

# Receive Update on Active Grade Crossing Projects & Corridor Crossing Strategy

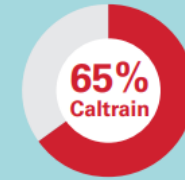
JPB AMP Committee  
February 26, 2025





# AGENDA

- **Corridor Crossing** Delivery Guide
- **Active Grade Crossing** Projects
- **Corridor Crossing** Strategy Update
- **Upcoming** Meetings



# Corridor Background

✓ **2 Corridor Owners**  
Caltrain and Union Pacific Railroad (UPRR)

- 3 additional corridor operators

## 71 At-Grade Crossings

- 43 (41 vehicular/2 pedestrian) on Caltrain corridor
- 28 vehicular on UPRR corridor

✓ **11 At-Grade Station Pedestrian Crossings**

✓ **Recently electrified railroad**



# Corridor Crossings Delivery Guide



**Corridor Crossings**  
STRATEGY



# Crossings Delivery Guide

## Spring 2024:

Received over 500+ comments from corridor partners

## August 2024:

Posted publicly at [www.Caltrain.com/caltrain-corridor-crossings-delivery-guide](http://www.Caltrain.com/caltrain-corridor-crossings-delivery-guide)

## Fall 2024:

Conducted Caltrain staff trainings on guide purpose and application

## Winter 2025:

Conducted trainings for corridor jurisdiction staff, industry partners, transportation authorities on guide purpose and application





# Purpose and Use of the Delivery Guide

## Purpose and Use of the Delivery Guide:



- ✓ Provide a consolidated location of standards for implementing a grade separation project.
- ✓ Define the processes, and roles/responsibilities of Caltrain and local partners to implement a grade separation or crossing closure.

### ***FOR WHAT***

- Grade Separations
- Crossing Closures

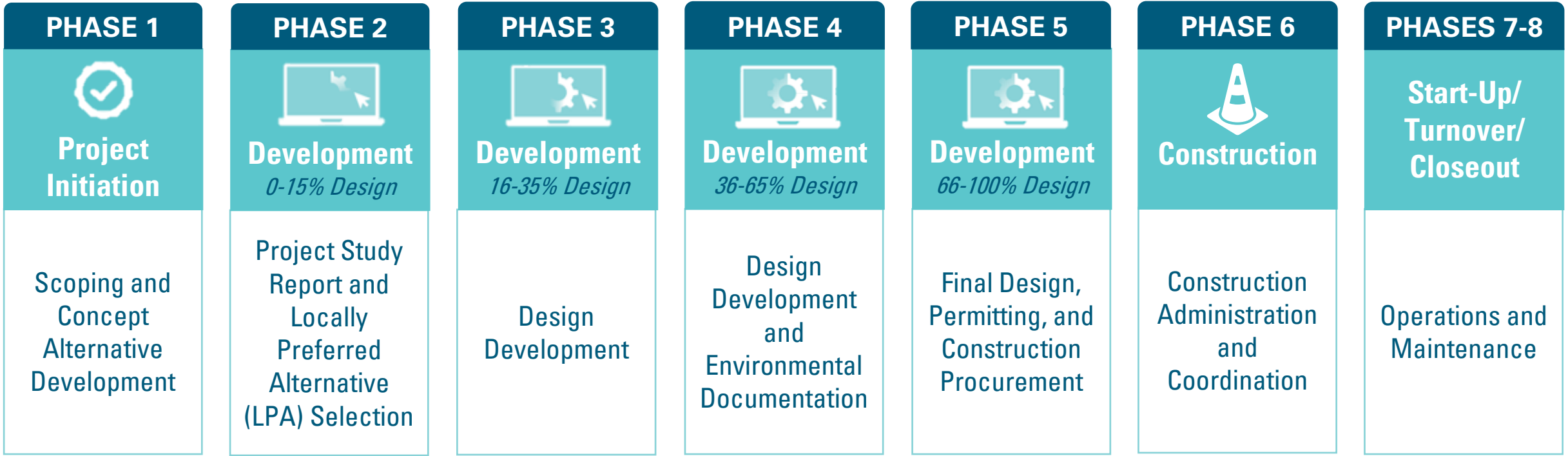
### ***FOR WHO***

- Jurisdictions and county transportation authorities along Caltrain corridor considering or currently implementing grade separation or crossing closure project
- Provides general guidance for projects along UPRR corridor

# Detailed Delivery Process







*City Led*

*Caltrain Led*



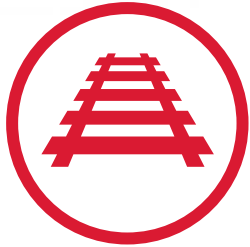


# Delivery Guide Highlights

-  Raised Caltrain's maximum profile grade from 1% to 2%
-  Refined the 4-track segments from the Business Plan
-  Summarized Horizontal/Vertical Clearances, in conjunction with updated Caltrain Design Standards
-  Communicated design variance request process and forms
-  Described operational considerations for construction on active, electrified railroad
-  Highlighted active transportation components of grade separations



# Maximum Profile Grade Revision



	CALTRAIN	UPRR	CHSRA	AREMA
Absolute Maximum Profile Grades	2.00%*	2.00%	2.50%	2.00%

\*Grade change will only occur on **Peninsula Main Line** (MP 0.147 to MP 44.0)

- Higher maximum profile grades allow for smaller grade separation footprints to adjacent communities and provides more flexibility in design
- Revised criteria to allow up to 2 percent grade **without a design exception**, subject to review and approval of Caltrain's Director of Engineering
- Considerations if profile is adjusted
  - Overhead Contact System (OCS)
  - Passenger and Freight Operations (Potential Shoofly Tracks)

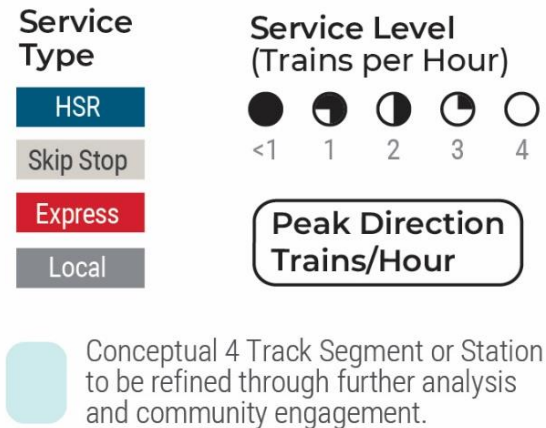
# 4-Track Refinement: Business Plan Recap

## Moderate Growth (Adopted Service Vision)

- Blended Caltrain/High-Speed Rail Service
  - 8 Caltrain trains + 4 HSR trains per hour per direction (phpd)
  - 4-track segments to be constructed at a later time, as the Adopted Service Vision (ASV) is implemented

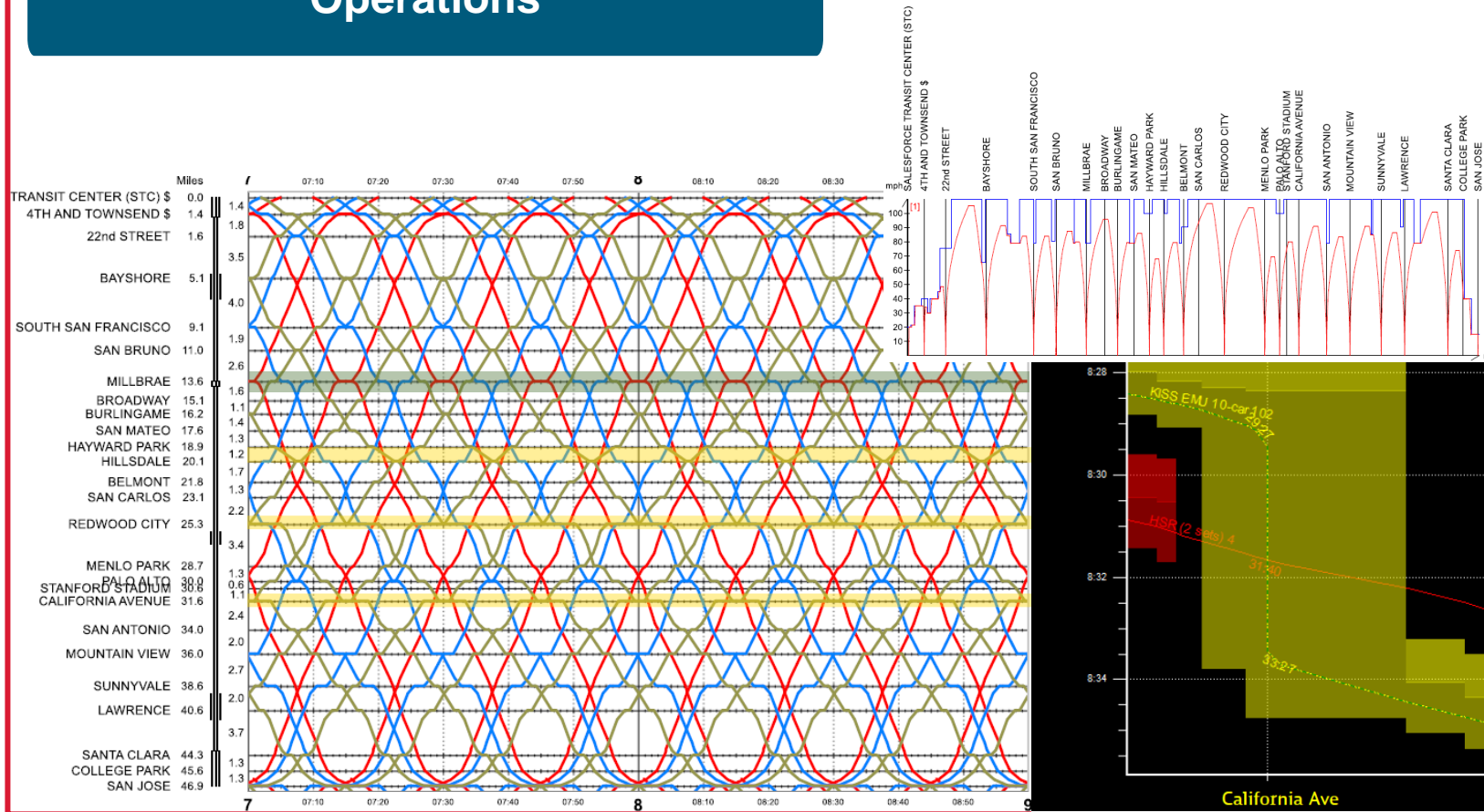
*PCJPB agrees that it **shall not take action ... that PCJPB knows or reasonably should have known at the time of the action would effectively preclude or make materially more complicated or expensive CHSRA's future operation in the Peninsula Rail Corridor...***

– Project Management and Funding Agreement (PMFA) Section 5.3.1

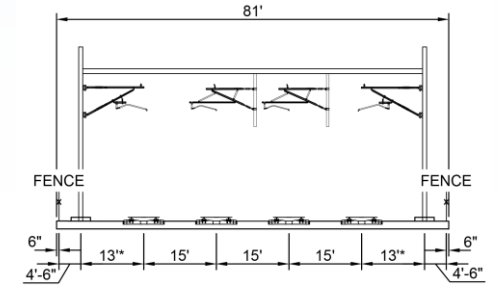


# 4-Track Refinement: Technical Analysis

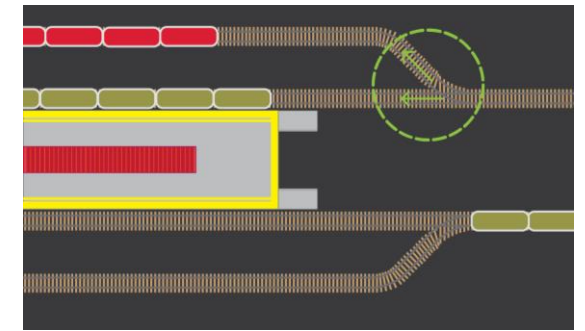
## Operations



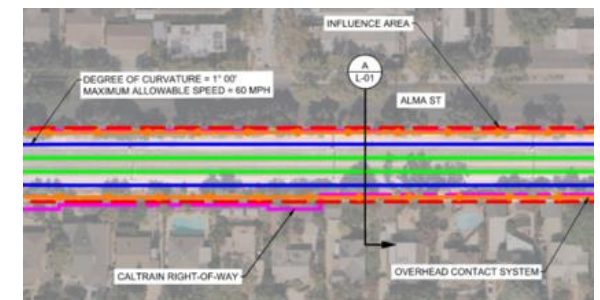
## Cross-sections



## Turnouts

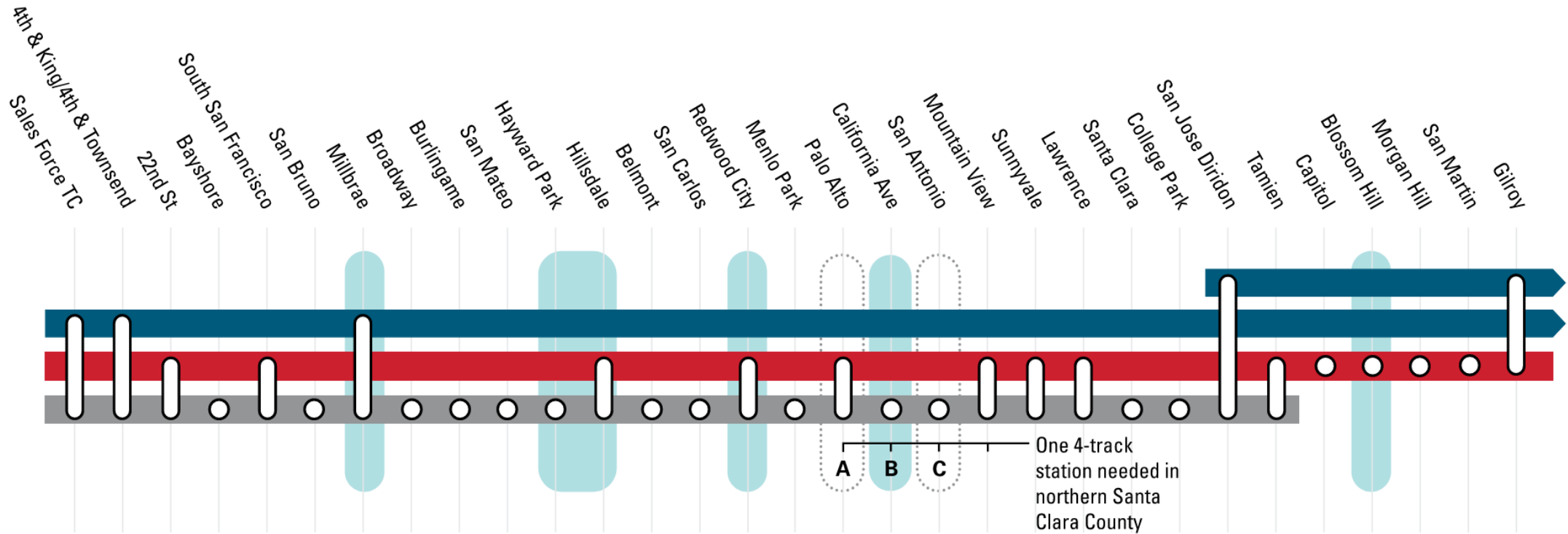


## Alignment Concept





# Refined 4-Track Analysis Segments



# Active Grade Crossing Projects



**Corridor Crossings**  
STRATEGY

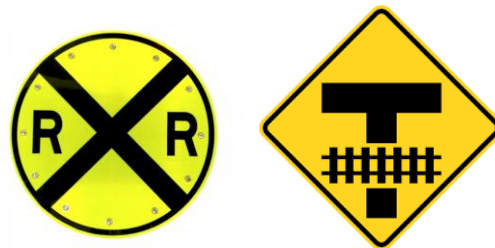
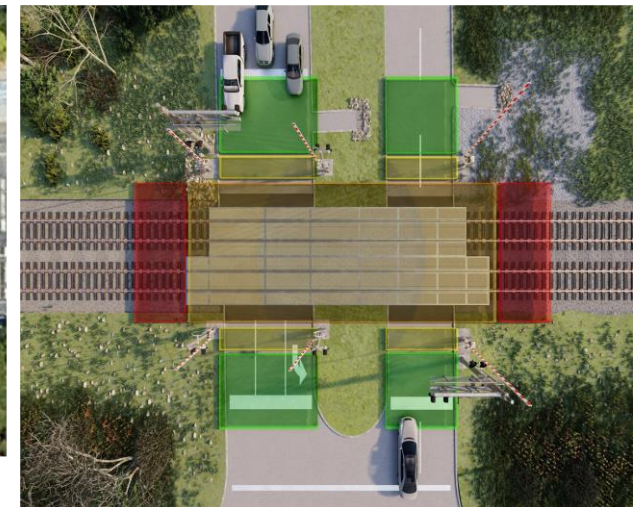
# Grade Crossing Project Types

## Crossing Enhancement Projects

At-grade crossing improvements implemented at existing elevation. May include signing, striping, solar lane markers, delineators, lighting, and technology.



At Grade Crossing w/Safety Improvements



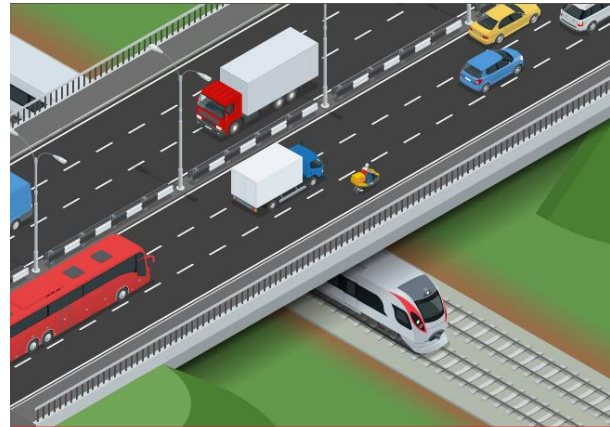
# Grade Crossing Project Types

## Crossing Elimination Projects

Crossing improvements that remove or change the elevation and access to the crossing



Closed Crossing

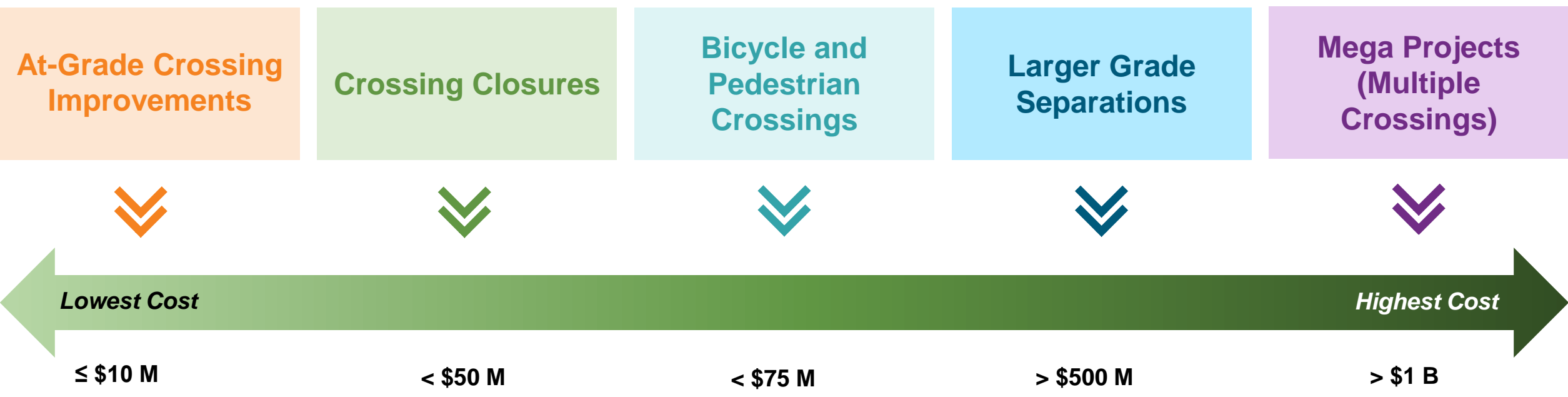


Grade Separated Crossing



Bike/Pedestrian Crossing

# Spectrum of Costs



*Note: Costs include the design and construction of the improvement in current \$*



# Active Grade Crossing Projects

8

*Crossing  
Enhancement  
Projects*

*(13 crossings)*

17

*Crossing  
Elimination  
Projects*

*(30 vehicular and  
5 bike/pedestrian crossings)*

# Active Enhancement Projects

Project Name	Crossing	CPUC Ranking*	Description	Status
<b>Corridor-Wide Navigation</b>	Multiple	-	Coordination with navigation applications to improve instructions around tracks	On-going
<b>Broadway Safety Improvements</b>	Broadway	1	Install intrusion technology, markers, striping, signage, and reflective delineators.	Technology and markers are completed. Other items in design.
<b>Watkins Avenue Grade Crossing Safety Improvements</b>	Watkins Ave	-	Install quad gates, pedestrian gates, pavement markers and markings, lighting, and sidewalk improvements	Completed
<b>San Mateo Grade Crossing Improvements</b>	4 <sup>th</sup> Ave 5 <sup>th</sup> Ave	-	Install quad gates	Under construction

\*California Public Utilities Commission (CPUC) – California Grade Separation Program Priority List for Fiscal Year 2024-2025

# Active Enhancement Projects

Project Name	Crossing	CPUC Ranking*	Description	Status
<b>Churchill Avenue/Alma Street Crossing Safety Improvements (Section 130)</b>	Churchill Ave	9	New pre-signal and traffic signals with timing modifications and pedestrian/bicyclist improvements	Under construction
<b>Churchill Avenue Grade Crossing Improvements</b>	Churchill Ave	9	Install intrusion technology, markers, striping, signage, and reflective delineators.	In design; advancing to 100% in 2025.
<b>Palo Alto Security Enhancements</b>	Churchill Ave to Palo Alto Station	9	New fencing	Under construction

\*California Public Utilities Commission (CPUC) – California Grade Separation Program Priority List for Fiscal Year 2024-2025

# Active Enhancement Projects

Project Name	Crossing	CPUC Ranking*	Description	Status
<b>Grade Crossing Improvement Program</b>	Mission Bay Dr			
	16 <sup>th</sup> St			
	Sunnyvale Ave	12 (Meadow)	Install solar markers, delineators, and signage	On-going
	3 <sup>rd</sup> Ave	23 (Sunnyvale)		
	Chestnut Ave			
	E Meadow Dr			
Whipple Ave				
Ravenswood Ave				

\*California Public Utilities Commission (CPUC) – California Grade Separation Program Priority List for Fiscal Year 2024-2025

# Active Elimination Design Projects San Mateo County

Project Name	CPUC Ranking*	City	Phase	Status
<b>South Linden and Scott Grade Separation</b>	6	SSF/ San Bruno	<b>Phase 3</b> 16 - 35%	Cities to decide on Value Engineering option.
<b>Broadway Burlingame Grade Separation</b>	1	Burlingame	<b>Phase 5:</b> 66 - 100%	Reviewing Value Engineering options. CM/GC procured.
<b>Middle Avenue Bike/Pedestrian Undercrossing</b>	-	Menlo Park	<b>Phase 4</b> 36 - 65%	Preparing advanced Preliminary Engineering and Environmental Review. Procuring CM/GC with April Board approval.

\*California Public Utilities Commission (CPUC) – California Grade Separation Program Priority List for Fiscal Year 2024-2025  
CM/GC = Construction Manager/General Contractor

# Active Elimination Design Projects Santa Clara County

Project Name	CPUC Ranking*	City	Phase	Status
<b>Connecting Palo Alto: Churchill, Meadow, and Charleston</b>	9 (Chur) 12 (Mead) 13 (Char)	Palo Alto	<b>Phase 3</b> 16 - 35%	Advancing Preliminary Engineering and Environmental Review.
<b>Rengstorff Grade Separation</b>	7	Mountain View	<b>Phase 4</b> 36 - 65%	In design; CM/GC procured.
<b>Mountain View Transit Center (Castro Street)</b>	20	Mountain View	<b>Phase 4</b> 36 - 65%	On hold; City prioritizing Rengstorff. CM/GC procured.
<b>Bernardo Avenue Bike/Pedestrian Undercrossing</b>	-	Sunnyvale	<b>Phase 3</b> 16 - 35%	Reviewing Environmental Documentation prepared by City.

\*California Public Utilities Commission (CPUC) – California Grade Separation Program Priority List for Fiscal Year 2024-2025

CM/GC = Construction Manager/General Contractor

# Active Elimination Planning Projects San Francisco and San Mateo County

Project Name	Crossings	CPUC Ranking*	City	Phase
<b>Pennsylvania Avenue Extension</b>	Mission Bay Dr 16 <sup>th</sup> St	-	San Francisco	<b>Phase 2</b> 0 – 15%
<b>Redwood City Grade Separation Study</b>	Whipple Ave Brewster Ave Broadway Maple St Main St Chestnut St	-	Redwood City	<b>Phase 2</b> 0 – 15%
<b>Menlo Park Grade Separation</b>	Encinal Ave Glenwood Ave Oak Grove Ave Ravenswood Ave	-	Menlo Park	<b>Phase 2</b> 0 – 15%

\*California Public Utilities Commission (CPUC) – California Grade Separation Program Priority List for Fiscal Year 2024-2025

# Active Elimination Planning Projects Santa Clara County

Project Name	Crossings	CPUC Ranking*	City	Phase
<b>Connecting Palo Alto</b>	Palo Alto Ave		Palo Alto	<b>Phase 1</b> Initiation
<b>South Palo Alto Bike/Ped Connectivity</b>	TBD	-	Palo Alto	<b>Phase 1</b> Initiation
<b>Mary Avenue Grade Separation</b>	Mary Ave	14	Sunnyvale	<b>Phase 2</b> 0 – 15%
<b>Sunnyvale Avenue Grade Separation</b>	Sunnyvale Ave	23	Sunnyvale	<b>Phase 2</b> 0 – 15%

\*California Public Utilities Commission (CPUC) – California Grade Separation Program Priority List for Fiscal Year 2024-2025



# Active Elimination Planning Projects Santa Clara County

Project Name	Crossings	CPUC Ranking*	City	Phase
<b>Diridon Area Projects</b>	Auzerais Ave W. Virginia St	10	San Jose	<b>Phase 1</b> Initiation
<b>Southern San Jose Grade Separations</b>	Skyway Dr Branham Ln Chynoweth Ave	16	San Jose	<b>Phase 1</b> Initiation
<b>Morgan Hill Grade Separations</b>	Dunne Ave Tennant Ave	-	Morgan Hill	<b>Phase 1</b> Initiation

\*California Public Utilities Commission (CPUC) – California Grade Separation Program Priority List for Fiscal Year 2024-2025

# Integrated Delivery Approach

## Managing risk, scope, schedule, and cost

- ✓ **Integrated City and Caltrain** project teams for transparency and accountability
- ✓ Develop and regularly update **Project Management Plan**
- ✓ Implement and regularly update **Project Risk Register**
- ✓ **Obtain commercial pricing** at key project milestones (e.g., 35% and 65%) to inform next steps
- ✓ Develop and regularly update **Funding Plan**
- ✓ **Incremental design progress** supported by strategic outreach activities

# Use of Independent Cost Estimates

Caltrain's emerging understanding of the market has led to onboarding industry professionals to develop **contractor-style costs**, **construction schedules**, and **constructability reviews** based on current commercial market conditions to assist in determining the reasonableness or validation of a project budget.



Validate project budget based on current market costs



Apply contractor level estimates at milestones



Ensure project aligns with the schedule



Reduce risk and identify potential issues at milestones

# Corridor Crossings Strategy Update





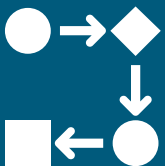
# Purpose

As an outcome of the **Business Plan**, the Corridor Crossings Strategy is an effort to **define a systematic corridor-wide approach** to crossings.

The strategy aims to **align stakeholder ambitions into balance with an implementable program**, addressing:

- Funding
- Organization
- Program Delivery

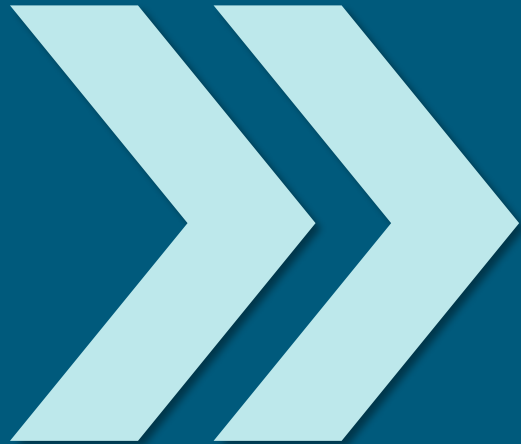
*Note: Active grade separation projects will continue in parallel as the program gets developed*





# Corridor Crossings Program

With the increase in project costs nationwide coupled with limited and competitive funding, Caltrain is focusing its energy on organizing resources on the following over the next decade:



- Identify and prioritize crossing enhancement projects
- Prioritize and facilitate delivery of crossing elimination projects



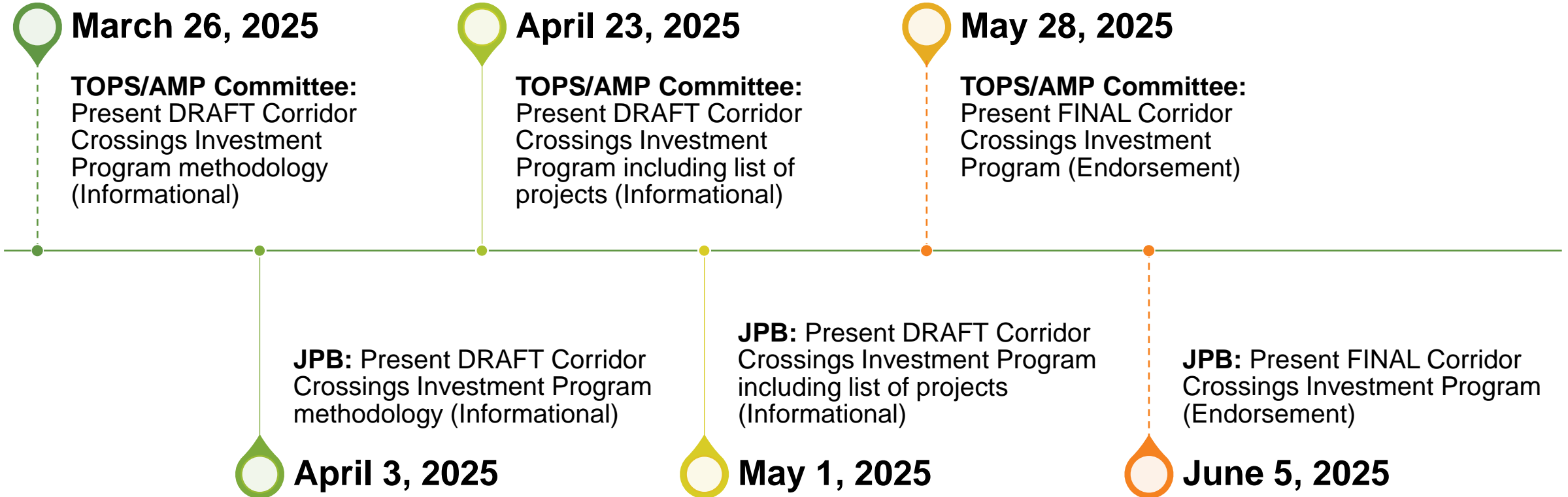
# Corridor Crossings Investment Program

The DRAFT Corridor Crossings Investment Program:

- Documents **prioritization methodology**,
  - Lists **Grade Crossing Enhancement** and **Elimination** projects in funding tiers,
  - Identifies **Project** and **Program** Funding Strategy,
  - Describes additional initial **Caltrain Activities** to enhance delivery, and
  - Outlines **future Program updates**.
- Will be presented at the future TOPS/AMP meetings



# Program Schedule





# Reference Information

**Program Website:**  
<https://www.caltrain.com/CCS>



**Contact Email:**  
[railplanning@caltrain.com](mailto:railplanning@caltrain.com)

# References

*Additional slides to supplement information provided above and for reference*



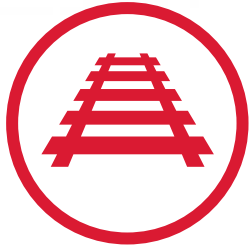
# Active Grade Separation Projects

COUNTY	PROJECT NAME	CROSSING STREET	PROJECT STAGE			
			PLANNING	ENVIRONMENTAL	DESIGN	CONSTRUCTION
San Francisco	Pennsylvania Avenue Extension	<ul style="list-style-type: none"> <li>Mission Bay Dr</li> <li>16th St At 7th</li> </ul>	✓			
San Mateo	South Linden Avenue and Scott Street Grade Separation	<ul style="list-style-type: none"> <li>S Linden Ave</li> <li>Scott St</li> </ul>			✓	
	Burlingame Broadway Grade Separation	<ul style="list-style-type: none"> <li>Broadway</li> </ul>			✓	
	Redwood City Grade Separation Study	<ul style="list-style-type: none"> <li>Whipple Ave</li> <li>Brewster Ave</li> <li>Broadway</li> <li>Maple St</li> <li>Main St</li> <li>Chestnut St</li> </ul>	✓			
	Menlo Park Grade Separation Project	<ul style="list-style-type: none"> <li>Encinal Ave</li> <li>Glenwood Ave</li> <li>Oak Grove Ave</li> <li>Ravenswood Ave</li> </ul>		✓		
	Middle Avenue Undercrossing**	<ul style="list-style-type: none"> <li>Middle Ave</li> </ul>			✓	
Santa Clara	Connecting Palo Alto	<ul style="list-style-type: none"> <li>Palo Alto Ave</li> </ul>	✓			
	Churchill, Meadow, and Charleston Grade Separation Project	<ul style="list-style-type: none"> <li>Churchill Ave</li> <li>Meadow Dr</li> <li>Charleston Rd</li> </ul>		✓		
	South Palo Alto Bike/Ped Connectivity**	<ul style="list-style-type: none"> <li>Two crossings south of Oregon Expressway</li> </ul>	✓			
	Rengstorff Grade Separation	<ul style="list-style-type: none"> <li>Rengstorff Ave</li> </ul>			✓	
	Mountain View Transit Center and Grade Separation*	<ul style="list-style-type: none"> <li>Castro St</li> </ul>			✓	
	Bernardo Avenue Undercrossing**	<ul style="list-style-type: none"> <li>Bernardo Ave</li> </ul>		✓		
	Mary Avenue Grade Separation	<ul style="list-style-type: none"> <li>N Mary Ave</li> </ul>	✓			
	Sunnyvale Avenue Grade Separation	<ul style="list-style-type: none"> <li>N Sunnyvale Ave</li> </ul>	✓			
	Diridon Area Projects	<ul style="list-style-type: none"> <li>Auzerais Ave</li> <li>West Virginia St</li> </ul>	✓			
	Southern San José Grade Separations Project (Union Pacific Rail Road)	<ul style="list-style-type: none"> <li>Skyway Dr</li> <li>Branham Ln</li> <li>Chynoweth Ave</li> </ul>	✓			
	Morgan Hill Grade Separations Project	<ul style="list-style-type: none"> <li>Morgan Hill Station Pedestrian Crossing</li> <li>Dunne Ave</li> <li>Tennant Ave</li> </ul>	✓			

Notes: Information as of January 2025.

\*Crossing Closure and Construct Bike/Pedestrian Only Crossings \*\*Bike/Pedestrian Only Crossings

# Maximum Profile Grade Revision



	CALTRAIN	UPRR	CHSRA	AREMA
Absolute Maximum Profile Grades	2.00%*	2.00%	2.50%	2.00%

\*Grade change will only occur on **Peninsula Main Line** (MP 0.147 to MP 44.0)

- Higher maximum profile grades allow for smaller grade separation footprints to adjacent communities and provides more flexibility in design
- Revised criteria to allow up to 2 percent grade **without a design exception**, subject to review and approval of Caltrain's Director of Engineering
- Considerations if profile is adjusted
  - Overhead Contact System (OCS)
  - Passenger and Freight Operations (Potential Shoofly Tracks)



# Refined 4-Track Segments

## Adopted Service Vision (Moderate Growth Scenario)

Blended Service: **8** Caltrain Trains + **4** HSR Trains

Refined 4-track segments at **Millbrae, Hayward-Hillsdale, Redwood City, and northern Santa Clara County** with length and mile post limits

- Analyses validated the passing track locations to enable the future blended service pattern for both Caltrain and HSR and fulfills Caltrain's obligations to HSR for a blended service system
- Segments **located at stations** to allow for passing trains and increased operational flexibility between trains
- Consistent with past and current planning efforts have shown that Millbrae, Hayward-Hillsdale, and Redwood City can accommodate future 4-track



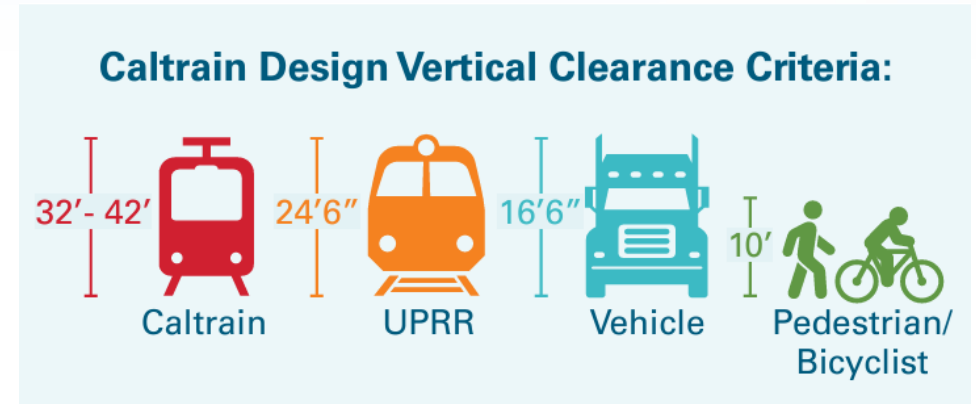
# Refined 4-Track Segments (Cont.)

## North Santa Clara County 4-Track Segment

- 4-Track segments at **Palo Alto**, **California Avenue**, and **San Antonio** stations were analyzed as part of this work
- Flexibility in service operations, impacts to existing community assets and infrastructure, available right-of-way, and engineering criteria were reviewed to evaluate the trade-offs with each options
- As a result of the Analysis, **California Avenue** is the North Santa Clara County 4-Track segment to support the Adopted Service Vision and reflect the PMFA

# Summary of Horizontal and Vertical Clearances

- **Vertical Clearances for Overpasses:** The height of a new overpass over the Caltrain ROW will be governed by the height of the OCS equipment, which varies throughout the corridor
- **Vertical Clearances for Underpasses:** Depth of cover is heavily dependent on construction methods, subsurface factors, and the railroad infrastructure at the crossing
- **Horizontal Clearances:** Horizontal clearances from tracks, equipment, and structures will often dictate the overall width of a grade separation



From Nearest Track Center to	Caltrain	Reference	UPRR	Reference
Adjacent Tangent Track	15'-0"	CDC 2.C.3.1	15'-0" 20'-0" (Preferred)	UPRR STD DWG 0002
Adjacent Tangent Track with Center Fencing	18'-0"	CDC 3.D.1.1.f		
Standard Clearance Envelope (Tangent and Curved Track)*	12'-6"	CSD SD-2002	9'-0"	UPRR STD DWG 0038
Underground Utilities	12'-0"	CSD SD-2002	15'-0"	UPRR/BNSF Guidelines for Temporary Shoring Figure 1
Pole (non-electrical)	10'-0"	CSD SD-9000	15'-0"	UPRR STD DWG 0038

# Design Variance Process



*Partner Cities have requested variance from the Caltrain Design Criteria involving clearances, construction methods, and other factors on grade separation projects*

## Clarified the Design Variance Request Process and Forms

- Project elements must be developed to at least 35% completion, including horizontal geometry, vertical alignment, and profile, to discuss variances
- Variance requests should be submitted using the standard Variance Request form found in Appendix 2 of the Delivery Guide
- Request must be supported by fact-based and cost-benefit analysis
- OCS modifications require a documented, robust analysis separate from a variance request and must consider construction impacts on transit service and future maintenance costs



# Operational Impacts for Construction

## General guidance on the Site-Specific Work Plan (SSWP) process and its key components

- Work scheduling process
- Work protection zones and activities that necessitate worker protection
- Considerations for track closures
  - **Shoofly tracks** – Must consider OCS system, double track operations, available right-of-way (ROW), post-construction demolition, and significant impacts on the project budget
  - **Single-track closures** - Caltrain would **only consider** single-track closures during off-peak and weekend hours



*“Freight rail access must be maintained during closures, as codified in the Trackage Rights Agreement with UPRR”*



# Active Transportation Considerations



Highlighted active transportation components of grade separations

**Facilities are identified and prioritized in the early planning stages of a project**

- Elements include accessible sidewalks, bicycle lanes, multi-use trails, and crosswalks
- Separate facilities when possible (separate vehicle, bike and pedestrian facilities)
- Bike facility type should be selected using NACTO's guidelines
- Design guidelines are provided for pedestrian facility design, shared use path design, and alternatives to bikes dismount signs
- Designs should comply to the updated **Station Access Policy**



Highest Priority → Lowest Priority