics and placemaking.

3.6.2 EXISTING TREES

- Existing trees should be preserved where appropriate per arborist recommendations.
- During construction, protect existing trees over 6" diameter breast height with protective fencing according to best management practices and local jurisdictional guidelines.

3.6.3 NEW TREES

- Trees should be matching species, form, and character in the station area plazas.
- Tree species selections shall respond to each site's unique solar exposure, slope and drainage, and soil conditions. Acceptable tree selections are listed in Appendix C: Plant List.
- Avoid tree varieties/species that have invasive characteristics such as:
    - Aggressively spreading surface roots, creating trip hazards that can be destructive to surrounding curbs or walks.
    - Large windblown seed varieties that are extremely allergenic.
    - Varieties with toxic properties that can be digested by humans or animals.
    - Excessive fruit or nut droppings.
    - Consider use of root barriers in situations for trees being in close proximity to pedestrian paved areas.
- Careful consideration should be given to locating evergreen trees to maintain sightlines across the station area. Evergreen trees should be located outside of the main pedestrian areas and only used for screening perimeter and utility zones.
- Soil cell systems should be considered surrounding the tree wells in the plaza areas to encourage long term growth and health of the trees. Refer to **Figure 3.23**.
- Soil cells may be used to support pavement systems while allowing healthy tree root expansion and discouraging pavement upheaval. This system contributes to storm water management control and requires little to no maintenance.

3.6.4 SHRUBS, GRASSES AND GROUNDCOVERS

In addition to trees, shrubs and groundcover plants provide visually attractive landscape and pervious surfaces to reduce stormwater runoff. All planting shall follow the guidelines and requirements set forth in the site's local jurisdiction.

- Planting layout should consider large masses of one plant type for a bold effect and use as few a species as possible, and groupings of trees of the same species.
- Planting should be guided by local conditions and micro climates of shade and sun aspect.
- Avoid planting immediately adjacent to south and west facing glazing to avoid plant scorching
- Raised landscape beds and planting should be max 36" in height in plaza areas to avoid blocking sight lines.
- Plant palette selection should consider the Ogren Allergy rating and list individual plant ratings in the planting schedule to minimize plant species with a high pollen count.
- Avoid clusters of shrubs or screens in front of station entries that may block views and circulation. Shrub placement should take into consideration ultimate growth heights to avoid creating hiding spaces.
- Plants should be selected based on a site's solar exposure, slopes/drainage, and specific soil conditions. Acceptable shrub and groundcover selections are listed in the Station Area Plant List, see the end of this chapter.
- Plants should be hardy, low maintenance to minimize leaf drop and pruning, drought tolerant/low water use, and native to the region where possible.
- Lawn areas at stations should be avoided for their high-water use.

3.6.5 IRRIGATION

Irrigation of planted areas is required per California State Water Mandate. Irrigation systems shall adhere to state and local jurisdiction requirements, following the more stringent standard, where applicable.

- Reclaimed water should be considered on a site-by-site basis and used where available.
- Design irrigation layout to efficiently and uniformly distribute water to all plant material zones.
- Organize plants into similar water use hydrozones by separating high, medium, low water-use plant materials as best as possible.
- All station sites should have consistent irrigation equipment by the same manufacturer to streamline system wide maintenance.
- Master valve and flow sensors shall be provided at each site, in addition to back flow prevention devices.
- Rain sensors should be provided at each site to control and monitor water use.
- Irrigation methods should encourage deep root growth.
- In-line shut off valves should be used to separate areas to control water distribution and for use during maintenance periods.
- Hose bibbs should be located in irrigation areas for maintenance.

Figure 3.24 Shrubs & Grasses Examples

Figure 3.25 Rain Sensor & Tree Well Examples

3.7 CRIME PREVENTION THROUGH ENVIRONMENTAL DESIGN (CPTED)

CPTED is a design methodology that focuses on reducing opportunities for crime and mitigating fear of crime to improve both perceived and actual quality of the built environment. The four basic principles of CPTED that should be integrated in station area site planning and landscape design include:

Territoriality:

- Incorporate CCTV into design so that it is seen by station area users
- Design fencing, signage, landscaping, and pavement treatments, that express ACE elements of continuity.

Natural Surveillance:

- Arrange physical features to maximize visibility, provide opportunities for "prospect and refuge," or safe areas to view others, with clear station area boundaries, edge seating with shelter and shade, and open sightlines across the station area.
- Avoiding features that block sightlines such as tall walls, tall hedges, or impermeable fences. Where barriers are needed, utilize barriers that do not restrict vision such low landscaping or bollards.

Maintenance:

- Select materials and finishes that are maintainable over time. Clean, well maintained spaces are perceived as safe, and can also build social cohesion around pride of place.

Access Control:

- Reduce the opportunity for crime by clearly defining station area boundaries and securing entry and exit points where practical. The physical guidance of people coming and going from a site by the appropriate placement of entrances, exits, fencing, landscaping and lighting reduces a criminal's access to potential victims.

3.7.1 CCTV

CCTV, or video surveillance, allows for the recording and live observation of activities at the station. CCTV improves station security and allows for remote monitoring of situations from central dispatch to route support staff, maintenance, or security personnel to issues at various station sites.

- CCTV camera locations should be carefully planned to provide maximum visibility. All areas of the station area including the parking and plazas should be monitored with CCTV cameras.
- Cameras should be placed to maximize coverage with the fewest number of cameras.
- Cameras should be mounted using minimalist components integrated into other site elements including signs, shelters, light poles, and pylons. The use of mounting fixtures that add to the visual clutter should be avoided.
- Placement of cameras shall take into consideration lighting levels, tree placement, waiting areas, to ensure the best possible views are achieved.
- Provide clear sightlines and reduce hiding areas, blind corners, and other obstructions that limit the visibility of CCTV cameras.
- Cameras should monitor entry and exit points including stairs, elevators entries, elevator cars, platform edges, platform ends, and other secured spaces and doors.
- Cameras should be positioned for facial recognition.
- In addition to fixed cameras, with pan-zoom-tilt capacity or similar technology may be considered at certain locations and are to be coordinated with SJRRC

3.7.2 EMERGENCY COMMUNICATION

Emergency communication provides safety and security to passengers to report issues at the station during hours of operation.

Figure 3.26 Emergency Phone *(Image Source: Creative Commons)*

- Providing emergency telephones removes the assumption that all passengers have access to a personal cell phone and is in keeping with the project goal of equity for all.
- An emergency telephone shall be made available at the station area plaza as a means for contacting ACE Operations Center with rollover service to 911 emergency call centers.
- Emergency telephones must conform to ADA standards.
- Future technology is anticipated to eliminate the classic phone cabinets, so the location and configuration of the phone should consider this as well as the usability and aesthetic of the returned space.

Phones should be integrated with other vertical site elements such as nearby shelters, pole lights, wall faces, or similar features to avoid visual clutter and passenger flow impediments.

3.7.3 RESTRICTED SITE ACCESS

Site perimeters and parking areas in remote station locations should be secured with fences, locks, and adequate lighting to serve as crime deterrents during non-revenue hours. Lighting provides overall illumination and can eliminate dark spaces, diminishing environments for criminals to operate unseen. Restricting vehicular access to site entry and exit points that are equipped with license plate readers limits avenues of opportunity for thieves and provides an effective deterrent. Similarly, restricting access to platforms during non-operating hours and employing pedestrian access controls such as roll down gates, provide an effective deterrent by limiting opportunity for criminal behavior.

A hierarchy of fences is needed to define station sites, provide safety and security, and guide people though the station areas. Fences should be designed with appropriate heights by purpose, and have a high degree of transparency to minimize possibilities of creating hiding spaces.

3.7.4 SECURITY FENCE

- A perimeter fence for enclosing the station area site during non-operating hours should be considered for each station site on an individual basis.
- Security fences may be tubular steel or chain link, and should be 8' high. Tubular steel security fences shall be painted black and used in higher visibility areas. Chain link security fences shall be painted black and only used in lower visibility areas.
- Landscape buffers should be provided on at least the station side of the fence. Consider landscape buffers on both sides of the fence at site entries or other highly visible locations.

3.7.5 UPRR FENCE

- A security fence along the UPRR shall be transparent, painted black, and a minimum of 6' high per UPRR standards.

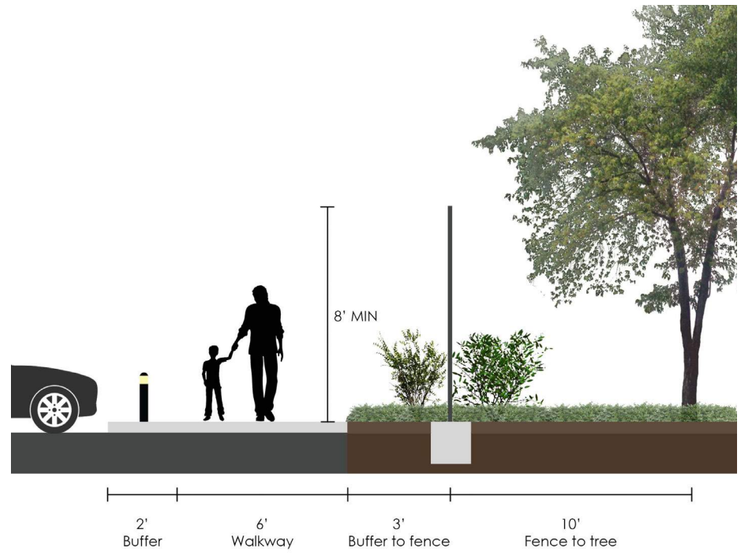

Figure 3.27 Section of Pedestrian Walkway with U.P.P.R. Fence

3.7.6 PEDESTRIAN FENCE

- A low, 3'-4' high steel pedestrian fence should be considered in areas where needed to prevent walking across landscape areas, or to channelize pedestrians to crosswalks to prevent multiple crossings of vehicle lanes or bus lanes.
- Pedestrian fences should be painted black to match security fencing, if present.

3.7.7 PEDESTRIAN SECURITY GATES

Pedestrian gates should be provided where sites are enclosed with a security fence.

- Gates should operate on a swing mechanism, match the tubular steel design, and should be self-closing.
- Pedestrian gates should have electronic access control and emergency egress hardware, per applicable codes.

Figure 3.28 Vehicle Gate Example

Figure 3.29 Security Fence Example

Figure 3.30 Pedestrian Fence Examples

3.7.8 VEHICLE GATES

- Electronically controlled vehicle gates should be provided where sites are enclosed with a security fence.
- Vehicle gates should be designed as a slide gate configuration where possible; swing gates are acceptable in locations with less spatial constraints. Swing gates should be no longer than 16'.
- The number of gate openings should be minimized as far as practical.
- Gates should be remotely operated, and equipped with a loop detector, light sensor, or motion detector to allow egress from the site when the gate is closed.
- Gates should be designed to have immediate operational access for emergency vehicles when required.

3.8 SITE LIGHTING

The station lighting system should promote the safety, security, and comfort of the commuter. Station area lighting should be designed to make the station a warm and inviting space at night, while still providing the necessary illumination for functional and security purposes. Lighting can also be used as an element of distinction and can greatly contribute to overall passenger experience.

3.8.1 GENERAL

- Promote the safety and security of station patrons and employees through the strategic selection, placement and use of various lighting types, optimal illumination levels and equipment.
- Illuminate passenger waiting areas, bus shelters, platforms, station main entries, elevators, stairs and bus operation areas at a higher level than parking areas.
- Lighting should be dark sky compliant.
- Lighting equipment should operate continuously, relying on automatic and manual controls to provide efficient energy use.
- Provide vandal-resistant luminaires and lenses for those luminaries mounted at accessible heights.
- All lighting shall conform to the requirements of NFPA 130 and NFPA 101 for both egress and emergency lighting.
- All lighting designs will be in compliance with IESNA standards and shall meet all applicable jurisdictional codes and requirements, including ADA compliance requirements.
- Lighting should use LED fixtures.

3.8.2 ILLUMINATION LEVELS

Illumination levels should define and differentiate between task areas, decision and transition points, and areas of potential hazard. In addition to quantity of light, it is essential that illumination be designed to minimize glare and provide uniform distribution.

- Luminaires should be selected, located, and/or aimed to accomplish their primary purpose while producing a minimum of objectionable glare and/or interference with task accuracy, vehicular traffic, and neighboring areas.
- Lighting design should consider both lighting installed for the project, as well as existing or proposed lighting levels from adjacent uses.

3.8.3 STATION SITE LIGHTING

- The placement of luminaires shall not obstruct the movement of pedestrians, cyclists, or vehicles and should be coordinated with the landscape plan to avoid plantings obstructing the light distribution.

3.8.4 PEDESTRIAN LIGHTING

- Pedestrian scale lighting shall be provided along walkways, crosswalks, ramps, stairs, and multi-use paths.
- Bollard lights may be located to help identify key pedestrian paths of travel as well as station entries.
- Accent lights may be used for aesthetic purposes in pedestrian gathering areas. Examples may include tree up lighting, in-grade wall lighting, and pathway lights.
- Provide path lighting where is helpful to direct patrons to desired paths of travel. Path lighting is a station specific consideration.
- Station illumination and equipment placement in plazas, bike paths, and other pedestrian areas should eliminate shadow casting.

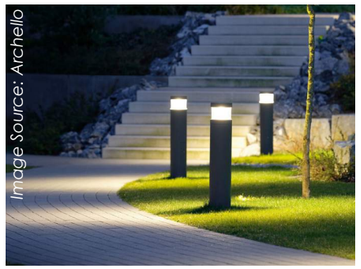

Figure 3.31 Bollard Lighting and Pedestrian Scale Light Examples

3.8.5 VEHICULAR LIGHTING

- Vehicular access lighting should provide a natural lead-in to the bus areas and Kiss and Rides. The illumination on all access and egress roads should be graduated up or down to the illumination level of the adjacent street or roadway.
- Pole lights within the parking aisles should be set to an appropriate height to facilitate required lighting levels at parking stalls and drive aisles.
- Promote security by providing lighting illumination levels, color and quality sufficient for quality HD recordings by CCTV cameras.
- Provide sufficient lighting for license plate readers at night in the parking areas as well as station entrances and exits.

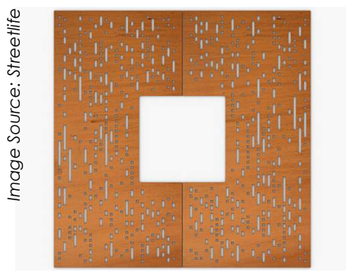

Figure 3.32 Tree Grate and Tree Well Planting Examples

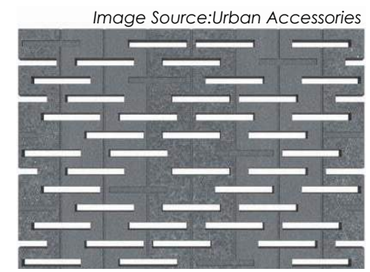

Figure 3.33 Trench and Drain Cover Examples

Figure 3.34 Bicycle Rack and Bicycle Locker Examples

3.9 SITE FURNITURE

All site furnishings should be durable, attractive, and inviting to use. Site furniture should be located to avoid creating visual obstructions or potential blind spots that could impair surveillance. Color selections to be coordinated with branding / identity of station wide system, and avoiding colors that quickly fade.

3.9.1 TREE GRATES

- Tree grates should be used in the station area plazas with higher volumes of pedestrian traffic.
- Grates should be designed to be able to accommodate mature trees over time.
- Constructed of strong and durable metal materials.
- Grates should be locally sourced if possible.

3.9.2 TRENCH & AREA DRAIN COVERS

- Constructed of strong and durable metal materials, and should match tree grates if used.
- Drains should be locally sourced if possible.
- Designed to provide easy maintenance access.
- Pre-fabricated drains only; no pour in place allowed.

3.9.3 BICYCLE RACKS AND BICYCLE LOCKERS

- Bicycle racks and lockers should be able to accommodate a range of bicycle types and sizes.
- Bicycle racks shall be able to support a bicycle at minimum two points of contact and enable use of a U-lock to secure a bicycle wheel and bicycle frame to the rack in accordance with APBP standards, and shall be cane detectable per ADA standards.
- Bicycle racks and lockers should have a durable finish such stainless steel for harsh outdoor temperatures and sun exposure. Powdercoat finishes should not be used.
- Lockers should have perforated sides to be able to view inside the locker for safety, **see Figure 3.34.**
- Bicycle racks and lockers should be located out of pedestrian circulation flow areas should be accessible from a bicycle facility. (Refer to Chapter 2: Site Circulation.)

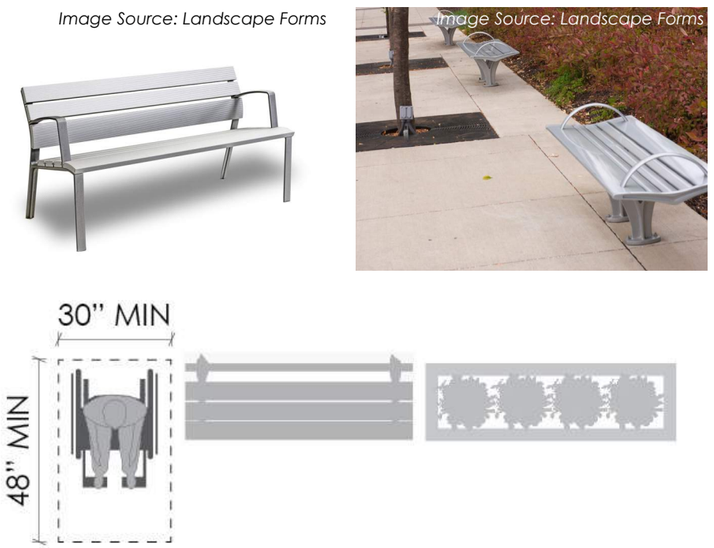

Figure 3.35 Accessible Bench Requirement

Figure 3.36 Trash and Recycling Bin Examples. *(Image Source: Landscape Forms)*

Figure 3.37 Bollard Examples

3.9.4 BENCHES

- Benches should be located at the perimeter of the central plaza areas and in waiting areas, oriented to best views where possible, clear of the main pedestrian circulation pathways.
- Benches should be constructed of solid, durable material and designed to withstand continued public use, UV degradation and vandalism.
- Benches should be provided in both backed and backless configurations. Benches with backs should have arm rests and center bars.
- Provide at least one 30" x 48" clear space adjacent to the ends of a group of benches to allow a person in a wheelchair to sit adjacent to them. See **Figure 3.35.**

3.9.5 TRASH AND RECYCLING BINS

- Station area plazas should have minimum of two trash bins and two recycling receptacles in the station plaza in addition to locations on the platform and/or bus and pick up drop off/taxi waiting areas.
- Locate trash and recycling receptacles at station plaza areas, bus zones, and high pedestrian traffic areas, out of the way of circulation paths.
- Locate trash and recycling receptacles so that they may be easily monitored and emptied by station maintenance staff.
- Ash urns are also recommended to be incorporated into the station area plazas but not required.
- Trash bins, ash urns, and recycling bins should be of a solid, durable material and match other site furnishings.
- Trash and recycling bins should have side openings rather than top openings to protect contents from wind or rain.

3.9.6 BOLLARDS

- Bollards may be provided to in lieu of a raised curb to prevent vehicle encroachment into pedestrian areas.
- Bollards shall be removable where required for maintenance or emergency vehicle access.
- Lighted bollards are preferred to provide additional security during evening hours.

3.10 STORMWATER MANAGEMENT

Integration of stormwater management techniques that mimic natural hydrology into all aspects of the station design should be considered, including streets and parking, buildings and structures, public spaces and landscaped areas. This approach assists both in flood management and provides public health and quality of life benefits that contribute to community livability and station aesthetics. Specific stormwater requirements will be determined on a site-by-site basis and by local jurisdictional standards including California Storm Water regulations and the National Pollutant Discharge Elimination System (NPDES) criteria.

Acceptable stormwater management techniques which incorporate these strategies might include bioswales, flow through planters, raingardens, and detention ponds. Subgrade vaults should only be considered in areas with little to no opportunity for stormwater planting.

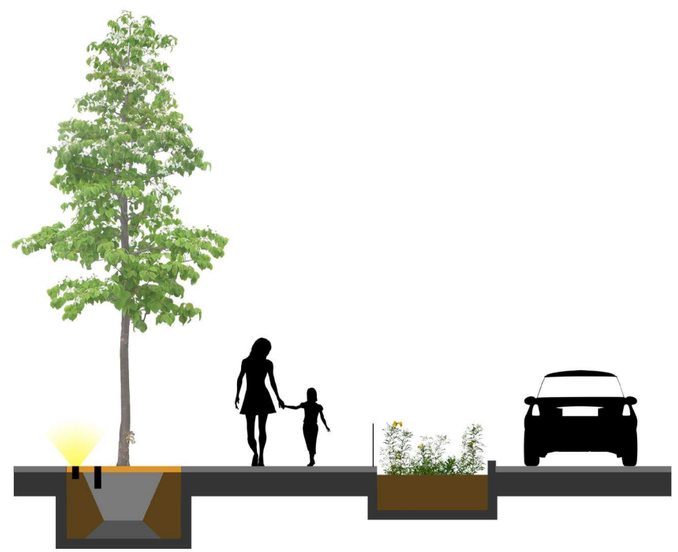

Figure 3.38 Typical Section of Vegetated Bioswale.

3.10.1 BIOSWALES

Bioswales should be integrated into the site grading plan and coordinated with the site civil engineering infrastructure and drainage plans. These natural systems play a significant role in stormwater management and treating urban runoff from impervious pavements.

- Bioswales should be located adjacent to impervious paved areas, such as parking lots, roadways, and urban plazas. Each station area may have optimal areas for bioswales and their sizes may be evaluated on a case-by-case basis to meet site specific stormwater requirements.
- Bioswale design should be large enough to accommodate a minimum 3:1 slope along the edges.
- Bioswales should be designed to maximize length (direction of flow) allowed by the site with a maximum longitudinal slope of swales between 1-2%.

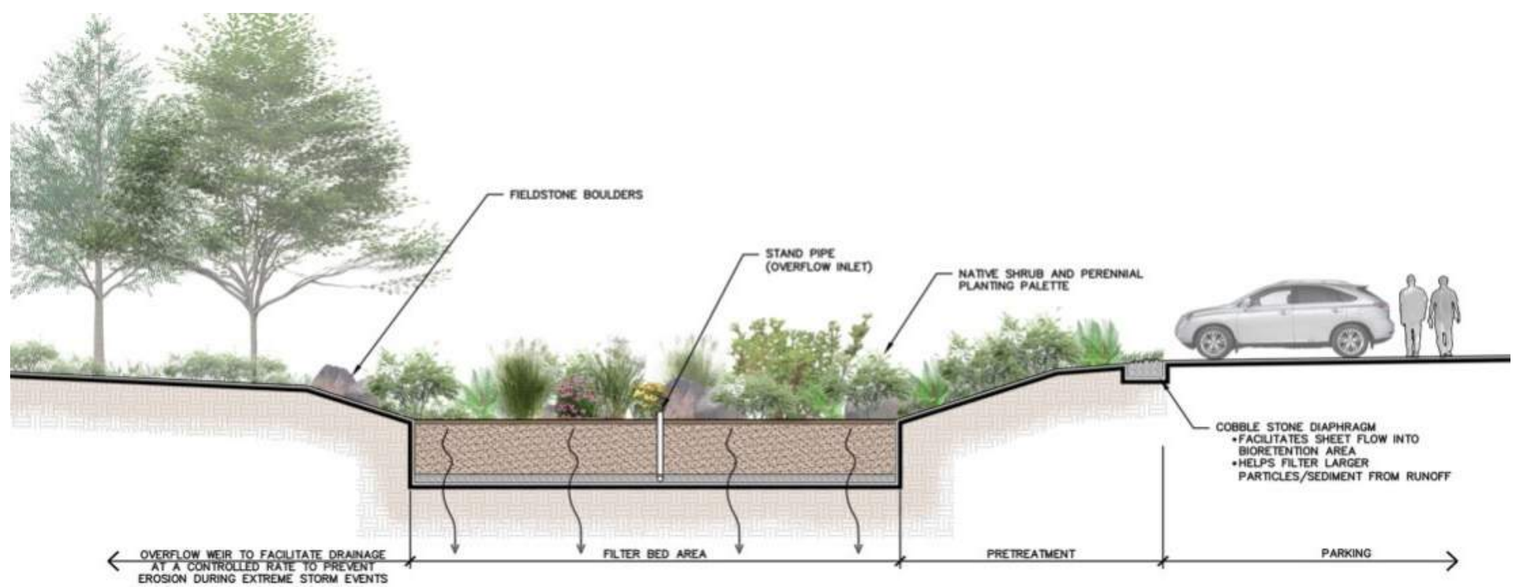

Figure 3.39 Bioswale Section. *(Image Source: The LA Group)*

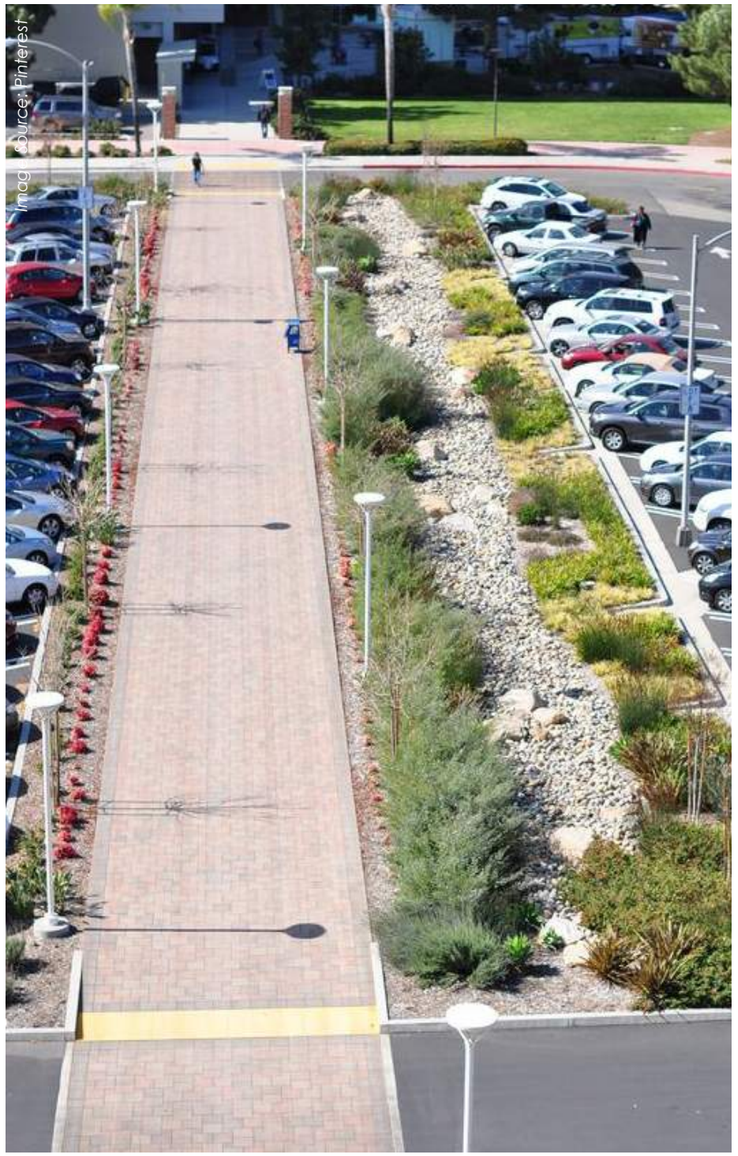

Figure 3.40 Bioswale at Edge of Pedestrian Walkway and Parking Lot

Figure 3.41 Rain Garden Examples

3.10.2 RAIN GARDENS

Raingardens are an effective storm water management component and should be implemented where possible in the station area plan, adjacent to streets, drive lanes, parking areas, and urban plazas.

- Rain gardens should be a minimum of 36" depth to allow for proper amount of absorption medium and plant material. Please refer to **Figures 3.40 and 3.41** for raingarden examples.
- Certain shrubs, groundcover, and grasses are effective in filtering stormwater and improving groundwater quality. Refer to the Plant List in Appendix C for plants suitable for these conditions.

3.10.3 BASINS AND DETENTION PONDS

Basins and Detention Ponds are typically larger structures that can accommodate a large volume of water. These should be located on the periphery of station sites, where possible

- Storm drainage basins and detention ponds should be graded to have a natural appearance where possible, while sized to accommodate the required volume of anticipated storm water.
- Where basins or detention ponds are immediately adjacent to walkways, safety fencing may be required, per local codes.

3.10.4 UNDERGROUND VAULTS

Underground vaults are large storage vessels to hold water and slowly drain. These structures prevent flooding and help address excess water quantity, however, they do not improve water quality, and thus are not a preferred stormwater management strategy.

- Underground vaults should not be used unless in urban station areas where there is little or no opportunity for large planting or stormwater storage, nor ability to connect to existing stormwater systems.

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4 VERTICAL CIRCULATION

SAFE
CONVENIENT
COMFORTABLE
ENJOYABLE
INTUITIVE

ACCESSIBLE
MULTIMODAL

ELEMENTS OF
CONTINUITY
UNIFIED SYSTEMS
KIT OF PARTS

LONG TERM
VALUE
MAINTAINABLE

4.1 OVERVIEW

Successful design for pedestrian vertical circulation balances design considerations for user comfort and convenience. Paths of travel must be accessible to everyone, regardless of their physical, cognitive, or mental ability. Paths should have clear and unobstructed sight lines, comfortable grades, and adequate widths to accommodate bi-directional flows of people; whether traveling in a group, or with a bike, stroller, or luggage. Smooth pavements and transitions, consistent lighting, and other urban design treatments should be considered to create an overall desirable passenger experience. These guidelines provide an overview of these design elements.

4.1.1 ACCESSIBILITY AND SAFETY

Design for pedestrian travel should be fundamentally based on Universal Design principles, which guide the design and composition of the environment as accessible, easily understood, and usable by all people regardless of their level of mobility and abilities. Accessible means a person with a disability is afforded the opportunity to engage in the same interactions and enjoy the same services as a person without a disability in an equally effective and integrated manner, with equivalent ease of use. The Americans with Disabilities Act (ADA) requirements are a minimum Federal standard for accessibility. However, ADA requirements only address technical aspects of accessibility and do not consider experiential quality. Though a public space may be ADA compliant, it may still be very challenging for people with disabilities to access. Thus, Universal Design principles are a critical tool to holistically address the user experience.

Often, people who have a mobility disability or those who rely on assisted mobility devices are limited in the distances they can travel, especially up long or steep grades. Extensive ramping can accommodate wheelchair users and other users such as people with strollers and bicycles, but often results in long crossing distances or steep slopes that discourage use. Roadway intersection crossings, dimly lit spaces, and abrupt level changes can be difficult or even dangerous for people with low or no vision to navigate. Design of station environments can include multi-sensory visual, tactile, and auditory wayfinding, signage, signals, and other navigation cues to help people of all ages and abilities clearly understand how to move through the station areas and access the platforms. Consideration of the experience of users of all abilities, which build off Universal Design principles, should guide the planning and design of all public spaces.

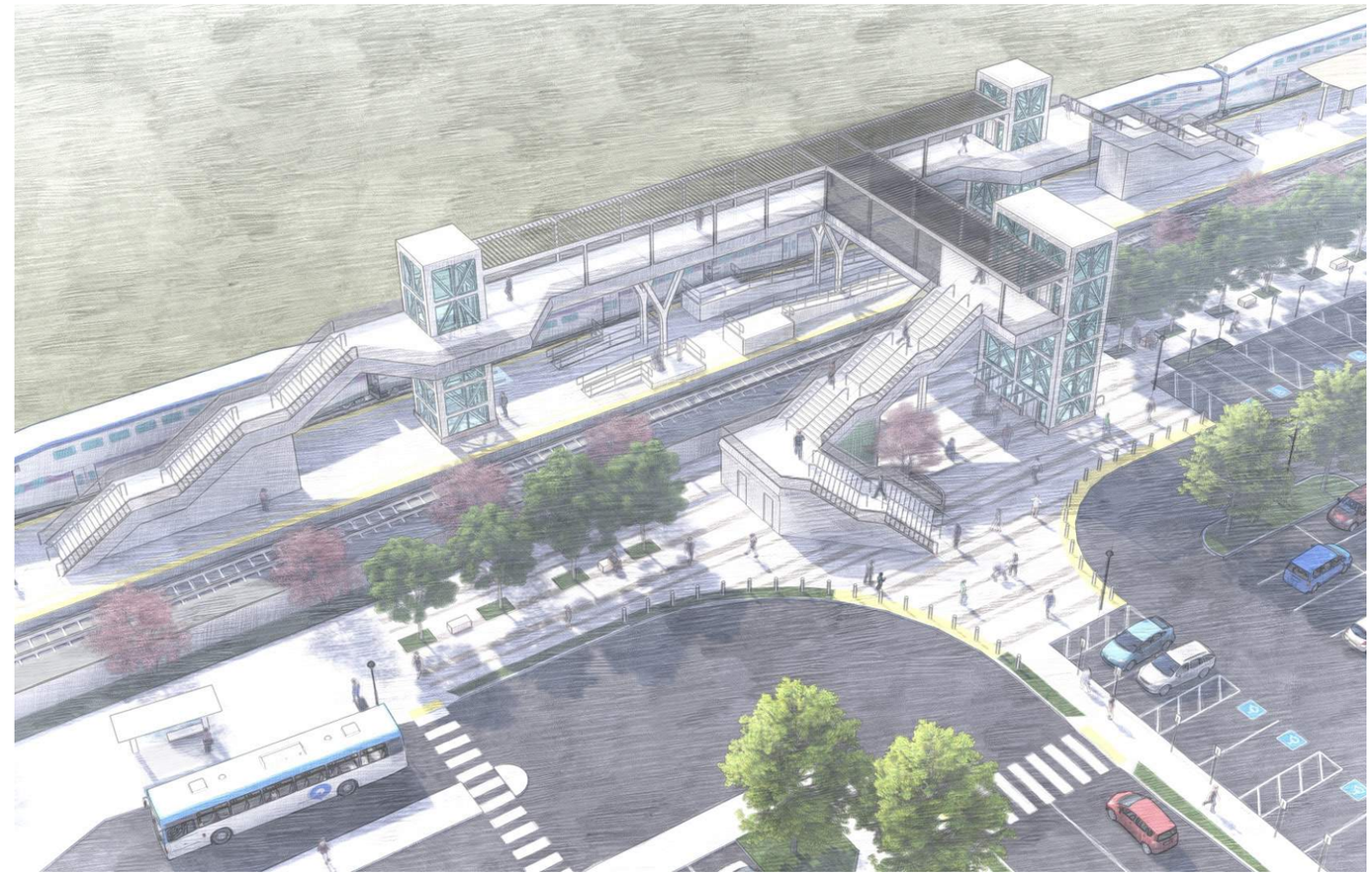


Figure 4.1 Vertical Circulation at Overcrossing Station

4.2 STATION TYPOLOGIES

At-grade pedestrian rail crossings over the active trackway to the platforms are not permitted per UPRR criteria. As a result, center platform stations require grade separated pedestrian access by means of a pedestrian overcrossing or undercrossing.

Pedestrian overcrossing structures are comprised of an elevated pedestrian overcrossing, pedestrian bridge, stairs and elevators. The combined structure should provide safe and accessible circulation on and off the platform as well as meet the requirements for emergency platform evacuation (NFPA 130).

Either overhead crossings or undercrossings may be utilized at particular stations depending on site specific conditions to provide grade separated access to the platform.

4.3 OVERCROSSING STATION

4.3.1 PEDESTRIAN OVERCROSSING

Pedestrian overcrossing refers to the portion of elevated walkway that runs perpendicular to the platform over the track. An overcrossing should be served by two elevators and a stairway from the station side (parking) and should connect to the pedestrian bridge above the platform. Escalators, in addition to elevators, are not indicated based on ridership projections at the stations. Vertical circulation to and from the overcrossing should be provided as follows:

- On the station (parking) side of an overcrossing, the pedestrian overcrossing should be accessed by a stair tower in conjunction with an elevator system complying with ADA requirements. Refer to Site Circulation and Station Area guidelines for information regarding the placement of the stair and elevator structure on the site.

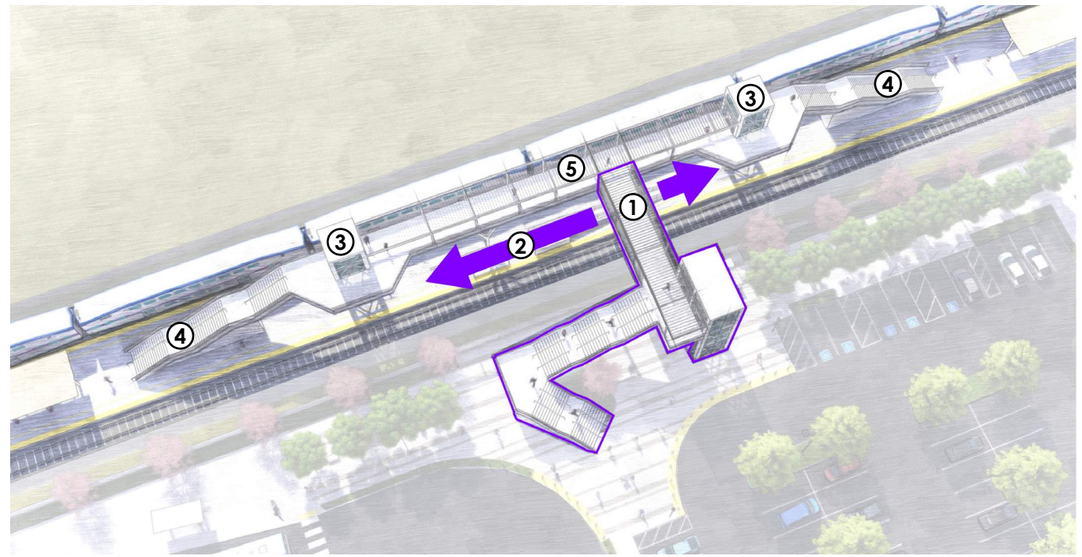


Figure 4.3 Overcrossing Station - Pedestrian Overcrossing Location Flexibility

1. Pedestrian Overcrossing connects station area to platform over trackway
2. Pedestrian Overcrossing location is flexible - can shift along pedestrian bridge between the two platform elevators in response to site context
3. Platform elevators direct passengers to center of platform and accessible ramps
4. Platform stairs direct passengers to either end of platform; Stair widths meet exiting and evacuation criteria
5. Pedestrian bridge parallel to platform

Figure 4.2 Plaza Area Approaching Stair and Elevators

- Two elevators must be provided for maintenance redundancy and to provide an adequate level of service to accommodate the projected passenger loads. Refer to subsection Vertical Circulation – Elements for additional information regarding elevators.
- The stair tower configuration should be a running stair with a single switchback landing unless site constraints are such that a multiple switchback stair tower must be utilized. The run of stairs below the single switchback landing should kick out at a 45 degree angle to create a more inviting approach from the station area.
- Stair width should be sized to accommodate egress loads based on station ridership projections, or a minimum of 10' wide clear. A 12" wide bike runnel should be provided along the outer edge of the running stair, outside the clear width of the stair. Refer to Section 4.6 Vertical Circulation Elements for additional information regarding stairs and **Figure 4.15** for illustration of a runnel.
- The location of the connection between the pedestrian overcrossing and the pedestrian bridge above the platform can shift between the two elevator towers on the platform for flexibility in responding to site specific conditions on the station side (parking) of the track.
- The overcrossing walkway should be a minimum of 11 feet wide and have a minimum vertical clearance over the tracks of 23'-4" from the top of rail.
- Any permanent structure on the station side must be set back a minimum of 5' clear horizontal distance from the UPRR right-of-way to facilitate construction of temporary work that won't encroach into the UPRR right-of-way or a minimum clear horizontal distance of 9' from the centerline of track, whichever is greater.

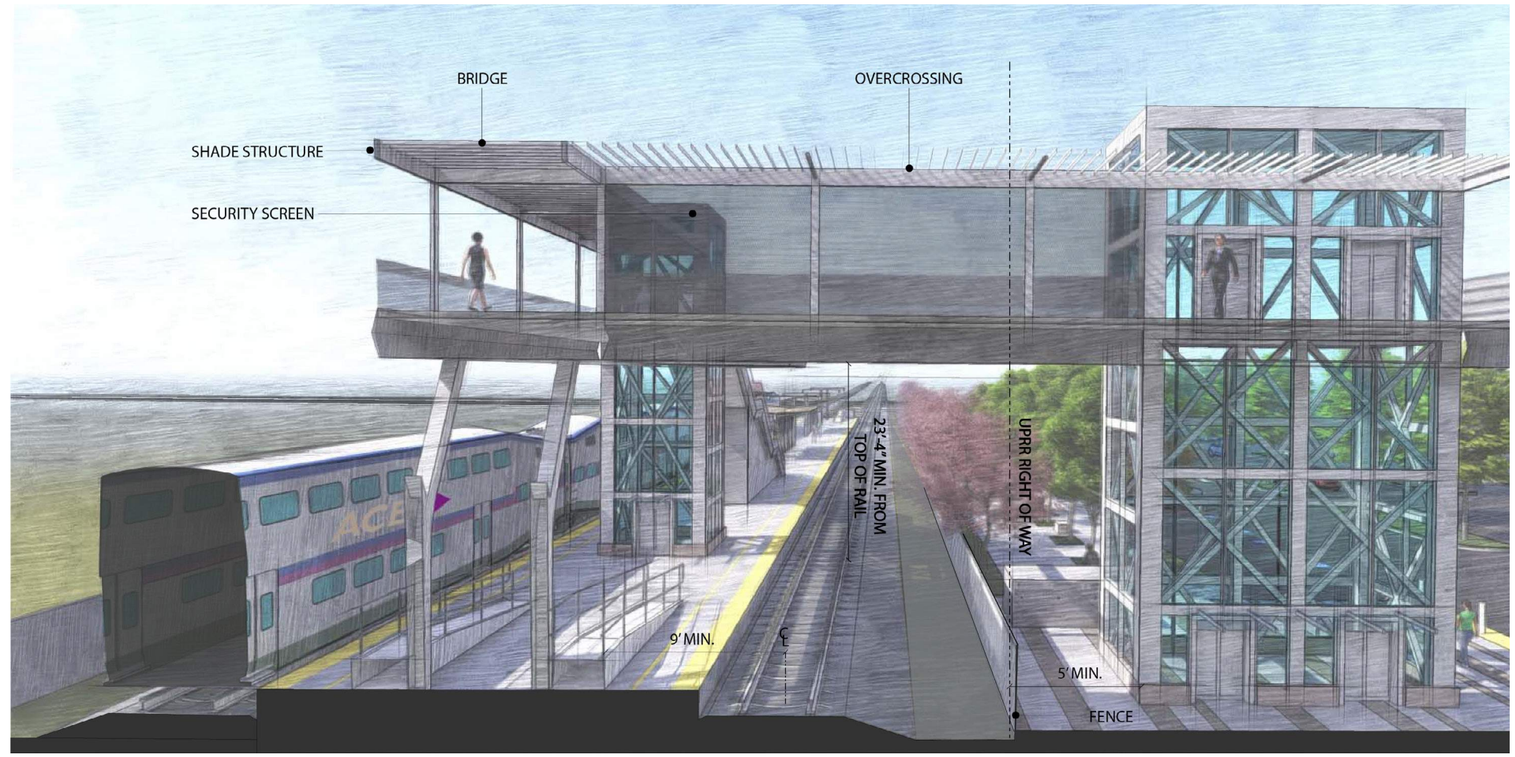


Figure 4.4 Overcrossing Section Perpendicular to Track

- An overhead shade structure should be considered for incorporation into the design of the overpass in order to provide a cost effective means of integrating lighting, wayfinding and security systems over the walkway while providing environmental protection and a sense of security for passengers traveling between the station side and the platform.
- Overcrossings should have protective railings and be equipped with security screens for the full height of the sides to prevent the dropping of objects from the overpass on to the UPRR right-of-way.
- A barrier system for access control should be incorporated at the station side entrance of the pedestrian overcrossing for security during station closure.

4.3.2 PEDESTRIAN BRIDGE

Pedestrian bridge refers to the portion of elevated walkway that runs parallel to the tracks above the platform and connects pedestrians coming from the overpass to a stair or an elevator leading down to the platform on either side of the central mini-highs.

- The pedestrian bridge should be the same width as the pedestrian overcrossing.
- Two elevators should connect the pedestrian bridge to the platform for maintenance redundancy and to provide adequate level of service to accommodate the projected passenger loads. Refer to Section 4.6 Vertical Circulation Elements for additional information regarding elevators.
- An elevator should connect down to the platform from each end of the pedestrian bridge. The landing area in front of the elevators on the pedestrian bridge should be provided with 10' minimum overall depth.
- A stair should connect to the platform from each end of the pedestrian bridge in order to provide two paths of egress off the platform, refer to the Platform guidelines for clear area depth at the bottom of the stair. The stair configuration should be a straight running stair with intermediate landings.
- Stair width should be sized to accommodate egress loads based on station ridership projections, or a minimum of 10' wide clear. Include a 12" wide bike runnel along both sides of the running stair outside the clear width of the stair. Refer to subsection Vertical Circulation – Elements for additional information regarding stairs.
- A walkway that connects the elevator to the adjoining stairs should maintain an overall width of 10' minimum.

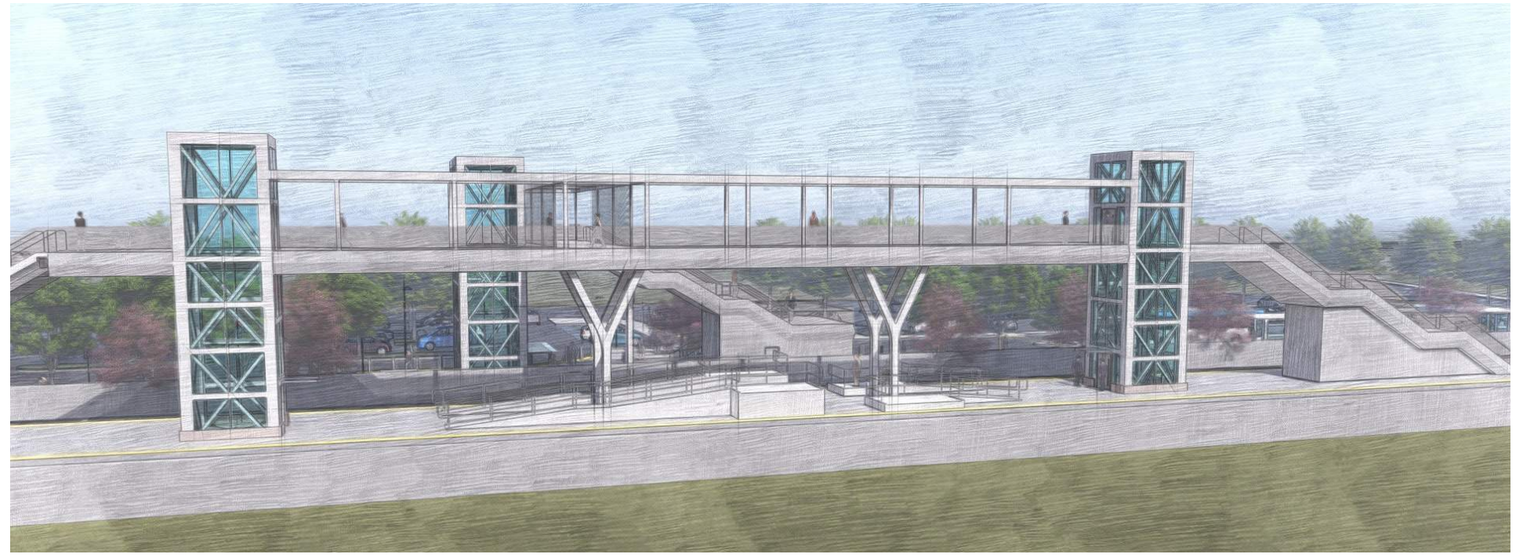


Figure 4.5 Pedestrian Bridge over Platform

- An overhead shade structure should be considered for incorporation into the design of the pedestrian bridge in order to provide a cost effective means of integrating lighting, wayfinding and security systems over the walkway while providing environmental protection and a sense of security for passengers traveling between the station side and the platform.
- The pedestrian bridge design should consider the proximity of adjacent uses at each station and provide appropriate screening along the bridge to preserve privacy for those properties.
- A directional tactile wayfinding paving strip should be provided to connect vertical circulation elements throughout the station.

4.4 UNDERCROSSING STATION

4.4.1 OVERVIEW

The use of pedestrian undercrossings at select station locations are considered where track and site constraints preclude an overcrossing, or where indicated by local jurisdictions. At some stations, an undercossing is infeasible due to site conditions such as soils or ground water and should not be considered.

Undercrossings work best when designed to feel open and accessible to encourage passenger comfort and safety. Undercrossings designed to meet minimum requirements are typically very poorly perceived by the public and can limit the use of the station all together. Blind ninety-degree corners, narrow channeled paths leading into tunnels, and a lack of sightlines contribute to an overall negative passenger experience. It is important to provide good visibility and direct lines of sight to tunnel entrances from walkways and station areas. Design elements such as 45 degree wing walls, shallow slopes and terraced walls increase light and visibility to tunnels for a feeling of openness. These design strategies visually minimize the "tunnel" effect and can be the difference between a well-used facility and an avoided facility. These design principles should take priority over other site design elements including parking.

4.4.2 PEDESTRIAN UNDERCROSSINGS

Station Side:

- Paths leading to a pedestrian underpass should be direct maintaining maximum sightlines into and from the tunnel for safety and security.
- Stairs should lead directly into the tunnel providing a direct line of sight into the tunnel. Wider stairs are preferred where possible which can feel safer and more inviting for users.

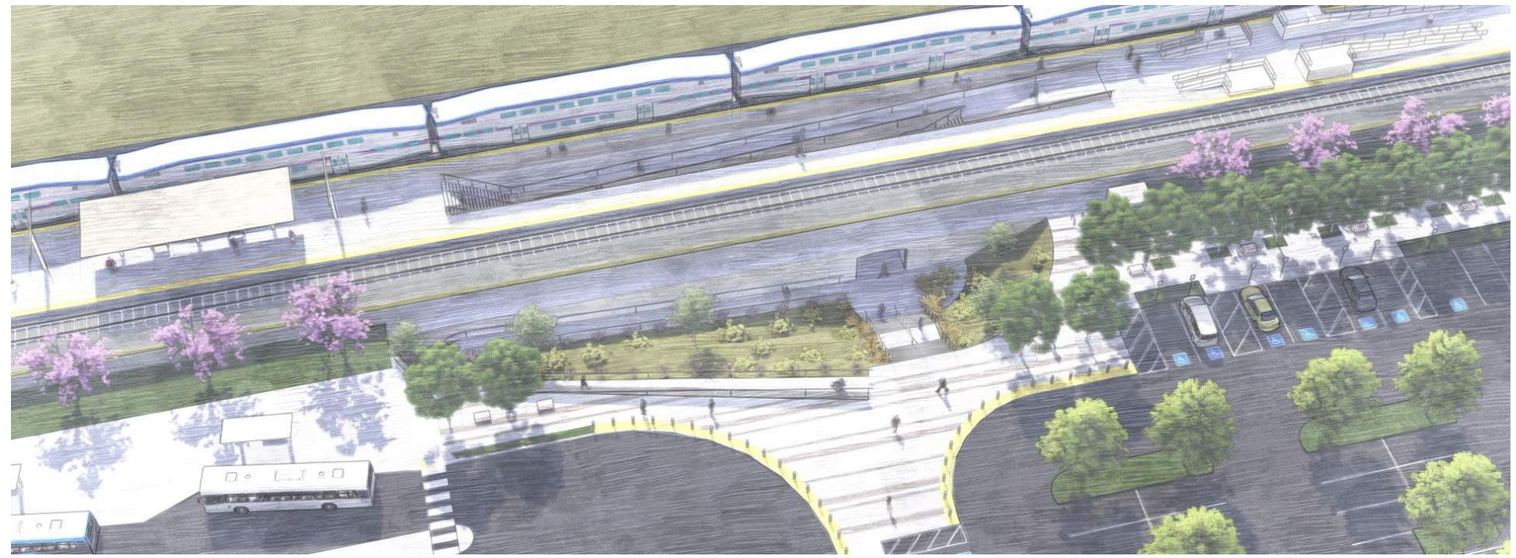


Figure 4.6 Undercrossing from Plaza to Platform

Figure 4.7 Undercrossing - Visibility at Tunnel Approach

- Ramps leading to tunnels should have a maximum slope of 6.8% if possible. Switch back ramps should use a minimum 16' radius at the point of redirection taken at the centerline of the ramp to better accommodate bicycle riders, users of wheelchairs and other mobility aids. Refer to Chapter 2 - Site Circulation guidelines for information regarding the placement of the stair and ramp plaza with regard to the overall site layout.
- Landscaped slopes should be incorporated at ramps to provide a more open and inviting passenger experience when accessing tunnels.

Platform Side:

- The location of the platform ramp longitudinally is determined by the station side access point, but should be centered on the platform as much as possible.
- The platform opening for stairs and ramps should be 12'-8" centered on the platform centerline. This dimension provides the desired openness for the ramp while maintaining adequate distance between the stand back line and ramp structure for passenger access and queuing. Maintain 48" minimum clear behind stand back line. Refer to **Figure 4.17** for illustration.
- Pedestrian ramps on the platform should be accessible at either end by stairs to provide emergency egress.

Tunnel Structure:

- Tunnels should be located where direct lines of sight can be accommodated through walkway alignment, landscaped slopes, amphitheater stairs and other sightline mitigation strategies.
- Where 90 degree turns occur for access at the end of tunnels, incorporate security mirrors providing a 180 area of reflection, such that pedestrians entering or exiting the tunnel can see clearly around corners.
- Tunnels should incorporate arched ceilings at least 10' high Tunnels should incorporate arched ceilings at least 10' high at the crown and 8'-6" at the side walls to enhance pedestrian experience.
- Tunnel widths should be 14' minimum, with 16' width preferred. Tunnel width should be increased if the underpass is longer than 60' in length from tunnel opening at the station side plaza to tunnel opening at platform side.
- A minimum of 3' of cover is required from top of rail to top of tunnel structure.
- A minimum longitudinal grade of 0.5% and a cross slope of 1.5% should be provided for drainage purposes. See section 4.4.6 Drainage for more detail.
- Tunnel lighting should be bright and incorporate as much natural daylight as possible.
- Tunnel wall treatments including texture, color, pattern, and art should be incorporated to enhance passenger experience. Graffiti removal mitigation should be used.
- A security gate should be installed at the station side entrance of the tunnel for access control during station closure.
- Use of wingwalls at tunnel entrances should be utilized to create deeper daylight penetration and enhanced sight-lines. Wing-walls should be constructed at a 45 degree angle typically. See **Figure 4.9** for illustration.

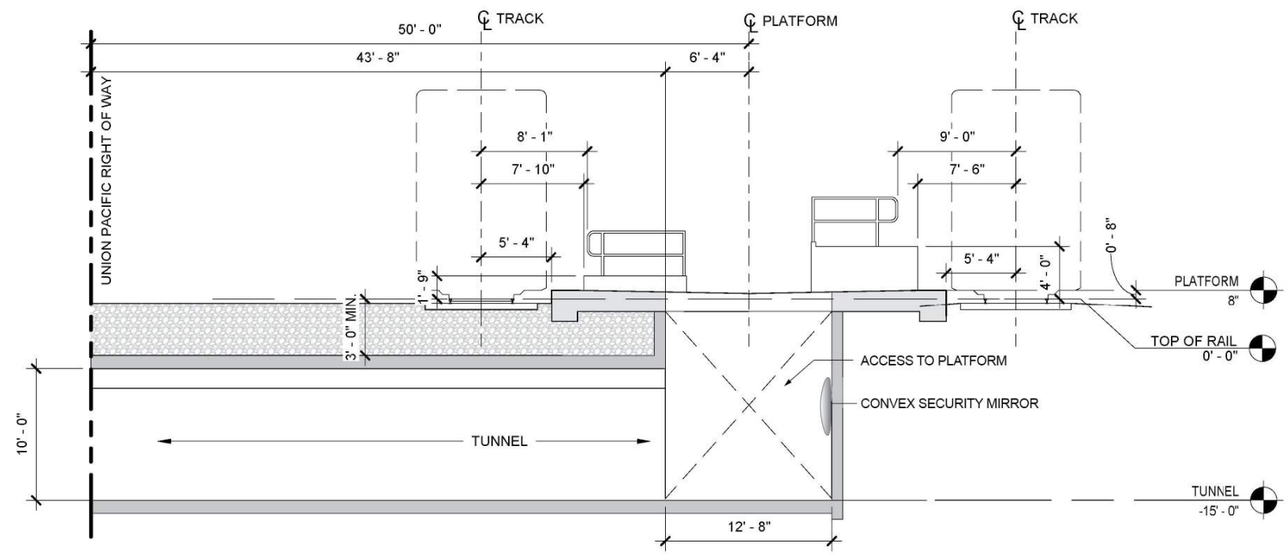


Figure 4.8 Tunnel Structure Clearances under Platform

4.4.3 LIGHTING

Tunnel and stair lighting should provide a welcoming dusk and nighttime atmosphere. Particular attention should be given to overcrossing structure entrances/exits, and tunnel pathways should be well lit both day and night to provide a sense of safety and security. Providing lighting at potentially hazardous locations provides passive security. Lighting acts as a crime deterrent by increasing the visibility in an area of concern. Lighting quality should be the primary consideration in lighting design, followed by lighting quantity and illumination levels. Lighting quality includes contrast, brightness adaptation, glare, and light source color which impact visibility.

4.4.4 DRAINAGE

Drains should be placed along the edges of the tunnel and out of the main traveled way of the corridor. Any drainage facility that must be in or along the usable surface must have a smooth, flat surface or inlet grates that are transverse to the path direction to avoid catching wheels or heels. Careful consideration should be given to intercept groundwater at undercrossing entrances to prevent surface water from entering the structure.

Figure 4.9 Tunnel Structure with Wing Walls

Figure 4.10 Tunnel Entrance to Santa Clara Station.

① **Access Control:** Fencing and signage indicate points of access

② **Natural Security:** Clear lines of sight from ramp, stairs, and tunnel and good lighting

③ **Maintenance:** Clean surfaces and maintained landscaping are perceived as safe inviting spaces

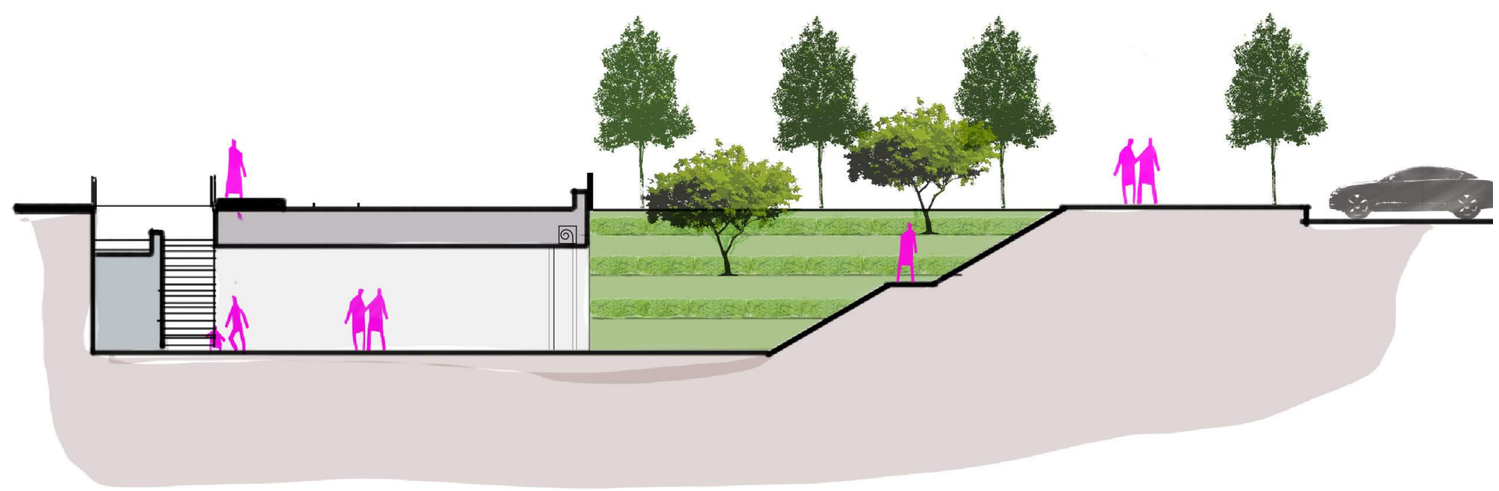


Figure 4.11 Cross Section at Tunnel Entrance

4.5 SIDE PLATFORM STATION

4.5.1 OVERVIEW

Side platform stations allow for pedestrian access from parking and station plaza areas without the need to cross the track right-of-way. Vertical circulation is not required unless site conditions are such that passengers will have to traverse grade differences in order to access the platform. Side platform stations can only be used at terminus stations and as allowed by UPRR.

4.5.2 SIDE PLATFORM – AT GRADE

Side platform stations should be accessed by users at grade where site conditions allow. Refer to the site circulation guideline section for information regarding station area walkways, refer to the below for configuring walkways accessing a side platform.

- Provide a minimum of three walkways for egress off the platform, the width of the walkways should be sized to accommodate projected ridership for the station or a minimum of 10' wide.
- Access points should be coordinated with platform seating and shelter configurations, mini-high boarding platforms, and provide logical paths of travel from station site arrival areas to the platform to distribute passengers boarding the trains.
- Walkways accessing the platform at side platform stations should be located no further than 300' apart.
- Walkways should provide clear surface areas at corners and decision points so that the predicted volume of queuing pedestrians can be accommodated.
- A directional tactile wayfinding paving strip should be provided to connect the station arrival plazas to the mini-high boarding areas for sight impaired passengers.

Figure 4.12 Side Platform - At Grade

- Access from station area plazas to platform level ideally is a level connection where all users may use the same accessible path of travel to support universal passenger access.

4.5.3 SIDE PLATFORM – AT DIFFERING ELEVATION

Where a side platform station site has significant grade differential or other conditions that require users to access the platform using vertical circulation elements, provide a combination of stairs and ramps in order to accommodate accessibility, egress and passenger convenience.

- Provide a minimum of three paths of egress off the platform.
- If a change in level from platform to the adjacent arrival plazas is unavoidable due to site constraints, ramped access points for ADA access should be designed to facilitate all users to support passenger equity.
- A ramp complying with ADA requirements should be located centrally along the length of the platform to provide convenient access to the mini-highs. Refer to subsection 4.6 Vertical Circulation Elements for additional information regarding ramps.
- Access points to the platform at side platform stations should be located no further than 300' apart.
- Stairs, if required due to site constraints, shall have widths designed to accommodate egress for the projected ridership of the station or a minimum of 10' wide.
- A directional tactile wayfinding paving strip should be provided to connect the station arrival plazas to the mini-high boarding areas for sight impaired passengers.

4.6 VERTICAL CIRCULATION ELEMENTS

4.6.1 STAIRS

Stairs must be designed for users to navigate comfortably and safely. Stair configurations should allow for maximum visibility and clear lines of sight by eliminating blind corners, providing direct paths of travel, and using appropriate width, tread/riser proportions, landing size and frequency, and railing transitions and heights. Consideration should also be given to material transparency and lighting of the stair. Refer to Section 4.2 Station Typologies for description of stair locations based on station configuration.

- The overall width of a set of stairs not described with minimum widths in other sections should be a minimum of 6 feet. Where possible wider stairs should be incorporated, for example at tunnel entrances, as wider stairs are more inviting, allow queuing space, and can feel safer for users, particularly in crowded public spaces.
- Stairs that are part of the path of egress should be sized according to ridership projections for each station as provided in the FEIR.
- Stair runs and landings should be vertically spaced by approximately 8' vertical distance so users can see each landing as they ascend the stairs. Landing depth in the direction of travel should be equal to the stair width, or a minimum of 6 feet.
- In order to eliminate tripping hazards the dimension of a riser should always be a minimum of 6 ½ inches and a maximum of 7 inches. Risers should be dimensioned in proportion with treads so that the overall stair slope is ~ 30 degrees, or following the formula 2 x Riser Height + Tread Length = 24 to 26". A 6-3/4 inch riser and 11-1/2 inch tread is preferred.

Figure 4.14 Cable Guardrail

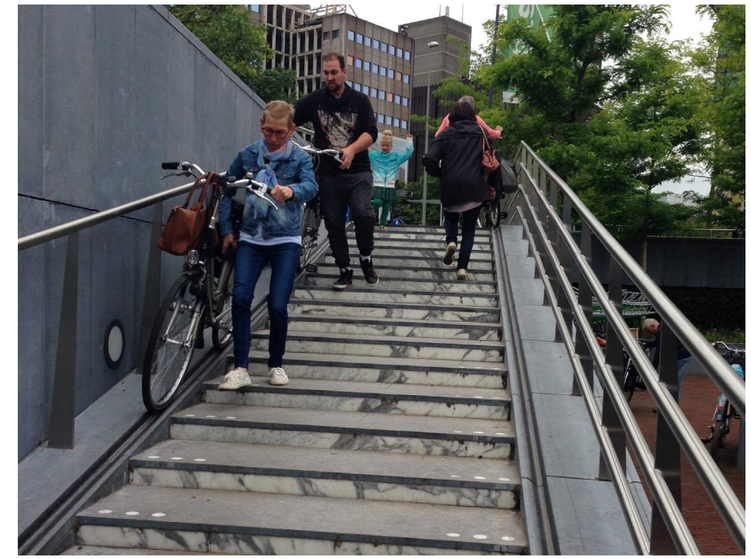


Figure 4.13 Stair Runnel in Rotterdam, NL

- Handrails are required at both sides of a stair. An intermediate handrail is required at egress stairs wider than 60" such that all portions of the stair minimum width or required egress capacity are within 30" of a handrail. The height of handrails should be 34"-38"above the walking surface and meet ADA standards.
- Where there is a drop to an adjacent surface of more than 30", guardrails shall be provided for stairs.

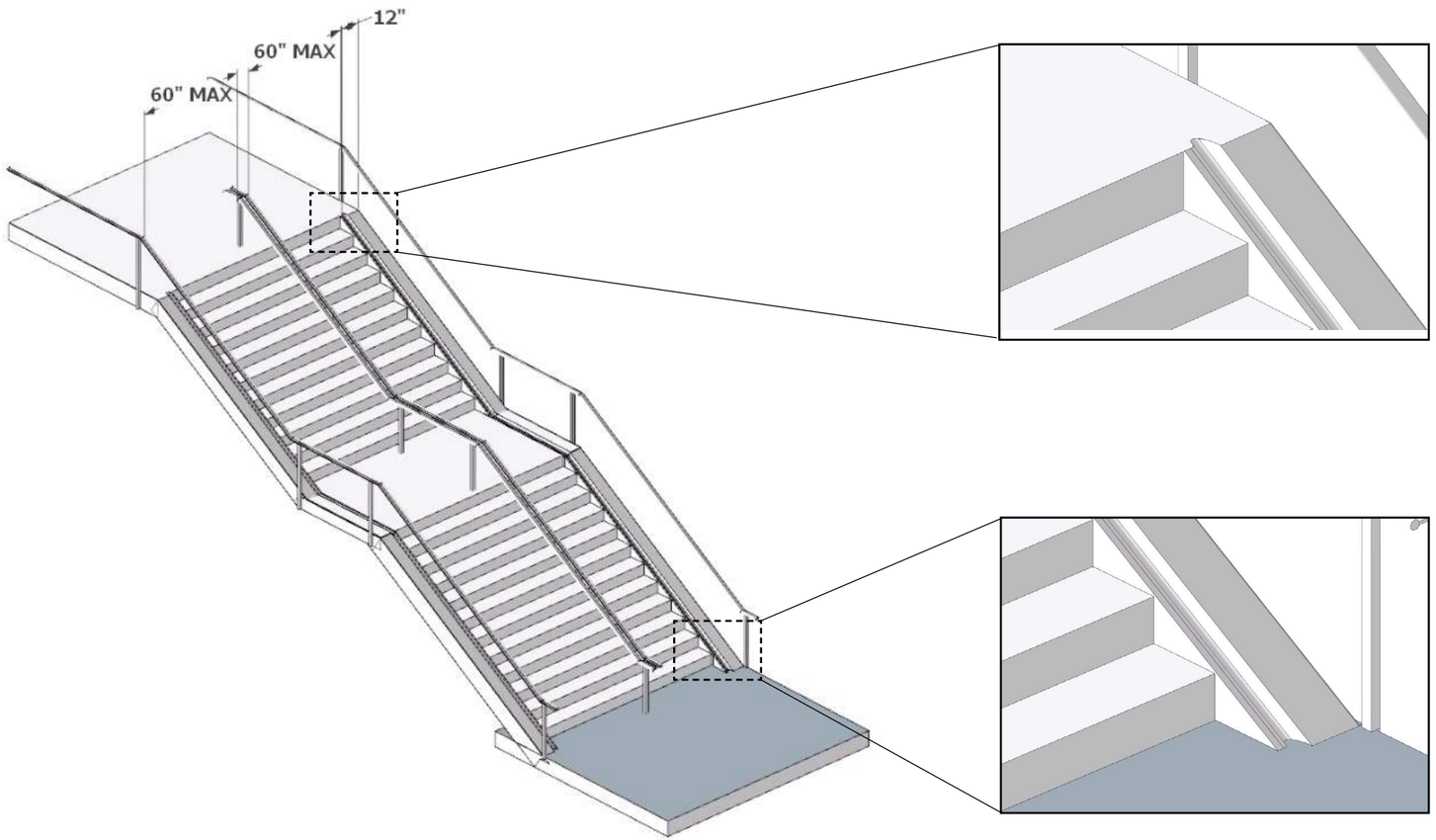


Figure 4.15 Stair Diagram of Maximum Spacing of Handrails and Bicycle Runnel Transition Details

4.6.2 STAIR BIKE RUNNELS

Bike runnels are grooved channels along the edge of a stair which facilitate rolling a bike up or down stairs without having to carry a bike.

- Runnels should be 12" wide with an 8" setback from the stair guardrail to avoid handlebar and pedal conflicts.
- Runnels should have a "U" shaped profile to hold a bicycle wheel.
- Runnels shall have a consistent slope with the stair run.
- Runnels shall have a continuous transition at top and bottom landings. See **Figure 4.15.**
- Bike runnels are preferred on both sides of stairs. If site width constraints preclude bike runnels on both sides of the stair, a runnel should be provided on the right-handed down direction of the stair to allow better user control for bikes.

4.6.3 RAMPS

Ramps must be designed for users to navigate elevation differences comfortably and safely. Ramp configurations should allow for maximum visibility and clear lines of sight by eliminating blind corners, providing direct paths of travel, and using appropriate width, slope, landing size and frequency, and railing transitions and heights. Refer to Section 4.2 Station Typologies for ramp locations based on station configuration.

- The grade for long ramps with an overall elevation gain of 8 vertical feet or more should be 6.8% preferred but the ADA allowable 8% percent can be used where necessary at constrained sites.
- Ramp landings should occur every 30" of vertical elevation.
- Provide one switchback landing at a change of direction. Ramp landing length should be equal to the width of the ramp or 6' minimum in the down direction.
- Ramps should be a minimum of 6' wide, 8' wide preferred for bidirectional travel.
- Handrails should be provided to assist public access where ramp structures have longitudinal grades greater than 5%. Handrails are required only along one side of the ramp structure but shall be continuous along the full length of the ramp. Where a ramp is part of an accessible egress route, handrails are required within 30" of the required egress width. The height of handrails should be 34"-38" above the walking surface and meet ADA standards.

Figure 4.16 Platform Ramp at Undercrossing Station

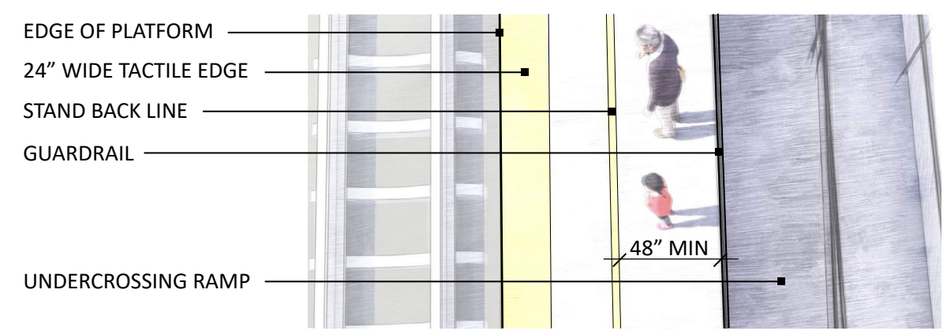


Figure 4.17 Edge of Platform Plan Diagram at Undercrossing

4.6.4 ELEVATORS AND ELEVATOR ENCLOSURES

Elevators are to be provided at overcrossing stations in order to provide an accessible path of travel from the station side plaza and parking to the platform.

- Each station area (platform and station side) should have two elevators to allow for continued operation of one elevator in the case of breakage or out of service condition to maintain the accessible route between the platform the station.
- Elevators should be sized to accommodate an 84" long by 24" wide stretcher, as well as a 60" turning circle within the elevator car when the doors are closed. The elevator car should utilize center opening doors to speed passenger ingress and egress reducing travel times and in order to maximize throughput of the elevators serving the station.
- Heavy duty hydraulic transit elevators are proposed that offer enhanced durability, simplest operation, and lowest maintenance requirements. They provide rapid travel time between levels and have the ability to handle large capacities. Vandal resistant design should be incorporated stainless steel and safety glass cabs and doors provide maximum visibility.
- A clear space for passenger queuing should be maintained in front of each elevator door extending 20' minimum in depth for the width of the elevator enclosure.
- A clear line of sight should be provided from one platform elevator to the other to allow people to regulate their queuing.
- Elevator enclosures should be transparent at the car doors and sides of the enclosure to facilitate passenger safety and security. Protection of the enclosure glazing should be considered up to 18" above finish floor at the overcrossing and platform landings to prevent incidental damage to the enclosure.

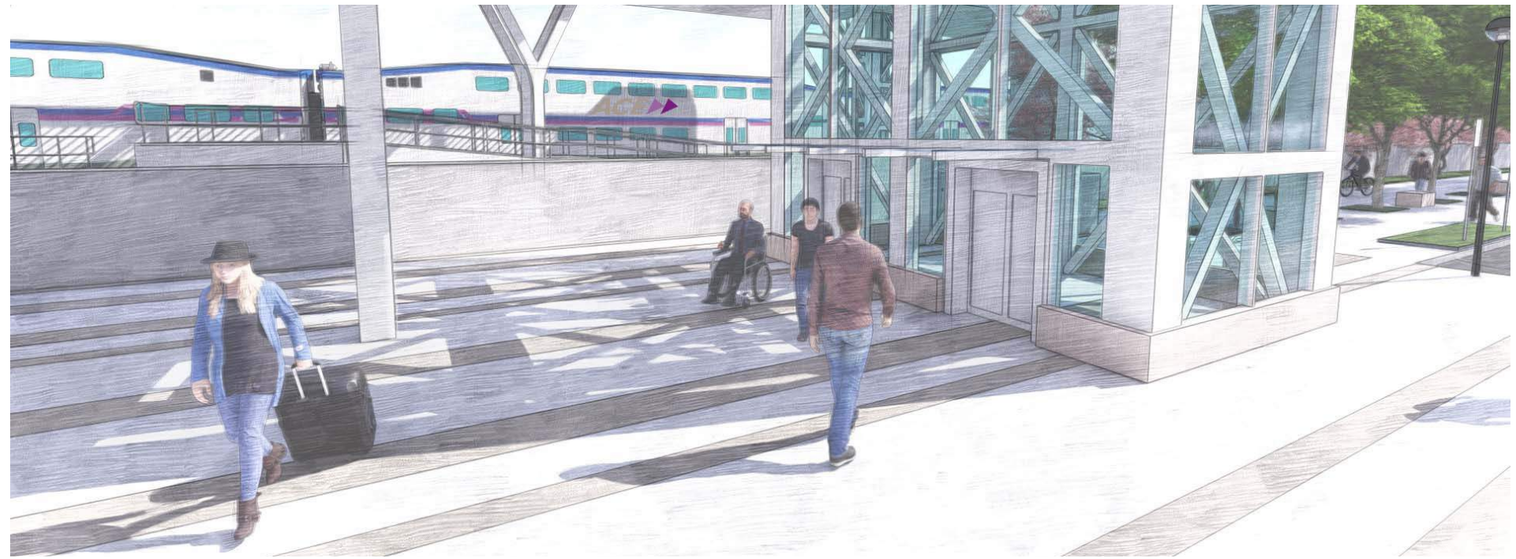


Figure 4.18 Elevator with Canopy

- The enclosure should be a minimum of 1-hr rated construction per the California Building Code (CBC). Any ledges on the interior of the elevator enclosure shall not exceed 2" unless provided with a 70 degree vertical sloped edge to prevent items from being left in the shaft and falling within the hoistway.
- A canopy should be provided above the door to each elevator for weather protection. The canopy should be a minimum of 6' deep and extend a minimum of 1' in width past the edge of the door opening. Where two elevators occur in the same enclosure, the canopy over both elevator doors may be continuous.
- Elevators should be equipped with controlled access for security and operations purposes during station closure and system non-operation.
- Provide hydraulic elevators with an elevator pit drain and a sump outside of the elevator pit.

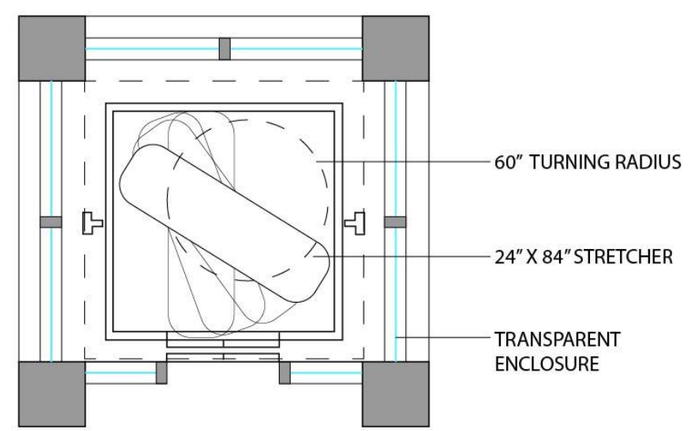


Figure 4.19 Elevator Cab Diagram

- Elevators should meet American Public Transportation Associate (APTA) criteria and specifications where possible to improve longevity and operations.
- Machine Roomless Elevators (MRLs) are not appropriate due to limited customization of elevator car sizes, and non-availability of APTA compliant elevators from manufacturers, and California specific limitations on the serviceablity of MRL type elevators.

4.6.5 ELEVATOR MACHINE ROOMS

- An elevator machine room should be provided for each elevator, where two elevators are within the same enclosure a single machine room may be provided to accommodate equipment for both elevators.
- An elevator machine room should have minimum interior clear dimensions to accommodate all required elevator equipment and equipment clearances.
- The distance from the elevator jack head in the elevator pit to the elevator machine room pump should be minimized. The maximum distance should be coordinated with the elevator manufacturer.
- Doors should be a minimum of 42" wide to facilitate equipment installation and replacement, the room should be secured and not contain any other support system controls not directly related to the elevator.
- The elevator machine room needs to be mechanically cooled with ductless split type HVAC systems to maintain room temperature within code and elevator manufacturer safety ranges.
- Machine rooms must meet requirements of the Elevator Code.

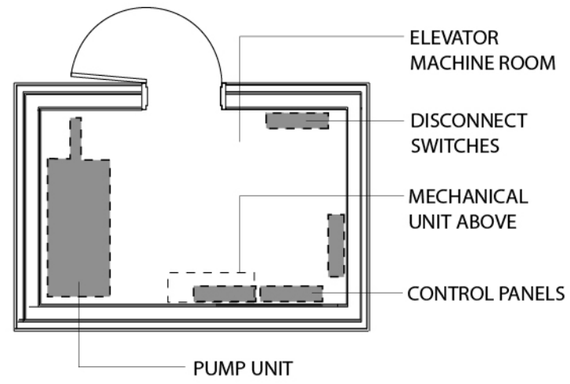


Figure 4.20 Elevator Machine Room Example Diagram

4.6.6 ESCALATORS

Escalators were evaluated based on serving the number of passengers during peak hours and determined not to be required for the following reasons:

- Based on the ridership projections in the FEIR, peak ridership at the most heavily traveled overcrossing stations is anticipated to be 600 passengers per day. While stairs were not considered as the primary means of vertical transportation, elevator capacity exceeds the desired capacity so escalators are not required.
- NFPA130 emergency evacuation standards state that escalators can only account for 50% of the exiting capacity. Available platform clearances and geometry do not allow for both escalators and stairs on the platforms.
- The additional cost of escalator maintenance supports the decision not to include escalators if they are not necessary.
- Future escalators could be considered at the station side if a significant increase in ridership is projected.

4.7 CONSTRUCTABILITY

4.7.1 OVERVIEW:

Considerations for constructing and erecting the vertical circulation elements within the UPRR ROW must be given during the design phase. Grade Separation Projects must be designed and phased that enables the UPRR track(s) to remain in service and cause no interruption to Railroad operations during construction. Refer to the UP and BNSF Guidelines for Railroad Grade Separation Projects for temporary and permanent clearances requirements. In addition, projects may require additional permanent clearance to accommodate future Railroad tracks, maintenance Access Roads, and MOW infrastructure. Also, considerations for sight distance to any train control wayside signals should be considered.

Other key considerations include:

4.7.2 OVERCROSSINGS:

- Other than the platform features, all other bridge features, piers, footings, retaining walls, and slope protection must be placed outside the UPRR ROW unless a variance is obtained.
- Use prefabricated structural elements to the greatest extent possible (e.g. using precast or prefabricated steel components and avoiding cast in place). This includes the horizontal and vertical elements for the Pedestrian Overcrossing, Pedestrian Bridge, Access Stairs and Elevator Enclosures. Because of this constraint, steel is preferred over concrete.
- Minimize the use of cast-in-place concrete for vertical structures on the platform.
- UPRR has stringent requirements regarding construction clearances that have to be maintained for all falsework and shoring.

4.7.3 UNDERCROSSINGS:

- Undercrossings must be designed and phased to enables the UPRR track(s) to remain in service and cause no interruption to Railroad operations during construction.
- The design of undercrossing structures should utilize the main line on the far side relative to the platform for UPRR operations during construction.
- Use of prefabricated structural elements to the greatest extent possible. This include prefabricated tunnel box structures that can be positioned in place using cut and cover methods in the shortest time possible avoiding cast in place.

Each of these factors are critical to the selection of steel vs concrete structural systems, where constructability governs, then cost. The intent of SJRRC is to use a common approach at all stations for these elements. Refer to the UPRR Guidelines for Railroad Grade Separation Projects, -UPRR Common Standards Passenger Platform Guidelines, and SJRRC Station design criteria for specific standards and criteria for the design of these elements.

5 PLATFORM

SAFE
CONVENIENT
COMFORTABLE
INTUITIVE

ACCESSIBLE
MULTIMODAL

UNIFIED SYSTEMS
KIT OF PARTS

FLEXIBLE

5 PLATFORM

5.1 OVERVIEW

5.1.1 OVERVIEW:

Platforms are the primary connection point for thousands of ACE and San Joaquins passengers daily. They establish the first impression of the quality of a passenger's public transportation experience, and reflect SJRRC's sensitivity to environmental, social, and economic accountabilities. The quality, durability, and sustainability of platforms is extremely important; the integration of good design, materials and asset management strategies is essential. These guidelines provide the basis for design decisions to be used to prepare designs for all platforms.

Designers should consider as part of their platform design, the requirement to maintain continuity of UPRR operations during construction. This includes phasing of work, temporary structures and shoring, coordinating with rail operations, and maintaining all necessary clearances. Refer to UPRR standard drawings for guidance.

Figure 5.1 System Diagram

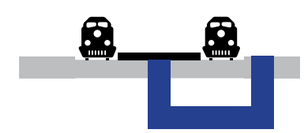
CENTER PLATFORM: OVERCROSSING

ELK GROVE
LODI
NORTH LATHROP
RIPON
TURLOCK

SIDE PLATFORM: OVERCROSSING

MODESTO

CENTER PLATFORM: UNDERCROSSING



OLD NORTH SACRAMENTO
MANTECA
CERES
LIVINGSTON/ATWATER

SIDE PLATFORM: SIDE CIRCULATION

NATOMAS
MIDTOWN
CITY COLLEGE
MERCED

5.1.2 GOALS:

Overall platform design goals support platforms to be safe, secure, friendly, predictable, and accessible to all users regardless of their abilities, creating an inclusive and engaging transit experience. Accessibility should be prioritized for those passengers with additional needs. Platforms should be designed to be consistent with all SJRRC stations providing a familiar user experience.

- Design for passenger experience, facilitating their journey with well-defined functional zones, paths of travel, real-time information, route maps, suitable lighting and visibility, seating, and weather protection.
- Design for security and safety in mind for every platform element including transparency and eliminating areas that can hide or obscure CCTV and visual observations of the platforms. Apply CPTED principles and strive to find ways to avoid clutter on the platforms including consolidating signage and security elements on poles and other features.
- Integrate the platform architecture so that it conveys being in the SJRRC transit environment while contributing to its local context; one that provides continuity of a rider's journey and reflective of the character of the neighborhoods and community of which it is a part. Establish enjoyable spaces with quality elements that appeal across demographics and generations, supporting public transit as a desirable option.
- Provide an efficient and predictable platform configuration for each platform typology to facilitate paths of travel to each train boarding location and waiting area. Provide elements of continuity for wayfinding and signage, fare collection and fare paid zones, boarding and alighting zones and waiting areas to provide a smooth, high-quality experience for riders.

Figure 5.2 Platform at Fairfield-Vacaville Station
(*Image Source: Google Maps*)

Figure 5.3 Platform at Sacramento Valley Station
(*Image Source: Sacramento Bee*)

- Consider sound and noise mitigation opportunities adjacent to the station side where platforms are located in areas exposed to high decibel ambient background noise levels. Refer to the project FEIR for detailed information regarding particular station sites. Mitigation strategies may include use of green shielding and other interventions such as noise barriers or windscreen enclosures designed for noise attenuation.
- Incorporate materials and finishes that utilize a unified family of parts for signage and wayfinding, fare collection, pedestrian controls, and platform furnishings that employ simple, vandal resistant, integrated design and that have proven durability and maintainability to achieve lowest life-cycle costs.
- Asset Management and Life-Cycle Costing- Minimize life cycle costs by balancing initial cost against operating, maintenance and energy cost. Allow for future operating changes with minimal reconstruction.
- Incorporate sustainable and resilient design early in the project development process, throughout project design and implementation, and in operation and maintenance.

5.2 PLATFORM CONFIGURATION

Platforms are characterized by their typologies. The four basic types of station platforms are single outside platforms, center platforms, center platforms at transfer stations, and double outside platforms. The type of platform selected depends upon the station function, station layout, site constraints, and track operation requirements. **Figure 5.4** shows the various platform configurations.

Platforms occur in the UPRR right-of-way, as such they must comply with UPRR Rule 6.30 which dictates that passenger platforms cannot have at-grade crossings across the tracks. Permanent fencing and grade separations are required to ensure the safety of passengers traveling across the tracks as described in the following section.

Platforms are positioned 8" above track, with the platform edge 5'4" from center line of track.

Train service at each platform may arrive at either side for each direction based on operational conditions. Therefore, it cannot be assumed that one side of the platform will always serve a specific direction.

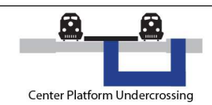
Platform Configuration Type	Center	Side	Double Side
Configuration			
Number of Platforms	One	One	Two
Access	Grade Separated	At Grade	At Grade or Grade Separated
	 Center Platform Undercrossing	 Side Platform	 Double Side Platform Overcrossing
	 Center Platform Overcrossing		 Double Side Platform

Figure 5.4 Platform Configuration Types

5.2.1 CENTER PLATFORM

- Center platforms are 30 feet wide by 955 feet long, located between the two mainline tracks. Center platforms are designed for passenger boarding and alighting on both sides of the platform.
- Pedestrian access to the platform is grade separated. Center platform stations will have an overcrossing bridge above the trackway to access the center platform (overcrossing stations), or an undercrossing to access the platform (undercrossing stations).
- Based on SJRRC and UPRR operating scenarios, a train may enter center platforms on either side to serve each direction of travel.
- Fencing is required along both sides of the UPRR right-of-way to prevent pedestrians from crossing the rail in order to access the platform.
- At transfer stations fencing shall also separate freight rail tracks from passenger rail racks to prevent pedestrians from crossing any track to access the platform.
- Platforms occur in the UPRR right-of-way which dictates that the trackway be fenced at the center platforms and passengers cannot cross the tracks at grade to access the platforms. Specific vertical circulation elements including stairs, elevators, pedestrian bridges and overcrossings, tunnels and ramps, are covered in detail in Chapter 4 - Vertical Circulation.

5.2.2 SINGLE SIDE PLATFORM

- Single side platforms are 15 feet wide by 955 feet long.
- Side platforms are designed for passenger boarding and alighting from one side of the platform.
- This configuration is used at terminal stations only and requires a station track to allow a passenger train to wait while not interrupting freight traffic.

5.2.3 DOUBLE SIDE PLATFORMS

- Double side platforms are 15 feet wide by 955 feet long. They are located on the outside of the two mainline tracks, with a separate platform serving each track. In this configuration, the platforms are located directly opposite of each other.
- Pedestrian access from one platform to the other may be either grade-separated, at existing nearby roadway crossings with active warning devices, or both.
- An overcrossing should be considered when no at grade crossing is available or proposed within the immediate vicinity of the platform or where the train would block the at grade crossing when stopped at the station

5.3 PLATFORM CIRCULATION

Platform circulation is defined by functional zones which help create an easily understood, predictable environment for passengers. Functional zones are designed to facilitate a passenger's journey, support passenger distribution along the platforms, provide passenger accommodations for waiting, boarding and alightings, ticketing and wayfinding, and direct bicycle riders to the designated bike cars. The following describe the platform functional zones and the circulation considerations for each specific platform typology.

Platform Circulation Considerations:

- Passenger Flow
- Passenger Accessibility
- Passenger Waiting and Queuing
- Passenger Services

Passenger flow and circulation considerations at each platform are also a function of both ridership and emergency evacuation criteria set forth in NFPA 130. Emergency exiting and evacuation paths are provided by the stairs, elevators and ramps. Platforms ends are not considered in egress calculations for NFPA 130 evacuation requirements. A passenger Through Zone for a minimum of 4 feet of clear space between the back edge of the stand behind line and any obstructions is required. The Through Zone is an unobstructed area void of above grade utility boxes, vertical elements, furnishings etc. That provides free flow of pedestrian movement.

Figure 5.5 Overcrossing Stations

Figure 5.7 Undercrossing Stations

Figure 5.6 Side Platform Stations

5.3.1 FUNCTIONAL ZONES

Functional zones are referenced for passenger flow accommodation. Functional Zones are defined to help create an easily understood, predictable environment for passengers and are designed to facilitate a customer's journey, support important customer decisions, actions and needs in specific areas.

Functional Zones:

- Platform Access
- Passenger Waiting Zones
- Bicycle Waiting Zones
- Ticket Vending and Validation Areas
- Accessible Zones and Mini-Highs

Figure 5.8 Bike passenger at Tracy Station (*Image Source: Tracy Press*)

Figure 5.9 Mini High at Livermore Station (*Image Source: Google Maps*)

General Considerations:

- Minimize crowding and path of travel impedances.
- Provide a minimum level of service for pedestrian flow based on Fruin level of service C as defined in "Pedestrian Planning and Design" by John J. Fruin, PhD. See **Figure 5.10** for graphic representation.
- Maximize safety and the ability to accommodate emergencies, including evacuating full trains at capacity, in one direction together with the platform passengers waiting to board to a point of safety in 6 minutes or less.

Walkway LOS	
LOS A	>= 35 ft²/p, avg. speed 260 ft/min
LOS B	25-35 ft²/p, avg. speed 250 ft/min
LOS C	15-25 ft²/p, avg. speed 240 ft/min
LOS D	10-15 ft²/p, avg. speed 225 ft/min
LOS E	5-10 ft²/p, avg. speed 150 ft/min
LOS F	< 5 ft²/p, avg. speed <150 ft./min

Waiting Area LOS	
LOS A	>= 13 ft² per person
LOS B	10-13 ft² per person
LOS C	7-10 ft² per person
LOS D	3-7 ft² per person
LOS E	2-3 ft² per person
LOS F	< 2 ft² per person

Figure 5.10 Level of Service Graphic - For Walkways and Waiting Areas (*Image Source: gkskill.com*)

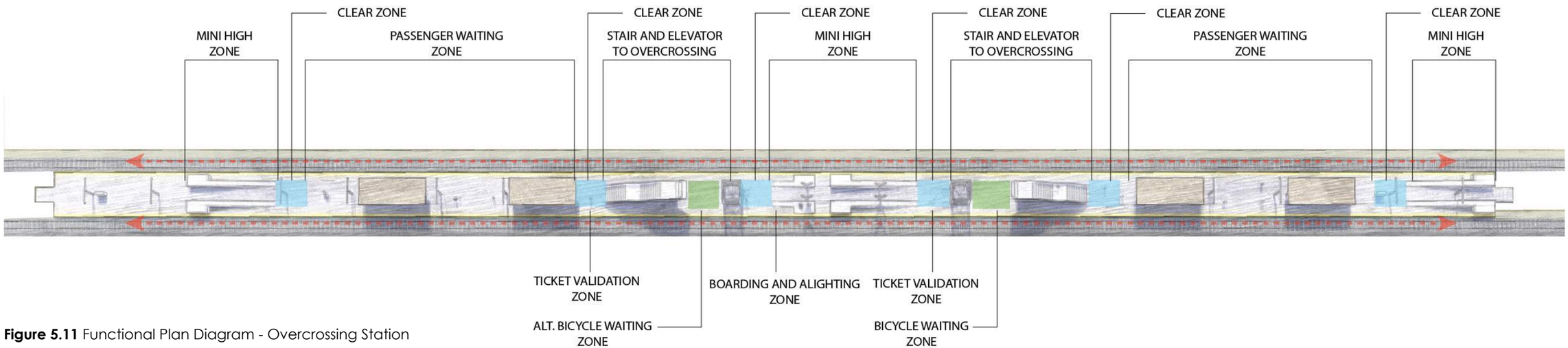


Figure 5.11 Functional Plan Diagram - Overcrossing Station

5.3.2 OVERCROSSING STATIONS

At overcrossing stations, all passengers access and egress the platform from the pedestrian overcrossing which connects to a pedestrian bridge that runs parallel to the platform. Passenger flow is directed to either end of the pedestrian bridge, each end served by an elevator and stair. In front of each elevator, passenger queue zones provide waiting areas for the elevator that won't impede the passenger flow to the stairs. At the platform level, elevators are oriented toward the mini-highs to provide a direct path of travel to the accessible boarding zones. Conversely, the stairs direct passengers toward the ends of the platform to encourage distribution along the platform. Bicyclists should be directed to specific waiting areas that are aligned with the bike car locations in the train consists.

The bridge widths are designed to accommodate both access and egress peak loads as well as NFPA 130 evacuation requirements. Stairs are sized to meet NFPA 130 exiting requirements, which may exceed the requirements for anticipated ridership.

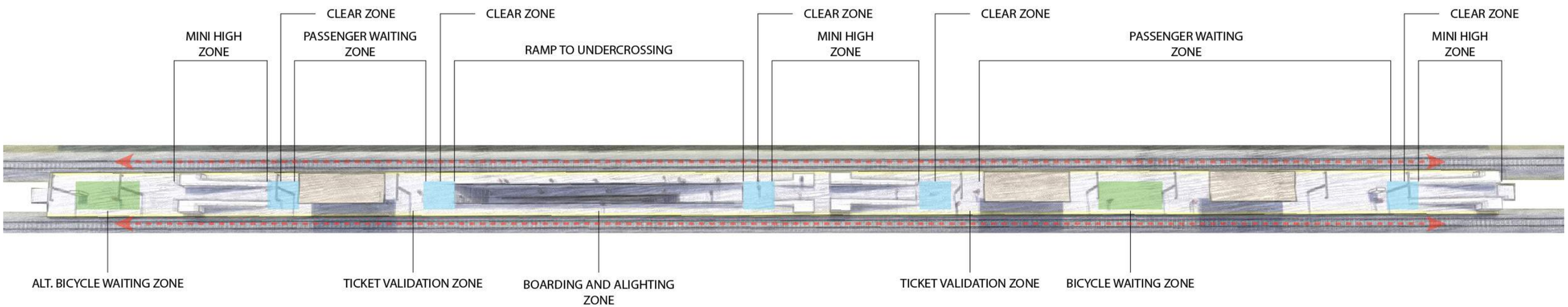


Figure 5.12 Functional Plan Diagram - Undercrossing Station

5.3.3 UNDERCROSSING STATIONS

At stations with undercrossings, all passengers access and egress the platform from a pedestrian tunnel which connects to the platform. Passenger flow is directed to either end of the platform from the tunnel, with an accessible ramp oriented toward the mini-highs to provide a direct path of travel to the accessible boarding zones. Stairs are provided at each end of the ramp to direct passengers toward the ends of the platform to encourage distribution along the platform. Bicyclists should be directed to specific waiting areas that are aligned with the bike car locations in the train consists.

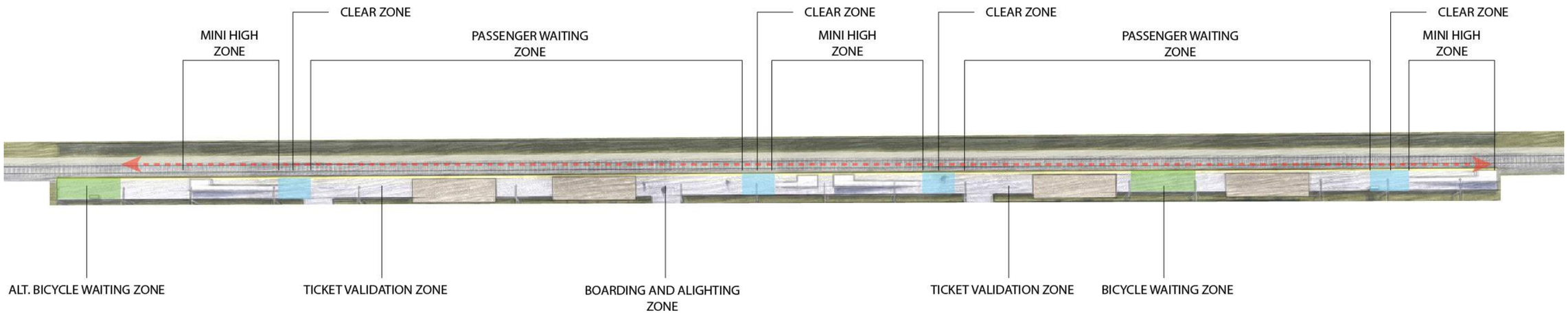


Figure 5.13 Functional Plan Diagram - Side Platform Station

5.3.4 SIDE PLATFORM STATIONS

At stations with side platforms, passengers can access and egress the platform from points along the sides and ends of the platform. Passenger flow can be directed using pedestrian control elements providing channeling to the platform. They include railings and handrails, fencing, walls, and track crossing protection. Fencing and walls should be used minimally as a barrier for pedestrian control and traffic separation. When used, they should be fundamentally transparent above 30" in height. Bicyclists should be directed to specific waiting areas that are aligned with the bike car locations in the train consists.

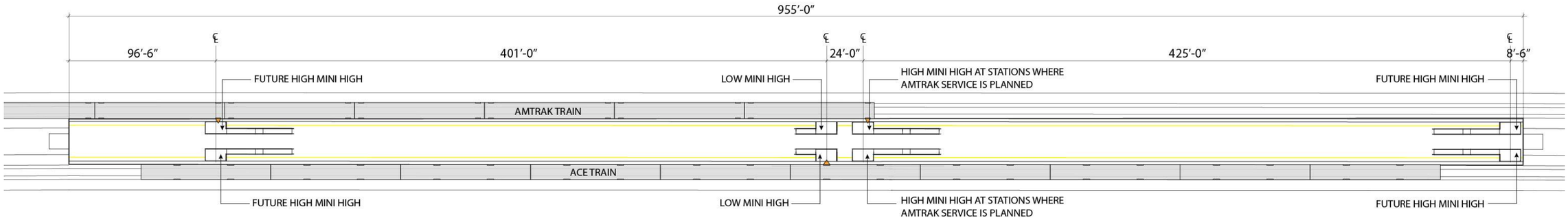


Figure 5.14 Mini High Locations at Center Platform

5.3.5 PASSENGER ACCESSIBILITY

Passenger accessibility to the platforms and train cars is served by two elevators on the platforms and "mini high" permanent ramps on the platform that provide accessible boarding and alighting. SJRRC operates two services, ACE and San Joaquins, each with their own train cars with differing floor heights. UPRR requires low platforms necessitating the need for different ramps and accessibility platforms to provide accessible path of travel to both the ACE and San Joaquins trains. These ramps and platforms, "Mini Highs", allow for accessible boarding and alighting of train cars and have been located toward the middle of the platform to provide the shortest distance of travel for ADA and mobility impaired passengers.

See above **Figure 5.14** for Mini-High layout and design.

Center Platform Stations:

- At each platform, two (2) "low mini highs" with a boarding height of 13" above top of platform are located adjacent to each track near the center of the platform for use with rolling stock having a floor height of 25". These mini highs are located to serve coaches designated for accessible boarding and alightings.
- For stations serving rolling stock having a 51" floor height, two (2) additional "high mini highs" are provided opposite the low mini highs in the platform center, and two (2) high mini highs are located at each platform end for a total of six (6) high mini highs. The high mini highs have a boarding height of 40" above top of platform and are located at the accessible boarding and alighting locations on the rolling stock.
- The orientation of the mini highs in the center of the platform is determined on a platform-by-platform basis and should be coordinated with SJRRC.
- All stations should be configured to allow for future San Joaquins mini highs. No permanent structures should be located in the future location for high mini highs per the required platform configuration.

Side Platform Stations:

- For side platform stations, mini high configuration is identical to center platforms, with only one set of mini highs per side.

5.3.6 PLATFORM ACCESS AND EGRESS AREAS

The platform access and egress areas include the areas adjacent to the platform stairs, elevators, and ramps. These areas should be kept free of any permanent structures and obstructions for at least 20' in front of the access point.

- For center platforms accessed by an overcrossing, the access area incorporates the approaches from the pedestrian overcrossing and pedestrian bridge served by both elevators and stairs. A 20' deep passenger queue zone should be provided in front of each elevator, allowing for waiting passengers to congregate without impeding the flow of passengers wanting to access the stairs or platform.
- For side platforms that are approached from three sides, the entry area is less defined, but can be implied using pavement markings and other architectural elements to direct passengers to the waiting and boarding and alighting areas.
- Emergency Exiting - Emergency exiting and evacuation paths are provided by the stairs, elevators and ramps. For center platforms, security gates need to be provided at the platform ends to restrict egress from the ends of the platforms. Platforms ends are not considered in egress calculations for NFPA 130 evacuation requirements.

Figure 5.15 Passengers boarding/alighting ACE train (*Image Source: Sacramento Bee*)

Figure 5.16 Passengers waiting to board ACE train at Tracy Station (*Image Source: Tracy Press*)

5.3.7 PASSENGER WAITING AND SEATING AREAS

Passenger waiting areas are located beyond either end of the stair towers on overcrossing served platforms and beyond either end of access ramps and stairs served by an undercrossing. A 20' clear zone past any platform stair or ramp should be provided. Passenger waiting areas can be both sheltered and unsheltered with the preferred configuration of shelters and open seating shown in **Figure 5.17**.

- Waiting areas include platform shelters provisioned with wind protection, seating, wayfinding and real-time displays and lean rails. In addition, unsheltered platform seating and lean rails can be provided along the platform.
- Considering allowing 8 square feet of space per person in waiting areas during peak periods.
- The waiting area is inside the six-foot boarding and alighting zone and provides amenities for customer safety and comfort that are open, spacious, are clearly identifiable on the platform.
- Emergency telephone and platform service cabinets should not be located within the sheltered waiting areas.
- Bike Access: Passengers arriving by bicycle shall be accommodated in a safe, convenient manner, and directed to a bike waiting area adjacent to where bike cars stop along the platform.

5.3.8 PASSENGER BOARDING AND ALIGHTING AREAS

Passenger boarding and alighting areas are located along each track side of the platforms. There is a continuous 2' tactile strip along the entire edge of the platform adjacent to the trackway. Additionally, there is also a stand back line located 4' from the edge of platform. The passenger boarding and alighting area is located along and behind the stand back line. Passengers queue at train door locations although those locations are not marked on the platform.

- The boarding and alighting area is the space directly adjacent to the track for the entire length of the platform.
- The trackside platform edge must have a continuous 24" tactile detectable warning strip running the entire length using FTA approved truncated dome pavers.
- Provide a pedestrian through zone for a minimum of 4' of clear space between the back edge of the stand back line and any obstructions. The Through Zone is an unobstructed area void of above grade utility boxes, vertical elements, furnishings etc. that provides free flow of pedestrian movement.
- A clear path of travel must be maintained without obstacles from the pedestrian through zone to the exiting areas of the platform. The path of travel must provide safe exiting from trains and platforms under both normal operational and emergency conditions.
- A clear and unobstructed pedestrian access across center platforms of at least 6' must also be provided where passengers exit and enter vehicles and wherever interchange between modes occurs.
- Platforms and exits shall be sized to allow passengers to completely clear the platform prior to the arrival of the next train.
- Adequate assembly space must be provided on platforms. Preferably allow 8 square feet of space per person for peak crowds.
- The waiting area is inside the 6' boarding and lighting zone and provides amenities for customer safety and comfort that are open, spacious, are clearly identifiable on the platform.
- This waiting area includes the shelters, along with wind protection, seating, wayfinding and real time transit displays, platform furnishings and leaning rails.

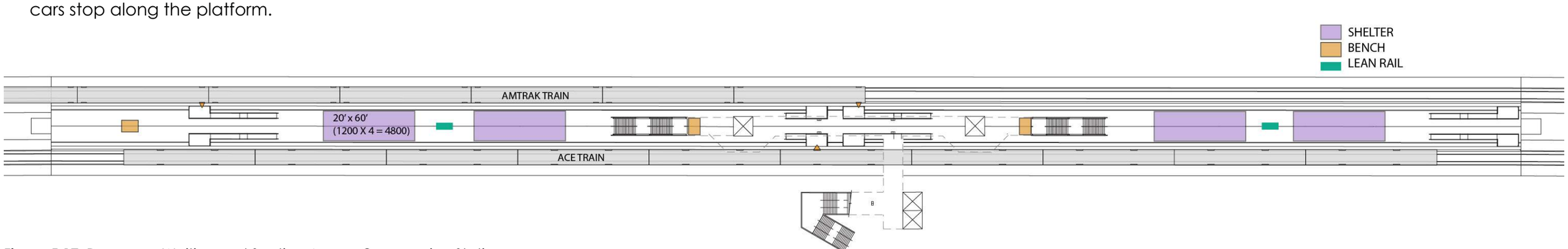


Figure 5.17 Passenger Waiting and Seating Areas - Overcrossing Station

5.4 PLATFORM SHELTERS

5.4.1 PLATFORM SHELTERS

Platform shelters provide protection from the elements including sun, wind, and rain. Passenger seating is provided at the shelters. Shelter roofs may be continuous over separate seating areas underneath to produce visual continuity along the platform and clearly direct passengers to the waiting areas. Platform systems including lighting, security and general wayfinding should be integrated into the shelter design.

- Shelter spacing should encourage passenger distribution along the platform length to avoid crowding for queuing for approaching trains.
- Adequate sheltered seating should be positioned along the platform adjacent to the mini-highs for ADA passengers.
- Stations with San Joaquins service should incorporate accommodations for passenger baggage and longer waiting periods for passengers. This should include an area for baggage carts at staffed stations to be located away from the direct path of travel of passengers.
- Peak train boardings are assumed to be ACE commuter trains such that the ACE boarding passenger load governs for providing the quantity of seating and passenger accommodation. Use a minimum of 200 passengers for peak train boardings as a baseline.
- Side Platform Stations – Shelter design should provide a clear space of 5' minimum behind the stand back line for passenger flow along the platform.

5.4.2 SHELTER CONFIGURATION

- Edges of shelter roofs should be setback 10' minimum from centerline of adjacent track.
- Larger continuous shelters are preferred over smaller segmented canopies. Minimum head clearance at any point at the canopy or associated system elements should be 8'-6" min clear.
- Maintain a clear queue space at the start of mini high ramps of at least 20' to the nearest vertical obstruction portion of a shelter (windscreen, column, etc).

5.4.3 SHELTER COVERAGE

Canopies should be sized to provide coverage for persons standing underneath the roof square footage and meet Level of Service C (20 sq ft per person) at peak train ridership for boardings. A minimum of 4000 sq ft of coverage should be employed for passenger coverage as a starting point per station platform. Adjustments for higher ridership, unique station conditions, unique transfer patterns or similar anomalies may increase or reduce the coverage.

- At least two ADA seating spaces and companion space should be provided at each shelter location. Provide a minimum of 4 ADA seating areas on each platform. ADA covered seating should be located as near as possible to the ACE high mini-highs toward the center of the platform.
- Seating and benches should be prioritized under shelters for longer-term waiting.

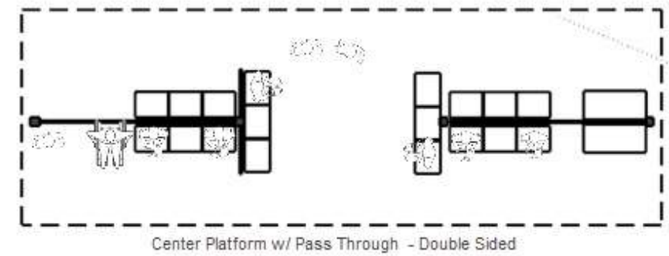


Figure 5.18 Shelter Plan Sketch

SHELTER DESIGN

Shelter Amenities: (per unit)

Accommodations:	
Seating	3
ADA Accommodations	1
Standing/Baggage	4
Amenities:	
Wind Screens	ea
Lean Rails	3
Wayfinding	1
Fare Validation/Collection	1
Features (potential):	
Solar Control Glazing	ea
Art Integration on Screens	3
Real Time Information	ea
Advertising/Digital	ea
Branding/Station ID	ea
Integrated Systems:	
Real Time Information	ea
Lighting	ea
Security/Comms	ea
CCTV	ea
Wifi	ea

Figure 5.19 Shelter Amenities per Unit

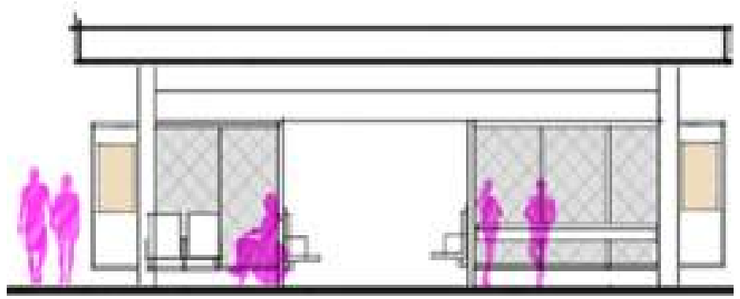


Figure 5.20 Shelter Sketch with Windscreens

Figure 5.21 Cotati Shelter - Windscreen *(Image Source: Google Maps)*

5.4.4 WINDSCREENS

Under shelter windscreens and seating must be provided to support passenger comfort. They may be standalone structures or integrated structures with the shelter. San Joaquin Valley temperatures in the summer months can be over 100 F during the afternoon commute period and stations may also experience near or below freezing hours in the winter months during the morning commute periods.

- Provide shelter coverage for a hierarchy of wind, then solar exposure, then rain protection.
- Provide sun shading to platform shelters during the midday hours for non-commute riders who maybe infrequent system users and arrive early for their train connection and on the platform.
- Platform shelter canopy roofs should not be glazed to provide protection from sun exposure and reduce maintenance needs.
- Modularity – Platform wind screens should utilize consistent modules using manufacturer standard material stock.
- Orient windscreen panels to attenuate prevailing northwesterly winds for stations south of Stockton and southwest prevailing winds for stations north of Stockton.
- Windscreens should be a minimum of 8' high to reduce turbulence at head height and provide adequate coverage for passengers.
- Perpendicular returns on windscreens should be utilized to provide options for multi-directional winds throughout the year and different weather patterns.
- Windscreens should have a high degree of transparency to support safety, visibility across the platform, and facilitate trains arriving on opposite tracks.
- Analyze how local station positioning may either reduce wind impacts or amplify wind impacts on station design and platform sheltering needs. Urban stations and/or stations with nearby buildings may require less wind protection, while exposed or rural station placement will offer little in the way of natural wind protection and will require more robust wind protection integrated in the shelter design.
- Mitigate low sun angles in the late afternoon for both glare and heat and low angles in the morning for glare during commute hours.
- Consider material properties with transparency and wind protection coverage such as high-visibility perforated metal or glazing on windscreens to protect from low sun angles and wind.

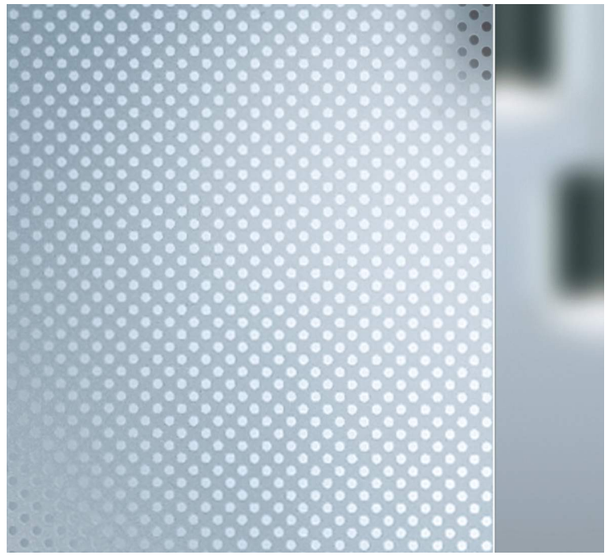


Figure 5.22 Fritted Glass (*Image Source: McGrory Glass*)

5.4.5 ELEMENTS OF DISTINCTION

The windscreen panels can be elements of distinction, providing an opportunity to incorporate patterns, color and art to the platforms. Fritted glass, etched glass, perforated metal panels, colored panels etc. may be considered. Patterns and art should be durable, weather resistant, and vandal-resistant media that may be easily secured to the shelter if artwork is not directly applied to the windscreens. Finished artwork should be covered with a vandal-resistant protective coating to retain its appearance and facilitate cleaning as necessary.

The artwork should be vetted and accepted by SJRRC and appropriate organizations serving as representatives of their community.

Figure 5.23 Systems Integration on shelter at Fairfield-Vacaville Station (*Image Source: Google Maps*)

5.4.6 INTEGRATED SYSTEMS

Shelter designs should consider how to integrate lighting, communications, signage, storm water collection, chases, services, conduit runs, and proper service separation within the integral structural elements of the shelter to provide clean surfaces devoid of attachments and to avoid opportunities for vandalism, weatherization, damage, or creating extraneous bird roosting opportunities.

Panels, removable elements, or junction boxes should be integrated and secured to allow access by maintenance teams for routine service or for future access to modernize system services.

5.5 PLATFORM SURFACES & FINISHES

Figure 5.24 Stand Behind Line and Tactile Warning Strip at Santa Clara Station (*Image Source: Rider blog post*)

Use low maintenance materials and finishes that minimize life cycle maintenance, repair, and refurbishment costs. Surfaces should employ simple, vandal resistant, integrated design detailing that incorporates support systems and components into a cohesive solution reducing "tacked-on" appearance.

The platform surface must be slip-resistant but smooth to facilitate passenger circulation in a safe and efficient manner between the platform access points and the train boarding areas. Standard broom finish concrete is preferred.

- The trackside platform edge must have a continuous 24" tactile detectable warning strip running the entire length using FTA approved truncated dome pavers.
- Stand Back Lines - a painted or thermo-plastic installed 3" wide stand-back line must be provided 10' from the centerline of the adjacent track and behind the tactile warning strip.

5.6 PLATFORM SIGNAGE & WAYFINDING

5.6.1 SIGNAGE & WAYFINDING

Signage and wayfinding systems provides direction (both visual and tactile, as well as auditory) to system passengers to support all types of system riders with varying abilities. Signage may describe train arrival, real time announcements, service updates, or regulations, as well as other messages. Signage communicates how passengers move between the station and the platform and train and vice versa to facilitate passenger travel. See Chapter 6 - Wayfinding for additional information.

5.6.2 SYSTEM INFORMATION

System information includes maps, line information, timetables, announcements and regulations, and other similar rider information. See Chapter 6 - Wayfinding for additional information.

5.7 TICKETING

5.7.1 TICKETING

A footprint for ticketing infrastructure should be provided at the station side approach to the access to the platform. Currently ACE uses mobile-ticketing on personal devices (such as a smart phone) as well as paper punch tickets. San Joaquins utilizes mobile-ticketing, as well as, other paper ticketing options including at-station ticket machines (**see Figure 5.25**).

At the time of publishing these guidelines future ticketing is assumed to continue to include mobile ticketing, and may continue to require at-station ticketing infrastructure. See Station Area Guidelines for more details. Queue space around the machine should consider main paths of travel and not overlap with elevator, stair, or other queuing space. Machines should be highly visible from the site and be monitored by CCTV cameras. Signage should direct passengers to the validation machine locations. Additionally, stations with shared facilities with local transit providers may feature third-party ticket sellers. Signage should direct passengers to this ticketing option.

- Ticket validators should be provided on the right-hand side of the path of travel in the direction of passenger flow heading toward the platform to facilitate passenger circulation.
- For center platform stations (undercrossing and overcrossing), provision conduit stub outs for two future ticket validators at the tunnel prior to traveling up to the platform for undercrossing stations and on the overcrossing bridge at the intersection with the platform bridge at the undercrossing and overcrossing stations types respectively.

Figure 5.25 Ticket Vending Machine Examples *(Image Source: SJRRC)*

- On the platform, provide space for minimum of two ticket validators as a future option.
- Platform ticket validators should be located near the top/bottom of the vertical circulation stair or ramp access to the platform.
- For side platform stations, ticket validators should be placed and planned for at platform access locations where they occur and in convenient locations to serve the main passenger flow.
- Platforms should have conduit stub-outs for the future provisioning of future ticket validator machines to these locations.

5.8 PLATFORM AMENITIES

5.8.1 TRASH AND RECYCLING RECEPTACLES

Provide four trash and recycling receptacle pairs along the platform spaced to support easy access by riders along the length of the platform. Trash receptacles should not impinge on major circulation paths but should be convenient and readily identifiable by passengers. Provide at least one trash and recycling receptacles pair at the station side near the access structure crossing to the platform.

5.8.2 WATER STATIONS

To support passenger comfort and for passengers waiting for arriving trains, providing water on the platform through drinking fountains and water refill stations, provides a valued service to passengers.

- Provide a minimum of one drinking fountain with a water bottle refiller along the platform.
- Centrally locate the water station nearest to the area with the highest density of waiting passengers.
- Locate the station near vertical circulation connections on and off the platform to allow passengers to easily assess the water station en route to their seating or queuing area.

5.8.3 CONVENIENCE OUTLETS

Convenience outlets provide power connections for maintenance staff to use on platform equipment. Outlets should be 120v, grounded, protected from the elements with a lockable cover and be rated for outdoor use.

5.8.4 WIFI:

At the time of publishing these guidelines, WiFi provisioning at the platforms is still under consideration.

Figure 5.26 Water Bottle Fill Station *(Image Source: Global Industrial)*

5.9 SECURITY

5.9.1 LIGHTING OVERVIEW

Lighting is important for both passenger comfort and safety as well as security. Since many of the commute hours are either during periods of darkness or during sunrise/sunset adjacent hours of the day, proper lighting should be incorporated at the shelters and along the platforms.

- Lighting at shelters must meet code minimums for illumination and properly illuminate the edge of platform.
- Where possible lighting should be integrated or flush mounted to the shelter to prevent bird roosting and dirt accumulation on exposed surfaces.

5.9.2 PLATFORM LIGHTING

Lighting is integral to providing passenger comfort especially at night. Commuter rail timetables have multiple trains throughout the year operating pre-dawn or after sunset. Lighting is critical to creating a safe and welcoming space for riders. Well-lit stations, pedestrian walkways and platform facilities deter crime. Lighting is a security element as well as an aesthetic element.

Platform area lighting shall be in waiting and loading areas. The lighting elements shall extend the entire length of the platform and shall demarcate the platform and emphasize the platform edge, vertical vehicle surfaces, and landings associated with elevators, ramps and stairs.

Lighting should be sufficient for effective surveillance of all areas. While facial recognition software systems are not proposed at the time of this writing, provisions for adequate lighting and camera resolution, both in daytime and at night, should be provided to allow for human recognition and to support law enforcement.

- Care shall be taken to avoid "blinding" train operators or other vehicle drivers with excessive or misdirected lighting.

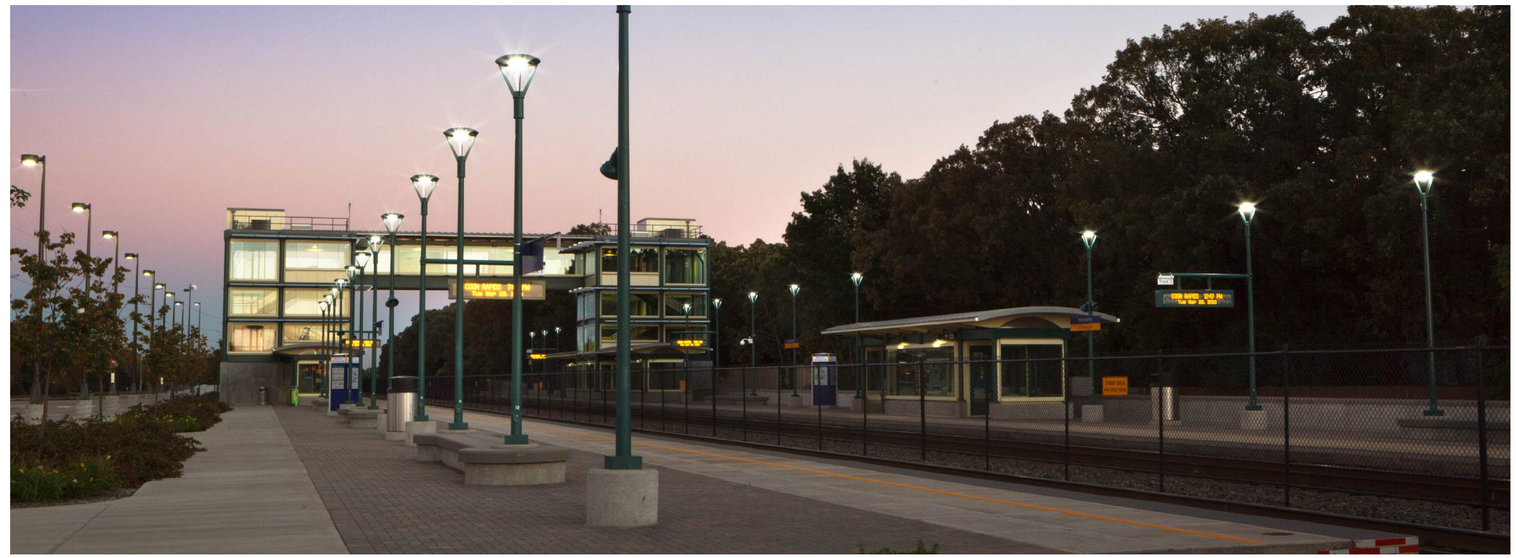


Figure 5.27 Platform Lighting at Riverdale Station - Northstar Commuter Rail, Minneapolis, MN (*Image Source: Colmena Engineering*)

- Lighting levels should be uniform to prevent dark spots or areas that are perceived as dangerous or uncomfortable, especially at night. Account for shielding or shadows created by various platform components in the lighting design to ensure proper lighting coverage.
- Different types of lighting along the platform at different locations shall be provided to ensure adequate and appropriate lighting and a high-quality visual environment that supports the transit functionality and safety through better visibility.
- In addition to area lighting, task and wayfinding lighting shall be incorporated in platform elements such as shelter canopies, wayfinding elements, and railings and bollards.
- Lighting can also be used as an element of distinction of a platform and can greatly contribute to making a platform a warm and inviting space at night while still providing the illumination for security purposes.
- The color and quality of lighting is an important consideration. Lamp and luminary selection influence the characteristics of the light produced as well as the maintenance requirements over the life of the platform.
- All luminaries and lamp types should be LED, standardized system-wide to the greatest extent possible. Standards provide design and perceptual unity and simplify maintenance requirements.
- Designers should also consider dark sky and light pollution in the designs. Inappropriate or excessive use of artificial light that contributes to excessive glare, light falling where it is not intended or needed, bright, confusing and excessive groupings of light sources, and casting light into the night sky should all be avoided.
- Lighting systems should utilize control systems to allow light groups and zones. Controls should allow light modulation for time of day in order to shed load and reduce energy use when supplementary lighting is not necessary. (Example: bridge lighting is not necessary during the day)

5.9.3 BARRIERS AND RAILINGS

Barriers and railings protect passengers from entering unsafe areas. Stand back lines on the platform also provide visual cues for where safe circulation zones occur outside of the active trackway for safety.

- Provide a guardrail height barrier (minimum of 42" above platform) around the opening to the undercrossing tunnel at the platform level.
- Provide barriers with emergency egress gates at each end of the platform to prevent passengers from going into the active trackway.
- Provide a stand back line 3" wide minimum centered 10' from the centerline of the adjacent track at each platform edge the entire length of the station platform.
- Provide a 2' wide minimum tactile strip along the entire edge of the platform.

5.9.4 CCTV

CCTV, or video surveillance, allows for the recording and live observation of activities on the platform. Video recording improves station security and allows for remote monitoring of situations on the platform from central dispatch to route support staff, maintenance, or security personnel to issues at various station sites.

CCTV camera locations should be carefully planned to provide maximum visibility. All areas of the platform should be observed with CCTV cameras.

Cameras should be mounted using minimalist components integrated into other platform elements including signs, shelters, light poles, and pylons. The use of mounting fixtures that add to the visual clutter of the platform area should be avoided.

Placement of cameras shall take into consideration lighting levels, shelter location, and location waiting areas, to ensure the best possible views are achieved. In addition to fixed cameras, cameras with pan-zoom-tilt capacity or similar technology are options at certain locations and are to be coordinated with SJRRC. CCTV cameras are operated and monitored in central control facilities.

- Provide clear sightlines and reduce hiding areas, blind corners, and other obstructions that limit the visibility of CCTV cameras.
- Cameras should be placed to maximize coverage with the fewest number of cameras.
- Cameras should monitor entry and exit points including stairs, elevators entries, elevator cars, platform edges, platform ends, and other secured spaces and doors.
- Facial recognition systems are not required at the time of this writing, but cameras should be of high enough resolution to support law enforcement in recognizing vehicles and individuals.

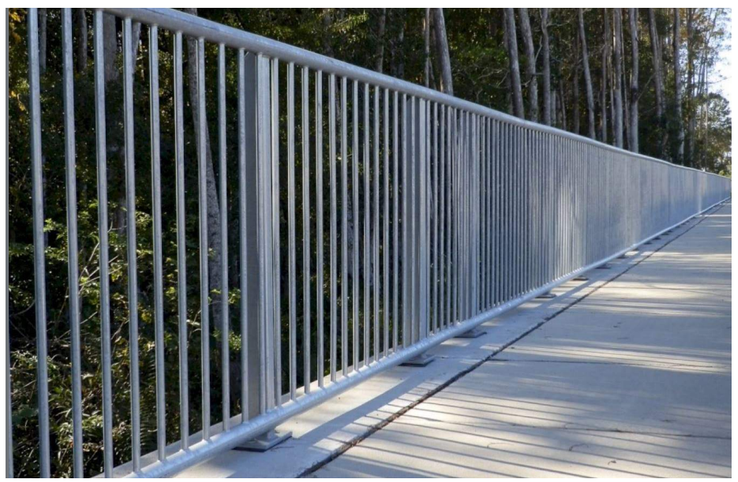


Figure 5.28 Guardrail Example

Figure 5.29 CCTV Camera Example *(Image Source: www.railway-technology.com)*

Figure 5.30 CCTV Camera Example *(Image Source: www.everypixel.com)*

5.9.5 EMERGENCY COMMUNICATION

Emergency communication provides safety and security to passengers to report issues on the platform or station during hours of operation.

Emergency Telephone:

- Providing emergency telephones removes the assumption that all passengers have access to a personal cell phone and is in keeping with the project goal of equity for all.
- An emergency telephone shall be made available on all platforms as a means for contacting the ACE Operations Center with rollover service to 911 emergency call centers.
- Emergency telephones shall be provided in the waiting area of the platform for all platforms that are not integrated into a public sidewalk.
- Do not locate phones inside or immediately adjacent to shelters.
- An emergency telephone is also recommended on grade separated platforms located near elevators.
- Telephones must conform to ADA standards.
- Future technology is anticipated to eliminate the classic phone cabinets, so the location and configuration of the phone should consider this as well as the usability and aesthetic of the returned space.
- Provide each platform with at least 2 emergency phones connected to central system monitoring and dispatch. Emergency phones should be spaced at least ½ the length of the platform.
- Phones should be integrated with other vertical platform elements such as nearby shelters, pole lights, wall faces, or similar features to avoid platform clutter and passenger flow impediments.

Platform Audio:

- Platforms should include public address systems, including both speakers and signs, to convey information to persons with disabilities in compliance with ADA requirements.
- Speakers and signs should be positioned to be clearly audible/visible, but not readily accessible to the public to avoid tampering or vandalism.
- Platform audio systems should be connected to the SJRRC telephone system.

5.10 SYSTEMS INTEGRATION

5.10.1 PLATFORM SYSTEMS

Platform systems support the functioning of station equipment, signals, lights, communication systems, power, and other embedded systems. These systems also provide collection and transport of stormwater collection, domestic water service, and waste water collection. These systems include the following:

- Power – Provide power connections along the length of the platform appropriate to service platform equipment, lighting, and other systems. Provide convenience outlets along the platform to allow maintenance staff to connect equipment or for other temporary uses.
- Communications – Provide a communications conduit with adequate sizing to support SCADA, Intercom, communications, PA, and real time information systems. Communications systems controls should be within a secured room or cabinet. Remote monitoring of systems should connect back to main system dispatch for remote monitoring.
- Fire Protection – provide fire hose cabinets along the platform length to provide adequate hose reach to cover the entire platform.
- Security and Locks – Secured rooms only accessible to SJRRC staff and personnel should be controlled by secure mechanical keyed locks, key cards, or other similar means to properly control access and be alarmed in the case of breaches.
- Storm Water – Platform surfaces shall be sloped away from the trackway and collected through flush area drains. Water is not permitted to run off the platform and drain into the trackway.
    - Platform canopies will collect roof storm water and route to sub-grade collection laterals.
    - Collect drainage discharge from elevator pits where they are provided and route to sump pits. If sump pits are routed to a sanitary sewer drain, confirm requirements with AHJ, including whether an oil separator must be provided.
- In-Ground Services - Along the length of the platform provide integrated in ground conduits in a utility duct. Separate conduits as required per code for each type of service (power, communications, etc). Provide periodic junction boxes to allow for cable pulls and future provisioning of new services or equipment. Coordinate junction box locations with finishes on the platform such as score lines and other architectural treatments. Junction box covers shall be flush with the surrounding surface, slip resistant, water proofed to prevent water infiltration, and have lockable covers.
- Ticketing – Provide conduit for the future provisioning of on-platform ticketing services (validation machines, tap to pay, etc). See section 5.7 - Ticketing for more information.

5.11 ANCILLARY SUPPORT AREAS

5.11.1 ELEVATOR MACHINE ROOM (OVERCROSSING STATIONS)

Refer to Vertical Circulation chapter, subsection 4.6.5 Elevator Machine Rooms.

5.11.2 MAINTENANCE (OVERCROSSING STATIONS)

Provide at least one janitorial space on the platform for the collection of trash, recycling, and other materials and for the storage of cleaning supplies. A mop sink should be provided, see **Figure 5.31**.

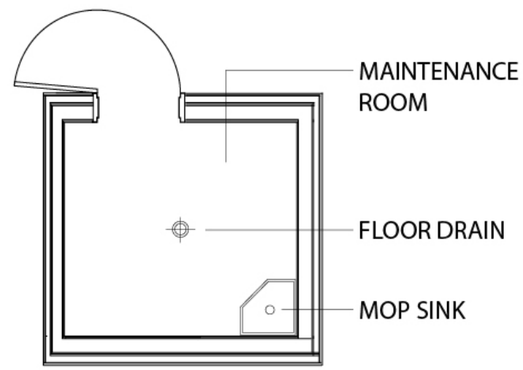


Figure 5.31 Maintenance Room Layout

5.11.3 SIGNALING AND COMMUNICATIONS

Provide a cabinet space at each end of the platform for the provisioning of signaling controls, communications panels, and other miscellaneous panel and control infrastructure.

5.11.4 ELECTRICAL CONTROLS

Provide lighting controls, electrical panels for power, and other electrical systems at each station.

5.11.5 FIRE HOSE STANDPIPE CABINET

Provide fire hose standpipe connections per NFPA 130 and CBC requirements.

5.11.6 HOSE BIB

Hose bibs allow for the connection of hoses and access to potable water by transit staff. Hose bibs facilitate the maintenance of the platform areas. Hose bibs help to facilitate wash down, rising, and cleaning of platform surfaces.

Provide at least 2 hose bib connections at each platform, located to facilitate maintenance staff access at both halves of the platform. Hose bibs should be tamperproof.

6 WAYFINDING

6 WAYFINDING

6.1 OVERVIEW

Wayfinding includes signage, maps, landmarks, and other environmental cues to help an individual orient themselves and navigate from place to place. Wayfinding should answer the fundamental questions "where am I , where is my destination, and how do I get there?" to aid in a rider's journey. Wayfinding supports all of the project principles. Providing appropriate and timely information enables a seamless and comfortable journey for people-first approach. Information presented in multiple accessible formats including auditory, tactile, and visual with high contrast colors and simple icons serves all communities. Sign graphics can be a recognizable and consistent element across all stations, and also present an opportunity for an element of distinction. Signage material selection is key for durability and ability to update information over time. And lastly, wayfinding does afford opportunity for technology integration with real time arrival information and dynamic displays.

6.2 PASSENGER JOURNEY

For passengers arriving at the station by foot, bicycle, bus, or other vehicle, there will need to be clear station identification signage at site and platform entries to let riders know they have arrived. Multiple product types of identification signage are needed to address the various speeds of these modes, as well as physical constraints of the site and station architecture. Within the station area, there will need to be information and regulatory signage pertaining to connecting transit service, designated parking and drop-off areas, and bicycle parking. From the station area plaza, there will need to be directional signage to the platform, which may vary slightly depending on vertical circulation. At the platform, additional maps and system information, regulatory signage, directional signage, and real-time information displays for train departures are needed.

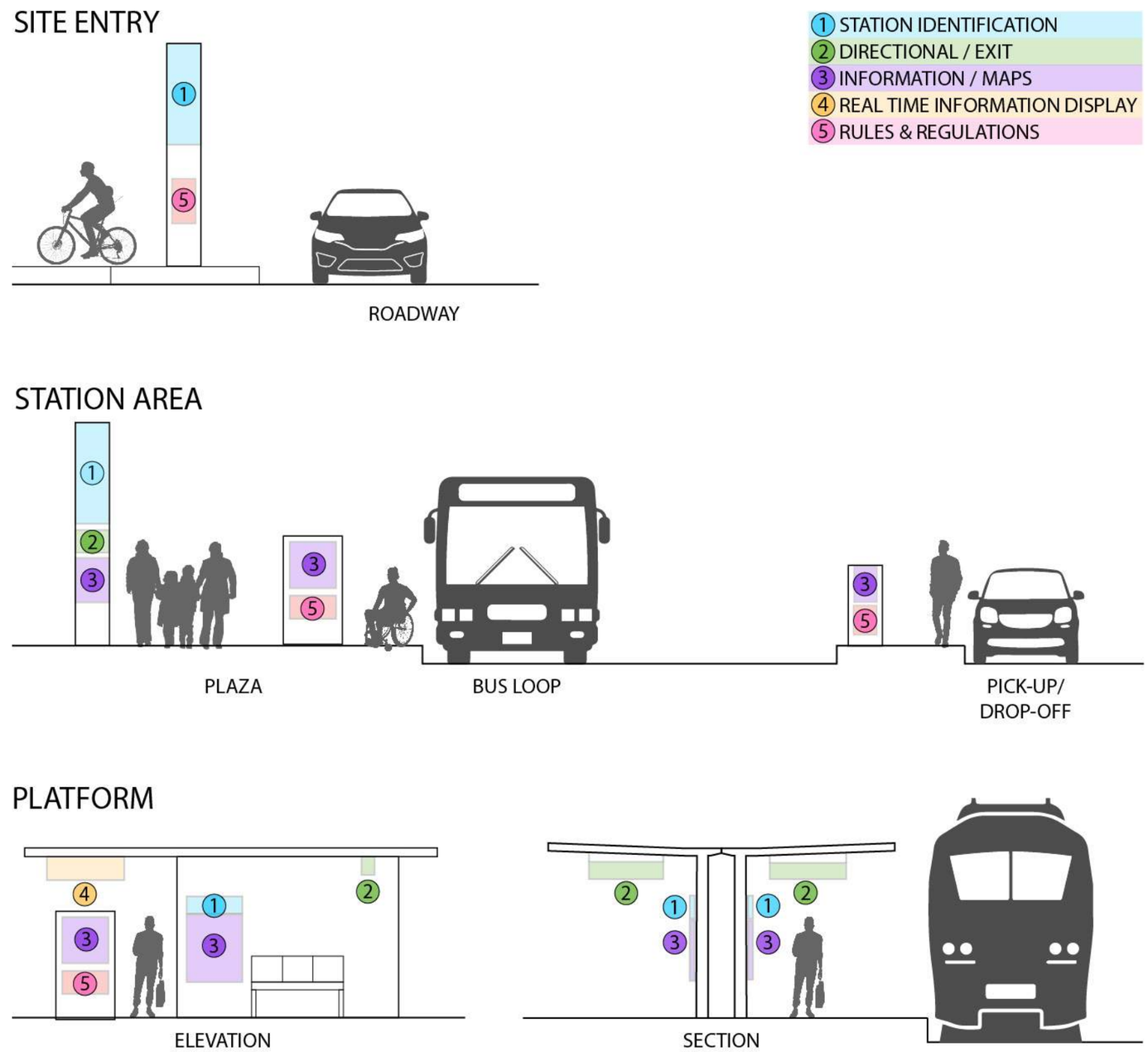


Figure 6.1 Signage Types at Various Points in the User Journey

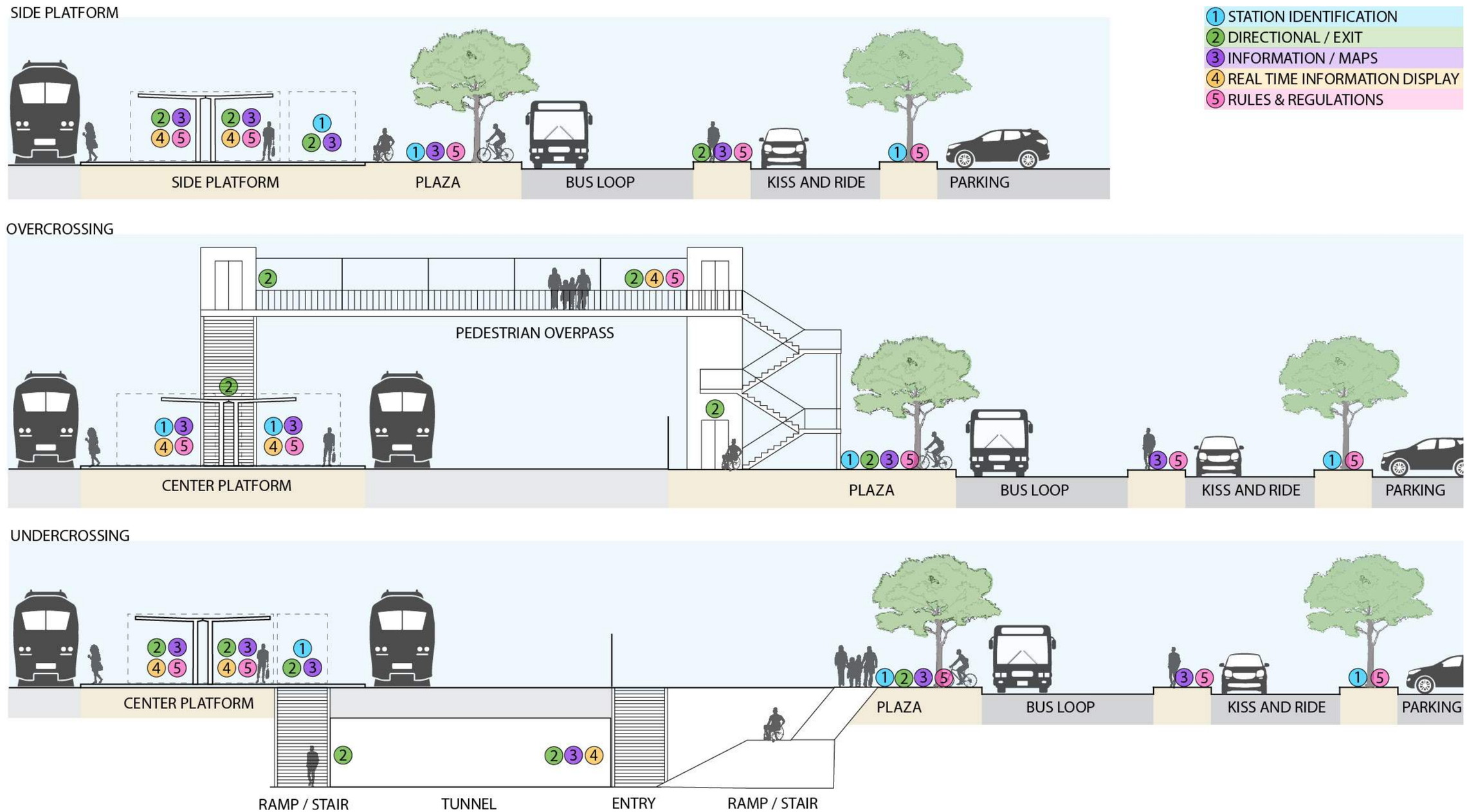


Figure 6.2 Signage Types at Various Points in the User Journey with Different Types of Vertical Circulation

6.3 SIGNAGE TYPES

Signage helps facilitate passenger travel and communicates how to use the rail system. There are several types of signage needed at a station, both wayfinding information and regulatory information. Wayfinding information includes signage which identifies the station, signs with arrows or other icons to direct passengers between the station and the platform and train, maps and detailed information, such as timetables, fare rates, and announcements; and real time dynamic information such as auditory announcements or displays for train arrival or departure times. Regulatory information includes rules, regulations, and safety information such as prohibiting smoking, rider conduct and legal requirements, emergency egress signs, or parking restrictions.

There are two separate agency efforts underway for signage on the SJRRC system which are beyond the scope of this document: a re-branding effort of combined ACE rail and San Joaquins service, and a consolidation of regulatory signage. Given these efforts, these guidelines will not detail the product design nor the graphic design of wayfinding or regulatory signage.

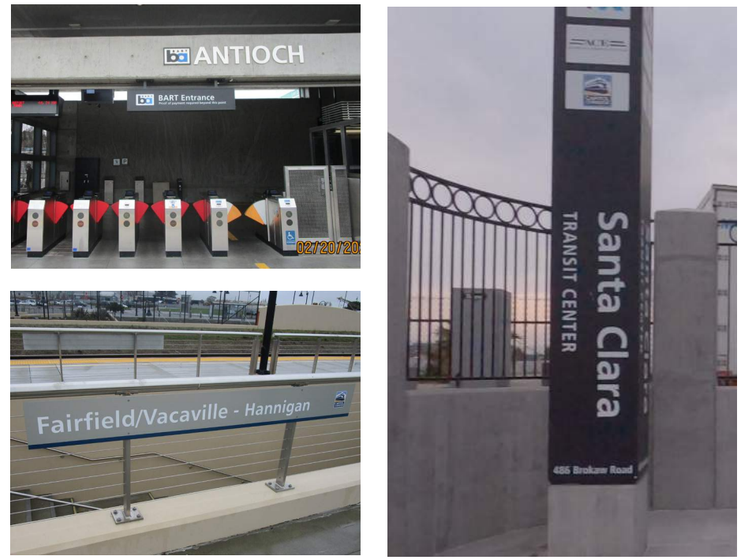


Figure 6.3 Precedent Station Identification Signage. *(Image Source: SJRRC.)*

Figure 6.4 Precedent Directional Signage. *(Image Source: SJRRC.)*

6.3.1 STATION IDENTIFICATION

Station identification signage orients riders to their station location whether arriving from a train, or arriving from the surrounding context. Station identification signage may be large landmark totems, overhead signs, or may be smaller plaques attached to walls or railings.

- Provide identification signage at station site entry points, legible to both drivers and pedestrians.
- Provide identification signage at station plazas.
- Provide identification signage at platforms as stand alone signage or integrated into shelters.

6.3.2 DIRECTIONAL

Directional information guides passengers from the station area to the platform and train and back.

- Provide directional information at any decision points where an individual may need to change direction to reach their destination.
- Limit the total number of destinations listed on a sign to simplify navigation choices and avoid user confusion.
- Maintain adequate text sizes for legibility and use icons for universal understanding.

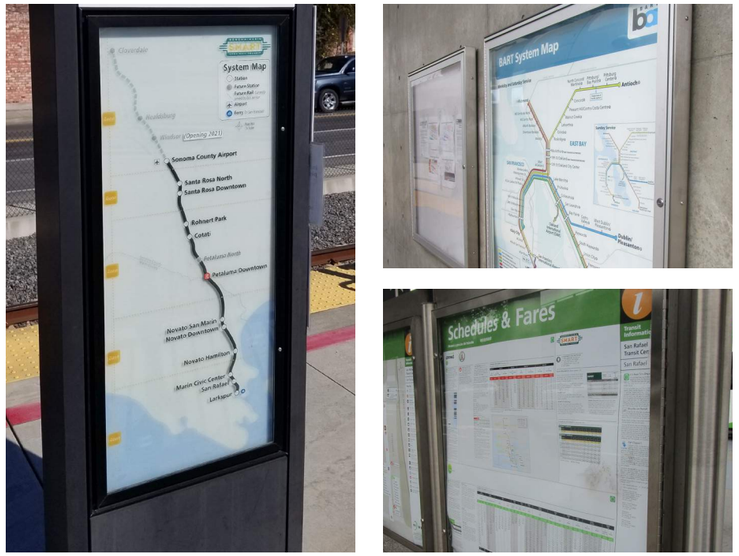


Figure 6.5 Precedent Map & Information Panels. *(Image Source: SJRRC.)*

Figure 6.6 Precedent Real Time Displays. *(Image Source: SJRRC.)*

Figure 6.7 Precedent Regulatory Signage. *(Image Source: SJRRC.)*

6.3.3 INFORMATION & MAPS

System information includes maps, route information, timetables, fare information, announcements, and other similar detailed information to help passengers use the rail system and plan their journey.

- Provide maps and information under shelters or other similarly weather protected areas along the platform.
- Provide maps and information in the station area plaza, proximate to passenger access to the platform or fare vending machines.
- Locate detailed maps and information at a comfortable viewing height, ideally in the range of 36"-72".
- Consider glare and vandal resistance in product material for map legibility.
- Consider back-lit maps and information.

6.3.4 REAL-TIME/DYNAMIC

Real time information in the form of audio announcements and digital monitors with system alerts and real time train arrival and departure information should be incorporated at each shelter. Since train platform assignments will be dispatched by Union Pacific, real time information is critical to indicate to passengers which platform is the appropriate side to board for their arriving train and respective destination.

- Locate real time information displays at intervals not to exceed 150'.
- Speakers should be selected for audio clarity.
- Site noise that interferes with audibility of announcements should be considered in the placement and quantity of speakers to facilitate proper platform coverage for information dissemination.

6.3.5 REGULATORY

Regulatory information includes rules, regulations and safety information for passengers.

- Provide regulatory signage as required by agency and local jurisdictions.
- Regulatory information should be consolidated where possible to avoid sign clutter.

6.4 ACCESSIBLE SIGNAGE

Wayfinding should be provided in multiple formats for the greatest user accessibility and equitable access to information, following the principles of Universal Design.

- All signs must be compliant with ADA standards, including fonts, contrast, pictograms, and sign placement. Refer to **Figures 6.8 and 6.9** for the limits of sign protrusions per ADA standards.
- Include pictograms on signs wherever possible, and consider bilingual signs in station areas with a high proportion of non-English speaking populations to adequately convey information.
- Consider raised lettering, braille, and auditory information integrated into information and map cabinets to provide information for sight-impaired passengers. Raised lettering and braille must be compliant with CBC Section 11B-703.
- Provide at least one tactile sign on the platform and at least one tactile sign on the station area plaza identifying the station.
- Provide a cane detectable linear tactile wayfinding strip from the platform to the station threshold, following an accessible route. **See Figure 6.11**.

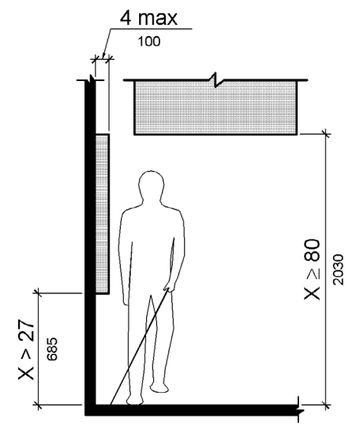


Figure 307.2
Limits of Protruding Objects

Figure 6.8 Limits of Protruding Objects. *(Image Source: ADA)*

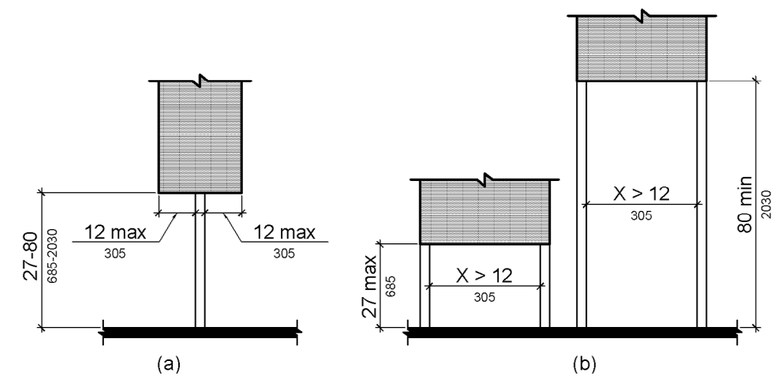


Figure 307.3
Post-Mounted Protruding Objects

Figure 6.9 Limits of Sign Protrusions. *(Image Source: ADA)*

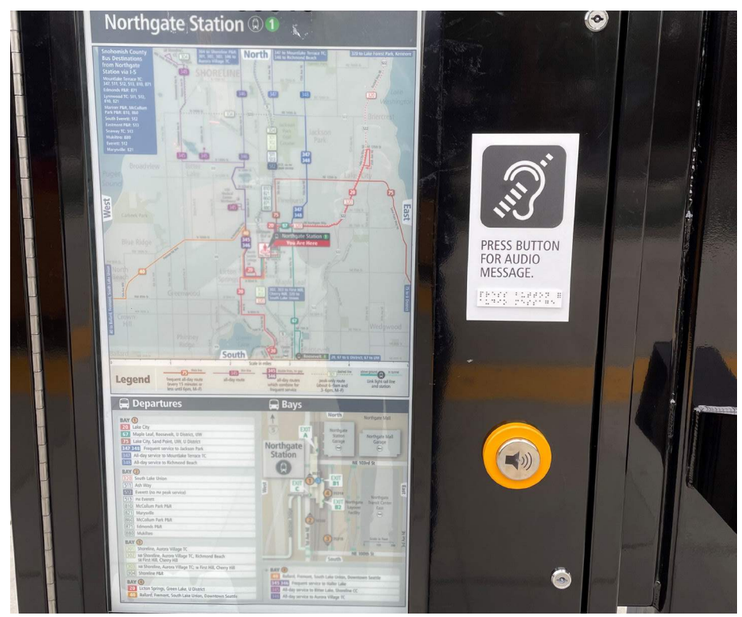


Figure 6.10 Auditory Information Integrated into a Map Cabinet.

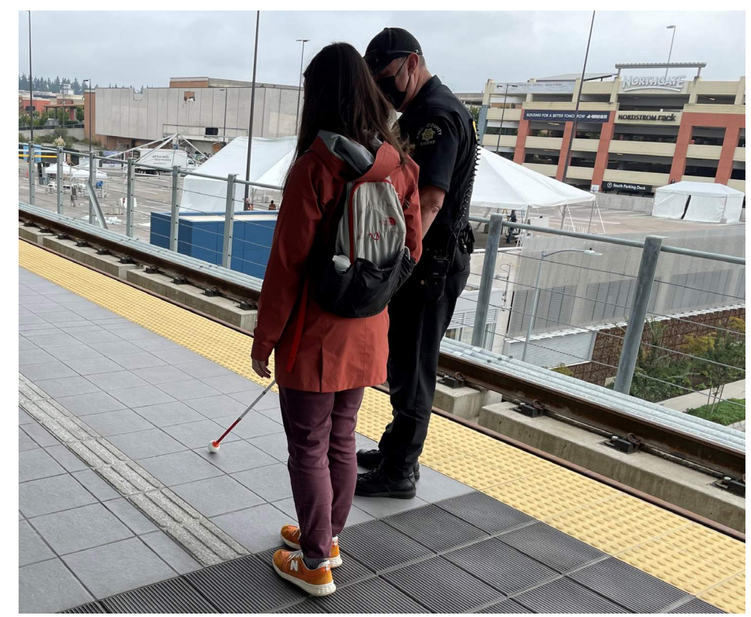


Figure 6.11 Linear Tactile Wayfinding Strip in White.

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Image Source: Robert Ashworth

7 FACILITIES

ELEMENTS OF CONTINUITY
UNIFIED SYSTEMS KIT OF PARTS

LONG TERM VALUE MAINTAINABLE

7.1 OVERVIEW

Facilities will be included at staffed stations, and include both public-facing facilities and SJRRC facilities. Individual site layouts and constraints will determine final configurations, locations and sizing.

7.2 PUBLIC FACILITIES

The following public facilities may be considered at staffed stations:

7.2.1 PUBLIC RESTROOMS

- Public restrooms should be provided on a case by case basis.
- Restrooms may be unisex if the number of necessary fixtures is less than three, per plumbing code, otherwise provide separate men's and women's facilities. Include areas in the planning for janitorial storage and a floor sink as required.
- Public restrooms may be standalone structures or incorporated into a larger transit facility on-site.

7.2.2 STAFFED TICKETING KIOSKS

- Staffed ticketing kiosks should be provided on a case-by-case basis.
- Ticketing services may be stand alone structures, or incorporated into a larger transit facility on-site.
- Secure storage for supplies must be made as part of the ticketing area or elsewhere on site.

7.2.3 BAGGAGE CHECK-IN AND HANDLING AREAS

Certain Amtrak stations may be provided with integrated or stand-alone baggage handling facilities. These can range from a baggage drop off area on the station side that a baggage cart can be used to bring baggage to the platform or a window in association with a ticket counter.

7.2.4 TRANSIT LOBBY AND ENCLOSED WAITING AREAS.

Transit facilities that incorporate indoor waiting areas, ticket and checked baggage counters, staff offices, and operator break rooms may be desired at certain sites. These facilities should be designed to accommodate the specific program requirements on a case-by-case basis. Program elements for a staffed transit facility may also include community rooms and should be adequately sized for intended uses.

Architecturally, larger transit facilities should be designed to reflect the local community, and design teams are encouraged to engage with the local jurisdictions for the more substantial project. Best practices in sustainability and resiliency should all be employed, including use of sustainable materials, construction methods, natural light, water saving features. For roof areas that exceed 1000sf, active solar may be incorporated where parking lot solar canopies cannot be accommodated.

7.3 SJRRC STAFF & MAINTENANCE FACILITIES

7.3.1 STAFF RESTROOMS

- Staff restrooms shall be provided at staffed stations.
- Staff restrooms should be unisex with a minimum of two separate rooms.

7.3.2 INDOOR STORAGE

- Provide lockable for administrative, ticketing and public information, and maintenance supplies.

7.3.3 OUTDOOR MAINTENANCE STORAGE

- Provide an enclosed area of approximately 150 - 200sf of secure storage for site maintenance.
- Orient maintenance storage away from highly traveled public areas and station parking.

7.3.4 TRASH ENCLOSURES

- Depending on station size and waste production, provide a trash bin storage closet adjacent to the facility building. Trash closets should accommodate two 95 gallon commercial recycling and waste bins.
- For larger facilities, provide a covered trash enclosure, sized for one 10-yard dumpster, wall height 8' min, with locking gates.
- Orient trash enclosures away from highly traveled public areas and station parking.

Image Source: Creative Commons
By Pat 5923 (58)

8 INFRASTRUCTURE

ELEMENTS OF CONTINUITY
UNIFIED SYSTEMS KIT OF PARTS

LONG TERM VALUE MAINTAINABLE

8.1 PLATFORMS

8.1.1 STATION PLATFORMS

This section provides guidance for the configuration, and clearances associated with the platforms within the rail right-of-way at the stations. Platforms shall be located on a tangent section of track.

8.1.2 STATION PLATFORM HEIGHT

The finished platform floor is assumed to be 8 inches above the top of the rail elevation at each station. Structural design of the platform and footing will be based on geotechnical conditions at each station.

8.1.3 MINI-HIGH PLATFORM

Different types of equipment are operated in the ACE and San Joaquins Corridors. ACE currently operates Bombardier Bi-Level Coaches with a floor height of 25", whereas the San Joaquins service operates Siemens Venture Coaches with a floor height of 51". Each type of rolling stock has a unique boarding height. Therefore, each rolling stock type will be using a different mini-high platform height to board and alight passengers. The finished mini-high platform for the Bombardier fleet will be 1 foot 11 inches above the top of the rail elevation. The finished mini-high platform for Siemens fleet will be 4 feet 0 inches above the top of the rail.

8.1.4 PLATFORM WIDTH

Safety zones along the boarding edge of the platform will include a 2 feet tactile warning strip at the edge of the platform and a stand-behind line at 4 feet from the edge of the platform.

8.1.5 PLATFORM CROSS SLOPE

The cross slope of the platform shall be designed to a 2.0% maximum cross slope away from the track.

8.1.6 PLATFORM CLEARANCE

Clearances on the platform shall conform to UPRR Standard Drawing 6001. To reduce minimum clearances, approval from UPRR would be required on a case by case basis.

8.2 RAIL CORRIDOR

8.2.1 HORIZONTAL TRACK GEOMETRY WITHIN UPRR RIGHT OF WAY

Tracks located within the UPRR right-of-way must be designed per UPRR standards. The standards referenced below can be found on the UPRR website.

8.2.2 DESIGN SPEED

- Design speeds must not be less than what is shown on the UPRR track charts.

8.2.3 HORIZONTAL TRACK DESIGN

- Minimum tangent distance per STD DWG 0018.
- Bridges need 100 feet of tangent track past the outside edge of the abutment.
- Turnouts.
  - Turnout Applications – STD DWG 0080
  - Facing Point Turnout Layout – STD DWG 0017
  - Turnout Layout - Design Data for Turnout Layout STD DWG 0050
  - Point of Switch Detail – STD DWG 0008A
  - Point of Switch Requirement – STD DWG 0018
  - Tangent Lengths adjacent to Turnouts - STD DWG 0018
  - Crossovers (#7, #9, #11, #15, #20, #24) – STD DWG 5030-5035
  - Permanent Derail Installation Instructions – STD DWG 2000
- Turnouts (Point of Switch).
  - Edge of crossing to point of switch is greater than 120 feet (300 feet preferred)
  - Point of switch to bridge abutment must be 500 feet or, if the bridge has a walkway and handrail, 100 feet (when diverging track does not cross bridge).
  - Point of switch to bridge abutment is equal to or greater than 300 feet (when diverging track crosses bridge).
- Horizontal Curves are concentric and are 100 feet minimum in length.
- Superelevation is calculated from STD DWG 0019 – 0023.
  - For Freight Operations – Use STD DWG 0021 (1" Imbalance) to determine design superelevation provided indicated superelevation is 4" or less. If the 1" imbalance table indicates a required superelevation of over 4" STD DWG 0022 (2" Imbalance) should be used to determine appropriate superelevation.
  - For Passenger Rail – For passenger train operations use STD DWG 0023 (3" Imbalance) to determine design superelevation.
  - Spiral Lengths – Spiral lengths are calculated from superelevation runoff rates times values in the table found on STD DWG 0019.

8.2.4 TRACK SPACING

- Track Centers for Wood Ties, Concrete Ties, Industry Tracks – STD DWG 0001-0003.

8.2.5 VERTICAL TRACK DESIGN

- Vertical Curve Design - UPRR STD DWG 0016, AREMA Chapter 5, Section 3.6.
- Vertical Tangent Design - AREMA Chapter 5, Section 3.6.

8.2.6 HORIZONTAL CLEARANCE

- Standard Minimum Operating Clearances – STD DWG 0038.

8.2.7 VERTICAL CLEARANCE (OVERPASS)

- Roadway Structures over Railroad – UPRR and BNSF Guidelines for Rail Separation Projects Section 5.
- Design Clearances for Highway and Pedestrian Overpass – STD DWG 0035.

8.2.8 VERTICAL CLEARANCE (UNDERPASS)

- Railroad Structures over Roadway – UPRR and BNSF Guidelines for Rail Separation Projects Section 6.
- Standard Minimum Operating Clearances – STD DWG 0038.

8.2.9 DRAINAGE STANDARDS FOR TRACK DESIGN

- For maintaining or changing existing drainage systems within the UPRR right-of-way, refer to Section 4.5 of the UPRR-BNSF Guidelines for Railroad Grade Separation Projects.
- For determining the hydraulic criteria for drainage systems parallel to railroad tracks, refer to Section 4.5.2 of the UPRR-BNSF Guidelines for Railroad Grade Separation Projects.
- For determining hydrology and hydraulic drainage studies on UPRR owned or maintained track, see Section 3.4 on the UPRR Industry Specifications.

Certain on-site conditions may make it challenging to meet these UPRR standards. Therefore, an alternative design approach for track drainage methodology is the following:

- Daylight section into existing grade and maintain existing drainage patterns (if top of subballast is above existing grade).
- Construct ditch with outlets per UPRR STD DWG 0001, Roadbed Sections for Wood Tie Track Construction; 0002, Roadbed Sections for Concrete Tie Track Construction; or 0003, Roadbed Section For Industrial Track Construction.
- Construct inlets and tie into storm sewer system.

The following options will only be considered after above options have been exhaustively evaluated by UPRR (designer to provide information for review):

- Construct underdrain that ties into a drainage system.
- For detention basins, refer to agency standards.

If the designer proposes a solution other than using the standard ditches specified in the UPRR Typical section drawings 0001 or 0002:

- A plan showing the existing drainage patterns including inlets, culverts, or other existing points of drainage outlet is needed. This plan should also show storm sewer mains as they relate to project drainage as well as nearby drainage ditches and facilities that could be possible outlets. If unable to connect to these locations/ facilities, a detailed explanation will be needed.
- The designer will need to prove that the proposed design meets UPRR's published hydrology and hydraulic drainage criteria unless the UPRR standard 10 foot ditch is provided or the UPRR tracks are well above the surrounding area and it is completely obvious that there is no risk of exceeding the UPRR hydrology and hydraulic drainage criteria.

8.2.10 PIER PROTECTION

Where pier protection is required, use 2018 AREMA Manual for Railway Engineering, Chapter 8, Section 2.1.5.1.

8.3 STATIONS

8.3.1 PAVEMENT DESIGN

8.3.2 TRAFFIC INDEX

Pavement designs will use the following minimum traffic indices for calculation of the structural section based on local geotechnical conditions.

Type of Street	Traffic Index
Parking Lot	5.0
Access Road without Buses	6.0
Access Roads With Buses	6.5

8.3.3 BUS PAVEMENT

For the bus stop area within the station site and any areas where significant bus turning occurs, the standard asphalt pavement will be substituted with PCC (Portland Cement Concrete) Pavement.

8.3.4 STATION AREA CIVIL

For the main civil components of the station parking and circulation area like curbs and curb and gutters use the standard details from the local jurisdiction, city or county.

8.4 GRADE CROSSINGS

Grade crossing modification within the UPRR ROW shall conform to the California Public Utilities Commission (CPUC) requirement GO-88-B. The standards can be found on the CPUC website.

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APPENDICES

APPENDIX A
STATION RIDERSHIP PROJECTIONS

Appendix D

ACE Ceres–Merced Extension Ridership, Revenue, and Benefits Report

To:	**Dan Leavitt, Manager of Regional Initiatives**
Cc:	
Subject:	**ACE Ceres-Merced Extension Project EIR – Ridership, Revenue, and Benefits Technical Memorandum**
From:	**Lincoln James, AECOM (Authored by Laura McWethy, AECOM)**
Date:	**January 27, 2021**

Introduction

This technical memorandum summarizes the methodology used to create ridership forecasts for the ACE Ceres-Merced Extension Project. This memorandum describes the process of developing the ridership forecasts, including key assumptions and inputs such as demographic data and conceptual operating plans, as well as the describing the ridership forecasts.

Ridership Methodology

The ridership forecasts were developed using the ACE Passenger Rail Forecasting Model ("ACE Model"). AECOM developed and has used the ACE Model to forecast ridership for recent and ongoing plans and projects to implement service improvements to the Altamont Corridor Express (ACE) and San Joaquins services, including the ACE*forward* program and the Valley Rail Sacramento Extension.

The ACE Model considers both intercity and commuter passengers and is based on the Amtrak forecasting model developed by AECOM. The ACE Model was calibrated to match existing ACE ridership and updated to account for future short- and long-term investments in the passenger rail network in Northern California, including select connections with BART.

The ACE Model is an incremental model that only forecasts rail ridership, as opposed to total travel by all modes. The model pivots off of existing ridership and service by station pair and the forecasts are based on demographic growth and service characteristics such as depart/arrival times of day, travel time between station pairs and train headways. In cases where there is no existing service, a proxy station pair that has similar characteristics to the new station pair is assigned, and the base ridership is adjusted to account for differences in market size and service. Each train is modeled separately, which allows for time-of-day factoring for both departure and arrival times. Connections are explicitly modeled, and factored lower to reflect the lower appeal of a required transfer. The model produces ridership forecasts that are unconstrained with regard to train capacity and parking capacity. To account for situations where the demand may be greater than the proposed service, the ridership results can be post-processed to reduce ridership to match available capacity at key choke points.

Demographic Assumptions

In addition to the rail service operating plan, demographic forecasts are one of the key inputs to the ACE Model. Demographic growth forecasts from Moody's Economy.com procured in 2013 were used in the ACE Model to generate trips on both ACE. These forecasts are based on detailed national and regional econometric modeling and provide corridor-wide consistency with respect to key measures of growth, including population, income, and employment. This dataset is a custom forecast of demographic data at the county level, and includes low, base, and high forecasts of total population, total non-farm employment, and total personal income.

The ACE Model, however, requires demographic data for each station. To translate county-level demographic data to smaller-scale station-level data, AECOM employed a custom geographic information system (GIS) application to calculate the population and employment contained within buffers around each station. Buffers ranging in radius from five to twenty miles around stations were used, and the weighted average population and employment for each buffer were inputted into the ACE Model.

The ACE Model was previously updated to reflect demographics from the 2018 Alameda County Transportation Commission (ACTC) travel demand forecasting model ("ACTC Model") which includes demographic forecasts for Plan Bay Area 2050. For this analysis, percentage changes in demographic data by jurisdiction from the base (2013) model to the updated (2018) model were estimated for analysis years of 2030 and 2040. These jurisdictional-level percentage changes were applied to ACE Model base demographic data associated with each station, with consideration to the geographic location, catchment area, and other characteristics of each station. This allows the demographics used in this analysis to be consistent with other planning projects in the region.

Model Refinements

Additional adjustments were made to the ACE model to improve the ridership forecasts and better match station catchment areas and characteristics. First, the population buffers resulting from AECOM's GIS application were revised around Ceres, Modesto, and Ripon stations. Prior to refinements, the buffers were created using straight-line distances around the stations and did not include highway access travel times or a measure of the directionality of the system, which is the standard procedure, but do not represent the unique characteristics of accessing some of the stations. In this particular area, it is expected that residents on the northwest side of the stations would choose to travel to the more inbound station to board ACE, rather than driving outbound and then taking an ACE train inbound, as it would reduce both the ACE travel time and the access drive time to the station. For example, a passenger that resides in northern Modesto may choose to drive inbound to Ripon to board an ACE train rather than drive outbound to the Modesto station to then board an inbound ACE train. Similarly, a passenger residing to the north/northwest of Ceres may rather drive inbound to Modesto rather than outbound to Ceres to board an inbound ACE train. Because of this potential situation, a portion of the population that was assigned to Ceres in the buffer process was shifted to Modesto, and

a portion of the population assigned to Modesto was shifted to Ripon. These shifts allow the model to better reflect demand at these stations.

Proxy station assignments, which are described briefly in the Methodology section above, also were thoroughly vetted to ensure the similarity between a proxy station and the corresponding station for which it is a proxy. Several factors were considered when improving the match between a proxy station and corresponding/new station. One factor is whether a new station is an end-of-line station; if so, then a proxy station that also is an end-of-line station is likely a good choice as a proxy, as they typically have a larger ridership draw. Demographics around a station matter as well. Stations in relatively high employment areas should be matched with a proxy that also is in a high employment area; similarly, stations in less dense or more rural areas should be matched with proxy stations in less dense areas. Distance between stations is also a factor. When a proxy station is chosen for a new station, the distance between the proxy station and other ACE stations should be similar to the distance between the new station and other ACE stations. Proxy station assignments were reviewed and revised based on the considerations described above. For example, the station pair of Merced to Modesto is a shorter-distance pair that includes an end of the line station and a moderate commute market. For this pair, the existing Stockton to Vasco station pair is used as the proxy to match with those characteristics. Downtown Manteca to Tracy uses the proxy station pair of Lathrop-Manteca to Tracy, as Downtown Manteca is located close to Lathrop-Manteca, but the existing ridership is factored down based on the addition of new stations in the area of Lathrop-Manteca.

Scenarios and Forecasts

The scenarios and resulting forecasts are described below. Ridership impacts, including passenger revenue (order-of-magnitude estimate only), parking demand at stations, and reduction in vehicle miles traveled (VMT), are also presented. For the ACE extension to Merced, the ridership analysis does not include the HSR project effect on ACE ridership (or vice versa). As the ridership does not include any impacts from HSR, this also extends to further components of ridership such as parking demand and VMT reductions. There are two reasons for this:

1. While the HSR extension to Merced is an adopted project, the exact timing and frequency of HSR service to Merced is still a work in progress;
2. The project team has analyzed the ACE extension to Merced on its own as a separate independent utility project from HSR. This is best done by not including any potential ridership effects due to transfers between ACE and HSR.

Similarly, the Valley Link project has not been factored into the ridership analysis for the ACE extension to Merced as the Valley Link project is not yet formally approved (but may be approved in Spring 2021). Though the Valley Link project would likely increase ACE ridership between Merced and Lathrop, it will likely decrease trips along the existing ACE line, and the project is not yet fully funded all the way to Lathrop and may be built in phases from west to

east. The Merced-Bakersfield HSR Interim Service and Valley Link will be addressed under the cumulative impacts section of the EIR.

The ridership modeling considers two future years: 2030, which assumes the full operating plan for 4 roundtrips each weekday; and a long-term horizon year (2040), which also assumes 4 roundtrips each weekday while capturing future population and employment growth along the route in the next 15–20 years. The assumption for each of these years for both build and no build are summarized in Table 1.

Table 1: Scenario Descriptions

	2030	2040
No Build	Existing ACE service No Valley Link service No California High-Speed Rail service	Existing ACE service No Valley Link service No California High-Speed Rail service
Build-Atwater	ACE with Sacramento and Merced Extensions, Atwater station No Valley Link service No California High-Speed Rail service	ACE with Sacramento and Merced Extensions, Atwater station No Valley Link service No California High-Speed Rail service
Build-Livingston	ACE with Sacramento and Merced Extensions, Livingston station No Valley Link service No California High-Speed Rail service	ACE with Sacramento and Merced Extensions, Livingston station No Valley Link service No California High-Speed Rail service

No Build Scenario

For 2030 No Build, inbound and outbound ACE service includes the extensions to Natomas and Ceres, with the following roundtrip train service and bus connections:

- Two direct trains between Stockton and San Jose
- One direct train between Ceres and San Jose with connecting bus service between Ceres and Merced
- One direct train between Natomas and San Jose
- One direct train between Natomas and Stockton
- Three trains between Ceres and Natomas via the Natomas Extension with connecting bus service between Ceres and Merced. These three trains also connect at North Lathrop to other inbound ACE trains with service to San Jose.
- Four buses between Ceres and Merced, connecting to the trains at Ceres.

No Build inbound and outbound ACE train service is shown in Table 2 and Table 3, respectively. Existing Amtrak intercity services in the region also was assumed for 2030 No Build, including San Joaquins and Capitol Corridor services. For the 2040 No Build, ACE service is the same as the ACE service used in 2030 No Build.

Table 2: No Build ACE Timetable – Inbound

	A01	A03	A05	A07	A09	302	204	304
Merced	3:09					3:59	4:59	5:59
Atwater	3:26					4:16	5:16	6:16
Turlock	3:55					4:45	5:45	6:45
Ceres	4:17					5:05	6:05	7:05
Modesto	4:25					5:13	6:13	7:13
Ripon	4:36					5:24	6:24	7:24
Manteca	4:44					5:32	6:32	7:32
North Lathrop						5:41	6:41	7:41
Stockton		5:33	6:33	7:33	8:39	5:52	6:52	7:52
Lodi				7:18	8:25	6:09	7:09	8:09
Elk Grove				6:56	7:56	6:31	7:31	8:31
Sutterville				6:42	7:42	6:45	7:45	8:45
Midtown Sacramento				6:36	7:36	6:51	7:51	8:51
North Sacramento				6:29	7:29	6:58	7:58	8:58
Natomas				6:19	7:19	7:09	8:09	9:09
North Lathrop		5:45	6:45	7:45		5:45	6:45	7:45
Lathrop-Manteca	4:52	5:52	6:52	7:52		5:52	6:52	7:52
Tracy	5:04	6:04	7:04	8:04		6:04	7:04	8:04
Vasco	5:33	6:33	7:33	8:33		6:33	7:33	8:33
Livermore	5:38	6:38	7:38	8:38		6:38	7:38	8:38
Pleasanton	5:46	6:46	7:46	8:46		6:46	7:46	8:46
Fremont	6:08	7:08	8:08	9:08		7:08	8:08	9:08
Great America	6:26	7:26	8:26	9:26		7:26	8:26	9:26
Santa Clara	6:33	7:33	8:33	9:33		7:33	8:33	9:33
San Jose	6:45	7:45	8:45	9:45		7:45	8:45	9:45

*Grey highlighted timestamps are transfers to another train.

**Orange highlighted rows are stations that are part of the Ceres-Merced bus service.

Table 3: No Build ACE Timetable - Outbound

	A98	A04	A06	A08	A10	215	315	217
Merced		18:41				19:52	20:52	21:52
Atwater		18:27				19:38	20:38	21:38
Turlock		18:01				19:12	20:12	21:12
Ceres		17:43				18:55	19:55	20:55
Modesto		17:37				18:49	19:49	20:49
Ripon		17:25				18:37	19:37	20:37
Manteca		17:17				18:28	19:28	20:28
North Lathrop						18:20	19:20	20:20
Stockton	14:28		18:28	19:27	20:27	18:07	19:07	20:07
Lodi	14:44		18:44			17:53	18:53	19:53
Elk Grove	15:06		19:06			17:31	18:31	19:31
Sutterville	15:20		19:20			17:17	18:17	19:17
Midtown Sacramento	15:26		19:26			17:11	18:11	19:11
North Sacramento	15:33		19:33			17:04	18:04	19:04
Natomas	15:41		19:41			16:51	17:51	18:51
North Lathrop			18:16	19:16	20:16	18:16	19:16	20:16
Lathrop Manteca		17:10	18:10	19:10	20:10	18:10	19:10	20:10
Tracy		16:51	17:51	18:51	19:51	17:51	18:51	19:51
Vasco		16:22	17:22	18:22	19:22	17:22	18:22	19:22
Livermore		16:17	17:17	18:17	19:17	17:17	18:17	19:17
Pleasanton		16:08	17:08	18:08	19:08	17:08	18:08	19:08
Fremont		15:45	16:45	17:45	18:45	16:45	17:45	18:45
Great America		15:29	16:29	17:29	18:29	16:29	17:29	18:29
Santa Clara		15:20	16:20	17:20	18:20	16:20	17:20	18:20
San Jose		15:15	16:15	17:15	18:15	16:15	17:15	18:15

*Grey highlighted timestamps are transfers to another train.

**Orange highlighted rows are stations that are part of the Ceres-Merced bus service.

Build Scenarios

The build scenarios included the same non-ACE service as the No Build (San Joaquins and Capitol Corridor Amtrak services for 2030 and the Amtrak services). For ACE, the build includes all the No Build service and converts the Ceres-Merced bus connection to rail, converting three bus stops to rail stations and improving travel times to these markets. Two versions of the build were tested:

one version with a station at Atwater and the other version with a station at Livingston. The full inbound and outbound ACE schedules for the build runs are provided in Table 4 and Table 5, respectively.

Table 4: Build Atwater/Livingston ACE Timetable - Inbound

Station	A01	A03	A05	A07	A09	302	204	304
Merced	3:43					4:31	5:31	6:31
Atwater/Livingston**	3:57/4:01					4:45/4:49	5:45/5:49	6:45/6:49
Turlock	4:08					4:56	5:56	6:56
Ceres	4:17					5:05	6:05	7:05
Modesto	4:25					5:13	6:13	7:13
Ripon	4:36					5:24	6:24	7:24
Manteca	4:44					5:32	6:32	7:32
North Lathrop						5:41	6:41	7:41
Stockton		5:33	6:33	7:33	8:39	5:52	6:52	7:52
Lodi				7:18	8:25	6:09	7:09	8:09
Elk Grove				6:56	7:56	6:31	7:31	8:31
Sutterville				6:42	7:42	6:45	7:45	8:45
Midtown Sacramento				6:36	7:36	6:51	7:51	8:51
North Sacramento				6:29	7:29	6:58	7:58	8:58
Natomas				6:19	7:19	7:09	8:09	9:09
North Lathrop		5:45	6:45	7:45		5:45	6:45	7:45
Lathrop-Manteca	4:52	5:52	6:52	7:52		5:52	6:52	7:52
Tracy	5:04	6:04	7:04	8:04		6:04	7:04	8:04
Vasco	5:33	6:33	7:33	8:33		6:33	7:33	8:33
Livermore	5:38	6:38	7:38	8:38		6:38	7:38	8:38
Pleasanton	5:46	6:46	7:46	8:46		6:46	7:46	8:46
Fremont	6:08	7:08	8:08	9:08		7:08	8:08	9:08
Great America	6:26	7:26	8:26	9:26		7:26	8:26	9:26
Santa Clara	6:33	7:33	8:33	9:33		7:33	8:33	9:33
San Jose	6:45	7:45	8:45	9:45		7:45	8:45	9:45

*Grey highlighted timestamps indicate transfers to another train.

**The first timestamp in a cell refers to Atwater and the second timestamp refers to Livingston in the Atwater and Livingston Build scenarios, respectively.

Table 5: Build Atwater/Livingston ACE Timetable – Outbound

Station	A98	A04	A06	A08	A10	215	315	217
Merced		18:17				19:35	20:35	21:35
Atwater/ Livingston**		18:03/17:59				19:21/19:17	20:21/20:17	21:21/21:17
Turlock		17:52				19:10	20:10	21:10
Ceres		17:43				18:55	19:55	20:55
Modesto		17:37				18:49	19:49	20:49
Ripon		17:25				18:37	19:37	20:37
Manteca		17:17				18:28	19:28	20:28
North Lathrop						18:20	19:20	20:20
Stockton	14:28		18:28	19:27	20:27	18:07	19:07	20:07
Lodi	14:44		18:44			17:53	18:53	19:53
Elk Grove	15:06		19:06			17:31	18:31	19:31
Sutterville	15:20		19:20			17:17	18:17	19:17
Midtown Sacramento	15:26		19:26			17:11	18:11	19:11
North Sacramento	15:33		19:33			17:04	18:04	19:04
Natomas	15:41		19:41			16:51	17:51	18:51
North Lathrop			18:16	19:16	20:16	18:16	19:16	20:16
Lathrop-Manteca		17:10	18:10	19:10	20:10	18:10	19:10	20:10
Tracy		16:51	17:51	18:51	19:51	17:51	18:51	19:51
Vasco		16:22	17:22	18:22	19:22	17:22	18:22	19:22
Livermore		16:17	17:17	18:17	19:17	17:17	18:17	19:17
Pleasanton		16:08	17:08	18:08	19:08	17:08	18:08	19:08
Fremont		15:45	16:45	17:45	18:45	16:45	17:45	18:45
Great America		15:29	16:29	17:29	18:29	16:29	17:29	18:29
Santa Clara		15:20	16:20	17:20	18:20	16:20	17:20	18:20
San Jose		15:15	16:15	17:15	18:15	16:15	17:15	18:15

*Grey highlighted timestamps indicate transfers to another train.
**The first timestamp in a cell refers to Atwater and the second timestamp refers to Livingston in the Atwater and Livingston Build scenarios, respectively.

Forecast Results

The forecasted annual and daily ACE ridership in Years 2030 and 2040 is shown in Table 6 below for the No Build, Build-Atwater, and Build-Livingston scenarios. Annual revenue, person miles travelled (PMT), and automobile VMT avoided are also shown in Table 6. Revenue is calculated based on the ridership forecasts, but is not an input into the model, meaning fares do not affect ridership numbers directly in the model. Unmodeled attributes such as fare are indirectly included in the incremental model through the baseline ridership, in that it is assumed that the proposed fares will be the same or similar to the existing fares. In cases where there is not existing ridership, such as for the extensions, proxy station pairs are assigned which are assumed to have similar characteristics, including market size, service levels, and fares.

The revenue was calculated as the ridership forecast for each station pair multiplied by the existing fare for each station pair. For new station pairs, fares were interpolated based on existing fares. As auto travel is not included in the ACE model, the VMT was estimated based on train miles by station pair multiplied by ridership and adjusted for average auto occupancy. All new ridership is assumed to be diverted from automobiles.

Overall ridership and the other metrics in both build scenarios are very similar in both 2030 and 2040. Overall ridership in the build scenarios is about 12 percent higher than in the No Build scenario, and annual revenue is about 10 percent higher than in the No Build. The Atwater and Livingston runs have similar total ridership.

Table 6: Forecasted Ridership, Revenue, & Auto VMT Avoided

	2030			2040		
	No Build	ATW	LVG	No Build	ATW	LVG
Annual Ridership	3,735,500	4,180,900	4,176,800	4,797,100	5,367,500	5,364,100
Daily Ridership	14,760	16,530	16,510	18,960	21,220	21,200
Annual Revenue ($)	24,511,200	27,041,500	27,033,900	31,632,200	34,872,800	34,872,300
Annual PMT	199,178,400	223,606,100	223,043,600	257,031,900	288,276,300	287,851,800
Annual Auto VMT Avoided	-	24,375,000	23,966,200	-	31,122,800	30,671,000

Combined station ons and offs (boardings and alightings) for each scenario and forecast year are shown below in Table 7. Relative to the No Build scenario, ridership in the build scenarios is forecasted to increase significantly at Merced, Atwater/Livingston, and Turlock stations as these stations are converting from bus to rail service; moderately at Modesto, Ripon, and Downtown Manteca stations (on the order of 15 percent); and (in general) slightly along the Natomas Extension stations and for ACE stations from Stockton to San Jose (on the order of 5 percent).

There are not significant differences in station-level ridership between the two build scenarios; however, there is slightly more ridership at Atwater in the Build-Atwater scenario compared to at

Livingston in the Build-Livingston scenario. Furthermore, there is slightly less ridership at Merced in the Build-Atwater scenario compared to the Build-Livingston scenario, which suggests that Atwater is an attractive option for some passengers who would otherwise board an ACE train at Merced.

Table 7: ACE Station Ons & Offs

	2030			2040		
Station	**No Build**	**ATW**	**LVG**	**No Build**	**ATW**	**LVG**
Merced	31,900	251,500	257,000	41,500	319,700	335,300
Atwater	17,100	115,300	-	22,000	149,100	-
Livingston	-	-	106,200	-	-	130,800
Turlock	32,400	177,600	177,000	41,700	229,700	228,700
Ceres	153,200	151,200	151,300	196,000	193,500	193,500
Modesto	340,400	401,200	401,100	436,800	515,700	514,500
Ripon	209,500	245,000	244,200	276,700	322,600	322,600
Downtown Manteca	136,700	156,300	155,800	181,200	206,700	206,700
Natomas	295,300	317,200	316,900	371,800	399,700	399,000
North Sacramento	235,500	248,300	248,100	295,600	311,800	311,300
Midtown Sacramento	460,200	483,800	483,600	575,900	605,900	604,900
Sutterville	261,800	271,500	271,300	329,000	341,300	340,900
Elk Grove	331,300	350,000	349,900	413,600	437,400	436,800
Lodi	141,500	158,500	158,400	178,400	200,100	199,600
Stockton	283,100	320,000	319,200	370,600	417,900	417,900
North Lathrop	209,700	209,700	209,700	282,200	282,200	282,200
Lathrop/Manteca	168,500	179,400	179,200	216,200	230,000	230,000
Tracy	664,500	693,700	693,100	886,800	924,800	924,800
Vasco	229,100	239,100	238,400	287,800	299,500	299,300
Livermore	244,100	250,500	250,200	306,000	313,700	313,400
Pleasanton	787,400	807,700	806,800	983,700	1,007,300	1,007,700
Fremont	344,400	357,300	357,600	436,800	453,200	453,400
Great America	1,406,200	1,467,600	1,468,900	1,829,500	1,909,800	1,910,800
Santa Clara	94,200	98,400	98,500	122,700	128,300	128,300
San Jose	393,000	411,000	411,300	511,700	535,300	535,600
Total Ons & Offs	7,471,000	8,361,800	8,353,700	9,594,200	10,735,200	10,728,000

Forecasted weekday parking demand at several stations is shown in Table 8 for each scenario and forecast year, which are proportional to the station-level ridership. The largest forecasted increases in weekday parking demand in the build scenarios relative to the No Build scenario are

at Merced, Atwater/Livingston, and Turlock. Modesto and Ripon are forecasted to have moderate increases in weekday parking demand, and all other stations are forecasted to have only slight increases in parking demand.

Table 8: Estimated Weekday Parking Demand

Station	2030			2040		
	No Build	ATW	LVG	No Build	ATW	LVG
Merced	45	358	366	59	455	477
Atwater	24	164	-	31	212	-
Livingston	-	-	151	-	-	186
Turlock	46	253	252	59	327	325
Ceres	218	215	215	279	275	275
Modesto	484	571	571	622	734	732
Ripon	298	349	347	394	459	459
Downtown Manteca	195	222	222	258	294	294
Stockton	403	455	454	527	595	595
North Lathrop	298	298	298	402	402	402
Lathrop/Manteca	240	255	255	308	327	327
Tracy	946	987	986	1,262	1,316	1,316
Vasco	326	340	339	410	426	426
Livermore	347	356	356	435	446	446
Pleasanton	1,120	1,149	1,148	1,400	1,433	1,434
Fremont	490	508	509	622	645	645

APPENDIX B
REFERENCE STANDARDS

REFERENCE STANDARDS

AASHTO Guide for the Development of Bicycle Facilities

Americans with Disabilities Act (ADA) Standards

AREMA Manual for Railway Engineering

Association of Pedestrian and Bicycle Professionals (APBP) Essentials of Bike Parking

California Building Code (CBC)

California Elevator Code and Regulations

California Green Building Standards Code (CALGreen)

California Manual on Uniform Traffic Control Devices (CA MUTCD)

California Public Utilities Commission (CPUC) General Order No.88B: Rules for Altering Public Highway-Rail Crossings

California State Water Resources Control Board Storm Water Regulations

City of Lathrop Design and Construction Standards

Code of Federal Regulations Title 49 Volume I Part 37: Transportation Services for Individuals with Disabilities (ADA)

FHWA Bikeway Selection Guide

Fruin, John J., Designing for Pedestrians: A Level of Service Concept

Illuminating Engineering Society (IES) Standards

NACTO Urban Bikeway Design Guide

NACTO Transit Street Design Guide

National Pollutant Discharge Elimination System (NPDES) Regulations

UPRR and BNSF Railway Guidelines for Railroad Grade Separation Projects

UPRR Standard Drawings

SAN JOAQUIN REGIONAL RAIL COMMISSION STATION/FACILITIES DEVELOPMENT COMMITTEE RESOLUTION 21/22 -

RESOLUTION OF THE SAN JOAQUIN REGIONAL RAIL COMMISSION STATION/FACILITIES DEVELOPMENT COMMITTEE APPROVING THE VALLEY RAIL STATION DESIGN GUIDELINES TO INCLUDE THE FOLLOWING DESIGN AREAS AND DIRECT HOW TIME SENSITIVE CHANGES TO THE GUIDELINES WILL BE MADE:

1. **SITE CIRCULATION**
2. **LANDSCAPE**
3. **VERTICAL CIRCULATION**
4. **PLATFORM**
5. **WAYFINDING**
6. **FACILITIES**
7. **INFRASTRUCTURE**

WHEREAS, to guide the designing of the Valley Rail Stations, staff has assembled a team to work together to provide design Principles, Guidelines, and Criteria to ensure consistency, efficiency, and prioritize the passenger experience, as well as ensure equitable access to the stations; and

WHEREAS, the process to determine overarching direction to unify the individual station designs is a three-step process: Principles, Guidelines, and Criteria. Each step builds upon the previous step to provide the Why, What, and How to design a Valley Rail Station; and

WHEREAS, core principles need to be established that embody commitment to people centric design, making passenger experience a priority, reflecting the goals to create a safe, accommodating, and positive total transit experience through enjoyable, sustainable and resilient facilities; and

WHEREAS, in order to help the station design teams advance the station designs of the Valley Rail Station Program, staff is recommending approval of the Valley Rail Station Design Guidelines to Include the Following Design Areas and Direct how time sensitive changes to the Guidelines will be made:

1. Site Circulation
2. Landscape
3. Vertical Circulation
4. Platform
5. Wayfinding
6. Facilities
7. Infrastructure

NOW, THEREFORE, BE IT RESOLVED that the San Joaquin Regional Rail Commission Station/Facilities Development Committee hereby Approves the Valley Rail Station Design Guidelines to Include the Following Design Areas and Direct how time sensitive changes to the Guidelines will be made:

1. Site Circulation
2. Landscape
3. Vertical Circulation
4. Platform
5. Wayfinding
6. Facilities
7. Infrastructure

PASSED AND ADOPTED, by the San Joaquin Regional Rail Commission Station/Facilities Development Committee this 12th day of November 2021, by the following vote:

AYES:
NOES:
ABSENT:
ABSTAIN:

ATTEST:

SAN JOAQUIN REGIONAL RAIL COMMISSION STATION/FACILITIES DEVELOPMENT COMMITTEE

_____
STACEY MORTENSEN, Secretary

_____
LEO ZUBER, Chair

SAN JOAQUIN REGIONAL RAIL COMMISSION
STATION/FACILITIES DEVELOPMENT COMMITTEE
Meeting of November 12, 2021

STAFF REPORT

Item 5 **INFORMATION**

Valley Rail Program Update

Background:
Executive Director, Ms. Stacey Mortensen, will provide and update on the Valley Rail Program at the November 12, 2021 Station/Facilities Development Committee meeting.

Fiscal Impact:
There is no fiscal impact.

Recommendation:
This is an informational item. There is no action requested.