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

November 10, 2022 – 9:00 am

Call-In Information: +1 (332)-249-0500 Phone Conference ID: 650-942-427#
Microsoft Teams Link: Click here to join the meeting

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 (332)-249-0500 with Phone Conference ID: 650-942-427# log-in using a computer, tablet or smartphone on Microsoft Teams using link: Click here to join the meeting

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 Microsoft Teams 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 October 14, 2022 **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 11, 2022 to December 10, 2022 **ACTION**

4. **Approve a Resolution of the San Joaquin Regional Rail Commission Station/Facilities Development Committee Approving an Agreement with Mark Thomas & Company, Inc. for Design Services for the Elk Grove Station and Trackwork for an Amount Not-To-Exceed $3,489,634 and Authorizing the Executive Director to Negotiate, Award, and Execute Any and All Agreements and Documents Related to the Project including Approving any and all Amendments within Her Spending Authority** **ACTION**
(Dan Leavitt)

5. **Approve a Resolution of the San Joaquin Regional Rail Commission Station/Facilities Development Committee Approving the Valley Rail Station Design Criteria as Attached Hereto** **ACTION**
(David Lipari)

6. **Committee Member Comments and Executive Director's Report**

7. **Adjournment**

The next regular meeting is scheduled for:
December 9, 2022 – 9:00 am

SAN JOAQUIN REGIONAL RAIL COMMISSION
STATION/FACILITIES DEVELOPMENT COMMITTEE
Meeting of November 10, 2022

Item 3.1 **ACTION**

Minutes of Committee Meeting October 14, 2022

The meeting of the Station/Facilities Development Committee was held at 9:00 a.m. on October 14, 2022 in accordance with Assembly Bill 361 (AB361) via teleconference or videoconference.

1. Call to Order, Roll Call

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

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

Members Absent: Chiesa

2. Public Comments

There were no public comments.

3. Consent Calendar

3.1	Minutes of Committee Meeting September 9, 2022	**ACTION**
3.2	Minutes of Committee Special Meeting September 30, 2022	**ACTION**
3.3	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 October 15, 2022 to November 13, 2022	**ACTION**

There were no comments on the Consent Calendar.

M/S/C (Hume/Hothi) to Approve items 3.1-3.3 of the Consent Calendar.

Passed and Adopted by the San Joaquin Regional Rail Commission Station/Facilities Development Committee on the 14th day of October, 2022 by the following vote to wit:

AYES:	3	Hume, Vice Chair Hothi, Chair Zuber
NOES:	0	
ABSTAIN:	0	
ABSENT:	1	Chiesa

4. Valley Rail Station Design Criteria Update: Restrooms **INFORMATION**

Mr. David Lipari gave a presentation on this item.

Chair Zuber inquired about people being required to leave the platform to use the restrooms.

Mr. Lipari confirmed that people would be required to leave the platform to use the restrooms.

Member Hume commented that there are a lot of ideas to be flushed out regarding this item.

Chair Zuber thanked Mr. Lipari for the informative presentation and commented in favor of the forward-thinking individuals in the design group to avoid pitfalls down the road.

Mr. Lipari recognized the team that is working together on the issues that arise.

There were no public comments on this item.

5. Committee Member Comments and Executive Director's Report

There were no Committee Member comments.

Executive Director Stacey Mortensen reported that staff will be coming to the Committee in the near future with an amendment to the existing contract for the Ceres Station and train layover facility because there is a new concept that moves the layover tracks a little bit to the South. Ms. Mortensen explained that the engineering team will have to design the double track improvements and tie in to a new and better location for the train layover. Ms. Mortensen explained because of the TIRCP funding awarded to the Ceres-Turlock Phase Extension, staff will be coming to the Commission at the beginning of next year with a contract to do the full design and bid documents for the layover station down to the Turlock station.

6. Adjournment

The meeting was adjourned at 9:16 am.

The next regular meeting is scheduled for:
November 10, 2022 – 9:00 am

SAN JOAQUIN REGIONAL RAIL COMMISSION
STATION/FACILITIES DEVELOPMENT COMMITTEE
Meeting of November 10, 2022

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 11, 2022 to December 10, 2022

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 October 14, 2022, the Committee held a regular meeting via teleconference under AB 361. In accordance with Government Code Section 54953(e)(1), the Committee made the AB 361 finding allowing teleconference meetings for 30 days thereafter. The resolution accompanying this staff report makes those findings to continue to hold teleconference meetings for the next 30 days. As a result, any Committee meetings occurring November 11, 2022 to December 10, 2022, may 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 11, 2022 to December 10, 2022.

SAN JOAQUIN REGIONAL RAIL COMMISSION STATION/FACILITIES DEVELOPMENT COMMITTEE RESOLUTION 22/23 -

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 11, 2022 TO DECEMBER 10, 2022

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 10, 2022, the SJRRC Station/Facilities Development Committee held a regular meeting in accordance with Government Code Section 54953(e) and hereby desires to adopt this resolution 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 on November 11, 2022 and cover the period through December 10, 2022.

PASSED AND ADOPTED, by the San Joaquin Regional Rail Commission Station/Facilities Development Committee this 10th day of November 2022, by the following vote:

AYES:
NOES:
ABSENT:
ABSTAIN:

ATTEST:

SAN JOAQUIN REGIONAL RAIL COMMISSION STATION/FACILITIES DEVELOPMENT COMMITTEE

_____
STACEY MORTENSEN, Secretary

_____
LEO ZUBER, Chair

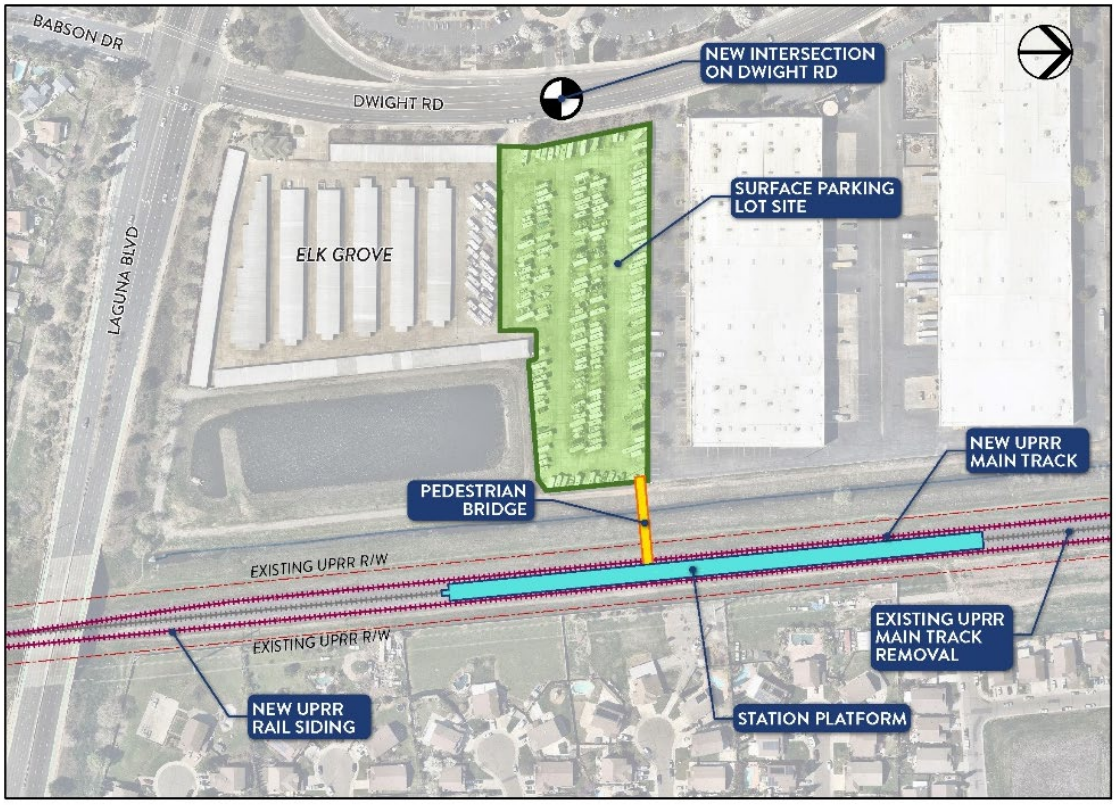
SAN JOAQUIN REGIONAL RAIL COMMISSION
STATION/FACILITIES DEVELOPMENT COMMITTEE
Meeting of November 10, 2022

STAFF REPORT

Item 4 **ACTION**

Approve a Resolution of the San Joaquin Regional Rail Commission Station/Facilities Development Committee Approving an Agreement with Mark Thomas & Company, Inc. for Design Services for the Elk Grove Station and Trackwork for an Amount Not-To-Exceed $3,489,634 and Authorizing the Executive Director to Negotiate, Award, and Execute Any and All Agreements and Documents Related to the Project including Approving any and all Amendments within Her Spending Authority

Background:
The Elk Grove Station will be constructed in the City of Elk Grove in Sacramento County California as part of the Valley Rail Program. A new center loaded commuter rail station platform will be provided within Union Pacific Railroad (UPRR) right of way (along UPRR's "Sacramento Subdivision" railroad) and a new surface parking lot will be provided including a new connection with Dwight Road just north of Laguna Boulevard between State Route 99 (SR-99) and Interstate 5 (I-5). A pedestrian overcrossing will provide access from the surface parking lot to the station platform.



The site proposed for the Elk Grove Station is predominately on property used for RV storage. The Project includes construction of up to a 10,000-foot-long siding track to accommodate the operational requirements Union Pacific Railroad (UPRR) needs to allow passenger service to run in the corridor.

The Project also involves the removal and replacement of approximately 3,900 feet of existing UPRR mainline track between Laguna Boulevard and Big Horn Boulevard to accommodate construction of the station platform.

The Rail Commission requires consultants to perform the professional and technical engineering services necessary to provide preliminary design and environmental services (PA&ED) and the Plans, Specifications, and Estimates (PS&E) for the project. Preliminary engineering is complete and deliverables will include NEPA documents (The Elk Grove Station EIR for CEQA was certified on April 1, 2022 by the Commission). Consultants selected will prepare the project final design PS&E culminating in a completed Ready to List PS&E package for the project as a single construction contract. SJRRC is expected to be the lead agency for the Advertising, Award, and Administration (AAA) of this project construction contract.

Procurement Process:

On August 2, 2022, the Rail Commission released a Request for Proposals (RFP) via vendor portal Planet Bids. By utilizing Planet Bids, 962 firms were notified of the opportunity and seventy-nine (79) firms showed interest.

On the due date of September 7, 2022, one proposal was received through PlanetBids at 2:00pm from the following firm:

- Mark Thomas & Company, Inc.

The proposal received was reviewed for completeness and responsiveness by the Procurement and Contracts Department. The proposal was deemed responsive and was evaluated by a panel consisting of the Rail Commission's staff.

Due to receiving one responsive proposal, staff reached out to those vendors that expressed interest to see why they did not submit a proposal. The Rail Commission received sixteen (16) responses at the time of the Board mailout, the reasons were either that they were subconsultants, the scope was too small, no time/busy, scope was not within their services offered, unable to secure a prime or cannot take new clients.

After reviewing the responses and based on previous work history with Mark Thomas & Company, Inc., staff deemed that there is not adequate competition available to justify resoliciting for the service. Therefore, it is at the Rail Commission's best interest to move forward with recommending the single proposal received.

Rail Commission staff and Mark Thomas & Company, Inc. met to negotiate a precise scope of work and price. Both parties came to an agreement on the terms of conditions of the agreement.

The agreement commencement date is estimated to be November 10, 2022 and shall continue upon completion of the scope. The base contract amount is $3,489,634.00.

The Notice of Intent to Award was published on October 25, 2022. Pursuant to the approved and adopted protest procedure, the proposal protest period closes on November 9, 2022, at 2:00 P.M. PST. As of the date of this staff report, no Proposal Protests have been received. Staff will update the Committee at the November 10th meeting as to the latest status of any Proposal Protests

received.

Fiscal Impact:
Expenses for the Elk Grove Station and Trackwork Project are identified in the approved SJRRC/ACE/SJJPA Fiscal Year 2022/2023 Capital Budget and are funded by Transit and Intercity Rail Capital Program (TIRCP) Funds. The Rail Commission has encumbered $2,713,116 to date for this project. This action will commit an additional $3,489,634, leaving $36,658,250 available for this project.

Funding Type	Source	Project Budget	Prior Encumbered	Total for this Contract	Available For Future Phases
TIRCP	State	$42,861,000	$2,718,730	$3,489,634	$36,652,636
	Total	**$42,861,000**	**$2,718,730**	**$3,489,634**	**$36,652,636**

Recommendation:
Approve a Resolution of the San Joaquin Regional Rail Commission Station/Facilities Development Committee Approving an Agreement with Mark Thomas & Company, Inc. for Design Services for the Elk Grove Station and Trackwork for an Amount Not-To-Exceed $3,489,634 and Authorizing the Executive Director to Negotiate, Award, and Execute Any and All Agreements and Documents Related to the Project including Approving any and all Amendments within Her Spending Authority.

SAN JOAQUIN REGIONAL RAIL COMMISSION STATION/FACILITIES DEVELOPMENT COMMITTEE RESOLUTION 22/23 -

RESOLUTION OF THE SAN JOAQUIN REGIONAL RAIL COMMISSION STATION/FACILITIES DEVELOPMENT COMMITTEE APPROVING AN AGREEMENT WITH MARK THOMAS & COMPANY, INC. FOR DESIGN SERVICES FOR THE ELK GROVE STATION AND TRACKWORK FOR AN AMOUNT NOT-TO-EXCEED $3,489,634 AND AUTHORIZING THE EXECUTIVE DIRECTOR TO NEGOTIATE, AWARD, AND EXECUTE ANY AND ALL AGREEMENTS AND DOCUMENTS RELATED TO THE PROJECT INCLUDING APPROVING ANY AND ALL AMENDMENTS WITHIN HER SPENDING AUTHORITY

WHEREAS, the Elk Grove Station will be constructed in the City of Elk Grove in Sacramento County California as part of the Valley Rail Program; and

WHEREAS, the Project includes construction of up to a 10,000-foot-long siding track to accommodate the operational requirements Union Pacific Railroad (UPRR) needs to allow passenger service to run in the corridor and also involves the removal and replacement of approximately 3,900 feet of existing UPRR mainline track between Laguna Boulevard and Big Horn Boulevard to accommodate construction of the station platform; and

WHEREAS, the Rail Commission requires consultants to perform the professional and technical engineering services necessary to provide preliminary design and environmental services (PA&ED) and the Plans, Specifications, and Estimates (PS&E) for the project; and

WHEREAS, the Project also involves the removal and replacement of approximately 3,900 feet of existing UPRR mainline track accommodate construction of the station platform; and

WHEREAS, on August 2, 2022, the Rail Commission released a Request for Proposals (RFP) via vendor portal Planet Bids and received one (1) responsive proposal; and

WHEREAS, after reviewing the responses and based on previous work history with Mark Thomas & Company, Inc., staff deemed that there is not adequate competition available to justify re-soliciting for the service and therefore, it is at the Rail Commission's best interest to move forward with recommending the single proposal received; and

NOW, THEREFORE, BE IT RESOLVED that the San Joaquin Regional Rail Commission Station/Facilities Development Committee hereby Approves an Agreement with Mark Thomas & Company, Inc. for Design Services for the Elk Grove Station and Trackwork for an Amount Not-To-Exceed $3,489,634 and Authorizing the Executive Director to Negotiate, Award, and Execute Any and All Agreements and Documents Related to the Project including Approving any and all Amendments within Her Spending Authority.

PASSED AND ADOPTED, by the San Joaquin Regional Rail Commission Station/Facilities Development Committee this 10th day of November 2022, by the following vote:

AYES:
NOES:
ABSENT:
ABSTAIN:

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 10, 2022

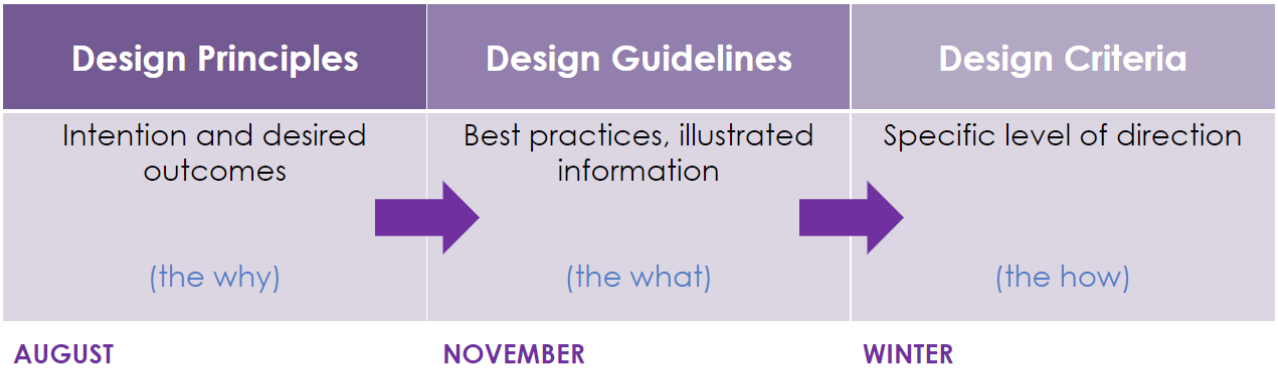
STAFF REPORT

Item 5 **ACTION**

Approve a Resolution of the San Joaquin Regional Rail Commission Station/Facilities Development Committee Approving the Valley Rail Station Design Criteria as Attached Hereto

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 (Committee) meeting, the Committee approved the "Design Principles". Based upon the 'Design Principles', 'Design Guidelines' were created and approved by the Committee at their November 2021 meeting.

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 Criteria:
The third step in this process is to establish and approve the 'Design Criteria'. The Design Criteria is based on the Design Guidelines and will help the station design teams to advance the station designs of the Valley Rail Station Program. It is essential to consider the 'How'. The Criteria identify a comprehensive list of work areas necessary for the San Joaquin Regional Rail Commission (Rail Commission) and the San Joaquin Joint Powers Authority (Authority) 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 Criteria include the following chapters:

Chapter 1 – General Overs
Chapter 2 – Civil
Chapter 3 – Rail Infrastructure Design
Chapter 4 – Utilities
Chapter 5 – Parking Facilities
Chapter 6 – Landscaping
Chapter 7 – Vertical Circulation
Chapter 8 – Station Platforms
Chapter 9 – Elevators
Chapter 10 – Mechanical and Plumbing Systems
Chapter 11 – Electrical Systems
Chapter 12 – Lighting
Chapter 13 – Communications
Chapter 14 – Structures
Chapter 15 – Signage and Wayfinding
Chapter 16 – Art and Elements of Distinction Program

The Design Criteria document and its content are the essential directions to the station design teams. As the document is implemented by the design teams, certain elements will need to be adjusted for site specific conditions. Additionally, the implementation of the document will yield essential station design learnings that will in the future require updating to the document.

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 Criteria as Attached Hereto.

SAN JOAQUIN REGIONAL RAIL COMMISSION STATION/FACILITIES DEVELOPMENT COMMITTEE RESOLUTION 22/23 -

RESOLUTION OF THE SAN JOAQUIN REGIONAL RAIL COMMISSION STATION/FACILITIES DEVELOPMENT COMMITTEE APPROVING THE VALLEY RAIL STATION DESIGN CRITERIA AS ATTACHED HERETO

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; and

WHEREAS, each step builds upon the previous step to provide the Why, What, and How to design a Valley Rail Station; and

WHEREAS, Design Principles were approved by the Committee at their August 2021 meeting and the Design Guidelines approved at their November 2021 meeting; and

WHEREAS, the third step in the process is to establish 'Design Criteria' based on the approved Design Guidelines in order to advance the designs of the Valley Rail Station Program; and

NOW, THEREFORE, BE IT RESOLVED that the San Joaquin Regional Rail Commission Station/Facilities Development Committee hereby Approves the Valley Rail Station Design Criteria as Attached Hereto.

PASSED AND ADOPTED, by the San Joaquin Regional Rail Commission Station/Facilities Development Committee this 10th day of November 2022, by the following vote:

AYES:
NOES:
ABSENT:
ABSTAIN:

ATTEST:

SAN JOAQUIN REGIONAL RAIL COMMISSION STATION/FACILITIES DEVELOPMENT COMMITTEE

_____
STACEY MORTENSEN, Secretary

_____
LEO ZUBER, Chair

VALLEY RAIL
STATION DESIGN CRITERIA

November 2022

San Joaquin
Joint Powers Authority

San Joaquin
Regional
Rail Commission

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Version: 1
Date: November 10, 2022

Prepared By:

SJRRC Staff

VIA – Perkins Eastman Studio

Pennino Management Group

O'Dell Engineering

AECOM

Colmena Engineering

DOCUMENT
TRACKING HISTORY

Station Committee Submission	November 10, 2022

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Rail Commission

CHAPTER 1

GENERAL

CHAPTER 1 – GENERAL

1.1 GENERAL

1.1.1 Goals and Principles

The SJRRC *Station Design Criteria Manual* (also *Design Criteria* or *Manual*) establishes criteria to be used in the design of the San Joaquin Regional Rail Commission (SJRRC) Valley Rail Station facilities for its own stations, shared stations with the San Joaquin Joint Powers Authority (SJJPA), and San Joaquins stations. SJRRC is the owner and operator of the Altamont Corridor Express (ACE®) train service and is the managing agency of the SJJPA Amtrak San Joaquins intercity passenger rail service. The criteria address station platforms, vertical circulation (including pedestrian bridges and undercrossings), parking facilities, bus waiting areas, and all other support facilities. In addition, SJRRC Directive Drawings are being issued to standardize and guide the design activities and the preparation of contract documents.

Criteria are directed toward achieving at least a 50-year life cycle value within the available budget for design and construction. Maximum value shall focus on designing capital investments that emphasize durability; minimize long-term maintenance effort and expense, operating expense, overall life cycle costs, energy consumption, water consumption, and disruption of existing local facilities—both public and private; while maximizing the utility and beauty of the resultant project efforts.

Further, designing for maximum value should consider life cycle management to plan and minimize costs associated with procurement, operation, maintenance, rehabilitation, and replacement of transit assets, while meeting or exceeding established service and reliability commitments for both the individual asset and the transit system as a whole. Long-term benefits to adjacent properties, improvements, and communities should be consistent with ensuring transit customer safety, security, system reliability, and service comfort, as well as the project-specific mode of operation and type of vehicle to be used. These longer-term community benefits include, but are not limited to, ensuring equal access to the programs, services, and activities in an integrated setting for people who have disabilities, as well as for racial and demographic minorities and lower-income individuals.

Finally, designing for maximum value shall require both attention to these criteria, as well as to the internal and external stakeholders for each project, and shall result in a fully integrated project design, where all project features are coordinated with each other, as well as with adjacent physical and planned features, so the project that results may be understood by people as an intentional, purposeful, and well-considered addition to the larger, existing SJRRC system. It follows that coordination between the chapters of this *Manual* is as critical to attention to the criteria within each chapter.

Decisions made during the design and procurement stage are critical to the management of an asset and can impact its useful life and longevity. These decisions consider both immediate and longer-term needs for service, customer usage, and flexibility to adapt to future technologies and energy sources, among other things. By doing so, this incorporates robust risk assessment and quality assurance/quality

control (QA/QC) processes into the design and procurement phase, mitigating the likelihood of poor design decisions and identifying potential and actual quality issues before they become the agency's responsibility.

Whereas the costs for corrective actions are generally lower when early and increase as design and construction proceed, it is still critical to continue evaluating potential risks and QA/QC issues throughout the construction phase to identify other potential challenges to an asset's life cycle. Decisions made in the design and procurement phase can inform performance monitoring through developing detailed performance specifications that transit agency staff will monitor throughout the asset's life. Recognizing that many transit agencies are responsible for legacy assets and that circumstances are often dynamic, regular risk assessments can help identify potential issues and provide an opportunity to develop cost-effective mitigation strategies to implement as part of facility renovations or rehabilitations. Identifying potential risk during the design and procurement phase helps to mitigate future issues and reduce cost without disrupting operations and service provision. Specific considerations for vehicles and facilities can be found in CHAPTER 3 – CIVIL.

All planning, design, and construction shall comply with these design criteria.

Specific attention should be given to the Final Rule of the U.S. Department of Transportation's (USDOT's) *Transportation for Individuals with Disabilities*, published in the Federal Register of September 6, 1991, and to any succeeding modifications that may be issued. While the U.S. Department of Justice's *Americans with Disabilities Act (ADA) Accessibility Guidelines* (ADAAG) guides most right-of-way (ROW) work, vehicles use the USDOT's 2006 guidance, and buildings use the International Building Code (IBC) (as adopted by the State of California) guidance. The applicability of that document is noted in several sections of this *Design Criteria Manual,* where it appears to be particularly appropriate. However, the regulations must be adhered to in all areas, whether mentioned here or not.

1.1.2 Document Format

Each chapter of this *Design Criteria Manual* is organized and formatted similarly.

A. Section X.1 of each chapter is a basic definition of the scope covered within that chapter, as well as a general description of the subject matter and any agency policy statements that may pertain to the subject matter within the chapter.

B. Section X.2 of each chapter is a list of references that are (or may be) applicable to the subject matter within that chapter.

C. Section X.2.1 is a list of cross-references to other chapters of this *Design Criteria Manual* or SJRRC documents that are relevant to that chapter.

D. Section X.2.2 is a list of industry standards, codes, or guidelines that may be relevant to all or part of the subject matter in that chapter. The Designer shall determine which industry standards, codes, or guidelines are applicable on a case-by-case basis for a given scenario.

E. Section X.2.4 is a list of stakeholders (where applicable), generally internal and sometimes external to SJRRC, who have a vested interest in the subject matter and with whom coordination may be necessary in design development.

F. Section X.3 of each chapter contains the design criteria/application for the subject matter within that chapter and the applicability of said criteria for givenscenarios. The Criteria/Application section of a given chapter may contain figures, tables and/or charts, as well as a narrative description of the criteria.

1.1.3 Interface with Other Jurisdictions

A. Other jurisdictions shall include, but are not limited to, California Department of Transportation (Caltrans), Local County Water District, California Public Utilities Commission (CPUC), Local Public Utilities Commission, Local Cities, Counties, and other Municipalities and Authorities Having Jurisdiction (AHJ).

B. The portions of the Work that will require interface with other jurisdictions include, but are not limited to, the following:

(1) Obtaining and complying with each jurisdictions' standards, requirements, reviews, permits, unless noted differently in the Special Permitting Process, as referenced in Section 01 71 43 Permits, Licenses and Agreements for construction and related activities for Work within and adjacent to each jurisdiction’s ROW.

(2) Inspections of portions of Work that are within each jurisdiction's ROW or easements and require compliance with codes and ordinances of each jurisdiction.

(3) Requests for assistance from each jurisdiction's police department or jurisdictional department/agency for traffic signal modifications, street closures, site security requirements, and similar activities required to protect the public and maintain the security of work site locations, Metro property at work site locations, and materials and equipment.

(4) Clarifications of each jurisdiction’s standards that apply to the Work.

(5) Participation in discussions with each jurisdiction at Project meetings to facilitate coordination of the jurisdiction’s requirements, the Contractor's requests, and the progress of the Work. Obtain all other governmental approvals required for timely execution of Work.

1.1.4 Sustainability

SJRRC is committed to advancing the social, economic, and environmental sustainability of the Central Valley and has adopted the following mission to guide its policies and practices:

> *SJRRC provides viable transportation options to support regional livability goals by building and operating a safe, attractive, easy-to-use transportation system that ensures equity, promotes human and ecosystem health, and facilitates the use of public transportation alternatives in our community.*

A. The Project shall comply with the California Green Building Standards Code (CALGreen) for non-residential construction. The green building measures established within this section shall be incorporated into the design, construction, and operation of facilities of the Valley Rail Project. The Project design and construction should be consistent with Silver Certification under the Envision Sustainable Infrastructure rating system or its equivalent. Sustainable measures beyond Silver Certification are encouraged and recommended.

B. These guidelines apply to all components of the Project, including the station platforms, ancillary facilities, and elevated pedestrian elements. A Life Cycle Assessment (LCA) may be conducted to compare various design alternatives to identify the lowest impact approach.

C. The following principles and objectives for sustainability are provided for reference only and shall be considered in the design, construction, and operations of the Project.

(1) Integrated Design

(a) Utilize an integrated design approach to arrive at design decisions. An integrated design approach brings together all major disciplines—planning, civil, landscape and urban design, architecture, structural, mechanical and electrical engineering—as well as other specialties as necessary to collaborate and determine the most effective ways to meet Project goals, objectives, and requirements with the lowest feasible life cycle environmental impacts.

(b) Consideration should also be given to including representatives from operations and maintenance team and future users in order to make informed design decisions that will ultimately improve the utilization and maintainability of the Project.

(2) Site Design

(a) Site design should consider maximizing the use of other low impact forms of transportation to get to and from the stations, such as walking, bicycling, local/regional transit, carpooling, and the use of electric and alternative fuel vehicles.

(b) To accomplish this objective, stairways and pedestrian pathways should be designed to be easily identified, accessible, comfortable, and visually appealing. Similarly, bike parking, designated carpool parking, electric vehicle (EV) charging stations, and public transportation connections should be convenient and easy to locate.

(c) Utilize landscaped areas to provide shade and reduce heat island effects where possible. Appropriately size hardscape areas to accommodate estimated pedestrian volumes and maximize the areas of landscape. Landscape areas can reduce heat island effects and be designed to function as stormwater detention and treatment. Other strategies for heat island reduction include the use of light-colored, cool-roof materials and construction materials. See CHAPTER 6 – LANDSCAPING for detailed criteria.

(3) Energy Efficiency

(a) Maximize the energy efficiency of the Project, including the use of renewable energy that exceeds code-required minimums. Consider passive strategies that take advantage of the favorable aspects of the local climate, such as prevailing winds, moderate temperatures, and days of sunshine, which may allow for natural ventilation, reduce the demands for heating and air conditioning, and support the installation of roof-mounted solar panels.

(b) Where California Energy Efficiency Standards apply to components of the Project, these standards shall be considered minimum-compliance

requirements. To the extent reasonably feasible, these standards shall be exceeded. For equipment not governed by these standards, the best available energy-efficient technologies shall be used. Advanced commissioning of building systems shall be conducted to ensure systems are operating as designed.

(4) Water Efficiency and Conservation

Identify and implement appropriate measures to reduce or eliminate potable water use indoors and in landscape areas.

(5) Material Conservation and Resource Efficiency

With consideration of Project performance objectives and technical requirements, maximize the use of materials with recycled content and/or materials that are rapidly-renewable, locally-sourced, and durable. Determine the approach to reducing the overall environmental impact associated with materials use by performing a LCA or similar analysis.

1.1.5 Resiliency

A. Design must consider ability of SJRRC critical infrastructure systems to respond and recover from risks of natural disasters, hazards and disruptive events and still retain their basic function and structural capacity.

B. Infrastructure resilience addresses disruption mitigation to prevent, absorb, recover, and adapt after disruptions caused by a probable hazard, in a timely and efficient manner.

C. The design standards for critical components of SJRRC infrastructure are intended to exceed basic reliability and durability requirements for critical components using a higher threshold for basic reliability and durability requirements than the threshold for standard components.

D. Engineering design shall be based on available and reliable data relating to resiliency, safety and disaster risk mitigation for critical rail infrastructure.

E. Coordinate with other infrastructure stakeholders (UPRR, AHJ's) for planning for infrastructure resilience by sharing information and expertise for coordinated benefits.

1.1.6 Durability

A. Design must assess potential for deterioration of materials and assemblies, including deterioration specific to exposure to the environment and operating conditions.

B. Materials and detail assemblies must be durable, with maintenance, repair and replacement compatible with the expected design life.

C. Design must consider mean time between failure and mean time between repair goals in the design of the systems and subsystems. These goals must be discussed and agreed with SJRRC.

D. For surfaces and assemblies for which appearance is important, as determined by SJRRC, durability must include the maintenance required to preserve appearance.

E. The design must take into account the following aspects of durability:

(1) Control of moisture.

(2) Control of corrosion (including material compatibility).

(3) Control of ultraviolet light exposure.

(4) Control of exposure to industrial and vehicular pollution.

(5) Minimize damage from wear and tear.

(6) Ease of access and repair.

(7) Ease of upgrade.

(8) Expected maintenance and frequency

1.1.7 Standardization

A. Design must use standard materials and equipment where possible.

B. Standardization is intended to ease procurement and inventory management, minimize staff training, optimize maintenance, and avoid long lead times for materials, equipment, and components.

C. Equipment and materials must be new, unused, meet industry standards, be available off the shelf to the extent possible, and supplied by established manufacturers. Selection of equipment and materials must consider long-term costs, ease of construction and maintenance, and readily available technical support.

D. For certain elements, SJRRC intends to use pre-qualified materials, goods, products, processes, to be incorporated into the Work by the Contractor. The Contractor shall provide Procurement Services using such selected Owner's Specified materials, manufacturers, model Vendors and Subcontractors as directed by the Owner.

E. The design must apply these standardized and common design solutions to optimize harmonized maintenance strategies and reduce life-cycle operating costs. Design must prescribe open-source software solutions for the software elements of the design to the extent practical and consistent with interoperable requirements

1.2 REFERENCES, STANDARDS, REGULATIONS, CODES, GUIDELINES

A. Where the Design Criteria Manual does not specifically cover References, Industry Standards, Regulations, Codes, Guidelines, Local Ordinances, and Good Practice requirements of a subject, the prevailing codes, standards, regulations, local ordinances, industry standards and best practices must govern.

B. If a requirement within the Design Criteria Manual is deemed contrary to codes, standards, regulations, or local ordinances, Designer must formally notify SJRRC.

1.2.2 SJRRC

A. *Station Design Criteria Manual,* all other chapters and appendices

B. SJRRC Design Guidelines

C. SJRRC Standard Drawings

D. The Owner Supplied Materials and Designated Matching Product listing of equipment and products to ensure interoperability with maintenance and operations of the SJRRC System.

1.2.3 Industry

Individual chapters will provide specific references by:

- American Society of Civil Engineers (ASCE), including the ASCE *Minimum Design Load Specifications for Buildings and Other Structures*, which focuses on the regulations of design and installation of building systems and incorporating industry standards in material design and installation. The building code covers structural and safety provisions, interior finish requirements, roofs, seismic engineering, innovative construction technology, and occupancy classifications.
- American Concrete Institute (ACI), American Welding Society (AWS), and American Institute of Steel Construction (AISC) standards, which provides requirements for general structural design and means for determining various loads: dead, live, soil, flood, wind, snow, rain, atmospheric, ice, and earthquake.
- Building codes and zoning codes, which vary by location.
- *ADA Standards for Transportation Facilities,* which contains technical requirements for accessibility to sites, facilities, buildings, and elements by individuals.

1.2.4 Federal, State, Local

A. U.S. Department of Transportation's *Transportation for Individuals with Disabilities: Final Rule*, published in the Federal Register of September 6, 1991

B. Americans with Disabilities Act (ADA)

C. 2010 U.S. Department of Justice's *Americans with Disabilities Act (ADA) Accessibility Guidelines* (ADAAG)

D. Federal Highway Administration (FHWA) *Manual on Uniform Traffic Control Devices* (MUTCD)

E. Caltrans *Standard Specifications for Construction*

F. Caltrans *Bridge Design and Drafting Manual*

G. Caltrans Standard Plans

H. Caltrans *Highway Design Manual*

I. Caltrans *Hydraulics Manual*

J. California Structural Specialty Code

K. Handbook for Transit Safety and Security Certification

L. Local jurisdictional standards, regulations, codes, and guidelines, as applicable

M. Others as referenced in individual chapters.

1.2.5 Stakeholders

Individual chapters will provide specific references.

1.3 CRITERIA / APPLICATION

Designers shall prepare drawings and technical specifications in accordance with these design criteria, and the applicable SJRRC contract. Directive Drawings are provided for the convenience of the design team and shall not be considered Standard Drawings or used to procure Construction. They do, however, provide dimensions and details for many common items used on SJRRC's projects. Designers shall use these drawings as the starting point for design of the items shown, and modify as required to meet specific site and station requirements.

1.3.1 Applicability

A. The design requirements specified herein must apply to trainway and associated facilities within the SJRRC Valley Rail System the improvements within the public right-of-way associated with the Valley Rail Project, and facilities and properties near the right-of-way that may affect the safety and function of the SJRRC System.

1.3.2 Utilities

A. The design of facilities and associated interconnections to the stations and/or new utility services must:

(1) Incorporate design requirements mandated by the utility service providers, to be provided by the customer/service requester.

(2) Comply with the service provider's design requirements.

(3) Be coordinated with the design of the utility services.

1.3.3 Exceptions

There will certainly be instances where deviation from the *Design Criteria* is in the best interests of the Agency. However, potential exceptions need to be carefully developed and evaluated to ensure coordination and compliance with all relevant parties and stakeholders. Any exceptions to "mandatory requirements" of these design criteria are permissible only if approved in writing by SJRRC's assigned Project Manager. The Designer shall expect the SJRRC Project Manager to provide a document to identify, explain, and justify any requested deviation from the established criteria. For all exception requests, SJRRC's Project Manager shall:

- ensure technical review by the appropriate SJRRC stakeholder personnel;
- document the issue or opportunity that resulted in request for an exception (i.e., the objective of the exception);
- document the development and analysis of multiple alternatives that could address that objective; and
- document the basis of their selected alternative and their approvals of an exception on that basis as part of the project records.

During this effort, an SJRRC Project Manager who is evaluating an exception shall ensure that they consider whether the issue is project-specific or relevant to all projects. If relevant to all projects, the SJRRC Project Manager shall also complete a Lessons Learned entry to capture that improvement to this *Design Criteria Manual* in

future updates. Exceptions to Certifiable Items shall only be granted if specifically approved by the station committee or board and that approval is clearly documented.

1.3.4 Revisions

A. As this *Design Criteria Manual* is revised, modified, or augmented, a Revision Record will be updated. The Revision Record will show the revised chapter or page number, date, and appropriate notation for each change or addition.

B. Proposals for revisions to this *Design Criteria* shall be directed to and approved by the committee or board managing director of the Design and Construction Department for approval

1.3.5 Applicability

Unless otherwise specified, the version of this *Design Criteria Manual* that is current at the time of **DESIGN** contract execution shall govern.

1.3.6 Definitions

Wherever the following words, terms, expressions, or pronouns appear in this manual, they shall be defined as follows:

A. Contracting Officer

An individual appointed by SJRRC to administer a given contract between SJRRC and other parties.

B. Contractor

Refers to the procurement, installation, or construction contractors under contract to SJRRC for the construction and implementation of the project.

C. Design Consultant

Consultants who have been retained by SJRRC to perform and coordinate the design or specification of SJRRC facilities.

D. Designer

Individual or organization performing project design. This may include SJRRC, Consultants, Subconsultants, and others.

E. Project Manager/Director

SJRRC’s designated individual responsible for the design and/or construction of a specific project.

F. Construction Manager

SJRRC’s designated individual responsible for the administration of a specific construction contract.

G. Subconsultant

Any firm(s) to which the prime Design Consultant has subcontracted a portion or phase of their scope of work.

H. SJRRC

San Joaquin Regional Rail Commission is the agency responsible for the governance, operation, and maintenance of the Altamont Corridor Express (ACE) and the current managing agency of the San Joaquins intercity passenger rail service under the direction of the San Joaquin Joint Powers Authority (SJJPA).

1.3.7 Types of Contracts

One of six basic types of contracts will be used in the construction of SJRRC facilities.

A. Construction (Low-Bid Procurement)

Construction contracts involve the general construction of SJRRC facilities, such as roadway grading and paving, drainage, stations, utilities, concrete work, trackway, buildings, bus stops, etc.

B. Construction Management/General Contractor (CM/GC)

CM/GC contracts are similar to construction contracts except they include certain design-phase activities whereby the construction contractor collaborates with SJRRC and potentially the Design Consultant during design and the final construction price is negotiated.

C. Design/Build (D/B)

D/B contracts combine the design phase and construction into a single contract entity.

D. Design/Furnish and Install

Design, Furnish and Install contracts involve both the procurement and installation of project-specific materials, such as Traction Electrification, Signals, and Communications Systems.

E. Procurement – Design/Furnish

Procurement contracts are used to acquire materials that are not 100 percent off-the-shelf items, and require some limited design on the part of the fabricator or supplier. Examples may include special trackwork, grade crossings, signage and graphics, shelters, etc.

F. Procurement – Furnish

Procurement contracts are used to acquire various ready-made or off-the-shelf materials. Examples included rail, continuous welded rail (CWR) strings, ties, traffic signal equipment, etc.

1.3.8 Design Codes and Manuals

In addition to this *Design Criteria Manual*, the Designer must comply with all other applicable codes and standards, including those of the various federal, state, and local jurisdictions.

If codes and/or manuals are specified herein for the design of an element of SJRRC facilities, then the most recent edition(s) shall be used. As stated above, Section X.2 of each chapter of this *Manual* includes a list of references, standards, regulations, codes, and guidelines that may be relevant to the subject matter contained within that chapter. However, responsibility for design remains with the Designer in accordance with the terms and conditions of their contract with SJRRC.

A. Jurisdictional Codes

SJRRC projects occur in numerous neighborhoods, planning districts/subareas, cities, counties, and, perhaps in the future, states.

Each of these legally-defined areas has different land use and development regulations and legislative procedures that may affect project planning and design.

Each individual jurisdiction may have special amendments or supplements to codes and standards that apply on a statewide and national basis.

Therefore, it is critical to:

- Identify the governing jurisdictions for the project at every governmental level.
- Locate jurisdictional boundaries.
- Review applicable adopted master plans and municipal codes.

1.3.9 Climatic Conditions

Valley Rail is situated in California's Central Valley, extending from Sacramento to the Bakersfield. The Central Valley extends through central California from the Cascade Ranges in the north to the Tehachapi Mountains in the south. Its 450-mile-long stretch is bounded by the Pacific Coast Range to the west and the Sierra Nevadas to the east. Ranging in width from 30 to 60 miles (78 to 155 kilometers), the Central Valley is divided into two smaller valleys: the Sacramento Valley in the north and San Joaquin Valley in the south. Major cities in this region include Fresno, Modesto, Stockton, and Sacramento.

A. The Central Valley has a hot Mediterranean climate in the north; the southerly parts of the region are dry and categorized as desert. The Central Valley is prone to greater daily and seasonal temperature ranges than the surrounding mountains or the coast. The ranges of mountains to the west offer some protection to the interior from the strong flow of air off the Pacific Ocean. Precipitation in the Central Valley ranges from more than 20 inches (51 centimeters) per year in the north to roughly 5 inches (13 centimeters) per year in the far south.

B. Temperature trends toward uniformity from day to day and from season to season on the ocean side of the Coast Range and in the coastal valleys. East of the Sierra Nevada, temperature patterns are continental in character, with wide excursions from high readings to low. Between the two mountain chains and over much of the desert area, the temperature regime is intermediate, between the maritime and the continental models. Hot summers are the rule, while winters are moderate to cold.

C. Thunderstorms may occur in the Central Valley at any time of the year, with no definite season. The storms are usually light and infrequent. Winds are primarily from the northwest. Design for wind loading shall be in accordance with local building codes.

1.3.10 Mandatory versus Non-Mandatory

These design criteria include both: 1) mandatory requirements, and 2) guidance or non-mandatory recommendations. Application of criteria shall be based upon the following use of terminology:

- "shall" – denotes a mandatory requirement

- "should" – denotes a recommended, but non-mandatory requirement, whose application depends upon analysis and particular circumstances
- "may" – denotes an optional requirement

1.3.11 Acronyms and Abbreviations

The following acronyms and abbreviations appear in this document. They are defined as indicated:

AAR	Association of American Railroads
AASHTO	American Association of State Highways and Transportation Officials
ABS	Automatic Block Signals
AC	Alternating Current
ACI	American Concrete Institute
ADA	Americans with Disabilities Act
ADAAG	Americans with Disabilities Act Accessibility Guidelines
AFC	Automatic Fare Collection
AFI	Air Filter Institute
AFO	Audio Frequency Overlay
AHJ	Authority Having Jurisdiction
AIM	ARINC Information Management
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AMCA	Air Moving and Conditioning Association, Inc.
ANSI	American National Standard Institute
APTA	American Public Transit Association
APWA	American Public Works Association
AREMA	American Railway Engineering and Maintenance-of-Way Association
ARI	Air Conditioning and Refrigeration Institute
ASA	Acoustical Society of America
ASCII	American Standard Code for Information Interchange
ASHRAE	American Society of Heating, Refrigeration and Air Conditioning Engineers
ASIC	Application Specific Integrated Circuit
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
ATA	Air Transportation Association of America
AT&T	American Telephone and Telegraph Company
ATP	Automatic Train Protection
ATS	Automatic Train Stop
AW0	Maximum empty vehicle operating weight
AWG	American Wire Gauge
AWS	American Welding Society
BLS	Bureau of Labor Statistics

BR	Vehicular Braking Force
CCC	Central Control Center
CCD	Charge Couple Device
CCER	Central Control Equipment Room
CCH	Communication Control Head
CCIR	International Radio Consultation Committee
CCITT	Consultative Committee for International Telephone and Telegraphs
CCR	Central Control Room
CCTV	Closed Circuit Television
CDA	Copper Development Association
CE	Clearance Envelope
CE	Vehicular Centrifugal Force
CFR	Code of Federal Regulations
CIL	Certifiable Items List
CMOS	Complementary Metal Oxide Semiconductor
CPM	Critical Path Method
CPTED	Crime Prevention Through Environmental Design
CR	Creep
CRT	Cathode-Ray Tube
CT	Vehicular Collision Force
CTIC	Cooperative Telecommunications Infrastructure Committee
CTS	Cable Transmission System
RW	Continuously Welded Rail CV Vessel Collision Force
DB	Dry Bulb
DBE	Disadvantaged Business Enterprise
DC	Direct Current
DC	Dead Load of Structural and Nonstructural Components
DD	Downdrag
DF	Direct Fixation
DIDi	Digital Information Display
DR	Derailment Loads
DW	Dead Load of Wearing Surface and Utilities
DWG	Drawing
E&H	Elderly and Handicapped
EB	Emergency Braking Force
ECS	Environmental Control System
ECU	Electronic Control Unit
EH	Horizontal Earth Pressure
EIA	Electronic Industries Association
Envision	ISI's Sustainable Infrastructure certification program
EMC	Electromagnetic Compatibility

EMI	Electromagnetic Interference
EPABX	Electronic Private Automatic Branch Exchange
EQ	Earthquake
ES	Earth Surcharge Load
EV	Vertical Pressure from Dead Load of Earth Fill
EVSE	Electric Vehicle (EV) Supply Equipment
FAA	Federal Aviation Administration
FACP	Fire Alarm Control Panel
FCC	Federal Communications Commission
FDB	Fahrenheit Dry Bulb
FEA	Finite Elements Analysis
FFGA	Full Funding Grant Agreement
FMP	Fire Management Plan
FMS	Fare Management System
FR	Friction
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
FWB	Fahrenheit Wet Bulb
GSA	General Services Administration
GTE	General Telephone Company
HPCU	Hydraulic Pressure Control Unit
HSCB	High Speed Circuit Breaker
HVAC	Heating, Ventilating, and Air Conditioning
IBC	International Building Code
IC	Ice Load
ICEA	Insulated Cable Engineers Association
IEC	International Electro-technical Committee
IEEE	Institute of Electrical and Electronic Engineers
IEQ	Indoor Environmental Quality
IES	Illuminating Engineering Society
IM	Vehicular Dynamic Load Allowance
ISI	Institute for Sustainable Infrastructure
ISO	International Organization for Standards
JEDEC	Joint Electronic Device Engineering Council
JIC	Joint Industrial Council
LAHT	Low Alloy High Tensile Strength (Steel)
LED	Light Emitting Diode
LEED	Leadership in Energy and Environmental Design
LID	Low Impact Development
LL	Vehicular Live Load
LOS	Level of Service

LPCS	Local Plane Coordinate System
LRFD	Load and Resistance Factor Design
LS	Live Load Surcharge
LVPS	Low Voltage Power Supply
MCE	Maximum Credible Earthquake
MDBF	Mean Distance Between Failure
MIL	Military Specification
MIS	Management Information System
MOV	Metal Oxide Varistor
MOW	Maintenance-of-Way
MSB	Maximum Service Brake
MSS	Manufacturers' Standardization Society of the Valve and Fitting Industry
MTTR	Mean Time to Repair
MUTCD	Manual on Uniform Traffic Control Devices
MWELO	Model Water Efficient Landscape Ordinance
NAVD	North American Vertical Datum
NBS	National Bureau of Standards
NEC	National Electrical Code
NEMA	National Electrical Manufacturer's Association
NESC	National Electrical Safety Code
NETA	InterNational Electrical Testing Association
NFL	No Field Lubrication
NFPA	National Fire Protection Association
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NTP	Notice to Proceed
ODOT	California Department of Transportation
OLE	Operating Level Earthquake
OSI	Open System Interconnect
OWF	Other Wayside Factors
PA	Public Announcement
PAAC	Public Art Advisory Committee
PABX	Private Automatic Branch Exchange (see TMTS)
PBX	Private Business Exchange (see TMTS)
PE	Preliminary Engineering
PIV	Peak Inverse Voltage
PL	Pedestrian Live Load
PMP	Project Management Plan
PTW	Part Time Warning Device
QAPM	Quality Assurance Program Manual
RC	Running Clearances

RMS	Root Mean Square
ROW	Right-of-Way
RTU	Remote Terminal Unit
SAE	Society of Automotive Engineers
SBD	Safe Braking Distance
SCADA	Supervisory Control and Data Acquisition
SE	Settlement
SEPP	Security Emergency Preparedness Plan
SES	Subway Environment Simulation
SH	Shrinkage
SIC	Standard Industrial Code, U.S. Department of Labor
SMACNA	Sheet Metal and Air Conditioning Contractor's National Association
SSC	Safety and Security Committee
SSCP	Safety and Security Certification Program
SSMP	Safety and Security Management Plan
SSP	System Safety Program
SSPP	System Safety Program Plan
TCRC	Transportation Change Review Committee
TES	Traction Electrification System
OFE	Owner (SJRRC) Furnished Equipment
TG	Temperature Gradient
TIG	Tungsten Inert Gas
TIR	Total Indicated Runout
TMTS	SJRRC Telephone System (supercedes PABX and PBX)
TOR	Top of Rail
TPO	Temporary Program Override
TTY	Text Telephone, Teletype Terminal, TeleTYpewriter
TU	Uniform Temperature
TWC	Train to Wayside Communication
UFC	Uniform Fire Code
UL	Underwriters' Laboratories, Inc.
UPS	Uninterruptible Power System
USASI	United States of America Standards Institute
USDOT	United States Department of Transportation
v	Velocity
VDE	Vehicle Dynamic Envelope
VOC	Volatile Organic Compound
VPI	Vacuum Pressure Impregnation
VSWR	Voltage Standing Wave Ratio
WA	Water Load and Stream Pressure
WB	Wet Bulb

WBE	Women's Business Enterprise
WS	Wind on Live Load
WL	Wind Load on Structure

1.3.12 Units of Measure

A	Ampere or Amp
Btu	British Thermal Unit
dB	Decibel
dBA	Decibel on the 'A' weighting network FC Foot-candles
ft	Feet or Foot
ft/min	Foot per Minute
ft3/min	Cubic Feet per Minute
	Acceleration due to Gravity (32.2 ft/s² = 9.81 m/s²)
gpm	Gallons per minute
	Hour
Hz	Hertz
in	Inch
	Joule
	Kelvin
kg	Kilogram
kHz	Kilohertz
km	Kilometer
km/h	Kilometer per hour
kWh	Kilowatt hour
	Liter
lb	Pound
lbf	Pound force
	Meter
MHz	Mega Hertz
mi	Mile
mph	Miles per hour
mphps	Miles per hour per second min Minute
mm	Millimeter
mV	Millivolt
µV	Microvolt
N	Newton
oz	Ounce
pcf	Pound per cubic foot
plf	Pound per linear foot
psf	Pound per square foot
psi	Pound per square inch

sec	Second
sq ft	Sq ft
	Time
V	Volt
Vac	Volt alternating current
Vdc	Volt direct current
C	Celsius
F	Fahrenheit
'	Foot
"	Inch
°	Degree

San Joaquin Joint Powers Authority

San Joaquin Regional Rail Commission

CHAPTER 2

RAIL INFRASTRUCTURE

CHAPTER 2 – RAIL INFRASTRUCTURE

2.1 GENERAL

San Joaquin Regional Rail Commission (SJRRC) will be operating in both the Union Pacific Railroad (UPRR) right-of-way (ROW) and the Burlington Northern Santa Fe LLC (BNSF) ROW. The design criteria used will default to whichever ROW each project is located in. The design criteria detailed below shall always be checked against the most current standards. It should be noted that all track curvature is to be chord-defined.

2.2 REFERENCES, STANDARDS, REGULATIONS, CODES, GUIDELINES

2.2.1 Industry

A. *North American Datum of 1983* (NAD 83)

B. *North American Vertical Datum of 1988* (NAVD 88)

C. AREMA *Manual for Railway Engineering*

2.2.2 Federal, State, Local

2.2.3 Stakeholders

A. SJRRC

(1) Operations

B. External

(1) UPRR

(2) Amtrak

2.3 CRITERIA / APPLICATION

2.3.1 General

Unless otherwise specified, all rail design, including turnouts and switches, shall be in accordance with the current specifications and design guidelines of UPRR. For those cases where UPRR has no design guidelines, the American Railway Engineering and Maintenance-of-Way Association (AREMA) guidelines shall be used.

A. UPPR

UPRR track design guidelines for third party projects are available on their website at the following location: UP: Public Projects.

B. Horizontal Track Geometry

(1) Track Spacing

(a) Track centers are dimensioned—20' min. required for new, future, or re-aligned tracks; 15' min. for temporary shoofly tracks. See Public Projects Check Sheet.xlsx (up.com).

(b) Bridges are designed for 20-foot track centers and future track, as required. See Public Projects Check Sheet.xlsx (up.com).

(c) 20-foot track centers are needed for crossovers, per STD DWG 0080, *Standard Turnout Applications* (0080-Default (up.com)).

(2) Horizontal Tangents

Minimum horizontal tangent lengths between reverse curves are based on UPRR STD DWG 0018, *Minimum Tangent Distance* (0018.DGN (up.com)).

(a) Minimum Tangent Lengths

i. Edge-of-crossing to point-of-switch shall be greater than 120' (300' is preferred). See Public Projects Check Sheet.xlsx (up.com).

ii. Point-of-tangent to point-of-switch or point-of-frog shall be 200' or greater, per UPRR STD DWG 0018 (0018.DGN (up.com)).

iii. Distance between point-of-switch and bridge abutment must be a minimum of 500' when diverging track does not cross the bridge. Distance may be reduced to 100' if the bridge has a walkway and handrail. See Public Projects Check Sheet.xlsx (up.com).

iv. Distance between point-of-switch and bridge abutment must be a minimum of 300' when diverging track does cross the bridge. See Public Projects Check Sheet.xlsx (up.com).

v. Bridges need 100' of tangent track past the outside edge of abutment. See Public Projects Check Sheet.xlsx (up.com).

(3) Horizontal Curves

(a) Horizontal curve lengths shall be equal to or greater than 100'. Greater than 60' is acceptable for yard tracks only. See Public Projects Check Sheet.xlsx (up.com).

(b) The body of horizontal curves shall be concentric wherever possible. See Public Projects Check Sheet.xlsx (up.com).

(4) Spirals

(a) All tracks, with the exception of industry tracks, yard tracks, and yard leads, shall have spirals.

(b) Superelevation and spirals shall be calculated per UPRR STD DWGs 0021, 0023, and 0019 (1" Freight, 3" Pass) (0019.dgn (up.com), 0021.dgn (up.com), 0022.dgn (up.com)). Spirals shall be rounded up to the closest 5' increment when possible.

C. Vertical Track Geometry

(1) Vertical Curve Lengths

(a) Vertical curves must be 100' or greater, per AREMA *Manual for Railway Engineering,* Chapter 5, Section 3.6.

(b) Vertical curve design (V/L) shall conform to UPRR STD DWG 0016, *Vertical Curve Design* (0016.DGN (up.com)).

(c) Vertical curves shall not fall within the limits of horizontal curves or

turnouts, unless authorized by the chief engineer.

D. Horizontal and Vertical Railroad Clearances

(1) Horizontal clearances shall meet the requirements of California Public Utility Commission (CPUC) General Order 26-D. UPRR has additional minimum clearance requirements, including vertical clearances through railroad-owned structures and facilities, signal structures, and switch machines and vertical clearances through industry-owned structures. BNSF and UPRR have joint guidelines specifically for grade separation projects.

(a) Horizontal and Vertical Clearances: UPRR STD DWG 0038, *Standard Minimum Operating Clearances* (0038.dgn (up.com))

(b) UPRR/BNSF Guidelines for Railroad Grade Separation Projects Design Clearances: GUIDELINES_FOR_RAIL_SEPARATION_PROJECTS.pdf (up.com)

E. Track Roadbed Sections

(1) For the required track roadbed to support the train loads, see the following UPRR standard drawings:

(a) Roadbed Sections for Wood Tie Construction: UPRR STD DWG 0001 (0001.dgn (up.com))

(b) Roadbed Sections for Concrete Tie Construction: UPRR STD DWG 0002 (0002.dgn (up.com))

(c) Roadbed Sections for Industrial Track Construction: UPRR STD DWG 0003 (0003.dgn (up.com))

F. Concrete, Wood, and Steel Ties and Panels

(1) Concrete Ties

See UPRR STD DWGs 0201–0210. (See Standard Drawing Index for specific concrete tie details (Standard Drawing Index.xls (up.com)).)

(2) Steel Ties

See UPRR STD DWGs 0220–0222. (See Standard Drawing Index for specific steel tie details (Standard Drawing Index.xls (up.com)).)

(3) Wood and Composite Ties

See UPRR STD DWGs 0230–0233. (See Standard Drawing Index for specific wood and composite ties details (Standard Drawing Index.xls (up.com)).)

(4) Panels

See UPRR STD DWGs 0254 and 256. (See Standard Drawing Index for panels (Standard Drawing Index.xls (up.com)).)

G. Road Crossings

See UPRR STD DWGs 0301, 0302, 0304, 0308–0312, 0322, 0324, 0326, 0328, 0330, and 0331. (See Standard Drawing Index for road crossings (Standard Drawing Index.xls (up.com)).)

H. Tie Plates, Fasteners, and Accessories

(1) Tie Plates

See UPRR STD DWGs 0460–0470. (See Standard Drawing Index for tie plates (Standard Drawing Index.xls (up.com)).)

(2) Fasteners and Fastening Accessories

See UPRR STD DWGs 0401, 0402, 0404,0406–0425, 0429–0439 and 0441. (See Standard Drawing Index for fasteners and fastening accessories (Standard Drawing Index.xls (up.com)).)

I. Roadway Signs and Track Markings

See UPRR STD DWGs 0501–0569. (See Standard Drawing Index for roadway design and track markings (Standard Drawing Index.xls (up.com)).)

J. Rail Sections

See UPRR STD DWGs 0701–0724. (See Standard Drawing Index for rail sections (Standard Drawing Index.xls (up.com)).)

K. Joint Bars, Transition Rails, Bolts, and Accessories

(1) Joint Bars

See UPRR STD DWGs 0901–0905. (See Standard Drawing Index for specific joint bars (Standard Drawing Index.xls (up.com)).)

(2) Transition Rails

See UPRR STD DWGs 0920–0928. (See Standard Drawing Index for specific transition rails (Standard Drawing Index.xls (up.com)).)

(3) Bolts and Accessories

See UPRR STD DWGs 0940–0942. (See Standard Drawing Index for specific bolts and accessories (Standard Drawing Index.xls (up.com)).)

L. Frogs and Frog Components

(1) General Information

See UPRR STD DWGs 3000, 3005, 3010, 3011, 3020–3022, and 3030. (See Standard Drawing Index for specific general information (Standard Drawing Index.xls (up.com)).)

(2) Rail Bound Manganese (RBM) Frogs

See UPRR STD DWGs 3040, 3042, 3044, 3050, 3060, 3062, 3070, 3072, 3080, 9082, 3090, and 3092. (See Standard Drawing Index for RBM frog plans (Standard Drawing Index.xls (up.com)).)

(3) Self-Guarded Frogs

See are UPRR STD DWGs 3200, 3202, 3210, 3215, 3220, and 3222. (See Standard Drawing Index for self-guarded frog plans (Standard Drawing Index.xls (up.com)).)

(4) Spring Rail Frogs

See UPRR STD DWGs 3305, 3310, 3315, 3320, 3330, 3350, 3355, 3360, and 3360. (See Standard Drawing Index for spring rail frog plans (Standard Drawing Index.xls (up.com)).)

(5) Movable Point Frogs

See UPRR STD DWGs 3400, 3310, 3315, 3410, 3420, and 3430. (See Standard Drawing Index for movable point frog plans (Standard Drawing Index.xls (up.com)).)

(6) Guard Rails

See UPRR STD DWGs 4001–4011. (See Standard Drawing Index for guard rail frog plans (Standard Drawing Index.xls (up.com)).)

M. Switches and Switch Components

(1) Switch Plans

See UPRR STD DWGs 1600, 1610, 1620, and 1800. (See Standard Drawing Index for specific switch plans (Standard Drawing Index.xls (up.com)).)

(2) Switch Points

See UPRR STD DWGs 1300, 1307, 1310, 1315-1318, 1320, 1325, 1330, 1335, 1340, 1351–1354, 1605, 1615, and 1621. (See Standard Drawing Index for specific switch points (Standard Drawing Index.xls (up.com)).)

(3) Stock Rails

See UPRR STD DWGs 1400, 1405, 1410, and 1490. (See Standard Drawing Index for specific stock rails (Standard Drawing Index.xls (up.com)).)

(4) Switch Plates

See UPRR STD DWGs 1525, 1540–1542, 1550, and 1625. (See Standard Drawing Index for specific switch plates Standard Drawing Index.xls (up.com)).)

(5) Hallow Steel Ties

See UPRR STD DWGs 1570–1572. (See Standard Drawing Index for hallow steel ties (Standard Drawing Index.xls (up.com)).)

(6) Switch Stands, Targets, and Rods

See UPRR STD DWGs 2100, 2103, 2105, 2107, 2115, 2120, 2132, 2134, 2136, 2138, 2140, 2150, 2155, 2160, 2170, 2190, 2195, and 2165. (See Standard Drawing Index for specific switch stands, targets, and rods (Standard Drawing Index.xls (up.com)).)

(7) Switch Rollers and Plates

See UPRR STD DWGs 2200, 2210, 2230, and 2240. (See Standard Drawing Index for specific switch rollers and plates (Standard Drawing Index.xls (up.com)).)

N. Turnouts and Turnout Components

(1) Turnout and Crossovers General Information

(a) Turnout Applications: UPRR STD DWG 0080 (0080-Default (up.com))

(b) 20’ Track Centers Needed for Crossovers: UPRR STD DWG 0080 (0080-Default (up.com))

(c) Nomenclature for Most Turnouts: UPRR STD DWG 5001 (5001.dgn (up.com))

(d) Specifications for:

i. Facing point turnout distances shall meet requirements of UPRR STD DWG 0017 (0017.dgn (up.com)).)

ii. Edge-of-crossing to point-of-switch shall be greater than 120' (300' is preferred). (See Public Projects Check Sheet.xlsx (up.com).)

iii. Point-of-tangent to point-of-switch or point-of-frog shall be 200' or greater per UPRR STD DWG 0018.

iv. Distance between point-of-switch and bridge abutment must be a minimum of 500' when diverging track does not cross the bridge. Distance may be reduced to 100' if the bridge has a walkway and handrail.

v. Distance between point-of-switch and bridge abutment must be a minimum of 300' when diverging track does cross the bridge. (See Public Projects Check Sheet.xlsx (up.com).)

(2) Wood Turnouts

See UPRR STD DWGs 5007–5032. (See Standard Drawing Index for specific wood turnout layouts (Standard Drawing Index.xls (up.com)).)

(3) Crossover Layouts

See UPRR STD DWGs 5030–5035 and 5060–5065. (See Standard Drawing Index for specific crossover layouts (Standard Drawing Index.xls (up.com)).)

(4) Steel Tie Turnouts

See UPRR STD DWGs 5040–5042. (See Standard Drawing Index for specific steel tie turnouts (Standard Drawing Index.xls (up.com)).)

(5) Concrete Turnouts

See UPRR STD DWGs 5050–5057. (See Standard Drawing Index for specific concrete turnouts (Standard Drawing Index.xls (up.com)).)

(6) Turnout Plates

See UPRR STD DWG 1500, 1505, 1510, 1515, 1520, 1640, 1645, 1655, and 1660. (See Standard Drawing Index for specific turnout plates (Standard Drawing Index.xls (up.com)).)

(7) Insulated Gauge Plates

See UPRR STD DWGs 1670–1674, 1680, 1681, 1685, 1687, 1700–1707, 1709, 1715, 1720, 1725, 1730, 1740, and 1799. (See Standard Drawing Index for specific insulated gauge plates (Standard Drawing Index.xls (up.com)).)

(8) Derails

Permanent derail types, installation, and instructions are shown in UPRR STD DWGs 2000, 2003, 2007–2009, 2020–2022. (See Standard Drawing Index for specific permanent derail types (Standard Drawing Index.xls (up.com)).)

San Joaquin
Joint Powers Authority

San Joaquin
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CHAPTER 3

CIVIL

CHAPTER 3 – CIVIL

3.1 GENERAL

The Designer shall design all street improvement work necessary for construction of the Project, including: subgrade, structural pavement section, pavement overlay (where appropriate), curbs, gutters, and medians; curb ramps and curb cuts; sidewalks; driveways; on-street parking; off-street parking, bus pads, and loading zones; streetlights; traffic signs and striping; traffic signals, signal communications, and surveillance; noise barriers, settlement, and vibration mitigation (as required).

3.2 REFERENCES, STANDARDS, REGULATIONS, CODES, GUIDELINES

3.2.1 Industry

A. *North American Datum of 1983* (NAD 83)

B. *North American Vertical Datum of 1988* (NAVD 88)

C. Standard Specifications for Public Works Construction (Green Book) and *Standard Plans for Public Works Construction*

D. American Concrete Institute (ACI) 318, *Building Code Requirements for Reinforced Concrete*

E. ACI 322, *Building Code Requirements for Structural Plain Concrete*

F. AASHTO *Policy on Geometric Design*

G. AASHTO *Standard Specifications for Highway Bridges* (most recent edition, with current supplements)

H. AASHTO *Manual for Maintenance Inspection of Bridges* (most recent edition, with current supplements)

I. AASHTO *Guide Specifications for Structural Design of Sound Barriers*

J. AASHTO *LRDF Bridge Design Specifications* (most recent edition, with current supplements)

K. AREMA *Manual for Maintenance Inspection of Bridges*

L. AISC *Manual of Steel Construction*

M. AISC Code, *Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings*

N. National Fire Protection Association (NFPA) *Code for Safety to Life in Buildings and Structures*

O. NFPA *Standards for Fixed Guideway Transit Systems*

P. National Forest Products Association *National Design Specification for Wood Construction*

Q. National Ocean Survey

R. Crime Prevention Through Environmental Design (CPTED)

3.2.2 Federal, State, Local

A. U.S. Department of Transportation's *Transportation for Individuals with Disabilities: Final Rule*

B. 2010 U.S. Department of Justice's *Americans with Disabilities Act (ADA) Accessibility Guidelines* (ADAAG)

C. U.S. Department of Commerce, National Oceanic and Atmospheric Administration's National Ocean Survey

D. Environmental Protection Agency (EPA)

E. National Pollutant Discharge Elimination System (NPDES)

F. California State Plain Coordinate System

G. California Department of Transportation (Caltrans)

(1) Bridge and Structure Construction Manuals

(2) Bridge Design and Seismic Manuals

(3) *Corrosion Guidelines*

(4) Federal Highway Administration (FHWA) *Manual on Uniform Traffic Control Devices* (MUTCD)

(5) *Highway Design Manual*

H. California Building Standards Code (2019 California Code of Regulations (CCR), Title 24)

I. California Green Building Standards Code, Part 11 (2019 California Code of Regulations (CCR), Title 24)

J. CCR Title 24, *Amendments to the International Fire and Safety Code*

3.2.3 Stakeholders

A. SJRRC

(1) Facilities Maintenance

(2) Safety, Security and Environmental Services

(3) Operations

B. External

(1) Local Jurisdiction Planning and Building Departments

(2) Local Jurisdiction Traffic Engineers

(3) Local Jurisdiction Public Works Departments

(4) Union Pacific Railroad (UPRR)

(5) Amtrak

3.3 CRITERIA / APPLICATION

3.3.1 General

Unless otherwise specified, all civil design, including road and street design, shall be in accordance with the current specifications and design guidelines of the involved local jurisdictions. For those cases where the local jurisdictions have no design guidelines, the California Department of Transportation (Caltrans) *Highway Design Manual* and a *Policy on Geometric Design of Highways and Streets* by the American Association of State Highway and Transportation Officials (AASHTO) shall be used.

3.3.2 Control Points

A. Horizontal Control

The horizontal control for all elements and facilities shall be referenced to the survey baseline control points established for the project. The coordinates for control points, mapping, and construction stakeout will be based on a Local Plane Coordinate System (LPCS) referenced to The *North American Datum of 1983* (NAD 83). All surveys are to be conducted in accordance with second order standards, as specified by the National Ocean Survey publications; and *Classification, Standards of Accuracy and General Specifications of Geodetic Control Surveys*.

B. Vertical Control

The vertical control for all elements and facilities shall be based upon the *North American Vertical Datum of 1988* (NAVD 88).

C. Surveys

Surveys that are primarily aerial-based, shall be confirmed by land-based surveys, with particular attention to areas that are forested and highly vegetated and areas that include sensitive design elements, such as retaining walls, bridges, abutments, etc.

3.3.3 Street Design

A. General

Unless otherwise specified, all road and street design shall be in accordance with the current specifications and design guidelines of the involved local jurisdictions. For those cases where the local jurisdictions have no design guidelines, the Caltrans *Highway Design Manual* and an AASHTO *Policy on Geometric Design of Highways and* Streets shall be used.

Roadway Geometry: All roadway geometric elements shall be designed according to the applicable codes and standards of the Authority Having Jurisdiction (AHJ). These include horizontal alignment, vertical alignment, super elevation, cross slopes, lane widths, shoulder widths, medians, driveways, sidewalks, curb return radii, crosswalks, curbs and gutters, clear zones, side slopes, and cut-and-fill slopes.

All roadway sections of public streets shall conform to the current specifications and standards of the involved local jurisdictions. In a case where the local jurisdictions have no codes or standards, the Caltrans Hi*ghway Design Manual* and AASHTO *Policy on Geometric Design* shall be followed.

(1) Horizontal Geometry

All horizontal alignment of public streets shall conform to the current specifications and standards of the involved local jurisdictions. In a case where the local jurisdictions have no codes or standards, the Caltrans *Highway Design Manual* and AASHTO *Policy on Geometric Design* shall be followed.

(2) Vertical Geometry

All vertical geometric curves of public streets shall conform to the current specifications and standards of the involved local jurisdictions. In a case where the local jurisdictions have no codes or standards, the Caltrans *Highway Design Manual* and AASHTO *Policy on Geometric Design* shall be followed.

(3) Superelevation and Cross Slope

(4) Roadway Alignments

Roadway alignments shall be designed for the City functional classifications, and specified design speeds shall determine the required functional classification, posted speed, and design speed. The Proposed Roadway Design Data shall be submitted to the AHJ for review, comment, and approval.

(5) Vertical Clearances

Designer shall provide vertical clearances in accordance with the requirements of the AHJ of the facility being crossed or the project requirements, whichever is more restrictive.

(6) Typical Sections

Typical sections of each street are shown in the Project Drawings, with limits of new structural pavement section and pavement overlay depicted schematically. Developer shall determine exact limits of new structural section after careful consideration of roadway profile, location and consistency of new crown, conformance to adjoining infrastructure, cross-slopes, and maintenance of traffic during construction.

3.3.4 Traffic Control Devices

A. Curb markings, signs, and striping used access roads and parking lots shall be standard facilities as required by the latest edition of the CA-MUTCD.

B. Paint materials and striping details, including standard pavement marking, striping with markers, striping transitions, and crosswalk detail, shall be obtained from AHJ standard plans and drawings and shall comply with current federal and state accessibility regulations. Where AHJ standards are not available, follow CA-MUTCD.

3.3.5 Vehicular Entrances at Station Sites

A. Vehicular entrances to station sites shall be in accordance with the following:

(1) Vehicular entrances from public streets shall be from minor streets where possible, with provisions for sufficient stacking space provided at intersections with major streets.

(2) Entrances, where feasible, should be so located that a vehicle approaching the station from any direction, missing one entrance, will find a second available without circuitous routing.

(3) The number of vehicular entrances along any one street shall be minimized. Entrances shall be at least 150 feet apart. Sufficient number of entrances shall be provided so that the volume per lane entering station sites does not exceed 300 vehicles per hour.

3.3.6 Site Work

A. Minimum grades, maximum grades, and cross-slopes for parking lots, driveways, ramps, ADA facilities, and access roads shall conform to AHJ standards and criteria and Title 24 standards.

B. Accessible parking spaces shall be located at an optimum location and via the shortest and most accessible route within the parking lot.

C. Vertical clearances shall be per AHJ standards or other city-accepted criteria.

D. Developer shall determine the curb return radii required to facilitate all vehicular turning movements within the site, but shall not provide any curb return radius less than minimum allowed.

E. Cut-and-fill slopes shall be as flat as possible and shall not exceed a slope of 2:1 (horizontal to vertical) or as recommended by Developer's geotechnical consultant. Tops of cut slopes shall be rounded.

3.3.7 Parking

A. Parking lot space sizes, drive aisles, grades, and required spaces shall conform to the AHJ Municipal Code and Standards.

B. Other required designated parking stalls, per the *California Green Building Code*, shall be incorporated into the parking lot design, such as parking for clean air vehicles and bicycles and charging for electric vehicles (EVs).

C. ADA spaces shall be provided per AHJ Municipal Code.

D. Designer shall verify compliant emergency access with the fire AHJ for all parking lot areas.

3.3.8 Drop-Off/Pick-Up Facilities

A. The required design capacity for a station shall be determined by Designer and will be based on the individual requirements of each station.

B. Drop-off/pick-up facilities shall be located off-street, in a parking lot/station site; shall be as near to the station plazas as practicable; and shall be physically separated so as not to appear as an integral part of long-term parking areas within the parking lot or parking structure.

C. Drop-off/pick-up loading is preferred on the right-hand side of the car. The location should, if possible, be such that a driver can view the station entrance to see an exiting passenger for whom they are waiting.

D. An accessible parking area for persons waiting to pick up persons with disabilities shall be provided as required by installing appropriate pavement markings and signs per MUTCD standards requirements.

E. All drop-off/pick-up parking spaces shall be delineated by signs or curb markings as being limited to short-term use.

F. Drop-off/pick-up parking stalls shall be 9 feet wide and 18 feet long.

G. All loading and unloading areas need to be properly marked with signage and curb markings indicating short-term parking for drop-off/pick-up only.

3.3.9 Clearance to SJRRC Facilities

The design of public streets adjacent to SJRRC facilities shall not compromise clearances related to the construction of SJRRC stations.

3.3.10 Pavements

All pavement in public streets shall be in conformance with the current specifications and practices of the involved local jurisdictions. In a case where the local jurisdictions have no codes or standards, Caltrans *Highway Design Manual* shall be followed.

A. Restored pavements shall conform to widths prevailing prior to construction or to current design standards of the local jurisdiction. All elements shall be provided in accordance with the requirements of the AHJ.

(1) Resurfacing

Designer may match existing cross slopes when resurfacing (or milling and resurfacing) existing roadways that are not reconstructed, provided there are no existing drainage or safety issues and the cross slope is a minimum of 1.5% or meets requirements of the AHJ. Maintain ingress and egress to all private properties.

(2) Overlay

Opportunities to overlay existing pavement, in lieu of full replacement, should be considered to minimize cost, provided agreement to overlay is reached with the AHJ over the street work.

B. Modification to Existing Streets

Developer shall identify the necessary limits of Work on roadways and streets to meet the requirements of the Project.

C. Bus stops disturbed by construction shall be reconstructed.

3.3.11 Traffic Signals

A. Codes and Standards

All relocations, temporary or permanent, and restoration of traffic signal facilities shall be in accordance with the practices of the involved local jurisdictions. In the case where the local jurisdictions have no standards, the MUTCD (as modified by the State of California) shall be followed.

B. New and Existing Signal Installations

All intersections of public streets with SJRRC facilities shall be signalized. New traffic signal installations shall provide for all required auto movements, in addition to signal preemption that may be required. All existing signals shall be modified to accommodate any revisions to auto movements and signal preemption for trains, where required. All revisions shall be compatible with the involved local jurisdiction's traffic signal control program.

3.3.12 Signs and Striping

All signs and striping in public streets shall be in conformance with the current specifications and practices of the involved local jurisdictions. In a case where the local jurisdictions have no standards, the MUTCD (as modified by the AHJ) shall be followed.

3.3.13 Ramps and Curb Ramps

A. Curb Cut Locating

The Designer shall obtain from the local jurisdiction or proper authority the locations of curb cuts.

B. Curb Ramps

(1) Curb ramps shall be constructed per AHJ standards and *ADA Accessibility Guidelines* (ADAAG), 2010 Edition and Title 24, California Code of Regulations Part 2, *Regulations for the Accommodation of the Disabled in Public Accommodations*.

(2) Curb ramps shall be provided at all corners affected by new construction at public streets. All curb ramps shall include detectable warning surface strips in compliance with AHJ standards. No pull boxes or access items (e.g., electrical, signal, water, etc.) that violate ADA standards shall be allowed within ramp areas. Designer shall verify that existing curb ramps within project limits meet ADA standards.

(3) Detectable Warnings

Detectable warnings shall be installed at all curb ramps. Within SJRRC jurisdiction, detectable warnings shall be per SJRRC Directive Drawings. All other locations shall include detectable warning material that conforms to the current specification and standard of the local jurisdiction.

(4) Design Grades

The grade of ramps and separated pathways should not exceed 4.8%. A maximum design grade of 14:1 (7.1%) is acceptable for a rise of no more than 2.0 feet, if a level landing at least 5 feet long is provided at each end.

(5) Cross-Slope

The maximum design cross slope for a walkway is 1.7%. At driveways, curb cuts, and crosswalks, a 3-foot-minimum-wide area must be maintained at 1.5%.

3.3.14 Drainage

A. General

Drainage design shall be in accordance with the standards and practices of the agency in whose jurisdiction each project or section of a project falls. In a case where the local jurisdictions have no codes or standards, Caltrans standards shall be followed.

B. Drainage Facilities Design

(1) Unless otherwise provided, drainage channels, culverts, and storm sewers shall be designed in accordance with the procedures specified in Caltrans's *Hydraulic Design Manual*. Surface runoff calculation and pipe hydraulic design shall comply with AHJ design criteria and requirements, depending on the facilities ownership.

(2) Drainage design of areas that are to be constructed beyond existing right-of-way (ROW), including stations, station plazas, parking lots, and ancillary spaces, but exclusive of realigned roadways, shall be subject to local jurisdictions' Low Impact Development (LID) Standards. Designer is responsible for coordinating LID projects with the local Water Quality Control Board.

(3) Designers shall ensure that the proposed drainage design conforms to the existing drainage pattern. Designer shall determine the incremental change of stormwater runoff for each individual watershed within the project limits and document that change in a Drainage Report for AHJ review and approval.

(4) All new culverts crossing beneath trackbeds shall be capable of passing the peak runoff from a 50-year storm without inundation of the trackbed. Inundation of the trackbed is defined as a water level above the top of subballast. Storm sewers shall be designed for 10-year storm frequency, except sewer outfalls that carry water from main line sags, which shall be designed for 25-year storm frequency.

(5) Minimum velocities in pipes, culverts, and concrete-lined channels shall be 3.0 feet per second.

(6) A minimum of 4'-6" clearance is required from the top of trackbed to the top of all track drainage pipes or casings beneath the trackbed, unless otherwise approved by UPRR.

(7) Underdrains (non-trackway) shall consist only of perforated concrete or perforated plastic pipe at least 6 inches in diameter for lengths less than 500 feet and at least 8 inches in diameter for lengths greater than or equal to 500 feet. The perforated pipe shall be surrounded by a minimum of 4 inches of gravel drain material and placed a minimum of 12 inches below subgrade. The underdrain system shall also be wrapped with filter fabric (minimum weight 4 oz/sq. yd) by placing the fabric between the gravel drain material and the surrounding soil.

(8) Necessary replacements of existing storm sewers and appurtenances shall provide services equivalent to existing facilities.

(9) Alterations to a roadway as a result of Project construction activities, or roadway realignment, may require modification of public storm drain facilities, including curb inlets, catch basins, and conveyance pipelines. All altered storm drain infrastructure in the public ROW shall meet the most recent drainage requirements of the AHJ, which may call for upsizing of existing facilities on-site or the addition of entirely new drainage facilities on-site. Any required upsizing of existing drainage facilities downstream of the project limits is beyond the scope of the Project.

(10) Services to adjoining properties shall be maintained by supporting in-place, by providing alternative temporary facilities, or by diverting to other points.

(11) Alterations to existing LID or Stormwater Best Management Practices elements as a result of Project construction activities shall be kept to a minimum. When necessary, Designer shall relocate, modify, retrofit, and reconnect these elements to maintain their original functionality and drainage pattern.

(12) All concrete storm sewer and culvert pipes shall be Class III or better concrete pipe (or equivalent), except pipes crossing under the trackway. At UPRR undercrossings, conveyance pipes shall be protected with ductile iron or steel casings per typical UPRR standards.

(13) Drainage structures for parking lots shall be selected from the standard storm drain details of the AHJ. Inlet structures shall not be placed adjacent to bus pads, on-site bus stops, or in anticipated passenger pick-up zones.

(14) A sufficient number of inlets shall be provided to intercept the surface drainage. Inlets on grade shall be designed to intercept at least 85% of the design flow. Inlets in sump areas shall be designed to intercept 100% of the design flow or as required by the AHJ, whichever is more stringent.

(15) Design or replacement of storm sewers for areas of less than 50 acres shall be based on the following Rational Method for computing runoff:

$$\mathbf{Q = CIA}$$

Where Q = Capacity, not less than that of line replaced

C = Coefficient of runoff as per Table 3-1

A = Area (sq ft)

I = Intensity (inches per hour)

(16) Table 2-1 – Runoff Coefficients

(a) For urban catchments that are not complex and are generally 160 acres or less in size, it is acceptable that the design storm runoff be analyzed by the Modified Rational Method.

(b) Design of storm sewers for basins beyond these limits shall utilize the higher-volume Soil Conservation Service (SCS) method, (a.k.a. NRCS).

Table 3-1: Runoff Coefficients

Percentage Imperviousness	Type C and D NRCS Hydrologic Soil Groups					
	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
0%	0.04	0.15	0.25	0.37	0.44	0.50
5%	0.08	0.18	0.28	0.39	0.46	0.52
10%	0.11	0.21	0.30	0.41	0.47	0.53
15%	0.14	0.24	0.32	0.43	0.49	0.54
20%	0.17	0.26	0.34	0.44	0.50	0.55
25%	0.20	0.28	0.36	0.46	0.51	0.56
30%	0.22	0.30	0.38	0.47	0.52	0.57
35%	0.25	0.33	0.40	0.48	0.53	0.57
40%	0.28	0.35	0.42	0.50	0.54	0.58
45%	0.31	0.37	0.44	0.51	0.55	0.59
50%	0.34	0.40	0.46	0.53	0.57	0.60
55%	0.37	0.43	0.48	0.55	0.58	0.62
60%	0.41	0.46	0.51	0.57	0.60	0.63
65%	0.45	0.49	0.54	0.59	0.62	0.65
70%	0.49	0.53	0.57	0.62	0.65	0.68
75%	0.54	0.58	0.62	0.66	0.68	0.71
80%	0.60	0.63	0.66	0.70	0.72	0.74
85%	0.66	0.68	0.71	0.75	0.77	0.79
90%	0.73	0.75	0.77	0.80	0.82	0.83
95%	0.80	0.82	0.84	0.87	0.88	0.89
100%	0.89	0.90	0.92	0.94	0.95	0.96
	TYPE B NRCS HYDROLOGIC SOILS GROUP					
0%	0.02	0.08	0.15	0.25	0.30	0.35
5%	0.04	0.10	0.19	0.28	0.33	0.38
10%	0.06	0.14	0.22	0.31	0.36	0.40
15%	0.08	0.17	0.25	0.33	0.38	0.42
20%	0.12	0.20	0.27	0.35	0.40	0.44
25%	0.15	0.22	0.30	0.37	0.41	0.46
30%	0.18	0.25	0.32	0.39	0.43	0.47
35%	0.20	0.27	0.34	0.41	0.44	0.48
40%	0.23	0.30	0.36	0.42	0.46	0.50
45%	0.26	0.32	0.38	0.44	0.48	0.51
50%	0.29	0.35	0.40	0.46	0.49	0.52
55%	0.33	0.38	0.43	0.48	0.51	0.54
60%	0.37	0.41	0.46	0.51	0.54	0.56
65%	0.41	0.45	0.49	0.54	0.57	0.59
70%	0.45	0.49	0.53	0.58	0.60	0.62
75%	0.51	0.54	0.58	0.62	0.64	0.66
80%	0.57	0.59	0.63	0.66	0.68	0.70
85%	0.63	0.66	0.69	0.72	0.73	0.75
90%	0.71	0.73	0.75	0.78	0.80	0.81
95%	0.79	0.81	0.83	0.85	0.87	0.88
100%	0.89	0.90	0.92	0.94	0.95	0.96

(c) The velocity of flow in storm sewers shall be no less than 3.0 feet per sec, as determined by Manning's Equation:

$$V = \frac{1.486}{n} R^{2/3} S^{1/2}$$

Where V = Velocity of flow (feet per sec)

R = Hydraulic radius (feet)

S = Slope of total head line (feet/feet) (min. = 0.5%)

n = Manning roughness coefficient

Table 3-2 gives values of n for various pipe and tunnel materials. SJRRC prefers use of landscape-type treatment facilities (e.g., bio-infiltration swales) for stormwater quality facilities when these can be designed to meet jurisdiction, site, and project requirements. If landscape-type facilities are not appropriate, and proprietary devices using replaceable media cartridges are specified, a 2-year maintenance contract for these devices shall be included in the project requirements.

(17) Table 2-2: Manning Roughness Coefficients

Table 3-2: Manning Roughness Coefficients

Condition	Manning's n Range
I. Closed conduits:	
A. Concrete pipe	0.011-0.013
B. PVC (polyvinyl chloride)	0.010
C. HDPE (high density polyethylene)	0.010
II. Gutters and tunnel inverts	
A. Concrete gutter, troweled finish	0.012
B. Asphalt pavement:	
1. Smooth texture	0.013
2. Rough texture	0.016
C. Concrete gutter with asphalt pavement:	
1. Smooth	0.013
2. Rough	0.016
Condition	**Manning's n Range**
D. Concrete pavement:	
1. Float finish	0.014
2. Broom finish	0.016
E. For gutters with small slope, where sediment may accumulate, increase above values of n by 0.002	

NOTE: For a complete listing of Manning Roughness Coefficients and related 'n' ranges, refer to the California State Highway Division Hydraulics Manual, Appendix A, Table 1.

3.3.15 Erosion and Sedimentation Control

A. Goal for Erosion Control

Design erosion control to reduce negative impacts on water and air quality.

B. Specific Requirements for Erosion Control

(1) Develop a site sediment and erosion control plan that conforms to best management practices in the EPA's Storm Water Management for Construction Activities, EPA Document No. EPA-833-R-92-001, Chapter 3, OR local erosion and sedimentation control standards and codes like those recommended by California Department of Environmental Quality (DEQ), whichever is more stringent. The plan must achieve the following benefits:

(a) Prevent loss of soil during construction by stormwater runoff and/or wind erosion, including protecting topsoil by stockpiling for reuse; and

(b) Prevent sedimentation of storm sewer or receiving streams and/or air pollution with dust and particulate matter.

(2) The EPA standard lists numerous measures, such as silt fencing, sediment traps, construction phasing, stabilization of steep slopes, maintaining vegetated ground cover, and providing ground cover, that will meet this prerequisite. Also see *Design Criteria*, CHAPTER 6 – LANDSCAPING.

(3) Investigate the use of "green manures" for erosion control and site topsoil improvements. Green manures are plants, usually nitrogen-fixing, that can be installed for erosion control and, then, tilled into the soil as an amendment where landscapes will be installed. Designers shall thoroughly document permit agency approval in advance of this approach being specified for jurisdictionally-required erosion control.

(4) Investigate the use of "compost berms" to meet erosion control requirements. These berms can be used for amendment of landscape area topsoil when erosion control is no longer necessary. Consultants shall thoroughly document permit agency approval in advance of this approach being specified for jurisdictionally-required erosion control.

3.3.16 Fencing

UPRR generally requires the use of fencing along the ROW. Fencing shall be designed with pickets not less than 4" apart or with mesh or fabric with openings of not more than 2" wide to make the fence "non-climbable." Fencing is to serve either one or both of the two purposes described below. Refer to SJRRC Directive Drawings for details.

A. Safety

Some form of fencing (chain link, wood, vinyl, chain and bollard, etc.) may be appropriate in situations where train speed, pedestrian activity, fall protection, or the presence of children, may be a factor. In this application, the fencing may act as a guide to pedestrians/bicyclists to follow certain routes or otherwise discourage access to a given location. Fencing for this application can vary from 3'-6" to 6'-0" in height depending on the location. Areas where pedestrian visibility is desirable, such as an approach to a pedestrian/UPRR crossing, a fence height of 3'-6" is appropriate. Since all situations are unique, the applicability of fencing in these circumstances shall be reviewed by the SJRRC Safety and Security Committee (SSC) for concurrence.

B. Security

Some form of fencing may be deemed appropriate as a barrier to prevent access to a given location. A typical example of a security fence is a chain link fence surrounding a SJRRC operations and maintenance facility. Fencing for this application can vary from 6’-0” to 8’-0” in height depending on the location. In these situations, SJRRC will generally provide guidance to the designer regarding the type of security fencing required.

3.3.17 Site Security Considerations

Sidewalks should be separated from the street by planter strips, street trees in tree grates, and/or on-street parking to provide pedestrian safety and enhance the pedestrian experience. Refer to *Design Criteria*, CHAPTER 6 – LANDSCAPING for specific buffer criteria.

A. Sidewalks and street design should provide the most direct route possible to and from the station or park-and-ride facility.

B. A minimum of two routes into and out of the facility should be provided for pedestrians.

C. Sidewalks must be at least five feet wide to allow two people to pass and to meet ADA requirements, with six-foot to eight-foot minimums being more desirable, depending on the context.

D. Street lighting must be provided per AHJ design standards. In a case where the local jurisdictions have no codes or standards, the Caltrans *Highway Design Manual shall* govern.

E. Signage and information systems at corners are necessary to provide convenient direction.

F. At parking facilities, a perimeter security fence shall be provided per SJRRC directive drawings. The height of the fence shall be a minimum of 6’.

San Joaquin
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CHAPTER 4

UTILITIES

CHAPTER 4 – UTILITIES

4.1 GENERAL

This section establishes design standards for the relocation, adjustment, and abandonment of existing utilities and the installation of new utilities within SJRRC right-of-way (ROW). No new or existing utilities shall be located within the UPRR trackway or within the limits of track pavement without permission from UPRR. Exceptions are for the purpose of crossing the tracks, but only with permission from UPRR, as evidenced by an executed license agreement.

For new rail alignments proposed in existing railroad ROW or other areas with existing underground utilities, SJRRC's Project Manager (PM) shall work with the designers, local jurisdictions, and utilities to develop cost-effective design solutions that may not require full utility relocations. Final design shall be based upon design solutions agreed upon by primary stakeholders.

4.2 REFERENCES, STANDARDS, REGULATIONS, CODES, GUIDELINES

4.2.1 SJRRC

4.2.2 Industry

A. APWA *Utility Color Standards*

4.2.3 Federal, State, Local

A. Applicable Jurisdictional Codes

B. California Utility Notification Center's One Call Locate Law

4.2.4 Stakeholders

A. Capital Projects and Construction

(1) Real Property

B. Operations

(1) Maintenance-of-Way

4.3 CRITERIA / APPLICATION

4.3.1 Utility Work – General

A. General Design Guidelines

The following general design guidelines shall be followed for all utility work:

(1) The vertical profile of utilities crossing the UPRR ROW shall be as follows:

(a) Depth of cover under the transit structure within the street shall be as approved by SJRRC and the jurisdiction having authority over the utility.

(b) Vertical clearance over the transit structure within the street shall be as approved by SJRRC and the jurisdiction having authority over the utility.

(2) Specifications and design standards of the various utilities shall be made available for reference through SJRRC.

(3) Utilities include facilities belonging to governmental agencies, public utility corporations, special service districts, private parties (including service lines to adjoining properties), and UPRR utilities.

(4) Utilities encountered or located close enough to be affected by transit construction shall be handled in one of the following ways:

(a) Protected and maintained in operation during construction;

(b) Temporarily relocated and maintained in operation during construction;

(c) Temporarily relocated and maintained and, upon completion of transit facilities, replaced by a new utility; or

(d) Permanently relocated to a new location beyond the immediate limits of transit construction. Preferably, this option would be implemented prior to Valley Rail construction.

(5) Utility service to adjacent property shall not be interrupted and, if temporarily relocated, shall be restored upon completion of work.

(6) Replacements for any existing utilities, including governmental, public, and privately-owned facilities, shall be designed to provide service equal to that offered by the existing installations. No betterments shall be included, unless specifically approved by SJRRC; such betterments shall be paid for by the utility owner, as evidenced by an executed agreement.

(7) The performance requirements in this section govern the maintenance of service during construction, support, restoration, design, and construction of utilities encountered by, or affected by, the construction of the Project. The performance of utility-related work shall consider the needs of the proposed transit system, the requirements and responsibilities of the utility organizations, traffic-handling and construction requirements, and any cooperative agreements between the utilities and the Project or ROW owners.

(8) Utilities affected or threatened by the proposed Project construction will be either protected-in-place (PIP), relocated, or temporarily relocated.

(9) Utility services to abutting properties shall not be interrupted unless agreed upon by the utility, and, if relocated, service shall be restored prior to the completion of Project work.

(10) The replacement of any existing utilities shall be designed to at least meet the current capacity. Designers shall comply with local codes and standards of the Authorities Having Jurisdiction (AHJs). Improvements to facilities shall not be included, unless specifically agreed upon by the owner and utility.

(11) All design concerning the maintenance of service, support, or relocation of utilities shall conform to all applicable specifications, criteria, and standard drawings of the relevant utilities and public/private agencies.

(12) Design of all utility rearrangements shall ensure that construction of the proposed Project is able to proceed without undue hindrance and without unnecessarily altering the continuity of service.

(13) When designing vertical alignments for utility rearrangements, Designer shall consider the maintenance of service and accessibility needs of the utility owner.

(14) Utilities that penetrate through or cross over proposed transit structures shall be designed to prevent shear failure and shall be encased as necessary to prevent damage. Encasements shall comply with all relevant standards and design requirements.

(15) All existing pipes that run under new construction shall be modified as necessary to support the additional loading.

(16) Utility designs with corrosion concerns shall be coordinated with any applicable corrosion control, in accordance with each utility owner's corrosion control practices and provisions.

(17) Pipelines crossing underneath the rail tracks carrying water or pressurized storm or sanitary sewage shall be cased.

(18) Pipelines that carry flammable materials, such as natural gas, oil, and fuel, and that cross underneath the rail tracks do not need to be cased. If casing pipe is installed, it shall be vented and approved on a case-by-case basis by UPRR and SJRRC.

(19) Casing pipes shall be designed to withstand UPRR loadings and, if metallic, they shall be protected against corrosion. The end of casing pipes shall be sealed and the annular space between the carrier pipe and the casing pipe shall be filled with sand. When casings are bored or augured under UPRR tracks, provisions shall be made to ensure no voids are created.

(20) Minimum cover for utilities trenched under proposed UPRR tracks is 6'-0" below top-of-rail or as approved by the UPRR engineer.

(21) Minimum cover for utilities augured or pushed under existing UPRR tracks is 7'-0" below top-of-rail or as approved by the SJRRC engineer

(22) Minimum cover for utilities directionally drilled under existing UPRR tracks is 10'-0" below top-of-rail or as approved by the SJRRC engineer

(23) Where possible, all utilities shall cross beneath the UPRR ROW at 90º angles or perpendicular to the UPRR centerline.

(24) New or replacement non-SJRRC utilities that run longitudinally adjacent to the UPRR ROW, unless otherwise approved by SJRRC, shall be located a minimum of 10 ft from the centerline of track to the near edge of longitudinal pipe.

(25) All non-metallic UPRR utilities pipes or casings shall have tone wires that terminate in a handhole to facilitate locating buried pipes.

(26) All non-metallic utility pipes or casings that cross the UPRR ROW shall have tone wires that terminate in a handhole to facilitate locating buried pipes.

(27) All abandoned pipes beneath the trackbed shall be plugged and filled with sand or CDF (controlled density fill) or low-strength concrete slurry, unless otherwise approved by SJRRC.

(28) Overhead utilities that cross the rail ROW, shall cross as close to perpendicular as possible. Vertical clearance shall be as approved by SJRRC and will have to account for the UPRR.

(29) If overhead utilities already exist in the UPRR ROW, their relocation is not mandatory as long as minimum clearance can be maintained to the overhead catenary wires, as required by the National Electric Safety Code. Note, the minimum clearance is 4'-0", but it may be more depending on the voltage of the overhead utility. If new overhead utilities are proposed in the UPRR ROW, they must be installed with a minimum of 10'-0" clearance to the overhead catenary wires, as required by the Occupational Safety and Health Administration (OSHA).

B. Coordination

The Design Consultant will coordinate the relocation design between SJRRC and impacted utility owners. Generally, a design review and utility-coordination process will be as follows:

(1) Preliminary drawings of each utility's preferred relocation alignments and requirements will be prepared by the utility's engineer and/or its consultant and submitted to SJRRC for review. The utility company shall locate and consultant shall pothole utilities, when appropriate, to aid the relocation coordination effort.

(2) SJRRC will review utility relocation requirements and preferred relocation alignment and issue a draft composite utility map showing proposed utility relocation alignments and orientations from various utility agencies.

(3) Each utility will respond to SJRRC with either acceptance of proposed alignments and orientations or submittal of a request for further alteration.

(4) Engineering Consultant will issue a final composite utility map showing utility orientations. The utility's engineer and/or its consultant will then develop the final designs of each utility on this basis.

4.3.2 Sewers

A. Codes and Standards

(1) All relocation, restoration, and construction of sewer facilities shall be in conformance with the current standards and specifications of the responsible local and state jurisdiction or agency and shall comply with other applicable area codes.

(2) All sewer work shall be coordinated through SJRRC with the appropriate local and state jurisdiction or agency.

B. General Design Guidelines

(1) Preliminary and final design of sewer locations shall be by SJRRC's Civil Design Consultant and approved by the appropriate AHJ.

(2) Service to adjoining properties shall be maintained by either supporting-in-place, providing alternate temporary facilities, or by diverting to other points. Necessary replacements of existing sewers and appurtenances shall provide services equivalent to those existing facilities.

(3) No casing pipe is required for gravity sewer pipes crossing the rail tracks, unless requested by SJRRC or the responsible local and state jurisdiction or agency on an as-needed basis. Pressurized sewer pipes crossing the rail tracks shall be cased in a larger diameter casing pipe, per the design standards of the responsible local and state jurisdiction or agency.

(4) All sanitary and storm sewers shall be designed to give mean velocities, when flowing full, of not less than 2.0 fps and 3.0 fps, respectively, based on the following formula:

$$V = \frac{1.486}{n} R^{2/3} S^{1/2}$$

Where V = Velocity of flow (ft per sec)

R = Hydraulic radius (ft)

S = Slope of total head line (ft/ft) (min. = 0.5%)

n = Manning roughness coefficient

4.3.3 Water Lines

A. Codes and Standards

(1) All maintenance, relocation, restoration, and construction of water mains and appurtenances shall be in conformance with the current standards and specifications of the responsible local and state agency and shall comply with other applicable area codes.

(2) All water line work shall be coordinated through SJRRC with the appropriate local and state jurisdiction, agency, or service district.

B. General Design Guidelines

(1) Preliminary and final design shall be by SJRRC's Civil Design Consultant and approved by the AHJ.

(2) Service to adjoining properties shall be maintained by supporting-in-place, providing alternative temporary facilities, or by diverting to other points. Necessary replacement of existing water mains and appurtenances shall provide services equivalent to those of existing facilities.

4.3.4 Gas Lines

A. Codes and Standards

(1) All work related to gas lines shall be designed and performed in accordance with the specifications and standards of the utility owner.

(2) All gas work shall be coordinated through SJRRC with the appropriate city or county agency.

(3) All relocation, restoration, and construction of gas mains and appurtenances associated with the project shall be the responsibility of the utility owner.

B. General Design Guidelines

(1) Preliminary and final design of gas relocations will be accomplished by the utility owner or by SJRRC's Civil Design Consultant and approved by the utility owner and the AHJ.

(2) Gas service to adjoining properties shall be maintained by either supporting-in-place, providing alternate temporary facilities, or by diverting to other points. Necessary replacements of existing gas lines and appurtenances shall provide services equivalent to the existing facilities.

(3) Replacement gas pipe and casing shall be non-metallic, unless metallic facilities are required for specific engineering purposes. If metallic pipe and casings are utilized, they shall be protected against corrosion.

4.3.5 Electrical Facilities

A. Codes and Standards

All work related to electric power transmission lines (overhead and sub-surface) shall be in accordance with the specifications and standards of the applicable utility owner). All electrical work shall be coordinated through SJRRC with the appropriate city or county agency.

B. General Design Guidelines

(1) Preliminary and final design of electrical relocations will be accomplished by SJRRC's Civil Design Consultant and approved by the utility owner and the AHJ.

(2) Electrical service to adjoining properties shall be maintained by either supporting-in-place, providing alternate temporary facilities, or by diverting to other points. Necessary replacements of existing electrical service shall provide services equivalent to those of existing facilities.

4.3.6 Communications and Cable

A. Codes and Standards

(1) All work related to communication and cable lines shall be in accordance with the specifications and standards of the appropriate company. Companies that may be affected as a result of utility work may include, but are not limited to:

- Qwest
- Comcast Cable
- Verizon (including MCI)
- American Telephone and Telegraph Company (AT&T)
- Sprint
- Others

(2) All communication and cable work shall be coordinated through SJRRC with the appropriate city or county agency.

B. General Design Guidelines

Preliminary and final design of communication and cable relocation will be accomplished by the appropriate company, or by SJRRC's Consultant, and approved by the appropriate communication or cable company and the AHJ. Communication or cable service to adjoining properties shall be maintained by either supporting-in-place, providing alternate temporary facilities, or diverting to other points. Necessary replacements of existing services shall provide services equivalent to those of existing facilities.

4.3.7 Vaults

A. Codes and Standards

All remodeling, abandonment, or other work involving private vaults extending from adjoining buildings into public space shall be in accordance with codes, standards, and practices of the responsible local jurisdiction. All work shall be coordinated through SJRRC with the private vault owners.

B. General Design Guidelines

The Civil Design Consultant shall determine which vaults will be affected by the project. Plans shall show, at a minimum, the following details:

(1) Portions of each vault to be excavated;

(2) New walls required to permit continued use of those vault areas outside of construction limits;

(3) New walls required to accomplish abandonment of vaults;

(4) Work required to restore vaults, including delivery chutes and freight elevators; and

(5) Area available for permanent occupancy upon completion of SJRRC’s work.

4.3.8 Manholes, Handholes, Pull Boxes, Junction Boxes, and Underground Grade Level Enclosures

A. Sizes and drainage design shall meet code and standards requirements. Junction boxes shall be of appropriate NEMA rating and suitable for locations in which they are being installed. All pull boxes shall be UL rated.

B. All manholes, handholes, and pull boxes within roadways, sidewalks, driveways, parking lots, station plaza areas, and other at-grade areas shall be rated for AASHTO H-20 loading.

(1) The size and drainage design of each enclosure, pull box, junction box, underground grade-level enclosure, and maintenance handhole shall comply with NEC code.

(2) Junction boxes shall be stainless steel, of NEMA 4 rating or better for water resistance, and suitable for locations in which they are being installed.

(3) Doors and covers of enclosures used solely as pull boxes, splice boxes, or junction boxes shall be locked, bolted, or screwed on.

4.3.9 UPRR Utilities

A. Codes and Standards

All utilities specifically designed for the UPRR shall conform to the applicable standards, codes, and requirements of the local jurisdiction within which the UPRR utilities are located.

B. General Design Guidelines

Preliminary and final design of the UPRR utilities shall be done by SJRRC's Consultant. Design approvals from the local jurisdictions and public utility agencies shall be coordinated through SJRRC.

San Joaquin Joint Powers Authority

San Joaquin Regional Rail Commission

CHAPTER 5

PARKING FACILITIES

CHAPTER 5 – PARKING FACILITIES

5.1 GENERAL

This section establishes SJRRC's design standards for surface parking lots and bicycle parking facilities. The intent is to design facilities that are safe and efficient for automobiles, bicyclists, and pedestrians. The design shall incorporate features that maximize passive security, i.e., increased lighting levels, visibility, and the elimination of dark corners and confined spaces.

5.2 REFERENCES, STANDARDS, REGULATIONS, CODES, GUIDELINES

5.2.1 SJRRC

A. Civil

B. Utilities

C. Landscape

D. Electrical, Lighting, Communications

E. Signage and Wayfinding

5.2.2 Industry

A. American Association of State Highway and Transportation Officials (AASHTO), *Guide for Design of Pavement Structures*

B. National Fire Protection Association (NFPA) 14, *Standard for the Installation of Standpipe and Hose Systems*

C. National Parking Association, Parking Consultants Council

D. International Plumbing Code (IPC)

E. Association of Pedestrian and Bicycle Professionals (APBP) *Bicycle Parking Guidelines 2nd Edition*

5.2.3 Federal, State, Local

A. 2010 U.S. Department of Justice's *Americans with Disabilities (ADA) Standards for Accessible Design* (ADAAG)

B. State of California

(1) California Building Standards Code (2019 California Code of Regulations (CCR), Title 24)

(2) California Structural Specialty Code

(3) Bicycle and Pedestrian Plan

C. Federal Transit Administration (FTA) *Transit Security Design Considerations*

D. Applicable local zoning codes and ordinances

5.3 CRITERIA / APPLICATION

5.3.1 Functional Design

Functional design includes parking geometrics, stall size, clearances, entrance and exit lane design, vehicle circulation, quick-drop areas, and accessibility.

A. Parking Geometrics

The parking geometric standards used in designing the parking areas shall be based on the recommendations of the Parking Consultants Council of the National Parking Association. The design shall provide no less than a "B" level-of-service (LOS) to all patrons. Alternate parking and traffic configurations must provide a comparable LOS.

B. Stall Size

Stall and aisle dimensions shall conform to local jurisdictional code requirements. Parking spaces shall be no larger than required by the applicable jurisdiction. Compact spaces should be placed in preferential locations to ensure that the first cars to arrive, regardless of size, do not fill the full-sized spaces. Accessible parking space sizes and quantities shall be compliant with ADA requirements. When conflicts arise, the most stringent requirement shall apply. In the event a local jurisdiction does not have code requirements concerning parking, the following requirements shall apply:

(1) The mix of standard and compact size spaces shall not be greater than a 40/60 percent mix of full-size vehicles to compact cars.

(2) The parking geometrics may not be less than the following:

Type of Space	Width	Depth 90°	Depth 60°
Standard Size Spaces	8 ft – 6 in	18 ft – 0 in	14 ft – 6 in
Compact Size Spaces (see NOTE)	7 ft – 6 in	16 ft – 0 in	
Accessible Spaces	9 ft – 0 in	18 ft – 0 in	
Aisle Adjacent Accessible Space	6 ft – 0 in		
Van Accessible Spaces	9 ft – 0 in	18 ft – 0 in	
Aisle Adjacent Van Accessible Space	8 ft – 0 in		

NOTE: Coordinate with the local authority having jurisdiction (AHJ) (i.e., City of Stockton minimum stall size is 8'-6" x 16'-0").

C. Clearances

Maintain adequate clearance at all locations within the parking, driving, and pedestrian areas. At the head of the parking stalls, horizontal clearance shall be 2'-6" in from the front face of the curb to any obstruction. Between stalls and obstructions, no horizontal clearance need be provided except at walls, where a 1'-0" minimum clearance is required.

D. Vehicle Circulation and Lane Widths

(1) The system of traffic circulation produced by the arrangement of parking aisles and stalls shall be designed to minimize vehicle travel distances, conflicting movements, and number of turns. Disperse vehicle movements within the parking area by strategic location of entrances, exits, and aisles. Standards for lane widths and circulation roads shall be per the local jurisdiction. When not specified by the local jurisdiction, lane widths shall be as shown below:

STRAIGHT	one lane	11 ft – 0 in
	multiple lanes	10 ft – 6 in
	at entries and exits	9 ft – 6 in
TURNING	one lane, one-way	13 ft – 6 in
	two lanes, two-way	25 ft – 6 in
TURNING LANE RADIUS	inside edge of pavement or curb	21 ft – 6 in
SINGLE LANE	outside edge of pavement or curb	35 ft – 0 in

(2) Circulation roads within a parking lot may be required where normal aisle standards would provide inadequate circulation.

(a) Two-way circulation roads will be 24 ft wide.

(b) One-way circulation roads will be 18 ft wide.

(c) The minimum vehicular inside turning radius is 16 ft.

(d) The minimum vehicular outside turning radius is 26 ft.

E. Entrance and Exit Lane Design

Design entrances, exits, parking spaces, and internal traffic aisles to provide ease of use and maneuvering. Avoid visual obstructions for all automobile and pedestrian traffic at these points.

(1) Exit lanes shall be designed to operate at no less than a “B” LOS during peak hours.

(2) Entrance and exit lanes shall be designed to accommodate future installation of access control equipment to consist of automatic gates, card readers, and ticket dispensers.

F. Quick-Drop Areas

Quick-drop areas are for drop-off or pick-up only. ADA criteria must be accommodated.

(1) Provide a minimum 10-foot sidewalk along quick-drop spaces with parallel parking.

(2) Provide a minimum 12-foot sidewalk along the head-end of angle or perpendicular quick-drop parking spaces location.

(3) Provide a barrier to direct pedestrian traffic to a designated crossing.

G. Accessibility

(1) Accessible spaces shall be designed to satisfy the requirements of the U.S. Department of Justice's *Americans with Disabilities Act (ADA) Accessibility Guidelines* (ADAAG), International Building Code (IBC), and local jurisdiction guidelines. The more stringent provisions of each shall govern.

(2) In addition, the design must accommodate pedestrians with disabilities, as required under the most current ADA requirements, the IBC, and other applicable codes.

H. Emergency Access

Emergency access through a parking facility shall be as required by the local authority having jurisdiction (AHJ) or local emergency medical services (EMS) provider.

I. SJRRC Maintenance Parking

Wherever practical, provide dedicated parking spaces for maintenance vehicles adjacent to platforms, plazas, utility rooms, and other frequently-maintained items. The number of parking spaces shall be determined by SJRRC.

J. Pedestrians

(1) Pedestrian circulation may use drive aisles. Circulation routes shall provide safe, open sightlines, where vehicle drivers can see pedestrians easily.

(2) Lot layout should be oriented with aisles parallel to pedestrian flows, along the shortest routes to the transit stop.

(3) When parallel aisles are not practical, perpendicular aisles with separate pedestrian sidewalks and crosswalks shall be provided.

(4) Aisles shall be no longer than 400 ft. Aisle length may be limited by offsetting aisles, or by changing the aisle alignment.

(5) Separate pedestrian aisles shall be included in the design as required by the local jurisdiction.

(6) All SJRRC-maintained paths and walkways shall be cast-in-place concrete, concrete unit pavers, or other low-maintenance materials.

(7) Where possible, sidewalks shall be flush walkways in order to minimize ramps and curb cuts.

K. Parking Civil Design

The civil design for vehicle parking includes curbs and medians, drainage and grading, and pavement; the requirements are outlined below**:**

L. Curbs and Medians

(1) Curbs shall be designed and built as specified by the local jurisdiction.

(2) Exposed corners of curbs will have a minimum radius (to face of curb) of 12", or as required by the local jurisdiction.

M. Drainage and Grading

(1) Cross-slope of pavement shall be no less than 1.5% nor more than 3%.

(2) It is preferred that the slope of a parking stall from the head to the back be no greater than 2%.

(3) Direct drainage away from drive aisle and pedestrian circulation routes.

(4) Where possible, primary catch basins should not be located in the aisles. Secondary catch basins may be used within drive aisles at the base of ramps inside of structured parking.

(5) Along roadways near pedestrian paths, design drainage and grading to keep the spread of water flow to a maximum horizontal distance of 2 ft from the face of the curb.

(6) Wherever possible, drainage shall flow into water quality treatment swales. Other water quality treatment methods may be required by the governing jurisdiction. Oil water separators may be required. See *Design Criteria*, CHAPTER 6 – LANDSCAPING, for more information on swales.

N. Pavement Design

(1) The pavement design for parking areas, circulation roads, bus loading zones, and access roads shall, at a minimum, conform to the standards set forth by the local AHJ.

(2) At a minimum, the pavement design shall be the latest version of the AASHTO *Guide for Design of Pavement Structures,* and the following parameters shall be used for design:

(a) 30-year design period

(b) 18-kip equivalent single axle loading

(c) 95% reliability

(d) Overall standard deviation of 0.45 (flexible) and 0.35 (rigid)

(e) Terminal serviceability 2.0

(f) Use of load transfer devices (as applicable)

(3) Where new pavement ties into existing pavement, the new pavement surface shall blend to match the existing surface elevation. Transition slabs shall be designed where differing pavement types tie into each other.

O. Wheel Stops

(1) Parking adjacent to flush walkways shall utilize wheel stops in the parking spaces to prevent automobiles from parking and/or driving on the walkway. Wheel stops shall be located at the head of each ADA-accessible parking stall.

(2) All other wheel stops may be installed in every other parking space and shall straddle the parking stall painted divider, where needed and as allowed by the applicable jurisdictional code; however, in instances where a parking aisle ends and the last space does not include a straddled wheel stop, a wheel stop shall be placed in the center of that parking stall.

P. Landscaped Areas

The total area allocated for landscaping shall comply with the codes and requirements of the local jurisdiction. Landscaping design shall be in accordance with *Design Criteria*, CHAPTER 6 – LANDSCAPING.

Q. Electrical System and Lighting Standards

Fixtures shall be chosen to complement the design and character of the facility and surroundings. Fixtures shall provide required illumination and shall be vandal-proof and suitable for exterior mounting. Consideration shall be given to energy conservation and maintenance in the selection of fixtures and lamps. Where solar exposure is adequate, future photovoltaic panels shall be considered for integration. Refer to *Design Criteria*, CHAPTER 12 – ELECTRICAL SYSTEM and CHAPTER 13 – LIGHTING, for further details.

R. Communications

See *Design Criteria*, CHAPTER 14 – COMMUNICATIONS.

S. Signage, Graphics, and Pavement Markings

See *Design Criteria*, CHAPTER 15 – SIGNAGE AND WAYFINDING.

(1) Signage and Graphics

Provide sufficient signage and graphics to direct and identify the most convenient means of vehicular and pedestrian access and egress. Graphics shall be direct, simple, easy to read, clearly visible, and uncluttered, as outlined in *Design Criteria*, CHAPTER 15 – SIGNAGE AND WAYFINDING.

Use graphics on each floor of a parking structure to provide patron orientation and to identify parking locations. Floor levels will be numbered and/or color-coded. Use corresponding colors and color-coding in the stair/elevator lobbies and cabs.

(2) Signs

Signage should outline facility ownership, owner’s rules and regulations, fire and safety regulations, designated parking areas, and support wayfinding for the parking facility. Signage and graphics shall comply with *Design Criteria*, CHAPTER 15 – SIGNAGE AND WAYFINDING, and all applicable codes and requirements of the AHJs. All content, graphics, and locations are to be approved by SJRRC. At a minimum, signage shall be installed as follows:

(a) Facility Identification Sign

A SJRRC standard monument sign that identities the name of the facility, site, or building as SJRRC's shall be placed at all access points to the site so as to be visible from the public right-of-way (ROW) (see SJRRC Directive Drawings).

(b) Signage with customer information (i.e., cost, hours, etc.) shall be placed at entrances to lots.

(c) Prohibited activities signage shall be placed in visible locations at each pedestrian entry point and each floor of the parking structure. Provide wayfinding signage, including signs indicating direction to pedestrian exits, elevators, stairways, designated parking areas, station and bus stop

locations, and quick-drop locations. Signs shall be placed at all points of decision to provide the operator destination choices for available parking and vehicle exits. Floor indication signs shall be placed at each level of a structured facility.

(d) Signage for SJRRC Maintenance parking, ADA parking, and other designated-use parking areas shall be provided.

(e) For facilities with paid parking, exterior “rate” information signs shall be required at each auto access.

(f) Signage for all interior uses and rooms, such as communication, utility, electrical, fire riser rooms, elevators and elevator equipment rooms, and bicycle facilities shall be provided.

(3) Pavement Marking

Accessible spaces shall be striped and marked as required by code. All pavement markings, such as directional arrows, stop bars, etc., shall be thermoplastic, with 4”-wide lines at parking spaces. If required, clearly mark compact car spaces with the word *COMPACT* in the aisle adjacent to each space in 12”-high letters**.**

T. Bicycle Parking

SJRRC provides bicycle parking at facilities for customers accessing transit by bicycle. The following are general design considerations.

(1) Bicycle Parking Equipment

Bike parking facilities equipment types include:

(a) Bike Rack

A metal rack attached to the ground utilized for supporting and locking bicycles. Bike racks shall vertically support a bicycle in at least two places on the same horizontal plane and shall be anchored with tamper-proof hardware.

(b) Electronic Bike Lockers

A lockable bike storage unit accessed by using an electronic key card. Typical installations consist of diagonally-partitioned two-bike-capacity units with opposing doors. Individual units can be installed in groups. These are typically provided through a third-party vendor responsible for supplying the lockers, fare collection, maintenance, and repair of the lockers.

(2) Design Considerations

Bicycle parking design considerations shall consider the amount and capacity of parking to provide, type and placement of equipment, security features, access and circulation, and relate to transit urban design elements. In addition, designs shall meet the following:

(a) Locate bicycle parking equipment in well-lit, frequently-visited areas, within sight of boarding platforms or bus shelters.

(b) Do not locate bicycle lockers on platforms, in pedestrian pathways, over utilities or vaults, or against walls.

(c) Bicycle lockers shall allow for visual inspection of the entire interior using available levels of light without having to open the doors to view contents.

(d) Materials for bicycle parking equipment shall be made of vandal-resistant, non-flammable materials and shall not be easily carved, melted, or otherwise damaged.

(e) Signage and graphics shall comply with *Design Criteria*, CHAPTER 15 – SIGNAGE AND WAYFINDING, SJRRC's Directive Drawings, and all applicable codes and requirements of the AHJs. All content, graphics, and locations are to be approved by SJRRC.

U. Parking Facility Security Considerations

Zoning ordinances and codes shall be considered and coordinated with the safety and security requirements for all vehicular and bike parking facilities.

(1) General

(a) Provide maximum visibility and clear sightlines into and out of all facilities from as many sides as possible. A minimum of two exits shall be provided.

(b) Provide vehicular and pedestrian access control gates. License plate reading technology and perimeter security fencing should be considered wherever feasible to secure parking facilities.

(c) Vehicle gates shall be either horizontal sliding type or swing type. Scissor type gates shall be prohibited.

(d) Gates shall guard the full width of the car entrance opening.

(e) A separate pedestrian walkway leading from the public sidewalk into a parking area shall be provided for any site with a security gate across a vehicular access driveway.

(f) For a security gate that controls pedestrian access, an intercom or telephone system (with video capability) shall be provided at the gate.

(g) Doors and gates and their guides, guide shoes, tracks, and hangers shall be so designed, constructed, and installed that when the fully closed door or gate is subjected to a force, it does not open.

(h) Enhance the safety and security of facilities by providing adequate lighting and illumination levels that meet the requirements as shown for each element and area in *Design Criteria*, CHAPTER 13 – LIGHTING.

(i) Emergency communications, including telephones and CCTV, should be designed for remote operation of security gates

(j) Emergency Response Access.

Prior to the issuance of any permits, fence plans with security gates shall be reviewed and approved by the City Fire and Police Departments as to ensure any required compliance with the following standards:

i. To facilitate access by Fire Department personnel, a key switch box, or other approved device, shall be provided for all pedestrian and vehicular security gates.

ii. To facilitate access by City law enforcement officers, a key pad, or other approved device, shall be provided for all pedestrian and vehicular security gates. Furthermore, vehicular gates must provide egress for law enforcement vehicles.

V. Future Electric Vehicle Charging Facility Considerations

(1) General

The goals of these guidelines are to ensure that SJRRC stations consider future electrification by ensuring that all necessary charging infrastructure, such as conduit, is installed in locations to access after construction is finished.

(a) Electric vehicle (EV) charging infrastructure is governed by various federal, state, and local building codes and requirements, including the National Electrical Code (NEC), the California Electrical Code (CEC), and the California Building Code (CBC)

(b) Local jurisdictions' standards must be considered to ensure the safe operation of equipment. Zoning ordinances and codes shall be considered and coordinated with the safety and security requirements for future EV charging facilities.

(c) The California Building Standards Commission (CBSC) mandatory building standards require pre-wiring for EV charging station installation in parking spaces. Pursuant to the California Green Building Standards Code (Title 24, Part 11, Chapter 5), all new construction must provide parking spaces and electrical infrastructure sufficient to support the future installation of Electric Vehicle Supply Equipment (EVSE).

(d) Each station parking area shall be configured for EV Readiness, including preparation for the future installation of EVSE with minimum disruption. Parking areas shall be equipped with "make-ready" infrastructure to support the immediate and convenient installation of an EVSE, including electrical panels, conduit/raceways, and pull boxes.

(e) Future EVSE includes charging stations and associated immediate infrastructure (e.g., transformers, etc.), excluding building electrical infrastructure, such as charging infrastructure, overprotection devices, and wires.

(f) Sites shall be configured to support Level 2 EVSE that operates on a 40 Amp 208 or 240-volt circuit and provides power between 3.3 and 7.2 kW. ·

(g) Additional consideration shall be made to support Direct Current Fast Charger (DCFC), EVSE that provides a minimum of 40 kW of power. Circuit requirements will change with charger power. These requirements will be determined on a station-by-station basis.

(h) Minimum EV charging station prewiring installation requirements are based on the number of parking spaces, per parking facility, as follows:

i. Requirements of California Green Building Standards. The minimum requirements of Title 24 are outlined below.

ii. The following table provides a framework for calculating how many EV parking spots are required at a given location.

TOTAL NUMBER OF ACTUAL PARKING SPACES	NUMBER OF REQUIRED EV CHARGING SPACES
0-9	0
10-25	1
26-50	2
51-75	4
76-100	5
101-150	7
151-200	10
201 and over	6 percent of total[1]

1. Calculation for spaces shall be rounded up to the nearest whole number.

Source: Title 24 Part 11 Section 5.106.5.3.3

Total EV Charging Stations	Van Accessible EV Charging Stations	Standard Accessible EV Charging Stations	Ambulatory Accessible EV Charging Stations
1 to 4	1	0	0
5 to 25	1	1	0
26 to 50	1	1	1
51 to 75	1	2	2
76 to 100	1	3	3
101 and over	1, plus 1 for each 300, or fraction thereof, over 100	3, plus 1 for each 60, or fraction thereof, over 100	3, plus 1 for each 50, or fraction thereof, over 100

(i) Public facilities must also install handicap-accessible EV charging stations when installing new or additional EV charging stations.

(j) To ensure EV Readiness in new projects, the following should be provided for each spot:

i. Pull boxes should be located at or near the location of future charging stations so that contractors can easily pull wire from the control panels to the stations without the need to trench or add new conduit. Conduit shall be a minimum 1” inside diameter.

ii. Electrical panel capacity for additional 40-Amp 208 or 240-volts branch circuits multiplied by minimum of 20% of the number of parking spaces. This will ensure that Level 2 EVSE operating at full capacity on a 40-amp circuit can charge a minimum of 20% of the total number of EV spaces simultaneously, or that EVSE operating at 8-amps can charge at 100% of the spots simultaneously.

iii. Room shall be left in the electric or utilities room for the future EV-specific electrical panels. This includes a minimum of 3 linear feet of wall space for the control panel with 3’ of clear floor space in front.

iv. To ensure ease of future planning and installation, electrical and design plans shall indicate that the service capacity of the electrical system, including any on-site distribution transformer(s), meet the requirements detailed above. The plans must demonstrate that capacity is sufficient to operate the EVSE at full rated amperage or a minimum of 40 amps per branch circuit, whichever is greater.

v. As appropriate, construction documents shall provide information on amperage of future EVSE, raceway method(s), wiring schematics, anticipated EV load management system design(s), and electrical load calculations.

vi. When desired, a DC fast charger can be installed and reduce the total number of EV charging spots by 10, provided that there is still a minimum of one Level 2 charger available.

vii. Electrical panels serving the DC fast charger must have capacity to provide a minimum of 63 Amps at 480 volts AC and 2 Amps at 120 volts AC, as well as a 40 Amp 208 or 240-volt branch circuit for each Level 2 charger in that area.

(k) Disabled Access/ADA-Compliance

Connector and receptacle heights, special curb cutouts, and disabled parking access are some of the measures that may be necessary to make a charging station fully accessible for the disabled.

San Joaquin
Joint Powers Authority

San Joaquin
Regional
Rail Commission

CHAPTER 6

LANDSCAPING

CHAPTER 6 – LANDSCAPING

6.1 GENERAL

This section establishes design standards for the selection, placement, establishment and maintenance through warranty requirements for landscaping features for the transit system, to include platforms, stations, station plazas, park and rides, transit centers, facility landscapes, parking lots and bus stops.

6.2 REFERENCES, STANDARDS, REGULATIONS, CODES, GUIDELINES

6.2.1 Industry

A. American Standard for Nursery Stock (ANSI) Z60.1, 2014 or later, as adopted by the American Association of Nurserymen, Inc.

B. American Joint Committee on Horticultural Nomenclature (AJCHN), Standard Plant Names

C. Sunset Western Garden Book

6.2.2 Federal, State, Local

A. Model Water Efficient Landscape Ordinance

B. California Native Plant Society

C. Standards for Rehabilitation of the U.S. Department of the Interior

D. Regulatory standards and relevant design guidelines for other applicable jurisdictions, as needed

6.2.3 SJRRC Key Stakeholders

A. Operations

(1) Facilities Management

(2) Maintenance

6.3 CRITERIA / APPLICATION

6.3.1 Design Goals and General Requirements

A. Adherence to Agency and Jurisdictional Codes and Standards

(1) All local codes and regulations, standards, and criteria from Authorities Having Jurisdiction shall be followed to ensure acceptance of landscape designs during design reviews and permitting. Jurisdictions and agencies issuing permits should be identified early and their requirements thoroughly understood. The project manager should specifically address the responsibility of any consultant in researching and documenting permit requirements in planning the scope of work for a project.

(2) Both SJRRC criteria and Local Jurisdiction criteria and standards may apply to a single project. Landscape designers must identify which entity will be maintaining each of the specific areas that will be landscaped. Designer shall

apply relevant standards, requirements, and preferences for each entity that should be adhered to throughout the design process for each location, as they are often different across entities and landscape functional types.

(3) Where conflicts arise between jurisdictional requests and SJRRC criteria, the SJRRC project manager shall ensure that safety, security and long-term maintenance requirements are consistent with SJRRC policy and SJRRC design criteria. Landscape architects to consult with appropriate SJRRC personnel as necessary.

B. Design and Construction of SJRRC Landscapes

The general requirements below apply for all landscape design where SJRRC is the maintenance entity:

(1) Sustainable Landscapes

SJRRC projects are required to comply with either the statewide Model Water Efficiency Landscape Ordinance (MWELO), or a local ordinance when required by the local water purveyor.

MWELO compliance for irrigation projects varies based on local agency and water purveyor requirements. To comply with MWELO on SJRRC irrigation projects the following steps shall be followed;

(a) Check with local agencies and or local water purveyors for projects to see if it is required by local ordinance. If a local ordinance is required follow the local ordinance requirements.

(b) If no local ordinance exists include the following on the irrigation sprinkler schedule sheet.

i. MAWA Calculation

ii. ETWU Calculation

iii. Hydrozone Information Table

iv. Irrigation Controller Schedule

v. Pressure Loss Calculations

The information above represents the minimum MWELO and Maintenance requirements for SJRRC projects

(2) Landscape design on all SJRRC properties shall incorporate water-wise landscaping principles. These principles are manifest in plant selectionand irrigation philosophy and design.

Landscaping on SJRRC properties shall:

(a) Prioritize native plant species

(b) Utilize plant material and/or hardscape, which is appropriate for the drainage, soil type, slope, sun exposure and local environment of thesite. SJRRC prefers native plants and evergreens where feasible. Prioritize low water use and low to no plant/tree litter. Minimal maintenance is a must. See appendix at end of this chapter for suggested plant list.

(c) Eliminate turf lawn and other plant types with high water needs that need regular maintenance or mowing.

(d) Protect and preserve existing planting prioritizing large trees, and preserving natural ecology.

(e) Encourage water infiltration. Prioritize low water use and low to no plant/tree litter. Minimal maintenance is a must. Discourage run-off through proper grading, appropriate placement of landscaping, appropriate subsoil preparation, appropriate topsoil preparation and depths, and water- wise irrigation design.

(f) Ensure quality topsoil of adequate depth in landscape areas. Strive to “reuse” or create topsoil wherever possible through amendment and/or mechanical loosening of suitable site material.

(g) Plant spacing to allow for the mature natural size of plants to minimize need for pruning. Consider incorporating evergreen trees that meet the criteria of minimal litter, minimal maintenance and low water-use.

(3) Aesthetics

SJRRC landscapes should be attractive, related to overarching urban design concepts at the project and/or location scales, provide year-round interest, complement the character of other improvements, and increase the positive perception of SJRRC.

(4) Safety and Security

Landscape design shall not adversely affect the safety of the system,or security for customers.

(a) Use landscaping to direct riders to the station in a clear, direct manner in locations where this is applicable.

(b) Avoid plants in height zones from 24 to 80 inches in planters within the first 5‘ adjacent to pedestrian areas, so as to not impede visibility.

(c) Select trees that will facilitate a limbed-up height of 80” from the ground acknowledging that this may not be feasible the first two years of establishment.

(d) Avoid trees that obscure site lighting and CCTV camera views.

(e) Use drought tolerant shrubs and other appropriate landscaping where possible to discourage graffiti on walls and discourage access to other facilities susceptible to vandalism. Shrubs may be used along walls to discourage graffiti or to discourage access to areas susceptible to vandalism.

(5) Sight Distances

No landscape design element shall obstruct the line of sight between bus and train operators and the public. No landscape design element shall obstruct the line of sight between bus and train operators and operations signals or signage.

6.3.2 Design Teams, Stakeholder Involvement and SJRRC Design Review

A. As appropriate for a particular project, Project Stakeholders should be identified and engaged in the final design of landscaping. The project manager and landscape architect should coordinate throughout the process regarding inventory, planning,

design, construction, establishment, maintenance and turnover. Arborists, public art specialists, and environmental engineers may also be included on this team as appropriate. These stakeholders should be identified early on to insure their participation all aspects of design and construction.

B. The stakeholders should periodically participate in design reviews. Consultants are expected to adhere to design criteria including the use of directive drawings and specifications as appropriate. Whenever adherence to these directives does not seem practical, it shall be explicitly documented well in advance of final design and approved by SJRRC.

6.3.3 Specific Design Criteria by Facility Type

A. All Areas

(1) Plants shall not be installed within 10’ of the centerline of the nearest track, except as specifically approved by UPRR and SJRRC.

(2) Design to minimize long term on-going maintenance costs.

(3) Design to allow for cost effective weed control. Rock, gravel, or decomposed granite between plantings is preferred. Choose materials that require little to no replacement.

(4) Plant the minimal amount of landscape needed to create passive barriers, privacy for local residents and an attractive view. (Avoid additional landscaping if existing landscape design meets these standards.)

(5) Provide proper tree form to allow pedestrian circulation and visibility (no low branches, provide minimum 6’ vertical clearance).

(6) Consider minimum width of tree wells: need for walk-over paving must be coordinated with requirements for tree health.

(7) Accommodate for the mature size and form of plant materials.

(8) Provide readily accessible, vandal resistant maintenance equipment (example: water sources).

(9) Consider overhead, at grade, and underground utility structures well in advance of final design including maintenance and costing implications and get SJRRC approval.

(10) Consider and address likelihood of littering globally and within specific areas (ex. parking lots, station plazas, and entrances to platforms) through low-maintenance plant selections.

(11) Maximize the size of tree species planted where this is not in conflict with other criteria.

(12) Provide separate deep watering irrigation provisions for trees.

(13) Use plant material that will require minimal pruning, including SJRRC preferred evergreen shrubs and trees. Shrubs must have a mature size that does not exceed 3 ft, except as needed for screening or to meet other jurisdictional requirements. Shrubs at this maximum height should be avoided adjacent to pedestrian areas and near track crossings.

(14) Trees should have a root barrier installed adjacent to hardscape areas

B. Park-and-Ride Lots, Transit Centers, and Building Landscapes

(1) Shading Requirements and Calculations:

(a) Per CALGreen requirements, the parking lot tree shading ordinance requires that all new parking lots include tree plantings designed to result in 50 percent minimum shading of parking lot surface areas within 15 years. Some JHA's are allowing "future solar" to qualify for the shading requirement. This opportunity should be researched and used where applicable.

(b) Shade calculations may be offset by solar canopies. Project sites shall require planning for necessary solar utilities and infrastructure to allow for future installation of solar panels.

(c) The shading requirements calculations apply to all new impervious surfacing on which a vehicle can drive, including:

i. Drive Isles

ii. Parking Spaces

iii. Walkways

iv. Pavements

(d) Within parking lots, utilize plant material that can tolerate heat from asphalt paving conditions and also help filter stormwater.

(e) Ensure planting and irrigation design at parking stalls are low-maintenance (example: avoid irrigation equipment in bumper overhang spaces). Reinforce pedestrian circulation. Adequate attention must be paid to sources and destinations of pedestrian traffic so that landscape areas are not trampled. Consider auto bumper overhangs in plant spacing, mature plant height and locations.

C. Station Plazas - Hardscape

(1) Ensure "fit" with surrounding area if already significantly developed.

(2) Provide continuity of materials and surfaces when transitioning between the station and adjacent improved areas.

(3) Incorporate public art where applicable (ensure that the maintenance of landscape elements, which are part of art work and immediately adjacent to a hardscape, are adequately addressed. See CHAPTER 16 – ART AND ELEMENTS OF DISTINCTION PROGRAM.

(4) Utilize ground covers and/or rock or gravel for water retention, weed suppression and aesthetics.

(5) Provide attractive entry points and emphasize important features (e.g., station main entries, drop-offs, etc.).

(6) Avoid use of thorny plants or low branching trees in areas immediately adjacent to hardscape unless a moderate level of control over unwanted pedestrian circulation is required.

(7) Species selections to account for drainage, storm water, heat, run-off and evaporation. Prioritize California natives. See appendix at end of this chapter

for suggested plant list.

D. Bus Bays

Design should also incorporate jurisdictional sidewalk and roadway standards per *Design Criteria*, CHAPTER 3 – CIVIL.

6.3.4 Specific Additional Criteria by Facility Sub-Type

A. Visual / Sound Mitigation

(1) When designing a visual and or sound mitigation area, a permanent irrigation system may be required. It is important to define the edges of these areas so they can be maintained. Structural edges (headers of treated wood, metal, concrete, or gravel) are recommended. Attention must bepaid to drainage to prevent chemicals used for weed control from flowing into visual mitigation areas.

B. Pocket Landscapes

Pocket landscapes are a small area of landscape, defined at its edges by hardscape and curbs. Pedestrian crossings, landscapes adjacent to side rail platforms, and landscape islands in parking lots are all pocket landscapes.

(1) When pocket landscapes are isolated, irrigation must be provided via sleeves below hardscape areas.

(2) All trees within 8’ or less of a curb or sidewalk shall have root barriers installed. Root barriers should be used to protect track ballast, and adjacent paving from tree roots, without unnecessarily restricting soil-rooting volume

C. Streetscapes

Streetscapes are trees, shrubs and ground cover components of a pedestrian area adjacent to a roadway. Major pedestrian circulation paths shall be treated as streetscapes to help wayfinding, organize site pedestrian circulation, and help resolve pedestrian and vehicle conflicts.

(1) Tree wells should be constructed as large as possible. Tree species selection should reflect the size of tree well proposed. No tree well should be smaller than 24 sq ft with 4 ft being the shortest dimension in any direction. 36 sq ft is preferred.

(2) Paving the tree well should be avoided unless required by a jurisdiction. If space constraints force this situation, careful detailed design and material selection are required to balance the soil needs of plant materials with the structural requirements of paving.

(3) Irrigation piping must be sleeved under all hardscape. Separate irrigation zones should be provided for trees to allow deep watering.

D. Vegetated Stormwater Facilities

Vegetated stormwater facilities are linear drainage features primarily used to treat and infiltrate storm water. Stormwater facilities may also be used for limited stormwater storage. The following criteria shall be followed for design and construction of these facilities:

(1) Stormwater facilities should be constructed with irrigation (unless expressly prohibited by the jurisdictional owner of the facility)

(2) Swales shall be located and designed to allow infrequent access by large equipment.

(3) The design of stormwater features will consider and control potential debris in the storm water drainage system.

(4) Stormwater facilities shall be designed so that the different plant types are defined and maintainable with a minimum of effort.

(5) Careful attention shall be paid to not over-steepen side slopes and sizing to be per civil engineering recommendations.

E. Public Art Areas

Public art is incorporated into many SJRRC projects. See CHAPTER 16 – ART AND ELEMENTS OF DISTINCTION PROGRAM for criteria.

(1) The Designer shall work with the AHJ and SJRRC to identify art element designs and locations.

(2) Location of public art shall be placed within the station plaza and not impede pedestrian circulation.

(3) Designers may also request to integrate landscape design as an art element and or design to purposefully treat landscaping as a setting for art installations.

F. Additional Criteria

(1) Utilities

Where near overhead utilities, use landscape plants whose locations and sizes are compatible with utility company requirements and require minimal maintenance to meet these requirements. For instance, ensure that trees planted under or near overhead wires will not conflict with wires. When near underground utilities, minimize adverse effects from root invasion.

(2) SJRRC Signage, Lighting, and Passenger Information

Planting plans shall account for the locations of signage elements, lighting, passenger information, and other visual elements that are intended to serve customer/passenger needs. Low ground-cover plants near signs, and good coordination between tree locations and light poles are examples of best practices that should be followed.

G. Advance Procurement of Trees

For large landscaping projects, Contractor may coordinate with SJRRC for advanced procurement of trees through a separate contract from construction.

(1) Large projects are defined as those involving more than 200 trees of 1.5” caliper and/or 5’-6’ tall or larger and/or 2 acres of landscaped area or more.

(2) Contractors shall verify with SJRRC’s project manager (PM) that advanced procurement may be used.

(3) Advanced procurement contracts shall be issued for bid a minimum of 2 full growing seasons, and ideally 3 full growing seasons, prior to the anticipated start of plant material installation.

(4) Designers shall ensure design documents and advanced procurement materials are thoroughly coordinated.

(5) It shall be the contractor's responsibility to maintain all planting in storage till planting time.

6.3.5 Site Preparation

A. Preservation and Incorporation of Existing Plant Material

(1) Mature, healthy existing plant material of appropriate species shall be preserved where possible. Existing trees on the site shall be indicated in the contract documents and appropriate protection during construction shall be specified for those high-value specimens that are to be retained. An arborist's services might be required and be provided by contractor.

(2) Designers should factor preservation of significant trees. In consideration of risk associated with a tree intended to be preserved dies, an arborist's services might be required (part of prime contractor's scope).

(3) If tree preservation is part of the design, the construction documents must reflect a realistic approach to achieving this based on specific technical expertise and site investigations.

B. Planning and Design

(1) The overall plan should be evaluated to identify opportunities to incorporate water-wise principles and to meet desired water conservation goals. In order to reduce water consumption, turf areas should be eliminated.

(2) All landscape areas should be coordinated with local AHJ requirements.

(3) Planting Plan

(a) To the extent possible shrubs and ground cover plantings should utilize no maintenance species and materials.

(b) Select plants and shrubs that grow to an appropriate mature size for the space provided. Group plants and shrubs to allow maintenance access for the specific maintenance required and reasonable plant growth expectations.

(c) Plant spacing and installation shall be designed such that full coverage of the ground surface by plants is achieved a maximum of 3 years after installation. Spacing of plants shall be designed to minimize overgrowth onto hardscapes.

(d) Plants of differing water requirements should be grouped or zoned together to simplify water management and irrigation zones. Climatic conditions such as sun, shade and exposure should also be considered. By taking advantage of climatic conditions, irrigation and maintenance requirements will be significantly reduced.

(e) Most landscapes should consist primarily of trees and groundcover material to maximize openness for natural surveillance. Use of shrub

material with mature heights greater than 3’ should be avoided. Limited use of shrub material with mature heights of 8” to 3’ should be used to satisfy specific jurisdictional requirements only.

(4) Soil Analysis and Improvement

(a) Minimum depth of quality topsoil where new planting is being established shall be 12 inches (different for stormwater facilities). Soils shall be tested and analyzed for texture, drainage, pH and soil type.

(b) The material occurring or placed immediately below the topsoil (“subsoil”) shall be amended and/or mechanically loosened as necessary to allow good, but not excessive, drainage, to allow root penetration, and to eliminate excessive compaction (above 65% proctor density). Average thickness of this layer in planting areas shall be 6 inches, with greater or less depths as necessary to address site conditions.”

(c) Project erosion control may be achieved through the use of compost berms or “green manures.” If this is the case, these materials should be utilized for soil amendments. Designers should specify materials appropriate for both functions. Designers should then determine the nutrient properties and quantities of these materials for inclusion in amendment material and installation specifications.

(5) Finish Grading

(a) Finish grading shall blend with adjacent land elevations. Sharp grade changes, excessive undulations, impounded areas, and other difficult to maintain grade features should be avoided.

(b) Finished grades should be sloped to adequately drain, yet avoid excessive slopes, which would erode. Minimum slope in landscape areas, except purposefully wet areas, shall be 0.50%. Maximum slopes shall be 4:1, except if turf or mown meadow mixes are used, then maximum slopes for these areas shall be 3:1.

(c) Finish landscape grades adjacent to paved areas shall be carefully coordinated with finished grades of paving to avoid mulch washing onto paved areas or tripping hazards at paving edges. Paving areas to be 1” higher than turf areas and 2” higher than shrub areas.

(6) Slope Stabilization

This section applies to permanent slope features of the design, not erosion control during construction.

(a) Mounds and depressed swale areas may be used where appropriate to control pedestrian movements, minimize run-off, modify wind and precipitation patterns, obscure objectionable views, to reduce the import or export of fill material from the site, and reduce objectionable noise to provide a more comfortable experience.

(b) At a minimum, the top 1’ of all slopes shall be flattened to create a smoother transition from adjacent paving or landscaping.

(c) All slopes should be stabilized to prevent physical failure, erosion, and maintenance issues.

(d) Slopes that are to receive mown plant materials or aggregate mulches

shall not exceed one (vertical) to four (horizontal), and shall comply with requirements of the jurisdiction having authority.

(e) Slopes that are to receive non-mowed grass or ground covers shall not exceed one (vertical) to three (horizontal), and shall comply with requirements of the jurisdiction having authority.

(f) Maximum slopes of fill areas shall not exceed one (vertical) to three (horizontal), except in table rock where the slope may be one (vertical) to one (horizontal). The one-to-one slope is also acceptable where hard stone paving is to be used, and shall comply with requirements of the jurisdiction having authority.

(g) Open anchored matting or other suitable materials shall be used to stabilize sodded or seeded slopes and swales (surface flow lines) exceeding six percent (6%) longitudinal gradient.

(h) Stable rock cut faces may be left exposed or may be treated with vines planted at top or bottom as appropriate.

(i) Vertical transition curves, 6–20 ft as appropriate to scale of slope, shall be provided at top and bottom of slopes or mounds.

(j) Suitable slope stabilization and erosion control materials and plants are shown below.

Material	Slope (Maximum)
Rough seed	3:1
Groundcover	3:1
Stone rip-rap	1.5:1
Cut stone	1:1
Brick paving	1:1
Concrete block paving	1:1
Concrete paving	1:1

(7) Additional Design Information Required

(a) Estimate of Maintenance Resources

Project designers shall prepare a comprehensive list of necessary maintenance activities and frequencies for all project elements once designs are early in the design process. SJRRC will use this information for identifying maintenance resources that the project will require.

6.3.6 Plant Selection

A. Select California native species and evergreens where practical. Select plants that require no or very low maintenance.

(1) Maximize the use of groundcovers and low shrubs.

(2) Landscape Buffers- typically located along the perimeter of the project site and delineated by fencing to separate the public right of way and project property line.

(3) Provide a minimum 3’ wide landscape buffer at parking lot edge to fencing.

(4) Landscape buffers shall be planted with low shrubs and ground covers and spaced to create a ‘carpet’ effect.

(5) For all planting, the most stringent MWELO water efficiency standards apply with regards to water use.

B. Water Requirements

Group plants with similar water requirements together in zones. Plant materials shall be suitable for the Central Valley climate in general.

(1) Zero (no eventual water required)

Use Dry land seed mixes, wild flowers, select trees and shrubs. Note that many of the plants in this category depend on planting at specified times of year. The “no irrigation” approach is not acceptable when control of landscape installation timing is uncertain. If meadow mixes are used, they may require periodic reseeding, the cost of which must be considered in evaluation of design options.

(2) Very Low (very low water requirement)

Needs water to get established, but once established will survive on seasonal precipitation. These plants should comprise the majority of plants specified.

(3) Low (low water requirement)

Requires occasional supplemental watering (1 inch per month), which is more water than is available through seasonal precipitation. These plants should be limited in number, readily accessible, and absolutely required by specific project conditions.

(4) Moderate (moderate water requirement)

Requires the greatest amount of supplemental water (1 inch per week) on a weekly basis. Annual flowers fall into this category. These plants should be extremely limited in number, readily accessible, and only planned for if absolutely required by specific project conditions.

C. Worst Case Head Calculations for Irrigation Systems

This calculation will verify that an irrigation system design allows enough pressure to operate the specified equipment.

(1) The “worst case head” is the irrigation sprinkler head that is the most hydraulically isolated from the point of connection. This isolation is a function of distance, layout, topography and the amount and type of fittings and equipment through which water must pass to reach the sprinkler.

(2) This calculation shall be prepared and submitted as part of final irrigation design. The submitted information shall show measurement or credible estimation of pressure at the point of connection, friction losses through all specified equipment, piping, and fittings, and documentation that pressure is adequate for proper operation of the “worst case” head.

D. Planting

(1) Shrubs, Grasses, and Groundcover

(a) Choose species that have a mature height and size that eliminates the need for pruning with no or very low litter from shrubs and groundcovers.

(b) Maximize the use of groundcovers in landscape areas. Only groundcovers and shrubs under 2’ are acceptable within 5’ of accessible paths of travel.

(c) Shrubs should be installed at a maximum spacing of 60” on center, and ground cover plants a maximum of 36” on center spacing.

(d) Ground cover plants shall be set back at least 12” from back of walk or curb, and 18” for shrubs to prevent overgrowth onto walkways or pavements.

(e) Use a minimum 1 gallon size for groundcover.

(f) Use a minimum 2 gallon size for low shrubs, and 5 gallon size for medium to large shrubs.

(g) Shrub areas shall be fine graded to within 2” below adjacent surfaces.

(h) Where use of turf is required, drought resistant or no-mow varieties shall be selected.

(2) Soils

(a) Amendments shall be evenly displaced and roto-tilled into the top 6-12” of soil at a minimum of 4 cubic yards per 1,000 sq ft.

(b) All planting areas with the exception of turf, shall receive a 2” minimum layer of decorative mulch after all planting has been completed to reduce evaporation and weed growth.

(c) Decorative mulch shall be dark fine grain color by Recology Environmental Products or equal.

(d) Fertilizer tablets shall be Best-Paks (20-10-5) planter packets and placed in all planting pits 1 per gallon, 3 per 5 gallon.

(e) Tree Planting:21-gram fertilizer plant tabs: 5 per 15 gal tree, 8 per 24" box tree, 12 per 36" box tree.

(3) Trees

(a) Parking lot trees should consist of up-to three species selected from the provided plant list (see Appendix).

(b) Limit the use of accent/seasonal color trees to areas along main pedestrian arrival routes.

(c) Evergreen trees shall be selected for primary circulation drives. Use evergreen trees that are minimal litter, minimal maintenance and low water-use.

(d) Trees within the station plaza shall be low-water use, minimal maintenance, minimal litter, and aesthetically pleasing.

(e) Select one primary tree species from the plant list provided for station plazas (see Appendix).

(f) Station plaza tree branching to allow for minimum 6’ of clearance below lowest branches.

(g) In pedestrian plaza areas, tree planting wells planted with shrub and

ground cover shall be a minimum size of 6’ x 10’, or 4’x4’ tree wells if tree grates are used.

(h) Evergreen Trees shall be a minimum of 7–8’ tall at time of installation.

(i) All trees shall be supported with two stakes installed 180 degrees apart on either side of the tree during planting and shall be set clear of the rootball. Tree stakes shall be removed once trees are adequately established.

(j) Root barrier systems shall be provided at minimum where trees are within 8’ of pedestrian hardscaped plazas.

(k) Root barriers shall be specific to root zone of species, some species have rather large root zones or send roots to sources of water from great distances. Root barrier should be used in most instances and a minimum 12” deep. Deeper barriers may be needed per site conditions. Root barriers should be a linear system, circular root barriers should not be used.

(l) Tree staking: 2" dia. x 8' (15 gal.-24" box), 3" dia. x 10' (36"-48" box) hardwood lodgepole stakes or equal. Stake trees at the lowest point where the tree can support itself.

(4) Park and Ride and Transit Center Trees

(a) Bus Stop Trees

Trees planted adjacent to Bus Stops fall into two conditions described below. See Streetscape Trees and Pocket Landscape Trees below.

(b) Streetscape Trees

i. Trees closely associated with vehicular or pedestrian circulation features will occur in two basic conditions: trees installed in tree wells and trees installed in continuous planters. For trees in continuous planters see Pocket Landscape Trees.

ii. Coordinate jurisdictional requirements when trees are selected for placement in a municipal right-of-way. A preferred street tree list may be available from the jurisdiction; however approval may not be limited to these trees alone.

iii. When installed in the right-of-way, trees shall be part of an existing street tree pattern, if any, or part of a street tree pattern established by the local governmental authority for adjoining areas. Where no pattern exists, a consistent pattern shall be established, with the consultation and approval of the local jurisdiction obtained early in the design process.

iv. Only broad-leaved evergreen or conifers with a natural high-branching form prior to maturity shall be specified for streetscape trees. Minimum caliper of deciduous trees located within the public right-of-way shall respond to jurisdictional codes. Minimum caliper of deciduous trees on SJRRC property shall be 2½ in, although 3 inches is preferred. Trees shall be spaced an appropriate distance apart depending on the species design intent and size at maturity.

v. The longitudinal spacing should be adjusted to accommodate subsurface conditions such as utilities and vaults, as well as special

conditions such as existing or proposed sidewalk canopies, awnings, and shelters. This spacing and the actual placement of trees must be thoroughly coordinated with subsurface utilities, subsurface structures, light poles, and signage to avoid conflicts in the field.

vi. These trees shall not be staked or guyed unless site conditions or permit agencies require it. If guying of streetscape trees is required itshall be accomplished through subsurface guying of the root ball.

(c) Pocket Landscape Trees

Trees in small landscape areas that are not in “tree wells”.

(5) Shrubs

Plant material installed as part of a SJRRC facility. Shrubs can be as high as 7’-8’ feet, but are generally considered to be smaller than 7’-8’ in height and larger than 6 inches in height. The criteria for shrubs are the same across all facility types and sub-types. Shrubs shall be selected for mature heights that fit their area and minimized for pruning.

(6) Groundcovers

Plant material generally smaller than 6” in height, installed as part of a SJRRC facility. The criteria for groundcovers are the same across all facility types and sub-types.

(7) Lawn

Do not use lawns in the design of SJRRC facilities unless specifically directed by the SJRRC PM.

(8) Meadow Mix

Mixtures of perennial and annual flowers and grasses (grass that may be mown or having low maintenance needs). Meadow mix may be useful as an alternative to lawn. Note that mixes requiring periodic reseeding shall not be used.

E. Related Items

(1) Topsoil

Soil material used by plants as a growth medium. Topsoil materials, by definition, shall be optimal in terms of particle distribution, density, water holding capacity, cation exchange rate, nutrient content, capacity for the support of microorganism growth associated with natural soils, and the lack of deleterious compounds or properties, for the optimal growth of landscape plants.

(a) Topsoil may be stockpiled site soil; stockpiling plus amendment of sitesoil; imported topsoil; or a combination of these.

(b) Details and specifications shall be coordinated with excavation and backfill specifications.

(c) Detail and specifications may require modifications and expansion if poor drainage or poor soil fertility in landscape areas is anticipated or encountered.

(2) Root Barriers

A manufactured or fabricated structure installed below grade intended to prevent plant roots from encroaching in an area. SJRRC may require the use of root barriers in smaller pocket planting areas and in some uses of the streetscape.

(a) Generally, root barriers should be included when tree wells are smaller than 36 sq ft of opening or immediately adjacent to the trackway. At a minimum, all trees within 8’ of a curb or sidewalk shall have root barriers installed.

(b) SJRRC standards call for physical root barriers only; root barriers containing chemicals shall not be specified.

(c) Root barriers by their definition limit rooting area and should not be allowed to do so more than absolutely necessary as explained above.

(3) Mulch

Organic or inorganic topdressing of planted areas generally intended to provide weed control, moisture retention, and a “finished” look.

(a) Organic mulches should be applied evenly to the soil surface at a depth of 2to 4 inches and distributed evenly throughout the plant bed.

(b) Bark mulch from fresh water mills should be a medium grind, fir or hemlock bark, uniform in color, free from weeds, seeds, sawdust, and splinters and shall not contain resin, wood fiber, or other compounds detrimental to plant life.

(c) SJRRC preference is for rock or gravel varieties where appropriate. Use mulches with minimum requirements for replenishment or replacement.

6.3.7 Water Facilities

The design team should assess total irrigation water use, determine projected water rates over the plant establishment period, and estimate the construction cost of irrigation metering. Based on these factors, the team should recommend a design that is the most cost effective over the life of the irrigation system. Irrigation and potable water system design must be completely coordinated by the design team in the construction documents stage and comply with jurisdictional requirements.

A. Irrigation

(1) SJRRC desires to utilize recycled water when possible. Recycle/reclaimed water use should be investigated on a site-by-site basis.

(a) For sites where recycled water is available, site irrigation shall tie-into the existing recycled water system and adhere to all applicable codes for a recycled water irrigation system.

(b) For sites where recycled water is not currently available but may be available in the future, install necessary infrastructure to allow for conversion to a recycled system (if and when possible).

(2) An automatic water-wise controlled irrigation system shall be provided at all landscaped areas (defined as an area with plants). All permanent irrigation systems are to be installed below the soil surface. Quick coupling valves shall be provided when appropriate for general maintenance and irrigation. The locations shall be coordinated to permit complete site coverage with hoses. Provision of locations to allow coverage using 100-foot hoses is desired, with up to 200-foot hoses allowed, if specifically approved by SJRRC.

(3) Drip irrigation or deep root watering tubes with irrigation equipment may be utilized. The design must allow access to the irrigation equipment for maintenance.

(4) Drip tubing, when used, should be of a “brown” color as appropriate to match the ground plane and will incorporate individual pressure compensating emitters and utilize root inhibitors. When using reclaimed water, conform to national guidelines regarding product color and identification.

(5) In sloped areas, run drip tubing perpendicular to the slope.

(6) Point source irrigation shall be utilized in shrub areas.

(7) Incorporate filters with mechanical image notification of filter clogs and built-in pressure compensation to reduce overall sizes of the irrigation valve boxes.

(8) Frequent and regimented inspections should be factored into all maintenance operations to ensure long term efficient applications.

(9) Master valve shall shut off water to the irrigation system when irrigation system is not actively working.

(10) Different hydrozones to be placed on separate remote control valves.

(11) Remote Control Valves recommended to use Rain Bird 100-PEB series for potable and 100-PESB for non-potable.

(12) Broadcast spray heads shall incorporate “in head” pressure regulation and check valves.

(13) Spray heads shall be designed for head-to-head coverage with minimal runoff onto adjacent paved surfaces.

(14) All turf spray heads/rotors shall have a minimum 6” riser.

(15) Bubblers will incorporate a built in pressure compensator and filter.

(16) Trees shall be irrigated with bubblers and placed on separate irrigation valves.

(17) Tree bubblers will utilize a “deep root” water device that incorporates a bubbler, check valve and swing joint with filter “sock” around tube to reduce impaction of soil into air tube device.

(18) Provide a minimum of 2 bubblers per tree well at 18” RWS, located on opposite sides of the tree.

(19) Flow sensors shall monitor and detect real time flow conditions of the irrigation system and provides alerts when a section of the system is not functioning as intended.

(20) Installing contractors shall perform irrigation audits on the constructed system prior to the installation of plant material, and make necessary adjustments to aid in the success of the system.

(21) Mainlines to have 18” of clean washed gravel cover and have a conduit for the irrigation control wire to reduce the potential of damage to wire and aid in future repairs or renovations.

B. Irrigation Zones

(1) Break the landscape into watering zones based on plant water requirements, shade/sun orientation, soil type and water/pressure availability. Install isolation valves at each irrigation zone.

(2) Trees and shrubs should be watered separately as their needs are different. Deep watering trees with bubblers are required. Deep root watering of trees may be accomplished with separate zoning or by zoning with shrub heads if irrigation head flow rates andplant water requirements are matched.

C. Drip and Subsurface Irrigation

SJRRC seeks to achieve water efficiency over the life cycle of a facility through plant selections that allow traditional spray and rotor head irrigation to be decommissioned after two growing seasons (“irrigate to establish”). Drip and subsurface irrigation have not proven to be low maintenance irrigation types. SJRRC does not consider drip or subsurface irrigation as a standard design solution. If these irrigation types are proposed, they must be explicitly noted by the designer and approved by SJRRC through a stakeholder process including SJRRC maintenance personnel and management.

(1) SJRRC will consider the use of in-line, shallow bury, or other “drip” type irrigation in circumstances where long linear runs of limited plant types are required (i.e. planting strips with trees) and/or to satisfy tree deep root watering requirements, if properly detailed, specified, and installed.

D. Controllers

(1) Provide a central controller at each site located within a wall mounted enclosure or in stainless steel flip top enclosure.

(2) Stainless steel flip top enclosures shall be mounted on min. 16”x16” square concrete slab if located within landscape areas.

(3) Controllers shall be able to accommodate future expansion of the irrigation system.

(4) All controllers shall have cellular modems with an antennae attached to the controller enclosure.

(5) Master valves and flow sensors shall have the ability to operate multiple valves per program or multiple programs simultaneously.

(6) Provide pressure regulating devices to valves.

E. Master Valve at Irrigation Mainlines

Irrigation systems designed for SJRRC shall include a “master valve” at all irrigation mainlines. This valve shall be configured so that water under pressure is allowed to flow into the irrigation mainline ONLY when an irrigation control valve is also open. This valve shall be electrically connected to the controller/clock when central clocks are specified, or shall be controlled by an independent battery operated controller when control valves are operated by battery operated controllers. The purpose of this valve is to reduce the volume of water lost should a mainline break occur.

F. Safety and Health

All irrigation systems, new or existing, must be equipped with an approved backflow prevention assembly to assure the safe separation of potable water and irrigation water. Only properly installed, state- approved backflow prevention assemblies will ensure the health and protection of the public.

G. Point of Connection and Metering

The design of the potable water system has cost, permit, and maintenance impacts. Irrigation systems generally should not cross- connect with building potable water systems. This can be achieved either with a separate dedicated point of connection with the municipal water supply, or by dividing irrigation water from building water immediately after the meter and providing an approved backflow prevention device. Metering irrigation water separately (“deduct meter”) is required by SJRRC for larger facilities when sewerage charges will be waived by the municipal water bureau for irrigation water.

H. Maintenance Water Facilities

The two types of items addressed in this category are hose bibs and quick coupling valves (quick couplers). Provision of water is important for maintenance. Consider the risks of vandalism, impact on backflow prevention, and cost when designing these features.

(1) Hose Bibs

An exterior hose connection generally allowing connection to the building domestic water supply, not the irrigation mainline. Hose bib locations should be located at areas to allow for hardscape cleaning and should be lockable and concealed or flush mounted. Hose bibs should be located within 75 reach of all areas requiring cleaning.

(2) Quick Coupler Valve (Quick Coupler)

An in-ground valve that allows connection of a hose to the irrigation mainline using a special key. Locations shall be coordinated to permit complete site coverage with hoses.

6.3.8 Life Cycle Costs

SJRRC seeks to reduce the whole-life cost of its facilities. This might mean that initial costs of a facility or a project will be higher, in order to decrease long term maintenance costs. Life cycle costs assessment has been incorporated into SJRRC’s standard details and specifications. Life cycle costs assessment must be incorporated into any proposed deviations or additions.

6.3.9 Landscape Establishment Maintenance and Warranty

Designers shall develop detailed Landscape Establishment Maintenance Period Specifications that describe the specific maintenance efforts required by the Contractor (or their landscape installation subcontractor) during the Landscape Establishment Maintenance period which commences upon Final Acceptance and concluded, coincidentally, at the end of the Warranty period.

These specifications shall address all elements of the installed landscaping with appropriate and relevant requirements with specific focus on:

- Irrigation operations including winterizing/de-winterizing
- Structural pruning of trees and interval
- All aspects of designated vegetated stormwater facilities including specifics related to regulatory compliance
- All aspects of designated vegetated mitigation areas include specifics related to regulatory compliance
- Timing of work
- Inspections
- Number of litter, weed, tree stakes/other plant support materials, and debris removal activities and timing (do not use performance specifications solely)
- Detailing of 'turnover' to ensure responsibilities, information, operations and maintenance training, and other elements typically at the contract period conclusions are addressed because, in essence, this requirement creates a need for two turnover interfaces—from installing contractor to installing contractors maintenance forces at Final Acceptance, and from installing contractors maintenance forces to SJRRC's maintenance forces at the end ofthe Landscape Establishment Maintenance Period.
- Cost estimating of all activities considered for specifications/specified to ensure fit to budget and link to high value outcomes.

6.3.10 Paving

A. Station Plaza hardscape fall within three categories: general circulation areas, high pedestrian traffic areas/areas of high visual interest, and miscellaneous/special conditions.

B. An accessible path of travel must be provided consisting of walks and sidewalks, curb ramps and other interior or exterior pedestrian ramps; clear floor paths through the parking facilities, plaza areas, elevators, pedestrian bridges and ramps, and continue unimpeded to the accessible mini high ramps on the platforms. t

C. corridors, rooms, and other improved areas; parking access aisles; elevators and

D. lifts; or a combination of these elements.

E. General circulation areas include sidewalks site paths in parking areas. General circulation area hardscape to be a poured-in place standard grey color broom-finish concrete and ADA-compliant.

F. Areas of high visual interest include elevator or stairwell transitions from the plaza and main path of travel from parking lots or bus drop-off. Hardscape in these areas

should act to facilitate circulation within the station plaza and help riders identify key station areas. Hardscape in these areas may be an integral-colored concrete paving, pavers or a change in concrete finish or pattern to distinguish itself from general circulation hardscape. For stations with permeable or sandy soils,

permeable paving (permeable concrete, porous asphalt, flexipave, etc.) may be used to support stormwater infiltration, per geotechnical recommendations.

G. Miscellaneous/special condition hardscape include secondary seating areas, informal walkways not along main paths of travel, and wayfinding/safety hardscape features.

H. Truncated domes/detectable warning strips shall be placed at curb ramps, along station platforms and at flush curbs adjacent to vehicular traffic (per applicable codes and regulations).

I. Stabilized decomposed granite may be selectively used but kept at a minimum in secondary seating or informal walkways.

J. Concrete Paving

(1) Concrete paving shall have saw cut joints. Scoring and expansion joints should be of a size and spacing to create visible patterns and to control and isolate cracking (per geotechnical recommendations).

(2) Scoring joints shall be used at a maximum spacing of 6 feet (6') on center in any direction, with a preferred pattern of 2' x 4'.

K. Pedestrian Paving

(1) Paving materials shall provide flush transitions between surfaces, with a minimal differential settlement over time, not to exceed 1/4".

(2) No more than 2/3 of a unit paver shall be cut for site installation.

(3) Walkways at plaza and within parking lots shall be raised at minimum 6" above adjacent vehicular paving.

L. Planter Curbs

Continuous planters in the parking areas shall be contained by a raised 6" concrete curb. In cases where raised curbs are not used in the tree planters for storm water management purposes, high contrast wheel stops and/or security bollards shall be used to protect each tree from vehicle damage.

6.3.11 Site Furniture

A. Seatwalls

(1) Seat walls should be a maximum 18" tall and minimum 12" deep.

(2) Skate deterrents shall be provided on the edges of concrete seatwalls, located 36"-42" apart.

B. Bike Racks

(1) Bicycle racks shall be securely anchored to the ground, either embedded or surface mounted with at least one tamper resistant fastener per rack foot.

(2) Power coat finishes shall not be used.

(3) Acceptable bike racks include:

- Sportworks 'Westport No-Scratch Bike Rack'
- Sportworks 'Tofino No-Scratch Bike Rack' (Cane detectable)

C. Bollards

(1) Bollards shall be constructed of stainless steel, 6" to 8" in diameter, 30" to max 36" height.

(2) Bollards may be retractable/removable per site conditions and SJRRC input.

D. Benches

(1) Benches at plazas and platforms shall be backless, made of stainless steel, and have arm rests in between to deter sleeping. Powdercoat finishes shall not be used unless SJRRC approved.

(2) Benches shall be either surface or wall mounted.

(3) The following benches may be used in the station areas:

- Landscape Forms 'Austin Bench'
- Forms+Surfaces 'Transit' Seating
- Forms+Surfaces 'Tecno RS; Seating System

E. Trash and Recycling Bins

(1) Trash and recycling bin selections must be robust with metal frames, made of solid durable material and aesthetically match other site furnishings. Approved materials include weathered steel, corten steel or cast iron.

(2) Acceptable trash and recycling receptacle models include:

- Landscape Forms Chase Park Litter Receptacle
- Landscape Forms 'Plexus'
- Forms+Surfaces 'Urban Renaissance'

F. Tree Grates

(1) Tree grates shall be used in station plaza areas, be ADA-complaint, minimum 6' width/diameter. Approved materials include weathered steel, corten steel or cast iron.

(2) Tree grates shall be constructed of the following materials:

- Weathered steel / Corten Steel
- Cast Iron

G. Drains

(1) Area drains and trench drains shall be ADA-compliant with heel-proof design.

(2) Drain covers shall be made of a strong and durable material, and aesthetically match tree grates.

H. Railings and Guardrails

(1) Railings are required where the path of travel is adjacent to areas where the

grade drops more than 30” or where the path is within 36” horizontally from the lowest adjacent grade. (Refer to California Building Code 1015.2)

(2) Where railings are required, rails shall not be less than 42” high from adjacent paths. Refer to California Building Code 1015.3)

(3) Hand rails and guardrails shall be constructed of Stainless Steel.

I. Site Lighting

(1) Site Lighting in parking lots and public plazas shall provide a minimum of 1.0-3.0 foot candle average lighting level with a max/min uniformity ratio of 7:1 max.

(2) Pole lights along pedestrian paths shall be mounted no higher than 12’.

(3) Trees in station plazas shall be illuminated with at least one in-grade or accent light per tree.

(4) Bollard lights shall be similar in design aesthetic to the pedestrian pole lights.

(5) Light fixtures selected need to comply with IESNA standards, be Dark Sky compliant and minimal glare.

(6) LED fixtures shall be selected and should be vandal resistant.

(7) At distinct stations, lighting design may be distinctly different than standard fixtures provided. These fixtures may draw from surrounding project context. For example, inspiration may be drawn from the strong mission revival architecture of the train depot (in the case of Modesto), the classic rail architecture (in the case of Manteca) or a more contemporary palette that blends with the effort to revitalized Midtown. Individual designers of these stations to have the freedom for selective opportunities for customization of plaza lighting within the larger “kit of parts”.

6.3.12 Stormwater Management

Key stormwater management strategies include 1) slowing down stormwater flows, allowing pollutants to slowly settle out of the water; 2) spreading stormwater out over a larger area allows plants and soil to filter out pollutants; and 3) sinking stormwater into the soil to help provide water for plants, replenishing the groundwater. Acceptable stormwater management techniques which incorporate these strategies 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.

A. Bioswales

(1) Bioswales shall have porous soil strata consisting of 60-70% sand and 30-40% compost with a gravel sub-base. Water should be able to percolate through this soil treatment at a rate of 5-6” (inches)/hour.

(2) Rows of planting along the top of the slope should be considered to be able to slow water down as it begins its decent from impervious surfaces down into the bio filtration swale.

(3) Select plant species that filter and slow the movement of water from curb inlets. Bioswale plants must be tolerant of partial standing water or flooding, and should be irrigated to maintain appearance year-round. Refer to section

6.4, APPENDIX—SUGGESTED PLANT LIST for acceptable bioswale plant selections.

(4) Permanent signage should be added to indicate bioswale areas, water quality purposes as well as safety signage such as, “area may pond after a heavy rain event” and “the area is not to be disturbed except for required maintenance.”

6.4 APPENDIX—SUGGESTED PLANT LIST

See Exhibits 6.4 A, B, C, D

Trees
Shrubs
Ornamental Plantings
Bioretention/Flow Through Planters

Under Separate Cover TBD

CHAPTER 7

VERTICAL CIRCULATION

CHAPTER 7 – VERTICAL CIRCULATION

7.1 GENERAL

This chapter pertains to new Valley Rail stations. Further civil and structural engineering guidelines are provided in *Design Criteria*, CHAPTER 3 – CIVIL.

Vertical circulation includes ramps, stairs, overcrossings, and undercrossings that facilitate passenger access to the station platforms.

The quality, durability, and sustainability of vertical circulation elements are extremely important; the integration of good design, good materials, and good asset management strategies is essential.

7.2 REFERENCES, STANDARDS, REGULATIONS, CODES, GUIDELINES

7.2.1 Industry

Design of stations shall comply with the principal standards listed below, except when superseded or amended by the District's Facility Design Criteria. The latest edition of any design standards, codes, and regulations shall be used:

A. UPRR, AREMA, and FRA design standards and requirements

B. California Building Code (CBC), as applicable

C. NFPA 101, 130, 220, as applicable

D. California Code of Regulations (CCR), Title 8, as applicable

E. California Code of Regulations (CCR), Title 24, as applicable

F. *American with Disabilities Act (ADA) Accessibility Guidelines* (ADAAG), as applicable

G. ASME A17.1, *American Society of Mechanical Engineers (ASME) Safety Code for Elevators and Escalators*

7.3 CRITERIA / APPLICATION

7.3.1 Vertical Circulation

This section provides design criteria for vertical circulation related to passenger access to and from platforms using ramps, stairs, pedestrian bridges, and tunnels.

7.3.2 Design Principles

Vertical circulation shall be designed to make access to and from platforms as safe, rapid, and convenient as possible for all potential passengers. Design 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.

7.3.3 Stairs

A. General

(1) All stairs are required to be accessible per *ADA Standards for Accessible Transportation Facilities.*

(2) The minimum design capacity of a stairway shall be for Fruin level-of-service (LOS) “C”—7 to 10 pedestrians per foot of effective width per minute. See “Pedestrian Planning and Design” by John J. Fruin, PhD.

(3) Noncombustible materials shall be used for all stair construction.

(4) Maximum height between landings should be 12 ft. Minimum landing depth shall be at least equal to effective stair width.

(5) In any one flight, the minimum number of risers shall be two.

(6) Minimum unobstructed space in front of stairs, at top and bottom, shall be 12 ft min, 15 ft preferred beyond the last riser. For stairs wider than 8 ft, the minimum distance shall be increased proportionally to the nearest whole foot.

(7) Tread and riser relationship shall have a minimum riser of 6-1/2” and a maximum riser of 7”. Tread depth shall be 11–12”. A 6-3/4” riser and 12” tread is preferred. The sum of tread depth and riser height shall be 17–18”, with the slope of stairs between 30 and 33 degrees.

(8) The stair treads shall be of a slip-resistant material, with a nosing that is distinct and meets the requirements of ANSI A117.1 and CBC. The slip-resistant materials used shall not require maintenance (other than normal housekeeping) to retain their slip-resistant qualities. The static coefficient of friction shall not be less than 0.6 when tested in accordance with ASTM C 1028).

(9) Nosings of each step and landing shall have a slip-resistant strip of contrasting color and texture 3” wide to alert the visually impaired. Nosing shall match or exceed same slip-resistance as treads.

(10) When stairs are poured-in-place concrete finish, a manufactured integral nose guard meeting the above requirements shall be used.

(11) Headroom

For protruding objects, measured perpendicular to the tread at nosing: 8’-6” minimum

For continuous soffits or ceilings, without obstructions:10’-0” minimum

B. Stair Widths

(1) Total width of stairs shall be calculated to meet emergency egress capacity requirements.

(2) Public use: 5’-6” minimum (three exit lanes at 22” each).

(3) Access/egress stairs from ends of platform to track bed: 3’-8” minimum (two exit lanes at 22” each). Provide areas of refuge for disabled where required by code.

C. Handrails

(1) Handrails shall meet the requirements of ANSI A117.1 and CCR, Title 24.

(2) Stairways having less than four risers need not have handrails or stair railings.

(3) Height of handrail at stairs, stair landings, and top and bottom of stairs: 34" measured vertically from the top of the tread, at the nosing, to the top of the handrail.

(4) Handrails shall be provided on each side of stairs and shall be continuous through landings for the full length of the stair. Handrails shall extend 18" beyond the riser at each end of flight.

(5) All stairs in excess of 5'-6" wide shall have intermediate handrails.

(6) Maximum width between handrails shall be 88" of required width. Minimum width between handrails shall be 44".

(7) Intermediate stair railings may be of single rail construction.

(8) Handrails may extend up to 3-1/2" into required stair width and should be between 1-1/2 to 1-3/4" in diameter.

(9) Handrails projecting from a wall shall have a space of not less than 1-1/2" between the wall and the handrail.

(10) Avoid handrail extensions terminating downward to avoid conflicts with bicycles on the bicycle stair channel (BSC).

(11) All handrails shall be made of 316-grade stainless steel.

D. Bicycle Stair Channel (BSC)

(1) General

(a) The shape of the bicycle channel shall guide the bicycle in a straight line and prevent pedals and handlebars from colliding with elements adjacent to the stair channel, such as stair walls, handrail posts, or solid walls.

(b) Accommodate for tires between 7/8" to 4" thick.

(c) Accommodate bike frame sizes between 14–21". (Full bicycle height of 2'-8" to 3'-4".)

(d) The shape shall encourage an upright handling of a bicycle and shall allow for tilted handling so as not to scrape or interfere with the adjacent walls or handrails.

(e) Avoid collisions or interference with adjacent surfaces, handrails, guardrails, and stairs.

(2) Placement

(a) Place BSC parallel to the run of the stair. The BSC shall be at the corner, where the stair meets a wall or a guardrail; or bisecting the stairway if there is an accompanying handrail that also bisects the stairway.

(c) Design BSC to prevent a foot or toe from getting wedged underneath to avoid toe-pinching or tripping. For BSCs located less than 4” measured from the edge of the nosing to the bottom of the stair channel, close gaps between stair channel and BSC with a solid vertical surface along the side of the channel.

(3) Size

(a) BSC shall not protrude greater than 6” beyond the handrail to maintain a reasonable distance between a pedestrian and the handrail. The stairway handrail may overlap above the width of the BSC by up to 4” without impacting its use.

(b) BSC shall not be narrower than 6-1/2”.

(c) BSC shall comply to CBC 1012.8 projections.

(4) Materials

(a) BSC shall have adequate friction or grip to prevent tire slip. Stainless steel does not have adequate friction. Three-dimensional decoration or a textured finish may be used to provide friction or grip.

(b) For wider channels, provide skate deterrents along the edge to discourage skateboard use.

(5) Transitions

(a) Provide smooth transitions at landings and at top and bottom of stairway. Provide transitions that diverge from the slope of stairs so that pedals do not collide with stairs.

(b) Transitions shall not cause a trip hazard.

(6) Visibility

(a) Mark edge of the BSC in a high contrasting color and pattern.

(b) Illumination may be used to increase visibility.

(7) Signage

Provide signage to guide bicyclists to stair channels and to inform bicyclists how to utilize the channel, with information including, if necessary, tilting and using the brakes.

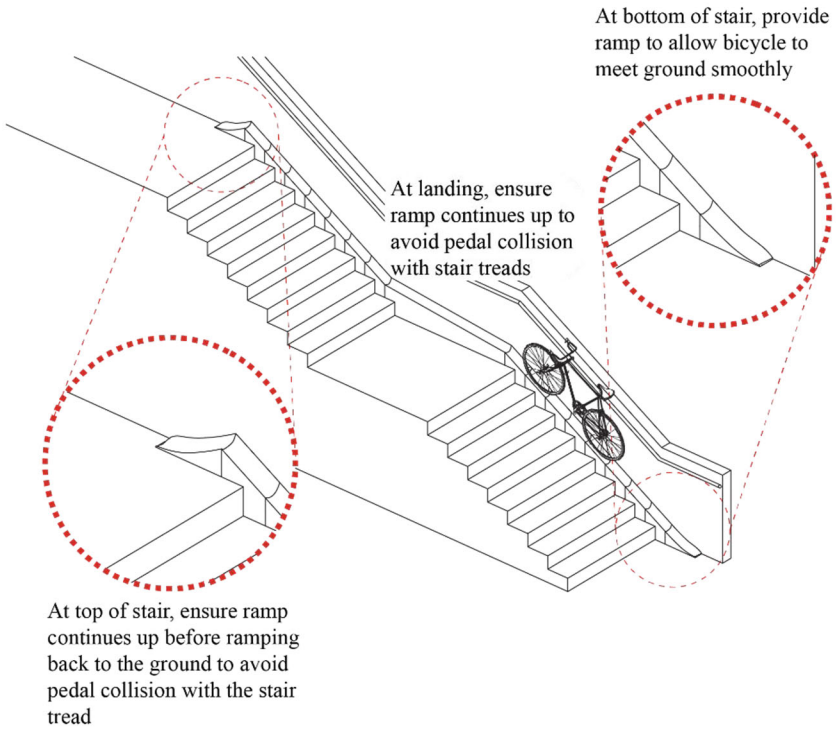

Figure 7-1: Illustration of Acceptable Transitions at Top, Bottom, and Landing of Stair

7.3.4 Elevators

A. General

(1) For all stations, at least two elevators shall serve the platform. Station elevators shall be hydraulic type per requirements in CHAPTER 8 – ELEVATORS.

(2) Elevators shall be sized for emergency evacuation of a horizontally-positioned stretcher 24” x 84”.

(3) At least one elevator on the platform side and one elevator on the station side shall be considered part of an accessible means of egress and shall comply with the emergency operation and signaling device requirements of section 2.27 of ASME A17.1. Standby power shall be provided in accordance with section 2702 and 3003.

(4) The elevators shall be equipped for Fire Service II, according to ASME A17.1.

(5) Elevator doors and hoistway doors shall have glass vision panels.

(6) Wayfinding signage to assist patrons in locating elevators shall be provided. Signage shall be accessible to patrons with disabilities. Signage indicating elevator locations shall be carefully designed so as not to misdirect passengers toward the sign but away from the elevator. Elevator hoistways shall be constructed to meet the code requirements of the building, but shall be a minimum of 1-hr fire rated construction.

(7) Elevators shall be signed as part of bicycle access routes.

(8) Finish floor at entrances to elevators shall slope away from hoistways to

prevent direct flow of water towards cabs and pits.

(9) For platform signs directing passengers to the elevators, the font and size displaying an elevator's location within the station shall be consistent with the wayfinding hierarchy as defined by *Design Criteria*, CHAPTER 15 – SIGNAGE AND WAYFINDING.

B. Machine Rooms

(1) A dedicated elevator machine room shall be provided for elevator operations. An elevator machine room may service multiple elevators.

(2) Elevator machine rooms shall be located as close as possible to the elevator hoistway, but shall not exceed 50 ft.

(3) No other machinery, equipment, panels, or controls other than those required for the operation of the elevator shall be permitted in the elevator machine room.

(4) Machinery and associated equipment in elevator machine rooms shall be made accessible only to authorized attendants.

(5) Elevator machine rooms shall be sized to accommodate related equipment, with adequate space for maintenance and replacement of all equipment, controllers, and auxiliary control equipment located in the machine room.

(6) The main machine room floor area shall be at least 150% of the square footage required by NEII.

(7) Machine room shall have clear headroom of 84" minimum.

C. Electrical

(1) All elevators shall be operated by 480-volt, 3-phase power from the emergency power source of the 480-volt switchboard or emergency generator.

(2) There shall be a minimum of four dedicated 120-volt circuits provided for each elevator, unless the elevators are grouped by one controller; elevator cab lighting and ventilation, CCTV, elevator machine room lighting and receptacles, and hoistway pit lighting and receptacles.

(3) The lighting levels in the elevator cab, at hoistway entrances, and in machine rooms shall comply with the requirements of the SJRRC *Design Criteria*, CHAPTER 12 – ELECTRICAL SYSTEM.

(4) Elevator machine rooms shall be equipped with smoke detectors that interface with the elevator controller via the main fire alarm panel.

D. Communications and Seismic Sensor

(1) Passenger elevators shall be provided with an emergency alarm system, operable from within the car. Refer to *Design Criteria*, CHAPTER 14 – COMMUNICATIONS, for communication requirements in regard to elevators.

(2) All station elevators shall shut down upon occurrence of a seismic event near the station. The elevators shall be connected to the seismic sensor, which shall be installed in one of the auxiliary communications rooms in the structure.

(3) For communication systems related to elevators, including white courtesy telephone inside and at entrances to elevators, fire alarm, seismic, CCTV cameras, remote monitoring and control indication of elevators at Cabral Station, refer to the appropriate section in *Design Criteria*, CHAPTER 14 – COMMUNICATIONS,.

E. Mechanical

Refer to *Design Criteria*, CHAPTER 11 – MECHANICAL AND PLUMBING SYSTEMS, for requirements for drainage from elevator pits.

7.3.5 Pedestrian Bridges and Overcrossings

A. General

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. At certain stations where pedestrian bridges and overcrossing are adjacent to residential areas, privacy screening should be incorporated as part of the barrier design. See *Design Criteria*, CHAPTER 16 – ART AND ELEMENTS OF DISTINCTION PROGRAM, for additional criteria.

(1) The access structure on the station side must be set back a minimum of 5’-0” clear horizontal distance from the UPRR ROW to facilitate construction of temporary work that will not encroach into the UPRR ROW or a minimum clear horizontal distance of 9’-0” from the centerline of track, whichever is greater.

(2) The overcrossing walkway shall be a minimum of 11 ft wide and have a minimum vertical clearance over the tracks of 23’-4” from the top of rail.

(3) The overcrossing walkway shall have a slip-resistant walking surface that meets the requirements of ANSI A117.1 and CBC. The slip-resistant materials used shall not require maintenance (other than normal housekeeping) to retain their slip-resistant qualities. The static coefficient of friction shall not be less than 0.6 when tested in accordance with ASTM (C 1028) 15.02.

(4) Electrical and mechanical handhole box lids shall be flush fit, checkered, sidewalk lids, and must meet standards for slip resistance.

(5) Overcrossings shall have protective throw barrier fencing, handrails, and guardrails per UPRR design criteria. Fencing shall be provided on both sides of the overcrossing. The fence shall extend completely across the UPRR ROW.

(6) Overcrossing throw barrier fencing shall be 10’-0” high where the overcrossing traverses the trackway within the UPRR ROW. Pedestrian bridges parallel to the tracks do not require throw barriers.

(7) Overcrossing throw barrier fencing shall have openings no greater than 1” in the maximum direction.

(8) An overhead shade structure shall be incorporated into the design of the overcrossing to provide users with sun protection.

(9) Handrails shall meet the requirements of ANSI A117.1 and CCR, Title 24.

(10) Height of handrail at stairs, stair landings, and top and bottom of stairs: 34” measured vertically from the deck to the top of the handrail.

(11) Handrails shall be provided on each side of pedestrian overcrossings and bridges and shall be continuous for the full length of the paths of travel.

(12) Handrails projecting from a wall shall have a space of not less than 1-1/2” between the wall and the handrail, and should be between 1-1/2 to 1-3/4” in diameter.

(13) A vertical rolling door barrier system for access control shall be installed at the station end of the overcrossing for security during station closure when ACE/San Joaquins does not provide service. Such access features require emergency egress release from the platform to the station side when closed.

(14) The preferred material for all fencing and railings is hot-dipped galvanized steel, without any additional coatings or finishes for durability and maintenance purposes.

(15) Duplex finishes utilizing a combination of both hot-dipped galvanizing and paint or powder coating must be approved by SJRRC in advance.

B. Handrails

All handrails shall be made of 316-grade stainless steel.

C. Water Service

(1) 1” diameter water service connections shall be provided to each overcrossing for cleaning. Water service(s) shall be coordinated and meet all applicable code requirements.

(2) Integral tamper-resistant wall valve and box for hose connections shall be provided on pedestrian bridges and overcrossings adjacent to the elevators, one on the platform side and one on the station side.

D. Electrical Service

Guidelines for electrical services are provided in *Design Criteria*, CHAPTER 12 – ELECTRICAL SYSTEM.

E. Security and Lighting

(1) CCTV camera locations should be carefully planned to provide maximum visibility. All areas of the overcrossing shall be observed with CCTV cameras.

(2) An emergency telephone conforming to ADA standards shall be made available on overcrossings located near station side elevators as a means for contacting 911 and SJRRC security.

(3) Pedestrian overcrossing shall be uniformly lit, with a minimum of 3 foot-candles and average of 5 foot-candles, with a uniformity of 2:1. All luminaries and lamp types shall be LED.

(4) All luminaries on pedestrian bridges and overcrossings shall be dark sky compliant.

F. Signage Elements

Signage and information elements include customer-facing signage to communicate with transit patrons and SJRRC safety and regulatory signage used to control, enforce, or direct pedestrian and bicycle traffic. See *Design Criteria*, CHAPTER 15 – SIGNAGE AND WAYFINDING.

G. Drainage

(1) Drainage from overhead structures shall be diverted away from the railroad ROW at all times.

(2) Deck drainage shall incorporate downspouts and shall be connected to the storm drain system. Scuppers from the deck shall not be permitted.

(3) Downspouts should be located to maximize efficiency and reduce quantity as possible. Downspouts should be architecturally integrated or hidden as practical. Downspout cleanouts should be provided to facilitate periodic cleanout by SJRRC.

7.3.6 Pedestrian Undercrossings

A. General

Pedestrian undercrossings shall meet all UPRR Guidelines for Railroad Grade Separation Projects.

B. Ramps

(1) Any part of an accessible route with a slope greater than 1:20 shall be considered a ramp and shall comply with *ADA Standards for Accessible Transportation Facilities*.

(2) Ramps shall have level landings, 5 ft long (60”), for rest and safety at no more than 30-foot intervals and whenever turns are unavoidable. A 5'-0” x 5'-0” landing is desirable at the top of a ramp, with 6 ft of straight clearance at the bottom.

(3) Ramps shall have a slip-resistant walking surface that meets the requirements of ANSI A117.1 and CBC. The slip-resistant materials used shall not require maintenance (other than normal housekeeping) to retain their slip-resistant qualities. The static coefficient of friction shall not be less than 0.6 when tested in accordance with ASTM (C 1028) 15.02.

(4) Walking surfaces greater than 5% slope shall be provided with a handrail. The minimum clear width of a ramp between handrails is 60”. Handrails shall be provided on both sides and shall be continuous.

(5) Sidewalk and/or ramp areas shall be a minimum of 72” in width and the ramp shall not exceed a slope of 1:14 (7.14%). The maximum cross slope shall not exceed 1.5%.

(6) The ramp areas and landings should consider station identification, Passenger Information Displays, and regulatory signage as required to facilitate passenger flow and station access.

(7) Lighting should be provided with a minimum of 3 foot-candles and an average of 5 foot-candles at the walk surface.

(8) The minimum design capacity of a ramp shall be for Fruin level of service “C”—10 to 15 pedestrians per foot of effective width per minute.

C. Tunnels

(1) Tunnels shall be of precast or cast-in-place concrete construction, in accordance with UPRR requirements and site structural requirements.

(2) Tunnel walkways shall have a slip-resistant walking surface that meets the requirements of ANSI A117.1 and CBC. The slip-resistant materials used shall not require maintenance (other than normal housekeeping) to retain their slip-resistant qualities. The static coefficient of friction shall not be less than 0.6 when tested in accordance with ASTM (C 1028) 15.02.

(3) Concealed Surfaces

Painting is not required on wall or ceiling surfaces in concealed areas and generally inaccessible areas, such as foundation spaces, furred areas, utility tunnels, pipe spaces, and duct shafts.

(4) Location of conduit, including location of raceways and crossovers must be coordinated with ceiling and wall cladding systems.

(5) For ceiling treatments, perforated metal ceiling elements, similar to those used at the bridge shade structures, shall be incorporated

(6) For wall cladding, final panel-to-wall attachment details and dimensions are to be coordinated and verified with porcelain panel fabricator.

(7) Vertical chases for conduit shall be provided. They are to be cast-in place in tunnel transitions to stairways.

(8) Conduit shall be designed within the floor of the tunnel or in a dedicated duct bank.

(9) Nonferrous Metal Wall Surfaces

Anodized aluminum, stainless steel, copper, and similar nonferrous metal materials will not require finish painting unless otherwise specified.

(10) Modified bituminous sheet waterproofing may not be used for waterproofing of tunnels, cut-and-cover underground structures, or structures.

(11) Provide only galvanized rigid steel conduit, intermediate metal conduit, and accessories for all installations in tunnels and under-platform chases, (including ventilation fans, lighting and sump pumps), where approved by NFPA 130. Galvanized rigid steel may not be used when conduits are embedded in concrete.

(12) All emergency power and lighting circuits, communication circuits, fire alarms, service entrances, emergency systems (vent fans, dampers, pumps, and generators), and circuits must not be installed in electrical metallic tubing.

(13) A convex mirror shall be provided at internal 90° corners and angled wall corners at directional changes.

(14) Any 3rd party advertising signs shall be integrated within the wall paneling system.

D. Drainage

(1) Drainage shall utilize side gutters, with metal grates over gutters secured to floor with retaining clips.

(2) Drainage gutters shall be 2” deep by 4” wide. Provide a minimum cross slope of 0.6% and longitudinal slope of 0.3% for drainage.

(3) Drainage shall be directed to a sump pump pit.

San Joaquin
Joint Powers Authority

San Joaquin
Regional
Rail Commission

CHAPTER 8

ELEVATORS

CHAPTER 8 – ELEVATORS

8.1 GENERAL

This chapter covers the basic design considerations and industry requirements for passenger elevators within the SJRRC system.

8.2 REFERENCES, STANDARDS, REGULATIONS, CODES, GUIDELINES

8.2.1 Industry

The following industry standards shall be the latest edition:

A. *ADA Accessibility Guidelines* (ADAAG) and/or standards, whichever are more stringent

B. ICC/ANSI A117.1, *Accessible and Usable Buildings and Facilities*, and/or the equivalent State of California codes, whichever are more stringent.

C. ASME A17.1/CSA B44, *Safety Code for Elevators and Escalators*, including *Elevator Safety Requirements for Seismic Risk Zone 2 or Greater*, and applicable State of California amendments

D. ASME A17.2, Guide for the Inspection of Elevators, Escalators and Moving Walks

E. ASME A17.3, *Safety Code for Existing Elevators and Escalators*, and applicable State of California amendments

F. ASME A17.7/CSA B44.7, Performance-based Safety Code for Elevators and Escalators

G. National Electrical Code (NEC): NFPA 70

H. National Fire Code: NFPA 13

I. National Fire Alarm and Signaling Code: NFPA 72

J. International Building Code (IBC)

8.2.2 Federal, State, Local

A. Local authority having jurisdiction.

8.2.3 Definitions

Terms used are defined in the latest edition of ASME A17.1, *Safety Code for Elevators and Escalators*.

8.2.4 Quality Assurance

A. Compliance with Regulatory Agencies: Comply with most stringent applicable provisions of following codes, laws, and/or authorities, including revisions and changes in effect.

B. Design elevator systems based on American Public Transit Association (APTA) heavy-duty transit guidelines for station elevators.

8.3 CRITERIA / APPLICATION

8.3.1 General Design Considerations

A. Elevator types shall be evaluated and selected based on site conditions, type of facility, intended use, amount of rise, capacity, speed, initial cost, and maintenance cost, in coordination with the codes and requirements of the AHJs.

B. Design elevator, hoistway, and machine room in accordance with the current versions of the following reference documents:

C. Elevator design and construction shall comply with all applicable building codes, Americans with Disabilities Act (ADA) requirements, and standards, as required by the Authorities Having Jurisdiction (AHJs).

D. Structural design for elevator systems and the structure to support these shall conform to the following codes and standards:

E. Elevators shall be in conformance with U.S. Department of Transportation's (USDOT's) ADA *Standards for Transportation Facilities*.

F. Structural members, elements, and components subject to dynamic loads from elevators shall be designed for impact loads and deflection limits prescribed by ASME A17.1.

G. Elevators and hoistway systems shall satisfy seismic design requirements for nonstructural components defined by American Society of Civil Engineers (ASCE) Structural Engineering Institute (SEI) Standard 7 (ASCE/SEI 7).

H. Structural design shall provide adequate support for rail bracket support points, machine-mount support points, deflector sheave mount points, and buffer reaction points (cab and counterweights).

8.3.2 Elevator System Selection

Proprietary systems shall not be used. Only equipment that is supported bythe manufacturer to all elevator maintenance companies, without regard to affiliation, or lack thereof, will be acceptable. Acceptable manufacturers for stations shall be coordinated with SJRRC and be of the same type and manufacturer system-wide per SJRRC direction.

A. The design shall accommodate the ability of the equipment to be maintained by multiple service contractors.

B. The design for public stations shall be robust equipment intended for use in outdoor environments and meet APTA requirements.

C. The size of the equipment shall be capable of transporting a gurney.

D. Preference for hydraulic or traction-type elevators should be based on:

- ≤ 40-Foot Rise – Use Hydraulic
- > 40-Foot Rise – Electric Traction

E. For Hydraulic Elevators:

- Wet submersible pump units are preferred for lower maintenance and smaller pump package sizes where elevator machine room space is

constrained.

- Where continuous high-use applications are anticipated, dry pump units may be considered for maintaining lower oil temperatures to improve leveling performance during periods of continuous usage and high service demand. Dry pump units require more space than wet submersible pumps.

8.3.3 Elevator System General Requirements

A. All equipment provided shall be weatherproof.

B. Elevators are to be suitable for heavy-duty transit environment.

C. Capacity Rating

Rated capacity of each passenger elevator shall be based on patronage, with a minimum capacity of 5,000 pounds.

D. The minimum speed of passenger elevators based on hydraulic elevators shall be 150 fpm.

E. Passenger elevators shall provide vertical transportation between levels for passengers, including individuals who have disabilities. The class of elevator shall be capable of transporting a single concentrated load equivalent to 25% of the rated capacity.

F. All exterior elevator entries shall be covered and protected from weather. Floor areas outside elevator doors and elevator shaft shall slope away from elevator. Provide floor drains outside elevator doors where entries are subject to weather. All fixtures shall be vandal-proof.

G. Controls shall be designed and located to meet requirements of the *ADA Accessibility Guidelines* and local codes.

H. The final assembly of all components shall not pose hazardous conditions to the public or maintenance personnel. Surface irregularities, sharp edges, or protrusions in public or maintenance areas shall not be permitted.

I. Metal surfaces shall be hot-dipped galvanized, except nonferrous metals and stainless steel. Where hot-dipped galvanizing is not feasible, the manufacturer shall submit an alternative corrosion-resistant treatment providing the equivalent protection for approval.

J. Machined and operational areas shall be protected from corrosion by applying a rust-preventative compound, oil, or grease.

K. All galvanized surfaces shall have a paint finish in accordance with the approval paint schedule.

L. No dissimilar metals shall contact each other.

8.3.4 Cab Doors, Openings, and Elevator Enclosure

A. All cab openings shall be situated or protected in such a way that solar expansion and environmental conditions in typical transit applications is addressed.

B. Utilize glass elevator doors and walls to enhance surveillance in and out of the elevator cab and elevator hoistway enclosure.

(1) Where glass walls are installed, provide laminated safety glass as required by ASME A17.1/CSA B44 and ANSI Z97.1.

(2) Protect glass in the elevator cab with a vandal shield product applied to the interior surface of the elevator cab glass and any exterior glass below 8 feet and within public reach. The exception would be etched glass, which vandal shield should not be applied to in any instance.

(3) All frames shall be stainless steel with vandal/tamper resistant stainless steel fastening screws.

(4) Provide sun shade or canopies at entrances, considering orientation of elevator and solar exposure when locating them within the structure.

(5) Glass pane size should not be a prohibitive size, shape, and weight to install, remove, or reinstall on site using standard equipment. Typically, 2'x3' has been the guideline for size, shape, and weight for installation by one person. Depending on whether or not a pane of glass is installed from the ground or from a ladder or lift, where there are more risks for the installer, some variations from that size have been considered. Maximum glazing sizes may be up to 6'x8'.

(6) For ease of replacement, standardize the size of the glass pane size uniformly on site to the greatest extent possible.

(7) Glass should be removable from the exterior of the elevator enclosure.

C. Minimum door size shall be 4'-0"x7'-0". Actual door size shall be determined by Designer. Door should be a single-speed center-opening door.

D. Provide a metal toe guard on door-side(s) of elevator cars, minimum of 36" below car, or as otherwise required by AHJ,

E. Floor platform materials shall be metal. Finish material shall be of durable material capable of handling heavy-duty traffic.

F. All metal wall and ceiling cladding, railings, and trim shall be stainless steel.

G. Elevator car ceiling heights shall be a minimum of 8'-0". Provide energy-efficient light fixtures consistent with Contract Documents.

H. Elevator cab shall provide floor space and maneuvering clearances for an 84"-long by 24"-wide with 5"-radiused corner stretcher or per requirements of the local AHJ, whichever is more stringent.

I. Provide APTA recommended door operators at elevator doors. Where provided, incorporate a fascia panel a minimum width of the door opening inside the elevator hoistway between elevator landings to prevent bodily harm in the case of car doors opening mid-travel between landings. Alternatively, elevator door interlocks may be provided that are non-APTA preferred to eliminate the need for a fascia.

J. Provide a metal attached sill, flush with the elevator landing threshold, meeting ADA surface level change criteria at each elevator landing. Attached sills allow debris to clear the door operator area and door tracks during normal operation into the hoistway. Recessed sills are discouraged due to the potential for build up of debris causing malfunction and inactivation. Recessed sills have a tendency to collect human waste, dirt, trash, and other debris leading to increased degradation of mechanical parts and finishes.

8.3.5 Finish Flooring and Base

A. Rhino™ linings or approved equal are to be installed as floor covering and vertically on all walls to a height of 6". No seams from actual flooring and vertical area on walls/flooring are allowed.

B. Sub-Flooring - Steel flooring is to be installed.

C. Car Handrails

Stainless steel handrails shall be provided on all walls and shall comply with ADA requirements.

8.3.6 Capacity Data Plate

All elevators (both passenger and freight) shall have a data plate attached to the interior wall of the cab specifying both maximum weight and occupancy capacity.

8.3.7 Fixtures, Call-Button Panels and Indicators

A. Fixtures, panels, and digital position indicators shall be provided inside the cab and elevator entrance/exit points at all landings or levels.

B. Digital Position Indicator Panel - The digital position indicator shall indicate floor level and car direction of travel in car position indicators.

C. Call-Button Panels - Call-button panels shall have stainless steel, vandal-resistant, domed buttons with jewel indicator lights.

8.3.8 Lighting

A. Interior and exterior elevator lighting levels and equipment requirements will be 50 fc at elevator exterior entry landings and 10 fc in cab interiors.

B. Emergency lighting shall be integrated into the normal portion of the car lighting.

8.3.9 CCTV

Cab shall accommodate installation of CCTV cameras and be connected to SJRRC's rail CCS system. CCTV shall be programmed and integrated with SJRRC's CCTV System.

8.3.10 Signal Equipment Criteria

A. An emergency alarm bell shall be provided.

B. Car and landing shall be equipped with illuminated and tactile pushbuttons. Hall lanterns that are visible from the side and bells shall be provided at each floor level, centered above each elevator entrance.

C. Call buttons and control devices shall be in NEMA 4 boxes in all locations. Shaft wiring shall be waterproof.

8.3.11 Communication Equipment

A. Passenger elevator communication devices shall operate in compliance with ASME A17.1/CSA B44 and ADA requirements.

B. A pushbutton-activated Passenger Emergency Telephone (PET) shall be provided in each elevator car for use by the public and employees. The phone equipment shall

communicate with the Information Technology and Communications (ITC) central communication control center.

C. Provide new code-compliant ADA-approved in-car emergency communication device, to be installed as an integral part of the Car Operating Panel (COP). Provide all necessary wiring between the elevator car and the elevator machine room.

D. Provide code-compliant intercom system between elevator car and elevator Firefighters' Emergency Operation station located at the designated level. On-off activation is required only at station. In-car communication is voice activated. Provide switch for ON and OFF positions. Engrave "ON" and "OFF" in position in ¼" letters on plate.

E. Provide code-compliant intercom between elevator car and elevator machine room. On-off activation is required only at machine room station.

F. A public address (PA) speaker shall be provided for audio messaging from the PA and emergency signaling systems.

G. CCTV cameras shall connect to SJRRC central communication control center.

8.3.12 Supervisory Control and Data Acquisition (SCADA)

A. Alarms shall be programmed to report to SJRRC's SCADA system.

B. Enable/Disable Functioning

(1) Enable/disable function shall be integrated with SJRRC's SCADA system.

(2) Provide equipment in the electrical room for interface with SJRRC's SCADA system.

(3) Provide the following status indications to the SCADA system for each elevator:

- Elevator Enable
- Elevator Disable
- Elevator Request Location 1
- Elevator Request Location 2
- Elevator Position 1
- Elevator Position 2

C. Elevator/Communications Interface

Provide a backboard in the elevator equipment room with cable terminations for CCTV, enable/disable contacts, and emergency telephone equipment.

8.3.13 Car and Hoist Ventilation

A. Where the hoistway may be subject to solar heat gain, provide ventilation or air conditioning as appropriate to keep equipment in operating range temperatures and keep car cool.

B. Vent

Provide slotted vent located at the top area of the cab walls near the ceiling area.

Provide screening on backside of vent slots.

C. Exhaust Fan

Provide an exhaust fan, to be mounted on the car top. Exhaust fan shall be compliant with applicable codes.

D. Car HVAC

Provide car-mounted HVAC unit to maintain temperature within the cab interior within design range temperatures per station location and elevator site conditions.

8.3.14 Elevator Hoistways, Shafts and Pits

A. Elevator hoistway vents shall be installed in compliance with the building code.

B. The hoistway entrance shall be designated to minimize the likelihood of water entering the pit, including water from rainfall or maintenance activities.

C. All elevator shafts and pits that are below grade shall be sealed and waterproofed, with an effective barrier system on the exterior walls and below the pit floor.

D. All passenger elevators shall be equipped with constant contact roller guides on the top and the bottom of the car frame.

E. Roller guide assemblies shall be selected based on the speed and capacity of the elevator.

8.3.15 Machine Room

A. Provide machine room ventilation to maintain the temperature at not more than over 90° F for 95% of the time, unless a lower temperature is specified by the elevator equipment manufacturer.

B. Machine and controller rooms and their access doors shall have adequate space for the installation and maintenance of the equipment. Only elevator-related equipment shall be located in the rooms. Lighting, heating, ventilation, and air conditioning shall be provided to meet manufacturer's recommendations and code requirements.

C. Provide separate telephone service to the elevator machine rooms in order to permit remote monitoring of the equipment.

D. Provide keys for elevator access and control (within elevator) in the elevator machine room.

E. Provide a minimum 3'-0" door to any elevator machine room for maintenance and installation of equipment.

F. Provide a minimum of 60 sq. ft. of area in the machine room; provide a minimum clear interior dimension in the least direction of at least 7'-0".

G. Disconnect switches shall be located on the strike side of the door accessing the elevator machine room.

8.3.16 Elevator Control Systems

All elevators shall include state-of-the-art, microprocessor-based control systems with remote monitoring, independent service, firefighters' emergency operation, inspection operation, access, and automatic two-way leveling.

A. The control system shall include a comprehensive means to access the computer memory for diagnostic purposes and shall have permanent indicators to indicate important elevator statuses as an integral part of the controller.

B. In cases where electric elevators are used, provide state-of-the-art microprocessor-based drive control systems with variable-voltage, variable-frequency, AC-regenerative motor drives.

C. Motion Control

Hydraulic, microprocessor-based AC type with unit valve suitable for operation specified and capable of providing smooth, comfortable car acceleration and retardation.

8.3.17 Electrical Systems

A. All elevator-related electrical disconnects shall be marked with the panel number, the circuit number, and the room number or location of the circuit breaker from which it is fed.

B. Car and hoistway conduit shall be watertight where exposed to elementsand required by code.

C. Refer to *Design Criteria*, CHAPTER 12 – ELECTRICAL SYSTEM, for electrical requirements.

8.3.18 Emergency Power/Standby Power

A. Sufficient emergency or standby power shall be provided in the event of a power failure to the elevators. In the event of power failure, the elevators shall be equipped with sufficient power for evacuation of the elevator by its passengers. Designer shall determine the best source for emergency power/standby power.

B. The emergency power shall provide a power system for auxiliary lighting, the alarm bell, and the emergency communication devices in the car. A battery rescue device at each elevator is an acceptable means to emergency power/standby power for the elevators.

C. Evacuation Requirement

Upon loss of power, the emergency power/standby power or the battery rescue device shall allow the elevator to automatically run the car at inspection speed to the nearest landing, up or down, depending upon load in the car. Upon arrival at the nearest landing, the elevator doors shall open automatically and remain open until regular door time has expired. The elevator shall then become deactivated.

San Joaquin Joint Powers Authority

San Joaquin Regional Rail Commission

CHAPTER 9

STRUCTURES

CHAPTER 9 – STRUCTURES

9.1 GENERAL

This chapter establishes the basic design criteria for platform and civil structures, including bridges, stations, elevator/staircase structures, retaining walls, drainage structures, construction structures, and miscellaneous structures. All applicable structural criteria are contained herein, ***excluding*** the structural design criteria for small buildings and parking facilities (garages).

Where special design cases are encountered that are not specifically covered in these criteria, the designer shall determine the applicable technical sources for the design criteria to be used, and obtain approval from SJRRC prior to use.

Where not covered by design criteria, design shall comply with applicable municipal,county, state, and federal regulations and codes.

Permanent clearance requirements for centerlines of UPRR tracks to all adjacent structures abovetop of rail are contained in UPRR Engineering - Track Standards – Standard Minimum Operating Clearances. Temporary clearance requirements are contained in UPRR-BNSF Guidelines for Railroad Grade Separation Projects. Shoring requirements are contained in UPRR-BSNF Guidelines For Temporary Shoring. Shoring and Clearance requirements must be met in the design of all structures including bridges, stations, and retaining walls. No additional references to clearances are made in this chapter.

9.2 REFERENCES, STANDARDS, REGULATIONS, CODES, GUIDELINES

9.2.1 Industry

A. Bridges

(1) AASHTO LRFD Bridge Design Specifications, 8th edition with California Amendments preface dated May 2021

(2) AASHTO LRFD Guide Specifications for LRFD Seismic Bridge Design, 2nd Edition with 2015 Interims

(3) Caltrans Seismic Design Criteria 2.0

(4) AASHTO Manual for Maintenance Inspection of Bridges (Most Recent edition with current supplements)

(5) LRFD Guide Specifications for the Design of Pedestrian Bridges, 2nd Edition, with 2015 Interims

(6) AASHTO/AWS/D1.5/D1.5M-2020 Bridge Welding Code

B. Sign Structures and Street Lighting

(1) AASHTO LRFD Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, 1st Edition with 2019 Interim Revisions

C. All Structures

(1) AASHTO Policy on Geometric Design

(2) AISC Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings (AISC Code)

(3) AREMA *Bridge Inspection Handbook, 2017*

(4) AREMA Manual for Railway Engineer, 2018

9.2.2 Federal, State, Local

A. California Building Code (CBC)

9.3 CRITERIA / APPLICATION

9.3.1 Items Requiring Coordination with Structural Design

A. Aerial Structures and Bridges

(1) Number of tracks,

(2) Vertical clearances overhead and vertical clearances underneath

(3) Horizontal clearances

(4) Civil site design including streets, sidewalks, bike paths, utilities, stormand sanitary sewers

(5) Site grading

(6) Aesthetics

(7) Geotechnical Data

B. Underground Structures

(1) Number of tracks,

(2) Vertical clearances underneath

(3) Horizontal clearances

(4) Civil site design including streets, sidewalks, bike paths, utilities, stormand sanitary sewers

(5) Site grading

(6) Aesthetics

(7) Geotechnical Data

C. Retaining Walls

(1) Civil site design including streets, sidewalks, bike paths, utilities, stormand sanitary sewers

(2) Site grading

(3) Aesthetics

(4) Geotechnical Data

9.3.2 Material Design Requirements and Criteria

A. Reinforced Concrete and Prestressed Concrete Design

(1) Minimum material properties: For all above ground reinforced concrete cast-in-place structures, including columns, cap beams, and superstructure for aerial structures and undercrossings:

f'c = 4,000 psi minimum

(2) Recycled aggregate shall not be used.

(3) For all cast in place drilled shaft foundations:

f'c = 4,500 psi minimum

(a) Mix design shall account for construction method, reinforcement clear space openings, and estimated time of placement.

(b) Maximum 3/8-inch aggregate shall be used and rebar minimum clear spacing 5 inches unless it is demonstrated that drilled shaft reinforcing cage clear space opening of at least 10 times the maximum size aggregate is maintained.

(c) No accelerants shall be permitted.

(d) Temperature monitoring of trial and test shafts shall be performed at three locations within the shafts to establish heat of hydration development within the as-placed shaft trial mix concrete. The data acquisition system shall be capable of acquiring, storing, printing, and downloading [archiving] data to a computer. Temperature sensors shall be in the upper 20 feet and top and bottom of the middle third as measured along the length of the shaft. For purposes of temperature monitoring, the shaft diameter groupings shall be

- Under 8 feet
- 8 feet to 10 feet, inclusive
- 10 feet or greater up 14 feet
- Greater than 14 feet

(e) Type-IV or Type-II (moderate heat) cement may be used in lieu of temperature monitoring.

(f) Supplementary cementitious materials if used shall be fly ash, blast furnace slag, and natural pozzolan, excepting Class-C fly ash, which is prohibited.

(g) Mix design shall address the workability requirements for drilled shaft concrete over a period of time exceeding expected duration of the pour. Workability of shaft concrete shall be ensured over the expected duration of pours such that slump measured at expected duration of pour plus 2 hours shall not be less than 6 inches. Duration of estimated pours shall take into account travel and any stand-by times and be based on substantiated placement production rates.

(h) Once a mix design has been approved, it shall not be changed without substantiation as described above.

(4) For prestressed concrete:

f'c = 6,000 psi minimum

(5) For all building foundations, floor slabs, pits, and other miscellaneous foundations other than those specified; and station platform foundations:

f'c = 3,600 psi minimum

(a) Cements

i. Type I Portland cement shall ordinarily be specified;

ii. Type II Portland cement shall be specified for concrete construction where soils or groundwater conditions require moderate sulfate resistance and moderate heat of hydration, or where required by a geotechnical or corrosion engineer; and

iii. Type III Portland cement may be specified for concrete mix design requiring a high early strength, except where soil conditions make the use of Type II necessary. Shrinkage compensation cement may be used only if approved by the Owner.

(6) In certain cases, strengths of concrete other than those specified above might be required. These cases shall be as recommended by Designer and approved by the Owner.

(7) Reinforcing Steel

Bar reinforcement shall conform to AASHTO M 31 for billet-steel bars or ASTM A706 for low-alloy steel bars and the following requirements: Bars shall be deformed type.

(a) Bars shall be Grade 60 or, for ASTM A706 bars or when specified for AASHTO M 31 bars, Grade 60.

(b) All reinforcing steel for building applications, including MSF, shall conform to ASTM A615 Grade 60.

(8) Prestressing Steel

Stress relieved steel strand ASTM A416 (AASHTO M 203) (low relaxation), high strength steel bar ASTM A722 (AASHTO M 275).

(9) Structural Steel

Structural steel for building elements shall conform to the following:

(a) Wide-flange shapes: ASTM A992;

(b) HSS members: ASTM A500, Grade C;

(c) Open-web joists: ASTM A36;

(d) Structural steel for frames shall be of the types listed above for structural steel enclosures and walls, but shall be a minimum of Grade 50.

(10) Additional Types of Steel

(a) Anchor bolts shall conform to ASTM F1554 and shall be galvanized in accordance with ASTM A153.

(b) Galvanized metal roof deck steel shall be in accordance with ASTM A653; and Steel for composite floor systems shall be galvanized and shall be in accordance with ASTM A653.

B. Structural Steel Design

(1) Structural steel channels, angles, MC shapes: ASTM A36 or ASTM A50.

(2) Structural steel W shapes for building frame: ASTM A992.

(3) Structural steel tube: ASTM A500 Gr B.

(4) Structural steel pipe: ASTM A53 Gr B.

(5) For uses requiring higher steel strengths or where economically justifiable: ASTM A242, A441, A514, A572, A588.

(a) Bolts: ASTM F3125, Grade A325 or A490, unless otherwise approved by Owner.

(b) Refer to AISC Manual of Steel Construction, Load and Resistance and Factor

(c) Design, latest edition, Specification for Structural Joints Using ASTM A325 or A490

(d) Bolts for use of bolts in snug-tightened, pretensioned, and slip critical joint applications.

(6) Shop connections as detailed by Designer's lead structural engineer shall be welded unless otherwise directed by the Owner. Weld shall be in accordance with the current code or specifications of the AWS, as applicable.

(7) All materials required for building applications which are not listed above shall conform to Infrastructure the CBC and the applicable specifications and codes and shall be approved by the Owner

9.3.3 Structural Design Criteria

A. Pedestrian Elevated Walkway Design

(1) Pedestrian walkways shall be designed in accordance with *Design Criteria*, CHAPTER 7 – VERTICAL CIRCULATION. Pedestrian walkways and other pedestrian areas shall be designed for a uniform LL of 100 psf.

(2) Pedestrian loads shall not be subject to a dynamic load allowance. To avoid the possibility of resonant vibrations induced by pedestrian traffic, the natural frequency of the unloaded pedestrian bridges shall be not less than 3.0 hertz. To avoid vibrations that might be objectionable to patrons, the calculated live load deflection of pedestrian walkways shall be limited to 1/500 of span length.

B. Pedestrian Undercrossing Design

TBD

C. Platform Structure Design

Design and loadings shall follow the design requirements of the applicable railroad authority. In the absence of such requirements, design and loadings shall follow the requirements of the most recent addition of the *Manual for Railway Engineering* by the American Railway Engineering and Maintenance-of-Way Association, hereinafter referred to as the AREMA Manual.

D. Earth Retaining Structure Design

For earth retaining structures, the AASHTO LRFD Bridge Design Specifications shall be followed.

E. Fire Hazard Rating Requirement

For the fire hazard ratings, the Code for Safety to Life in Buildings and Structures, by the National Fire Protection Association (NFPA) shall be followed.

F. Temporary Structure Design

All materials for temporary structures both above and below ground shall be removed unless given an exception by SJRRC.

G. Miscellaneous Structure Design

For structures and structural supports not included above such as art pieces, poles, signs, luminaires, traffic signs, etc., the most recent edition of the AASHTO Standard Specification for Structural Supports for Highway Signs, Luminaires and Traffic Signals shall be followed.

H. Loads, Forces and Load Factors

(1) Dead Loads

Dead loads consist of the actual weight of the structure pipes, conduits, cables, utilities, services, and all other permanent construction and fixtures. Superimposed dead load shall also be considered such as the weights of all appurtenances and utilities attached to the structure, including, but not limited to, railings and acoustical barriers. Dead loads for all elements shall account for deck camber.

(2) Other Load and Load Combinations

All other loads and loading combinations shall be as specified in the AASHTO LRFD Bridge Design Specifications or appropriate building code and standards.

I. Additional Structural Requirements

(1) Elevators

(a) Structural design for elevator systems and the structure to support these shall conform to the following Codes and Standards:

i. Elevators be in conformance with the U.S. DOT's Americans with Disabilities Act (ADA) Standards for Transportation Facilities.

ii. Structural members, elements, and components subject to dynamic loads from elevators shall be designed for impact loads and deflection limits prescribed by ASME A17.1.

iii. Elevators and hoistway systems shall satisfy seismic design requirements for nonstructural components defined by ASCE/SEI Standard 7.

iv. Structural design shall provide adequate support for rail bracket support points, machine-mount support points, deflector sheave mount points, and buffer reaction points.

(2) Elevated Walkway Structures

Elevated walkway structures shall be designed to take into account potential displacement from a fault offset, dynamic response due to ground shaking, and any other fault-induced hazards (e.g., creep) that may occur. The design shall be in accordance with the Caltrans MTD 20-8, which defines a method for determining the potential displacement at columns and abutments at fault crossings and designing the structure so it can slide without falling.

(a) The proposed elevated walkways shall be designed in accordance with applicable Caltrans guidelines including Memo to Designers 20-8 (Analysis of Ordinary Bridges that Cross Faults) and 20-10 (Fault Rupture). Probabilistic procedures also shall follow those outlined in Caltrans Memo to Designers 20-10-Fault Rupture, dated January 2013.

(b) It is Designers 's responsibility to identify Calculated Tension/Compression members, Fracture Critical Main Members, Secondary Members, and Components of Main Members in designing a new steel structure or walkway and to designate or tabulate them explicitly on the construction documents (plans and Special Provisions). A fracture-critical walkway structure, subject to dynamic cyclic loading, which has at least one tension member or tension component of bending member (including those subject to reversal of stress), whose failure would be expected to result in the collapse of the bridge.). For further requirements see, Caltrans, Memo to Designers, Guidelines for Identification of Steel Bridge Members, latest edition.

(3) Wind Design

Aeroelastic force effects shall be taken into account in the design of guideways and structural components apt to be wind-sensitive.

(4) Construction Loads shall be considered in the design in accordance with AASHTO-CA LRFD BDS Section 5.14.2.

(5) Foundation Design

A Project Geotechnical Data Report is required for each facility. Geotechnical Engineer shall perform all site specific investigations and develop all supplemental information to provide a final geotechnical engineering report which shall identify recommended soil properties to be used in design, including densities, strengths, compressibility, environmental conditions and any other data necessary for the successful execution of the design to be performed by Developer.

(6) Stormwater

Direct any stormwater accumulating along the guideway to inlets, then to drainpipes located within pier columns and bents and transmitted into the existing or new storm drainage system or natural surface-level water courses. Such drainage provisions shall not be visible to the public and shall not point discharge onto any streets or roadways.

(7) Existing Structures

Support existing structures as necessary to avoid any imposed loads and/or settlement as a result of the construction of any structures.

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CHAPTER 10

STATION PLATFORMS

CHAPTER 10 – STATION PLATFORMS

10.1 GENERAL

This chapter pertains to new Valley Rail station platforms. Further civil and structural engineering guidelines are provided in *Design Criteria*, CHAPTER 3 – CIVIL and CHAPTER 9 – STRUCTURES.

Platforms represent the station area adjacent to the tracks facilitating passenger boarding and alighting and waiting areas. They are the primary interface to the Valley Rail system for thousands of passengers that circulate through platform areas daily. They establish the first impression of the quality of a passenger's SJRRC experience; reflect the Agencies' sensitivity to environmental, social, and economic accountabilities; and are the places where community integration happens.

The quality, durability, and sustainability of platforms is extremely important; the integration of good design, good materials, and good asset management strategies is essential.

10.2 REFERENCES, STANDARDS, REGULATIONS, CODES, GUIDELINES

10.2.1 Industry

A. National Fire Protection Association (NFPA) 130, *Standard for Fixed Guideway Transit and Passenger Rail Systems*

B. "Pedestrian Planning and Design" by John J. Fruin, PhD

C. ASTM 1028

10.2.2 Federal, State, Local

A. California Code of Regulations (CCR), Title 24

B. International Building Code (IBC) (now part of the OSSC)

C. 2010 U.S. Department of Justice's *Americans with Disabilities Act (ADA) Accessibility Guidelines* (ADAAG)

10.3 CRITERIA / APPLICATION

10.3.1 Basic Goals

Passenger platforms are station elements that include the boarding and alighting area and waiting areas alongside rail tracks. They are usually part of a larger station area.

Overall platform design goals are listed below for three main categories: Architecture (user experience), Integration, and Configuration. These goals are applicable to all sections of this chapter.

A. Architecture

(1) Integrate the platform architecture so that it conveys being in the SJRRC environment while contributing to its local context—one that provides continuity of a rider's journey and is reflective of the character of the neighborhoods and community of which it is a part.

(2) Design platforms to be safe, secure, friendly, predictable, and accessible to all users regardless of their abilities, creating an inclusive and engaging transit experience.

(3) Design for passenger experience, facilitating their journey with well-defined functional zones, paths of travel, real-time information, route maps, suitable lighting, seating, and weather protection.

(4) Incorporate art and elements of distinction to make the platforms enjoyable and interesting. Providing settings that support passenger respite and repose.

(5) Provide elements of continuity of the system that utilize a unified family of parts for signage and wayfinding, fare collection, pedestrian controls, and platform furnishings.

(6) Design with security and safety in mind for every platform element, including line of sight and eliminating areas that can hide or obscure CCTV and visual observations of the platforms. Strive to find ways to avoid clutter on the platforms, including consolidating signage and security elements on existing poles and other features.

(7) Implement systems that use low maintenance materials and minimize life cycle costs. Systems should employ simple, vandal-resistant, integrated design detailing that incorporates support systems and components into a cohesive solution, reducing "tacked-on" appearances.

(8) Leverage opportunities for incorporating sustainability and resiliency, renewable energy production and other sustainability measures.

B. Integration

(1) Provide clear and easily understood transit information that can be referenced quickly and does not contribute to users impeding the path of travel for other passengers.

(2) Provide an efficient and predictable platform configuration for each platform typology to facilitate paths of travel, safe and accessible access and egress.

(3) Protect, maintain, and enhance existing neighborhood and community qualities that are valued.

(4) Initiate and coordinate programs with the community that limit local traffic impacts and minimize disruption during and after the implementation phase.

(5) Utilize local jurisdictional processes and agencies throughout project design and implementation.

10.3.2 Platform Configuration

A. Purpose

The purpose of this section is to describe the system-wide design considerations for platform layouts.

(1) Platforms are characterized by their typology:

- center platforms
- side and split platforms
- platforms integrated into the public sidewalk

There are variants and combinations to these when occurring in transit centers and exchanges.

Platform Configuration Type	Center	Side (double)	Side (single)
Illustration			
Number of Platforms	One	one or two	One
Access	• access via bridge or tunnel • access both ends	•access one end only •access both ends •access both ends and a side	•access one end only •access both ends •access both ends and a side

10.3.3 Circulation and Platform Functional Zones

A. Design Objectives

Design objectives guide and measure the design response to the basic goals of passenger platform configuration planning and design. Performance standards based on design objectives shall be the basis for all design decisions. They provide the fundamental framework for resolving the inter-relationship between each of the platform activities and the means for minimizing conflicts and maximizing efficiency.

Design objectives are categorized into three primary groups:

(1) Passenger Flow Accommodation

(a) Minimize crowding, travel impedances, conflicts, disorientation, level changes, and physical barriers.

(b) Provide a minimum level of service for pedestrian flow based on Fruin level of service “C”. See “Pedestrian Planning and Design” by John J. Fruin, PhD.

(c) Maximize safety and the ability to accommodate emergencies.

(2) Passenger Environmental Accommodation

(a) Provide a comfortable ambient environment, adequate lighting, personal comfort, aesthetic quality, supplementary services, weather protection, and security.

(b) Passenger accommodations should be equitable across the system based on platform typologies.

(c) Locate station amenities, including bike parking and ticketing, off of the platform and in an area adjacent to the flow of patrons.

(3) 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.

10.3.4 General Considerations

A. All areas and elements of the passenger platforms must be accessible per both ADA and FTA standards.

B. As a general rule, ADA code requirements and NFPA 130 standards for fixed guideway transit shall have precedence over other design criteria noted in this chapter.

C. Good pedestrian circulation to, from, and across platforms is essential for the smooth and safe operations. Circulation patterns should be as simple, obvious, and comfortable as possible. Some of the points that warrant careful review for applicability and consideration in achieving good pedestrian orientation and circulation follow:

(1) Pedestrian access from bus, quick drop, and park-and-ride areas must be as clear and as simple as possible.

(2) Circulation elements shall use color, texture, and sight distances to increase visual pleasure, guidance, and patron safety.

(3) Provide well-lit pedestrian walkways in accordance with *Design Criteria*, CHAPTER 13 – LIGHTING.

(4) Provide adequate assembly space on platforms. Preferably allow 8 sq ft of space per person for peak crowds.

(5) Security shall be enhanced by providing CCTV mounting locations that allow good viewing angles and sightlines for all areas of the platform.

D. Platform Functional Zones:

Functional zones are defined to help create an easily understood, predictable environment for passengers and are designed to facilitate a customer's journey and support important customer decisions, actions, and needs in specific areas. The following describe the platform functional zones and the design considerations for each specific typology.

(1) Platform Access and Entry Areas

A detectable warning surface is required where a sidewalk or crosswalk connects to the ramp area and where the entry enters into roadway or trackway areas.

(2) Ramps

(a) Any part of an accessible route with a slope greater than 1:20 shall be considered a ramp and shall comply with *ADA Standards for Accessible Transportation Facilities*.

(b) Ramps shall have level landings, 5 ft long (60”), for rest and safety at no more than 30-foot intervals and whenever turns are unavoidable. A 5'-0” x 5' 0” landing is desirable at the top of a ramp with 6 ft of straight clearance at the bottom.

(c) Walking surfaces greater than 5% slope shall be provided with a handrail. The minimum clear width of a ramp between handrails is 60”. Handrails shall be provided on both sides and shall be continuous.

(d) Sidewalk and/or ramp areas shall a minimum of 72” in width and the ramp shall not exceed a slope of 1:15 (6.8%). The, the maximum cross slope shall not exceed 1.5%.

(e) Where possible, a preferred ramp width of 8–10 ft is desirable.

(f) The ramp access may also incorporate station identification, Passenger Information Displays, and regulatory signage. Sufficient lighting should be provided for nighttime surveillance.

(g) The minimum design capacity of a ramp shall be for Fruin level of service (LOS) “C”—10 to 15 pedestrians per foot of effective width per minute.

(h) Access ramp and entry area pavements can be an element of distinction through the use of pavement designs.

E. Emergency Exiting

Provide not less than two exits accessed from accessible paths on any platform.

F. Accessibility

Accessible means shall be provided for passenger access to and from platforms and vehicles. All design and construction of facilities shall comply with the Americans with Disabilities Act (ADA). In the event of a discrepancy between these criteria and ADA, the ADA requirements shall govern.

G. Stairs

See *SJRRC Design Criteria*, CHAPTER 7 – VERTICAL CIRCULATION.

H. Elevators

See *SJRRC Design Criteria* CHAPTER 8 – ELEVATORS.

I. Ticket Vending and Validation Areas

(1) The ticketing area is an area for purchasing and validating tickets. The ticketing area should be located adjacent to the platform entry area.

(2) The ticketing area should incorporate wayfinding and transit real-time information panels or passenger information display panels (PIDs), fare information, and ticket validators as required for rail and local transit services at that station.

(3) The ticketing area should be level, with a maximum cross slope in any direction of less than 3% for a distance of 60” in front of the Ticket Validators. Accessibility to the ticketing area must meet all other ADA and FTA accessibility requirements.

(4) For platforms accessed from two sides, provide two separate ticketing areas on either end of the platform.

(5) For platforms that are accessed from three or more points, pedestrians should be directed to the center of the platform with directions to a designated ticketing area.

(6) For platforms that are grade separated and accessed from stairs, elevators, or ramps, the ticketing area and paid fare zone marker will be prior to the vertical circulation elements.

(7) Waste receptacles may be placed near the ticketing areas.

(8) Adequate space should be provided for passenger queues at fare collection areas that do not block through passenger traffic or interfere with equipment maintenance functions.

(9) Fare Paid Zone

(a) SJRRC uses a paid fare zone where the zone ticketing area (fare enforcement area) is separated from the surrounding public right-of-way.

(b) Paid fare zones can be shown on the platform using a pavement inlay strip demarking “Fare Paid Zone”. Demarcations shall be consistent across all platforms based on their typology. Alternatively for stations with one main access point, a delineation may be made at that entry point to establish the start to the paid fare zone (example: center platforms with tunnel access entries).

(c) Passengers must have a valid fare to be on the other side of the demarcation, but no physical barrier is provided.

(d) The location of ticket vending machines and electronic fare validators should be located outside of “Fare Paid Zones.”

(e) For platforms that are integrated into the public sidewalk, no demarcation is required, however regulatory signage may be provided to describe the implementation of SJRRC fare enforcement policies.

J. Boarding, Alighting and Waiting Areas

(1) The boarding and alighting area is the space directly adjacent to the track for the entire length of the platform.

(2) The trackside platform edge must have a continuous 24” tactile detectable warning strip running the entire length, using FTA approved truncated dome pavers.

(3) Provide a pedestrian Through Zone for a minimum of 6 ft of clear space

between the back edge of the platform tactile paver and any obstructions to facilitate passenger flow from rail vehicles to the platform for boarding and alighting. Mini-High passenger ramps and platforms may encroach into this zone as required to comply with the standard Mini-High design. The Through Zone is an unobstructed area void of above-grade utility boxes, vertical elements, furnishings, etc. that provides free flow of pedestrian movement.

(4) A clear path of travel must be maintained without obstacles from the pedestrian through zone to the exiting area of the platform. The path of travel must provide safe exiting from trains and platforms under both normal operational and emergency conditions

(5) A clear and unobstructed pedestrian access across center platforms of at least 6 ft must be provided where passengers exit and enter vehicles and wherever interchange between modes occurs.

(6) Platforms and exits shall be sized to allow passengers to completely clear the platform prior to the arrival of the next train.

(7) The waiting area is inside the 6-foot boarding and alighting zone and provides amenities for customer safety and comfort that are open, spacious, and are clearly identifiable on the platform.

(8) This waiting area includes the shelters, along with wind protection, seating, and wayfinding.

(9) Designated waiting area shall have clear sightlines and path of travel to emergency exits and communication equipment. Designated waiting areas should allow for customer access to real time information through auditory and visual announcements, especially related to track dispatch changes, train arrival and departure information, and service alerts.

(10) Provide customer information pylons on the platform, half at the front end of the train, with one each for in-bound and out-bound platforms.

10.3.5 Platform Elements

Platform elements and associated components include lighting, railings, signage, shelters, customer seating, litter receptacles, and pavement.

Platform life cycle costing requires investment in the quality and durability of components that reduce maintenance, repair, and refurbishment costs necessitated to maintain a state of good repair and increase useful life expectancies.

The platform elements and components are listed and enumerated in this section; this section also addresses the general configuration of these elements. The primary components are categorized as:

- Safety and Security Elements
- Pedestrian Control Elements
- Ticketing Areas
- Signage and Wayfinding Elements
- Passenger Amenity Elements
- Platform Surfaces

- Utilities and Services

A. Safety and Security Elements

(1) General

(a) Safety and security is a fundamental requirement for platforms and the designer must apply security awareness in all aspects of design.

(b) Platform design should be evaluated early in the planning stages to incorporate crime prevention principles into each new project. Lighting, CCTV (placement and type of cameras), location and type of landscaping, service cabinets, type of shelters, and location and scale of artwork are all areas that need to be considered throughout the design process.

(c) Security consideration in the design of platforms is based on the principles of “crime prevention through environmental design,” or CPTED. CPTED relies on four basic strategies:

i. Natural Surveillance

Placing physical features, lighting, activities, and people in ways that maximize visibility and transparency for observance of activity.

ii. Natural Access Control

Using judicial placement of shelters, benches, furnishings, and lighting to direct pedestrians in ways that discourage crime.

iii. Territorial Reinforcement

Using physical and symbolic boundaries and features to define the space, encourage ownership, and reinforce desired activities.

iv. Target Hardening

Accomplished by features that prohibit entry or access. Methods could include railings, bollards, lighting, CCTV, and openness of the area.

(d) CPTED strategies shall be employed to enhance visibility and surveillance, lighting and security, sightlines, and access control and enforcement.

(2) Visibility and Transparency

(a) Aspects of design relating to visibility should consider eliminating any element that provides a location that could be used for hiding or low-visibility corners.

(b) Transparency in materials should be utilized. Large columns, walls, and other structures should be eliminated. Existing vertical solid elements, including shelters and windscreens, should be replaced with transparent windscreens and poles instead of walls and columns.

(c) Platforms shall be designed to maintain open sightlines and maximize visibility by eliminating all unnecessary and redundant elements and supports for creating uncluttered station areas.

(d) Platform service cabinets should be placed where they provide the least opportunity to obscure sightlines.

(3) Lighting

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.

(a) Lighting should be sufficient for effective surveillance of all areas, including CCTV facial recognition of individuals both in daytime and at night.

(b) 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.

(c) 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.

(d) 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.

(e) The color and quality of lighting is an important consideration. Lamp and luminary selection influences the characteristics of the light produced, as well as the maintenance requirements over the life of the platform.

(f) 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.

(g) 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.

(4) CCTV

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

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

(c) Placement of cameras shall take into consideration lighting levels, shelter location, and location waiting areas, to ensure the best possible views are achieved.

(d) Cameras with pan-zoom-tilt capacity or similar technology are options at certain locations. CCTV cameras are operated and monitored in central control facilities. See CHAPTER 14 – COMMUNICATIONS for additional information.

(5) Platform Audio

(a) Platforms should include public address systems, including both speakers and signs, to convey information to persons with disabilities in compliance

with ADA requirements.

(b) Speakers and signs should be positioned to be clearly audible/visible, but not readily accessible to the public within reach range to reduce vandalism. Locate digital signs and speakers a minimum of 8’-6” above the platform surface.

B. Pedestrian Control Elements

(1) General

Pedestrian control elements provide pedestrian control channeling at the platform. They include railings and handrails, bollards and cable, fencing, and track crossing protection.

(2) Railings and Handrails

(a) Railings are used as a protective barrier to separate passenger and pedestrian areas from vehicular zones, protect ends and edges of the non-trackside portions of the platform, define platform zones, and provide handrails along ramps and stairs.

(b) Railings and handrails are required to be designed and constructed in accordance with all applicable code(s) and ADA standards.

(c) Railings shall be designed to facilitate attachment of a handrail or to perform as a handrail.

(d) Continuous railings shall be on both sides of access ramps.

(e) Railing and or barrier sections are used to terminate the platform to discourage pedestrians from entering the trackway at the end of platforms. An access gate provides access to the trackway beyond.

(f) Safety railings shall be designed in a way to deter climbing.

(g) Safety railings shall be designed as an element of continuity, while still providing opportunities for art and other elements of distinction.

(h) Materials and Finishes

i. Duplex finishes utilizing a combination of both hot-dipped galvanizing and paint or powder coating must be approved by SJRRC in advance.

ii. All handrails shall be 316-grade stainless steel.

(3) Bollards

Bollards are required to be designed and constructed in accordance with all applicable code(s). The following guidelines shall also be considered:

(a) Bollard(s) are safety elements that help protect Passenger areas from vehicles and are used in lieu of fencing to direct Passengers from crossing traffic. Also refer to SJRRC Directive Drawings for bollard types and placement.

(b) Bollards are used to form a continuous barrier by incorporating connecting chain or cables between them.

(c) Bollards shall be able to withstand pedestrian impacts without showing damage.

(d) Bollards should be secured with anchor devices that can facilitate bollard re- installation if struck by a vehicle.

(e) The typical type is galvanized steel with industrial strength coating system. plastic bollards may be used in the ROW as directed by SJRRC.

(f) Embedded bollards shall only be used when required by the Authority having jurisdiction or if specifically called out by SJRRC.

(g) Areas where pedestrian visibility is desirable, such as an approach to a Pedestrian / Passenger crossing, a height of 3'-6" is appropriate.

(h) Bollards can have integral lighting to illuminate the area.

(i) Since all situations are unique, the applicability of bollards shall be reviewed by the SJRRC Safety and Security Committee (SSC) for concurrence.

(j) Materials and Finishes

i. The preferred material for all bollards is hot-dipped galvanized steel without any additional coatings or finishes for durability and maintenance purposes.

ii. Duplex finishes utilizing a combination of both hot-dipped galvanizing and paint or powder coating must be approved by SJRRC in advance.

iii. Plastic breakaway bollards are acceptable where crash protection is not required at the platforms.

iv. Bollard cable systems shall be 316 stainless steel.

v. Bollard lighting systems shall incorporate vandal resistant LED fixtures that can be easily maintained.

(4) Fencing and Walls

Fencing and walls should be used minimally as a barrier for pedestrian control and traffic separation.

C. Signage and Wayfinding Elements

(1) Signage and information Elements include customer facing signage to communicate with transit patrons, non-customer facing signage that communicates with operations personnel, SJRRC safety and regulatory signage used to control, enforce, or direct vehicular, pedestrian and bicycle traffic. See *Design Criteria*, CHAPTER 15 – SIGNAGE AND WAYFINDING, for guidance.

(2) Best practices are based on a progressive disclosure of information. While approaching the platform, Station Signage located in the entry areas identifies the stop from a distance.

(3) Within the ticketing area, free standing or integrated information pylons at each ticketing location should be are placed adjacent to ticketing equipment. In addition, SJRRC's Passenger line diagrams, journey planning information, and other transit information should be provided.

(4) Downtown platforms integrated into the public sidewalk should follow design guidelines for the specific design overlay zone for that jurisdiction in conjunction with SJRRC criteria.

(5) New Technology Elements

(a) Provisions for emerging technologies in wayfinding, journey planning including touch screen digital displays, availability of Last Mile modes and connections, arrival location information, and digital advertising should be planned for.

(b) The decision point for this information should be outside the waiting areas, outside the paid fare zone, and adjacent to the ticketing area.

D. Ticketing and Fare Collection Elements

SJRRC's fare collection system planned for Rail Platforms will continue to use a barrier-free, self-service method consistent with the existing system. The fare collection equipment is comprised of the following Elements:

(1) Ticket Validators - stand-alone devices that imprint an inserted ticket with a validation mark and ticketing information; or digital card readers for passengers to "tap on" or "tap off". Additionally App-based smartphone technologies are employed for digital ticket validation and proof-of-payment.

E. Passenger Amenity Elements

Passenger amenities include; platform canopies, windscreens, lean rails, customer seating, litter receptacles, landscaping/streetscaping, and public art.

(1) Platform Canopies

Platform Canopies provide overhead weather protection along with wind protection when combined with an integrated wind screen. They are located on platforms in the designated waiting areas. Canopies can be free standing or attached to adjoining structures in downtown locations. Three or more canopies shall be provided per center platform. Generally side platforms should have double the quantity of canopies of a center platform station to provide equitable passenger coverage.

(a) The Canopies shall have a Steel Structure (columns, beams and deck) which supports a metal roof. The Canopy provides support for benches, lean rails, CCTV cameras PA Speakers, Lighting, and real time passenger information signage and Wayfinding Elements.

(b) Platform Canopies shall be centered in the Designated Waiting Area to provide maximal weather protection for waiting Passengers.

(c) All Canopy elements, including associated structure, shall be designed to deter climbing or bird roosting opportunities.

(d) Platform Canopies shall be provided with engineered joint conduit systems for power, lighting, communications, signage, audio and CCTV that is easily accessible. All electrical wiring/conduits and junction boxes are to be hidden from public view; no surface mounted conduit is allowed.

(e) Conduits rising to Canopy to be internally routed within support columns or within a Vertical Service Chase. All electrical wiring, conduit, and equipment to be concealed from public view in a single Service Chase

which is to be designed with two coordinated access points, one located at platform level and the other at canopy roof level.

(f) Passenger Shelters

i. Passenger shelters shall be standardized utilizing a “kit of parts” approach for the system as a whole to maintain system continuity. Specific station that have existing station architecture or unique site conditions may have variable aesthetic characteristics (Ex: Modesto with the Spanish Revival Station architecture), however all passenger shelters and canopies should be designed to achieve the following objectives:

ii. Provide Passengers with comfort and protection from adverse weather conditions from rain, wind and sun.

iii. Provide a level of design and craftsmanship, so as to contribute to the quality of the user experience.

iv. Provide identity for the station as well as the surrounding area.

v. Provide a feeling of security and means of surveillance.

vi. Contribute to adequate lighting on the platform.

vii. Utilize materials that are interchangeable with existing materials and construction practices that are compatible with existing SJRRC facilities.

viii. Utilize materials and construction practices that minimize maintenance requirements.

ix. Utilize materials and construction practices that minimize life cycle costs.

x. Standardize materials and construction practices.

xi. Shelter structure elements that will be in contact with the public shall be coated with an abrasion-resistant coating system.

xii. Powder coating will only be used with SJRRC approval. Special attention should be paid to the adhesive properties of the priming system. Epoxy priming systems can provide superior adhesion, and prevent corrosion migration if the finish is compromised. Thermoset powder is preferred for its higher performance properties.

xiii. Specialty shelter glass roofs may only be used with SJRRC approval. Glazing-laminated safety glazing with PPG Solex tinted glass for shade protection. Provide modular panel sizes and minimize special maintenance equipment.

xiv. Shelter leaning rails shall be stainless steel with ”bead-blast” finish. Bronze may only be used with SJRRC approval.

xv. Shelter elements, assembly and finished must allow reasonable access for electrical wiring of light fixtures and ease of future equipment.

xvi. Properly size conduits for all electrical and communications needs.

xvii. Locate hand holes (with vandal-resistant screwed cover plates) to provide easy access for shelter wiring. Coordinate handhold

locations with platform slope, structural connections, electrical equipment (lighting, etc.) and public artwork.

(g) Acceptable Materials and Finishes

i. All glass or other panels shall be surface or exterior bolted point-fixed glass assemblies, without the use of intermediary mullions or similar framing systems requiring sealed joints to allow for easy replacement if damaged.

(h) Element of Continuity / Distinction

Platform canopy windscreen modules for are opportunities for elements of distinction, see CHAPTER 16 – ART AND ELEMENTS OF DISTINCTION PROGRAM. Within each station, canopy materials and colors shall be consistent.

i. Type and color of High Performance Coatings to structural steel elements shall be consistent throughout all Stops.

(2) Windscreens

Windscreen Panels can be used as elements of distinction at stops through the use of art. Public Art may be coordinated with the design of Windscreen Panels provided all other requirements for the Panels are met. Within each station, windscreen materials and design shall be consistent.

(a) Windscreens shall be provided in each Designated Waiting Area to increase protection of Passengers from wind.

(b) Windscreen panels perpendicular to the tracks should be glazed to provide maximum visibility down the length of the platform. Panels perpendicular to the tracks should typically be perforated metal, but may be glazed if approved by SJRRC as part of an Element of Distinction Art implementation for that station.

(c) Windscreen shall be comprised of vertical panels of perforated metal or glass resistant to weathering, impact, and vandalism. Perforated metal shall be at least 40% transparent or more to facilitate visibility while also providing shading from low sun angles and mitigating wind and driving rain.

(d) Windscreen frames shall be of SJRRC Suitable durable materials (Stainless-Steel or Galvanized).

i. Windscreen frames shall provide for surface mounted glazing systems or bolted point-fixed glass assemblies.

(e) Minimum of 6’-8” in height as a stand alone element, otherwise typical panel height is per the SJRR Standard Drawings for a Station Platform Shelter.

(f) Structure shall be galvanized or stainless steel.

(g) Glazing support system shall be designed to prevent corrosion, and trapping any water in the system. .

(h) Finish shall be either stainless steel, galvanized or abrasion resistant coating system. Powder coating is an acceptable product if specs are approved by SJRRC.

(i) Glass should be modular impact resistant laminated safety glass that is shaped for easy fabrication, and is of a size/weight that promotes ease of replacement.

(j) Element of Continuity / Distinction

Glass surface should be treated with either a public art or other design pattern that maintains effective transparency with no more than 40% of the surface area obscured, to minimize vandalism.

(3) Seating

All seating shall be functional, vandal and weather resistant, constructed of highly durable materials, finishes and details that minimize life cycle costs, and meet station and urban design objectives. All seating shall be reviewed and approved by the Agency.

(a) Fixed Seating

Provide benches in the platforms' waiting areas. Typically these areas will be provided under the shelter canopies.

(b) Each Seating unit shall have armrests, with no moving parts. One fixed armrest may be shared by two adjacent seats.

(c) Do not place benches in the vicinity of vertical circulation elements.

(d) Seating height shall be selected for short durations of time; nominal range of 18 inches to 20 inches.

(e) Seating design shall be coordinated with the leaning rail and windscreen design.

(f) All horizontal seating surfaces to be designed or sloped to prevent ponding of water on seat surface.

(g) Seating design should incorporate features that discourage abuse from skateboarding and discourage sleeping on or below the Seating.

(h) Provide cane detection feature at base of seating or cane detection integral with the seating design.

(i) Individual Seating units shall be designed for replacement by maintenance staff and installed using fixing hardware.

(j) All benches including accessories and fixing hardware shall be made from suitable durable materials and finishes per SJRRC Design Criteria, including anti-graffiti coating to minimize repair and maintenance cost.

(k) Element of Continuity / Distinction

Seating maybe an element of distinction on the platforms for specialty stations as outlined elsewhere in this chapter in order to reflect the design motif of the rest of the platform. Individual seating units shall be self-similar and use common fixing hardware to simplify replacement by maintenance staff.

(4) Leaning Rails

Lean Rails provide a space saving alternative to seats, and provide resting opportunities to waiting Passengers.

(a) Lean Rails shall be integrated with canopies wherever practical. Leaning Rail design should utilize the same attachment details to simplify replacement and maintenance.

(b) Structure required for Leaning Rail shall be coordinated with Seating, Windscreen, and Canopy structures.

(c) Element of Continuity / Distinction

Leaning Rails are an Element of Continuity for all Stops. New Lean Rails shall be stainless-steel.

(5) Platform Furnishings

TBD

(6) Waste Receptacles

Waste receptacles shall be located at each platform. Provide a minimum of two (2) SJRRC approved waste receptacles at each station platform and coordinate them to be adjacent to seating locations but not under canopies. Quantity of waste receptacles may be adjusted based on the following criteria:

- Platform usage
- Number and location of entry areas

(7) Public Art Opportunities

Public Art should be considered in the platform areas and exchange plazas as determined by the SJRRC Public Art Implementation Plan. Specific public art opportunities for relevant elements are referenced and further described in *Design Criteria*, CHAPTER 16 – ART AND ELEMENTS OF DISTINCTION PROGRAM, which includes guidelines and standards.

F. Platform Surface Materials

Platform surface materials should be selected for durability, slip resistance, ease of maintenance and retrofit accessibility. Colors, patterns, sizes, textures and materials need to be coordinated with maintenance and ADA programs.

(1) Concrete should be judiciously used to minimize future maintenance or systems access concerns. Proper slip resistance needs to be provided by light broom or other appropriate finish. Provide scoring to minimize shrinkage and settlement cracking.

(2) Electrical and mechanical box lids shall be flush fit, checkered sidewalk lids, and must meet standards for slip-resistance.

(3) Platform inserts for public art, communications or other equipment shall pass ASTM 1028-89 standard for slip-resistance.

(4) Platform Tactile Pavers

(a) Type 1a shall be nominal 24” x 24” x 2” thick, white with SJRRC pattern and dome size, with no ‘bridge plate’ zone.

(b) Type 1b shall be nominal 24” x 24” x 2” thick, white with SJRRC pattern and dome size, with an integral ‘bridge plate’ zone.

(c) Type 2a shall be nominal 24” x 24” x 2” thick, white with SJRRC pattern and dome size, with no ‘bridge plate’ zone.

(d) Type 2b shall be nominal 24” x 24” x 2” thick, white with SJRRC pattern and dome size, with an integral ‘bridge plate’ zone.

(e) Type 2c shall be nominal 24” x 6” x 2”, white with no domes (smooth, vertical facing tile).

(f) Type 3 shall be special sized, white, smooth surfaced.

(g) Manufacturers of the above tactile pavers include: Engineered Plastics (Armor Tile) for Type 1a and 1b; Hanover and Wausau for Types 2a, 2b and 2c.

(h) Trackway crossing tactile pavers shall be nominal 2’ x 3’ Armor Tile (manufactured by Engineered Plastics), yellow with SJRRC pattern and dome size.

G. Mechanical and Electrical Systems

(1) Water Service

At least 1-inch diameter water service connections shall be provided to each Passenger platform for cleaning. Water service for irrigation may also be required. Water service(s) shall be coordinated and meet all applicable local code requirements.

(2) Electrical Service

Guidelines for electrical services are provided in *Design Criteria*, CHAPTER 12 – ELECTRICAL SYSTEM.

10.3.6 Security Considerations

A. Stations

(1) Ticket Validators should be located off of the station platforms, and allow for clear delineation of a “Paid Fare Zone”. Where change machines are located or physical monetary payment is collected, provide adequate sight lines and CCTV coverage of those machines to deter crime and vandalism.

(2) Provide well-lit entrance and exit points for pedestrian access and egress to the station. Also see *Design Criteria*, CHAPTER 13 – LIGHTING.

B. Shelters and Windscreens

(1) Create shelters that provide weather protection, but allow easy surveillance. Avoid columns wider than 16 inches to minimize potential hiding places.

(2) Strive for a minimum eave height of nine (9) feet to allow easy viewing into the shelter. Create balance between eave height and shelter width to ensure adequate weather protections for patrons.

(3) Avoid deep U-shaped windscreens, which can create a feeling of entrapment.

(4) Use graffiti resistant materials and coatings or use easily replaceable and cost-effective materials.

C. Platform Furniture

(1) Benches on Platform

Benches shall prevent and discourage laying down and long lingering periods. Seating and benches shall be well illuminated and along typical paths of travel to support visibility and deter hiding places.

CHAPTER 11

MECHANICAL and PLUMBING SYSTEMS

CHAPTER 11 – MECHANICAL AND PLUMBING SYSTEMS

11.1 GENERAL

11.2 REFERENCES, STANDARDS, REGULATIONS, CODES, GUIDELINES

AC electrical system design shall conform to the latest edition of the following standards and codes, where applicable:

11.2.1 Industry

A. American Society of Plumbing Engineers (ASPE)

B. American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE)

11.2.2 Federal, State, Local

A. California Mechanical Specialty Code

B. Mechanical codes or amendments of the local authority having jurisdiction

C. California Public Utility Commission (PUC)

D. California Department of Energy – California Building Energy Codes

11.3 CRITERIA / APPLICATION

11.3.1 General

These criteria cover the functional requirements in operation and environmental control for the following facilities: stations and platforms

11.3.2 Performance Requirements

A. The performance requirements in this section are project-specific minimum requirements that designs shall conform to meet applicable laws.

B. The HVAC systems shall be designed to provide optimal energy efficient operation and to satisfy the current CEC energy performance requirements. HVAC shall be installed and tested in accordance with the requirements of the applicable codes and standards of the approving agencies. Where there are different requirements, the more stringent of the requirements shall be followed.

C. Best practices shall be adopted and implemented where such requirements as defined under 2019 California Green Building Standards Code and California Energy Code.

D. All mechanical equipment shall bear the ADC, AMCA, ARI, and UL labels where available.

E. The Environmental Control System (ECS) shall control temperature, humidity, air flow, static pressure change, odor, dust and stop the spread of fire by means of mechanical devices and ventilation systems.

(1) Mechanical Ventilation and/or Air conditioning via single-zone mini-split system units or packaged roof-top units shall be provided for the following

Station AncillarySpaces:

- Communication Room
- Electrical Room
- UPS and Battery Room
- Elevator Machine Room

(2) Ventilation for the following spaces shall be provided with an outside air intake louver or gravity ventilator and a centrifugal roof exhaust fan as required:

- Compressor Room
- Janitor Room / Closet
- Storage Rooms
- Elevator Enclosure

(3) Communication rooms shall be provided with an air conditioning system. Redundant air conditioning systems shall be provided where required to ensure the reliability of safety systems.

(4) Designer shall determine the appropriate HVAC requirements for all rooms associated with the Operating System of the HVAC and communication systems and shall provide climate control as required. Similarly, Designer shall determine the appropriate requirements for HVAC for all rooms included within the scope of the Designer's Operations and Maintenance approach.

(5) Load Calculations

(a) Per the latest California Energy Code, heating and cooling load calculations shall be performed. Where applicable, above grade, the "U" value heat transmission coefficients, glazing solar heat gain coefficients, and shading coefficients of the exterior envelope components shall not be greater than the prescriptive requirements for the proposed type of buildings. The building envelope shall comply as a minimum per CEC prescriptive requirement. Glazing: glass/frame combination (typical vertical)

i. Description: double pane, low-e, and thermal break frame

ii. Max U-factor = 0.36

iii. Max RSHGC = 0.25

(b) Curtain Wall (if applicable)

i. Description: double pane, low-e, and thermal break frame

ii. Max U-factor = 0.41

iii. Max RSHGC = 0.26

(c) Stair Enclosure Wall Construction (Metal Stud Walls)

i. Metal stud walls with R-21 batt insulation, metal studs with 2" polyiso continuous insulation

ii. Insulation: R-21 batt insulation

iii. Max U-factor = 0.062

iv. Filled CMU blocks

v. Insulation: N/A

vi. Max U-factor = 0.44

(d) Canopy Roof construction:

i. Description: Metal deck

ii. Roofing: white one-ply white, multi-layer built-up roofing with reflective coating

iii. Insulation: R-30 batt insulation

iv. Max U-factor = 0.034

(e) The design of the mechanical ventilation systems, heating systems, and cooling systems shall comply with the requirements of the latest California Mechanical Code and ASHRAE Standards of Indoor Air Quality and Thermal Comfort.

(6) HVAC Design Criteria

(a) Outdoor Design Conditions

The outdoor ambient environmental conditions prescribed herein are those of cooling design temperature of Modesto in 1% and heating design dry bulb in winter medians of extremes taken from 2019 Title 24 Joined Appendix JA2.1. This climatic weather data will be used to generate the cooling and heating load calculations that will be used to determine the required capacities of the Station Ancillary Spaces and HVAC systems.

(b) Indoor Design Conditions

Space	Summer(^{O}F DB)	Winter (^{O}F DB)	Humidity Control	Space Pressure	Remark
Mechanical equipment room	Max. 10^{o}F above outdoor temperature	None	None	Negative	Ventilation only (Min. 10 ACH)
Electrical equipment room	78	None	None	Positive	(Min. 10 ACH)
UPS room	77	None	None	Negative	
Elevator machine room	78	None	None	Negative	
Battery/UPS Room	77	None	None	Negative	Min. 10 ACH continuous ventilation
Communication Room	75	None	50% RH	Positive	To be verified with the manufacturer.

(c) Ventilation Criteria

i. Outdoor air supply rates for areas shall be based on minimum dilution ventilation requirements for occupant comfort, occupant density, pressurization criteria, contamination control, and/or exhaust air requirements.

ii. Minimum ventilation requirements per ASHRAE 62.1-2016, California Mechanical Code Chapter 4, and Title 24 Section 120.1 shall be met and increased as necessary for higher make-up air requirements to maintain the space at a positive pressure with respect to the outside.

iii. Comply with the latest California Energy Code, California Mechanical Code, California Building Code and current ASHRAE 62.1.

iv. All areas: 0.15 cfm/ sq. ft.

(d) Exhaust Ventilation

i. Storage area: 6 air changes per hour

ii. Mechanical equipment room: 6 air changes per hour

iii. Service pit: 4 cfm/ sq. ft. pit area

iv. Receptacle power:

- Electrical transformers: % loss / 50% diversity
- Elevator machine rooms: 18,000 btu/h min
- Comm/data/IT rooms: 25 w/sq. ft.

v. Comm/data: one zone (temperature sensor) per enclosure.

vi. Elevator Enclosure

(e) Filtration Criteria

i. Comply with 2019 California Energy Code (efficiency equal to or greater than MERV-13).

ii. Air handling units serving occupiable spaces shall supply air through 85% (MERV-13) ASHRAE efficient filters.

iii. Units serving mechanical and electrical equipment and storage areas shall supply air through 30% (MERV-8) ASHRAE efficient filters.

iv. All intake screened wall louvers shall be provided with 2" MERV-13 filters and motor-operated dampers. within the spaces. Where applicable, an air duct silencer (soundattenuator/trap) shall be used.

v. The UPS/battery exhaust ductwork, including dampers and air distribution devices located in the air stream, shall be constructed of 316 stainless- steel.

vi. Underground pipe-ductwork serving pit sidewall mounted exhaust registers shall be constructed of schedule 40, fiberglass reinforced thermosetting resin epoxy (FRE) pipe, with "taper/taper" two-part amine cured resin adhesive bonded with matching tapered joints.

vii. To meet high efficiency operation, duct static pressure friction loss shall not exceed 0.08" w.g. per 100 feet for duct sizing. Air velocities above the indicated maximum values require acoustical treatment.

viii. Fire Dampers, Smoke Dampers, and Combination Fire/Smoke Dampers

Fire dampers, smoke dampers, and combination fire/smokedampers shall conform to NFPA 90 and be UL 555 and UL 555S listed and shall be installed for fire and smoke-rated separation and as required by the current building code.

ix. Ductwork Insulation and Acoustic Lining

Outdoor air intake, supply air and return air ductwork and plenums shall be insulated, except supply and return air ductwork exposed within the space served and that is internally acoustically lined, need not be externally insulated. Exhaust air duct work shall not be insulated. The insulation material R-value and thickness shall meet 2019 California Energy Code.

11.3.3 Station HVAC Systems

A. Designer shall provide an appropriate and complete Control Environmental System for the Station Buildings. It shall be the responsibility of the Designer to determine whether or not adequate spare capacity exists to support the requirements of the selected System. Platforms are open and no air conditioning is required.

B. Selected System shall be installed in a manner that minimizes sound transmission to normally occupied spaces.

C. Designer shall provide smoke control and exhaust in accordance with the applicable codes and standards noted and shall comply with all fire and life safety requirements of the Authority Having Jurisdiction (AHJ).

D. For HVAC systems, the system efficiency shall be higher than the latest California Energy Code. The system efficiency shall be higher than the latest California Energy Code for HVAC systems savings compared to the ASHRAE 90.1 baseline.

E. For UPS and battery rooms, exhaust fans shall be spark resistant AMCA Type A with explosion proof fan motors.

F. Future growth capacity, size the equipment as follows:

(1) An additional 15% sensible heat load to equipment capacity.

(2) An additional 5% to the latent heat load equipment capacity.

G. HVAC Instrumentation and Building Management System (BMS) Installation requirements of this project with respect to the BMS shall require a complete turnkey-single source approach with selected contractor.

H. The BMS shall be classified as a Personal Computer Based, Networked, Distributed Digital Control System with graphical user interface and web access features and is defined as follows:

(1) The requirements of the control system shall include the design of a complete stand alone, automated temperature control system made up of distributed digital controllers (DDC) networked together to provide automated control and monitoring of various mechanical and electrical equipment. The BMS controllers shall be electronic, with most control devices (dampers and valves) electrically actuated. Each DDC shall include all hardware, software, signal conditioning, and termination devices to provide full monitoring and control. All controllers shall be furnished with back-up power from dedicated back-up power panels with UPS.

(2) Network controllers shall be connected by a communication data highway. Each DDC component shall be capable of peer-to-peer communication for sharing of point status and value information. Communication from one DDC to another shall not depend on a central host computer. The optimum system architecture shall be configured during the design development.

(3) Software features shall include time-of-day scheduling, trend logging, automatic alarm reporting, and fully interactive web access to allow for remote monitoring and control of all control points.

(4) Installation requirements of this project with respect to the BMS shall require a complete turnkey-single source approach with selected contractor.

(5) All BMS temperature control systems shall be capable of BACnet communication protocol according to ASHRAE Standard SPC-135A, latest edition, over the BMS's Ethernet Local Area Network, and via an auto-dial telephone line modem connection. All components and network controllers shall be true "peer-to-peer" communicating devices, utilizing EIA Standard RS-485 Communications Protocol, via a three-conductor cable with shield. The communications bus shall be capable of communicating through a telephone modem to a remote location. The BMS system shall be programmed to automatically monitor, control, actuate and alarm all facility HVAC systems operational modes and functions, except for "control" of Fire Alarm System functions.

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CHAPTER 12

ELECTRICAL SYSTEM

CHAPTER 12 – ELECTRICAL SYSTEM

12.1 GENERAL

This chapter establishes the requirements for the design and function of alternating current (AC or ac) power electrical systems within SJRRC's station facilities. These facilities include: stations, small buildings, parking facilities, and other ancillary facilities and other features within the station area. It also establishes the requirements for AC and DC (direct current or dc) power duct banks.

12.2 REFERENCES, STANDARDS, REGULATIONS, CODES, GUIDELINES

AC electrical system design shall conform to the latest edition of the following standards and codes, where applicable:

12.2.1 Industry

A. National Electrical Code (NEC) (NFPA 70)

B. National Electrical Safety Code (ANSI/IEEE C.2)

C. Institute of Electrical and Electronics Engineers (IEEE)

D. American National Standards Institute (ANSI)

E. National Electrical Manufacturers Association (NEMA)

F. Fixed Guideway Transit Systems (NFPA 130)

G. Life Safety Code (NFPA 101)

H. Insulated Cable Engineers Association (ICEA)

I. Underwriters' Laboratories, Inc.

12.2.2 Federal, State, Local

A. California Electrical Specialty Code

B. Electrical codes or amendments of the local authority having jurisdiction

C. California Public Utility Commission (PUC)

D. California Department of Energy – California Building Energy Codes

12.3 CRITERIA / APPLICATION

12.3.1 General

A. Electrical Equipment

Equipment used shall in all cases be listed and labeled by a nationally recognized electrical safety testing organization. These include but are not limited to:

- Bay Area Compliance Laboratory
- Intertek (formerly Electrical Testing Laboratories)
- MET Laboratories.

- Nemko North America, Inc. (NNA)
- NSF International.
- QAI Laboratories.
- QPS Evaluation Services.
- SGS North America.
- TUV Rheinland of North America
- Underwriters Laboratories Inc

(1) The electrical and mechanical equipment requiring power includes the following:

- Lighting
- Heating, Ventilation and Air Conditioning (HVAC) Equipment
- Fare Collection Equipment
- Communications Systems
- Emergency Lighting and Power Systems

12.3.2 System Voltage

A. Service Voltage

All facilities shall have either 120/240V single-phase or 208Y/120V three- phase ac power service. If required, due to the nature and amount of load,a 480Y/277V three-phase service may also be required.

B. Utilization Voltages

See Table 12-1 below.

Table 12-1: Electrical Utilization Voltages

Description	Requirement
Lighting	
LED	120V 1 Phase
	277V 1 Phase, if available
Mechanical Equipment and Motors	
Motors 1HP and above	240V 1 Phase
	480V 3 Phase, if available
	208V 3 Phase, if available
Motors, less than 1HP	120V 1 Phase
Controls	120V 1 Phase
Fare Collection Equipment	120V 1 Phase
Communications System Equipment	120V/240V 1 Phase
Signage	120V1 Phase
Other Loads	Use applicable voltage

NOTE: Where single-phase power is taken from a 3-phase source, the loads shall be balanced among the three distribution phases.

12.3.3 System Capacity

Power shall normally be supplied from a single power distribution panel mounted in the stair tower building or on the Station platform. The power distribution panel shall be of sufficient capacity to power all loads.

A. In calculating system capacity, the following Element - Demand Factorsshall apply:

Element	Demand Factor
Lighting (normal)	1.0
Lighting (emergency)	1.0
Heating (optional)	1.0
Ventilation (optional)	1.0
Air Conditioning (optional)	1.0
Fare Collection Equipment	0.5
Communications System Equipment	1.0
Others	Varies with duty cycle and code requirements

B. Maximum load for convenience receptacles on a circuit shall be 80% ofcircuit capacity based on a demand load of 180 VA per receptacle.

C. Auxiliary transformer size election shall be based upon the connected load and demand factors listed above. The transformer shall provide ratedVA plus a 30% allowance for load growth with no more than 115°C rise above 40°C ambient.

12.3.4 Power Distribution Method

The distribution system shall be designed so that failure of any one feeder or branch over current device, conductor, or raceway will not result in total disruption of electrical services required for normal and safe operation of the facility.

12.3.5 Electrical Equipment

A. Equipment requirements shall be based upon electrical load studies. Sizing of equipment shall take in to consideration:

- Circuit breaker size requirements;
- Surge protection (if required) for transformers;
- Transformer capacities
- Low Voltage Distribution Panelboard

B. The low voltage distribution panelboard shall be composed of a main circuit breaker and one distribution circuit breaker for each feeder. The panel shall be sized to include spare circuit breakers and spaces for future use.

C. Electrical supply metering shall conform to the requirements of the serving electrical utility.

D. Phase over current and ground default devices shall be coordinated such that ground faults, short circuits, or overloads will trip only the immediate upstream protective device from the point where the fault or overload occurs.

12.3.6 Wiring

A. Raceways, ducts, boxes, cabinets, and equipment enclosures that are located within emergency ventilation areas shall be capable of withstanding temperatures to 500° C (932° F) and shall not support combustion. All insulation shall conform to Article 310 of NFPA 70. Wire and cable construction for power circuits to emergency fans shall conform to IEEE Standard 383-74.

B. All conductors shall be enclosed in raceways.

C. Conductors used for power and lighting circuits shall have an insulation rating of 600 VAC minimum, with a type XHHW-2 insulation system suitable for both wet and dry locations.

D. Conductors for emergency lighting, communications, and other systems required during emergency operations shall be protected from physical damage from transit vehicles or other normal transit system operations and from fires.

12.3.7 Emergency Power Systems

Emergency power systems are intended to automatically supply illumination and/or power essential for safety to human life, and shall be designed to provide power to selected systems in the event of outage of normal utility power sources.

A. Emergency Power Sources

(1) Emergency power sources shall be selected on the basis of reliability and lowest life-cycle cost. Possible sources include fixtures with integral batteries, a central battery system, uninterruptible power supply (UPS), and redundant utility company power services.

(2) Each station and or facility shall provide for a portable generator hookup and transfer switches to allow for auxiliary temporary power in the case of power failure. Size generator connections to supply power to emergency power systems and 50% of vertical transportation system capacity to allow for station egress.

(a) Fire detection and other critical systems that require low voltage DC for normal operation shall utilize internal battery DC power supplies.

(b) Battery-powered emergency light units shall meet the performance requirements below.

(c) Batteries shall be sealed lead-acid type with calcium-alloy grid or other suitable maintenance-free type. Units shall be connected to the branch supply circuit, using direct-wired connections. Attachment plugs and receptacles shall not be used. The branch circuit over current device shall be employed as the disconnecting means.

(d) Battery-powered emergency light units shall employ LED lamps, and shall be capable of maintaining rated illumination for not less than 90 minutes. Units shall employ solid state pulse-type charging circuits, which shall recharge battery to fully charged state not more than 12 hours after full-discharge duty cycle.

(e) A solid state switching circuit shall energize the lamps upon sensing AC power loss, and shall de-energize lamps upon either power restoration or when battery voltage reaches a minimum value recommended for extended service life.

(f) An uninterruptible power supply (UPS) shall consist of a static voltage inverter, sealed valve-regulated rechargeable batteries, battery charger, and a static load transfer switch. The batteries shall be sized to continuously carry the load for a minimum of 90 minutes.

12.3.8 Systemwide Grounding

Project elements will be grounded as described in this section. Grounding connections shall be located so as to minimize exposure in an effort to reduce vandalism and theft.

A. Station Platforms

(1) Grounding for passenger station platforms shall consist of a ground system under each facility composed of a buried exothermically welded grid-and-rod system.

(2) All electrical raceways, fittings and equipment and 60 Hz, 120-volt AC systems providing power and lighting for the station platform shall be grounded to the ground grid.

(a) Where gates interrupt the fence, the fence shall be grounded at each side of the gate and a flexible ground strap used to bond the gate to the fence.

(3) Utility Ground Rod

(a) The utility ground rod shall be adequate for grounding the utility neutral or cable shielding, and shall be electrically separated from each of the traction power ground mats.

(b) A warning sign be posted on the service equipment to provide notice of potential hazards to technical persons who may have access to the service equipment. The notice shall clearly indicate that the neutral is isolated and not grounded.

12.3.9 Conduit and Duct Banks

This section applies to all raceways and duct banks for signals, communications, low voltage including station platforms, systems buildings and Park and Ride stations.

A. General Requirements

(1) All power wire and cable shall be protected by raceways. Installations shall comply with the NEC, California Electrical Code, local and City codes.

(2) Raceways shall be galvanized rigid steel conduit unless indicated otherwise. Raceways below grade shall be galvanized rigid steel conduit provided with suitable corrosion protection. Acceptable corrosion protective coatings may be either coal-tar epoxy or factory-applied PVC (PVC-GRS), continuous for the entire embedded or buried portion plus a minimum of 12" on each stub-up.

(3) PVC conduit may be used only in duct banks or where otherwise indicated and shall be schedule 40 or heavier. Installation of PVC conduit is subject to bending radius limitations as follows:

(a) All conduit bends at 30 degrees or more shall be PVC/GRS except bends in duct banks with radius greater than 6 feet may be PVC, schedule 40. Bends shall be factory-made or field-made using an approved hot-bending appliance.

(b) Bends in duct banks greater than 100-foot radius may be made by sweeping the duct bank.

(4) Where large cables are to be installed in raceway, the bending radiusof the raceway shall be no less than 12 times the cable diameter. Minimum bend radius for raceways 2-inch and larger installed below grade shall be as follows:

Conduit Size (in)	2	2 ½	3	3 ½	4	5	6
Conduit Radius (in)	24	27	30	33	36	42	48

(5) Raceways shall be limited to a maximum of 270 degrees of bend between manholes, handholes, junction boxes, or termination points.

(6) Communications conduits shall have no bends with a radius less than 24 inches, regardless of conduit size.

(7) A minimum of 40% spare raceways shall be provided, except where determined by SJRRC that spare capacity is either not necessary, or that undue expense would be incurred.

B. System Duct Banks

(1) Duct banks are concrete-encased raceways that are usually type PVC conduit. The exact dimensions vary with the number and size of raceways. Spacers shall provide a minimum of 1½ inches of space between raceways for signal/communications duct banks and 3 inches for power. Signal, communications and power wiring shall be separated as required by the NEC. The outside envelope should have 4 inches coverage between the raceway and earth on all four sides.

(2) System duct banks should be located longitudinally along the length of the track. For under-slab conduits, match NEMA TCB 2-2000 guidelines for spacing and backfill.

(3) Lateral crossings underneath the tracks are permitted, but should be minimized. Duct banks may be located directly under the tracks longitudinally, but access to manholes, handholes and vaults shall not be located between the rails.

(4) System duct banks shall be located precisely in plan and profile. Duct banks should be sloped to drain to manholes or handholes, and located to avoid interference with existing utilities.

(5) Manholes and handholes shall be of the pre-cast type, complete with cable supports, and pulling irons. Where manholes or handholes are installed, a ground rod shall be driven, and all metallic parts grounded. Where installed in streets, they shall be equipped with a traffic-rated cast iron cover and grade ring that can be adjusted for final grade. In other locations, covers may be welded steel.

C. Cable Trough

(1) Cable trough is defined as a continuous auxiliary gutter with removable lids. Cable trough may be used for signal, signal power and communication cables only. Cable trough may be cast in place concrete or pre-fabricated.

(2) Cable trough shall have integral dividers as required to maintain separation between signal, signal power and communications cables.

(3) Cast in place concrete cable trough shall be used on pedestrian bridges only and may be an integral part of an emergency pedestrian walkway. The lids for cast in place cable trough must be nonmetallic, rated for exterior use, resistant to sun light exposure, suitable for use in wet locations and secured with stainless steel vandalism secure hardware. When used as an integral part of a pedestrian walkway, the lids must be skid resistant and meet a load designation of A-0.3 per ASTM Standard C-857-95.

(4) Pre-fabricated cable trough shall be nonmetallic, rated for exterior use, resistant to sun light exposure and suitable for use in wet locations. Individual sections must interlock when connected. The lids shall be secured with stainless steel vandalism secure hardware.

(5) Pre-fabricated cable trough cannot be used in platform areas, road and pedestrian crossings and any areas accessible to pedestrians and/or the general public.

(6) Pre-fabricated cable trough shall be placed in a level trench, with only the lids above grade. Cables shall only enter and exit the cable trough through pull boxes, handholes or manholes.

(7) All vaults used shall be designed to accommodate the entry of cable trough without modification.

D. Station Platforms

(1) For station platforms, raceways shall be PVC Schedule 40 embedded in fill 18 inches minimum below the platform slab.

(2) All conduit stub-ups through the platform slab shall be PGRS conduit.

(3) Junction and pull boxes shall consist of concrete hand holes set in the rough concrete slab and matching cast iron sidewalk topping boxes with bronze covers set flush with the finished platform surface.

(a) All conduit penetrations into the concrete handhole shall be provided with insulated bonding bushings and bonding jumpers.

(b) The topping box shall be bonded to the raceway system with a #6 AWG minimum bare stranded copper jumper cable.

E. Park and Ride Lighting and Street Lighting

(1) For park and ride lot lighting and street lighting that is maintained by SJRRC, raceways shall be PVC, schedule 80, and direct buried 36" below grade.

(2) If raceways must be buried less than 36" below grade, consider concrete encasement and the use of PVC/GRS conduit as required by the jurisdiction having authority over the installation.

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CHAPTER 13

LIGHTING

CHAPTER 13 – LIGHTING

13.1 GENERAL

This chapter establishes the design requirements for lighting function, illumination levels and equipment within SJRRC's Valley Rail system and facilities.

13.2 REFERENCES, STANDARDS, REGULATIONS, CODES, GUIDELINES

Lighting system design shall conform to the latest edition of the following standards, guidelines and codes where applicable:

13.2.1 Industry

A. UPRR

B. AREMA

C. National Electrical Code (NEC) (NFPA 70)

D. National Electrical Safety Code (ANSI/IEEE C.2)

E. Institute of Electrical and Electronics Engineers (IEEE)

F. American National Standards Institute (ANSI)

G. National Electrical Manufacturers Association (NEMA)

H. Fixed Guideway Valley Rail systems (NFPA 130)

I. Life Safety Code (NFPA 101)

J. Insulated Cable Engineers Association (ICEA)

K. Illuminating Engineering Society of North America (IESNA), LightingHandbook

L. Underwriters' Laboratories, Inc.

13.2.2 Federal, State, Local

A. California Code of Regulations (CCR), Title 24, as applicable

B. California Electrical Specialty Code

C. *International Building Code* (IBC)

D. Electrical codes or amendments of the local authority having jurisdiction

E. California Public Utility Commission (PUC)

F. California Department of Energy – California Building Energy Codes

13.3 CRITERIA / APPLICATION

13.3.1 General

The lighting criteria contained herein are intended to provide the functional and aesthetic guidelines necessary to design adequate, quality illumination for SJRRC's Valley Rail system.

A. Lighting design and selection shall be based on multiple considerations including, type of facility or element, operational requirements, cross-element interdependencies, site conditions, intended use, capacity, occupancy, sight distances and sightlines, transitional differentiation, safety and security, aesthetic and community integration, life cycle cost, maintenance, sustainability, system standardization, existing system infrastructure and equipment, and compliance with all applicable codes and requirements of the authorities having jurisdiction.

Table 13-1: Illumination Level Requirements

TABLE NOTES:

- All light illumination levels contained in the table below are considered Safety and Security Certifiable. All variances to these levels shall be reviewed and approved by SJRRC.
- The foot candle average minimum is a "base" number that shall be achieved. Impacts from adjacent elements and their lighting level requirements shall be taken into consideration and calculated as part of the resulting averages.
- Illumination calculations and measurement procedures shall be based on IESNA standards and shall result in 'minimum averages' rather than the element specific foot candle ranges previously used. This format shall be followed in both the design and construction phases of a project.
- All lighting plan photometrics shall document these illumination averages.
- Unless otherwise indicated, average/minimum uniformity ratios shall not exceed 3:1 AND maximum/minimum ratios shall not exceed 6:1

Category	Location	Illumination Level: Foot Candle Minimum Averages	Notes
	Stairways	20	
	Emergency Lighting	1	
Exterior	**Stations, Stops and Transit Centers**		
	Bus Stops, Sheltered	2	
	Bus Stops, Unsheltered – "Limited Use"	2	Currently SJRRC only installs lighting at unsheltered bus stops in specific circumstances. These include high ridership, pass-ups and in cases of high frequency or consistent use by individuals covered under ADA.
	Station Platforms, Sheltered	7	
	Station Platforms, Other than Sheltered	5	
	Fare Vending Area	7	
	Stairs / Ramps	7	
	Walkways	5	
	Pedestrian Trackway Crossings	2	
	Quick Drop Areas	5	

Category	Location	Illumination Level: Foot Candle Minimum Averages	Notes
	Outdoor Plaza	4	
	Bus Layover Areas at Transit Centers	5	Should be Same as at Train Stations
	Signage Cases / Pylons	TBD	See, Signage and Graphics – specific to cases used.
	Bike Parking Facilities		
	Bike Locker	5	Generally, this type of bike parking is not allowed under structures such as overpasses or bridges and not inside or directly adjacent to a parking garage.
	Bike Rack	5	Depends on placement, should comply with CCTV needs.
	High Capacity (50+)	7	Can be Sheltered or inside a building and will need to be CCTV compliant.
	Other		
	Public Telephone Areas	5	Depends on placement and Equipment type.
	Public art	TBD	Project specific – depends on art type and placement requirements.
	Parking Facilities		
	Surface Lots		
	Parking Surface Area	5	
	Bike Parking	5	See bike parking above – this may depend on placement within the facility – and needs to account for CCTV requirements.
	Walkways	5	
	Quick Drops	5	
	Vehicle Entrance and Exits	5	
	Public art	TBD	Project specific – depends on art type and placement requirements.

Category	Location	Illumination Level: Foot Candle Minimum Averages	Notes
	Driveways / Drive ramps	5(N) 10(D)	Per IESNA – (D) Daytime light – a sum of electric and natural light
	Entrance / Exit	5(N) 25(D)	Per IESNA – (D) Daytime light – a sum of electric and natural light
	Bike Parking	7	See Bike parking above – this may depend on placement within the facility – and needs to account for CCTV requirements.
	Walkways	5	Transition points into other Elements should be considered on paths and walkways.
	Stairs / Ramps	7	This falls in the “shall be noticeably higher level” and “placed on the external side of the building for easy surveillance” and should consider CCTV requirements.
	Pedestrian Overpasses or Tunnel Walkways	5	
	Passenger Elevators		
	Internal Lighting	10	
	Lobby/Entrance area	10	
	Pedestrian Crossings		
	Pedestrian Crossings	2	

B. Unless otherwise required by the authority having jurisdiction, lighting illumination averages shall at a minimum, meet or exceed the levels specified in Table 13-1.

C. Designers shall prepare and submit for SJRRC review and comment a Draft Basis of Lighting Design exhibit using polygons to define the each of features occurring on the project using the exact language and as specifically described in Table 13-1 for the entire extent of the project site plan. No area of the site plan for the project may be omitted. Purpose of this work is to ensure that Designers subsequent photometric analysis provides lighting levels as described in Table 13-1 and that any judgments about what levels apply to each area are resolved with SJRRC involvement before that work begins. Designer shall resolve all comments on Draft and prepare a Final Basis of Design exhibit to memorialize the basis of lighting design approved by SJRRC.

D. Designers shall provide site lighting plans with photometric information including lighting averages. Calculations shall be in compliance with IESNA standards and shall meet all applicable jurisdictional codes and requirements, including ADA compliance. Light spilling over any SJRRC property line will cause a possible deviation from Table 13-1.

13.3.2 Safety and Security

Promote the safety and security of SJRRC patrons and employees through the strategic selection, placement and use of various lighting types, illumination levels and equipment.

A. Considerations

(1) Illuminate passenger waiting areas, parking facilities, station entrance/exit and plaza areas at a noticeably higher level than surrounding areas in accordance with Table 13-1.

(2) Use varying illumination levels to define and differentiate between task areas, decision and transition points, and areas of potential hazard.

(3) Promote security by providing lighting illumination levels, color and quality sufficient for quality recordings by CCTV cameras. Refer to Design Criteria, CHAPTER 14 – COMMUNICATIONS, for CCTV lighting requirements and coordinate with SJRRC Systems Engineering to achieve compatibility.

(4) All lighting and control mechanisms shall be safely accessible for maintenance personnel.

(5) Stairway and pedestrian bridge and overcrossing lighting fixtures shall be accessible to maintenance personnel from a landing using an 8’ A-frame step ladder.

(6) Fixtures mounted over 30’ must have a lowering mechanism, with a security lock-out feature, to allow service from grade level.

(7) Photocells shall be located so they are safely accessible for maintenance purposes and can be reached using an 8-foot step ladder.

(8) Enhance the system's visual and functional clarity through the use of illumination that reinforces the presentation of signage and graphics and differentiates between site circulation networks, station entrances, fare validation areas and platforms.

(9) Select lamps, drivers, and fixtures that are resistant to the effects of lumen depreciation.

13.3.3 Illumination and Equipment

A. Illumination Levels

Illumination levels shall define and differentiate between task areas, decision and transition points, and areas of potential hazard.

(1) Luminaries shall be selected, located, and/or aimed to accomplish their primary purpose while producing a minimum glare and/or interference with task accuracy, vehicular traffic, and neighboring areas.

B. Quality

The resultant quality of light produced must be considered in determining the selection of equipment. Different types of lamps will provide different lighting for a given lighting level and color. Lamp and luminary selection must consider the following characteristics of the light produced:

(1) Color 'Temperature'

(2) Degrees Kelvin (K): Exterior locations and designated plaza locations shall have a color temperature of 5100 K. For pedestrian bridge, pedestrian tunnel, and under canopy locations, a color temperature of 3900K - 4100K is suitable. For most parking lot settings, SJRRC prefers the whitest light (highest color temperature) for a given lighting level.

(a) Color Rendering Index (CRI): Lamps shall have a CRI of 85–95.

C. Lamps, Drivers and Controls

Lighting equipment shall be designed and selected based on the required illumination level output, light quality, color, lifespan, sustainability practices, maintenance requirements and other features specific to the intended use.

Several SJRRC standard lighting equipment options exist. They can be hard-wired or solar powered.

(1) General

(a) Equipment selection shall produce the required lighting color, level and quality requirements for each given element. In addition, the selected lighting equipment shall meet applicable code and maintenance requirements.

(b) All luminaries and lamp types should be standardized system-wide tothe greatest extent possible. Standardization will provide design and perceptual unity and simplify maintenance requirements. Coordinate selection with SJRRC Facilities 'Standard Equipment List'.

(c) New technology types, not currently in use, shall be coordinated with the project manager (PM) and Facilities Management. Preference willbe given to 100,000-hour+ low-wattage lights.

(2) Lamps

(a) New installations/designs should use LED lamps whenever possible.

(b) Lamps not approved for use are:

- T12 fluorescent lamps.
- High-pressure sodium (HPS) lamps.
- Metal-halide lamps.
- Mercury Vapor

(3) Controls

(a) Automatic and manual lighting control shall be designed to use energy efficiently.

(b) All exterior site areas shall be illuminated when the ambient daylight drops below 30 fc and all but security site lighting is turned off ½ hour after revenue service stops. Provisions shall be made for photocell and manual override.

(c) A photocell for control of exterior lighting shall be provided.

i. Photocells shall be located so that they are accessible for routine maintenance purposes and can be reached using an 8’ A-frame step ladder.

ii. In cases where photocell placement is located on a building or parking structure, the photocell shall be placed on the roof, facing north, unless this location is detrimental to performance, such as in the path of any electric light, shading or shadows.

(d) Ancillary areas shall be individually switched.

(e) Control arrangements shall ensure efficient maintenance procedures.

(f) Areas with frequently switched lighting circuits shall use programmed start.

(g) Motion sensors used for restroom lighting control shall be located in the ceiling area.

13.3.4 Lighting Types

A. Interior Lighting

Interior lighting shall promote a safe environment for patrons and employees and provide proper lighting for task specific performance.

(1) Buildings and Facilities

(a) Refer to Table 13-1 for interior light levels for buildings and facilities.

(b) The following guidelines apply to all operations and maintenance facilities, employee office buildings, signals and communications buildings, concession buildings, staff/operator break buildings, storage buildings, traction power substation buildings and elevator machine and control rooms.

i. Emergency lighting shall be provided at all enclosed (indoor or underground) facilities.

ii. Interior lighting shall be LED (3500K - 4100K)

iii. Interior lighting fixtures shall have polycarbonate diffusers (Lexan or approved equal).

iv. Recessed canister fixtures shall not be used.

v. SJRRC prefers highest color temperature for a given lighting level.

(c) Passenger Elevator: Cab Interior, Entryways, and Lobbies

i. Passenger elevator cab interior lighting shall be a minimum of two (2) tamper resistant lamps of equal illumination.

ii. Lamps and drivers shall be removable from the interior of the cab.

B. Exterior Lighting

Security shall be promoted by illuminating passenger waiting areas, parking areas, and building entrance/exit areas at a higher level than surrounding areas. In addition, exterior illumination shall promote safety and security by defining and differentiating task areas, decision and transition points, and areas of potential hazard. Refer to Table 13-1 for exterior base illumination level minimum averages.

(1) Bus Stops and Shelter Areas

When required, provide bus shelter lighting and overhead lighting at bus stop locations oriented towards the bus stop boarding area. Refer to Table 13-1 for specific lighting level requirements.

(2) Valley Rail Station Platforms

(a) Station site lighting includes internal site circulation and access to the station. The placement of luminaries shall not obstruct the movement of vehicles. Luminary placement shall be coordinated with the landscape and site plan to protect light standards, and to ensure that plantings will not obscure the lighting distribution pattern. Consideration should be given to those sites located adjacent to roadways.

(b) Station illumination and equipment placement shall accommodate facial recognition for both patrons and CCTV and shall be such that shadow casting is eliminated.

(c) Platform area lighting shall differentiate 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 and stairs. Care shall be taken to avoid "blinding" train operators or other vehicle drivers with excessive or misdirected lighting.

(3) Parking Facilities

(a) Surface Lots

i. Vehicular access lighting shall provide a natural lead-in to the bus areas and quick drops. The illumination on all access and egress roads shall be graduated up or down to the illumination level of the adjacent street or highway.

ii. Surface Park and Ride lot lighting includes lighting of private automobile parking stalls and access aisles.

iii. The placement of poles and luminaries shall not obstruct the movement of vehicles, and shall consider door swings.

iv. Luminary placement shall be coordinated with the landscape and site plan to protect light standards, which are located adjacent to roadways, and to ensure that plantings will not obscure the lighting distribution pattern.

v. Use ‘high mast’ lights for surface lot lighting rather than pedestrian level lights to provide uniform lighting throughout park-and-ride facilities. Pedestrian lighting may be required for pedestrian pathways and walkways. Coordinate the pedestrian requirements with the SJRRC PM and the Safety, Security and Environmental Division.

(b) Bicycle Parking

Refer to Table 13-1 for light level information related to bicycle parking areas.

(4) Pedestrian Access

Pedestrian access lighting shall clearly define pedestrian walkways, crosswalks, ramps, stairs and bridges.

(a) Provide mid-level lighting at heights of 10 to 14 feet at pedestrian access points to stations and station facilities.

(b) Pedestrian rail crossing lighting shall provide 1.5 times the track way illumination for 100' before and after the crossing.

(5) Buildings

Refer to Table 13-1 for exterior light levels for buildings.

C. Emergency Lighting

(1) These luminaries and all exit, egress, and essential directional signage, shall be powered by an emergency power source as described in *Design Criteria*, CHAPTER 12 – ELECTRICAL SYSTEM.

(2) Illumination levels shall comply with current Federal, State and Local Codes. SJRRC’s standard Illumination ‘minimum base averages’ are specified in Table 13-1. If any conflicts exist between the authorities having jurisdiction and the specified levels in the table, the SJRRC Station Committee (SSC)) shall review and approve alternatives.

(3) Emergency lighting for stairs shall be designed to emphasize the top and bottom steps or landings, by using a minimum FC ratio of 1:4

D. LIGHTING CONTROLS AND INSTRUMENTATION

(1) Lighting control system shall be digital and consist of a Master LCP, Remote LCPs, if required. All system components shall connect and be controlled via Category 5, 4 twisted pair cable with RJ45 connectors, providing real time two-way communication1. All LCP’s shall be in NEMA Type rated enclosure with screw cover or hinged Locking door. Furnish NEMA rated types as applicable per code.

(2) 4. Control electronics in the low voltage section shall be capable of driving 2 to 48 relays (rated as per Section 2.1.3), control any individual or group of relays, provide individual relay overrides, provide a master override for each panel, store all programming in nonvolatile memory, after power is restored return system to the correct state for time of day, provide programmable dual blink warn timers for each relay or zone of relays, and be able to control Normally Open Latching (NOL) or Normally Closed Latching (NCL) relays.

(3) Standard Output Relays

(a) Relays shall be individually replaceable. Relay terminal blocks shall be capable of accepting minimum two (2) #8AWG wires on both the line and the load side. Systems that do not allow for individual relay replacement or additions are not acceptable. Relays to be rated for 250,000 operations minimum at a full 30a lighting load. Standard relay shall default to closed at normal power loss, Normally Closed Latching (NCL).

(4) Switches

(a) 1. Keyed switches shall be similarly programmable and connect to the lighting control system bus.

(b) 2. Digital switches for high abuse areas (common areas, platforms, etc.) shall be vandal resistant, contain no moving parts, and be touch sensitive and available with up to two buttons in a single gang. Multi gang versions shall also be available. Touch pads shall be Stainless Steel and capable of handling both high abuse and wash down locations. High abuse switches shall connect to the lighting control system digital bus. Each high abuse touch button shall be able to be programmed in the same way as other digital switch buttons. Switches must be capable of handling electrostatic discharges of at least 30,000 volts (1cmspark) without any interruption or failure in operation.

(c) 5. System shall come with a pre-Installed modem that allows for remote programming from any location using a PC and free remote control software.

(d) 6. DTC shall provide system wide timed overrides. Any relay, group or zone that is overridden ON, before or after hours, shall automatically be swept OFF by the DTC a maximum of 2 hours later.

(5) Photocells:

(a) 1. Photocells to be mounted in location indicated on the plans. Photocells used for exterior lights shall provide multiple trip points from 1 roof mounted unit. All trip points shall be able to be changed remotely via Internet or dial up modem. Photocells requiring manual trip point adjustment are not acceptable.

(b) Photocell used for interior lighting control shall have multiple settings such as start-point, mid-point, off-point, fade-up, fade-down, etc. All settings shall be remotely accessible and adjustable. Systems providing local adjustment only are not acceptable. Photocells to be certified to comply with the current energy code covering this project at time of submittal of plans for building permit.

(6) Interfaces:

(a) 1. A dry contact input interface card that provides 14 programmable dry contact closure inputs. Use shielded cable to connect input devices to interface card on runs over 200 feet.

San Joaquin
Joint Powers Authority

San Joaquin
Regional
Rail Commission

CHAPTER 14

COMMUNICATIONS

CHAPTER 14 – COMMUNICATIONS

14.1 GENERAL

The communications system includes the electronic communications, data processing, and human interface systems to enable the monitoring and supervisionof SJRRC rail operations, security, and administrative functions. Also included are voice and data communication systems in support of SJRRC customer service and administrative functions.

14.2 REFERENCES, STANDARDS, REGULATIONS, CODES, GUIDELINES

Communications Systems shall be designed and implemented to the latest revisionof the following codes and standards:

14.2.1 Industry

A. American National Standards Institute (ANSI)

B. Building Industry Consulting Service International (BICSI)

C. Consultative Committee for International Telephone and Telegraph (CCITT)

D. Electronic Industries Association (EIA)

E. Institute of Electrical and Electronics Engineers (IEEE)

F. International Organization for Standardization (ISO)

G. National Electrical Manufacturers Association (NEMA)

H. National Fire Protection Association (NFPA)

I. Building Industry Consulting Service International (BICSI)

14.2.2 Federal, State, Local

A. Americans with Disabilities Act (ADA)

B. Federal Communication Commission (FCC)

C. *Human Engineering Design Criteria for Military Systems, Equipment, andFacilities* (MIL-STD-1472D)

14.3 CRITERIA / APPLICATION

14.3.1 SJRRC Communication Systems

A. Scope

Valley Rail communications systems include the following basic elements:

(1) Communications Power Systems

These are the power requirements for communications equipment. The power configuration depends on the application and location.

(2) Supervisory Control and Data Acquisition System (SCADA)

Provides data transmission capabilities between SJRRC's Rail Operations Command Center and each rail station, signal equipment room and case, communications room and case, traction power substation, and various facilities.

(3) Closed Circuit Television System (CCTV)

Permits visual monitoring of rail platform, pedestrian overcrossings, pedestrian undercrossings, plazas, and parking facilities to satisfy operations and security requirements. Video is recorded at a central location, and is available via the SJRRC Enterprise network to authorized users.

(4) Digital Information Displays (DIDi)

Systems used to provide train arrival and service exception information directly to passengers at selected rail and bus stopsand at certain other locations. All fall under the umbrella of Digital Information Displays, which consists of several hardware arrangements to provide visual and audible announcements. Digital Information Displays use real-time train location information to determine arrival time information for each given sign location.

(5) Security Systems

SJRRC facilities require security systems to detect intruders and to limit access into sensitive areas to authorized individuals. Examples of facilities with intrusion detection are tunnels and pedestrian bridges

(6) Valley Rail Stations

(a) Valley Rail Stations require the following communications services:

i. Emergency Telephones (for passenger emergency telephone access, via 911);

ii. Digital Information Displays (video displays with public address);

iii. Ticket vending machine network access;

iv. CCTV;and

v. An associated communications equipment room with a SCADA RTU, IP telephone, and communications backbone network node.

(b) Where Valley Rail stations include two or more platforms, an emergency phone and digital information displays shall be provided on each platform.

(c) A minimum of two ticket validators shall be provided at each station. Multiple platform stations may require more depending on anticipated use. Each Validator shall be provided with 100Base F fibers (multimode) over two fibers for data service,

(d) Station designs must be carefully evaluated for CCTV requirements, considering all station areas.

(e) Communications Equipment Room

Stations require a communications equipment room that houses the communications node for the station. Major communications node elements are: fiber optic terminations, uninterruptable power supply, communicationsnetwork equipment, SCADA remote terminal unit, CCTV power supply,CCTV termination equipment, backboard, and copper cable surge andlightning protection equipment.

(7) Parking Lots

Parking lots are single-level facilities, and are either stand-alone facilities, associated with a rail station, or associated with a transit center.

(a) CCTV

Each lot shall be equipped with CCTV cameras to cover lot entrances and exits, and generally covering most lanes of the lot. Facial recognition is not required in the lanes. Entrance/exit camerasshall be arranged to see license plates and faces of drivers and passengers.

i. Cameras are Pan-Tilt-Zoom with 35:1 zoom ratio, in pressurized, vandal resistant housings with heaters. Use of UTP cable is acceptable for video with 20 AWG twisted pair cable for PTZ control. Power for cameras shall be arranged to permit power cycling of each camera individually, from a central location at the facility.

ii. All areas that cameras are expected to “see” require adequate lighting. A minimum of 1.0 FC with a lighting ratio maximum of 1:3is preferred.

iii. CCTV cameras shall be integrated with SJRRC’s CCTV system wherever possible.

iv. Cameras at or near rail facilities shall be integrated with SJRRC’s fiber optic backbone and cable transmission system.

(b) Where live video will not be sent to the end-user or a centralized recording system, PTZ control of cameras is only required for set-up,not for real-time viewing. On-site DVRs require removable media, sothe media can be taken to the Police office for evaluation if required, while new media can be installed in place and service restored.

(c) Communications Equipment Case

Each lot shall be equipped with a communications equipment case to contain camera control equipment,camera power supplies, power distribution equipment, PTZ signal distribution equipment, network interface equipment, digital video recorder, network firewall, and broadband interface equipment. Each cabinet shall be equipped with forced air ventilation and a dehumidifying heater. A UPS is required to support network interface, firewall, and camera control equipment for a minimum of 90 min.

(d) Emergency telephones shall be VOIP Phones using Ethernet Cat 6/7installed in elevator cabs, and emergency phone locations. These telephones shall be integrated with the SJRRC Cable transmission system, or equivalent, and shall auto-dial the OCC. Telephones shall be hands free and shall be arranged to provide a visual “Help Coming” message for the aurally disabled.

(e) Access Control

Each equipment room shall be equipped with accesscontrol hardware as required to be a fully functional element of SJRRC’s access control system. This includes signal rooms, communication equipment rooms, elevator machine rooms, and electrical equipment rooms, fire sprinkler and fire alarm panel rooms, and ventilation equipment rooms. Hub equipment for access control is to be located in the communications equipment room.

(f) SCADA

SCADA is required to transmit indications and alarms from the facility to the Cabral OCC and to send controls from the OCC to the facility. Typical alarms and indications: fire, intrusion, elevator trouble.Typical controls: elevator enable/disable. These controls and indications may be integrated with the SCADA RTU for rail operations,if practical.

(8) Undercrossings

Undercrossings are short pedestrian tunnels not long enough to require ventilation equipment. Generally, NFPA-130 applies, as appropriate to the design. Short tunnels generally require emergency telephones, CCTV, and intrusion detection. This communications equipment is serviced by one or more nearby station communications equipment rooms.

(9) Pedestrian Bridges

Pedestrian bridges generally require emergency telephones, CCTV, and intrusion detection. This equipment is serviced by one or more nearbystation communications equipment rooms.

(10) SJRRC Facilities

SJRRC Facilities are defined as non-revenue buildings, not including small buildings.

(a) Facilities functions that must be monitored by CCS require SCADARTUs or Operations Ethernet connections for monitor and control devices.

(11) Fare Collection

Ticket Validators are located at each SJRRC Valley Rail station platform, or at specific nearby locations. The communication system transports data between each Validator and the Fare Collection Network Computer (FCNC), located at (TBD).

(a) Validators interface to the communications network switch using a100-Base-F multimode connection. Multi-mode fiber optic cable makes a home-run connection from each Validator to the nearest communications node.

(12) Maintenance

Maintenance-of-Way staff works in many areas of the system and generally require two-way radio and TMTS telephone service for voice communications and access to the SJRRC enterprise network. Also, certain operations staff requires access to the AIM network workstations.

(13) Passengers

Passengers receive information via the Station Information System (Digital Information Displays), and utilize pay telephone stations in theplatforms for emergency telephone service.

(14) Digital Information Displays (PID)

(a) Digital Information Displays is a passenger information system that provides visual and audible train and/or bus arrival and general information to passengers at designated stations. Public address isintegrated with the Digital Information Displays.

(b) Generally, public address in the digital information displays is silent; it is activated by a remote announcement from the control center, or by local push button activation to announce train/bus arrival information. Determination of public address capability and the pushbutton activation feature needs to be made as a part of project design. At some locations with no close-by neighbors, the public address functionof the signs is timed to make announcements at a pre-determined interval.

(c) Preferred physical mounting location of the signs is determined by choosing a location that provides good screen visibility, screen glare resistance, vandal resistance and orientation to avoid viewing of signsby passengers with their backs to active tracks and platform edges.

(d) Sign communications is typically by Ethernet over multi-mode fiber, from the nearest communications node. In special situations, wireless communications may be used, but is not required.

(e) Signs are typically hosted by server-based application developed bySolari, Inc. All signs must be compatible with this system.

(f) Signs are typically 32” LCD displays in NEMA-4 rated enclosures.

B. Communication Subsystem Functional Descriptions

(1) Communications System Grounding

(a) All communications equipment must be properly grounded to provide a safe installation and minimize spurious interference both to and from the communications system. The system design must include a grounding plan covering all equipment and parameters for pass/fail testing of the grounding system.

(b) Each communications node requires a signal ground with a maximum earth-to-ground resistance of five ohms. This ground should be distributed to bus bars on the backboard and each equipment rack. Each equipment rack should be electrically isolated from each other and from accidental

grounds through mounting hardware. All equipment should receive a chassis ground from the rack bus bar.

(2) Communications Power Systems

(a) In general, communications systems should operate for eight hours inthe event of utility power failure. Most communications equipment is now configured for 120 VAC, 60 Hz power, so Uninterruptable Power Supplies (UPS) are appropriate to maintain operation in the event of utility power failure. UPS units and batteries must be industrially ratedto withstand temperature extremes and deep discharge cycles. Ratedlifetime should be a minimum of ten years.

(b) Field equipment to be supplied by UPS units: CTS network equipment, CCTV node equipment, SCADA, TMTS telephone sets, fiber optic media converters for fare collection equipment, telephone, signals, and traction power.

(3) Fiber Optic Cable

A fiber optic cable is required to serve each Valley Rail station (major node), additional communications node (minor node), and facility requiring communications along the right-of-way.

(a) A fiber backbone consisting of loose-tube single-mode fibers in RUS (REA) PE-89 rated cables interconnects each major communications node. These cables are installed in conduit or duct bank, in inner duct.A minimum of 100% spare fibers is required. A minimum fiber count of96 is required.

(b) The quantity of fiber terminations required at each major communications node is a minimum of 200% of the active fibers dropping off at the node, in multiples of 12. Utilize ST-type fiber patchpanels.

(c) Minor communications nodes, such as signal rooms, traction power substations, and short tunnel communication cases, depending on distance from main communications nodes and equipment requirements, may be served with multi-mode fiber cable between theminor node and the nearest major node. The cable construction shallbe RUS (REA) PE-89 rated. A minimum of 100% spare fibers is required. A minimum fiber count of 12 is required. All fibers shall be terminated at each end on an ST-type patch panel.

(d) Individual communication devices, such as CCTV cameras and Digital Information Displays may be served with tight buffered, multimode cables (62.5 micron fibers). A minimum of 6 fibers per cable is required, and no more than one third of the fibers in the cable may be assigned at time of construction.

(e) All major node patch panels shall have capacity for all terminationsplus 100% at a minimum.

(f) At end nodes, all fibers shall be terminated.

(g) At intermediate nodes, all un-terminated fibers shall be splicedthrough.

(h) All signals network fibers shall be spliced through in communications rooms, without terminations.

(4) Supervisory Control and Data Acquisition

Supervisory Control and Data Acquisition (SCADA), provides an interface between systems such as signals, traction power, and facilities; and the communications network. Locate a microprocessor based Remote Terminal Unit (RTU) at each user node. Each RTU has input and output (I/O) capability as needed to interface to the users, and programming as required to transport indications from the RTU to a host computer located at the control center and to actuate commands received from the hostcomputer. RTUs are networked on the SCADA network VLAN.

(5) Point-to-Point Data

(a) Point-to-point data circuits are generally to be avoided in favor of networked data connections.

(b) Where necessary, point-to-point data circuits are implemented to transport data to and from a field device, and the host computer at thecontrol center. These devices usually employ a serial communications interface.

(c) Historically, these circuits are implemented using a sub-rate data circuit on the communications backbone; however, the availability ofsuch services is becoming rare.

C. Transport System VLAN Definitions

The following VLANs shall be available as required at each communicationsnode.

(1) SCADA VLAN

The SCADA VLAN is an Ethernet network carried on the communications network. It transports all communications between the CCS (AIM) host computer at Cabral and field SCADA equipment.

(2) VoIP VLAN

The VoIP VLAN is an Ethernet network carried on the communications network. It transports telephone traffic between field locations and theVoIP telephone servers.

(3) Fare Collection VLAN

The Fare Collection VLAN is an Ethernet network carried on the communications network. It transports all network communications between ticket vending machines located at Valley Rail stations and the Fare Collection Network Computer, located at the control center.

(4) CCTV VLAN

The CCTV VLAN carries all CCTV images captured in the field to the CCTV servers located at the control center. Conversely, it carries cameracontrol commands to the field equipment.

(5) Digital Information Displays VLAN

The Digital Information Displays VLAN is an Ethernet network carried onthe communications network. It transports all communications between Digital Information Display devices located at Valley Rail stations and the Digital Information Display server, located at Center Street.

D. Field Equipment Technical Requirements

(1) General

(a) A communications room or house is required at each communications node, typically at every station and platform. Communications equipment requires housing in environmentally controlled rooms or houses. In the event there is not sufficient real estate to locate a roomor house within 200 feet of a platform being served by the communications node, an environmentally controlled case may be used for equipment serving that platform.

(b) Whether the communications equipment is in a house, room, or case,the following design requirements apply:

(c) The room, house, or case for each communications node shall besized to accommodate and be equipped with:

i. Three racks minimum, with cable management hardware between racks.

ii. Outlet strips for each rack wired to UPS and house power.

iii. Ground bus bars for each rack.

iv. Overhead raceway serving racks and backboard.

v. Rack height (excluding raceway) shall be a maximum of 7’-0”.

vi. Backboard—Provide for termination of all copper signal cables and placement of cable entrance protection.

vii. Layer 2 Gigabit Ethernet switch with 24 ports, minimum and a minimum of 50% spare ports, integrated with SJRRC’s network configuration and Cisco network management system

viii. Fiber splice/patch panel for splicing/terminating the fiber backbone cable and any additional fiber cables for local runs.

ix. Fiber optic media converters as required.

x. SCADA RTU, with a minimum of 16 inputs and 8 outputs.

xi. SCADA I/O Termination hardware.

xii. Equipment to provide real time passenger information (public address and variable message signs) for the adjacent platform(s).

xiii. Equipment to provide at least 8 CCTV cameras for the adjacent station.

xiv. UPS with Sealed lead-acid batteries with thermal runaway protection shall be provided and sized to carry the load for all equipment for that communications node for a minimum of 8 hours, assuming the lowest allowable environmentally controlled temperature.

xv. The UPS battery charger shall be sized to carry the load for all equipment for the communications node and still recharge the batteries within 24 hours.

xvi. UPS capacity shall be calculated based on all available rack spaces being occupied and a power requirement of 5000 Wattsper rack, minimum, in order to provide for future equipmentadditions. This power requirement shall also be used as the basisfor calculating room cooling requirements.

xvii. TMTS Telephone

xviii. Power management hardware

xix. Environmental control shall be provided to maintain the temperature in the case/room between 60 and 90 degreesFahrenheit.

xx. Interior lighting plans for houses shall be coordinated with the comprehensive equipment and furnishings layouts to minimize shadows from suspended equipment, raceways and equipment racks.

xxi. House power wall receptacle locations shall be coordinated with equipment layout and requirements. Provide a minimum of two receptacles per wall.

xxii. Each room/case shall report status of intrusion detection, firealarm, and access control to CCS/AIM via SCADA.

xxiii. Communications Cases are to be avoided, or used for a sub-set of equipment only.

(2) SCADA RTU Requirements

(a) General RTU Requirements

i. Solid-state, microprocessor-based with logic elements and auxiliary components configured on easily replaceable plug-inmodules.

ii. Provide interchangeability of modules; all RTUs shall be of a common design.

iii. Capability to continue operations with the loss of communication to CCS as a result of either communication equipment failures or CCS failures.

iv. Operate normally unattended. RTU logic and configuration data shall reside in non-volatile memory.

v. Perform self-tests upon power up and on command from local test equipment and from CCS. Self-tests shall also be performed by input/output subsystems and input/output cards.

vi. Provide for maintenance of input/output circuits (including disabling power to output circuits) and safe replacement of input/output cards while power is applied. Possess the capability to continue operation between 0˚C and +60˚C with 0 to 95% humidity (non- condensing).

vii. Operate within a power supply range of plus or minus 5% of its nominal value and a frequency range of plus or minus 1% of its nominal value.

viii. Capability to continue operation in the electromagnetic environment where they will be located, such as traction power substations, signal cases, and communications equipment roomsor cases.

ix. Support local initialization and troubleshooting with either a local control panel or portable test equipment.

x. Be modular in design to provide expansion of performance and capacity by adding subsystem modules. This shall include the ability to add a minimum of 20% more input/output subsystem modules.

xi. Supplied with hardware and software tools and documentation for reconfiguration and expansion.

(b) RTU Inputs and Outputs

RTUs shall support discrete inputs and outputs via relay contact closures (or optically isolated solid-state equivalents such as silicon-controlled rectifiers). All discrete inputs to the RTU shall be of the same type. All discrete outputs by the RTU shall be of the same type.The following RTU input and output requirements shall be met:

i. Digital inputs to the RTU shall be from Form C relay contacts. The sensing voltage DC power supply shall be in the RTU domain.

ii. Input and output signals shall be electrically isolated from the RTU.

iii. RTU shall generate outputs via relays. Relays and transient suppression circuits shall be provided. RTU interface relays and relay contacts shall have an MTBF, at rated loads, of 5,000,000 cycles or more.

iv. RTU outputs shall be momentary contact closures with a time duration that is stable and adjustable.

v. RTUs shall prevent unintended action such as energizing output circuits upon power-up and power- restore.

vi. A serial digital data interface may be used between the RTU and other processor-based devices, such as TWC interrogators. All serial interfaces to RTUs shall be optically isolated.

(c) RTU Wiring and Cabling

The RTU shall be designed and implemented so that wiring andcabling between the RTU and field devices are uniform in type, routing, and connection locations. The following field interface requirements shall be met:

i. Signals between the RTU and signal rooms shall terminate at one centralized location.

ii. Signals between RTU and TPSS sites shall terminate at one centralized location.

iii. Environmental control system signals between RTU and a tunnel site shall terminate at one concentrated location.

iv. RTU terminations shall include test points and rapid disconnect.

v. All wires and cables shall be labeled using a logically consistent labeling convention.

(d) RTU Networking

i. RTUs shall utilize a 10 base-T Ethernet connection via the CTS to communicate with the CCS. Error correction and detection schemes shall be used utilizing an industry standard (such as CCITT CRC-16) and, at a minimum shall detect all errors of up to 16 contiguous bits and detect at least 99% of all error bursts greater than or equal to16 bits.

ii. The required protocol is Modbus TCP, implemented to be compatible with existing drivers in the Central Control System(AIM).

(3) Cable Transmission System (CTS)

A fiber optic Cable Transmission System shall be installed along the LRT right-of-way to connect the various field voice, data and video signals between the field and the OCC as follows:

(a) A Gigabit Ethernet network shall be installed, with a layer-2 node ateach major node.

(b) The network switch shall be equipped with fiber ports to interconnectwith remote devices such as Ticket Vending Machines, Digital Information Displays, and TWC interrogators.

(c) All Ethernet circuits shall be routed through an RJ-45 patch panel.

(d) Power Sources

The CTS shall be powered by the UPS.

(e) Temperature

The CTS equipment shall be capable of operating within an ambient temperature range of 0□C to + 50□C.

(f) Capacity

The CTS and its associated conduit system shall be sized to accommodate future anticipated growth, including possible commercialization. The redundant single-mode fiber optic cable shall consist of 96 fibers or the number of fibers required plus 100% spare fibers, whichever is greater. All mainline cables shall be installed in inner duct. Each mainline communications conduit shall be provided with inner duct for current and future use.

(4) Intrusion Detection System

Intrusion detection shall be provided at each tunnel portal and at each restricted access bridge entrance. All new intrusion detection systems shall utilize adaptive video technology providing discrimination betweenintruders, trains, buses, bicycles, and small animals.

(a) Unauthorized traffic shall activate the following:

i. An alarm to OCC to alert Operations staff

ii. CCTV to permit Operations staff to view intruder

iii. An on-site warning alarm consisting of a tone alert, a flashingyellow beacon, and a recorded voice-warning message

(b) The system shall have the following features:

i. OCC controlled timed bypass for maintenance access

ii. Tamper alarms on intrusion detection equipment located atsecurity area entrance

iii. Rechargeable battery backup for 4 hours in the event of power failure

(5) Telephone System

Telephone equipment modifications are to be compatible with and interfaced with the existing SJRRC Telephone System (TMTS). Suchmodifications are to be coordinated through SJRRC's Voice Systems Engineer.

(a) Blue Light Telephones

i. Blue Light Telephones, also designated 'Emergency Telephone,'are required in elevators, tunnels, and on long bridges exceeding 200' and shall generally meet the requirements of NFPA 130.

ii. Blue Light Telephones shall be weatherproof and designed for hands-free operation and meet the requirements of ADA whereADA applies.

iii. Blue Light Telephones shall be a portion of SJRRC's TMTS telephone network. Each phone shall be arranged for on-hook and off-hook detection by the SCADA system.

(b) TMTS Telephones

Standard push button dial (TMTS) telephones shall be provided in Communications Rooms, Signal Rooms, Traction Power Substations, Operation Rooms and other designated locations. Generally, these telephone sets shall be IP based instruments, featured for internal (to SJRRC) calls only.

(6) Closed Circuit Television (CCTV)

Closed circuit television (CCTV) equipment is required to provide security surveillance at each Valley Rail station, parking lot, parking garage, tunnel portals, bridge entrances, and other selected locations. All new camera locations are to be integrated into SJRRC's existing CCTV system. Camera types (PTZ/vari-focal/fixed) are selected based on coverage needs at each location.

(a) The current CCTV system back-end is based on Verint Nextiva software. Back-end storage is a minimum of 14 days for all images, at7.5 fps, at 4-CIF resolution.

(b) Field equipment generally consists of digital multi sensor cameras in pressurized and heated housings. IP cameras are acceptable if installed in equivalent housings and are compatible with SJRRC'sVerint-based back-end system.

(c) Analog cameras are connected to Verint Smart-sight codecs, which are in turn connected to the Verint back-end via the CTS network onthe CCTV VLAN. Each rail station/comm. room requires a complement of CCTV equipment.

(d) Station Platform cameras provide a view of the entire platform, with special attention to ticket vending machines, elevator interiors and exteriors, and stairways. Cameras shall be arranged to provide facialrecognition at paid-zone entrances and exits. Pinhole cameras may be utilized where practical.

(e) Card-swipe access via SJRRC's TRACS access control system.

(7) Intrusion Detection

(a) Intrusion detection is required at tunnel portals, bridge entrances, and secured areas, such as systems equipment rooms.

(b) Intrusion detection for tunnel portals and bridge entrances shall be of a scanning type, with sufficient resolution and logic so as to alarm only with intruders and not with trains and small animals. These systems require on-site annunciation consisting of flashing lights and audible warnings.

(c) Intrusion detection for secured areas will detect when doors are breeched, but will not include on-site annunciation. Smoke and heatalarms will be coordinated with intrusion detection.

(d) Intrusion detection equipment provides dry contact closures to the SCADA system, which in turn reports intrusions to the CCS system,which in turn annunciates alarms at Central Control.

(e) An acceptable alternate to laser scan detection is intelligent video detection, where the video system automatically learns the norms forthe situation and alarms when the norms are violated.

(8) Real-Time Information System (RTI)

Where physically and economically feasible all SJRRC station platforms will be equipped with RTI equipment, generally known as Digital Information Displays. These displays provide schedule, service advisory, public service, and advertising information to passengers. RTI equipment shall consist of amplifier-driven loudspeakers and variable message signs.Most locations require pushbuttons to permit passengers to hear an audiopresentation of rail/bus schedule information.

(a) When a user requests a display, the completed display shall appearon the screen in not more than 10.0 seconds.

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CHAPTER 15

SIGNAGE and WAYFINDING

CHAPTER 15 – SIGNAGE AND WAYFINDING

15.1 GENERAL

This chapter describes the categories, types, characteristics, purpose, placement, equipment, general requirements and typical use of signage andgraphics within SJRRC's Valley Rail Stations and associated transit facilities.

ADA compliant signs and tactile wayfinding shall be provided throughout the facilities including specific Braille dots, visual characters, raised characters (also called tactile characters), and/or pictograms, depending on the area or room the sign is identifying.

Accessible signage and wayfinding shall be positioned at required heights and specific places to achieve a universal standard of accessible design so that people with disabilities know where to find where they need to travel from any position along an accessible path of travel.

Signage and graphic design and selection shall be based on SJRRC branding and station graphics plan and several factors, including: message type and intent, site conditions, type of facility, intended use, location, code enforcement, safe operation, and requirements of the authorities having jurisdiction.

15.2 REFERENCES, STANDARDS, REGULATIONS, CODES, GUIDELINES

15.2.1 Industry

A. AASHTO

15.2.2 Federal, State, Local

A. U.S. Department of Justice's, Americans with Disabilities Act (ADA)

B. Federal Highway Administration (FHWA) *Manual on Uniform Traffic Control Devices* (MUTCD)

C. International Building Code (IBC)

15.2.3 SJRRC Stakeholders

A. Capital Projects and Construction

B. Maintenance and Operations

15.3 CRITERIA / APPLICATION

15.3.1 Materials and Finishes

A. General

The selection of signage materials directly affects maintenance requirements and the image of each facility. Simple, durable, readily available, and easily maintained materials should be used to minimize damage and maintenance, while enhancing the character and visual quality of each station. Because vandalism is more likely where it already exists, use materials that reduce repair time so that stations donot appear under-used or abandoned.

(1) Design platform and pedestrian station access such that navigating in, through and around them is intuitive with clear, visible, and easily identifiable entrances and access points; with obvious circulation pathways where wayfinding is not sign dependent.

(2) ADA-compliant tactile wayfinding solutions shall be designed to provide a tactile response via raised bars or domes and directional tiles that make paths of travel easier to follow for pedestrians who are visually impaired or who otherwise struggle with traversing a walking path.

(3) The Project shall include a comprehensive wayfinding, signage and graphics communications program that includes district identification signage identifying SJRRC facilities, as well as station signage inclusive of wayfinding, informational and regulatory signs.

(4) The program shall be based on established wayfinding logic, adhere to the 4 Cs of wayfinding: consistency, continuity, connectivity, and confirmation.

(5) The communications program shall acknowledge that wayfinding information is effective when it utilizes multiple connections to users: visual, verbal and virtual.

(6) A distinctive brand identity and signage standards shall be developed for the Project including a logo, font(s), colors, and sign layout guidelines. The brand identity shall be complementary to the physical design of the facilities, the architectural approach and contribute to the overall Project aesthetic.

(7) Static signage shall have a distinct look consistent with the brand identity.

(8) Static, dynamic and digital signage types may be utilized as appropriate as part of the wayfinding program.

(9) Uniformly placed, larger format signs that allow for multiple wayfinding messages to be clearly displayed in an organized manner are preferred since they avoid a cluttered appearance caused by multiple smaller signs.

(10) Sign messages shall use appropriately sized fonts to be clearly legible for universal accessibility and in compliance with the Americans with Disabilities Act and the California Building Code requirements for type size and style, and color contrast.

(11) When specifying manufactured items or materials, standard off- the-shelf items that are available from more than one supplier arepreferred over custom made or single source items.

(12) Refer to Signs & Graphics Design Standards Manual for details pertaining to font, color, logo treatment and basic layout of varioussigns.

B. Life Cycle Objectives

(1) Maximize ease of fabrication and installation

(2) Maximize the use of available materials and finishes

(3) Maximize the use of durable materials and finishes

(4) Minimize the number of components and shapes

(5) Minimize life cycle costs

(6) Maximize ease of replacement

(7) Maximize the use of materials that are interchangeable with other SJRRC signage

(8) Maximize ease of maintainability

C. Performance Elements

(1) Durability

(a) Use durable materials that have consistent wear, strength, andweathering qualities.

(b) Materials must be capable of good appearance throughout theiruseful life and be colorfast or integrally colored, as appropriate.

D. Low Maintenance

Minimize life cycle maintenance costs when evaluating allmaterials and finishes.

E. Appearance

(1) Materials should be appealing and harmonious in appearanceand texture.

(2) Materials should reinforce system continuity

F. Cleaning

(1) Use materials that do not soil or stain easily, whose surfacesare easily cleaned in a single operation employing SJRRC's approved cleaning agents, commonly used equipment and practices.

(2) Minor soiling should not be easily visible.

G. Repair or Replacement

Materials shall be standardized as much as possible for easy repair or replacement without undue disruption of location or facilityoperations. For example, information panels and sign materials shall be standardized with respect to sizes and finishes for easy inventory stocking and installation.

H. Corrosion Resistance

Because of moisture and the nature of the harsh environment associated with rail operation, give special consideration to preventing corrosion. Usenon-corrosive materials in moisture/current susceptible areas.

I. Compatibility

Selected materials must be suitable for the Central Valley area climateand compatible with existing materials within the facility vicinity.

J. Availability

(1) Select materials that permit multiple competitive bidders.

(2) Emphasize regional products and processes over those notlocally available.

K. Fire resistance

"Flame spread" ratings must conform to the appropriate codes.

L. Finish Materials

(1) Dense, hard, nonporous materials are preferred for all applications. Finish materials must be corrosion, acid, andalkali resistant and will be compatible with chemical compounds required for maintenance.

(2) All porous finishes subject to public contact must be treated orfinished in a manner that allows easy removal of common graffiti vandalism.

M. Detailing

(1) For detailing finishes, avoid unnecessary surfaces that maycollect dirt and complicate cleaning or otherwise harm the public (ex: sharp corners or edges within reach)

(2) All edge and finish materials shall be detailed, incorporatingjoints and textures that reduce the requirements for true, visually perfect installation over long distances.

N. Waterproofing

All finish materials will be selected and detailed with properattention to waterproofing.

O. Texture

Materials within reach of passengers must be easily cleaned andhave a finish that prevents or conceals scratching, soiling, and minor damage.

P. Fasteners

For SJRRC maintained items that require vandal resistant fasteners,use a square head that is greater than ¼” in length. Avoid specialty or proprietary fasteners.

Q. Color

In selecting color, favor materials that are light and reflective tomaintain desired illumination levels.

15.3.2 Signage Types and Categories

A. Types

There are two signage types within the SJRRC Valley Rail transit system, Passive (non-electronic), and Active(electronic)

(1) Passive Signage (Non-Electronic)

Passive signage includes reflective and non-reflective staticsignage that does not require power or data.

(2) Active Signage (Electronic)

Active signage requires power and data connections for properoperation.

B. Categories

Signage is grouped into the five main categories (these can be both“Active” and “Passive” type signage) including:

(1) Customer Facing

This signage is intended to communicate with transit patrons. This signage assists the patron in safely navigating and using the transitsystem and its supporting services and facilities like Ticket Validators, Park & Ride lots and garages and Bike & Ride facilities.

(2) Non-Customer Facing

Signage that communicates with operations personnel. Non- customer facing signage is provided primarily to direct and assist in the safe operation of the transit system.

(3) SJRRC Regulatory

This signage is typically placed within or adjacent to SJRRC’s facilities. They are generally used to control, enforce, or direct vehicular, pedestrian and bicycle traffic to and behavior within the transit system. In some cases such as when wayfinding signage is placed adjacent to a road or freeway off ramp to direct traffic to a transit station or facility, it may be regulated by the authority having jurisdiction (AHJ). This signage is provided, placed and maintained by SJRRC. This signage can be both customer-facing and non-customer facing (operational) and can be passive or active.

(a) Customer-Facing

When this type of signage is used as “customer-facing” to communicate with transit patrons, generally the template formatis the same as the Manual on Uniform Traffic Control Devices (MUTCD) signage referenced below. In some cases, such as prohibited activity or enforcement signage, the templates are specific to SJRRC and do not follow the standard MUTCD template.

(b) Non-Customer Facing

When this type of signage is utilized in a “non-customer facing” operational capacity, it is typically placed in the right-of-way of

the transit system to direct and assist in the safe operation of rail and bus transportation. Given the specific function and placement of this signage type, the templates generally used are specific to SJRRC operations and the dimensions, color, layout, graphics, icons/symbols and message may not follow the same design template specifications as the MUTCD signage described below.

(4) Non-SJRRC Regulatory

This signage is typically found outside of SJRRC's right-of-way, in street environments and is generally used by local and state authorities having jurisdiction to control or enforce vehicular, pedestrian and bicycle behavior.

(a) In some instances SJRRC Capital Projects may be required by the AHJ to provide, modify and/or install this signage as part ofnew construction or redesign.

(b) For the most part, specific information for this type of sign is notcovered by this chapter. This information is typically described in the *Manual on Uniform Traffic Control Devices* (MUTCD), and in some element specific cases, can also be found in the SJRRC Directive Drawings.

(5) SJRRC Safety

This signage typically functions to maintain safety in the navigation,use and operation of the transit system. These signs can be passive, active, customer facing and/or non-customer facing.

15.3.3 Common Signage Characteristics

A. Colors and Materials

(1) Standard Colors

Refer to *SJRRC Signage Graphic Standards Manual* and verify colors with SJRRC Marketing Department.

(2) Materials and Finishes

Information on standard signage materials and finishes can befound by referencing SJRRC's Marketing Department, SJRRC Directive Drawings and *Design Criteria*, CHAPTER 15 – SIGNAGE AND WAYFINDING.

B. Lighting and Illumination

See *Design Criteria*, CHAPTER 13 – LIGHTING, and SJRRC DirectiveDrawings.

C. Electrical

See *Design Criteria*, CHAPTER 12 – ELECTRICAL SYSTEM.

D. Communications

See *Design Criteria*, CHAPTER 14 – COMMUNICATIONS, for information onthe installation of 'Active' signage that requires the use of data lines and/or telephone lines and for information regarding the inclusion of CCTV infrastructure and equipment on signage cabinets and structures.

E. Mounting Design

The mounting design shall be based on the sign type, intended useand message, placement, loading requirements, and mounting requirements. Foundations for sign structures shall be sufficient to support the required loads.

(1) Mount Types

(a) Pole / Post / Railing Mounted

(b) Pedestal Mounted

(c) Ceiling or Suspension Mounted

(d) Surface Mounted (Wall, Window, Pavement, Door, etc.)

i. Mechanical

ii. Adhesive

iii. Paint

iv. Heat/Thermal

v. Epoxy/Chemical

(2) Mounting Hardware, Materials and Finishes

(a) Hardware, materials and finishes used for mounting signageshall be vandal/tamper resistant type.

(b) Mounting hardware shall be rated as applicable for theappropriate requirements.

(c) Coordinate vandal/tamper resistant hardware selection withSJRRC Facilities Management, Operations

(d) Refer to *Design Criteria*, , for further loading engineering requirements.

F. Placement and Installation

Standardized placement of signage and graphics facilitates system familiarity for both patrons and operations personnel. Signage shall bearranged and distributed in a uniform manner that is easily visible to transit patrons and personnel.

(1) Signage placement and installation shall be based on several factors including: signage type and category, intended messageand use, mounting requirements, site conditions, type of facility, capacity, codes and requirements of the authorities having jurisdiction. Consider accessibility clearances, protruding objectsand detection when designing and placing signs.

(2) Placement and installation design shall to be coordinated with SJRRC, as specified based on the signage type and category. When not otherwise specified, the designer shall coordinate withthe SJRRC Project Manager for direction.

(3) Location and placement of signage should be consistent to the extent possible, within each element, throughout all transit facilitiesincluding: stops and stations, parking facilities, operations and maintenance facilities, right-of-way and trackway, traffic and pedestrian crossings and at all other applicable areas and facilities.

(4) At SJRRC transit facilities, signage should be direct and imply the owner/operator's authority over the facility and intent to enforce regulations.

(5) SJRRC Customer Informational Signage should be strategically placed so it is not necessary to enter “Paid Fare Zones” or areas where patrons are required to possess a valid ticket or pass, for any reason other than to immediately use, the transit system. Thisreduces the presence of non-riders, which assists in the enforcement of the “Paid Fare Zones”.

15.3.4 Specific Signage by Facility Type

A. SJRRC Facilities

These facilities include owned and leased property and can serve bothSJRRC employees and its customers.

(1) Meet interior and exterior AHJ and ADA signage guidelines

(2) Include SJRRC identity signage

(3) Include hours of operation (for visitors)

(4) Identify safety equipment such as fire extinguishers, defibulatorsand first aid boxes

(5) Identify enclosed rooms and cube ID signs

(6) Restroom

(7) Elevator signs

(8) Parking lot signs (ADA, Carpool, Reserved)

B. Rail Stations

(1) Customer Facing – Active

Quantity, placement, configuration and design shall be coordinatedwith SJRRC’s Project Manager, Operations Safety and Security, Customer Service, and Marketing - Creative Services departments.

(a) Digital Information Display (DIDi)

i. Digital panel that displays bus or train real time and/orscheduled arrival information.

ii. Provide DIDi initial installations (or provide for future installation as directed by SJRRC) at all shelter structures.

iii. Reader Boards: LED

iv. Flat Screen: LCD

(b) PTW (Part-Time Warning)

(c) Audio Messaging

i. Reader Board Active Audio

This type of messaging is provided with some Reader Boards and Flat Screen displays, depending on the contextand ambient characteristics.

ii. Patron Activated Audio

This type of messaging will be provided for Flat Screen displays as determined by SJRRC.

(2) Customer Facing - Passive

Listed below are examples of element specific signage typicallyincluded or required at the various types of facilities. For information on other element specific requirements not listed below, coordinate with the applicable SJRRC departments and documents as directed in this chapter.

(a) Stations

i. Station Identification

- ID blade sign and customer information display on one column.
- ID blade sign only on column or light pole.
- Provide two blade signs on each platform that identify the light rail lines that serve the station and destination.
- Place blade signs in areas that are not served by pylons.
- Place in illuminated locations or provide integral backlit illumination.

(b) Shelter Signage

i. Provide station identification signs in passenger shelters.

ii. Destination signs shall be shelter mounted on center platforms and shall indicate destination.

(c) Customer Information Display

Free standing or integrated information pylons at allstations. These displays shall provide:

i. Customer and system information

ii. Tactile station name for vision impaired users

iii. CCTV camera (optional)

iv. Weather resistant convenience outlets

v. Contain integrated back-lighting for transit information, line designation and maps.

vi. Electrical and lighting shall meet the standards escribed in Design Criteria, CHAPTER 12 – ELECTRICAL SYSTEM and CHAPTER 13 – LIGHTING.

vii. Size pylons to accommodate standard SJRRC information materials (e.g., LRT and bus system maps and schedules) and to accommodate internal maintenance that may be required.

viii. Locate pylons on the platform half at the front end of the train, with one each for in-bound and out-bound platforms.

ix. Locate additional pylons at pedestrian entry points, as required, and at circulation confluence points not covered by platform pylons.

(d) Directional Signs

Provide simple and clear directional signage between modes of transportation.

(e) Use of SJRRC Property

(f) Prohibited Activities

i. No Trespassing

(3) Non-Customer Facing (Operations Based)

Coordinate non-customer facing (operations based) signage with the SJRRC project manager (PM), Operations, Safety and Security and Marketing - Creative Services departments.

Color makeup, orientation and placement of these signs are delineated in the SJRRC *Rail Transportation Rule Book*. Additionalinformation can be found in the SJRRC Directive Drawings and through coordination with SJRRC creative services manager.

(a) Active

i. Speed Indicator Sign

(b) Passive Signs and Markers (including, but not limited to)

i. Emergency Walkway

(4) SJRRC Regulatory

Coordinate SJRRC regulatory signage placement and quantitieswith the SJRRC PM, Operations, Safety and Security, CustomerService, and Marketing – Creative Services departments.

(a) Active

Not applicable

(b) Passive (including, but not limited to)

i. Prohibited Activities

ii. Use of SJRRC Property

iii. Payment Required

iv. No Smoking

v. Danger – No Bike Riding Through Transit Centers

vi. Do Not Cross Tracks (see SJRRC Directive Drawings)

vii. Danger - No Trespassing (see SJRRC Directive Drawings)

viii. Directional Wayfinding

ix. No Trespassing

x. Maintenance Only

(5) Safety

The following signage is related to crossing safety or customer/operational safety. Some of these signs may also be referenced in the SJRRC Directive Drawings.

(a) Active

i. PTW – LED Pedestrian Warning - Double Image (also seeSJRRC Directive Drawings) PTW1 – Street Traffic Warning, Train Approaching (alsosee SJRRC Directive Drawings)

ii. PTW2 – Street Traffic Warning, Train Crossing (also seeSJRRC Directive Drawings)

iii. Flashing Speed Indicator Sign

(b) Passive (including, but not limited to)

i. STOP HERE

ii. DON'T STAND HERE

iii. Look Both Ways (also see SJRRC Directive Drawings)

iv. DO NOT CROSS TRACKWAY (see SJRRC DirectiveDrawings)

v. Danger – No Trespassing (see SJRRC Directive Drawings)

vi. Do Not Cross Tracks (see SJRRC Directive Drawings)

vii. Do Not Walk Between Railings and Track (see SJRRCDirective Drawings)

(6) Non-SJRRC Regulatory

These signs shall be provided and placed as specified andrequired by the authority having jurisdiction.

(a) These types of signs may include:

i. Prohibitive signs (red background with white lettering)

ii. Warning signs (yellow background with black lettering)

iii. Regulatory signs (white background with black lettering)

iv. Road Work signs (orange background with black lettering)

v. Motorist Services signs (blue background with whitelettering)

vi. Guidance or Informational signs (green background withwhite lettering)

vii. Historic, Cultural or Recreational signs (brown backgroundwith white lettering)

C. Bus Stops

(1) Transit Center

Signs at Transit Centerl stops currently resemble Transit rail platforms for a unified rider experience from block to block. Referto *Signs and Graphics Standards Manual* for details.

(a) Active

i. Transit Tracker arrival information digital information display.

(b) Passive

i. Bus Information Display

A bus information display is afreestanding, two-sided cabinet that displays bus route schedules.

- Bus stop sign with pole mounted customer information display.
- Provide one at each transit center and at all bus stops with multiple bus lines.
- Refer to *Signs and Graphics Standards Manual* for details.

D. Park & Ride Surface Lot

(1) Customer Facing

(a) Active

None

(b) Passive

i. Facility Identification monument sign shall be placed at amain entry/exit location of each park and ride facility

ii. Use of SJRRC property (24-hour parking limit, notresponsible for loss/damage)

iii. ADA parking

iv. Vehicle directional

v. Pedestrian wayfinding to the facility if needed

vi. Bicycle signage

vii. Carpool parking spaces

viii. Electric car parking spaces

ix. Quick Drop parking (limited time)

(2) Non-Customer Facing

None

(3) Regulatory

(a) Passive

i. Stop sign

E. Bike and Ride Facilities

(1) Customer Facing

(a) Active

i. Bike Link card access machine

(b) Passive

i. a) Facility ID sign

ii. b) Area wayfinding to facility

F. Transit Center Bus Bay Signs

Bus bay signs are pole-mounted signs that indicate bus route numbers. These signs shall be located at each bus bay or stop.

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CHAPTER 16

ART AND ELEMENTS OF DISTINCTION

CHAPTER 16 – ART AND ELEMENTS OF DISTINCTION PROGRAM

16.1 GENERAL

This chapter serve as a guide for the SJRRC Valley Rail Art and Elements of Distinction Program within SJRRC's Valley Rail transit facilities.

The Art and Elements of Distinction Program are intended to enhance the quality of the region's transit experience and have a positive impact on SJRRC's ability to attract and retain riders. In an effort to keep project funds in the local economy, the Elements of Distinction program strives to use local artists and utilize materials and equipment that can be procured through local or regional manufacturer's and fabricators.

The visual quality of transit systems has a profound impact on transit patrons and the community at large. Transit systems should be positive symbols, attracting local riders, tourists, and through passengers. Good design and Elements of Distinction can improve the appearance and safety of a facility, give vibrancy to its public spaces, and make patrons feel welcome. Good design and Elements of Distinction will also contribute to the goal that transit facilities help to create livable communities."

16.2 REFERENCES, STANDARDS, REGULATIONS, CODES, GUIDELINES

16.2.1 Industry

A. Americans for the Arts, Network - Best Practice Goals andGuidelines

B. Americans for the Arts, Network - Call for Artists Resource Guide

C. Americans for the Arts, Network - Annotated Model Elements of Distinction Commissioning Agreement

16.2.2 Federal, State, Local

A. International Building Code (IBC)

B. California Structural Specialty Code (OSSC)

C. California Electrical Specialty Code (OESC)

D. State of California Structural Code - International Building Codewith statewide amendments

E. State of California Electrical Code - National Electrical Code (NFPA 70)

F. U.S. Department of Transportation's *Transportation for Individuals with Disabilities; Final Rule*, including 49 CFR Parts 27, 37 with Appendix A –*Standards for Accessible Transportation Facilities* and Part 38

G. Federal Transit Administration Design and Art in Transit Projects – C 9400.1A

H. Federal Transit Administration *Best Practices Procurement Manual,* Chapter 6 – Procurement Object Types: Special Consideration 6.7 ARTWORK

16.3 CRITERIA / APPLICATION

16.3.1 Art and Elements of Distinction Program

A. Background

SJRRC's incorporating Elements of Distinction was initiated by the SJRRC Stations Committee adopting the Elements of Distinction as part of the SJRRC Valley Rail Design Guidelines.

B. Goals and Principles

(1) Promote increased transit use and community pride by integrating temporary and permanent art works into SJRRC's public transit system.

(2) Celebrate the contributions of public transportation and recognize cultural richness in the region.

(3) Utilize local, regional and national artists to develop high quality Elements of Distinction work to enhance the transit environment and adjacent communities.

C. Scope

The Work of this Section consists of coordination, roles and responsibilities, design integration, fabrication and installation of artwork, and artwork lighting. All artworks are structures integral to the customer environment and shall be designed by SJRRC contracted artists. Depending on the artwork material, SJRRC shall either provide artist designs to the Contractor for fabrication and installation, or furnish the fabricated artwork for installation by the contractor. All artworks shall be installed by Contractor.

(1) Elements of Distinction Program Management

The Elements of Distinction Program is administered by SJRRC staff that prepare and issue RFPs or RFQs, coordinate artist selection, artwork design and technical reviews, write and manage artist contracts, and oversee the fabrication of artwork.

16.3.2 Artwork – Responsibilities

A. SJRRC Responsibilities

(1) Management

All aspects of artist contracts and artwork development through project completion to ensure adherence with the aesthetic, sustainability and qualitative integrity of SJRRC approved artwork design.

(2) Coordination

Work with Contractor to implement the artwork. There is no Contractor requirement for artist or art consultant management services as partof this scope.

(3) Communications

Plan, schedule, coordinate and facilitate any meetings, presentations and community outreach as determined for public communicationof the overall Art Program and the specific public art projects. This includes directing communications with artists, specialized art fabricators and engineers under

contract with SJRRC , and providing input to others under contract with the Contractor, associated with planning, scheduling, fabrication, delivery and installation of the artworks.

(4) Identify Artwork Locations

At stations, and or along the transit corridor project,at appropriate locations to emphasize maximum visibility and engagement with transit customers, substantial scale, and significant enhancement to the station and project environment. SJRRC staff will work with the project team to achieveartwork integration and be in keeping with SJRRC standards for long term durability, maintenance and safety.

(5) Design

Participate in design workshops, development or modifications affecting the architecture and aesthetics of the project in order to ensure holistic integration of the artwork. Provide artwork final designs for the project for incorporation by the Contractor into the construction drawings and specifications, including general dimensions and weights.

(6) Review

Coordinate and interface with SJRRC departments as necessary to obtain appropriate reviews and approvals for artwork locations and materials. Comment on all phases of Contractor design and construction document submittals, requests for information, shop drawings, samples and mock ups and other pertinent constructability and technical reviews.

(7) Engineering

Provide input on requirements associated with the individual artwork to the Contractor; i.e. material(s), size, weight, means and methods for attachment/installation, or any other special requirements.

(8) Value Engineering

Participate in any value engineering processes or any modification reviews affecting the architecture and aesthetics of the station, and/or the transit corridor project due to possible effects on the artwork locations and materials and its impact to the Art Program.

(9) Delivery

Coordinate delivery of SJRRC furnished artwork design, and provide input on delivery of Contractor furnished artworks within the Contractor's construction schedule, to minimize risk of damage to artworks being delivered and/or installed too far in advance of revenue testing and project (Line) opening. Inspect artworks at the time of delivery to the Contractor project site, assess artworks and document conditions.

(10) Installation

Provide oversight during installation phase to ensure that artworks are installed as approved by SJRRC and to ensure installation per artist's aesthetic design.

(11) Punch List

Provide Contractor with artwork related punch list(s) reports for implementation and follow-through until final resolution.

B. Contractor Responsibilities

(1) Project Delivery

Incorporate the artwork into the base construction, utilizing the artwork designs and/or fabricated artworks furnished by SJRRC. The Contractor has no coordination, overview or management responsibility withSJRRC selected project artists. All artist interfaces will be with SJRRC Program staff.

(2) Review

Participate in meetings as required to plan the holistic integration, design, engineering, construction documents and installation of the artworks at the station and/or the transit corridor project. Include SJRRC in design workshops, development or modifications affecting the architecture and aesthetics of the project in order to ensure holistic integration of the artwork, including submittals for contractually stated project design review and comment phases through Approved for Construction (AFC) documents, as well as informal “over-the-shoulder reviews,” fabrication shop drawings, samples and mock ups.

(3) Engineering

Provide artwork related constructability reviews and interface with SJRRC to arrive at mutually agreeable artwork attachment and installation details for incorporation into the Contractor construction drawings. Attachment and installation details shall be in keeping with the artistic design of the artworks. Provide California licensed professional engineer reviews to engineering calculations, drawings and attachments as required.

(4) Value Engineering

Notify, coordinate and interface with SJRRC on any value engineering processes or any modifications affecting the architecture and aesthetics of the station and/or the transit corridor project due to possible effects on the artwork locations and materials and its impact to the Art Program.

(5) Construction Documents

Incorporate artwork location and installation references to accurately reflect artwork final designs provided by SJRRC into the construction drawings and specifications. Work with SJRRC to determine final location of signs, sprinklers and fire systems equipment, security cameras orother life/safety or operations equipment and cabinets that may conflict with the overall artwork aesthetic. Reasonable options shall be explored and be in keeping with all applicable codes and regulatory requirements for the project. Artwork installation work plans shall include methods, materials, installation drawings, plans, sections, axonometric views, attachment details and embedded or concealed mechanical, structural or seismic requirements as required.

(6) Fabrication

Contract with specialized studios with proven expertise in artwork production as determined and approved by SJRRC . Provide shop drawings indicating layout, elevations, sizes, dimensions, materials, anchorage and fastening, supports and other details such as anchorages embedded in concrete,shop welds or fastenings to steel structures. Show large scale details of edge conditions and typical conditions. Work with specialized studios to prepare graphic files as required for fabrication. Provide scale samples and/or mock upsof all Contractor fabricated artwork for SJRRC review and approval prior to startof fabrication.

(7) Delivery

Work with SJRRC to schedule the delivery of artworks. Provide delivery schedule and storage plans for each station and/or the transit corridor project artworks to minimize risk of damage by artworks being delivered too far inadvance of installation. Provide six (6) month advance notice to SJRRC for delivery of artworks to the Contractor's project site.

(8) Storage and Protection

Receive and off-load artworks and provide safe, secure and crated, wrapped and/or covered storage from delivery until Final Acceptance of the Project or Revenue Operation Date, whichever comes firstand as officially determined between SJRRC and the Contractor. Contractor shall be responsible for the cost of replacement or repairs to artworks, and any associated scheduling delay, should loss or damage occur while under their purview, from delivery and installation, and until time of official acceptance of the project by SJRRC. Contractor will work with SJRRC to determine the bestmethod of artwork storage and protection.

(9) Installation

Provide materials, equipment, tools, and skilled trades as requiredto install all artworks. Provide installation plans for each artworks to minimize risk of damage by artworks being delivered too far in advance of revenue testing and project opening. Provide twenty-four (24) month advance notice to SJRRC for installation.

(10) Punch List

Review and implement SJRRC provided artwork punch list reportsand coordinate with SJRRC through resolution and final completion.

16.3.3 Quality Control

Comply with SJRRC Project Quality Program Requirements –Design/Build.

16.3.4 Artwork Design

A. Materials

(1) Perforated Metal Exterior Architectural Panels (SJRRC furnished design. Contractor fabricatedand installed).

(a) Artwork shall consist of artist designed panels for the windscreens and stair enclosures as produced by specialized, reputable fabrication studio/s with expertise in working with renowned contemporary artists and shall be in keeping with artist'saesthetic design and as approved by SJRRC.

(b) SJRRC shall contract directly with all artists and provide final designs to theContractor for integration into the platform shelter windscreens.

(c) SJRRC shall review and approve studio perforated metal samples submittal for aesthetic quality considerations, including expertise in fabricating artworks and working with artists, prior to final selection of proposed studios by the Contractor.

(d) Exterior treatment techniques (color ceramic printed, anodized, silk screened, sandblasted, back painted, hand painted, fused, air brushed, dichroic, ceramic frit, acid etched, graphic interlayer or combination of treatments) shall be explored during the artwork design development stages and determined by SJRRC. In all cases artist designed panels shall comply and be compatible with requirements for exterior metal panels as required by SJRRC for safety and durability.

(e) The mode of image making must be UV suitable, and resistant to fading utilizing proven technology suitable for long term exterior display.

(f) Each station's art panels shall be unique, and a different studio technique may be required at each individual station, meaning that the Contractor may be required to contract with more than one art fabrication studio.

(g) Artwork may incorporate multiple colors, half tone or single color.

(h) The artwork may be a single image spread over many panels per elevation ora series of images repeated on various tiles.

(i) Contractor shall provide a sample metal panel structural assembly so that SJRRC can test the visual accuracy of the selected artwork techniques.

(j) SJRRC shall review and approve full scale final artwork control samples submittal prior to fabrication for aesthetic quality considerations.

(k) Contractor shall provide shop drawings for panel assembly, indicating allpanel sizes, framing, joints and installation mark numbers.

(l) SJRRC will supply artist designs as high resolution, professionally scanned and color corrected files. The Contractor will ultimately be capable of working with the fabrication studio on any final formatting required to prepare the artist designs into ready-to-print high resolution graphic files.

(m) Cutting to overall dimensions, edgework, drilled holes, notching and grinding shall be performed prior to artwork application.

(n) Contractor shall fabricate and install finished panels in curtain wall assemblies designed to meet SJRRC's requirements for structural integrity, vandalism and overall architectural design.

(o) Exact locations shall be determined during final design stage in coordination with the Contractor.

(2) Tile/Panels (SJRRC furnished design. Contractor fabricated and installed).

(a) Artwork shall consist of artist designed porcelain panels for the concourse areas as produced by specialized, reputable studio/s with expertise in working with renowned contemporary artists and shall be in keeping with artist'saesthetic design and as approved by SJRRC .

(b) SJRRC shall contract directly with all artists and provide final designs to the Contractor for integration into the concourse walls. .

(c) Contractor shall contract with reputable metal panel studio/s with expertise in working with renowned contemporary artists. Studios with proven expertise and highly skilled artisans shall be as noted below:

(d) SJRRC shall review and approve studio samples submittal for aesthetic quality considerations, including expertise in fabricating artworks and working with artists, prior to final selection of proposed studios by the Contractor.

(e) Glass treatment techniques (color ceramic printed, silk screened, graphic interlayer) shall be explored during the artwork design development stages and determined by SJRRC . In all cases artist designed glass shall comply and be compatible with requirements for glass tile/ panels as required by SJRRC for safety and durability.

(f) The mode of image making must be UV suitable, and resistant to fading utilizing proven technology suitable for long term interior display.

(g) Each station's art shall be unique, and a different studio technique may be required at each individual station, meaning that the Contractor may be required to contract with more than one art glass studio.

(h) Artwork may incorporate multiple colors, half tone or single color.

(i) SJRRC will determine tile or panel sizes to suit artwork design.

(j) SJRRC shall review and approve full scale final artwork control samples submittal prior to fabrication for aesthetic quality considerations.

(k) Contractor shall provide shop drawings for assembly, indicating all panel sizes, framing, joints and installation mark numbers.

(l) SJRRC will supply artist designs as high resolution, professionally scanned and color corrected files. The Contractor will ultimately be capable of working with the studio on any final formatting required to prepare the artist designs into ready-to-print high resolution graphic files.

(m) Cutting to overall dimensions, edgework, drilled holes, notching and grinding shall be performed prior to artwork application.

(n) Contractor shall fabricate and install finished tile/panels in concourse wall assemblies designed to meet SJRRC's requirements for structural integrity, vandalism and overall architectural design.

(o) Stainless steel attachment system.

(p) Waterproofing membrane required behind artwork.

(q) Exact locations shall be determined during final design stage in coordination with the Contractor.

(3) Ceramic/Porcelain/Glass Tile or Mosaic for Wall Application (SJRRC furnished designs and fabricated artwork. Contractor installed.)

(a) Artwork shall consist of ceramic/porcelain/glass tile or mosaic for wall application as produced by a specialized, reputable ceramic tile/glass mosaic studio company with expertise in working with renowned contemporary artistsand in keeping with artist's aesthetic design and as approved by SJRRC .

(b) SJRRC shall contract with fabricator to deliver the completed artwork to the project site at an agreed to date between Contractor and SJRRC for installationby the Contractor. Contractor shall work with SJRRC to engineer attachment and connection details.

(c) Artwork shall be preassembled into sections and coded, with backing materials when required and shall be compatible with structural wall assemblies as required by SJRRC for safety and durability.

(d) Refer to SJRRC Mosaic and Ceramic Mosaic Tile specifications.

(e) Stainless steel attachment system.

(f) Waterproofing membrane required behind artwork.

(g) Exact locations shall be determined during final design stage in coordination with the Contractor.

(4) Porcelain Enamel Steel Panel (SJRRC furnished design. Contractor fabricated and installed).

(a) Artwork shall consist of artist designed porcelain enamel steel panels for Undercrossing walls as produced by a specialized, reputable porcelain enamel steel studio with expertise in working with renowned contemporary artists and shallbe in keeping with artist's aesthetic design and as approved by SJRRC. Studios with proven expertise and highly skilled artisans shall be as noted below.

(b) SJRRC shall contract directly with the artist and provide final designs to the Contractor.

(c) Panels shall measure 4 ft. in height and 6 ft. in width, shall be flush mounted to the architectural surface in line with the signage band and shall not impact the reinforcement of the concrete wall, and shall be attached with a concealed stainless steel cleat system to be approved by SJRRC.

(d) SJRRC shall review and approve porcelain enamel steel studio submittalfor aesthetic quality considerations, including expertise in fabricating artworksand working with artists, prior to final selection of proposed studio by the Contractor.

(e) SJRRC shall review and approve full scale final artwork control samples submittal prior to fabrication for aesthetic quality considerations.

(f) Contractor shall provide shop drawings for assembly, indicating all panelsizes and installation mark numbers, and be ultimately capable of working with the porcelain enamel studio to prepare the artist designs into ready-to- fabricate high resolution graphic files.

(g) Contractor to install finished panels in assemblies designed to meet SJRRC's requirements for structural integrity, vandalism and overall architectural design of the station room elements.

(h) Exact locations shall be determined during final design stage in coordination with the Contractor.

(5) Perforated Metal Ceiling (SJRRC furnished design. Contractor fabricated and installed).

(a) Artwork shall consist of artist designed perforated metal ceiling panels for the Canopies as produced by a specialized, reputable fabricator and shall be in keeping with artist's aesthetic design and as approved by SJRRC . Studios with proven expertise shall be as noted below.

(b) SJRRC shall contract directly with the artist and provide final designs to the Contractor.

(c) SJRRC shall review and approve fabricator submittal for aesthetic quality considerations, including ability to work with artists, prior to final selection of proposed studio by the Contractor.

(d) SJRRC shall review and approve full scale final artwork control samples submittal prior to fabrication for aesthetic quality considerations.

(e) Contractor shall provide shop drawings for assembly, indicating all panelsizes and installation mark numbers, and be ultimately capable of working with the fabricator and the artist to prepare the artist designs into ready-to- fabricate high resolution graphic files.

(f) Contractor to install finished panels in assemblies designed to meet SJRRC's requirements for structural integrity, safety, vandalism and overall architectural design of the station room elements.

(g) Provisional Sum for the artwork shall cover the cost differential between the architectural glass and artist embellished sections. Artwork integration and installation shall be covered by Contractor's base construction costs.

(h) Provisional sum for the artwork shall cover the cost differential between the architectural finish and the artist embellished sections. Artwork integrationand installation shall be covered by Contractor's base construction costs.

(6) Sculpture (SJRRC furnished design and fabrication; Contractor installed)

(a) Artwork shall consist of integrated sculpture for the plaza areas as produced by a specialized studio with expertise in working withrenowned contemporary artists and shall be in keeping with artist's aesthetic design and as approved by SJRRC.

(b) Contractor to provide concealed base and anchorage. SJRRC shall review and approve specialty fabricator submittals for aesthetic quality considerations priorto final selection of specialty fabricator by the Contractor and shall review shop drawings during fabrication stages.

(c) Exact locations shall be determined during final design stage in coordination with the Contractor.

(d) Artwork integration and installation shall be covered by Contractor's base construction costs.

B. Maintenance and Durability Considerations

(1) In general, materials, finishes and fabrication methods of artwork should conform to the same standards of durability as used in other aspects of SJRRC facilities, with exceptions. The expected lifespan of artworks and design enhancements should be twenty (20) years at minimum.

(2) Assembly and fabrication of artwork elements shall be designed for accessibility to aid ease of maintenance and to facilitate replacement orreport of any operational components.

(3) Artwork designs are to factor in vandalism and sustained exposure to public contact. Additionally, climate and environmental factors such asheat, cold, moisture, ice and wind, shall be considered when reviewingartwork designs.

(4) Artworks are considered unique within SJRRC facilities; however certain applications may require the same or similar performance standards for amenities.

C. Substitution of Standard Amenities

When an artist-designed amenity, such as a bench or railing, is substituted fora standard amenity, it must meet the same design and safety/security criteria as the standard amenity.

D. Safety and Security Considerations

Installed artwork must comply with the following Safety and Security Certification protocols:

(1) Maintainability

(a) Artistic elements, especially freestanding artworks, should be designed with durable, vandal-resistant materials to the greatestextent possible.

(b) Artwork should be of a design and material consistent with its long-term appearance and function.

(c) Artistic elements should not require high levels of routine maintenance. Clean and undamaged surfaces contribute to a sense ofpersonal safety.

(2) Placement or Siting of Artwork

(a) Artwork should be located where it doesn't unduly obstruct views orcast shadows.

(b) Artwork shall be sited to comply with ADA and IBC code requirementsfor accessibility.

(c) Elements of Distinction

Elements shall not be placed in the trackway or in other locations which could pose a safety hazard to viewers or patrons orobstruct line-of-sight between train operators and persons.

(d) Foundations and support work should be designed to not create hiding places or obstruct views of transit vehicle operators.

(e) Artwork might be placed out of reach in some cases, where it can be viewed with less risk of damage.

(f) In general, artwork should not create facilities for loitering, such asplaces to sit or occupy for an extended period of time.

(3) Other

(a) Artwork should be securely attached and should be free of sharp orheavy elements that could be used to inflict bodily harm.

(b) Metal artwork elements within the catenary wire safety zone shall be grounded as defined in *Design Criteria*, CHAPTER 12 – ELECTRICAL SYSTEM.

E. Permanence of Elements of Distinction Work

General guidelines exist regarding SJRRC's Elements of Distinction collection:

(1) SJRRC will be responsible for maintaining all works in its Elements of Distinctioncollection.

(2) Site specific works shall remain at the site for which they were created,unless circumstances dictate otherwise.

(3) Functional changes and additions to existing transit facilities that indirectly impact artwork will be reviewed though an internal SJRRC process that includes Elements of Distinction Program staff.

(4) Planned maintenance that will disrupt existing artwork in anyway, shouldbe brought to the attention of the Elements of Distinction Program staff by the SJRRC Maintenance staff as early as possible in the planning process.

(5) Design work may lead to a request to relocate artwork. This may arise for several reasons, such as a change in the context or use of the site such that the artwork is no longer compatible. In these cases, the project lead shall notify the Elements of Distinction Program staff, who will follow an established process for resolution of the request as outlined in the *Elements of Distinction ProgramOperating Policy*.

F. Artwork Lighting

(1) Lighting for the purposes of illuminating or providing accent lighting to artworks shallbe in keeping with *Design Criteria*, CHAPTER 13 – LIGHTING.

(2) Lighting for the purposes of highlighting or illuminating art works shall be designed by a professional lighting design firm as part of base construction services provided by the Contractor team. Scope shall include design, calculations and notation oflight fixtures and bulb types in the lighting and electrical drawings.

(3) Light fixtures and bulb types specified for the purpose of artwork illumination shallbe within the range of fixtures specified for the overall project and not unique, specialty products without proven track record and shall be subject to approval by SJRRC Traction & Power.

(4) The aesthetic design intent for illumination of artwork locations is as follows:

(a) Exterior Architectural Glass

Illuminated from within in order for the glass art elements to be clearly illuminated and viewed by persons in the surrounding urban area. The illuminated glass shall function as a welcoming station element. Targeted luminance value shall be no less than 30 foot-candles.

(b) Ceramic Mosaic/Tile and Glass Tile/Panels

Consistent, even wash of light for art work tile for full width and height without obvious hot spots. Targeted luminance value shall be no less than 50 foot-candles.

(c) Porcelain Enamel Steel Panels

Consistent, even wash of light for artwork panels for full width and height without obvious hot spots. Targeted luminance value shall be no less than 50 foot-candles.

(d) Sculpture

Lighting will need to be developed for integration into the project lighting plan to maximize visual impact and provide security.

(e) Use of fixtures embedded within interior or exterior paving are unsuitable for illumination of artworks.

(f) Contractor's base construction costs shall cover the specific design integration and installation of the artwork lighting for the project.

16.3.5 Construction Drawings Requirements

A. Artist designed exterior architectural glass shall be noted on the construction drawings as "Artist designed glass. Artwork designs provided by SJRRC and artwork fabricated and installed by Design Builder."

B. Artist designed porcelain enamel steel at the platform level shall be noted on the construction drawings as "Artist designed porcelain enamel steel. Artwork designs provided by SJRRC and artwork fabricated and installed by Design Builder."

C. Artist designed interior glass tile/panels shall be noted on the construction drawings as "Artist designed glass tile/panels. Artwork designs provided by SJRRC and artwork fabricated and installed by Design Builder."

D. Artist designed train room perforated metal ceiling shall be noted on the construction drawings as "Artist designed perforated metal ceilings. Artwork designs provided by SJRRC and artwork fabricated and installed by Design Builder."

E. Integrated sculpture shall be noted on the construction drawings as "SJRRC furnished sculpture. Installed by Design Builder".

F. Ceramic/porcelain/glass tile or mosaic for wall application shall be noted on the construction drawings as "SJRRC furnished mosaic. Installed by Design Builder."

G. Photographic light boxes shall be noted on the construction drawings as "Furnished and installed by Design Builder."

H. Architectural lighting to illuminate art works shall be located and noted in appropriate plans, elevations, sections, details and schedules.

I. Elements of Distinction work Conceptual Design Proposals

Conceptual proposals for Elements of Distinction will be developed in close collaborationwith local communities, design teams, SJRRC technical staff and Elements of Distinction Program staff. The development of artwork proposals should parallel the schedule of thehost project when possible to be integral to the project design process.

J. Technical Review of Proposed Elements of Distinction Works

Following conceptual design approval and prior to submission of Final Design, all proposals for artwork will be reviewed for technical, structural andoperational feasibility, including life cycle costs, by SJRRC staff. The review panel includes staff members from technical (design and engineering), safetyand security, operations, and maintenance departments. Select proposals may also require review by a qualified artwork conservator. Significant designchanges may result in the need for additional technical reviews. Draft structural engineering for artwork proposals must be submitted in advance ofthe Technical Review.

K. Artwork Final Design

Final design proposals are developed upon approval of the conceptual designby SJRRC and completion of the Technical Review. Final design proposalsshould be considered 95% complete. Further details regarding final design requirements are detailed in individual contracts.

L. Structural Engineering and Permitting Requirements

(1) Prior to issuance of a Notice to Proceed (NTP) to fabricate artwork, artwork subject to loads shall be designed by a registered Professional Engineer (PE) licensed in California.

(2) The artist is responsible for retaining a Registered Professional Engineerfor all structural details and supporting calculations for the artwork and itsattachment to the foundation.

(3) SJRRC is responsible for the structural design and construction of artwork foundations.

(4) The artist shall communicate with SJRRC prior to the development of structural details to ensure design intent, coordination and clarity of scope between the foundation and the artwork.

(5) All calculations and details shall be stamped and signed by the artist's Engineer and submitted to SJRRC for review and approval.

(6) Artwork may be subject to local jurisdictional permitting processes. The artist is responsible for ensuring that the artwork will meet the requirements of the permitting agencies which may include, but are not limited to, providing structural calculations and details, meeting building code requirements, meeting special inspections requirements, meeting zoning requirements, and completing design or historic commission reviews. Any required revisions are the responsibility of the artist and theartist's Engineer.

M. Lighting

Specific lighting for artwork may be desired to illuminate the work at night or other low light level conditions. It may be desired to enhance the viewing of the work, to

accentuate its urban design presence, or it may be an integral element of the art's concept. All artwork lighting will need to be reviewed andapproved by SJRRC's internal Technical Review.

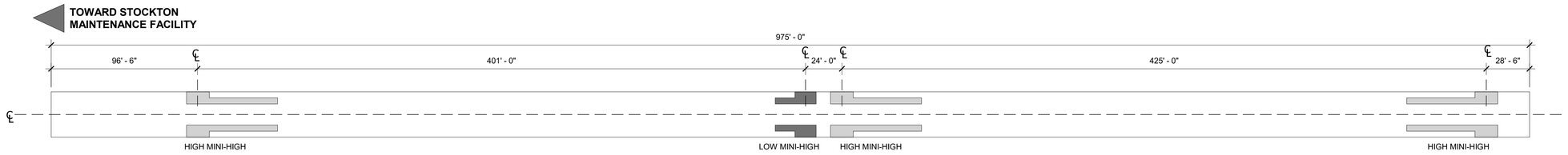
(1) Artwork lighting shall coordinate with other functional or aesthetic lighting,and will comply with *Design Criteria*, CHAPTER 12 – ELECTRICAL SYSTEM, unless a variance is granted by SJRRC.

(2) Lighting provided for viewing the artwork may be provided by Elements of Distinction infrastructure budget. This shall be confirmed during the conceptual development of the artwork. The lighting levels and character of the lighting will be coordinated by SJRRC with the artist's input.

(3) Lighting that is integral to the artwork shall be reviewed and approved by SJRRC. It may need to meet SJRRC Operational, Safety, Security, and Maintenance needs. The artist will provide the necessary electrical engineering to satisfy SJRRC and/or local jurisdictional approvals. To the greatest extent possible, lighting elements and systems should be long lasting, low energy use, durable, weather resistant, and low maintenance.

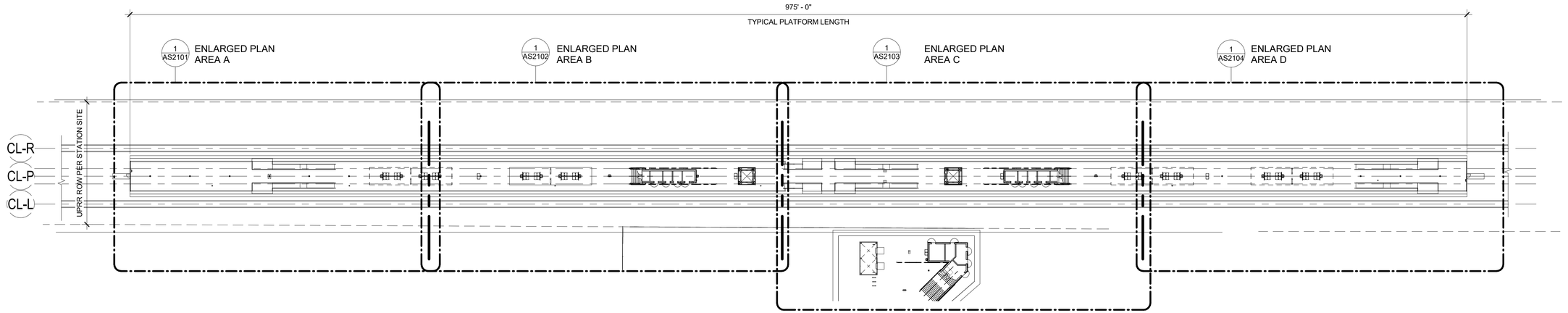
(4) Artwork lighting may need to meet ADA requirements, CPTED principles, and SJRRC Operational needs. Artwork lighting shall endeavor to meet the Elements of Distinction program objectives while not impinging upon other requirements.

END of CRITERIA



1 TYPICAL CENTER PLATFORM CONFIGURATION

1" = 40'-0"



2 CENTER PLATFORM PLAN OVERALL

1" = 40'-0"

GENERAL NOTES:

1. DESIGNER TO CONFIRM ILLUMINATION LEVELS AND PHOTOMETRICS FOR ALL PLATFORM AND STATION LIGHTING LAYOUTS. DIMENSIONS FOR LIGHTING SPACING ARE PRESUMPTIVE AND NEED TO BE CONFIRMED BY EACH DESIGN TEAM ON A PER STATION BASIS.
2. SEE SJRRC CRITERIA DOCUMENT FOR CIVIL, LANDSCAPE, STRUCTURAL, MEP, ARCHITECTURE, AND VERTICAL TRANSPORTATION DESIGN CRITERIA. COMMUNICATIONS BY DESIGNER
3. SEE SJRRC GUIDELINES DOCUMENT FOR OVERARCHING STATION DESIGN GUIDELINES.
4. UNION PACIFIC RAILROAD (UPRR) RIGHT-OF-WAY (ROW) VARIES PER STATION SITE, STATION DESIGNER TO CONFIRM UPRR ROW DIMENSIONS AND TRACK DESIGN
5. FENCING SEPARATING UPRR ROW AND STATION SITE SHALL EXTENT ALONG ENTIRE LENGTH OF PLATFORM, SEE UPRR DESIGN CRITERIA FOR FENCING REQUIREMENTS
6. STATIONS WITH ACE SERVICE SHALL PROVIDE LOW MINI-HIGH PLATFORMS ON THE STATION PLATFORM. STATIONS WITH AMTRAK SERVICE SHALL PROVIDE HIGH MINI-HIGH PLATFORMS UNLESS DIRECTED OTHERWISE BY SJRRC. ALL STATIONS SHALL ALLOW FOR THE FUTURE INSTALLATION OF HIGH MINI-HIGH PLATFORMS AND NOT PRECLUDE THEIR INSTALLATION AT A FUTURE DATE.

0 10' 40' 80'
1"= 40'-0"

REV. #	BY	DATE	DESCRIPTION

DIRECTIVE DRAWING
FOR INFORMATION
ONLY
NOT FOR CONSTRUCTION

SAN JOAQUIN REGIONAL RAIL COMMISSION

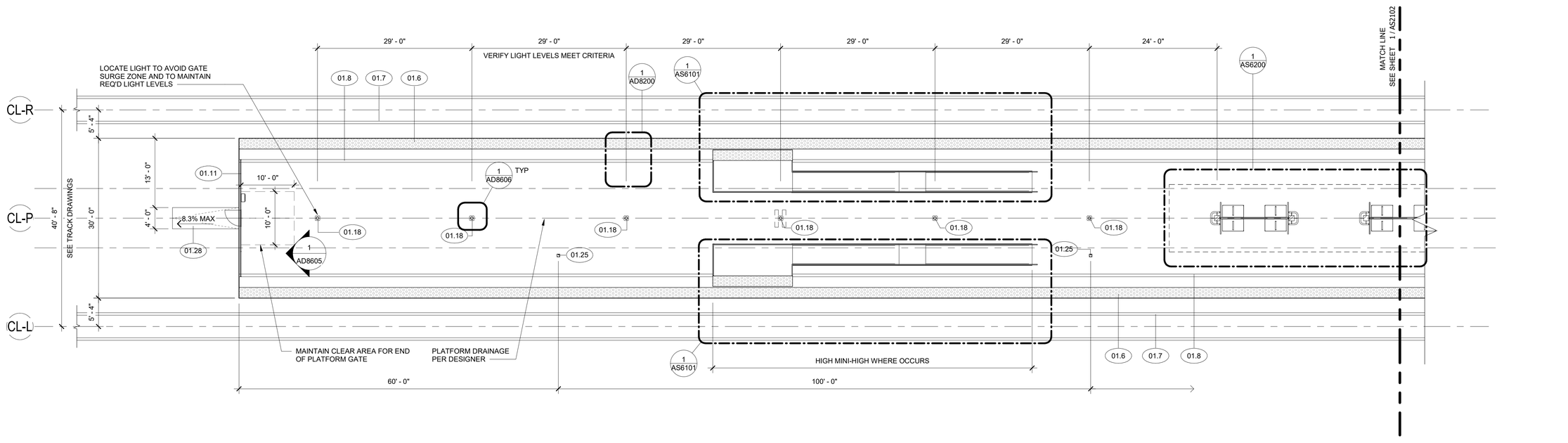
DRAWN BY: Author
CHECKED BY: Checker
DATE: 10/28/2022
SHEET NUMBER: **AS2100**

SAN JOAQUIN REGIONAL RAIL COMMISSION

LOCATION & DESCRIPTION:
STATIONS AND FACILITIES
STANDARD DRAWINGS

SHEET TITLE:
OVERCROSSING - CENTER PLATFORM - OVERALL PLAN

DATE / TIME STAMP: 11/4/2022 10:07:12 AM



1 OVERCROSSING - CENTER PLATFORM - AREA A

1" = 10'-0"

KEYNOTE LEGEND	
Key Value	Keynote Text
01.3	MINI HIGH
01.6	TACTILE WARNING STRIP
01.7	TRACK
01.8	STAND BEHIND LINE STRIPE LETTERING
01.9	PLATFORM CANOPY
01.11	END OF PLATFORM FENCE AND GATE
01.14	IRON FENCE
01.17	BIKE PARKING
01.18	LIGHT POLE
01.20	WASTE RECEPTACLES
01.22	WATER STATION w/ BOTTLE FILLER
01.23	GUARDRAIL
01.24	THROW BARRIER
01.25	IN PLATFORM HOSE CONNECTION
01.26	AREA DRAIN
01.28	END OF PLATFORM RAMP
01.29	SIGNAGE KIOSK

GENERAL NOTES:

1. DESIGNER TO CONFIRM ILLUMINATION LEVELS AND PHOTOMETRICS FOR ALL PLATFORM AND STATION LIGHTING LAYOUTS. DIMENSIONS FOR LIGHTING SPACING ARE PRESUMPTIVE AND NEED TO BE CONFIRMED BY EACH DESIGN TEAM ON A PER STATION BASIS.
2. SEE SJRRC CRITERIA DOCUMENT FOR CIVIL, LANDSCAPE, STRUCTURAL, MEP, ARCHITECTURE, AND VERTICAL TRANSPORTATION DESIGN CRITERIA. COMMUNICATIONS BY DESIGNER
3. SEE SJRRC GUIDELINES DOCUMENT FOR OVERARCHING STATION DESIGN GUIDELINES.
4. UNION PACIFIC RAILROAD (UPRR) RIGHT-OF-WAY (ROW) VARIES PER STATION SITE, STATION DESIGNER TO CONFIRM UPRR ROW DIMENSIONS AND TRACK DESIGN
5. FENCING SEPARATING UPRR ROW AND STATION SITE SHALL EXTENT ALONG ENTIRE LENGTH OF PLATFORM, SEE UPRR DESIGN CRITERIA FOR FENCING REQUIREMENTS
6. STATIONS WITH ACE SERVICE SHALL PROVIDE LOW MINI-HIGH PLATFORMS ON THE STATION PLATFORM. STATIONS WITH AMTRAK SERVICE SHALL PROVIDE HIGH MINI-HIGH PLATFORMS UNLESS DIRECTED OTHERWISE BY SJRRC. ALL STATIONS SHALL ALLOW FOR THE FUTURE INSTALLATION OF HIGH MINI-HIGH PLATFORMS AND NOT PRECLUDE THEIR INSTALLATION AT A FUTURE DATE.

0 5' 10' 20'
1"= 10'-0"

DATE / TIME STAMP: 11/4/2022 10:07:16 AM

REV. #	BY	DATE	DESCRIPTION

DIRECTIVE DRAWING
FOR INFORMATION
ONLY
NOT FOR CONSTRUCTION

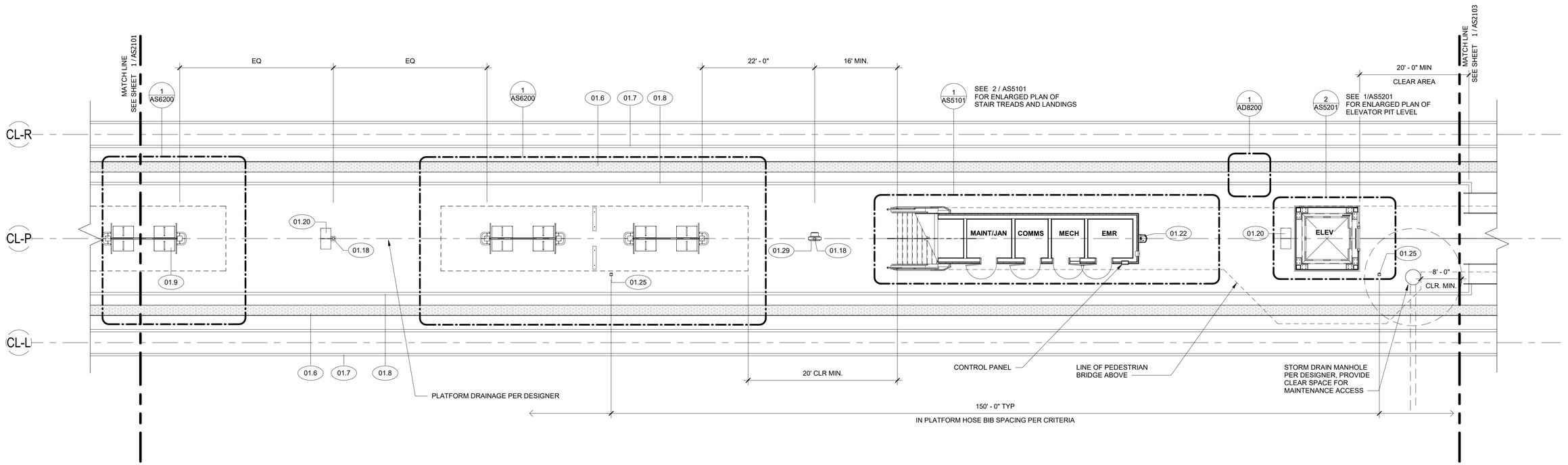
SAN JOAQUIN REGIONAL RAIL COMMISSION

DRAWN BY: Author
CHECKED BY: Checker
DATE: 10/28/2022
SHEET NUMBER: **AS2101**

SAN JOAQUIN REGIONAL RAIL COMMISSION

LOCATION & DESCRIPTION:
STATIONS AND FACILITIES
STANDARD DRAWINGS

SHEET TITLE:
OVERCROSSING - CENTER PLATFORM PLAN - AREA A



1 OVERCROSSING - CENTER PLATFORM - AREA B

1" = 10'-0"

KEYNOTE LEGEND	
Key Value	Keynote Text
01.3	MINI HIGH
01.6	TACTILE WARNING STRIP
01.7	TRACK
01.8	STAND BEHIND LINE STRIPE LETTERING
01.9	PLATFORM CANOPY
01.11	END OF PLATFORM FENCE AND GATE
01.14	IRON FENCE
01.17	BIKE PARKING
01.18	LIGHT POLE
01.20	WASTE RECEPTACLES
01.22	WATER STATION w/ BOTTLE FILLER
01.23	GUARDRAIL
01.24	THROW BARRIER
01.25	IN PLATFORM HOSE CONNECTION
01.26	AREA DRAIN
01.28	END OF PLATFORM RAMP
01.29	SIGNAGE KIOSK

GENERAL NOTES:

1. DESIGNER TO CONFIRM ILLUMINATION LEVELS AND PHOTOMETRICS FOR ALL PLATFORM AND STATION LIGHTING LAYOUTS. DIMENSIONS FOR LIGHTING SPACING ARE PRESUMPTIVE AND NEED TO BE CONFIRMED BY EACH DESIGN TEAM ON A PER STATION BASIS.
2. SEE SJRRC CRITERIA DOCUMENT FOR CIVIL, LANDSCAPE, STRUCTURAL, MEP, ARCHITECTURE, AND VERTICAL TRANSPORTATION DESIGN CRITERIA. COMMUNICATIONS BY DESIGNER
3. SEE SJRRC GUIDELINES DOCUMENT FOR OVERARCHING STATION DESIGN GUIDELINES.
4. UNION PACIFIC RAILROAD (UPRR) RIGHT-OF-WAY (ROW) VARIES PER STATION SITE, STATION DESIGNER TO CONFIRM UPRR ROW DIMENSIONS AND TRACK DESIGN
5. FENCING SEPARATING UPRR ROW AND STATION SITE SHALL EXTENT ALONG ENTIRE LENGTH OF PLATFORM, SEE UPRR DESIGN CRITERIA FOR FENCING REQUIREMENTS
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0 5' 10' 20'
1"= 10'-0"

DATE / TIME STAMP: 11/4/2022 10:07:21 AM

REV. #	BY	DATE	DESCRIPTION

DIRECTIVE DRAWING
FOR INFORMATION
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NOT FOR CONSTRUCTION

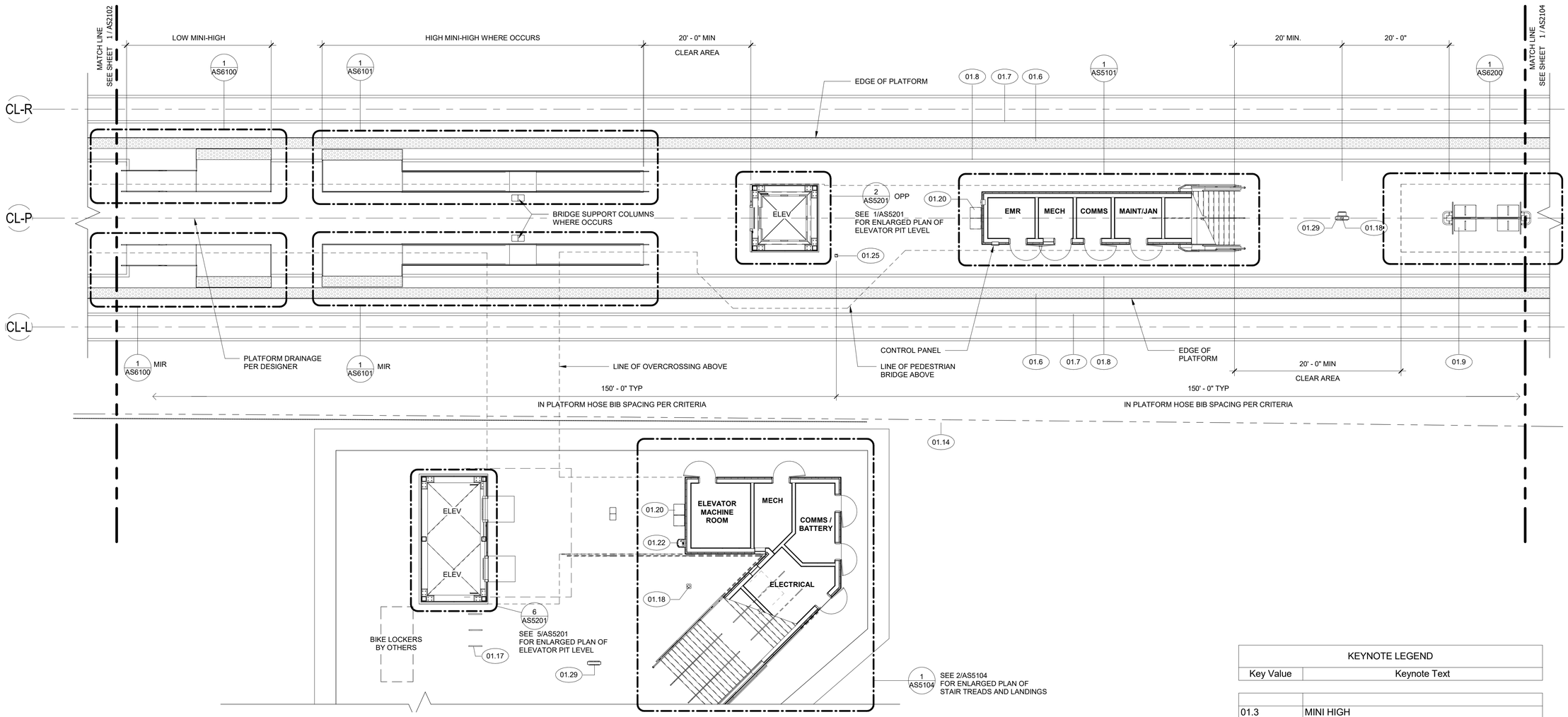
SAN JOAQUIN REGIONAL RAIL COMMISSION

DRAWN BY: Author
CHECKED BY: Checker
DATE: 10/28/2022
SHEET NUMBER: **AS2102**

SAN JOAQUIN REGIONAL RAIL COMMISSION

LOCATION & DESCRIPTION:
STATIONS AND FACILITIES
STANDARD DRAWINGS

SHEET TITLE:
OVERCROSSING - CENTER PLATFORM PLAN - AREA B



1 OVERCROSSING - CENTER PLATFORM - AREA C

1" = 10'-0"

GENERAL NOTES:

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KEYNOTE LEGEND	
Key Value	Keynote Text
01.3	MINI HIGH
01.6	TACTILE WARNING STRIP
01.7	TRACK
01.8	STAND BEHIND LINE STRIPE LETTERING
01.9	PLATFORM CANOPY
01.11	END OF PLATFORM FENCE AND GATE
01.14	IRON FENCE
01.17	BIKE PARKING
01.18	LIGHT POLE
01.20	WASTE RECEPTACLES
01.22	WATER STATION w/ BOTTLE FILLER
01.23	GUARDRAIL
01.24	THROW BARRIER
01.25	IN PLATFORM HOSE CONNECTION
01.26	AREA DRAIN
01.28	END OF PLATFORM RAMP
01.29	SIGNAGE KIOSK

0 5' 10' 20'
1"= 10'-0"

DATE / TIME STAMP: 11/4/2022 10:07:27 AM

REV. #	BY	DATE	DESCRIPTION

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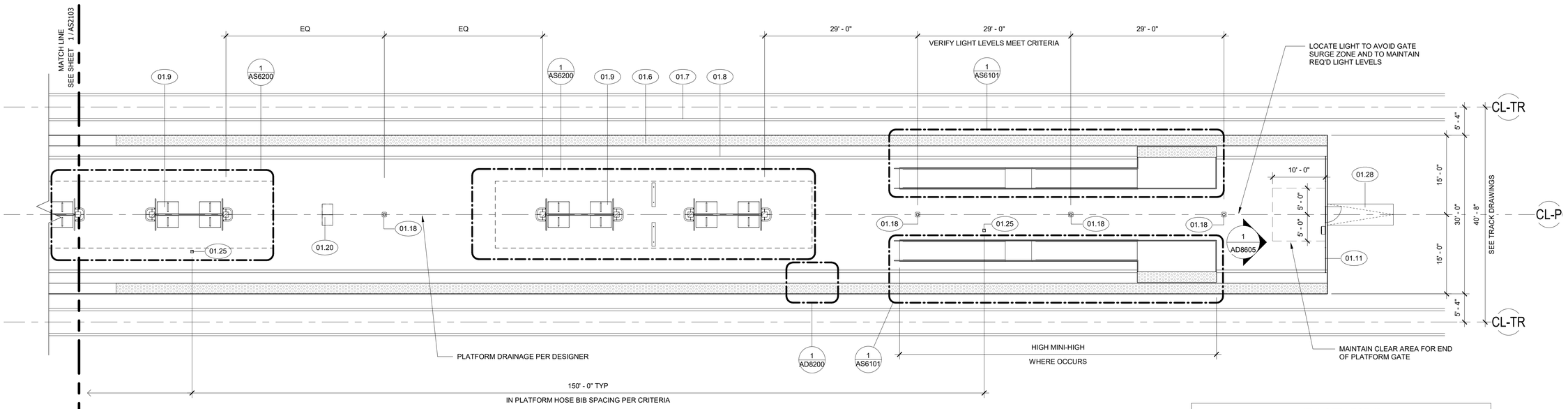
SAN JOAQUIN REGIONAL RAIL COMMISSION

DRAWN BY: Author
CHECKED BY: Checker
DATE: 10/28/2022
SHEET NUMBER: **AS2103**

SAN JOAQUIN REGIONAL RAIL COMMISSION
LOCATION & DESCRIPTION: STATIONS AND FACILITIES STANDARD DRAWINGS
SHEET TITLE: **OVERCROSSING - CENTER PLATFORM PLAN - AREA C**



1 OVERCROSSING - CENTER PLATFORM - AREA D

1" = 10'-0"

GENERAL NOTES:

1. DESIGNER TO CONFIRM ILLUMINATION LEVELS AND PHOTOMETRICS FOR ALL PLATFORM AND STATION LIGHTING LAYOUTS. DIMENSIONS FOR LIGHTING SPACING ARE PRESUMPTIVE AND NEED TO BE CONFIRMED BY EACH DESIGN TEAM ON A PER STATION BASIS.
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KEYNOTE LEGEND	
Key Value	Keynote Text
01.3	MINI HIGH
01.6	TACTILE WARNING STRIP
01.7	TRACK
01.8	STAND BEHIND LINE STRIPE LETTERING
01.9	PLATFORM CANOPY
01.11	END OF PLATFORM FENCE AND GATE
01.14	IRON FENCE
01.17	BIKE PARKING
01.18	LIGHT POLE
01.20	WASTE RECEPTACLES
01.22	WATER STATION w/ BOTTLE FILLER
01.23	GUARDRAIL
01.24	THROW BARRIER
01.25	IN PLATFORM HOSE CONNECTION
01.26	AREA DRAIN
01.28	END OF PLATFORM RAMP
01.29	SIGNAGE KIOSK

0 5' 10' 20'
1"= 10'-0'

DATE / TIME STAMP: 11/4/2022 10:07:31 AM

REV. #	BY	DATE	DESCRIPTION

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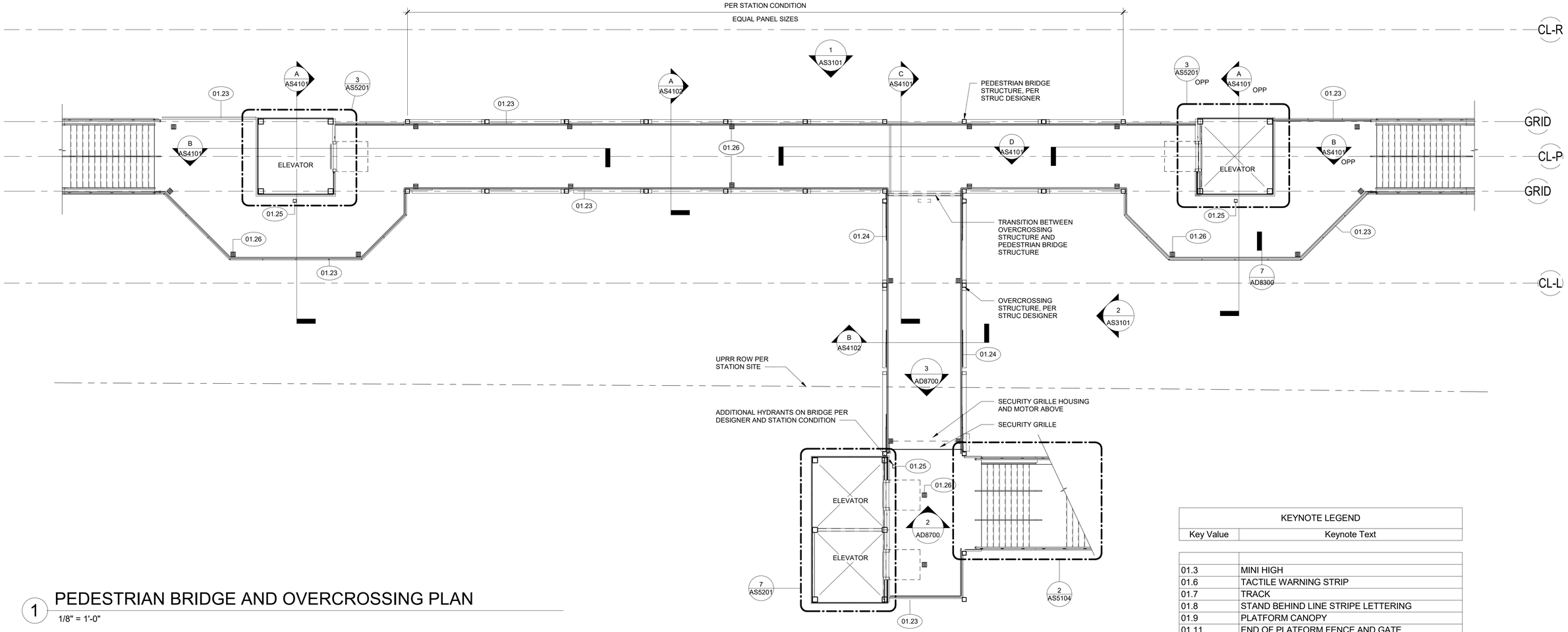
SAN JOAQUIN REGIONAL RAIL COMMISSION

DRAWN BY: Author
CHECKED BY: Checker
DATE: 10/28/2022
SHEET NUMBER: **AS2104**

SAN JOAQUIN REGIONAL RAIL COMMISSION
LOCATION & DESCRIPTION:
STATIONS AND FACILITIES
STANDARD DRAWINGS
SHEET TITLE:
OVERCROSSING - CENTER PLATFORM PLAN - AREA D



1 PEDESTRIAN BRIDGE AND OVERCROSSING PLAN

1/8" = 1'-0"

GENERAL NOTES:

1. DESIGNER TO CONFIRM ILLUMINATION LEVELS AND PHOTOMETRICS FOR ALL PLATFORM AND STATION LIGHTING LAYOUTS. DIMENSIONS FOR LIGHTING SPACING ARE PRESUMPTIVE AND NEED TO BE CONFIRMED BY EACH DESIGN TEAM ON A PER STATION BASIS.
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KEYNOTE LEGEND	
Key Value	Keynote Text

01.3	MINI HIGH
01.6	TACTILE WARNING STRIP
01.7	TRACK
01.8	STAND BEHIND LINE STRIPE LETTERING
01.9	PLATFORM CANOPY
01.11	END OF PLATFORM FENCE AND GATE
01.14	IRON FENCE
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01.18	LIGHT POLE
01.20	WASTE RECEPTACLES
01.22	WATER STATION w/ BOTTLE FILLER
01.23	GUARDRAIL
01.24	THROW BARRIER
01.25	IN PLATFORM HOSE CONNECTION
01.26	AREA DRAIN
01.28	END OF PLATFORM RAMP
01.29	SIGNAGE KIOSK

0 4' 8' 16'
1/8" = 1'-0"

DATE / TIME STAMP: 11/4/2022 10:07:33 AM

REV. #	BY	DATE	DESCRIPTION

DIRECTIVE DRAWING
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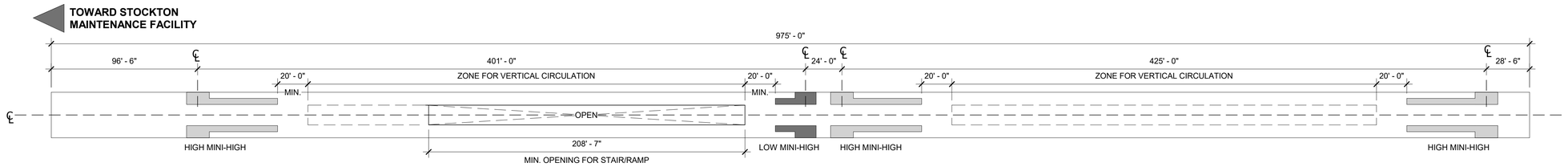
SAN JOAQUIN REGIONAL RAIL COMMISSION

DRAWN BY: Author
CHECKED BY: Checker
DATE: 10/28/2022
SHEET NUMBER: **AS2105**

SAN JOAQUIN REGIONAL RAIL COMMISSION

LOCATION & DESCRIPTION:
STATIONS AND FACILITIES
STANDARD DRAWINGS

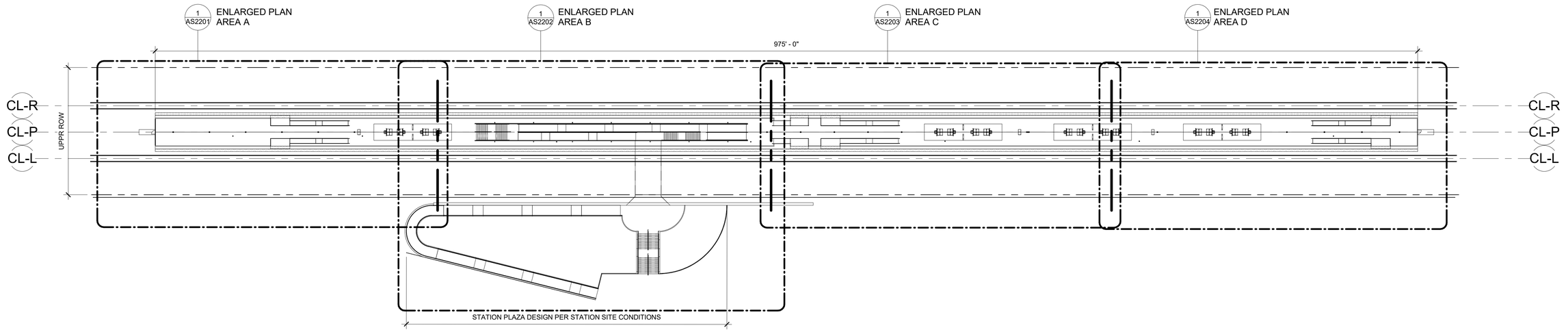
SHEET TITLE:
OVERCROSSING - PEDESTRIAN BRIDGE AND OVERCROSSING PLAN



NOTE: CONFIGURE TOP OF RAMP TO TERMINATE NEAR LOW/HIGH MINI-HIGHS. ONLY (1) ZONE FOR VERTICAL CIRCULATION SHALL BE UTILIZED AS SUCH ON THE PLATFORM, THE OTHER REGION WILL CONTAIN PLATFORM CANOPY SHELTER AREAS PER SJRRC DESIGN GUIDELINES AND CRITERIA.

1 TYPICAL CENTER PLATFORM CONFIGURATION - UNDERCROSSING

1" = 40'-0"



2 UNDERCROSSING - TOP OF PLATFORM

1" = 40'-0"

GENERAL NOTES:

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0 10' 40' 80'
1"= 40'-0"

DATE / TIME STAMP: 11/4/2022 10:07:34 AM

REV. #	BY	DATE	DESCRIPTION

DIRECTIVE DRAWING
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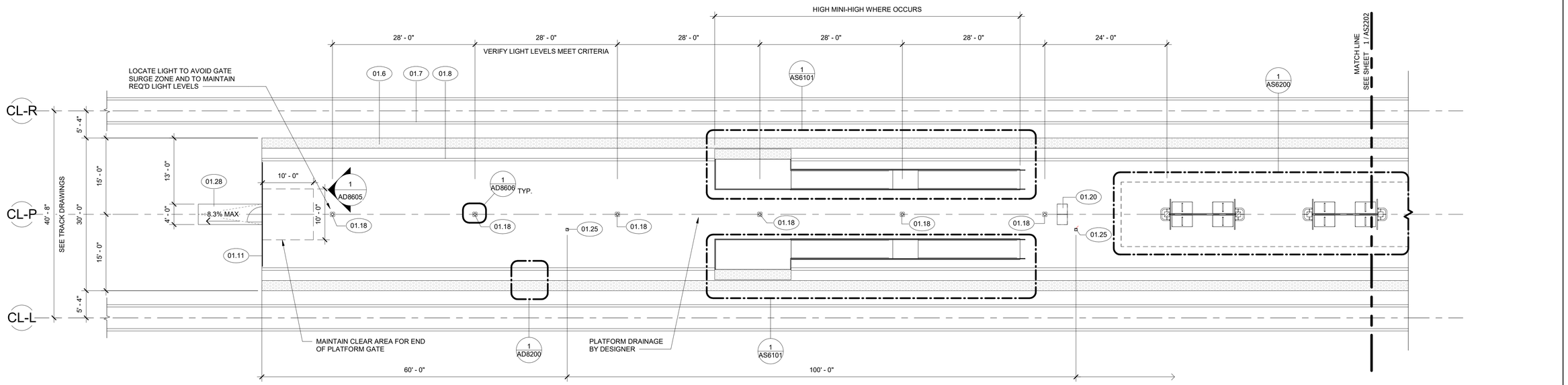
SAN JOAQUIN REGIONAL RAIL COMMISSION

DRAWN BY: Author
CHECKED BY: Checker
DATE: 10/28/2022
SHEET NUMBER: **AS2200**

SAN JOAQUIN REGIONAL RAIL COMMISSION

LOCATION & DESCRIPTION:
STATIONS AND FACILITIES
STANDARD DRAWINGS

SHEET TITLE:
UNDERCROSSING - CENTER PLATFORM - OVERALL PLAN



1 UNDERCROSSING - CENTER PLATFORM - AREA A

1" = 10'-0"

GENERAL NOTES:

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KEYNOTE LEGEND	
Key Value	Keynote Text
01.3	MINI HIGH
01.6	TACTILE WARNING STRIP
01.7	TRACK
01.8	STAND BEHIND LINE STRIPE LETTERING
01.9	PLATFORM CANOPY
01.11	END OF PLATFORM FENCE AND GATE
01.14	IRON FENCE
01.17	BIKE PARKING
01.18	LIGHT POLE
01.20	WASTE RECEPTACLES
01.22	WATER STATION w/ BOTTLE FILLER
01.23	GUARDRAIL
01.24	THROW BARRIER
01.25	IN PLATFORM HOSE CONNECTION
01.26	AREA DRAIN
01.28	END OF PLATFORM RAMP
01.29	SIGNAGE KIOSK

0 5' 10' 20'
1"= 10'-0"

DATE / TIME STAMP: 11/4/2022 10:07:35 AM

REV. #	BY	DATE	DESCRIPTION

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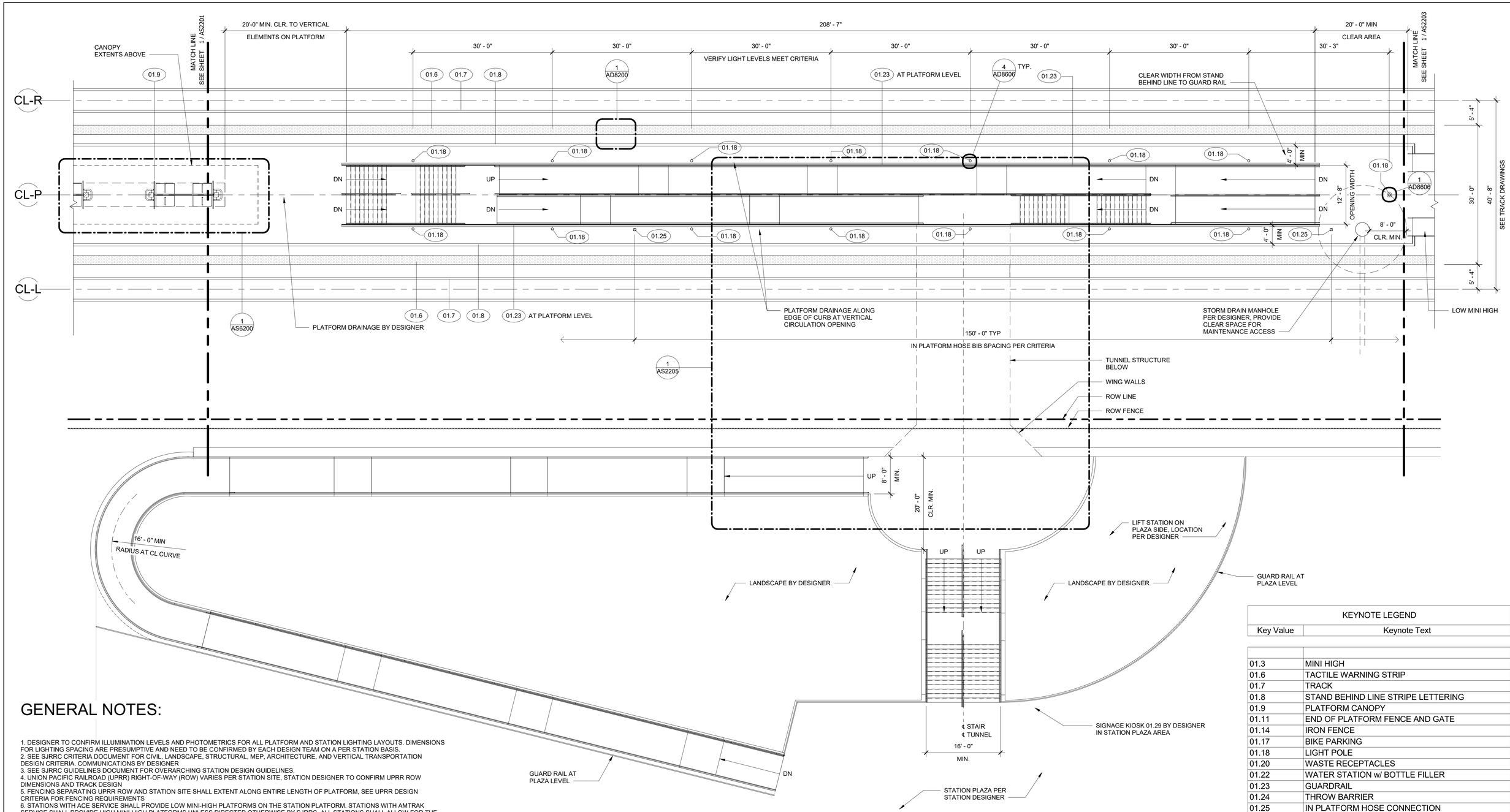
SAN JOAQUIN REGIONAL RAIL COMMISSION

DRAWN BY: Author
CHECKED BY: Checker
DATE: 10/28/2022
SHEET NUMBER: **AS2201**

SAN JOAQUIN REGIONAL RAIL COMMISSION

LOCATION & DESCRIPTION:
STATIONS AND FACILITIES
STANDARD DRAWINGS

SHEET TITLE:
UNDERCROSSING - CENTER PLATFORM PLAN - AREA A



GENERAL NOTES:

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01.18	LIGHT POLE
01.20	WASTE RECEPTACLES
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01.23	GUARDRAIL
01.24	THROW BARRIER
01.25	IN PLATFORM HOSE CONNECTION
01.26	AREA DRAIN
01.28	END OF PLATFORM RAMP
01.29	SIGNAGE KIOSK

1 UNDERCROSSING - CENTER PLATFORM - AREA B

1" = 10'-0"

0 5' 10' 20'
1"= 10'-0"

DATE / TIME STAMP: 11/4/2022 10:07:37 AM

REV. #	BY	DATE	DESCRIPTION

DIRECTIVE DRAWING
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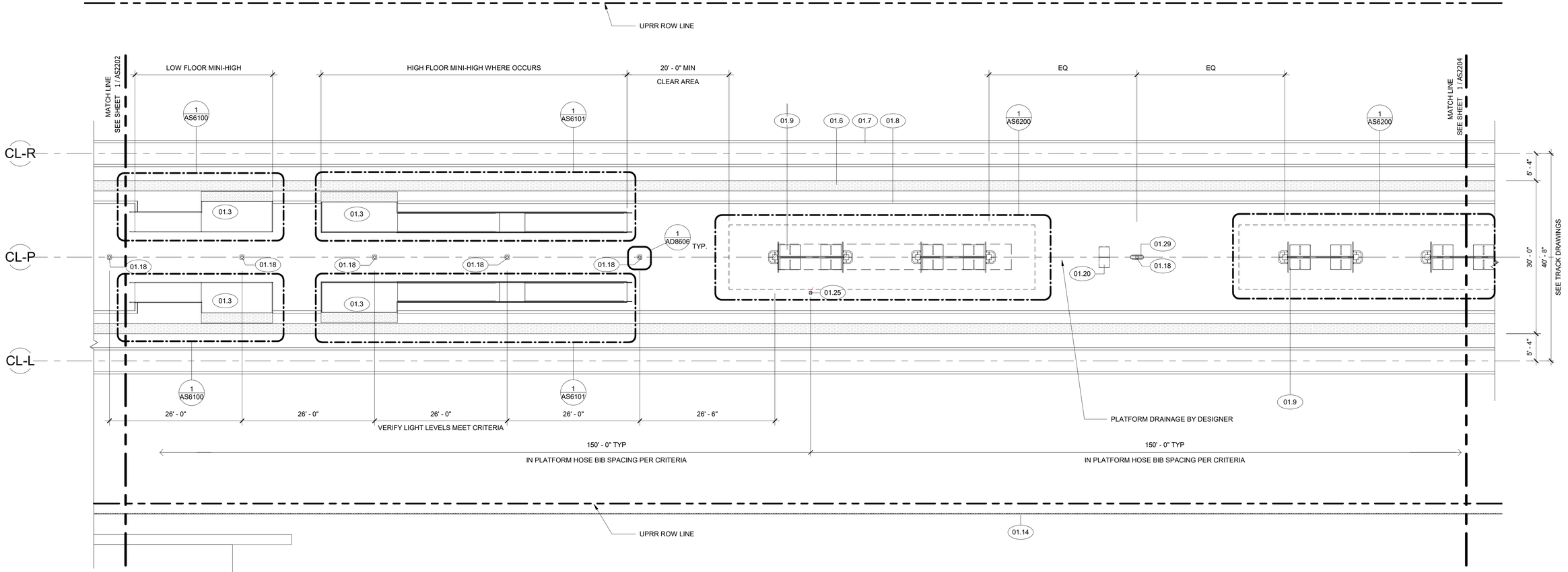
SAN JOAQUIN REGIONAL RAIL COMMISSION

DRAWN BY: Author	**SAN JOAQUIN REGIONAL RAIL COMMISSION**
CHECKED BY: Checker	LOCATION & DESCRIPTION: STATIONS AND FACILITIES STANDARD DRAWINGS
DATE: 10/28/2022	
SHEET NUMBER **AS2202**	SHEET TITLE: **UNDERCROSSING - CENTER PLATFORM PLAN - AREA B**



1 UNDERCROSSING - CENTER PLATFORM - AREA C

1" = 10'-0"

GENERAL NOTES:

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01.25	IN PLATFORM HOSE CONNECTION
01.26	AREA DRAIN
01.28	END OF PLATFORM RAMP
01.29	SIGNAGE KIOSK

0 5' 10' 20'
1"= 10'-0"

DATE / TIME STAMP: 11/4/2022 10:07:39 AM

REV. #	BY	DATE	DESCRIPTION

DIRECTIVE DRAWING
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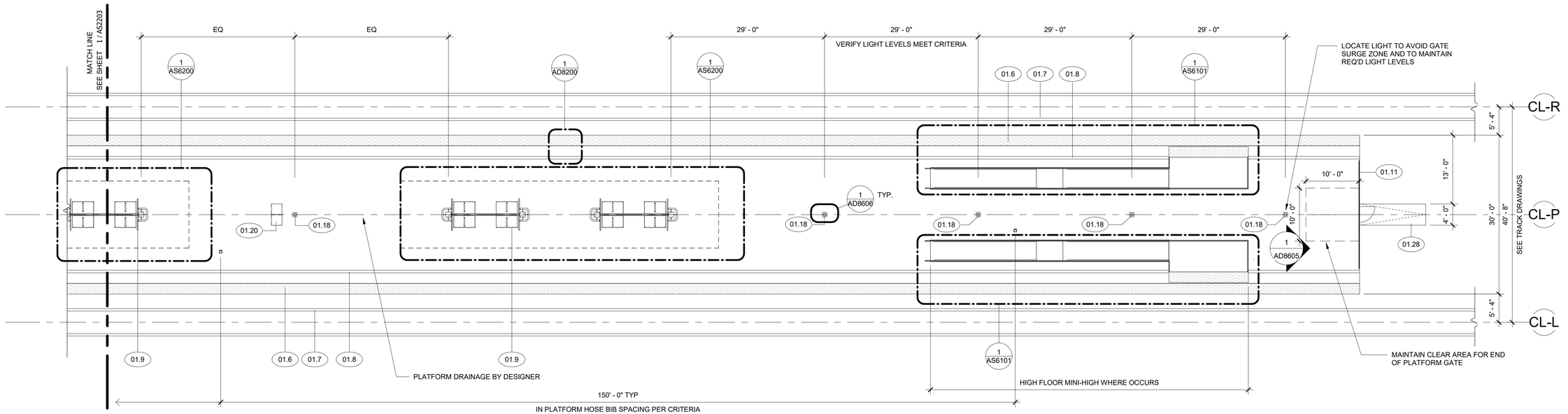
SAN JOAQUIN REGIONAL RAIL COMMISSION

DRAWN BY: Author
CHECKED BY: Checker
DATE: 10/28/2022
SHEET NUMBER: **AS2203**

SAN JOAQUIN REGIONAL RAIL COMMISSION
LOCATION & DESCRIPTION: STATIONS AND FACILITIES STANDARD DRAWINGS
SHEET TITLE: **UNDERCROSSING - CENTER PLATFORM PLAN - AREA C**



1 UNDERCROSSING - CENTER PLATFORM - AREA D

1" = 10'-0"

KEYNOTE LEGEND	
Key Value	Keynote Text
01.3	MINI HIGH
01.6	TACTILE WARNING STRIP
01.7	TRACK
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01.28	END OF PLATFORM RAMP
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6. STATIONS WITH ACE SERVICE SHALL PROVIDE LOW MINI-HIGH PLATFORMS ON THE STATION PLATFORM. STATIONS WITH AMTRAK SERVICE SHALL PROVIDE HIGH MINI-HIGH PLATFORMS UNLESS DIRECTED OTHERWISE BY SJRRC. ALL STATIONS SHALL ALLOW FOR THE FUTURE INSTALLATION OF HIGH MINI-HIGH PLATFORMS AND NOT PRECLUDE THEIR INSTALLATION AT A FUTURE DATE.

0 5' 10' 20'
1"= 10'-0"

DATE / TIME STAMP: 11/4/2022 10:07:40 AM

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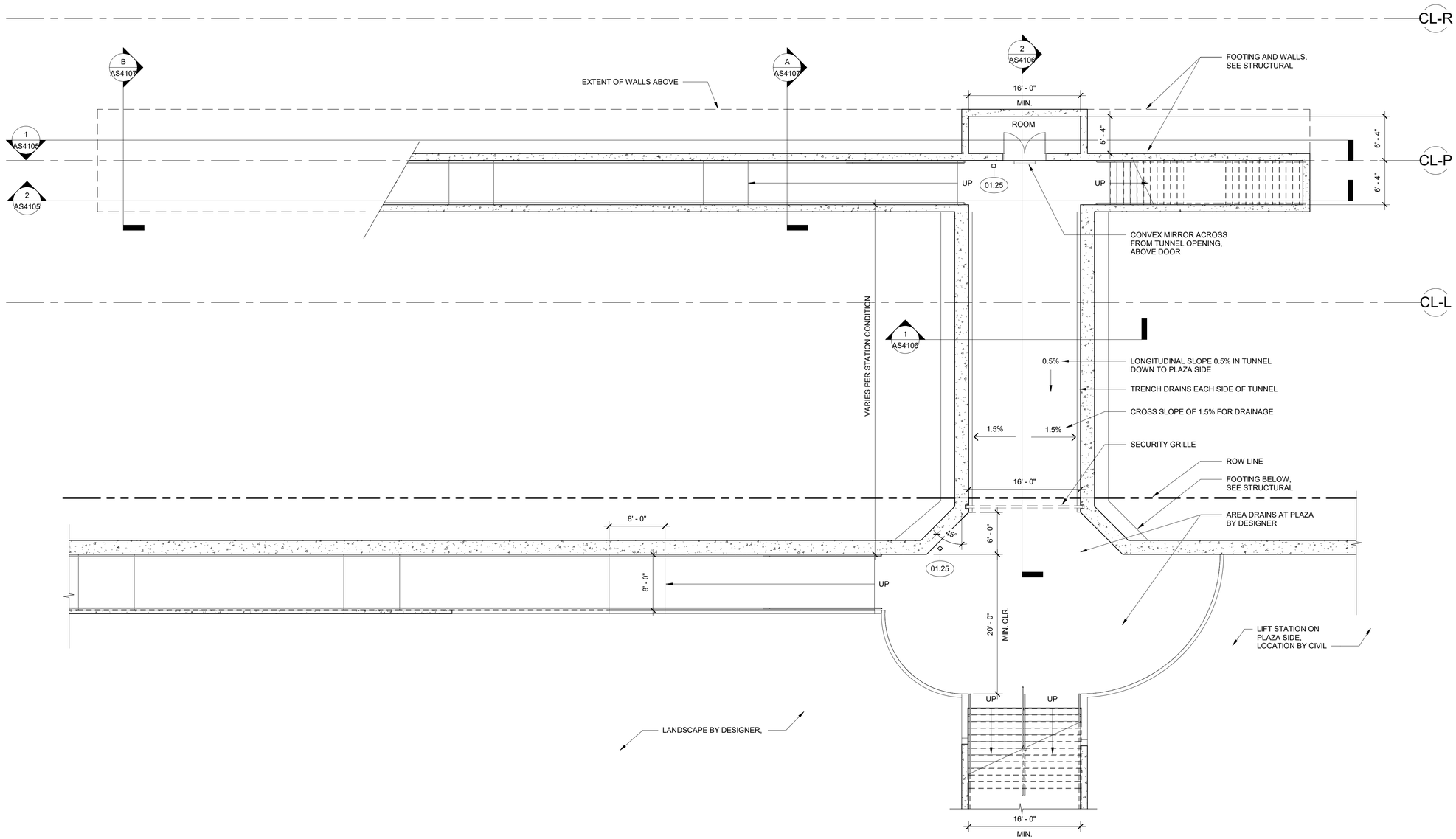
SAN JOAQUIN REGIONAL RAIL COMMISSION

DRAWN BY: Author
CHECKED BY: Checker
DATE: 10/28/2022
SHEET NUMBER: **AS2204**

SAN JOAQUIN REGIONAL RAIL COMMISSION

LOCATION & DESCRIPTION:
STATIONS AND FACILITIES
STANDARD DRAWINGS

SHEET TITLE:
UNDERCROSSING - CENTER PLATFORM PLAN - AREA D



1 TUNNEL WALKWAY FLOOR PLAN

1/8" = 1'-0"

0 4' 8' 16'
1/8" = 1'-0"

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SAN JOAQUIN REGIONAL RAIL COMMISSION

DRAWN BY: Author
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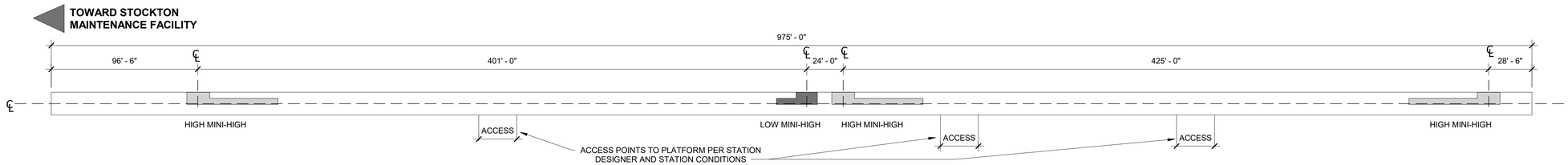
DATE: 10/28/2022
SHEET NUMBER: **AS2205**

SAN JOAQUIN REGIONAL RAIL COMMISSION

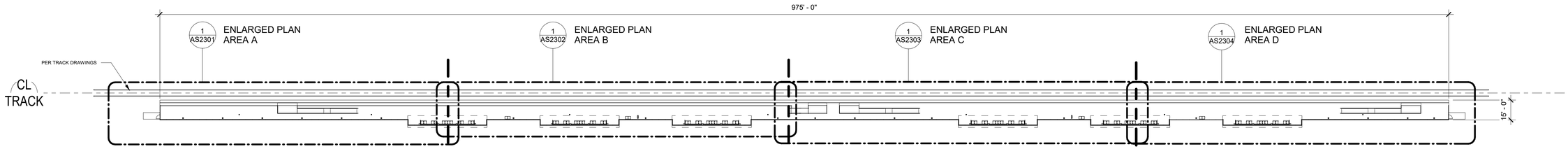
LOCATION & DESCRIPTION:
STATIONS AND FACILITIES
STANDARD DRAWINGS

SHEET TITLE:
UNDERCROSSING - CENTER PLATFORM - ENLARGED TUNNEL PLAN



1 TYPICAL SIDE PLATFORM CONFIGURATION

1" = 40'-0"



NOTE: SIDE PLATFORM SHELTER CANOPY QTY AND PLACEMENT BY DESIGNER TO REFLECT SPECIFIC SITE CONFIGURATIONS AND CONDITIONS.

2 SIDE PLATFORM PLAN OVERALL

1" = 40'-0"

GENERAL NOTES:

1. DESIGNER TO CONFIRM ILLUMINATION LEVELS AND PHOTOMETRICS FOR ALL PLATFORM AND STATION LIGHTING LAYOUTS. DIMENSIONS FOR LIGHTING SPACING ARE PRESUMPTIVE AND NEED TO BE CONFIRMED BY EACH DESIGN TEAM ON A PER STATION BASIS.
2. SEE SJRRC CRITERIA DOCUMENT FOR CIVIL, LANDSCAPE, STRUCTURAL, MEP, ARCHITECTURE, AND VERTICAL TRANSPORTATION DESIGN CRITERIA. COMMUNICATIONS BY DESIGNER
3. SEE SJRRC GUIDELINES DOCUMENT FOR OVERARCHING STATION DESIGN GUIDELINES.
4. UNION PACIFIC RAILROAD (UPRR) RIGHT-OF-WAY (ROW) VARIES PER STATION SITE, STATION DESIGNER TO CONFIRM UPRR ROW DIMENSIONS AND TRACK DESIGN
5. FENCING SEPARATING UPRR ROW AND STATION SITE SHALL EXTENT ALONG ENTIRE LENGTH OF PLATFORM, SEE UPRR DESIGN CRITERIA FOR FENCING REQUIREMENTS
6. STATIONS WITH ACE SERVICE SHALL PROVIDE LOW MINI-HIGH PLATFORMS ON THE STATION PLATFORM. STATIONS WITH AMTRAK SERVICE SHALL PROVIDE HIGH MINI-HIGH PLATFORMS UNLESS DIRECTED OTHERWISE BY SJRRC. ALL STATIONS SHALL ALLOW FOR THE FUTURE INSTALLATION OF HIGH MINI-HIGH PLATFORMS AND NOT PRECLUDE THEIR INSTALLATION AT A FUTURE DATE.

0 10' 40' 80'
1"= 40'-0"

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DRAWN BY: Author
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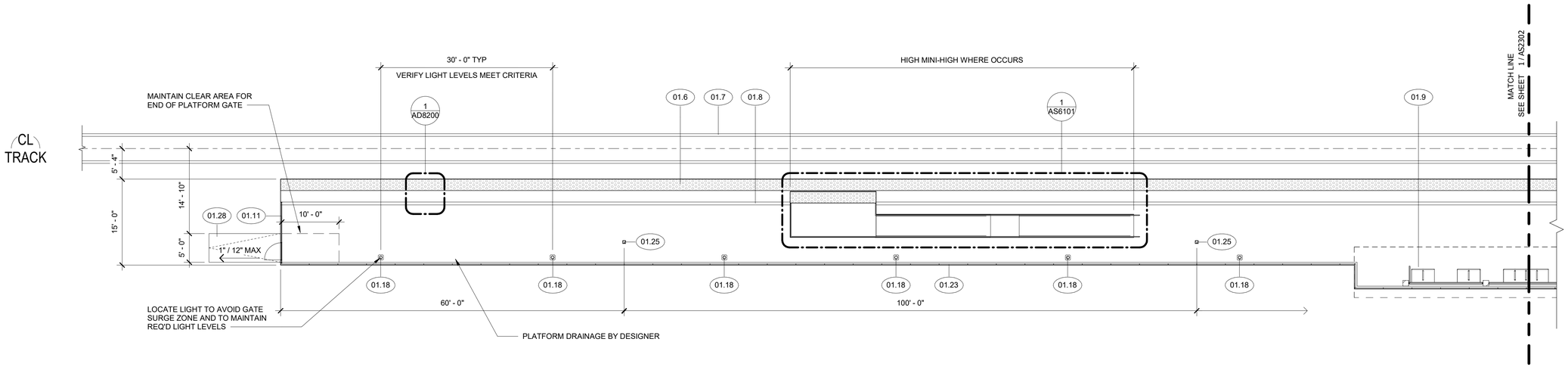
DATE: 10/28/2022
SHEET NUMBER: **AS2300**

SAN JOAQUIN REGIONAL RAIL COMMISSION

LOCATION & DESCRIPTION:
STATIONS AND FACILITIES
STANDARD DRAWINGS

SHEET TITLE:
SIDE PLATFORM OVERALL PLAN



1 SIDE PLATFORM - AREA A

1" = 10'-0"

KEYNOTE LEGEND	
Key Value	Keynote Text
01.3	MINI HIGH
01.6	TACTILE WARNING STRIP
01.7	TRACK
01.8	STAND BEHIND LINE STRIPE LETTERING
01.9	PLATFORM CANOPY
01.11	END OF PLATFORM FENCE AND GATE
01.14	IRON FENCE
01.17	BIKE PARKING
01.18	LIGHT POLE
01.20	WASTE RECEPTACLES
01.22	WATER STATION w/ BOTTLE FILLER
01.23	GUARDRAIL
01.24	THROW BARRIER
01.25	IN PLATFORM HOSE CONNECTION
01.26	AREA DRAIN
01.28	END OF PLATFORM RAMP
01.29	SIGNAGE KIOSK

GENERAL NOTES:

1. DESIGNER TO CONFIRM ILLUMINATION LEVELS AND PHOTOMETRICS FOR ALL PLATFORM AND STATION LIGHTING LAYOUTS. DIMENSIONS FOR LIGHTING SPACING ARE PRESUMPTIVE AND NEED TO BE CONFIRMED BY EACH DESIGN TEAM ON A PER STATION BASIS.
2. SEE SJRRC CRITERIA DOCUMENT FOR CIVIL, LANDSCAPE, STRUCTURAL, MEP, ARCHITECTURE, AND VERTICAL TRANSPORTATION DESIGN CRITERIA. COMMUNICATIONS BY DESIGNER
3. SEE SJRRC GUIDELINES DOCUMENT FOR OVERARCHING STATION DESIGN GUIDELINES.
4. UNION PACIFIC RAILROAD (UPRR) RIGHT-OF-WAY (ROW) VARIES PER STATION SITE, STATION DESIGNER TO CONFIRM UPRR ROW DIMENSIONS AND TRACK DESIGN
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0 5' 10' 20'
1"= 10'-0"

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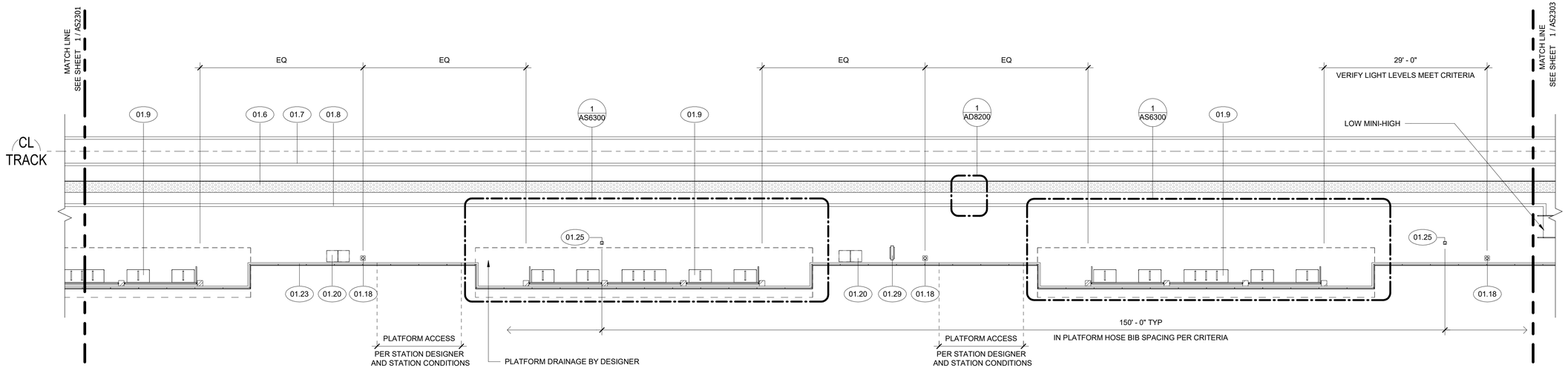
SAN JOAQUIN REGIONAL RAIL COMMISSION

DRAWN BY: Author
CHECKED BY: Checker
DATE: 10/28/2022
SHEET NUMBER: **AS2301**

SAN JOAQUIN REGIONAL RAIL COMMISSION

LOCATION & DESCRIPTION:
STATIONS AND FACILITIES
STANDARD DRAWINGS

SHEET TITLE:
SIDE PLATFORM PLAN - AREA A



1 SIDE PLATFORM - AREA B

1" = 10'-0"

GENERAL NOTES:

1. DESIGNER TO CONFIRM ILLUMINATION LEVELS AND PHOTOMETRICS FOR ALL PLATFORM AND STATION LIGHTING LAYOUTS. DIMENSIONS FOR LIGHTING SPACING ARE PRESUMPTIVE AND NEED TO BE CONFIRMED BY EACH DESIGN TEAM ON A PER STATION BASIS.
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KEYNOTE LEGEND	
Key Value	Keynote Text
01.3	MINI HIGH
01.6	TACTILE WARNING STRIP
01.7	TRACK
01.8	STAND BEHIND LINE STRIPE LETTERING
01.9	PLATFORM CANOPY
01.11	END OF PLATFORM FENCE AND GATE
01.14	IRON FENCE
01.17	BIKE PARKING
01.18	LIGHT POLE
01.20	WASTE RECEPTACLES
01.22	WATER STATION w/ BOTTLE FILLER
01.23	GUARDRAIL
01.24	THROW BARRIER
01.25	IN PLATFORM HOSE CONNECTION
01.26	AREA DRAIN
01.28	END OF PLATFORM RAMP
01.29	SIGNAGE KIOSK

0 5' 10' 20'
1"= 10'-0"

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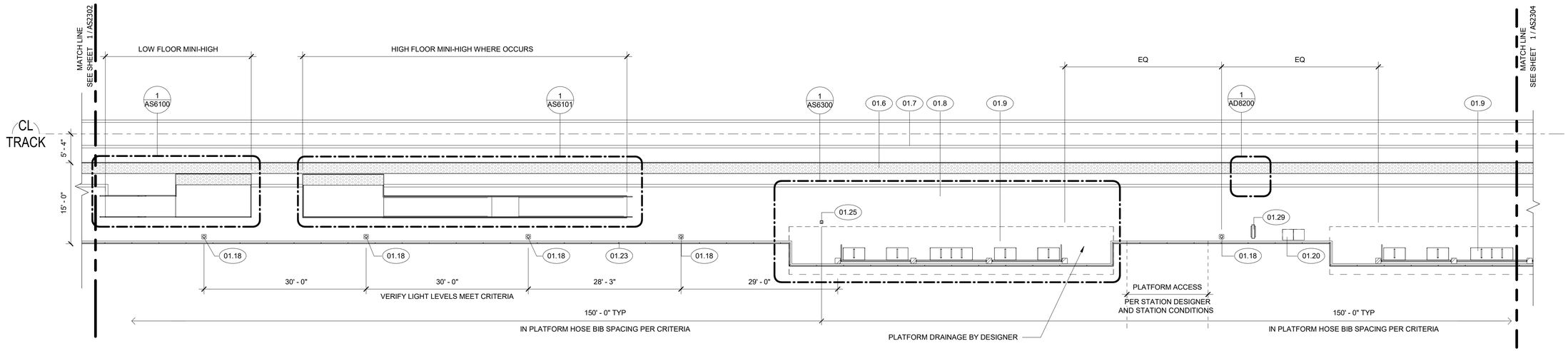
SAN JOAQUIN REGIONAL RAIL COMMISSION

DRAWN BY: Author
CHECKED BY: Checker
DATE: 10/28/2022
SHEET NUMBER: **AS2302**

SAN JOAQUIN REGIONAL RAIL COMMISSION

LOCATION & DESCRIPTION:
STATIONS AND FACILITIES
STANDARD DRAWINGS

SHEET TITLE:
SIDE PLATFORM PLAN - AREA B



1 SIDE PLATFORM - AREA C

1" = 10'-0"

GENERAL NOTES:

1. DESIGNER TO CONFIRM ILLUMINATION LEVELS AND PHOTOMETRICS FOR ALL PLATFORM AND STATION LIGHTING LAYOUTS. DIMENSIONS FOR LIGHTING SPACING ARE PRESUMPTIVE AND NEED TO BE CONFIRMED BY EACH DESIGN TEAM ON A PER STATION BASIS.
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KEYNOTE LEGEND	
Key Value	Keynote Text
01.3	MINI HIGH
01.6	TACTILE WARNING STRIP
01.7	TRACK
01.8	STAND BEHIND LINE STRIPE LETTERING
01.9	PLATFORM CANOPY
01.11	END OF PLATFORM FENCE AND GATE
01.14	IRON FENCE
01.17	BIKE PARKING
01.18	LIGHT POLE
01.20	WASTE RECEPTACLES
01.22	WATER STATION w/ BOTTLE FILLER
01.23	GUARDRAIL
01.24	THROW BARRIER
01.25	IN PLATFORM HOSE CONNECTION
01.26	AREA DRAIN
01.28	END OF PLATFORM RAMP
01.29	SIGNAGE KIOSK

0 5' 10' 20'
1"= 10'-0"

DATE / TIME STAMP: 11/4/2022 10:07:50 AM

REV. #	BY	DATE	DESCRIPTION

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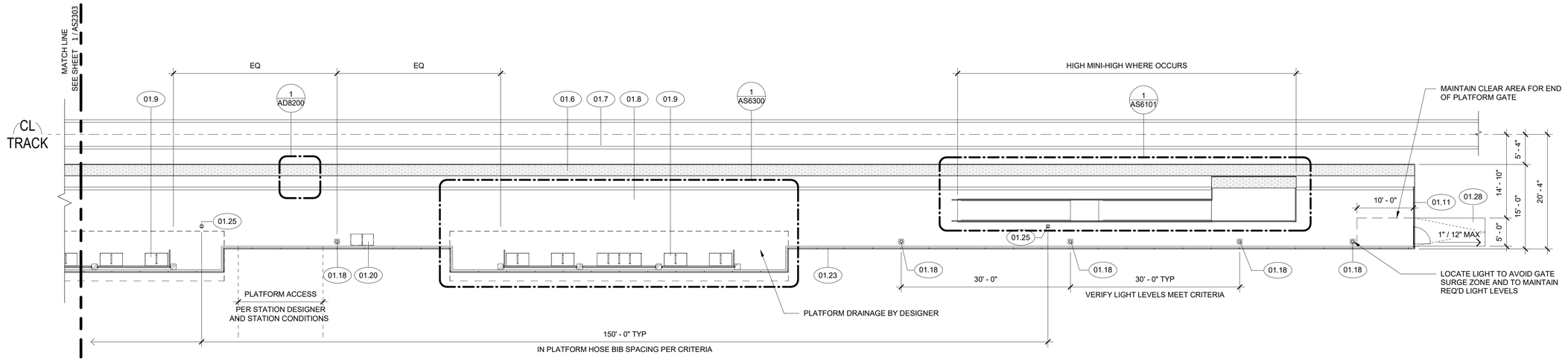
SAN JOAQUIN REGIONAL RAIL COMMISSION

DRAWN BY: Author
CHECKED BY: Checker
DATE: 10/28/2022
SHEET NUMBER: **AS2303**

SAN JOAQUIN REGIONAL RAIL COMMISSION

LOCATION & DESCRIPTION:
STATIONS AND FACILITIES
STANDARD DRAWINGS

SHEET TITLE:
SIDE PLATFORM PLAN - AREA C



1 SIDE PLATFORM - AREA D

1" = 10'-0"

KEYNOTE LEGEND	
Key Value	Keynote Text
01.3	MINI HIGH
01.6	TACTILE WARNING STRIP
01.7	TRACK
01.8	STAND BEHIND LINE STRIPE LETTERING
01.9	PLATFORM CANOPY
01.11	END OF PLATFORM FENCE AND GATE
01.14	IRON FENCE
01.17	BIKE PARKING
01.18	LIGHT POLE
01.20	WASTE RECEPTACLES
01.22	WATER STATION w/ BOTTLE FILLER
01.23	GUARDRAIL
01.24	THROW BARRIER
01.25	IN PLATFORM HOSE CONNECTION
01.26	AREA DRAIN
01.28	END OF PLATFORM RAMP
01.29	SIGNAGE KIOSK

0 5' 10' 20'
1"= 10'-0"

GENERAL NOTES:

1. DESIGNER TO CONFIRM ILLUMINATION LEVELS AND PHOTOMETRICS FOR ALL PLATFORM AND STATION LIGHTING LAYOUTS. DIMENSIONS FOR LIGHTING SPACING ARE PRESUMPTIVE AND NEED TO BE CONFIRMED BY EACH DESIGN TEAM ON A PER STATION BASIS.
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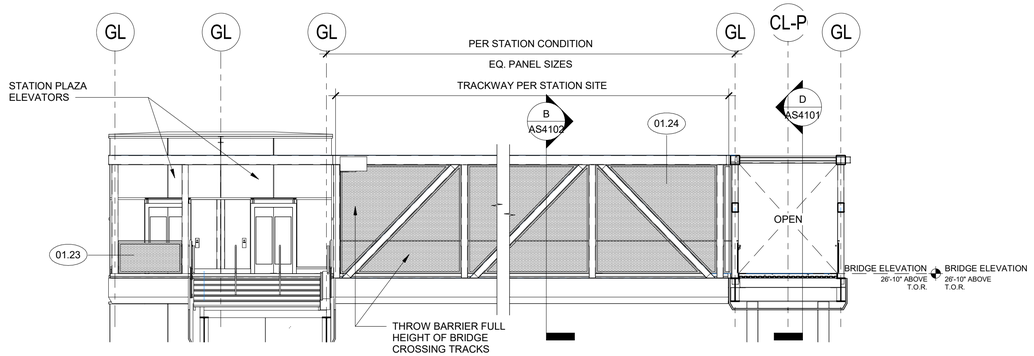
SAN JOAQUIN REGIONAL RAIL COMMISSION

DRAWN BY: Author
CHECKED BY: Checker
DATE: 10/28/2022
SHEET NUMBER: **AS2304**

SAN JOAQUIN REGIONAL RAIL COMMISSION

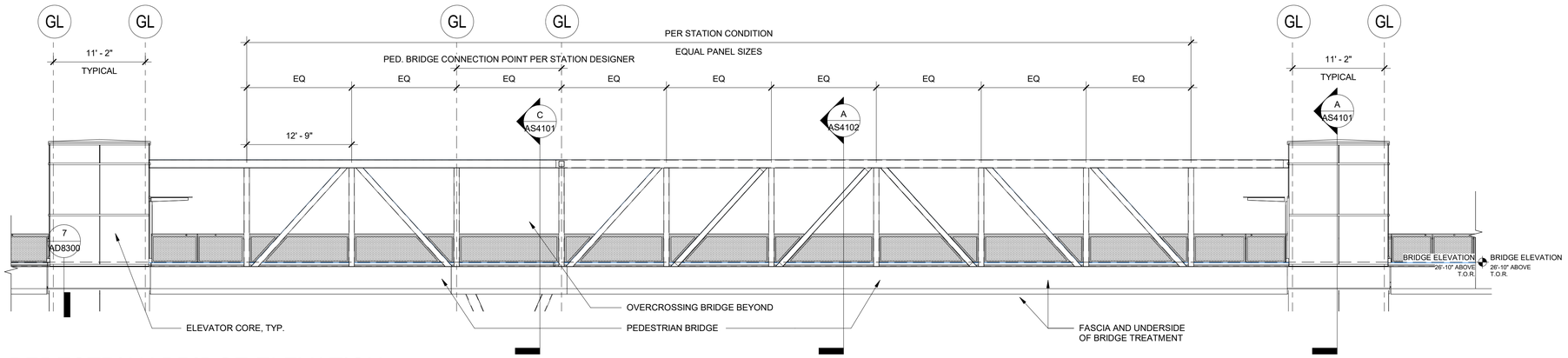
LOCATION & DESCRIPTION:
STATIONS AND FACILITIES
STANDARD DRAWINGS

SHEET TITLE:
SIDE PLATFORM PLAN - AREA D



2 OVERCROSSING BRIDGE ELEVATION

1/8" = 1'-0"



1 PEDESTRIAN BRIDGE ELEVATION

1/8" = 1'-0"

0 4' 8' 16'

1/8" = 1'-0"

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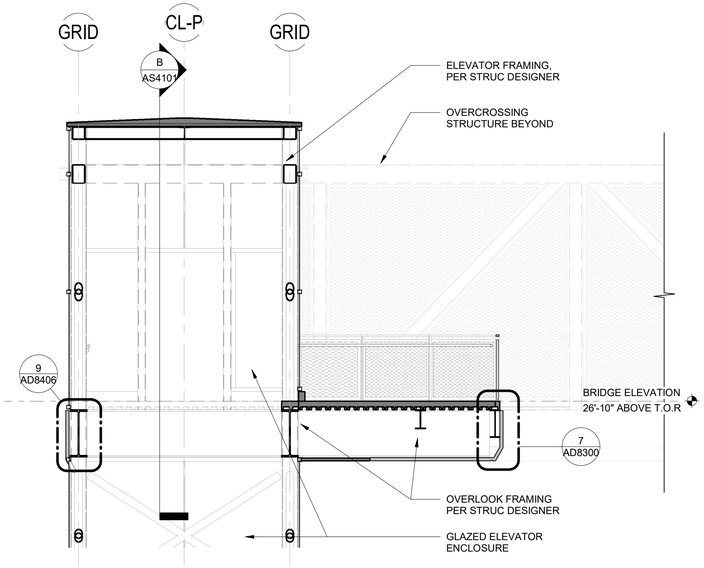
SAN JOAQUIN REGIONAL RAIL COMMISSION

DRAWN BY: Author
CHECKED BY: Checker
DATE: 10/28/2022
SHEET NUMBER: **AS3101**

SAN JOAQUIN REGIONAL RAIL COMMISSION

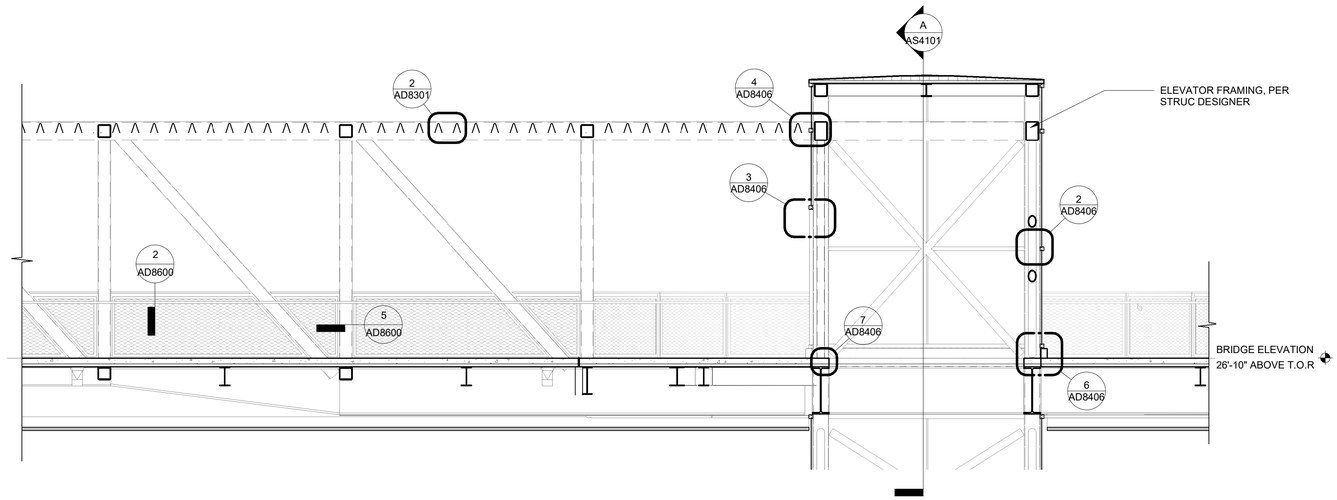
LOCATION & DESCRIPTION:
STATIONS AND FACILITIES
STANDARD DRAWINGS

SHEET TITLE:
OVERCROSSING BRIDGE ELEVATIONS



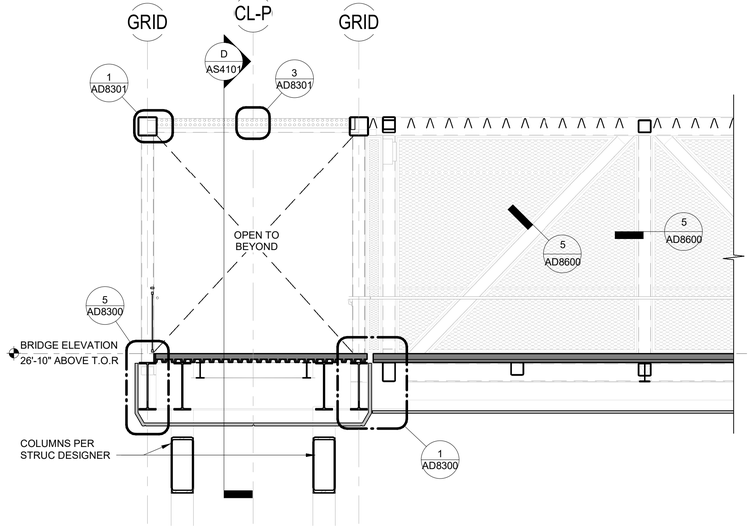
A PEDESTRIAN BRIDGE SECTION AT OVERLOOK

1/4" = 1'-0"



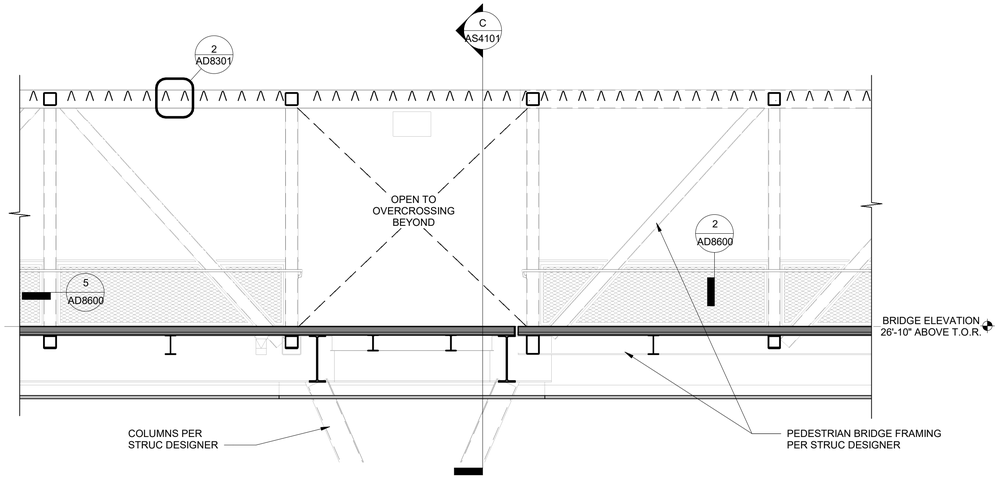
B PEDESTRIAN BRIDGE SECTION AT ELEVATOR

1/4" = 1'-0"



C PEDESTRIAN BRIDGE SECTION AT OVERCROSSING CONNECTION

1/4" = 1'-0"



D PEDESTRIAN BRIDGE SECTION AT OVERCROSSING

1/4" = 1'-0"

0 2' 4' 8'
1/4" = 1'-0"

DATE / TIME STAMP: 11/4/2022 10:08:02 AM

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SAN JOAQUIN REGIONAL RAIL COMMISSION

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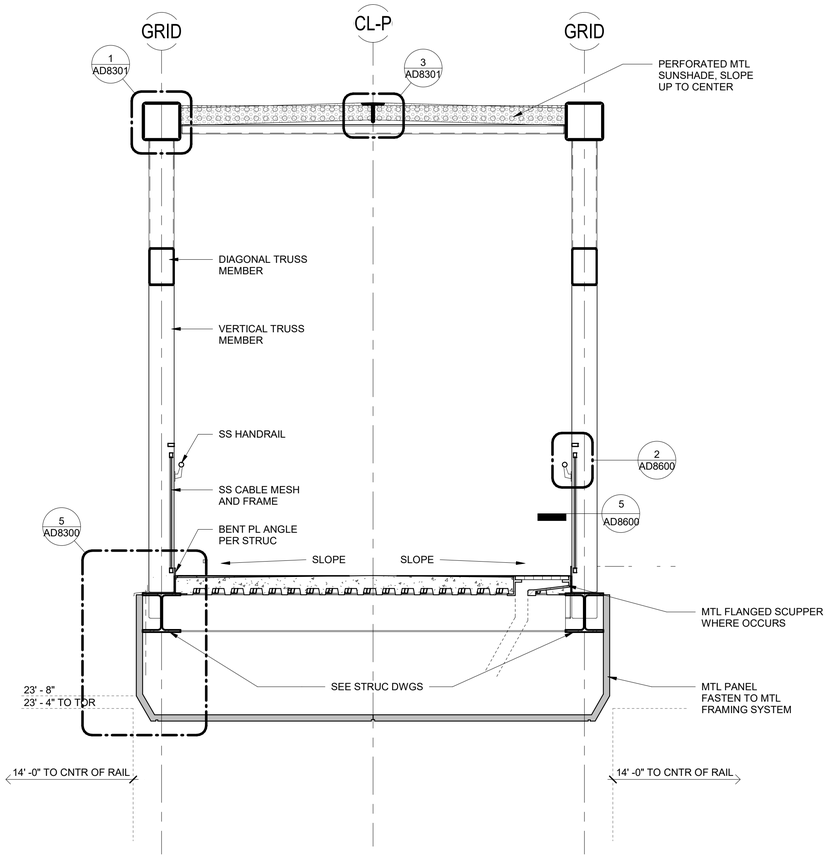
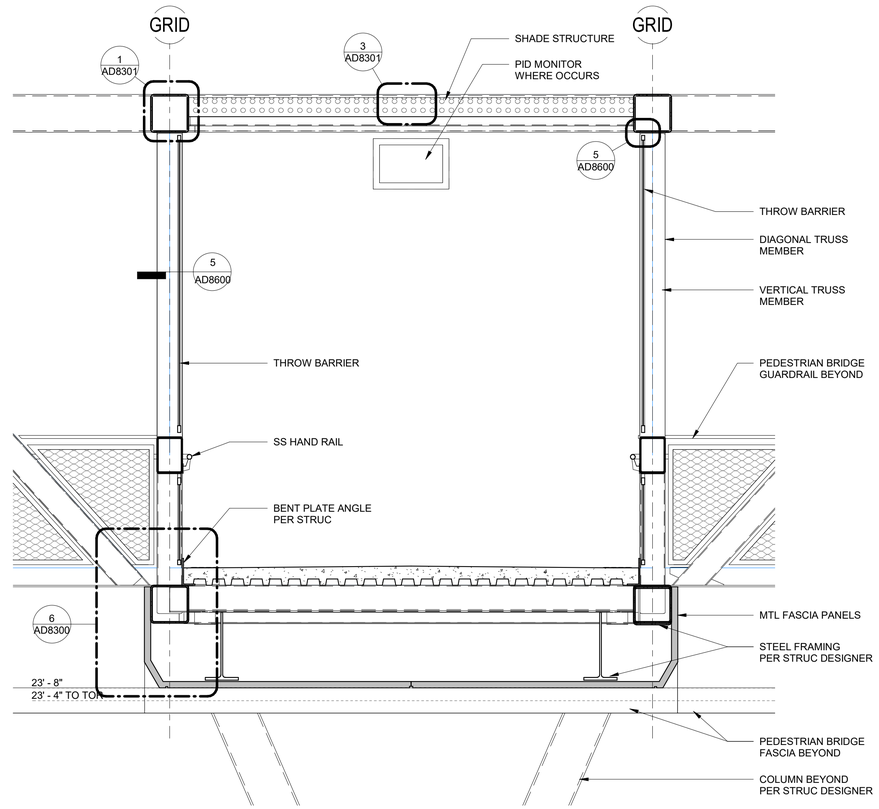
CHECKED BY: Checker	LOCATION & DESCRIPTION: STATIONS AND FACILITIES STANDARD DRAWINGS
DATE: 10/28/2022	
SHEET NUMBER **AS4101**	SHEET TITLE: **OVERCROSSING AND PEDESTRIAN BRIDGE SECTIONS**



A TYPICAL PEDESTRIAN BRIDGE SECTION

1/2" = 1'-0"



B TYPICAL OVERCROSSING BRIDGE SECTION

1/2" = 1'-0"

0 12" 2' 4'
1" = 1'-0"

DATE / TIME STAMP: 11/4/2022 10:08:05 AM

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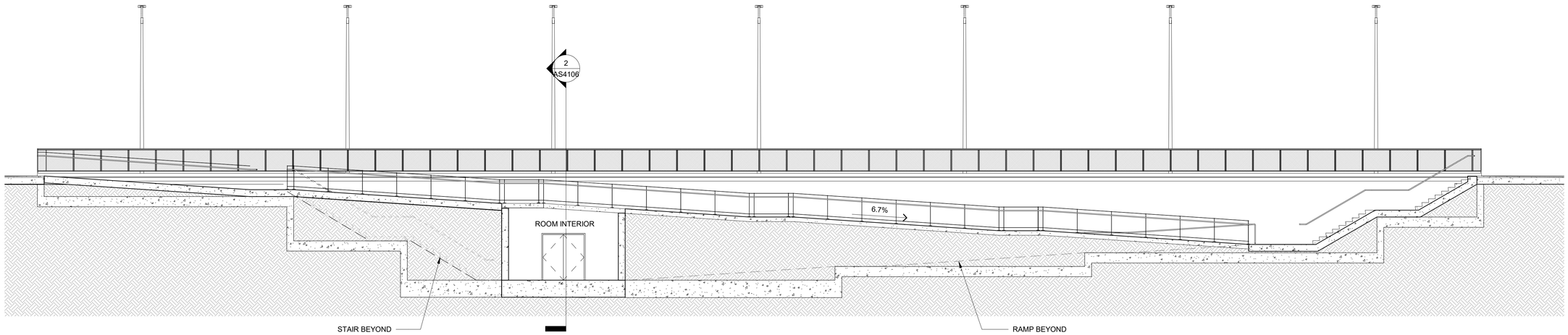
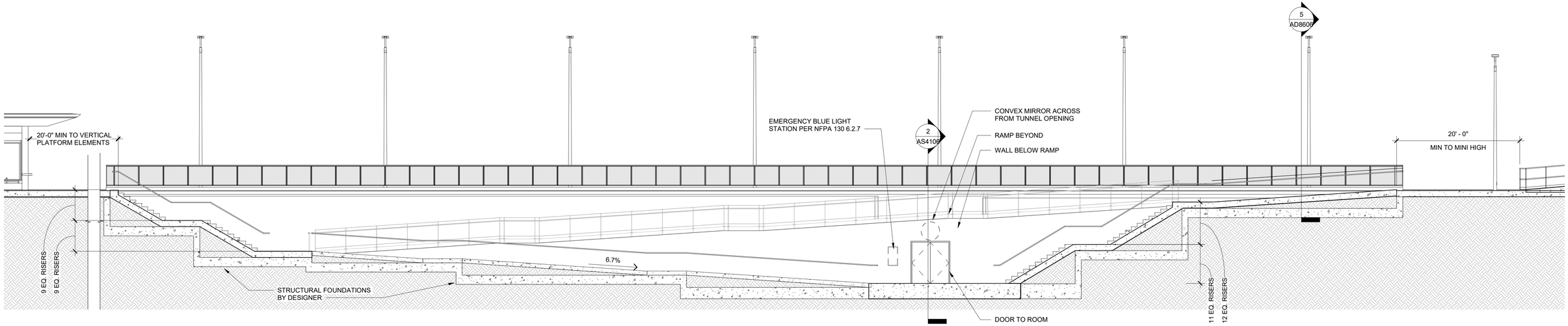
DRAWN BY: Author	**SAN JOAQUIN REGIONAL RAIL COMMISSION**
CHECKED BY: Checker	LOCATION & DESCRIPTION: STATIONS AND FACILITIES STANDARD DRAWINGS
DATE: 10/28/2022	
SHEET NUMBER **AS4102**	SHEET TITLE: **TYPICAL PEDESTRIAN AND OVERCROSSING BRIDGE SECTIONS**



1 UNDERCROSSING RAMP & STAIR SECTION - UPPER RAMP

1/8" = 1'-0"



2 UNDERCROSSING RAMP & STAIR SECTION - AT STAIR BOTH SIDES

1/8" = 1'-0"

0 4' 8' 16'
1/8" = 1'-0"

DATE / TIME STAMP: 11/4/2022 10:08:06 AM

REV. #	BY	DATE	DESCRIPTION

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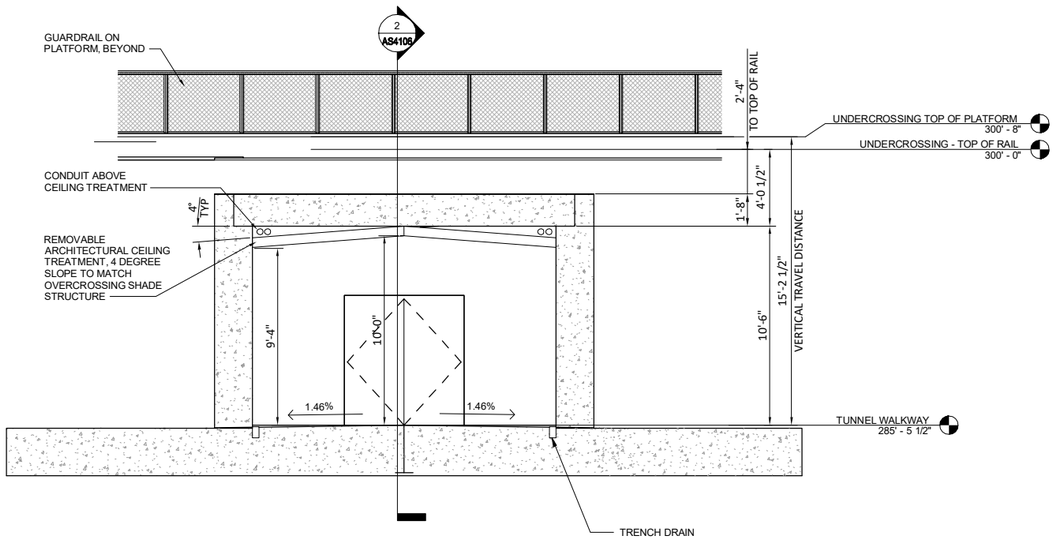
SAN JOAQUIN REGIONAL RAIL COMMISSION

DRAWN BY: Author
CHECKED BY: Checker
DATE: 10/28/2022
SHEET NUMBER: **AS4105**

SAN JOAQUIN REGIONAL RAIL COMMISSION

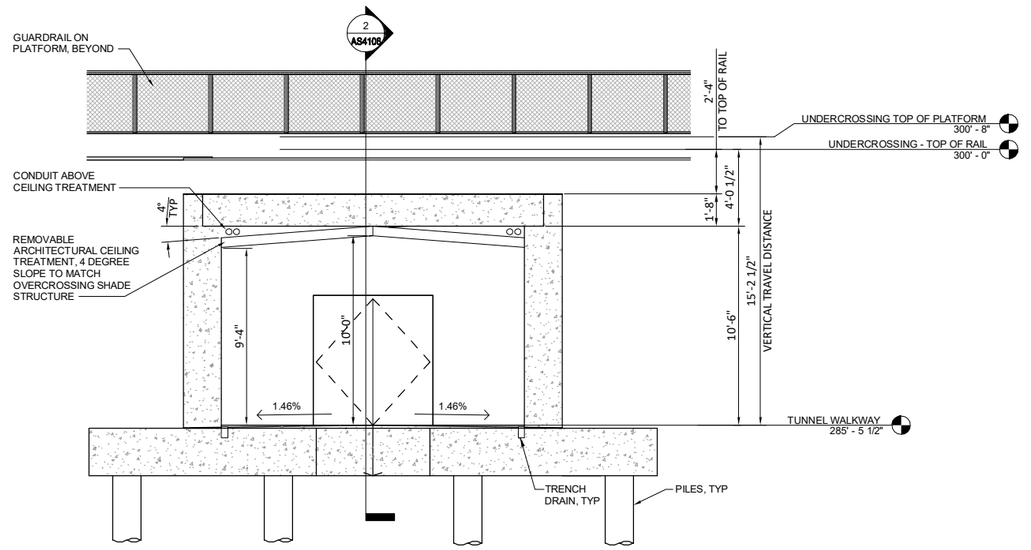
LOCATION & DESCRIPTION:
STATIONS AND FACILITIES
STANDARD DRAWINGS

SHEET TITLE:
UNDERCROSSING RAMP SECTION - CENTER PLATFORM



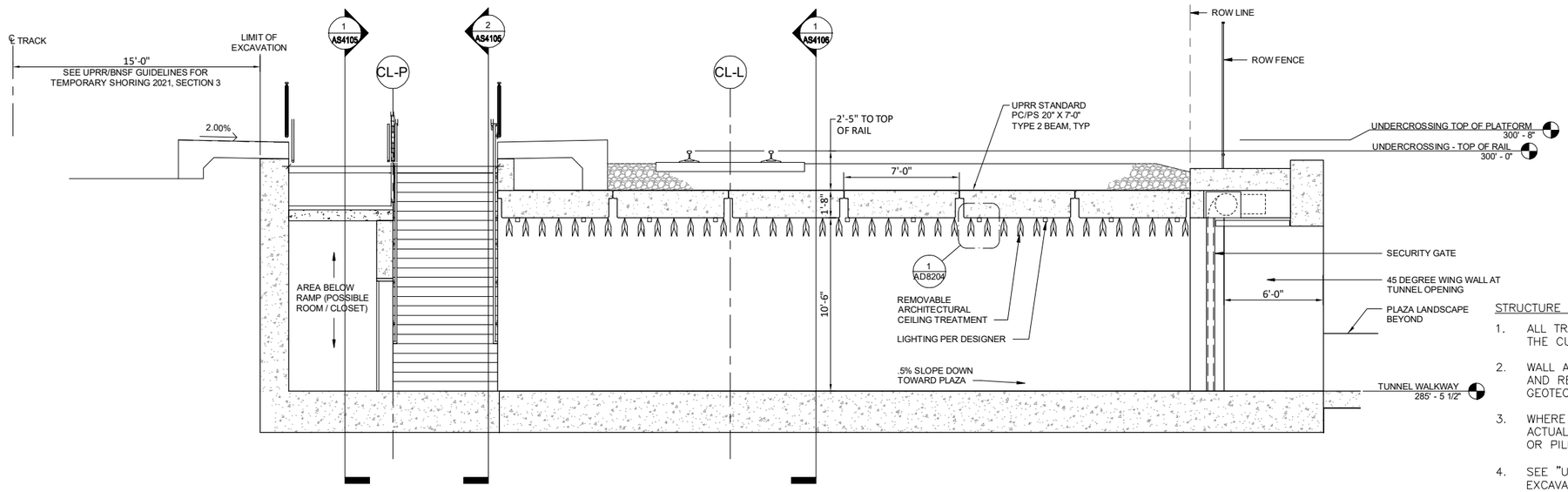
1 UNDERCROSSING CROSS SECTION (SPREAD FOOTING)

1/4" = 1'-0"



1 UNDERCROSSING CROSS SECTION (DEEP FOUNDATION)

1/4" = 1'-0"



2 PLATFORM SECTION AT UNDERCROSSING

1/4" = 1'-0"

STRUCTURE DESIGN NOTES:

1. ALL TRACK SUPPORT STRUCTURES SHALL BE DESIGNED IN CONFORMANCE WITH THE CURRENT UPRR STANDARDS AND AREMA MANUAL FOR RAILWAY ENGINEERING.
2. WALL AND FOUNDATION DIMENSIONS SHOWN ARE PRELIMINARY; ACTUAL DIMENSIONS AND REINFORCEMENT SHALL DEPEND ON SITE SPECIFIC GEOMETRY AND GEOTECHNICAL CONDITIONS.
3. WHERE SHALLOW FOOTING GROUNDWATER OR GEOLOGICAL HAZARD IS PRESENT, ACTUAL WALL OR FOOTING THICKNESS MAY VARY, AND VERTICAL GROUND ANCHOR OR PILES MAY BE REQUIRED.
4. SEE "UPRR/BNSF GUIDELINES FOR TEMPORARY SHORING, 2021" FOR LIMITS OF EXCAVATION AND OTHER SHORING REQUIREMENTS.
5. SEE "UPRR/BNSF GUIDELINES FOR RAILROAD GRADE SEPARATION PROJECTS, 2016" FOR CLEARANCES AND LAYOUT REQUIREMENTS.

DATE / TIME STAMP: 3/28/2022 2:04:11 PM

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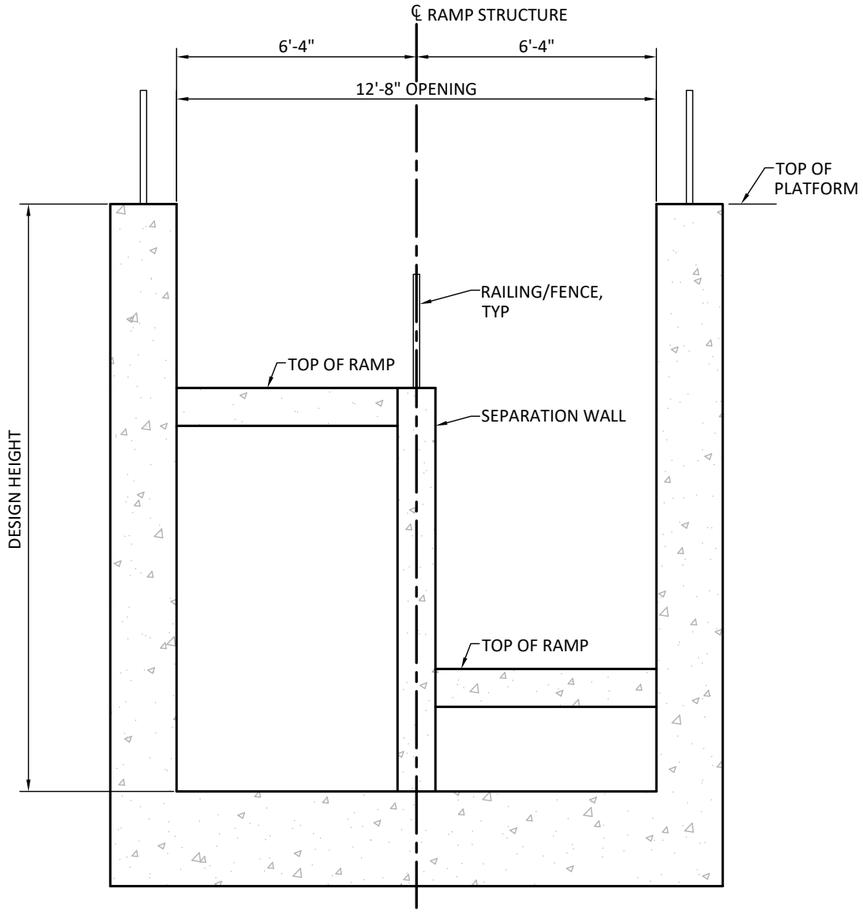
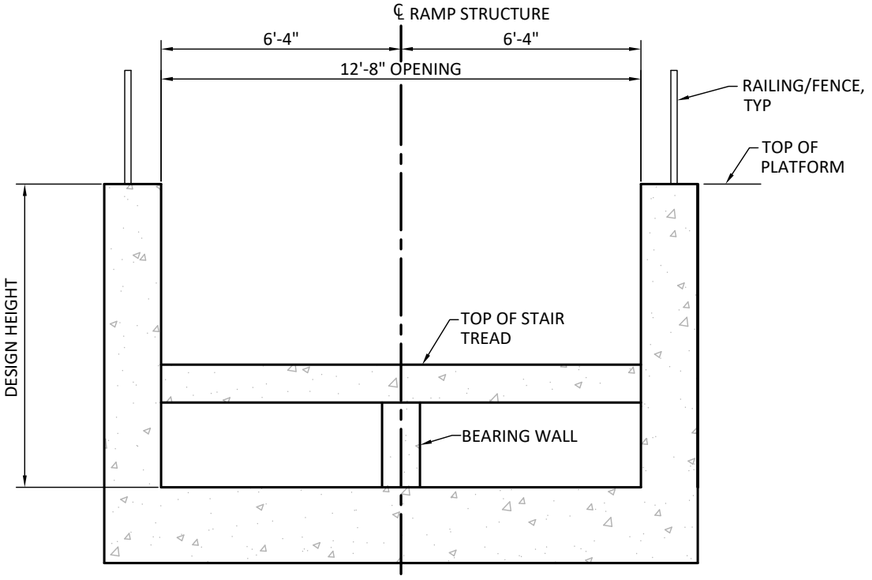
SAN JOAQUIN REGIONAL RAIL COMMISSION

DRAWN BY:	SAN JOAQUIN REGIONAL RAIL COMMISSION
CHECKED BY:	LOCATION & DESCRIPTION: STATIONS AND FACILITIES STANDARD DRAWINGS
DATE: 10/28/2022	
SHEET NUMBER: AS4106	SHEET TITLE: UNDERCROSSING SECTIONS - CENTER PLATFORM



A SECTION
1/2" = 1'-0"



B SECTION
1/2" = 1'-0"

STRUCTURE DESIGN NOTES:

1. ALL TRACK SUPPORT STRUCTURES SHALL BE DESIGNED IN CONFORMANCE WITH THE CURRENT UPRR STANDARDS AND AREMA MANUAL FOR RAILWAY ENGINEERING.
2. WALL AND FOUNDATION DIMENSIONS SHOWN ARE PRELIMINARY; ACTUAL DIMENSIONS AND REINFORCEMENT SHALL DEPEND ON SITE SPECIFIC GEOMETRY AND GEOTECHNICAL CONDITIONS.
3. WHERE SHALLOW FOOTING GROUNDWATER OR GEOLOGICAL HAZARD IS PRESENT, ACTUAL WALL OR FOOTING THICKNESS MAY VARY, AND VERTICAL GROUND ANCHOR OR PILES MAY BE REQUIRED.
4. SEE "UPRR/BNSF GUIDELINES FOR TEMPORARY SHORING, 2021" FOR LIMITS OF EXCAVATION AND OTHER SHORING REQUIREMENTS.
5. SEE "UPRR/BNSF GUIDELINES FOR RAILROAD GRADE SEPARATION PROJECTS, 2016" FOR CLEARANCES AND LAYOUT REQUIREMENTS.
6. FOR SECTION "A" AND "B" LOCATIONS, SEE SHEET AS4105.

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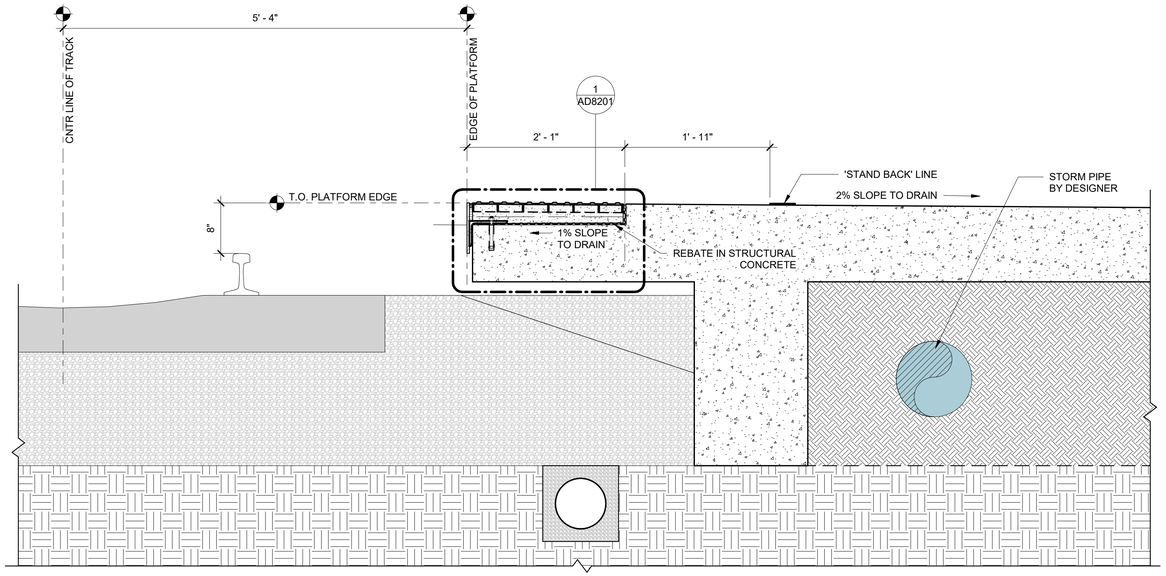
DATE: 10/28/2022
SHEET NUMBER: AS4107

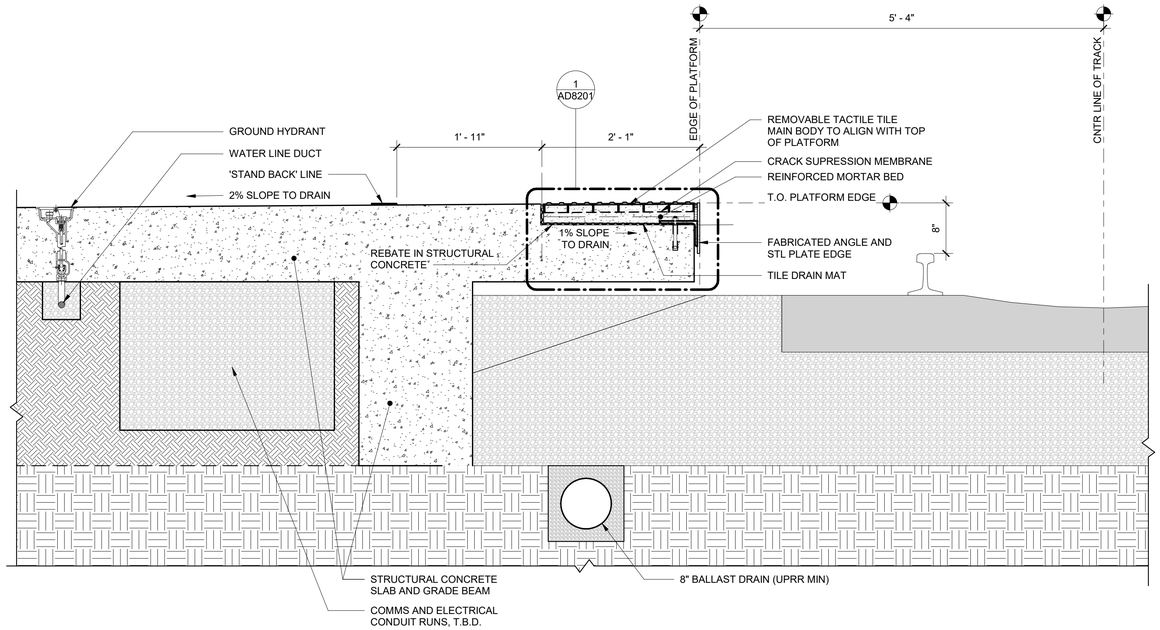
SAN JOAQUIN REGIONAL RAIL COMMISSION

LOCATION & DESCRIPTION:
STATIONS AND FACILITIES
STANDARD DRAWINGS

SHEET TITLE:
UNDERCROSSING SECTIONS - RAMP SECTIONS

DATE / TIME STAMP: 3/28/2022 2:04:11 PM





1 TYPICAL CENTER PLATFORM SECTION

1" = 1'-0"

0 6" 1' 2'
1" = 1'-0"

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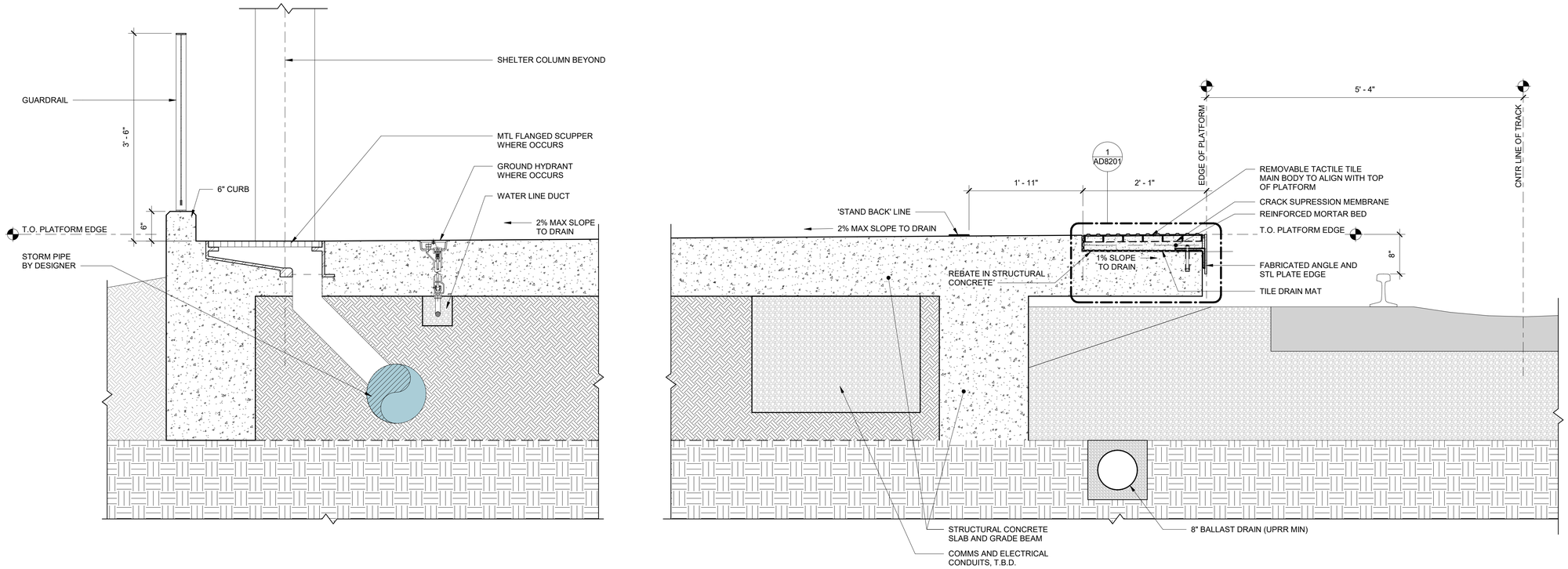
SAN JOAQUIN REGIONAL RAIL COMMISSION

DRAWN BY: Author
CHECKED BY: Checker
DATE: 10/28/2022
SHEET NUMBER: **AS4110**

SAN JOAQUIN REGIONAL RAIL COMMISSION

LOCATION & DESCRIPTION:
STATIONS AND FACILITIES
STANDARD DRAWINGS

SHEET TITLE:
TYPICAL CENTER PLATFORM SECTION



1 TYPICAL SIDE PLATFORM SECTION - DRAIN

1" = 1'-0"

0 6" 1' 2'
1" = 1'-0"

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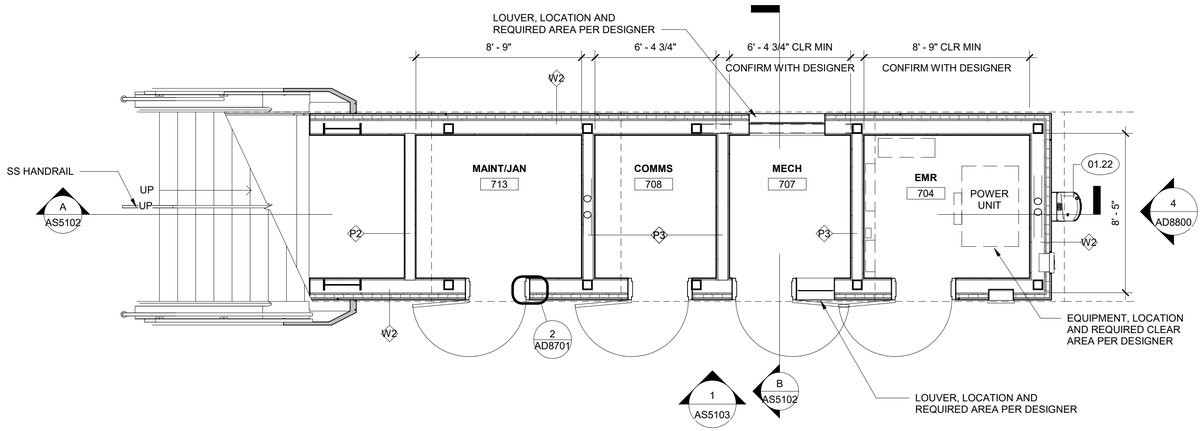
DRAWN BY: Author
CHECKED BY: Checker
DATE: 10/28/2022
SHEET NUMBER: **AS4111**

SAN JOAQUIN REGIONAL RAIL COMMISSION

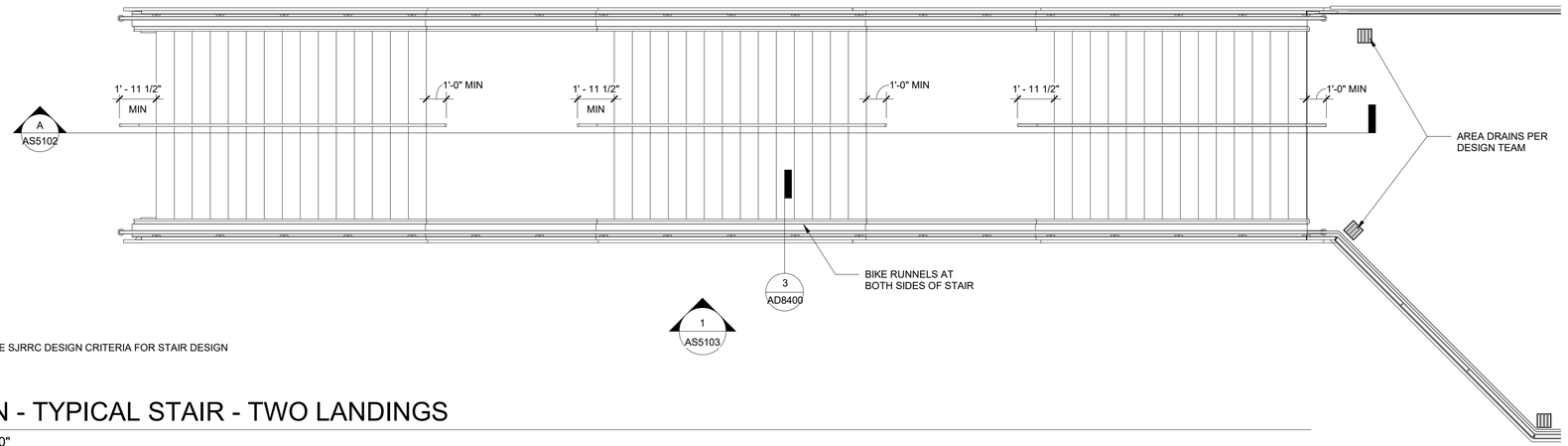
LOCATION & DESCRIPTION:
STATIONS AND FACILITIES
STANDARD DRAWINGS

SHEET TITLE:
TYPICAL SIDE PLATFORM SECTION



1 PLAN - TYPICAL STAIR - UNDER STAIR ROOMS

1/4" = 1'-0"



NOTE: SEE SJRRC DESIGN CRITERIA FOR STAIR DESIGN

2 PLAN - TYPICAL STAIR - TWO LANDINGS

1/4" = 1'-0"

0 2' 4' 8'
1/4" = 1'-0"

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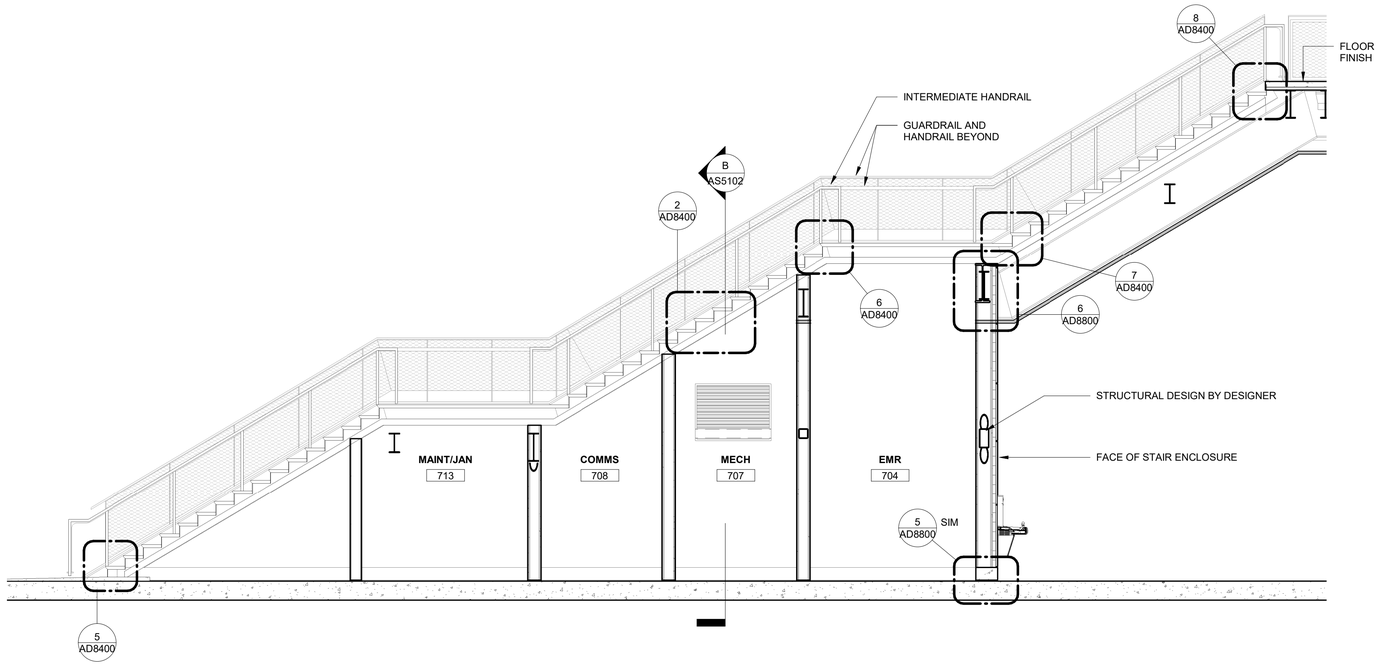
SAN JOAQUIN REGIONAL RAIL COMMISSION

DRAWN BY: Author
CHECKED BY: Checker
DATE: 10/28/2022
SHEET NUMBER: **AS5101**

SAN JOAQUIN REGIONAL RAIL COMMISSION

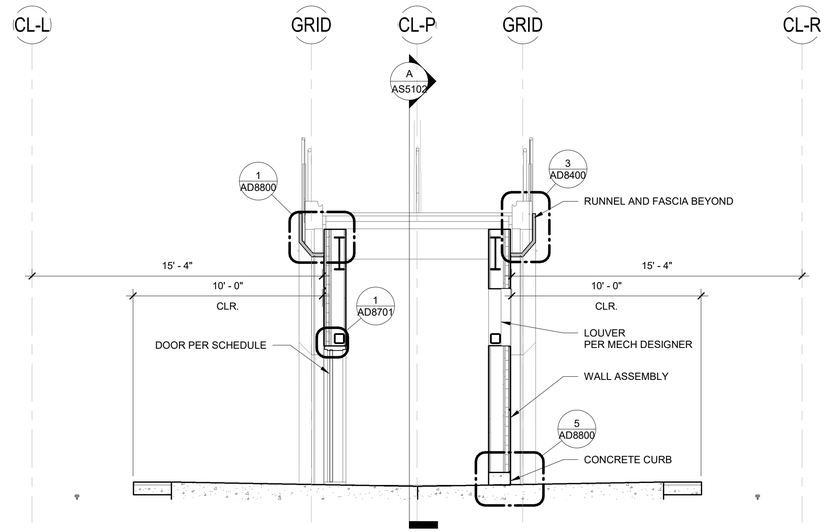
LOCATION & DESCRIPTION:
STATIONS AND FACILITIES
STANDARD DRAWINGS

SHEET TITLE:
CENTER PLATFORM - TYPICAL STAIR PLANS



A CENTER PLATFORM STAIR SECTION

1/4" = 1'-0"



B CENTER PLATFORM TRANSVERSE STAIR SECTION

1/4" = 1'-0"

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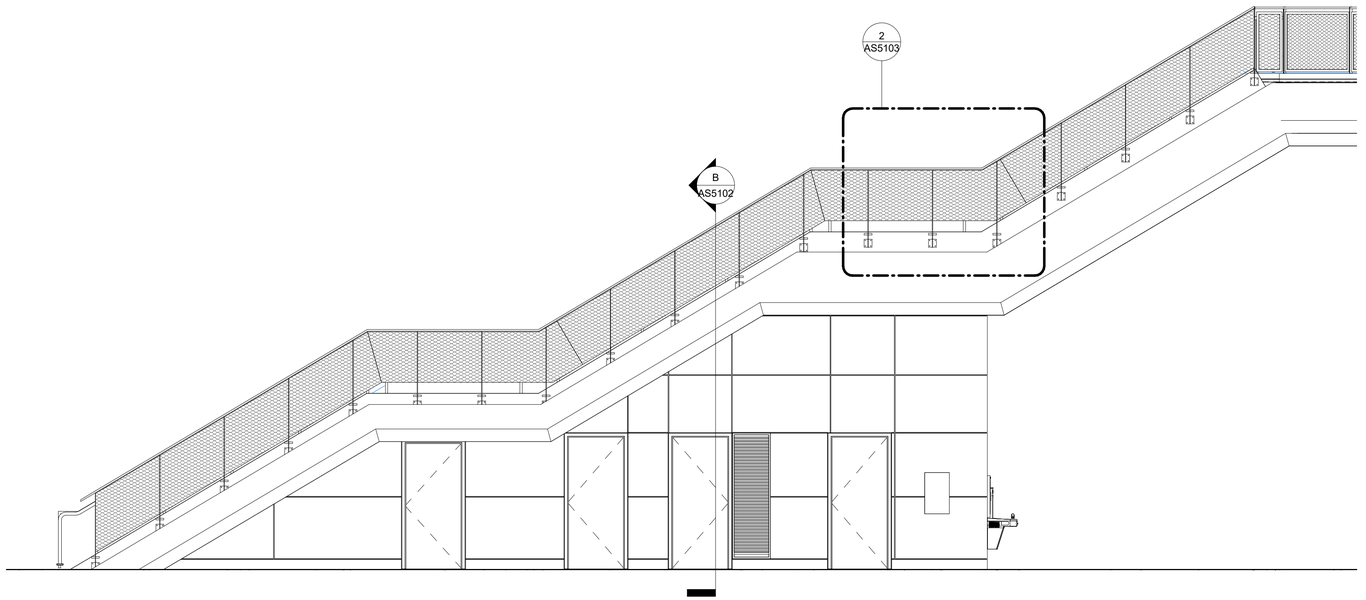
SAN JOAQUIN REGIONAL RAIL COMMISSION

DRAWN BY: Author
CHECKED BY: Checker
DATE: 10/28/2022
SHEET NUMBER: **AS5102**

SAN JOAQUIN REGIONAL RAIL COMMISSION

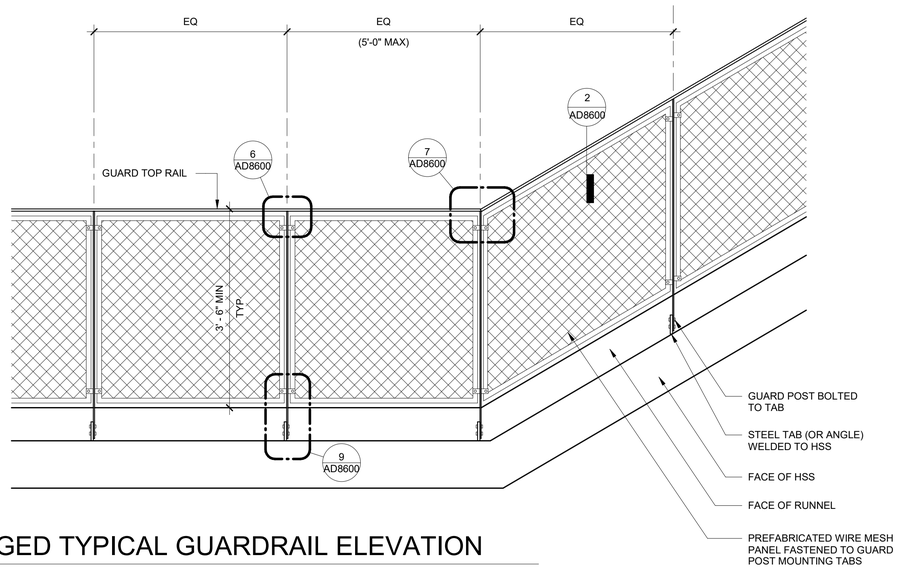
LOCATION & DESCRIPTION:
STATIONS AND FACILITIES
STANDARD DRAWINGS

SHEET TITLE:
CENTER PLATFORM - TYPICAL STAIR SECTION



1 CENTER PLATFORM TYPICAL STAIR ELEVATION

1/4" = 1'-0"



2 ENLARGED TYPICAL GUARDRAIL ELEVATION

3/4" = 1'-0"

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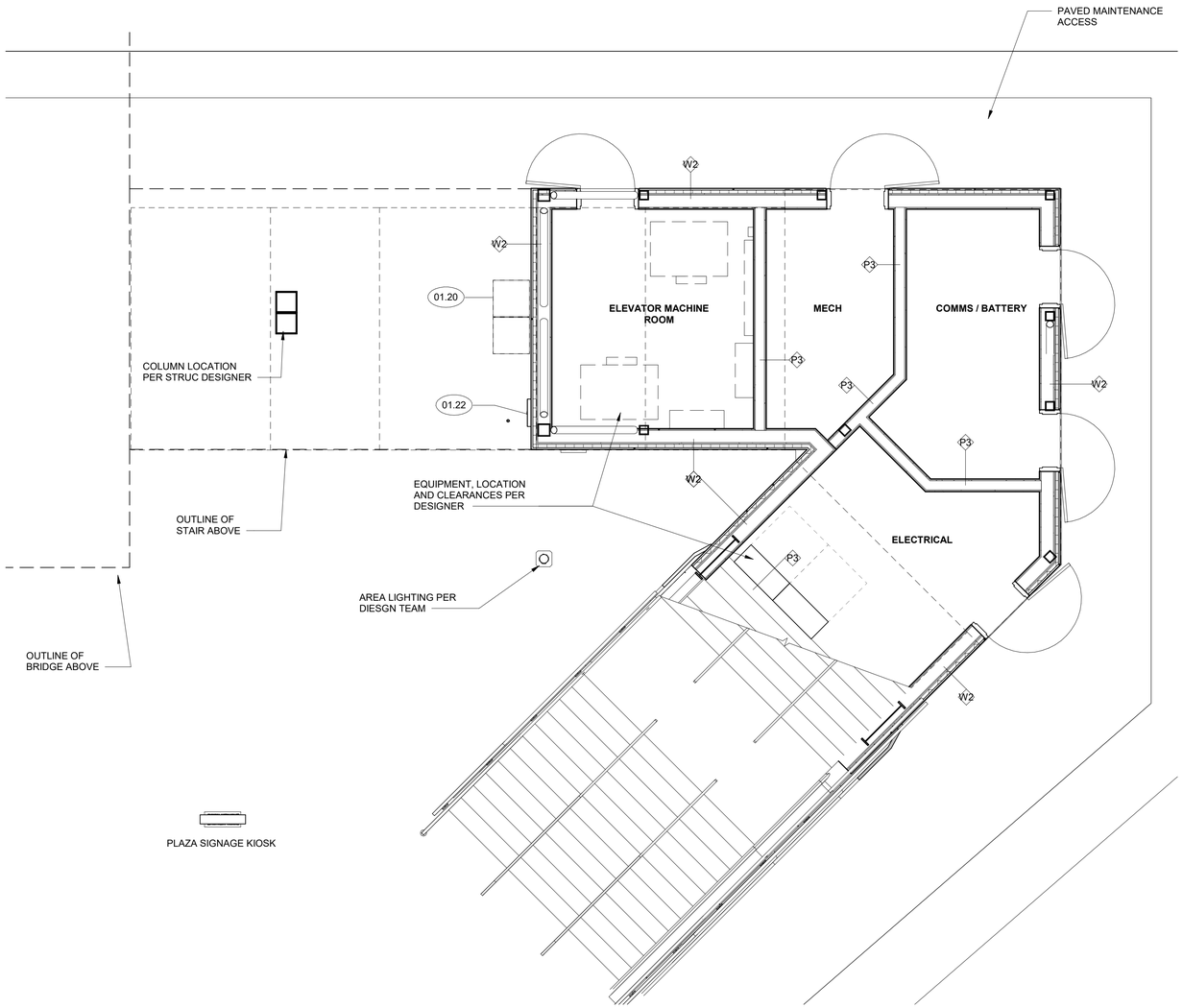
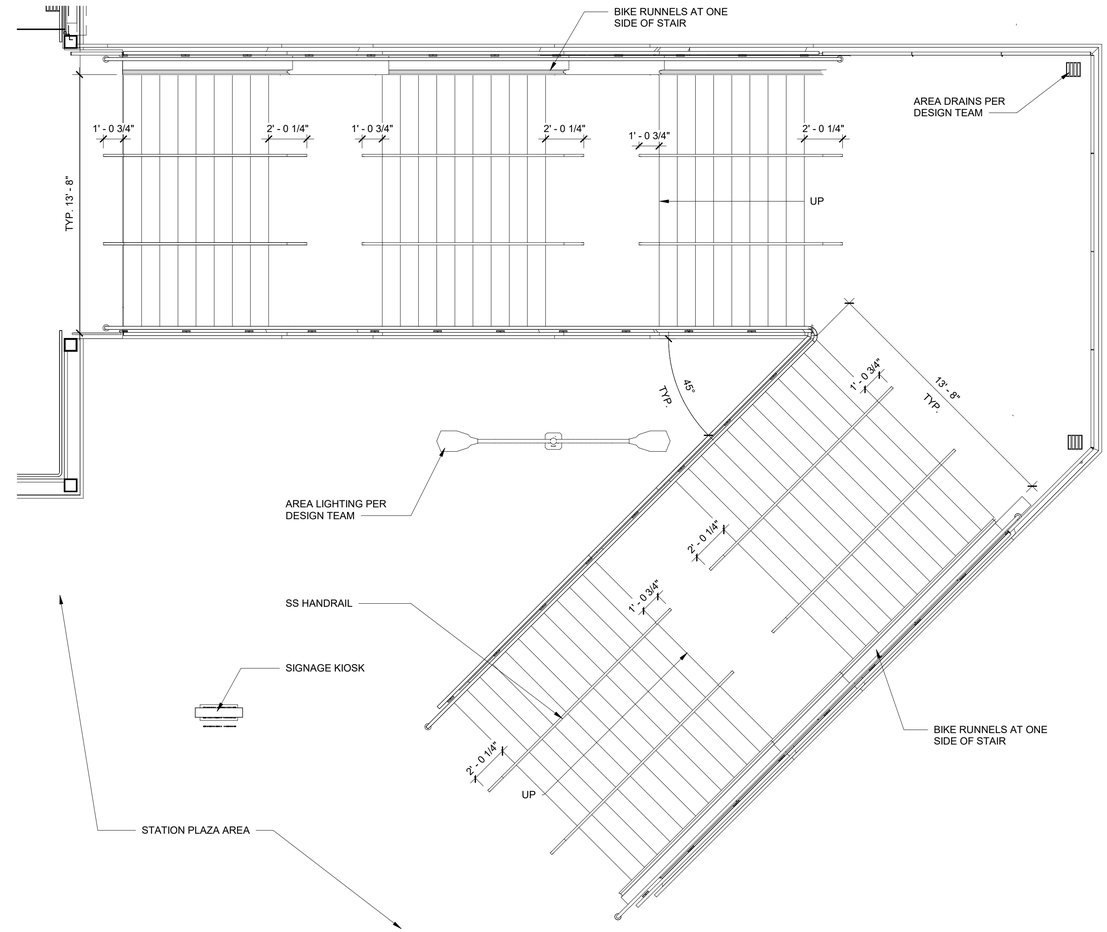
DATE: 10/28/2022	
SHEET NUMBER **AS5103**	SHEET TITLE: **CENTER PLATFORM - TYPICAL STAIR ELEVATIONS**



1 PLAN - PLAZA STAIR - UNDER STAIR ROOMS

1/4" = 1'-0"



2 PLAN - PLAZA STAIR - STAIR LANDING LAYOUT

1/4" = 1'-0"

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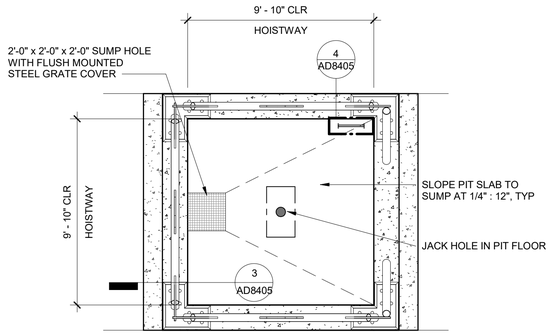
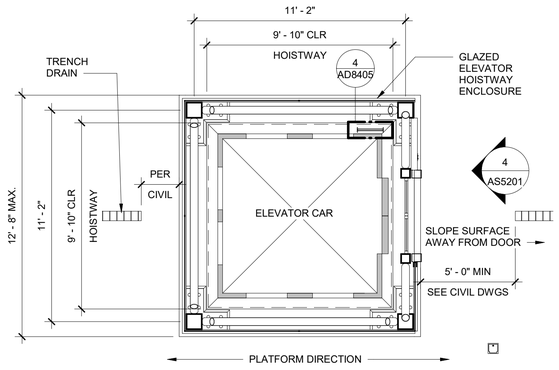
DATE: 10/28/2022	
SHEET NUMBER **AS5104**	SHEET TITLE: **CENTER PLATFORM - TYPICAL PLAZA STAIR PLANS**



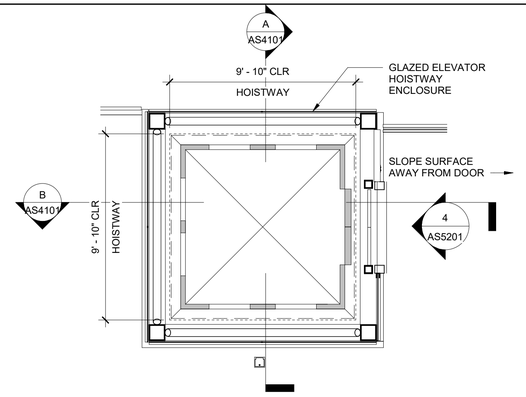
1 ELEVATOR PIT LEVEL

1/4" = 1'-0"



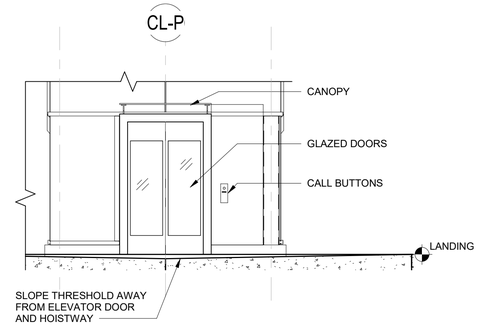
2 ELEVATOR PLATFORM LEVEL

1/4" = 1'-0"



3 ELEVATOR PED BRIDGE LEVEL

1/4" = 1'-0"



4 TYPICAL ELEVATOR ENTRY ELEVATION

1/4" = 1'-0"

5 ELEVATOR PLAZA PIT LEVEL

1/4" = 1'-0"

6 ELEVATOR PLAZA LEVEL

1/4" = 1'-0"

7 ELEVATOR OVERCROSSING LEVEL

1/4" = 1'-0"

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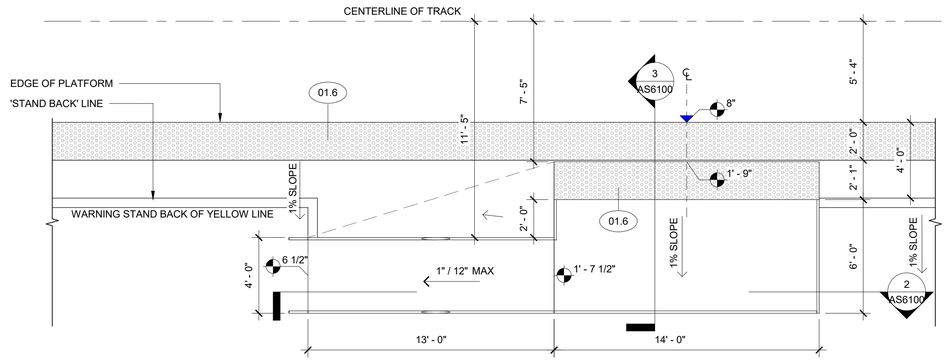
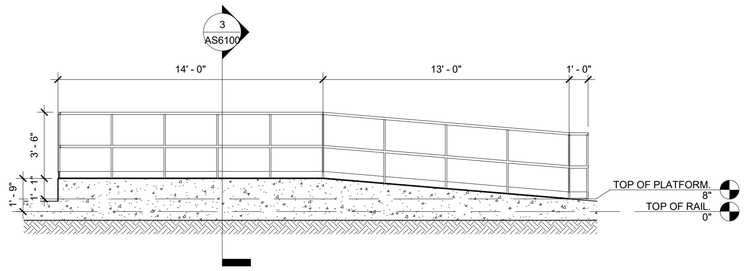
CHECKED BY: Checker	LOCATION & DESCRIPTION: STATIONS AND FACILITIES STANDARD DRAWINGS
DATE: 10/28/2022	
SHEET NUMBER **AS5201**	SHEET TITLE: **ELEVATOR DRAWINGS**



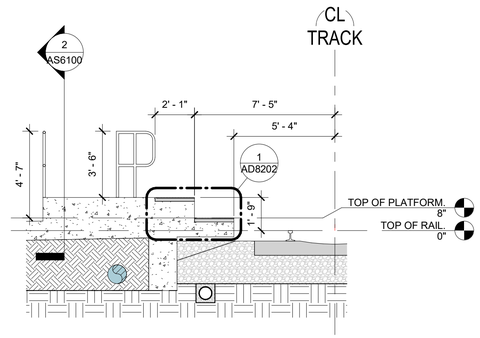
1 LOW FLOOR MINI HIGH - PLAN

1/4" = 1'-0"



2 LOW FLOOR MINI HIGH - SECTION

1/4" = 1'-0"



3 LOW FLOOR MINI HIGH CROSS SECTION

1/4" = 1'-0"

0 2' 4' 8'

1/4" = 1'-0"

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SAN JOAQUIN REGIONAL RAIL COMMISSION

DRAWN BY: Author
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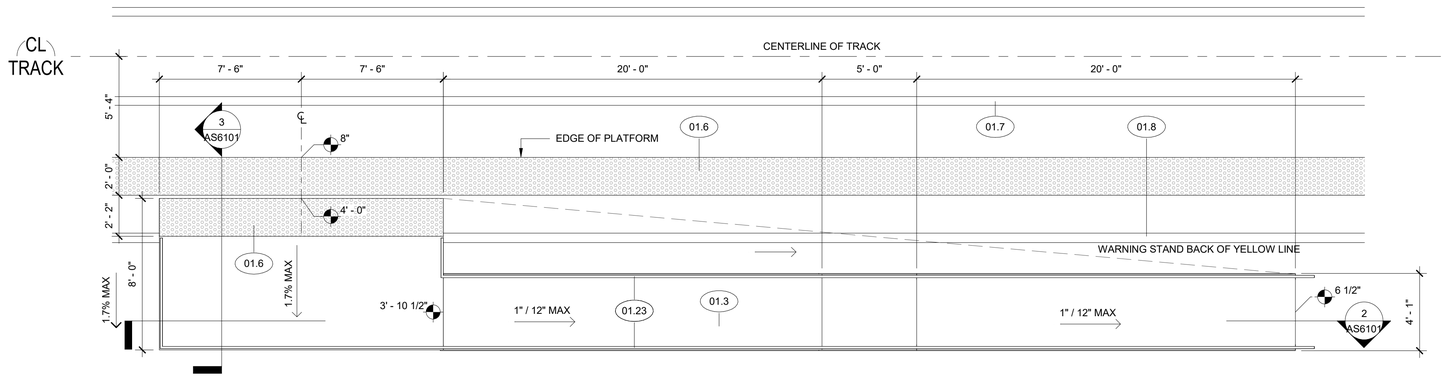
DATE: 10/28/2022
SHEET NUMBER: **AS6100**

SAN JOAQUIN REGIONAL RAIL COMMISSION

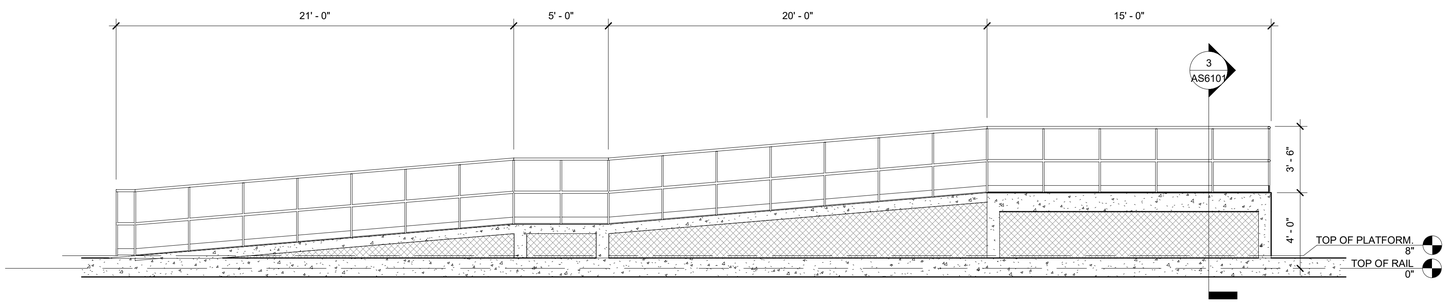
LOCATION & DESCRIPTION:
STATIONS AND FACILITIES
STANDARD DRAWINGS

SHEET TITLE:
LOW FLOOR MINI HIGH



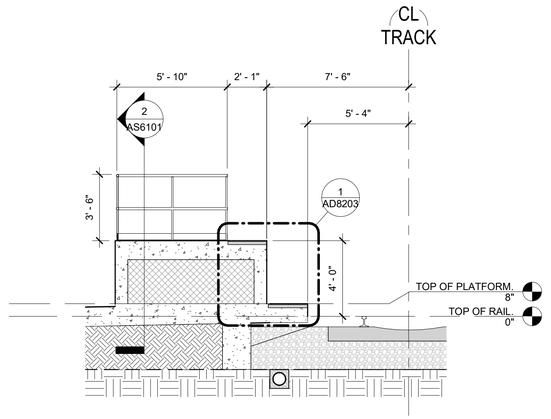
1 HIGH FLOOR MINI HIGH - PLAN

1/4" = 1'-0"



2 HIGH FLOOR MINI HIGH SECTION

1/4" = 1'-0"



3 HIGH FLOOR MINI HIGH CROSS SECTION

1/4" = 1'-0"

0 2' 4' 8'
1/4" = 1'-0"

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SAN JOAQUIN REGIONAL RAIL COMMISSION

DRAWN BY: Author
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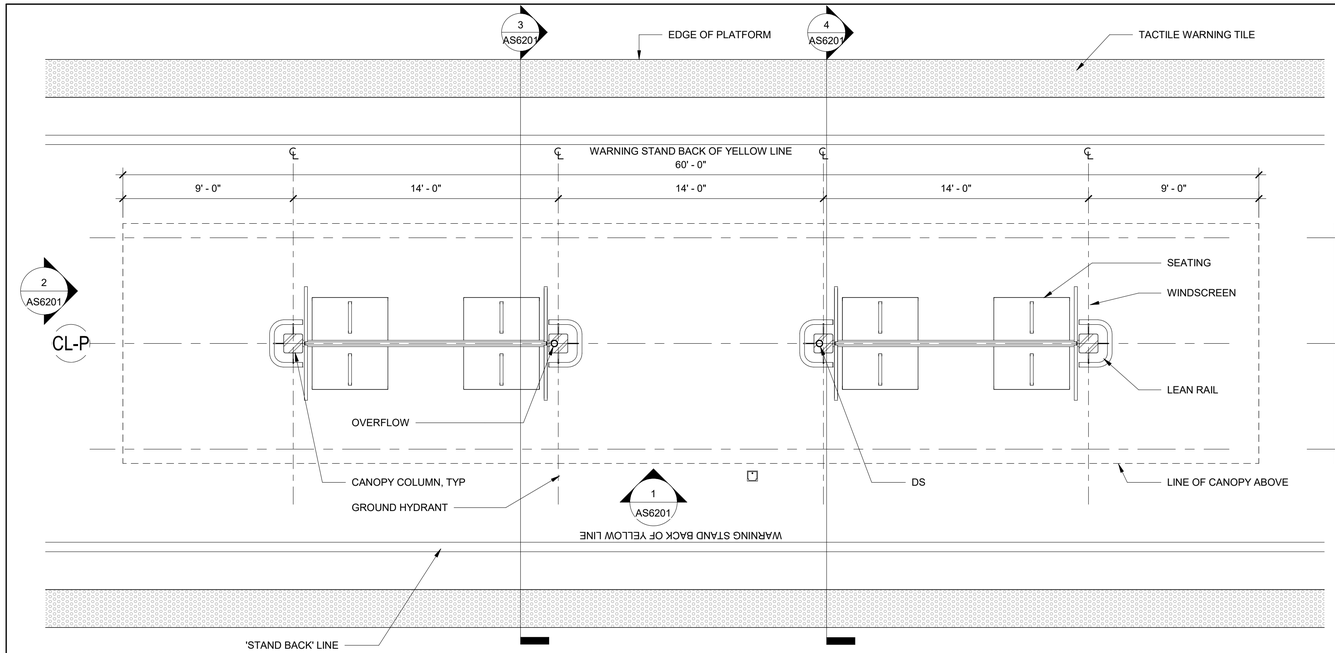
DATE: 10/28/2022
SHEET NUMBER: **AS6101**

SAN JOAQUIN REGIONAL RAIL COMMISSION

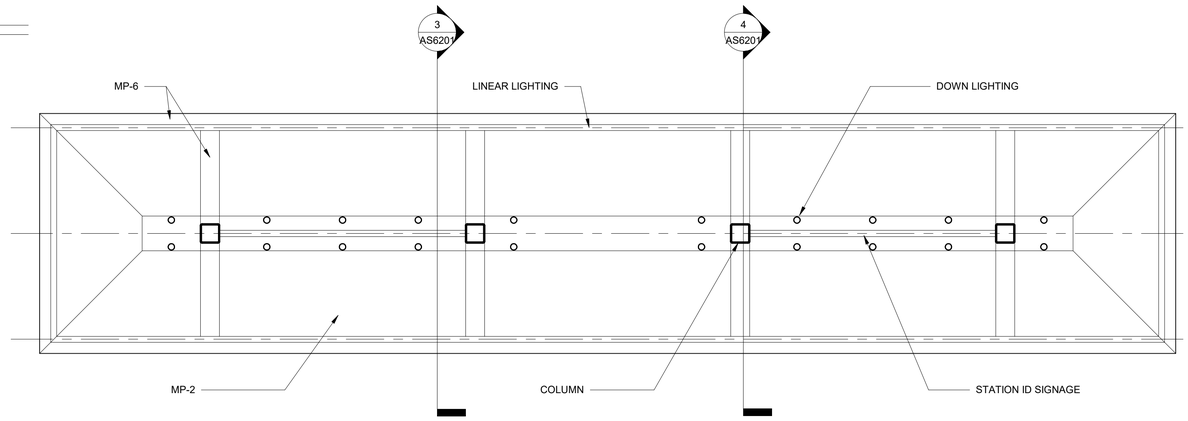
LOCATION & DESCRIPTION:
STATIONS AND FACILITIES
STANDARD DRAWINGS

SHEET TITLE:
HIGH FLOOR MINI HIGH



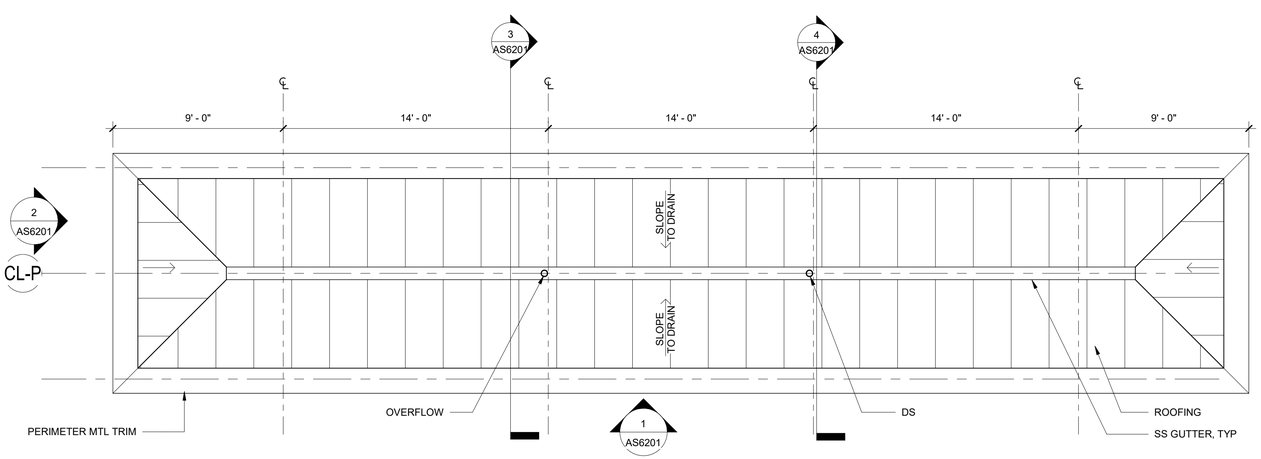
1 TYPICAL CENTER PLATFORM SHELTER - PLAN

1/4" = 1'-0"



2 TYPICAL CENTER PLATFORM SHELTER - RCP

1/4" = 1'-0"



3 TYPICAL CENTER PLATFORM SHELTER - ROOF PLAN

1/4" = 1'-0"

0 2' 4' 8'

1/4" = 1'-0"

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DATE: 10/28/2022
SHEET NUMBER: **AS6200**

SAN JOAQUIN REGIONAL RAIL COMMISSION

LOCATION & DESCRIPTION:
STATIONS AND FACILITIES
STANDARD DRAWINGS

SHEET TITLE:
CENTER PLATFORM - TYPICAL SHELTER

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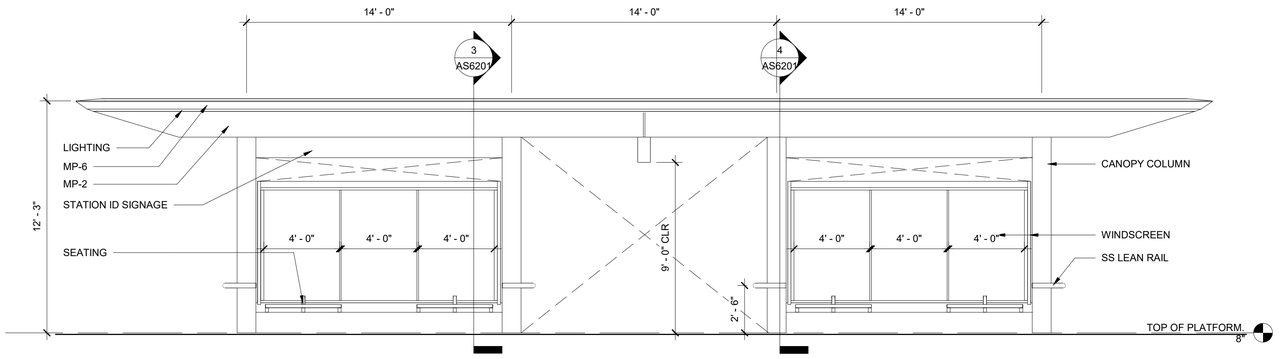
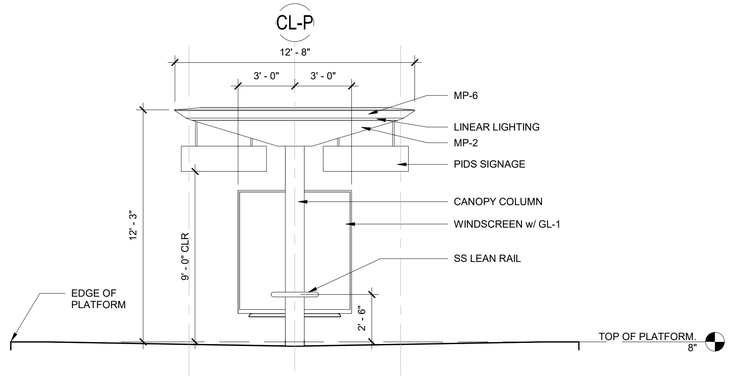


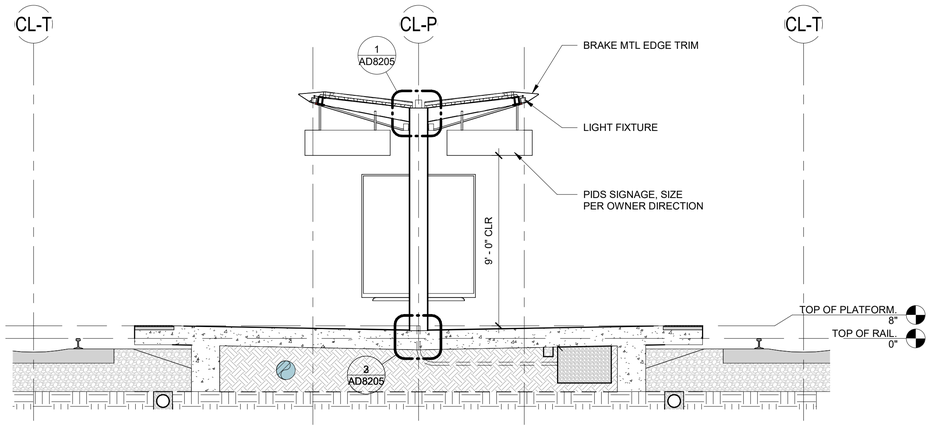
1 TYPICAL PLATFORM SHELTER - SIDE ELEVATION

1/4" = 1'-0"



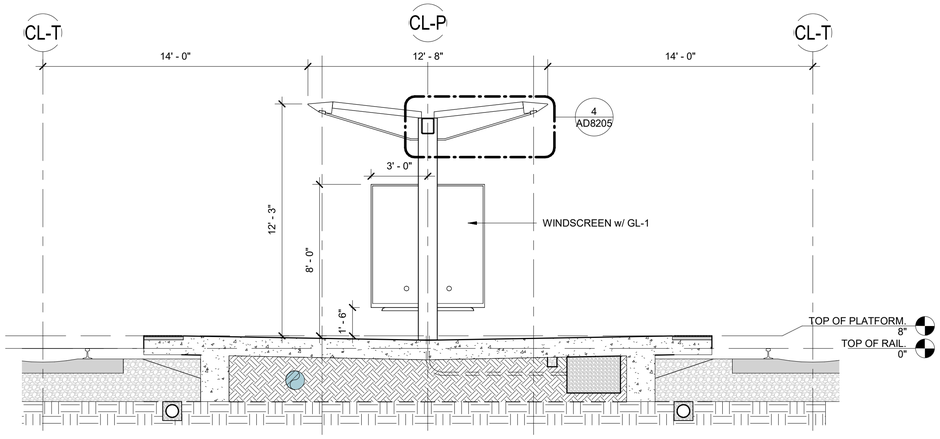
2 TYPICAL PLATFORM SHELTER - END ELEVATION

1/4" = 1'-0"



3 TYPICAL CENTER PLATFORM SHELTER - AT COLUMN

1/4" = 1'-0"



4 TYPICAL CENTER PLATFORM SHELTER - AT SEATING

1/4" = 1'-0"

0 2' 4' 8'
1/4" = 1'-0"

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SAN JOAQUIN REGIONAL RAIL COMMISSION

DRAWN BY: Author
CHECKED BY: Checker
DATE: 10/28/2022
SHEET NUMBER: **AS6201**

SAN JOAQUIN REGIONAL RAIL COMMISSION

LOCATION & DESCRIPTION:
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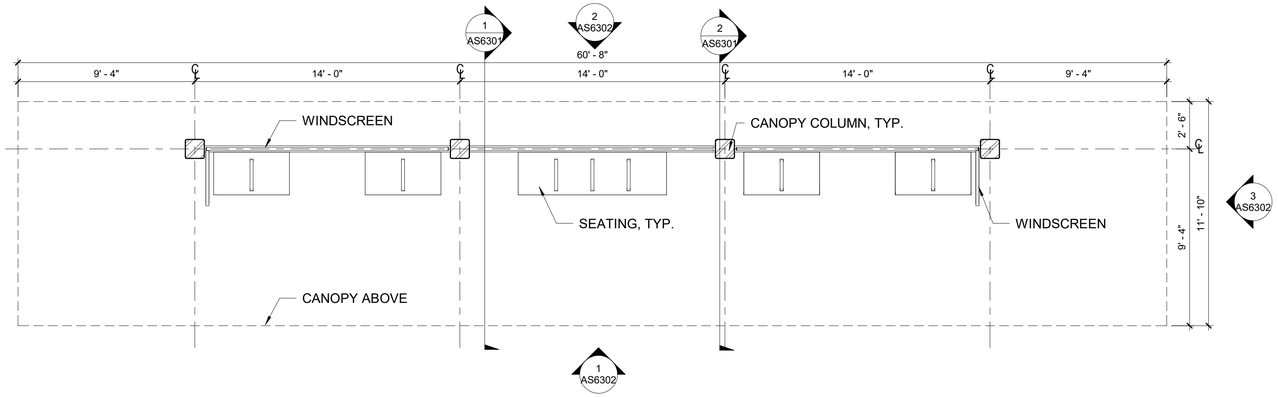
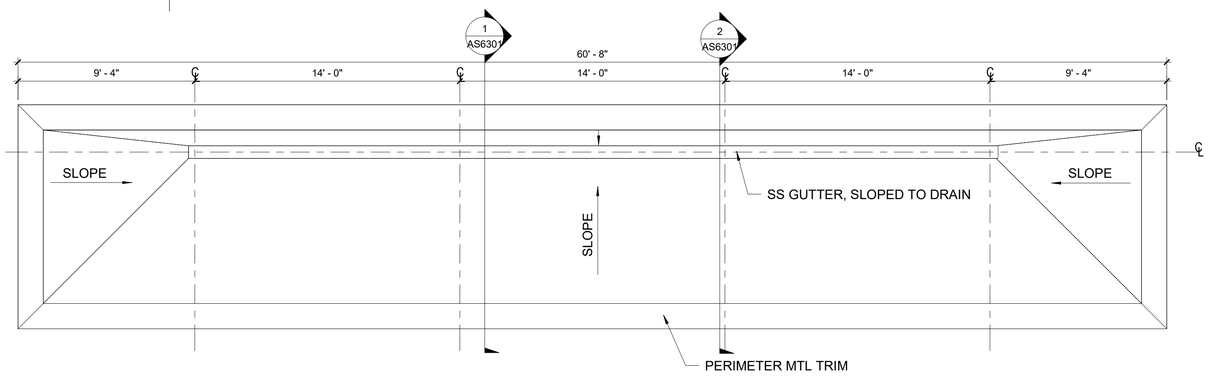
SHEET TITLE:
CENTER PLATFORM - TYPICAL SHELTER

DATE / TIME STAMP: 11/4/2022 10:08:26 AM



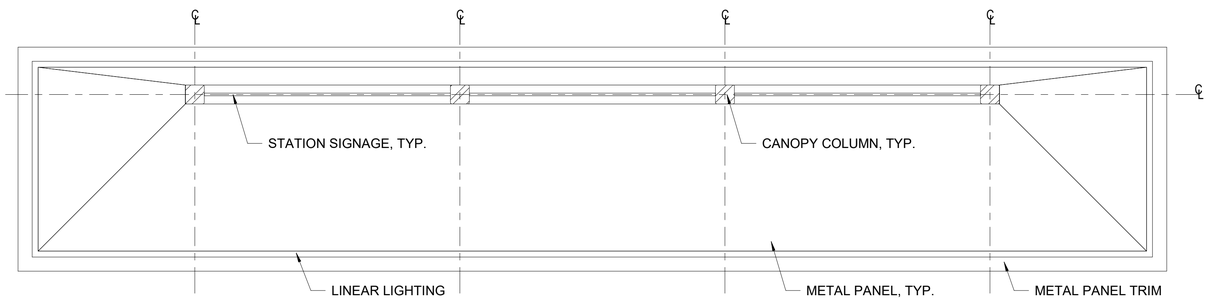
1 | STATION SHELTER - SEATING PLAN

AS6300 | REF: A301 — SCALE: 1/4" = 1'-0"



2 | STATION SHELTER - ROOF PLAN

AS6300 | REF: A301 — SCALE: 1/4" = 1'-0"



3 | STATION SHELTER - RCP

AS6300 | REF: A301 — SCALE: 1/4" = 1'-0"

DATE / TIME STAMP: 10/21/2022 2:25:09 PM

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CHECKED BY:
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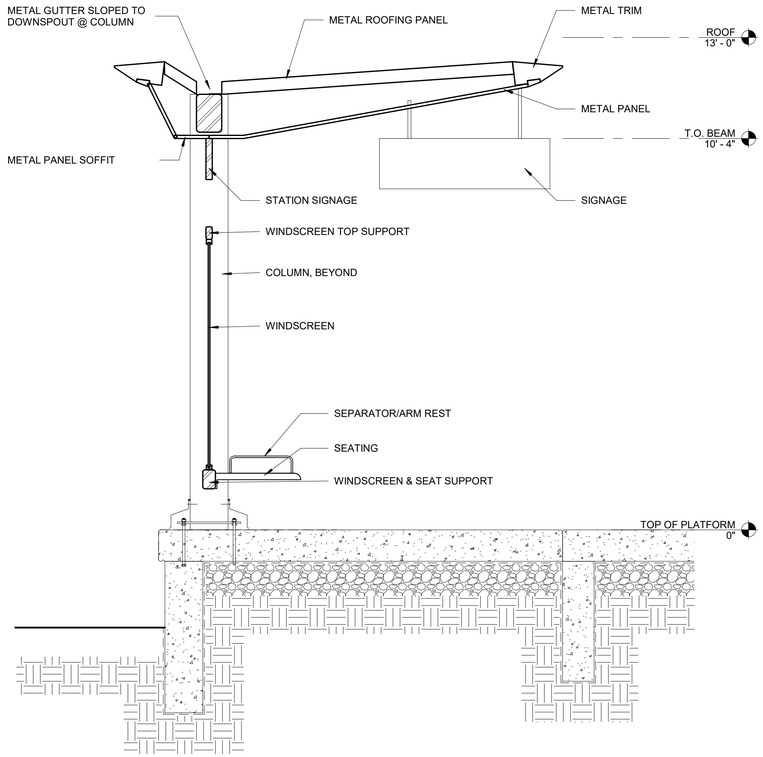
SHEET NUMBER: **AS6300**

SAN JOAQUIN REGIONAL RAIL COMMISSION

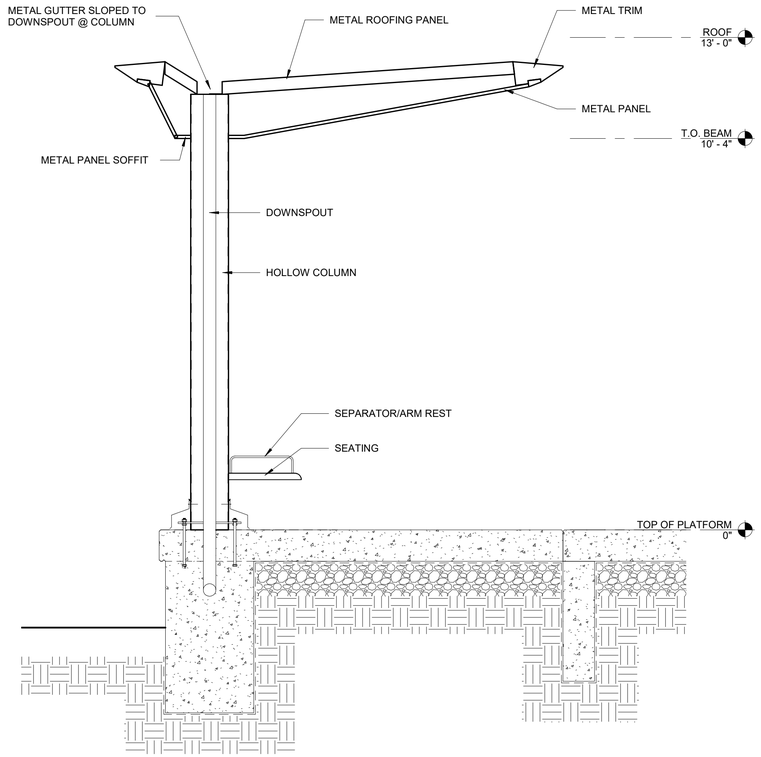
LOCATION & DESCRIPTION:
STATIONS AND FACILITIES
STANDARD DRAWINGS

SHEET TITLE:
TYP. SIDE PLATFORM SHELTER PLANS



1 SECTION

AS6301 | REF: A101 | SCALE: 1/2" = 1'-0"



2 SECTION

AS6301 | REF: A101 | SCALE: 1/2" = 1'-0"

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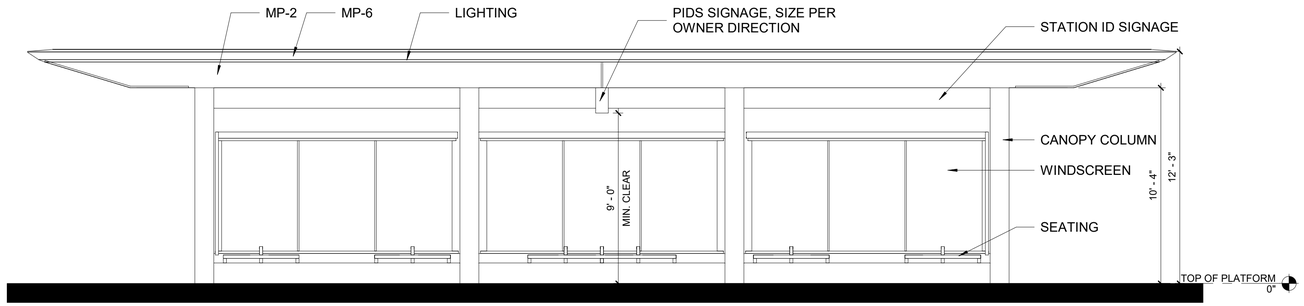
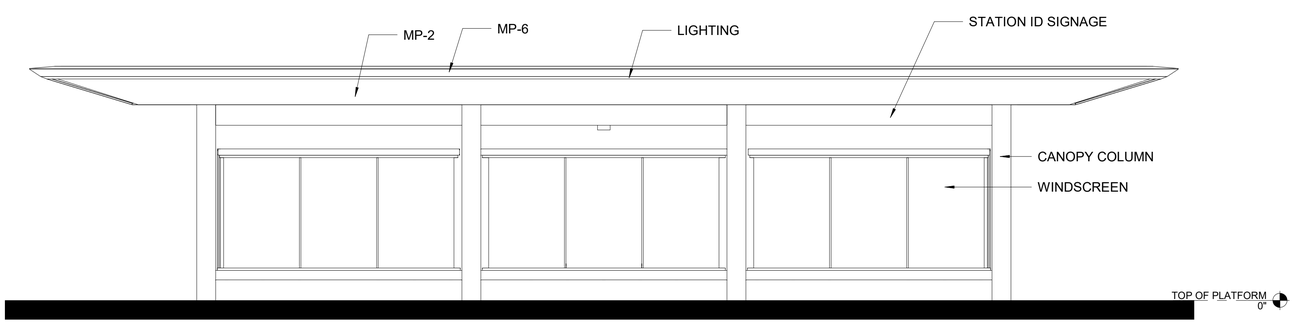
STATIONS AND FACILITIES
STANDARD DRAWINGS

SHEET TITLE:
TYP. SIDE PLATFORM SHELTER SECTIONS



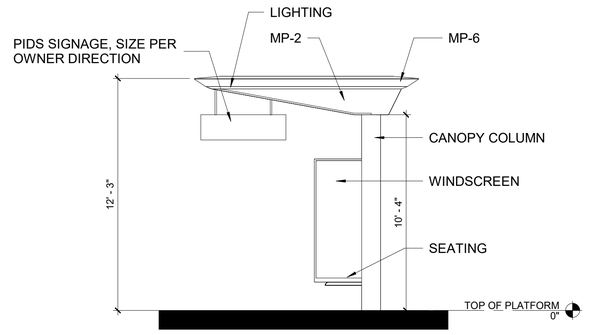
1 | TYP. STATION SHELTER - FRONT ELEVATION

AS6302 | REF: A101 — SCALE: 1/4" = 1'-0"



2 | TYP. STATION SHELTER - REAR

AS6302 | REF: A101 — SCALE: 1/4" = 1'-0"



3 | TYP. STATION SHELTER - SIDE

AS6302 | REF: A101 — SCALE: 1/4" = 1'-0"

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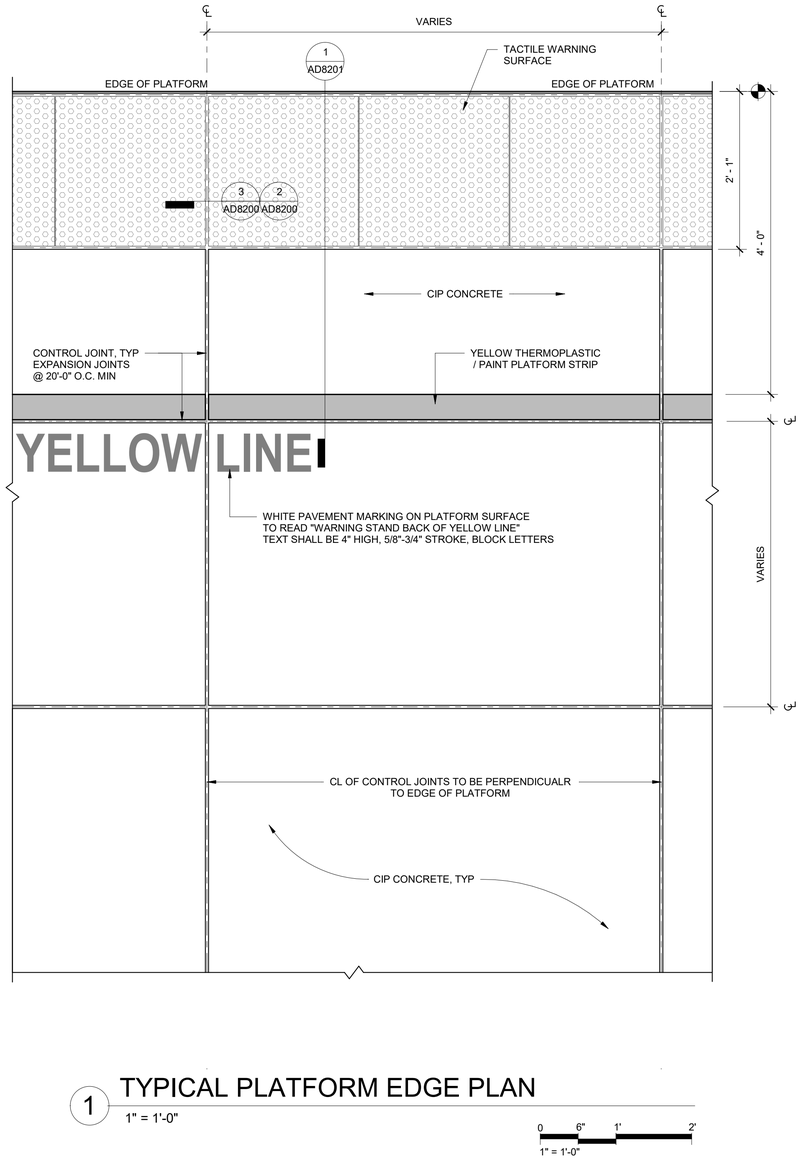
CHECKED BY:	LOCATION & DESCRIPTION: STATIONS AND FACILITIES STANDARD DRAWINGS
DATE: 10/28/22	
SHEET NUMBER: **AS6302**	SHEET TITLE: **TYP. SIDE PLATFORM SHELTER ELEVATIONS**

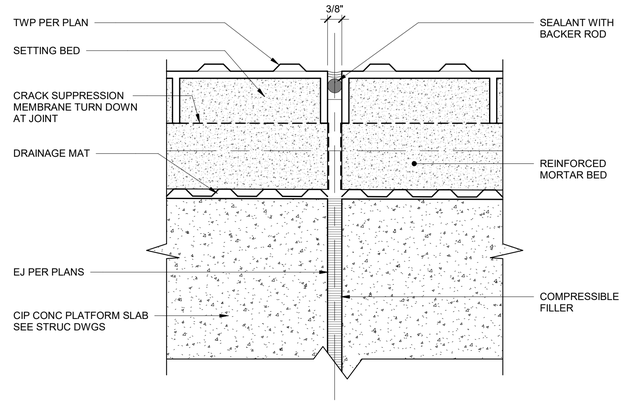


1 TYPICAL PLATFORM EDGE PLAN

1" = 1'-0"

0 6" 1' 2'

1" = 1'-0"

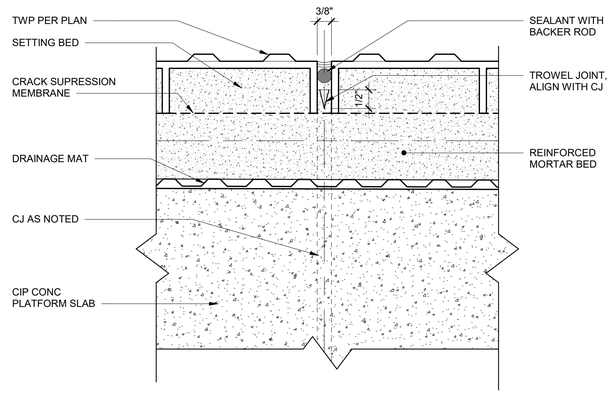


2 TYPICAL TILE JOINTS @ EJ

6" = 1'-0"

0 1" 2" 4"

6" = 1'-0"



3 TYPICAL TILE JOINTS @ CJ

6" = 1'-0"

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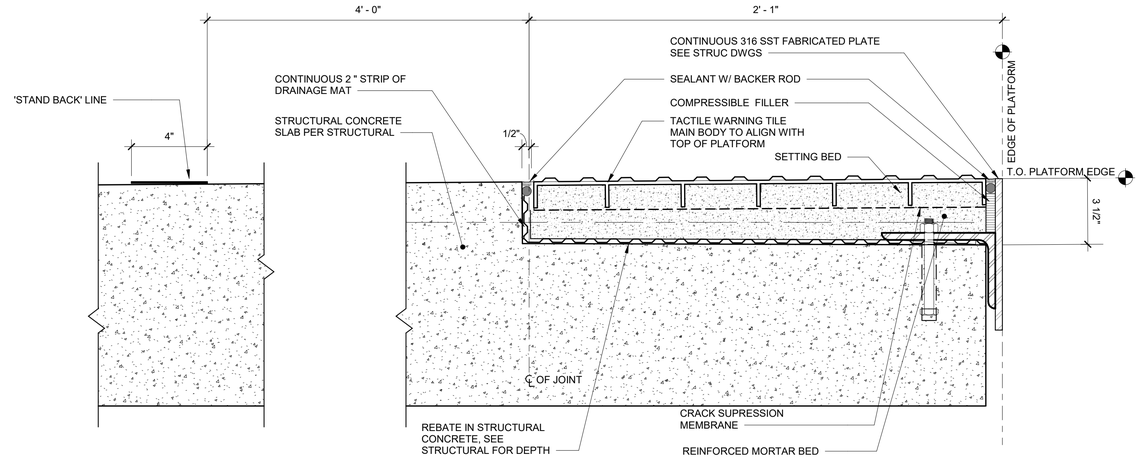
DRAWN BY: Author
CHECKED BY: Checker
DATE: 10/28/2022
SHEET NUMBER: **AD8200**

SAN JOAQUIN REGIONAL RAIL COMMISSION

LOCATION & DESCRIPTION:
STATIONS AND FACILITIES
STANDARD DRAWINGS

SHEET TITLE:
PLATFORM DETAILS



1 TYPICAL PLATFORM EDGE DETAIL

3" = 1'-0"

0 2" 4" 8"

3" = 1'-0"

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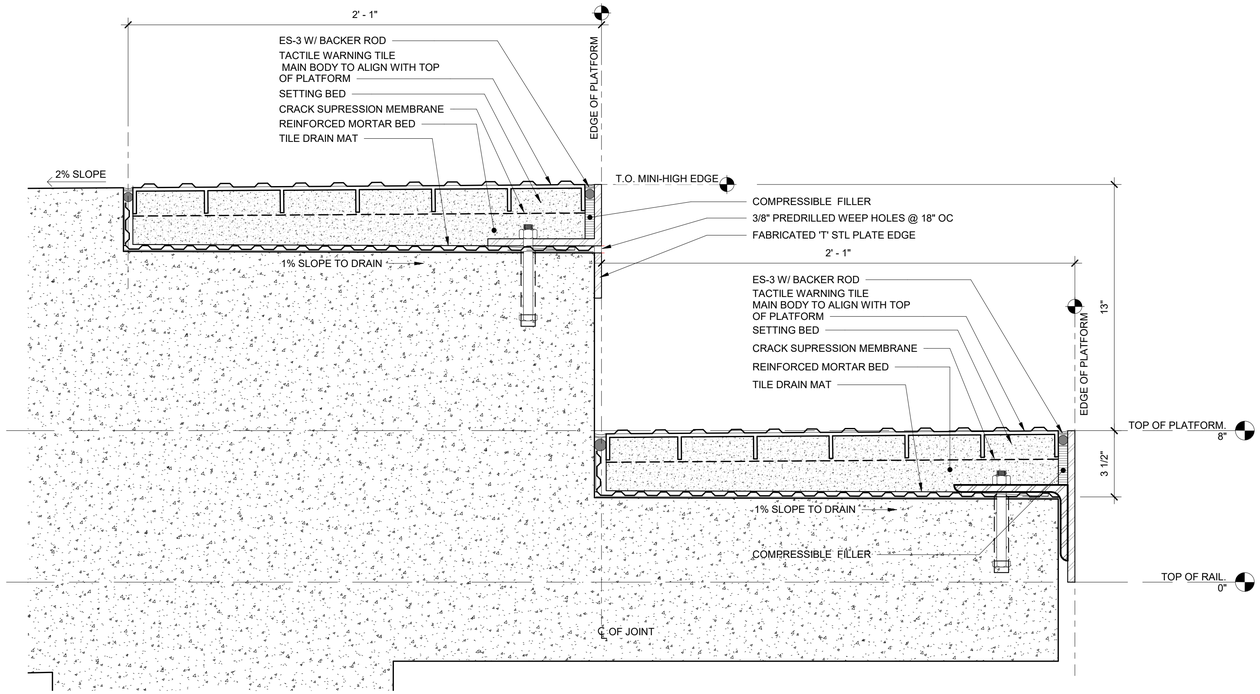
DRAWN BY: Author
CHECKED BY: Checker
DATE: 10/28/2022
SHEET NUMBER: **AD8201**

SAN JOAQUIN REGIONAL RAIL COMMISSION

LOCATION & DESCRIPTION:
STATIONS AND FACILITIES
STANDARD DRAWINGS

SHEET TITLE:
PLATFORM EDGE DETAILS



1 TYPICAL LOW FLOOR MINI-HIGH EDGE DETAIL

3" = 1'-0"

0 2" 4" 8"
3" = 1'-0"

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DRAWN BY: Author
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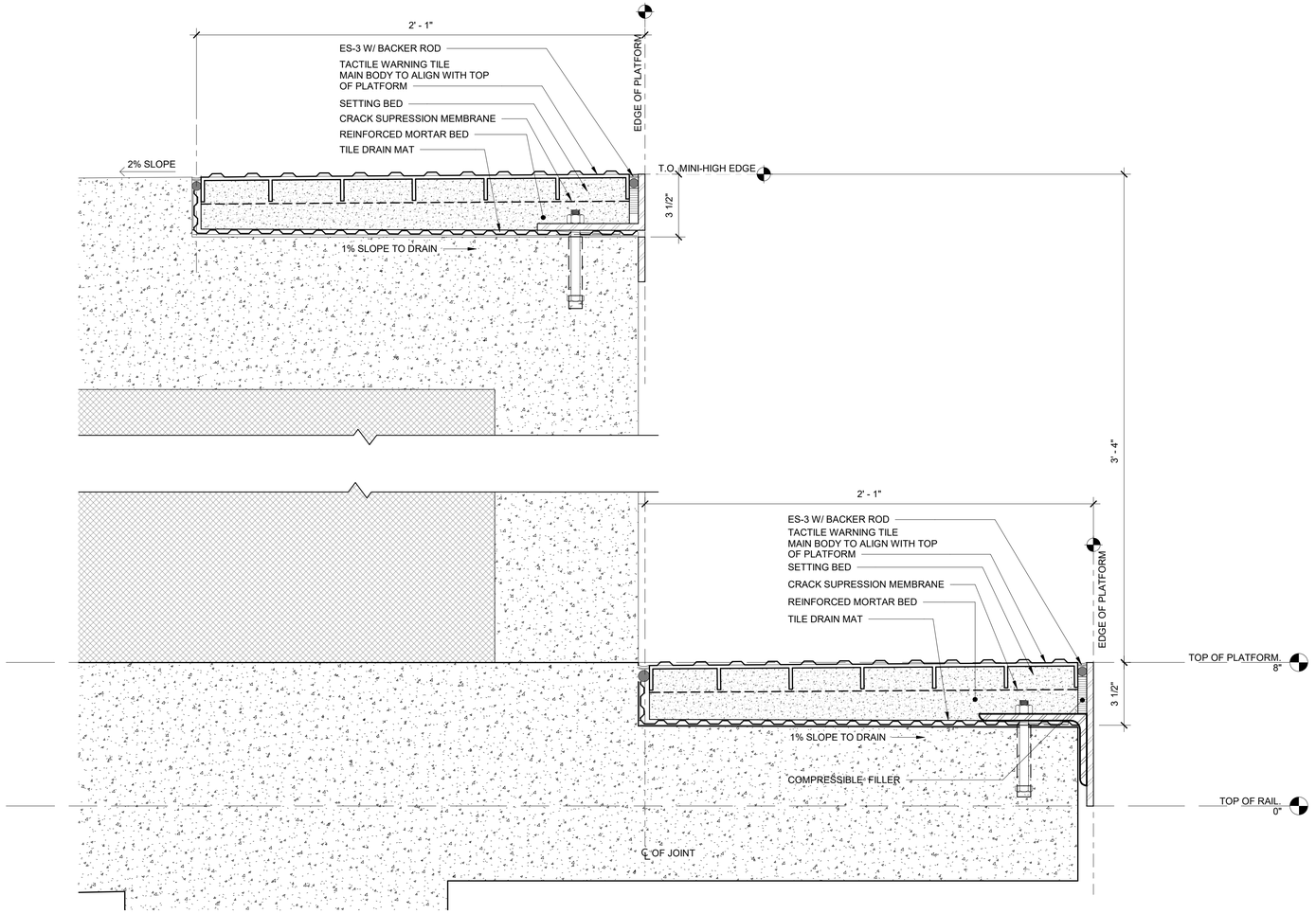
DATE: 10/28/2022
SHEET NUMBER: **AD8202**

SAN JOAQUIN REGIONAL RAIL COMMISSION

LOCATION & DESCRIPTION:
STATIONS AND FACILITIES
STANDARD DRAWINGS

SHEET TITLE:
LOW FLOOR MINI-HIGH EDGE DETAIL



1 TYPICAL HIGH FLOOR MINI-HIGH EDGE DETAIL

3" = 1'-0"

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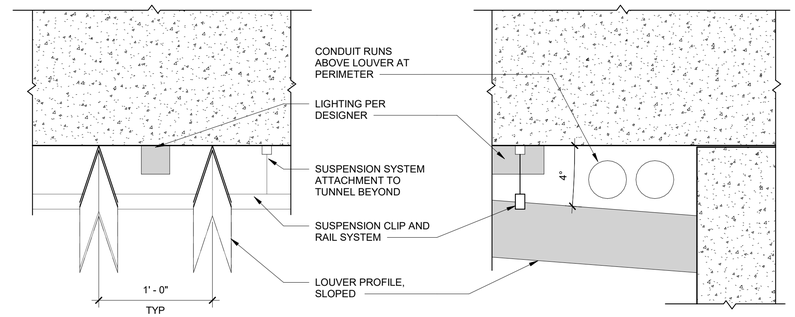
SAN JOAQUIN REGIONAL RAIL COMMISSION

LOCATION & DESCRIPTION:
STATIONS AND FACILITIES
STANDARD DRAWINGS

SHEET TITLE:
HIGH FLOOR MINI-HIGH EDGE DETAIL



1 TUNNEL ARCHITECTURAL CEILING SECTION

1 1/2" = 1'-0"

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DRAWN BY: Author
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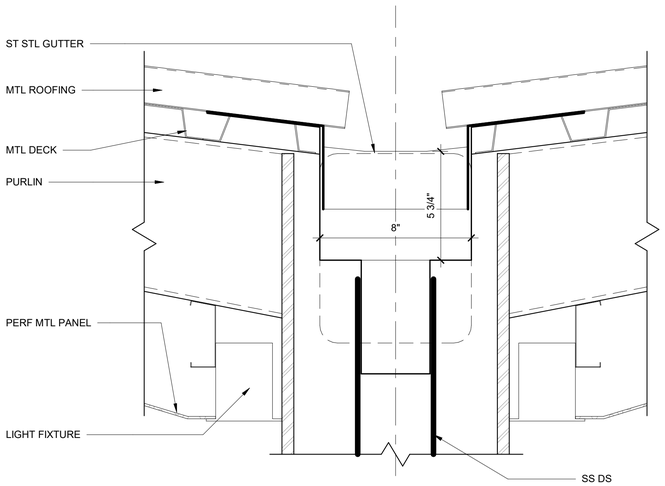
DATE: 10/28/2022
SHEET NUMBER: **AD8204**

SAN JOAQUIN REGIONAL RAIL COMMISSION

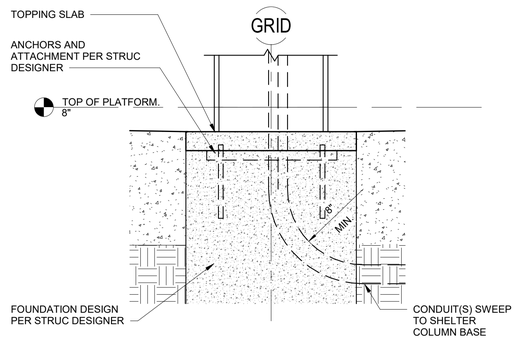
LOCATION & DESCRIPTION:
STATIONS AND FACILITIES
STANDARD DRAWINGS

SHEET TITLE:
TUNNEL DETAILS



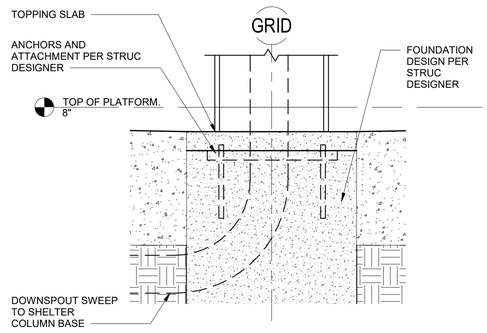
1 SHELTER GUTTER

3" = 1'-0"



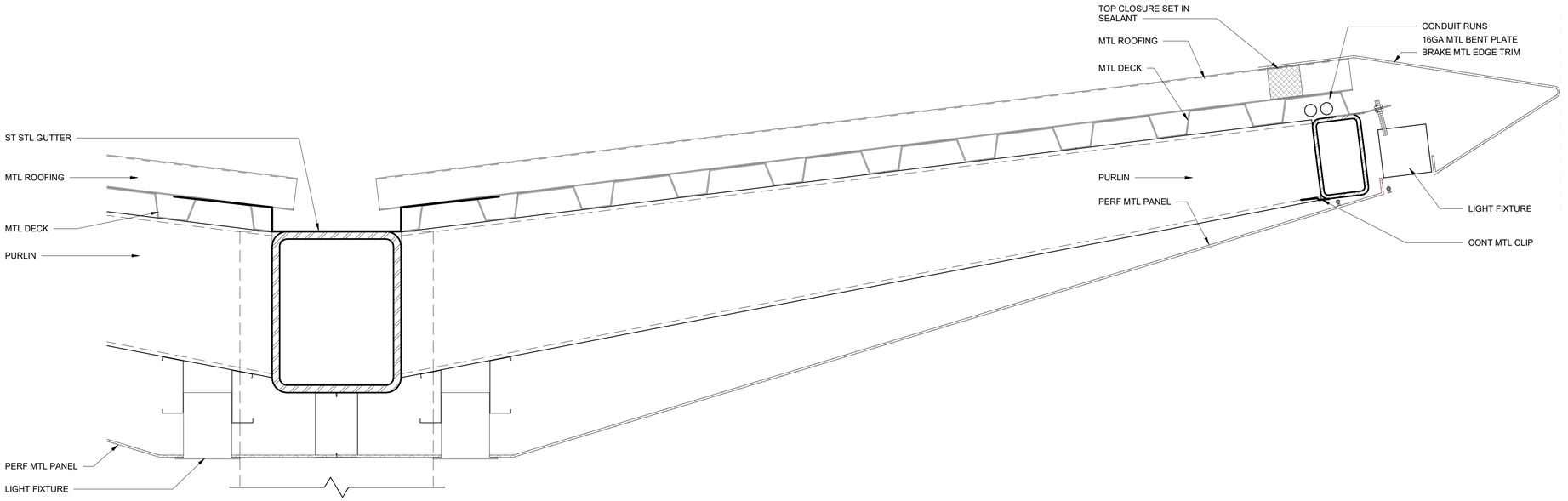
2 CONDUIT AT SHELTER COLUMNS

1 1/2" = 1'-0"



3 DOWNSPOUT AT SHELTER COLUMNS

1 1/2" = 1'-0"



4 SHELTER ROOF FRAMING

3" = 1'-0"

0 2" 4" 8"

3" = 1'-0"

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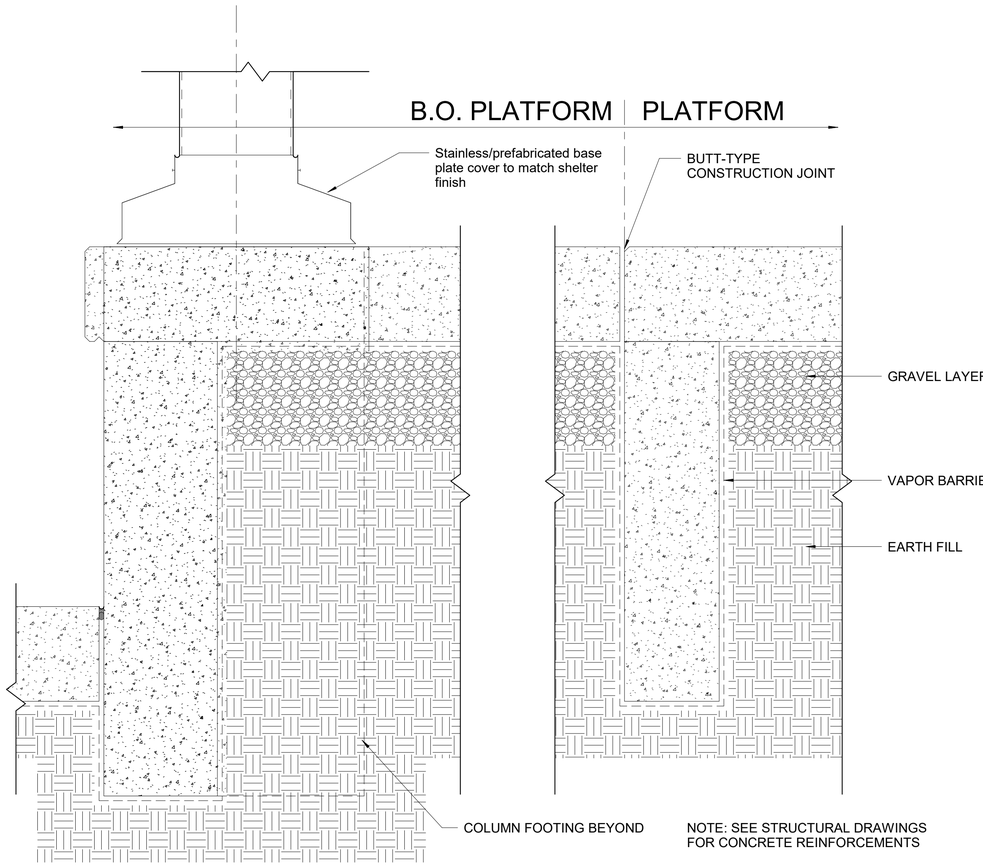
DATE: 10/28/2022
SHEET NUMBER: **AD8205**

SAN JOAQUIN REGIONAL RAIL COMMISSION

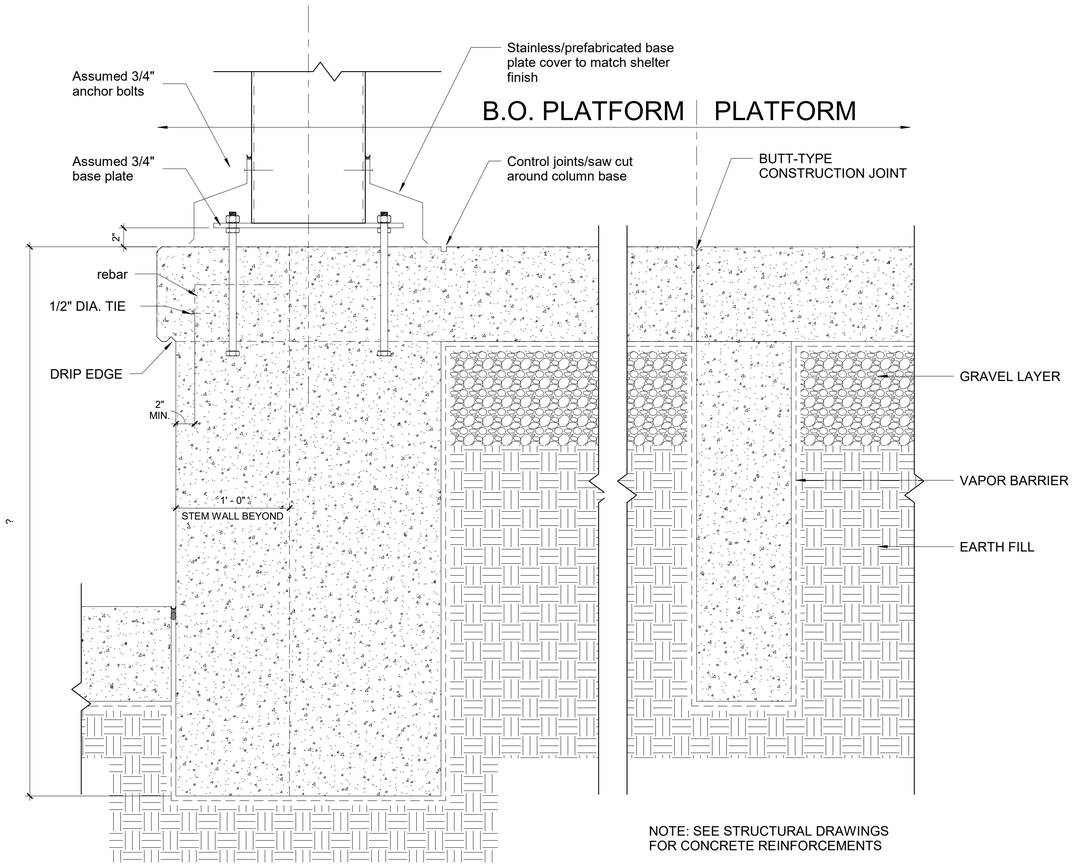
LOCATION & DESCRIPTION:
STATIONS AND FACILITIES
STANDARD DRAWINGS

SHEET TITLE:
TYPICAL CENTER PLATFORM SHELTER DETAILS



1 | TYP. B.O. PLATFORM EDGE

AD8206 | SCALE: 1 1/2" = 1'-0"



2 | TYP. SHELTER COLUMN @ B.O. PLATFORM

AD8206 | SCALE: 1 1/2" = 1'-0"

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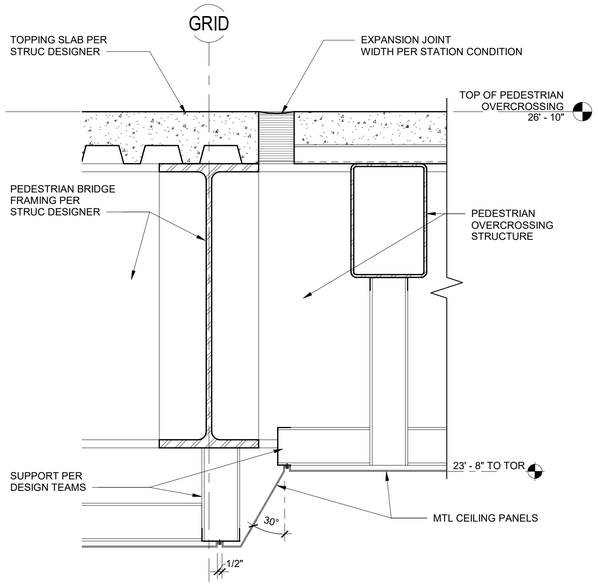
DATE: 10/28/22
SHEET NUMBER: **AD8206**

SAN JOAQUIN REGIONAL RAIL COMMISSION

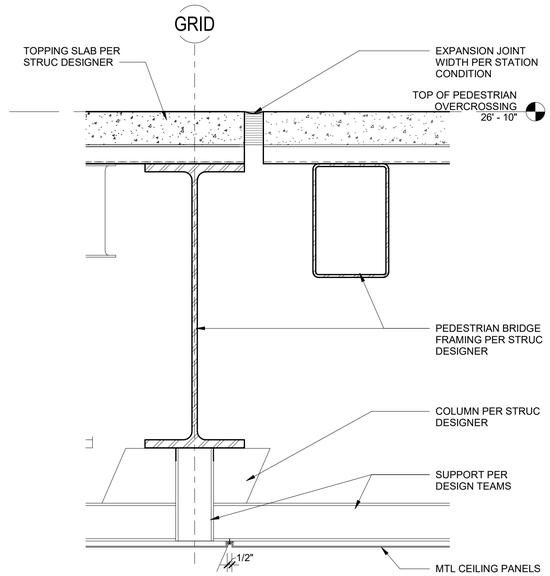
LOCATION & DESCRIPTION:
STATIONS AND FACILITIES
STANDARD DRAWINGS

SHEET TITLE:
TYP. SIDE PLATFORM SHELTER DETAILS



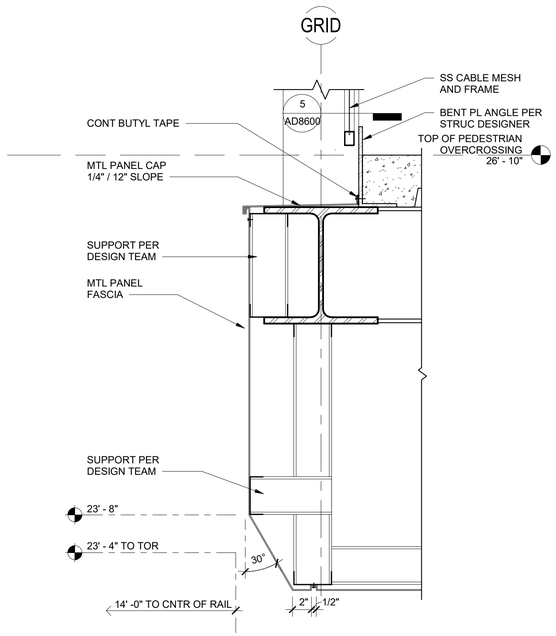
1 SLAB JOINT AT OVERCROSSING

1 1/2" = 1'-0"



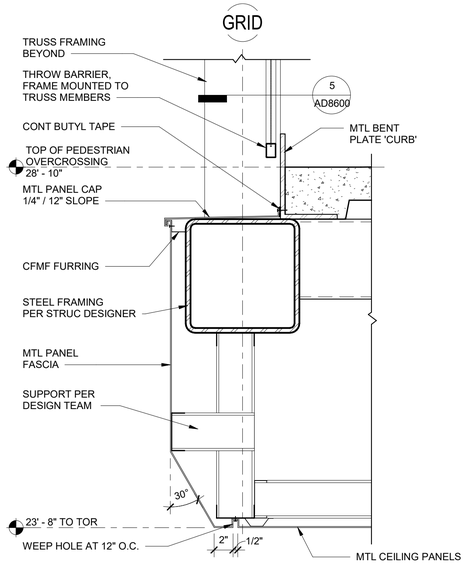
2 SLAB JOINT AT PEDESTRIAN BRIDGE

1 1/2" = 1'-0"



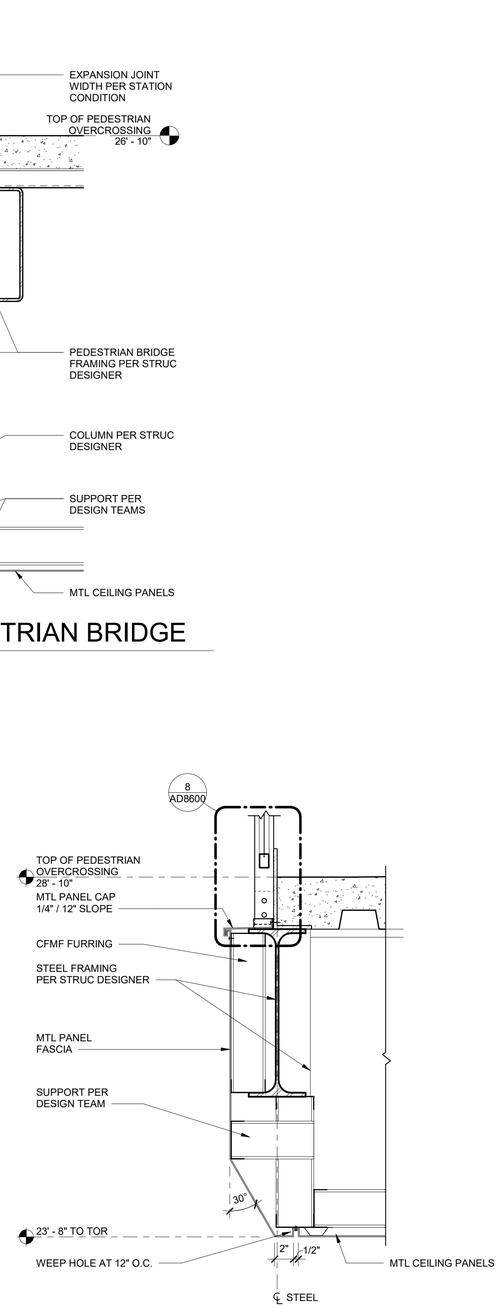
5 PEDESTRIAN BRIDGE FASCIA

1 1/2" = 1'-0"



6 OVERCROSSING BRIDGE FASCIA

1 1/2" = 1'-0"



7 PEDESTRIAN BRIDGE OVERLOOK FASCIA

1 1/2" = 1'-0"

0 4" 8" 16"

1 1/2" = 1'-0"

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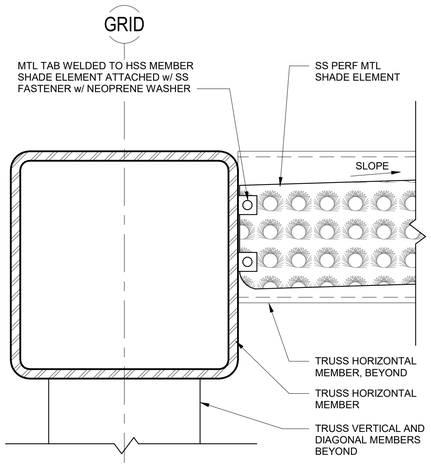
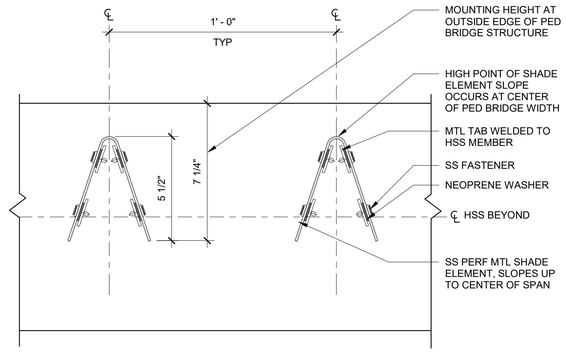
DATE: 10/28/2022	
SHEET NUMBER **AD8300**	SHEET TITLE: **OVERCROSSING AND PEDESTRIAN BRIDGE DETAILS**



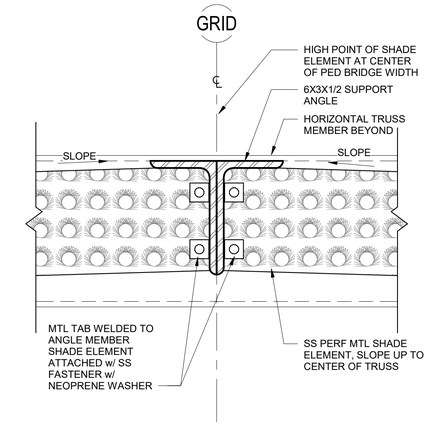
1 PB SHADING ELEMENT - EDGE DETAIL

3" = 1'-0"



2 PB SHADING ELEMENT - SECTION DETAIL

3" = 1'-0"



3 PB SHADE ELEMENT @ PEAK

3" = 1'-0"

0 2" 4" 8"
3" = 1'-0"

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DATE: 10/28/2022
SHEET NUMBER: **AD8301**

SAN JOAQUIN REGIONAL RAIL COMMISSION

LOCATION & DESCRIPTION:
STATIONS AND FACILITIES
STANDARD DRAWINGS

SHEET TITLE:
OVERCROSSING AND PEDESTRIAN BRIDGE DETAILS

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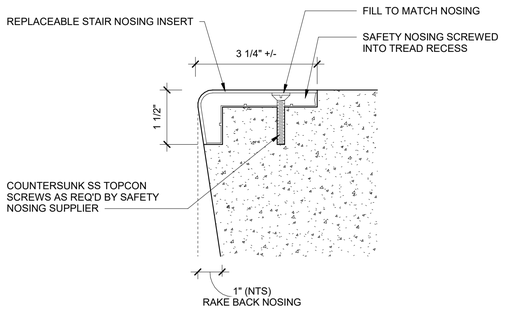
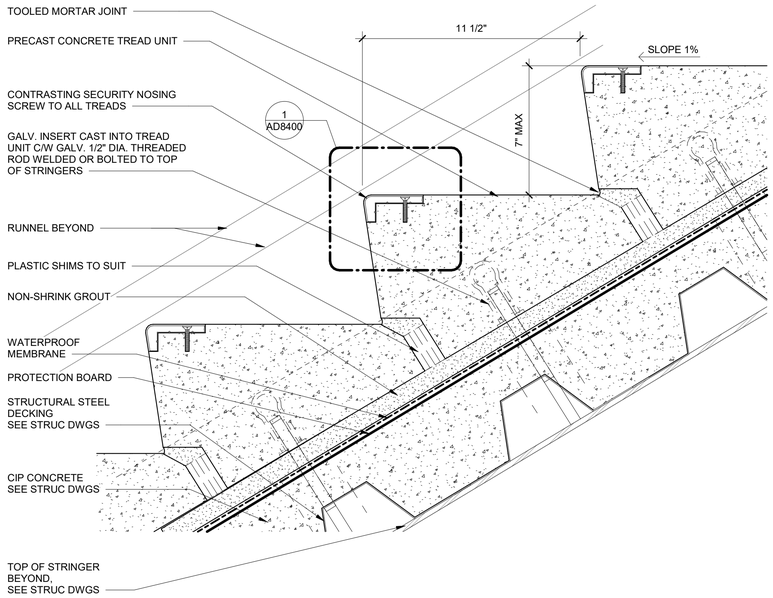


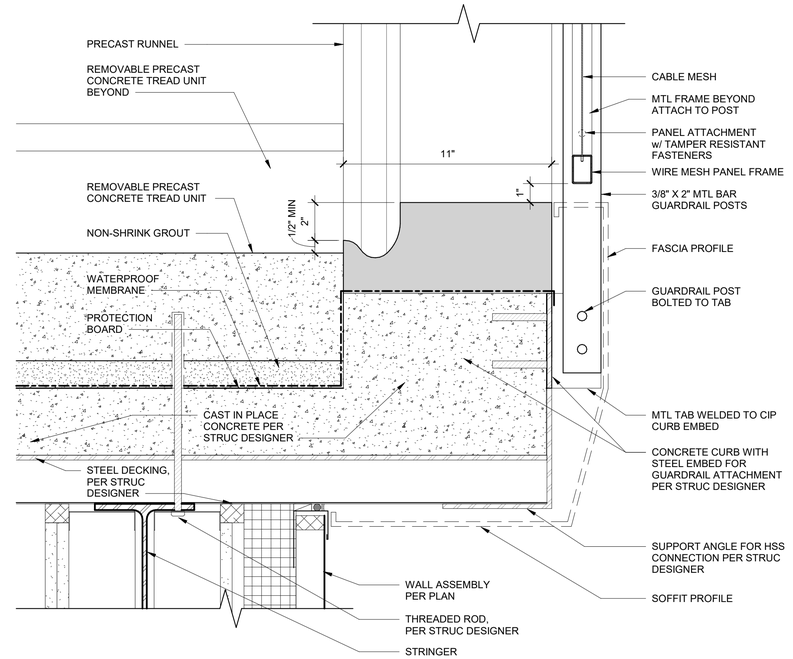
1 TYPICAL NOSING

6" = 1'-0"



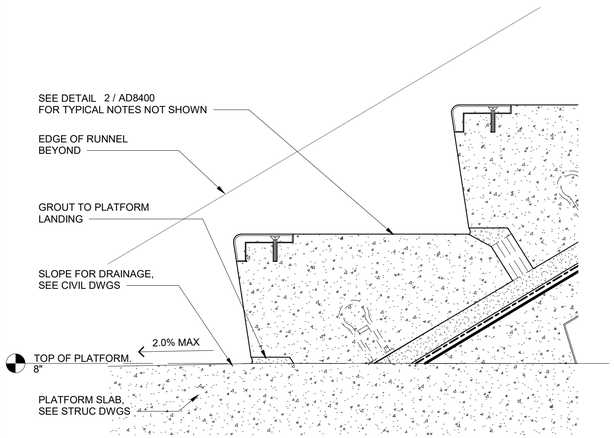
2 TYPICAL STAIR DETAIL SECTION

3" = 1'-0"



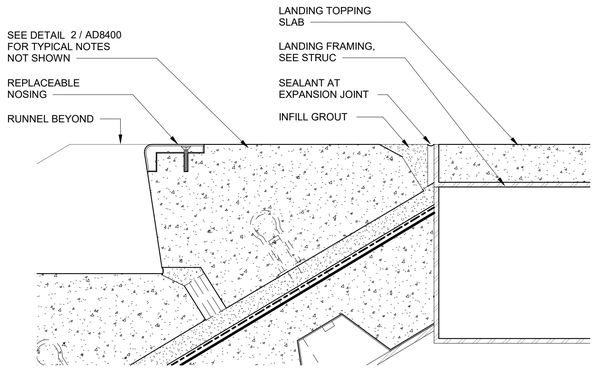
3 TYPICAL STAIR EDGE WITH RUNNEL

3" = 1'-0"



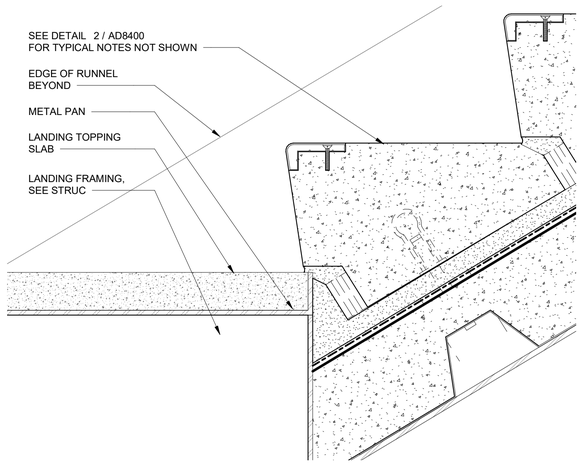
5 TYP BOTTOM TREAD AT PLATFORM

3" = 1'-0"



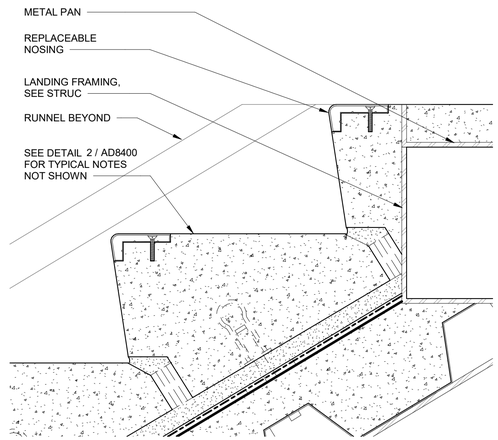
6 TYP TOP TREAD AT LANDING

3" = 1'-0"



7 TYP BOTTOM TREAD AT LANDING

3" = 1'-0"



8 TYP TOP OF STAIR

3" = 1'-0"

0 2" 4" 8"
3" = 1'-0"

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SAN JOAQUIN REGIONAL RAIL COMMISSION

DRAWN BY: Author
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DATE: 10/28/2022
SHEET NUMBER: **AD8400**

SAN JOAQUIN REGIONAL RAIL COMMISSION

LOCATION & DESCRIPTION:
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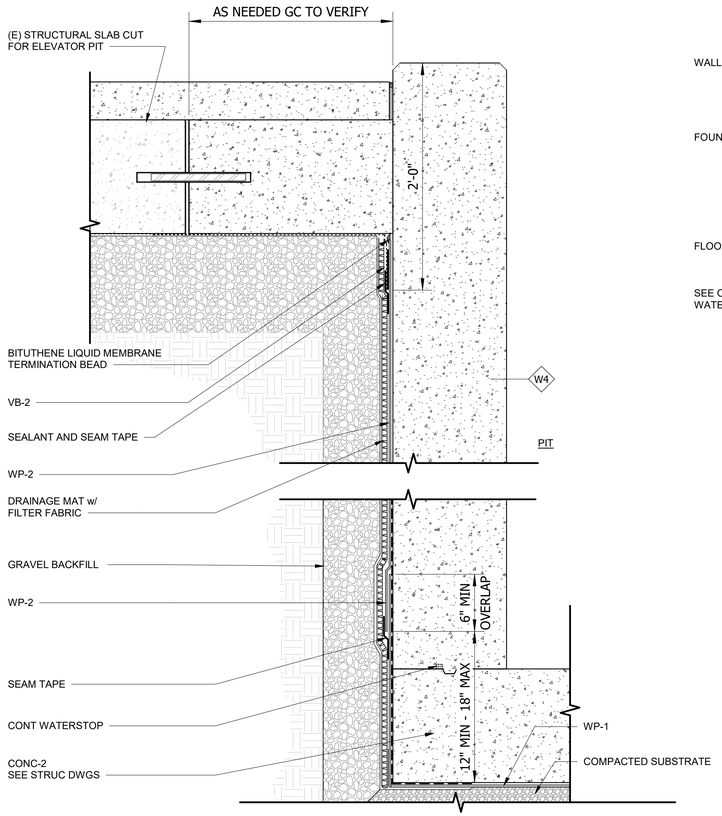
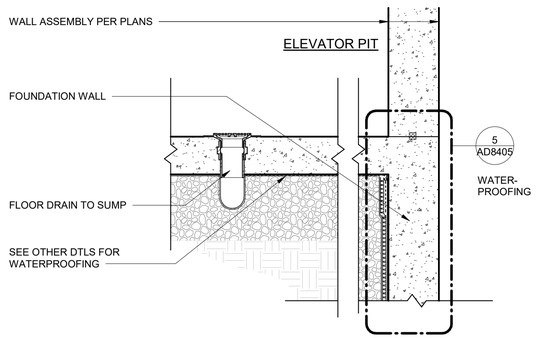
SHEET TITLE:
STAIR DETAILS

DATE / TIME STAMP: 11/4/2022 10:07:02 AM



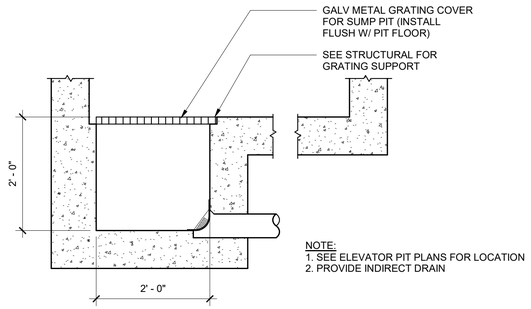
5 ELEVATOR PIT FOUNDATION WATERPROOFING

1 1/2" = 1'-0"



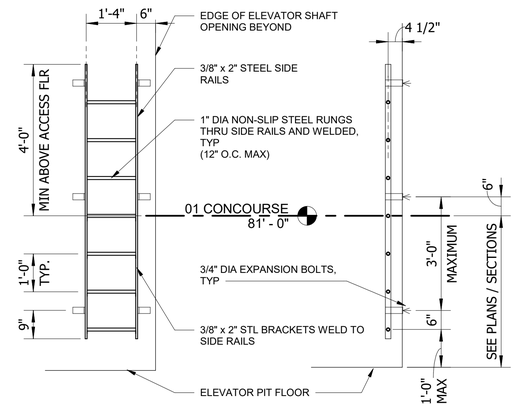
2 ELEVATOR PIT

1" = 1'-0"



3 ELEVATOR SUMP PIT SECTION

3/4" = 1'-0"



4 ELEV. PIT ACCESS LADDER

1/2" = 1'-0"

DATE / TIME STAMP: 11/4/2022 10:07:03 AM

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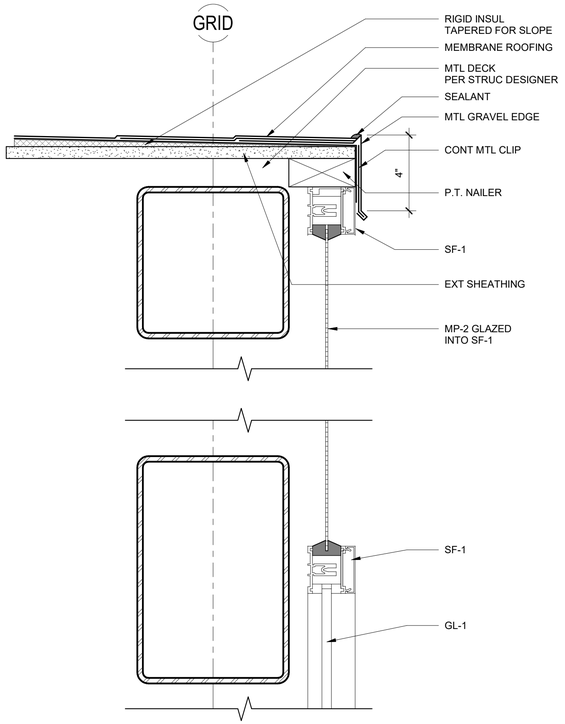
SAN JOAQUIN REGIONAL RAIL COMMISSION

DRAWN BY: Author
CHECKED BY: Checker
DATE: 10/28/2022
SHEET NUMBER: **AD8405**

SAN JOAQUIN REGIONAL RAIL COMMISSION

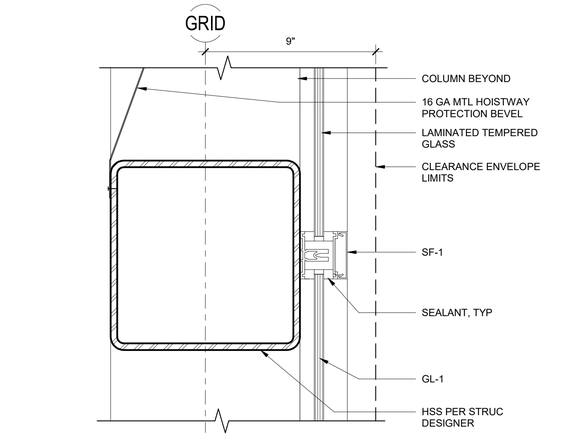
LOCATION & DESCRIPTION:
STATIONS AND FACILITIES
STANDARD DRAWINGS

SHEET TITLE:
ELEVATOR DETAILS



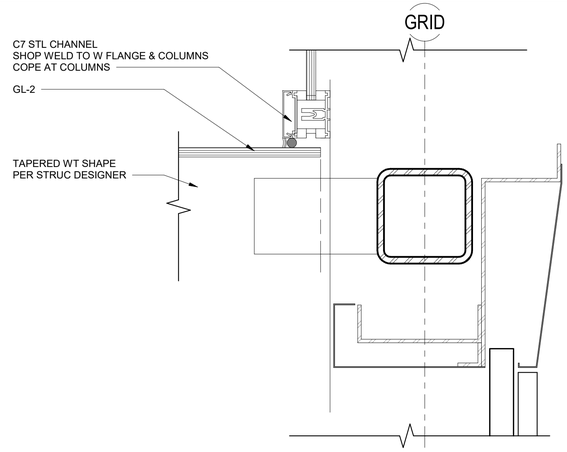
5 ELEVATOR ROOF AT ENCLOSURE

3" = 1'-0"



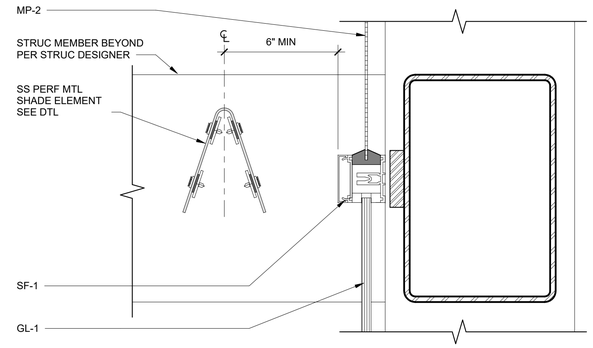
2 TYPICAL HORIZ MULLION

3" = 1'-0"



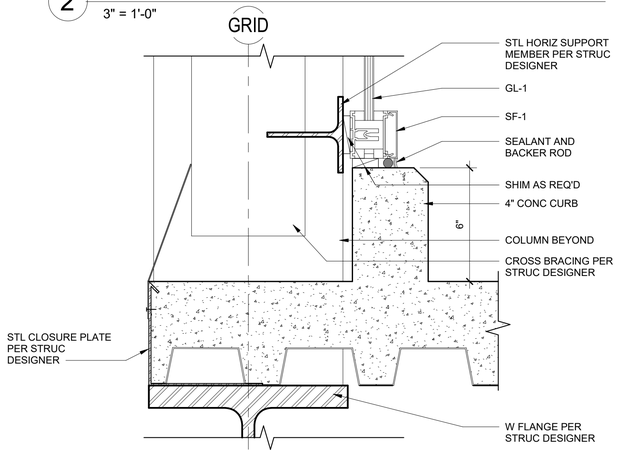
3 ELEVATOR DOOR HEAD

3" = 1'-0"



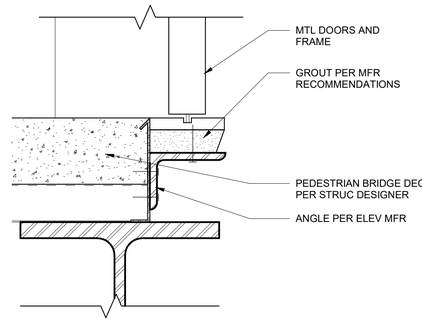
4 SUNSHADE AT ELEV ENCLOSURE

3" = 1'-0"



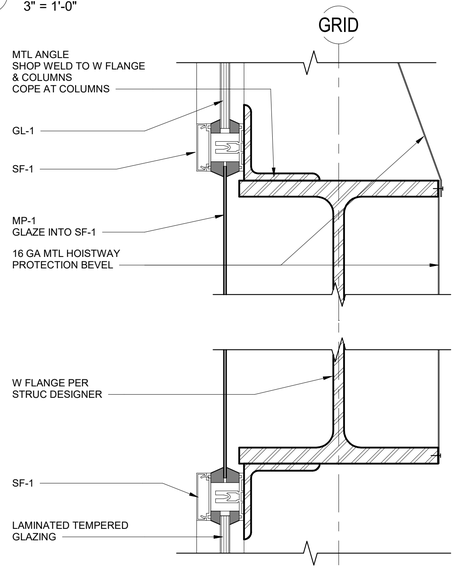
6 ENCLOSURE SILL AT BRIDGE CURB

3" = 1'-0"



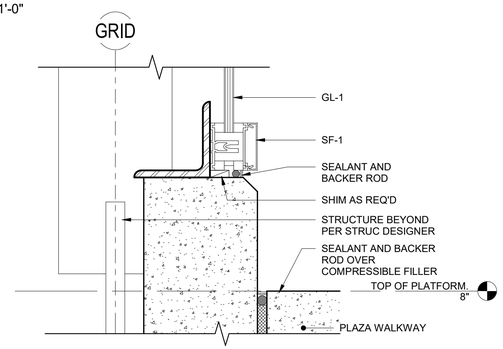
7 ELEVATOR DOOR SILL AT PED BRIDGE

3" = 1'-0"



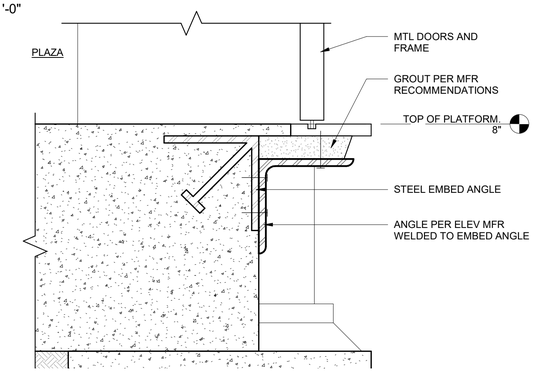
9 TYPICAL HORIZ MULLION AT W-FLANGE

3" = 1'-0"



10 TYPICAL ENCLOSURE SILL AT PIT WALL - PLAZA

3" = 1'-0"



11 ELEVATOR DOOR SILL AT PLATFORM LEVEL

3" = 1'-0"

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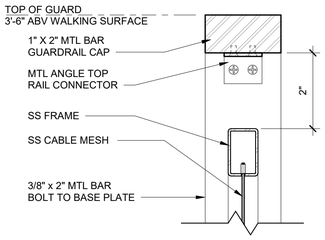
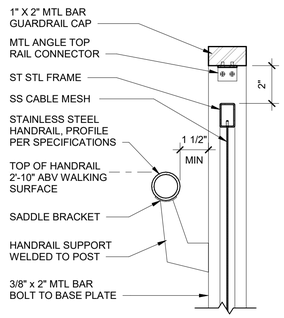
SAN JOAQUIN REGIONAL RAIL COMMISSION

DRAWN BY: Author	**SAN JOAQUIN REGIONAL RAIL COMMISSION**
CHECKED BY: Checker	LOCATION & DESCRIPTION: STATIONS AND FACILITIES STANDARD DRAWINGS
DATE: 10/28/2022	
SHEET NUMBER **AD8406**	SHEET TITLE: **ELEVATOR ENCLOSURE DETAILS**



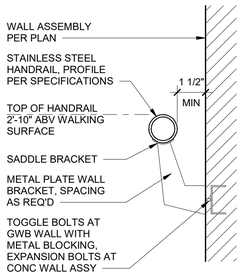
1 TOP OF GUARDRAIL

6" = 1'-0"



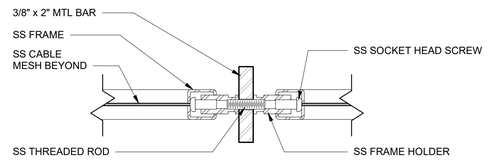
2 HANDRAIL BRACKET AT GUARD

3" = 1'-0"



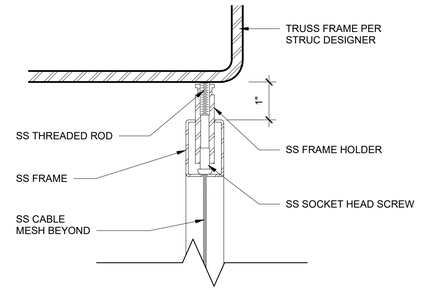
3 HANDRAIL BRACKET AT WALL

3" = 1'-0"



4 CABLE MESH ATTACHMENT

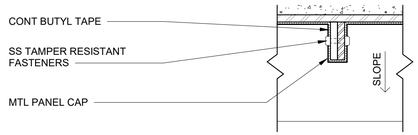
6" = 1'-0"



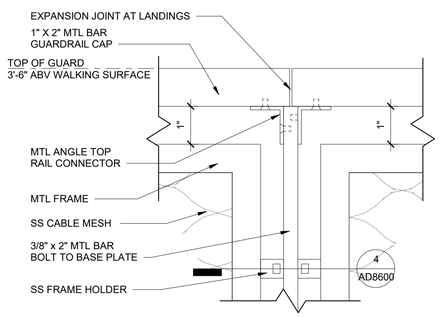
5 CABLE MESH ATTACHMENT AT HSS

6" = 1'-0"

0 1" 2" 4"
6" = 1'-0"

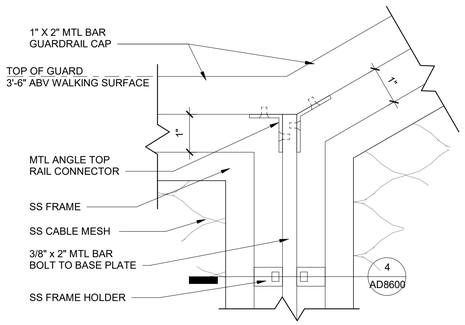


SECTION A - A



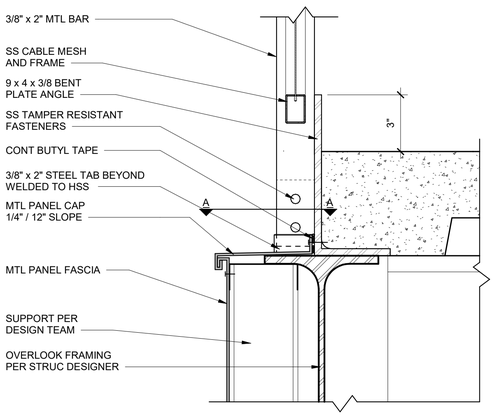
6 TOP OF GUARDRAIL JOINT ELEVATION

6" = 1'-0"



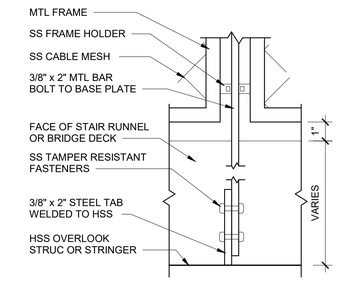
7 TOP OF GUARDRAIL - ELEVATION

6" = 1'-0"



8 GUARDRAIL BASE AT OVERLOOK

3" = 1'-0"



9 GUARDRAIL BASE ELEVATION

3" = 1'-0"

0 2" 4" 8"
3" = 1'-0"

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SAN JOAQUIN REGIONAL RAIL COMMISSION

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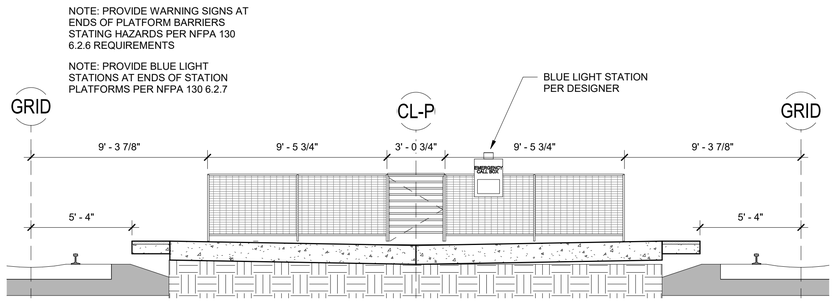
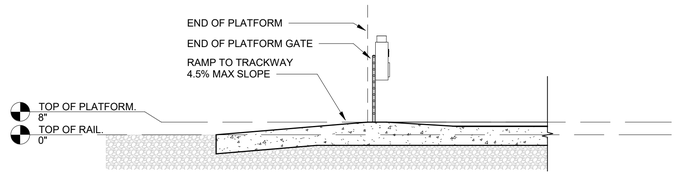
CHECKED BY: Checker	LOCATION & DESCRIPTION: STATIONS AND FACILITIES STANDARD DRAWINGS
DATE: 10/28/2022	
SHEET NUMBER **AD8600**	SHEET TITLE: **GUARDRAIL AND HANDRAIL DETAILS**



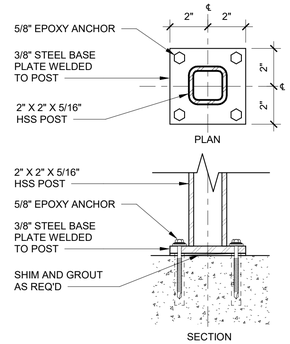
1 END OF PLATFORM GATE

1/4" = 1'-0"



2 END OF PLATFORM GATE AND RAMP

1/4" = 1'-0"



3 PLATFORM END GATE POST DETAIL

3" = 1'-0"

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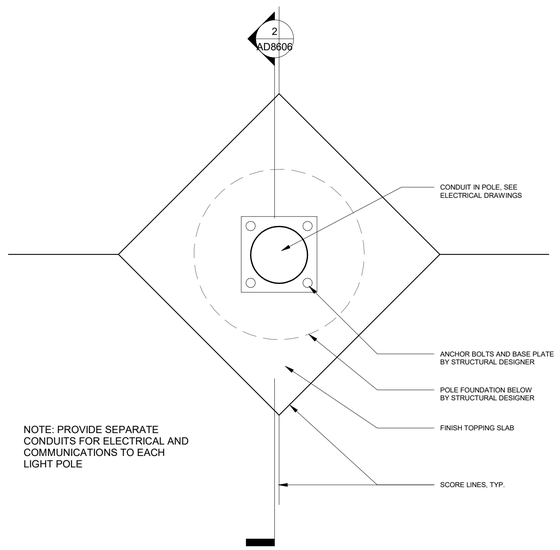
SAN JOAQUIN REGIONAL RAIL COMMISSION

DRAWN BY: Author
CHECKED BY: Checker
DATE: 10/28/2022
SHEET NUMBER: **AD8605**

SAN JOAQUIN REGIONAL RAIL COMMISSION

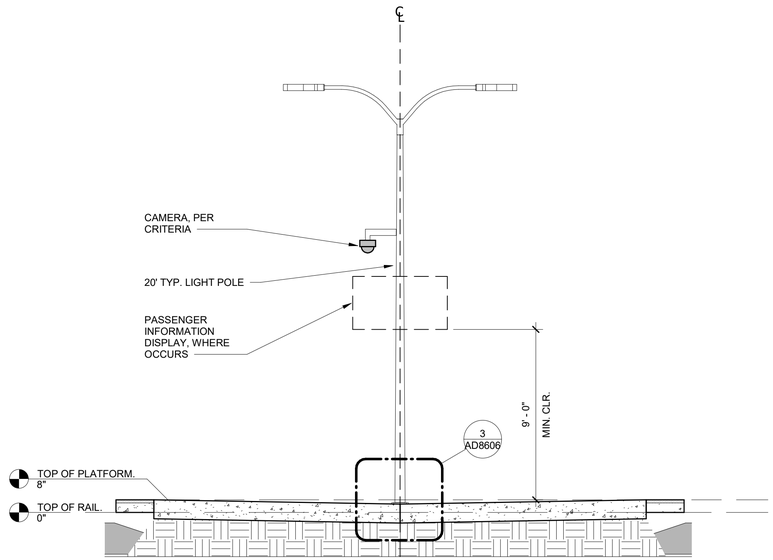
LOCATION & DESCRIPTION:
STATIONS AND FACILITIES
STANDARD DRAWINGS

SHEET TITLE:
PLATFORM ELEMENTS - GATE AND RAMP



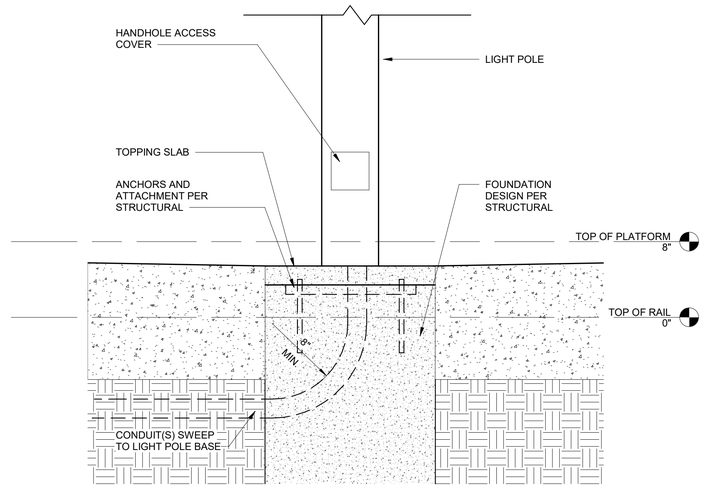
1 PLATFORM LIGHT POLE - PLAN

1 1/2" = 1'-0"



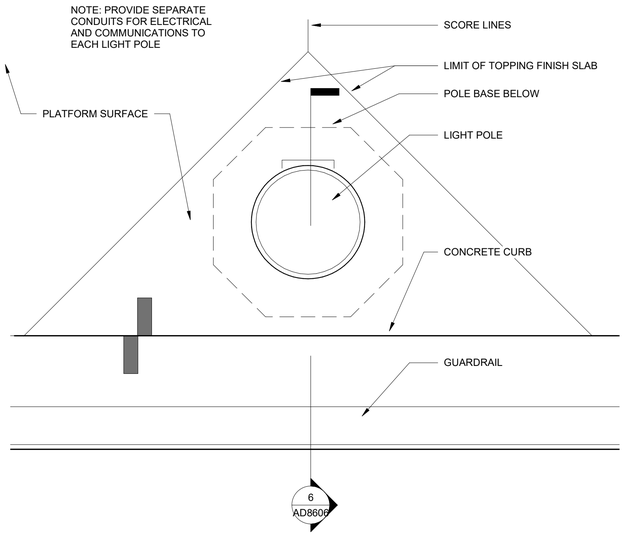
2 TYPICAL PLATFORM POLE LIGHTS

1/4" = 1'-0"



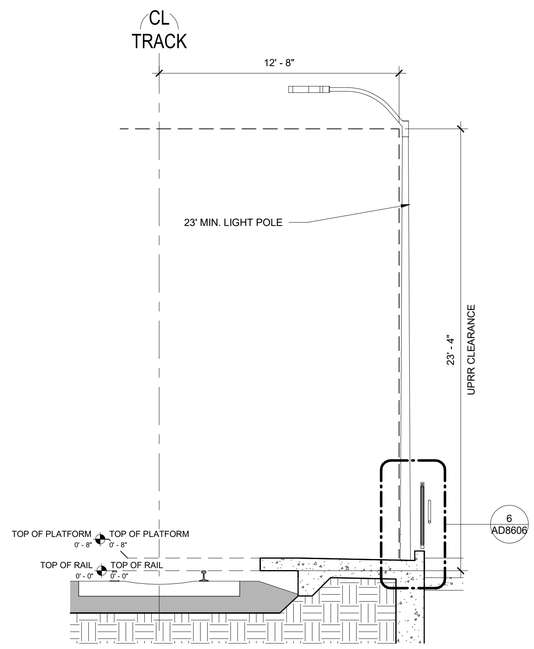
3 PLATFORM POLE LIGHT BASE DETAIL

1 1/2" = 1'-0"



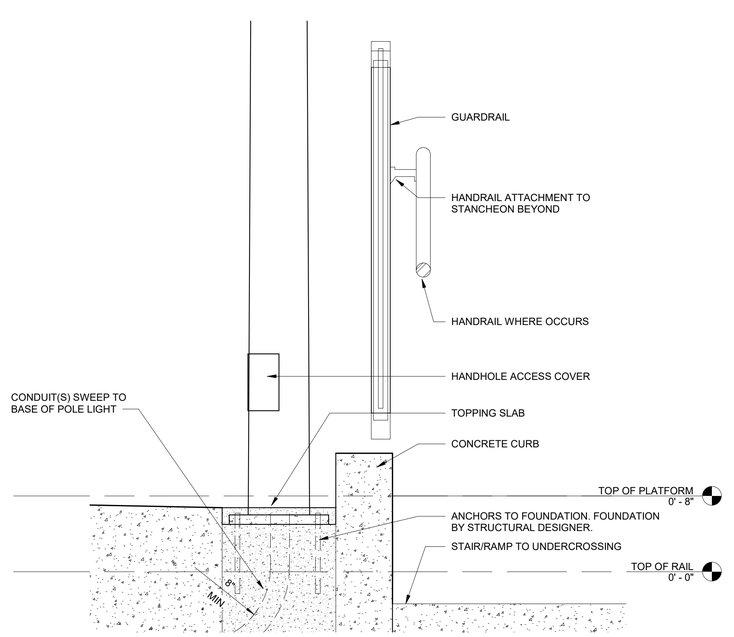
4 UNDERCROSSING LIGHT POLE - PLAN

3" = 1'-0"



5 UNDERCROSSING STATION POLE LIGHT

1/4" = 1'-0"



6 UNDERCROSSING STATION POLE LIGHT BASE

1 1/2" = 1'-0"

DATE / TIME STAMP: 11/4/2022 10:07:07 AM

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SAN JOAQUIN REGIONAL RAIL COMMISSION

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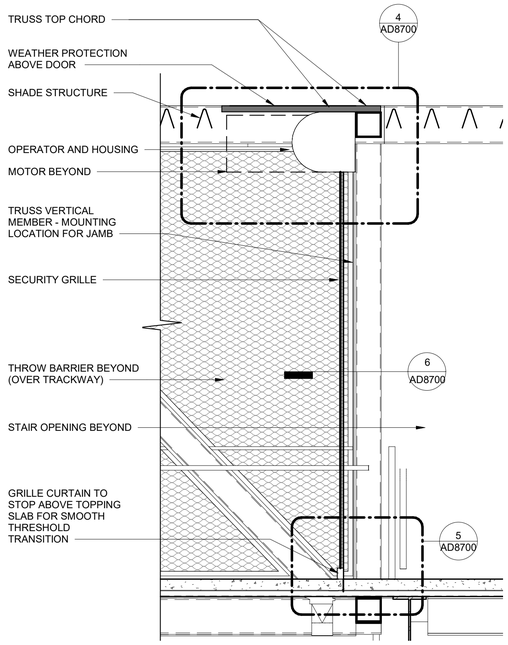
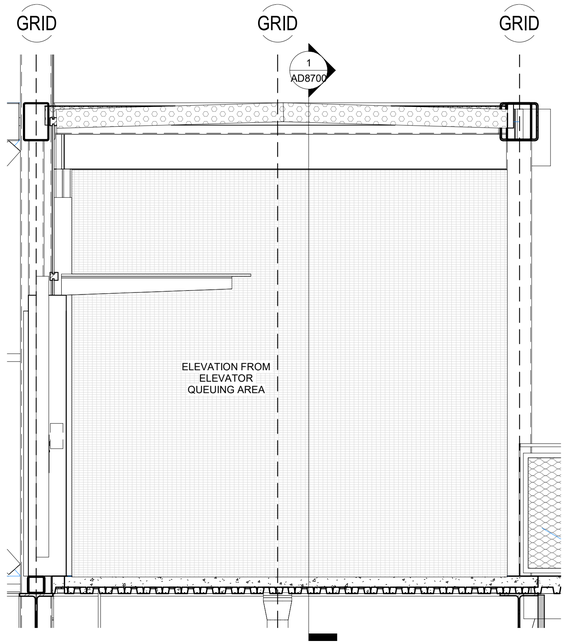
DATE: 10/28/2022	
SHEET NUMBER **AD8606**	SHEET TITLE: **PLATFORM ELEMENTS - POLE LIGHTS**



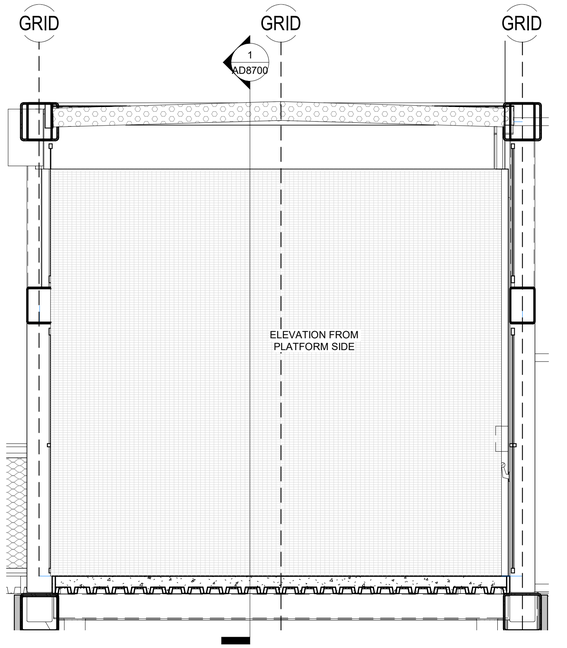
1 SECURITY GRILLE - SECTION AT OVERCROSSING

1/2" = 1'-0"



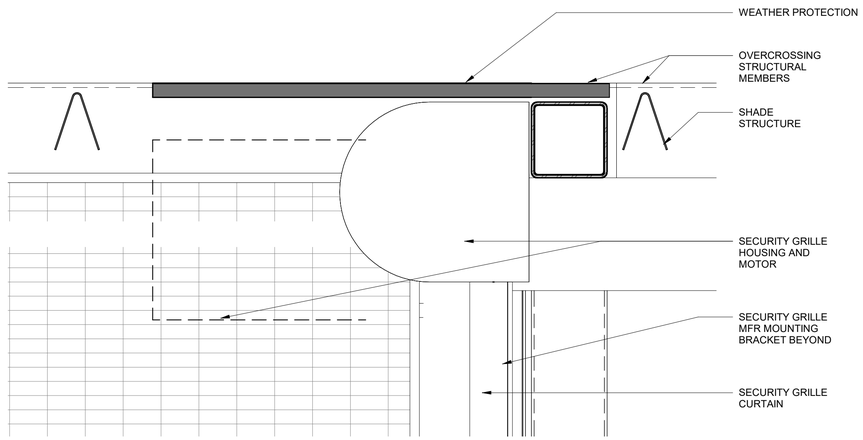
2 OVERCROSSING SECURITY GRILLE ELEV1

1/2" = 1'-0"



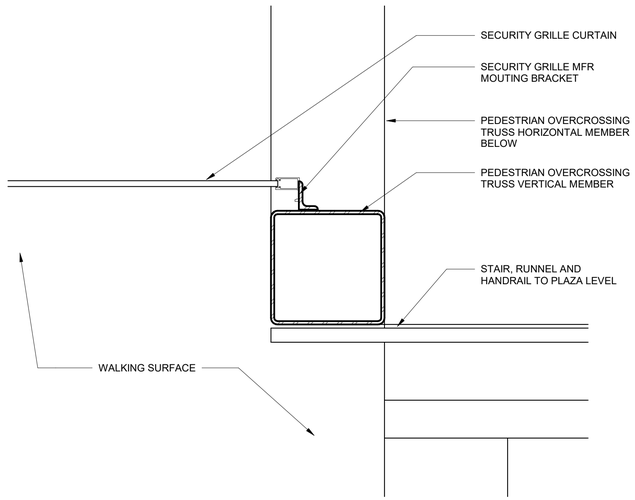
3 OVERCROSSING SECURITY GRILLE ELEV2

1/2" = 1'-0"



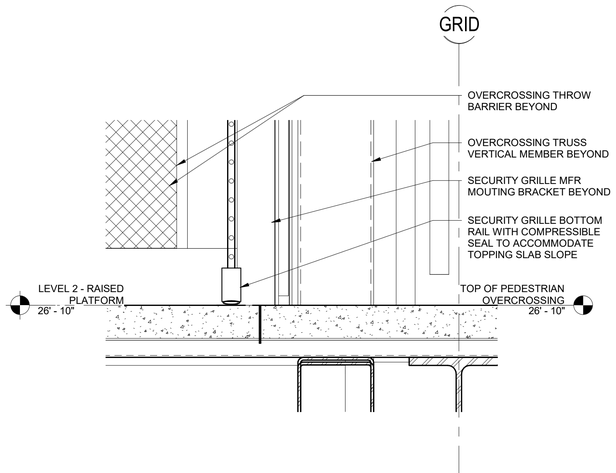
4 SECURITY GRILLE - HEAD

1 1/2" = 1'-0"



6 SECURITY GRILLE - JAMB

1 1/2" = 1'-0"



5 SECURITY GRILLE - THRESHOLD

1 1/2" = 1'-0"

REV. #	BY	DATE	DESCRIPTION

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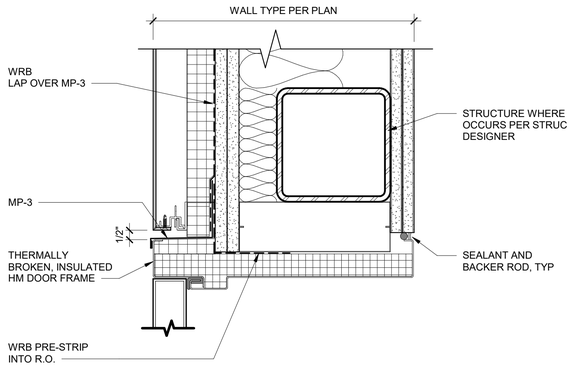
SAN JOAQUIN REGIONAL RAIL COMMISSION

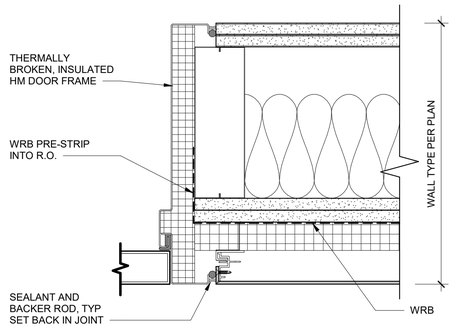
DRAWN BY: Author	**SAN JOAQUIN REGIONAL RAIL COMMISSION**
CHECKED BY: Checker	LOCATION & DESCRIPTION: STATIONS AND FACILITIES STANDARD DRAWINGS
DATE: 10/28/2022	
SHEET NUMBER **AD8700**	SHEET TITLE: **OVERHEAD COILING GRILLE DETAILS**

DATE / TIME STAMP: 11/4/2022 10:07:09 AM



1 TYPICAL DOOR HEAD

3" = 1'-0"



2 TYPICAL DOOR JAMB

3" = 1'-0"

0 2" 4" 8"

3" = 1'-0"

REV. #	BY	DATE	DESCRIPTION

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SAN JOAQUIN REGIONAL RAIL COMMISSION

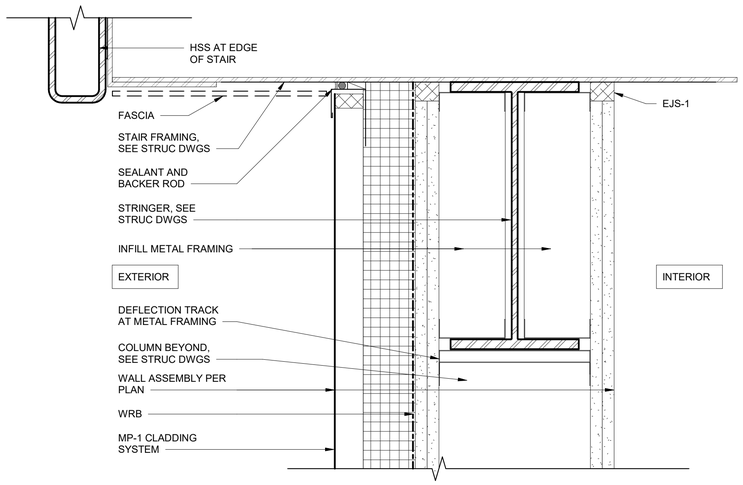
DRAWN BY: Author
CHECKED BY: Checker
DATE: 10/31/22
SHEET NUMBER: **AD8701**

SAN JOAQUIN REGIONAL RAIL COMMISSION

LOCATION & DESCRIPTION:
STATIONS AND FACILITIES
STANDARD DRAWINGS

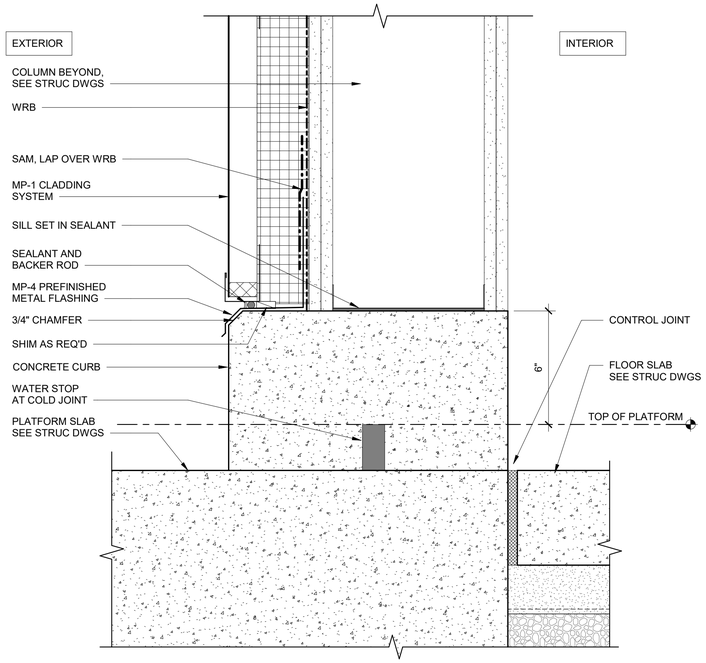
SHEET TITLE:
DOOR DETAILS

DATE / TIME STAMP: 11/4/2022 10:07:10 AM



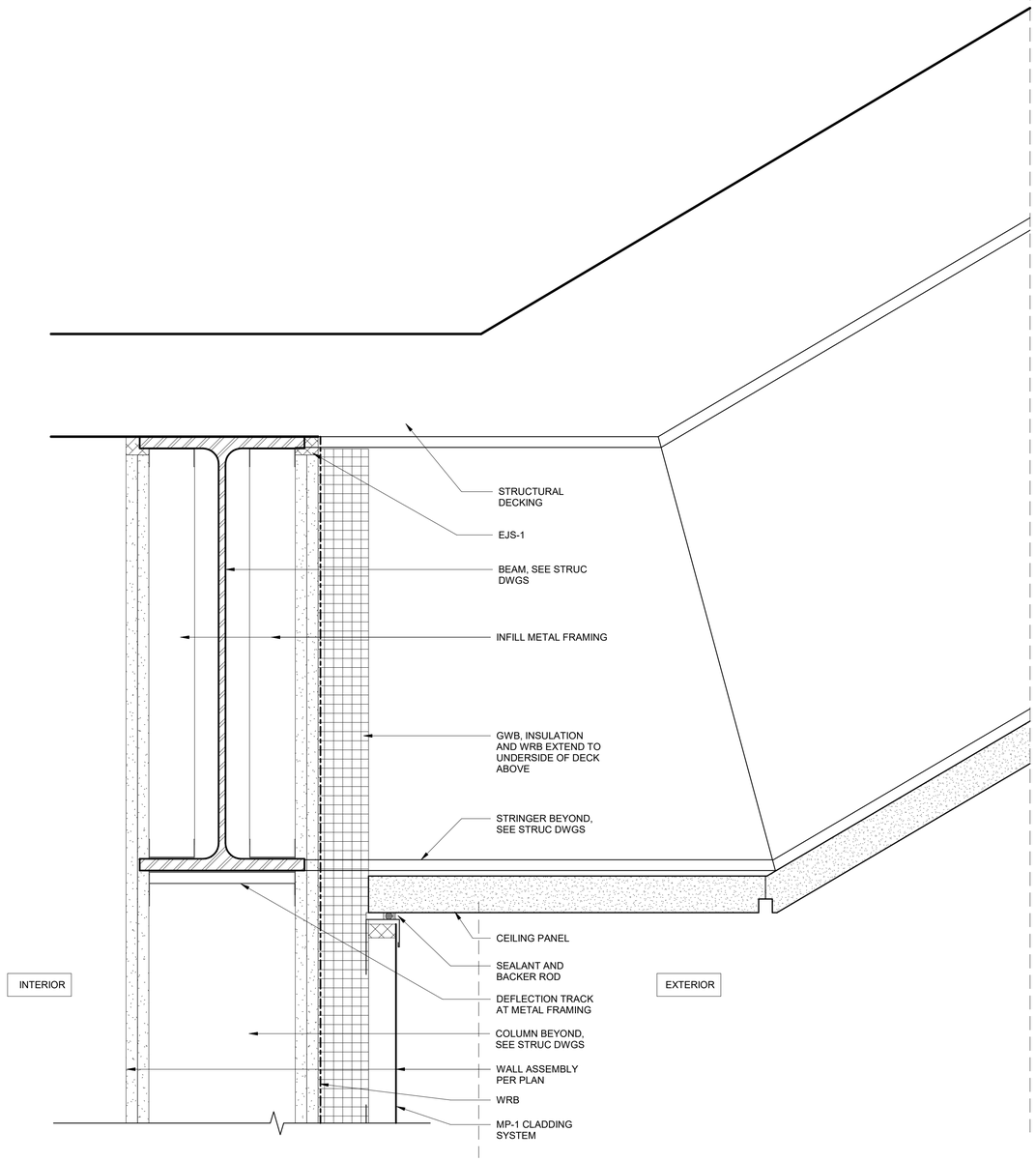
1 UNDER STAIR WALL - HEAD PARALLEL TO STAIR

3" = 1'-0"



5 UNDER STAIR WALL - CURB BASE

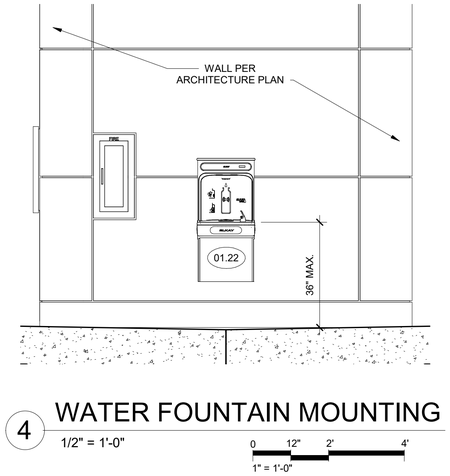
3" = 1'-0"



6 UNDER STAIR WALL - HEAD PERP TO STAIR

3" = 1'-0"

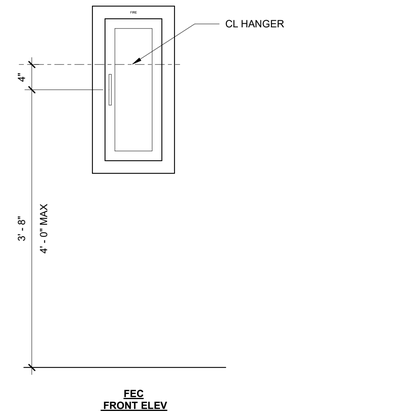
0 2" 4" 8"
3" = 1'-0"



4 WATER FOUNTAIN MOUNTING

1/2" = 1'-0"

0 12" 2' 4'
1" = 1'-0"



FEC
FRONT ELEV

8 FEC MOUNTING HEIGHT

1" = 1'-0"

0 6" 1' 2'
1" = 1'-0"

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SAN JOAQUIN REGIONAL RAIL COMMISSION

DRAWN BY: Author	**SAN JOAQUIN REGIONAL RAIL COMMISSION**
CHECKED BY: Checker	LOCATION & DESCRIPTION: STATIONS AND FACILITIES STANDARD DRAWINGS
DATE: 10/28/2022	
SHEET NUMBER **AD8800**	SHEET TITLE: **WALL DETAILS**

KEY	ITEM	SPEC SECTION	COLOR	REMARKS
CABLE NET				
CN-1	STAINLESS STEEL CABLE MESH FRAME SYSTEM		AISI TYPE 316 STAINLESS STEEL	
CEILINGS				
CLG-1	SS STL PERFORATED CEILING PANEL	05 70 00		
CLG-2	APPLIED FIREPROOFING	07 81 00		
CONCRETE				
CONC-1	ARCHITECTURAL CONCRETE	03 33 00		
CONC-2	CIP CONCRETE - PITS	03 30 00		
CONC-3	CIP CONCRETE	03 30 00		
EXPANSION JOINTS				
EJS-1	FOAM SEAL	07 91 00		
FIREPROOFING				
FC-1	FIRE CAULK	07 84 13		
FC-2	INTUMESCENT FIREPROOFING	07 81 24		
FC-3	APPLIED FIREPROOFING	07 81 00		UL D759
GLAZING				
GL-1	LAMINATED TEMPERED GLASS	08 80 00		
GL-2	LAMINATED TEMPERED GLASS - "TRANSLUCENT"	08 80 00	INTERLAYER: 0.060 INCH, 30% WHITE PVB	
GL-3	FIRE RATED IGU	08 88 13		
WALL FINISHES				
GWB-1	INTERIOR GYPSUM WALL BOARD - TYPE X	09 29 00		
GWB-2	INTERIOR GYPSUM WALL BOARD	09 29 00		
GWB-3	EXTERIOR SHEATHING	06 16 00 07 54 23		
GWB-4	INTERIOR GYPSUM WALL BOARD - 1" SHAFT LINER	09 29 00		
GWB-5	CEILING GYPSUM WALL BOARD	09 29 00		
GWB-6	TILE BACKER BOARD	09 29 00		
HIGH PERFORMANCE COATINGS				
HPC-1	HIGH PERFORMANCE COATING - ON CONCRETE	09 96 00		
HPC-2	HIGH PERFORMANCE COATING - EXPOSED STEEL	09 96 00		
HPC-3	HIGH PERFORMANCE COATING - ANTI GRAFFITI ON GLASS			
INSULATION				
INSUL-1	POLYISOCYANURATE RIGID FOAM INSULATION (ROOF) - R4.2 /...	07 22 00		
INSUL-2	MINERAL FIBER BATT - R21	07 21 00		
INSUL-3	MINERAL FIBER RIGID INSULATION - R4.2 PER INCH	07 21 00		
INSUL-4	SPRAY POLYURETHANE FOAM - R6.5 PER INCH	07 21 19		
INSUL-5	RESIN-BONDED FIBROUS GLASS INSULATION BOARD	05 70 00		
METAL PANELS				
MP-1	PREFINISHED METAL PANEL CLADDING	05 70 00		
MP-2	PERFORATED STAINLESS STEEL METAL PANEL	05 50 00		
MP-3	PREFINISHED METAL TRIM	07 42 13 19		
MP-4	PREFINISHED METAL FLASHING	07 62 00		
MP-5	PREFINISHED METAL COUNTERFLASHING	07 71 00		
MP-6	STAINLESS STEEL SHEET METAL			

KEY	ITEM	SPEC SECTION	COLOR	REMARKS
PAINT				
PT-1	METAL DOOR PAINT	09 90 00		
PT-2	METAL DOOR FRAME PAINT	09 90 00		
PT-3	WALL PAINT	09 90 00		
PLYWOOD **				
PLY-1	INTERIOR PLYWOOD (NON-VISIBLE)	06 10 53		
ROOFING				
RFG-1	SBS MODIFIED BITUMINOUS...	07 52 16		
SEALER				
SEAL-1	WATER REPELLENT / ANTI-GRAFFITI COATING	09 96 23		
SEAL-2	CONCRETE FLOOR AND SLAB TREATMENT; SEALER	03 30 00		
WEATHER RESISTANT BARRIERS				
SAM	SELF ADHERED MEMBRANE	07 65 26		
WRB	SELF-ADHERED SHEET	07 13 26		
WATERPROOFING MEMBRANE				
WP-1	WATERPROOF MEMBRANE	07 13 26		
WP-2	SHEET WATERPROOFING	07 13 26		
VAPOR BARRIER				
VB-1	MEMBRANE BARRIER (ROOF)	07 54 23		

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SAN JOAQUIN REGIONAL RAIL COMMISSION

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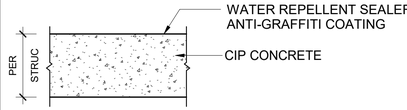
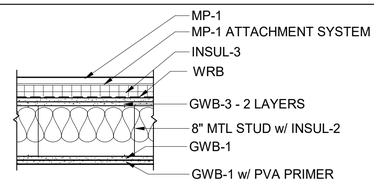
DATE: 10/28/2022
SHEET NUMBER: **AS9000**

SAN JOAQUIN REGIONAL RAIL COMMISSION

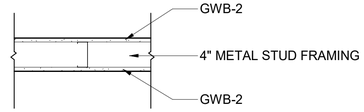
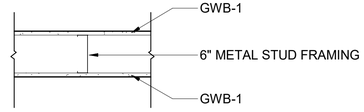
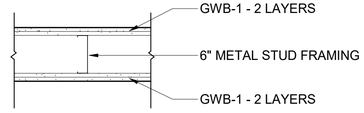
LOCATION & DESCRIPTION:
STATIONS AND FACILITIES
STANDARD DRAWINGS

SHEET TITLE:
TECHNICAL NOMENCLATURE

EXTERIOR WALL ASSEMBLIES

W1 EXTERIOR CAST-IN-PLACE CONCRETE		FIRE RATING STC RATING ASSEMBLY LISTING
W2 EXTERIOR 8" METAL STUD WALL WITH METAL PANEL SIDING		FIRE RATING: 2HR STC RATING: 50 ASSEMBLY LISTING: UL U425

INTERIOR WALL ASSEMBLIES

P1 METAL STUD NON-RATED PARTITION		FIRE RATING: NR STC RATING ASSEMBLY LISTING
P2 METAL STUD RATED PARTITION		FIRE RATING: 1HR STC RATING ASSEMBLY LISTING: UL U419
P3 METAL STUD RATED PARTITION		FIRE RATING: 2HR STC RATING ASSEMBLY LISTING: UL U403

ASSEMBLY NOTES:

1. FIRE RATED ASSEMBLIES ARE BASED ON CBC, UL, ICC, OR US GYPSUM ASSOCIATION (GA) TEST DATA & ARE TO BE CONSTRUCTED IN ACCORDANCE WITH THE REQUIREMENTS OF THE TESTING AGENCIES. REFER TO SPECIFIC TEST REPORTS INDICATED FOR REQUIRED COMPONENTS & ASSEMBLIES.
2. EXTENTS OF ASSEMBLIES ARE SHOWN ON THE PLANS & SECTIONS.
3. REFER TO TECHNICAL NOMENCLATURE SCHEDULE ON SHEET AS9000 FOR ASSEMBLY ABBREVIATIONS.
4. FIRE RATED ASSEMBLIES FORM A SEPARATION THAT SHALL BE CONTINUOUS FROM FLOOR TO STRUCTURE ABOVE WITH NO BREAKS AT COLUMNS, WALL TRANSITIONS, OR OTHER OBSTRUCTIONS.
5. ALL PENETRATIONS IN FIRE RATED ASSEMBLIES REQUIRED TO HAVE PROTECTED OPENINGS SHALL BE FIRESTOPPED OR PROVIDED WITH APPROVED SMOKE AND/OR FIRE DAMPERS.
6. SUBSTITUTE WATER RESISTANT GWB AT TOILET ROOMS, SHOWER ROOMS, JANITOR ROOMS & SIM USES.
7. SUBSTITUTE TILE BACKER BOARD AT CERAMIC TILE FINISHES.
8. BLOCKING IS REQUIRED AT THE FOLLOWING LOCATIONS: CASEWORK, SHELVING & PANELING; ACCESSORIES & EQUIPMENT; DOOR HARDWARE; TOILET PARTITIONS & ACCESSORIES; ACOUSTICAL PANELS; OTHER LOCATIONS WHERE REQUIRED PER MANUFACTURER'S RECOMMENDATIONS OR INDUSTRY STANDARDS.
9. FIRE BARRIERS AND PARTITIONS MAY HAVE OPENINGS FOR ELECTRICAL BOXES PER CBC 714.4.2.
10. ALL ROOFING SYSTEMS TO COMPLY WITH CLASS A SYSTEM REQUIREMENTS.
11. ALL EXPOSED INSULATION AND PLASTIC FACED BATT INSULATION SHALL HAVE A FLAME SPREAD INDEX OF NOT MORE THAN 25 AND A SMOKE-DEVELOPED INDEX OF NOT MORE THAN 450 PER CBC 720.3.
12. INTERIOR WALL AND CEILING FINISHES TO MEET MINIMUM CLASS A WITH FLAME SPREAD INDEX 0-25 AND SMOKE DEVELOPED INDEX 0-450 AS DEFINED IN CBC 803.1.1 AND TABLE 803.1.2
13. FLOOR ASSEMBLIES PER STRUCTURAL. FLOOR FINISHES PER FINISH SCHEDULE.
14. SEE REFLECTED CEILING PLANS & TECHNICAL NOMENCLATURE FOR CEILING TYPES.

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SAN JOAQUIN REGIONAL RAIL COMMISSION

DRAWN BY: Author
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DATE: 10/28/2022
SHEET NUMBER: **AS9100**

SAN JOAQUIN REGIONAL RAIL COMMISSION

LOCATION & DESCRIPTION:
STATIONS AND FACILITIES
STANDARD DRAWINGS

SHEET TITLE:
WALL ASSEMBLIES