



# Caltrain Modernization EMU Procurement Boarding Height

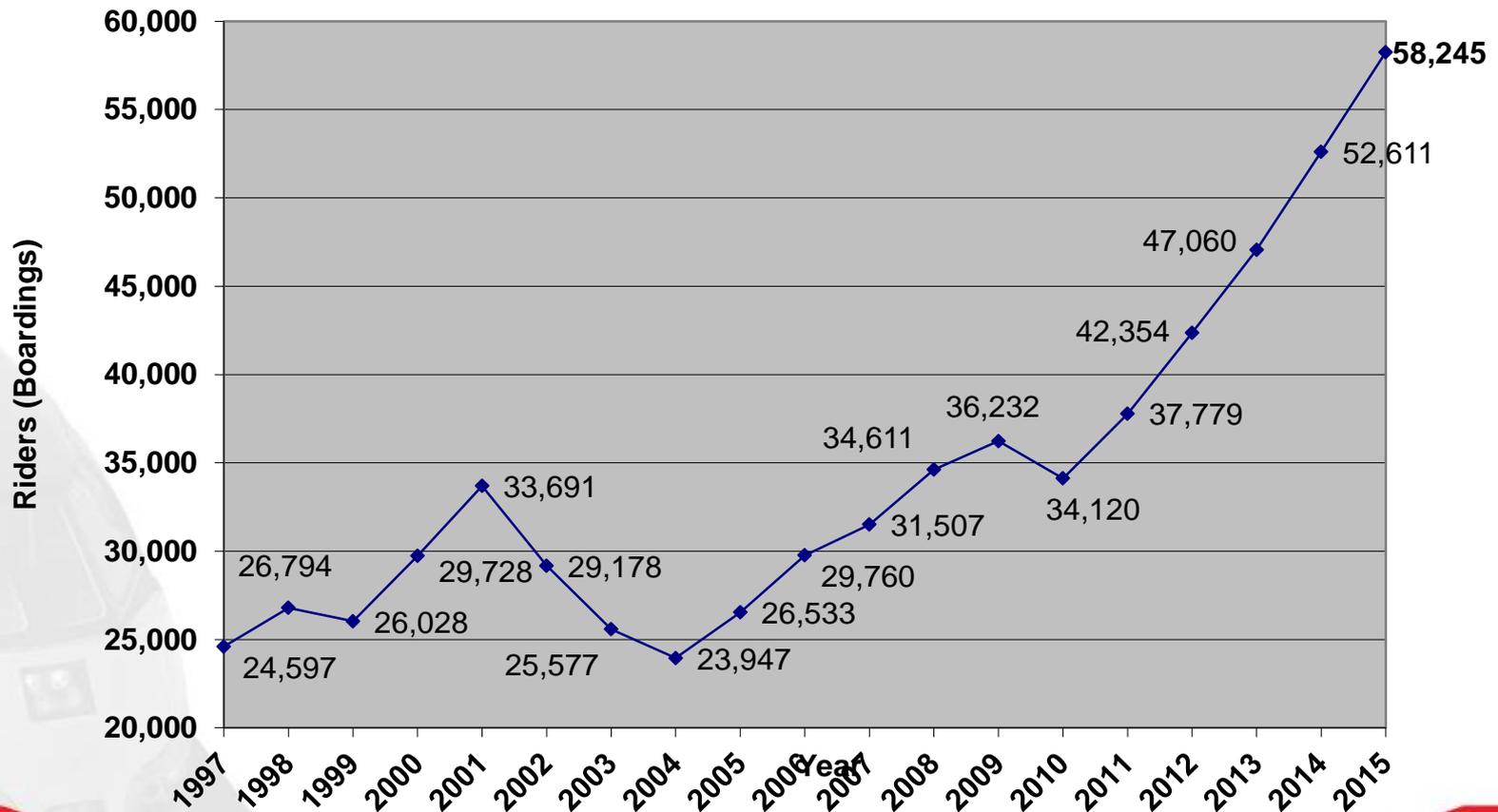
SF Land Use and Economic  
Development Committee  
June 22, 2015

# Context



# Average Weekday Ridership

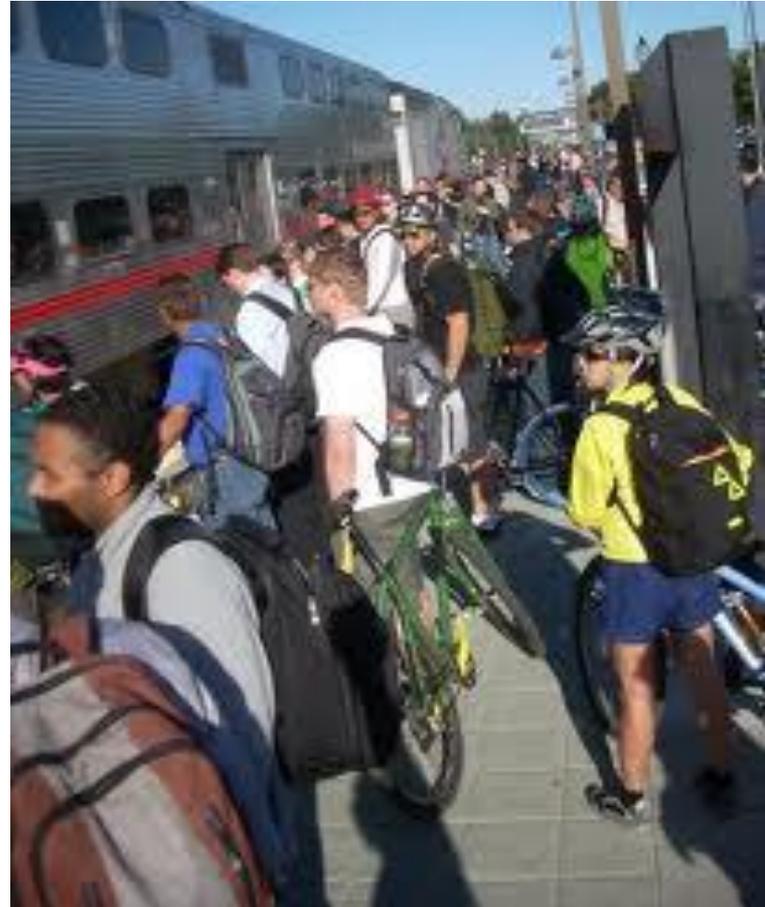
Since 2004 143% increase



# Standees: 2015 Maximum Loads

Northbound		
Depart SJ	Percent of Seated Capacity (low season)	Percent of Seated Capacity (high season)
7:03 AM	135%	158%
7:45 AM	128%	150%
8:03 AM	127%	149%
5:23 PM	122%	143%
6:57 AM	122%	142%
7:50 AM	117%	137%
6:45 AM	108%	126%
6:50 AM	106%	124%
4:39 PM	106%	124%
7:55 AM	103%	121%
8:40 AM	102%	119%
4:23 PM	96%	113%

# Exceeding Capacity Today



# Rider Average Trip

- Caltrain
  - Average trip length 20-28 miles
  - Average trip time 30-50 minutes
- Other Bay Area Transit Systems
  - BART 14 miles / 24 minutes
  - Muni 2.8 miles / variable
  - VTA light rail 5.7 miles / 23 minutes
  - ACE 48 miles / 60+ minutes

# Regional Transportation Needs

- US 101 and Interstate 280 Congested
- Corridor supports growing economy
  - 14% CA GDP; 52% CA patents; 25% CA tax revenue
- Caltrain Commuter Coalition (formed 2014)
  - 75% Caltrain rider's commute to work; 60% choice riders

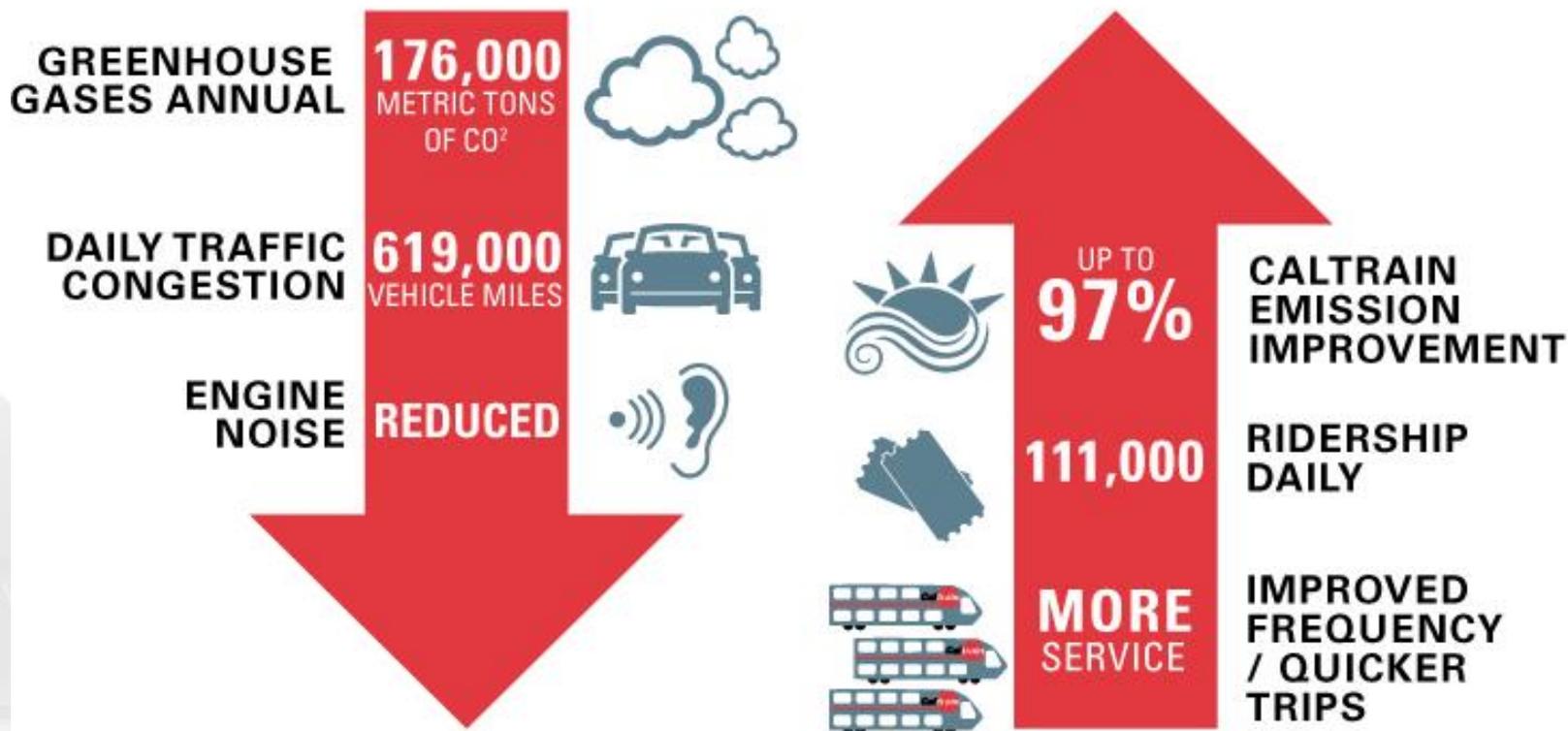


# Need to Maximize Capacity

- Add cars to diesel trains now
- Caltrain Electrification (2020)
  - More trains / serve more riders
  - Increase station stops and/or reduced travel times
- Level boarding and longer trains



# Key Regional Benefits



Note: 2013 Bay Area Council Report, generates \$2.5 billion economic activity and 9,600 jobs

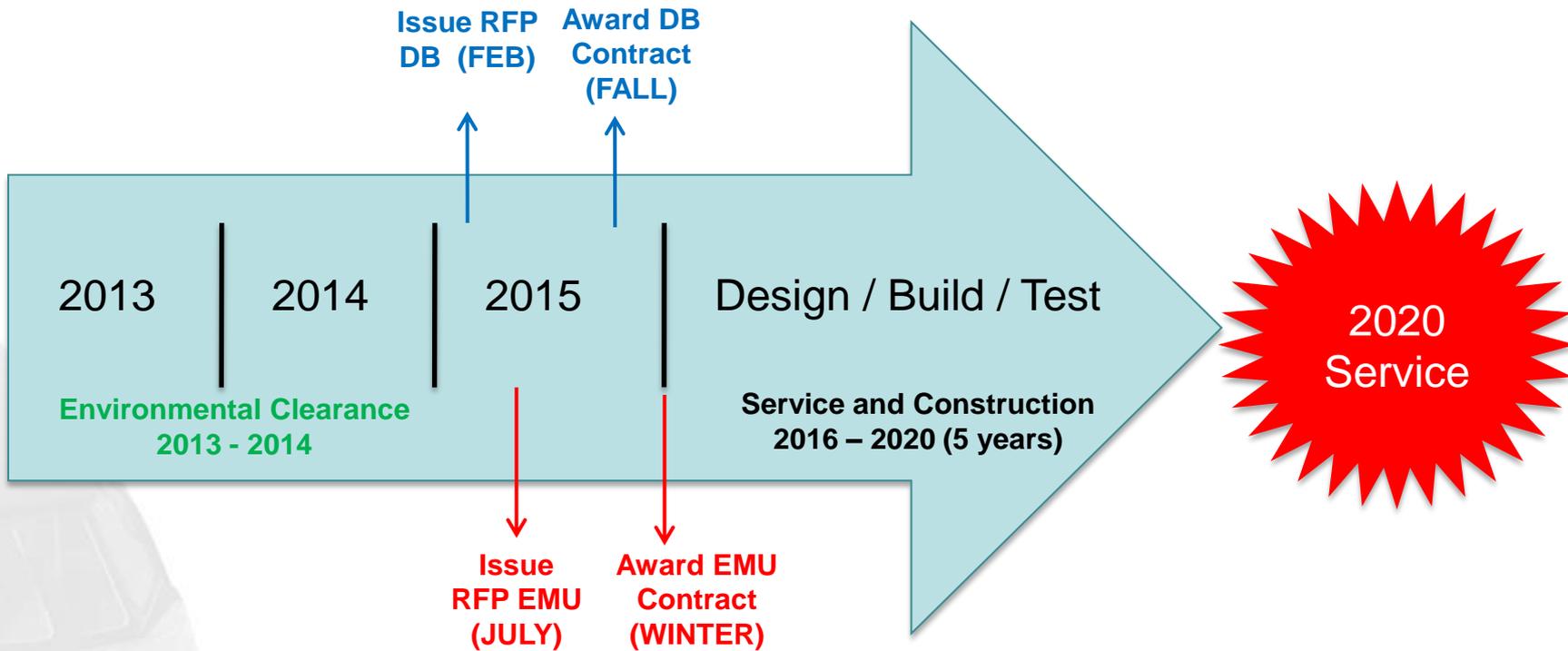
# PCEP Service Benefits

Metric	Today	PCEP
Trains / peak hour / direction	5	6
<b><i>Example Baby Bullet Train</i></b>		
<i>Retain 5-6 stops</i>	<i>60 minutes</i>	<i>45 minutes</i>
<i>Retain SF to SJ 60 minutes</i>	<i>6 stops</i>	<i>13 stops</i>
<b><i>Example Redwood City Station</i></b>		
<i>Train stops / peak hour</i>	<i>3</i>	<i>5</i>

# Electrification Project



# 2020 Revenue Service



Important milestones to meet 2020 service date

## 2 Key Contracts / Milestones

- Design Build Electrification Infrastructure
  - RFQ Issued / 6 Teams Pre Qualified
  - DB RFP Issued
  - Contract Award (Fall 2015)
- Electric Multiple Units (96 cars)
  - RFI Issued (2 – 4 builders interested)
  - **– RFP to be issued July 2015**
  - Contract Award (Winter 2015/2016)

# **EMU Original Plan / Modification Consideration**



# Information to Car Builders

## *Summer 2014*

- Growing Demand
  - Weekday ridership today: 60,000+
  - Weekday ridership future: 110,000+
- Today
  - 20+ mile trips
  - 96%-135% peak weekday (over capacity in low season)
  - 11% bikes on board
- Future
  - Share train slots (6 Caltrain / 4 HSR) per hour / direction

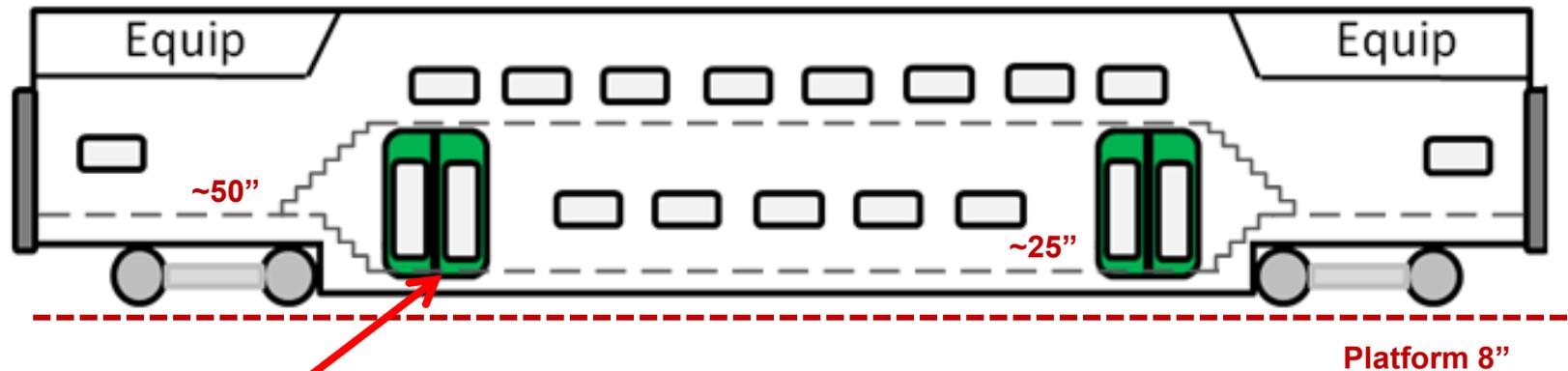
# Request for Information

## *Summer 2014*

Attributes	Industry Confirmation
Maximize Capacity	<ul style="list-style-type: none"> <li>• Bi-level (versus single level)</li> </ul>
Previously Made	<ul style="list-style-type: none"> <li>• Service proven options</li> <li>• Saves costs / time</li> </ul>
US Regulation Compliance	<ul style="list-style-type: none"> <li>• ADA</li> <li>• Buy America</li> <li>• FRA Waiver / Alternative Compliant Vehicles Criteria</li> <li>• Meet Caltrain Technical / Quality Standards</li> </ul>
Floor Threshold	<ul style="list-style-type: none"> <li>• 2 double doors per car (low-level boarding)</li> <li>• ~22" to ~25" most common</li> </ul>

Note: Anticipate adequate competition for the RFP

# Recommended EMU



1-2 steps onboard

- Bi-level car
- 2 double doors (located: ~25" floor)
- Passengers step (1-2) from platform
- ADA passengers and bikes located ~25" level
- ADA use mini highs and wayside lifts

# Similar to Today's Bombardier



# Future Level Boarding

(Beyond Electrification)

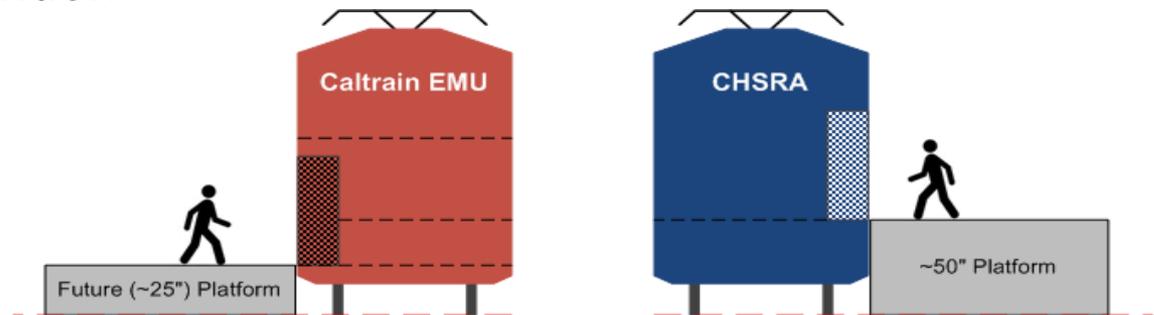
- Important to Caltrain
- Safety enhancements
- Operating efficiencies
- Passenger convenience
- ADA



# Future Level Boarding continued

## (Beyond Electrification)

- Caltrain ~25" Dedicated Level Boarding all stations
- HSR ~50" Dedicated Level Boarding 2 – 3 stations
  - Transbay Terminal Center
  - Millbrae
  - San Jose Diridon



Dedicated Platforms

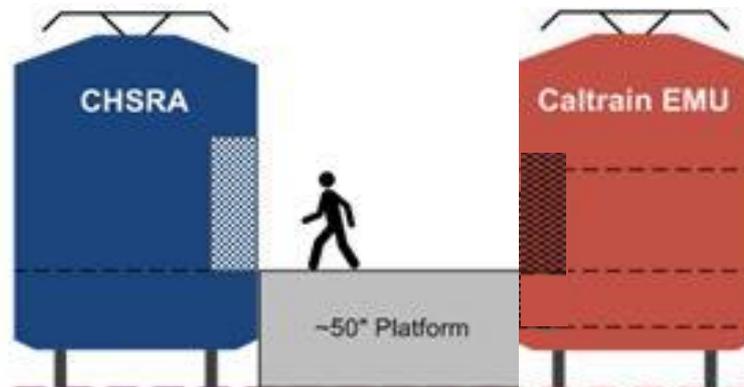
# Level Boarding Challenges

- Lengthy construction period with revenue service
- CPUC waiver needed for freight corridor
- Tenants with different boarding heights
  - Altamont Corridor Express
  - Capitol Corridor
  - Amtrak
- Station area impacts (e.g. ramps, circulation, etc.)

# Request for EMU Modification

# Request for EMU Modifications

- Stakeholder request for car modification
- Caltrain bi-level EMU ~25" boarding height
- HSR single level cars ~50" boarding height (different needs than Caltrain)
- **Can Caltrain modify EMUs to not preclude ~50" boarding in the future?**



# Explore Modification Options

- 6-month effort (Dec 2014 to May 2015)
- Car builder interviews w/ HSR
- Technical analysis w/ HSR
- Caltrain operational assessment

# Car Builder Interviews

- 7 Participated
- Proposed Modification Solutions
  - Option A Cars with more doors  
(Seat loss 60 - 100 per 6-car train)
  - Option B Cars with traps  
(No seat loss, operational challenge)
- Redesign existing vehicles (not starting from scratch)
- Vehicle delivery (2020 revenue service)
- Competition adequate



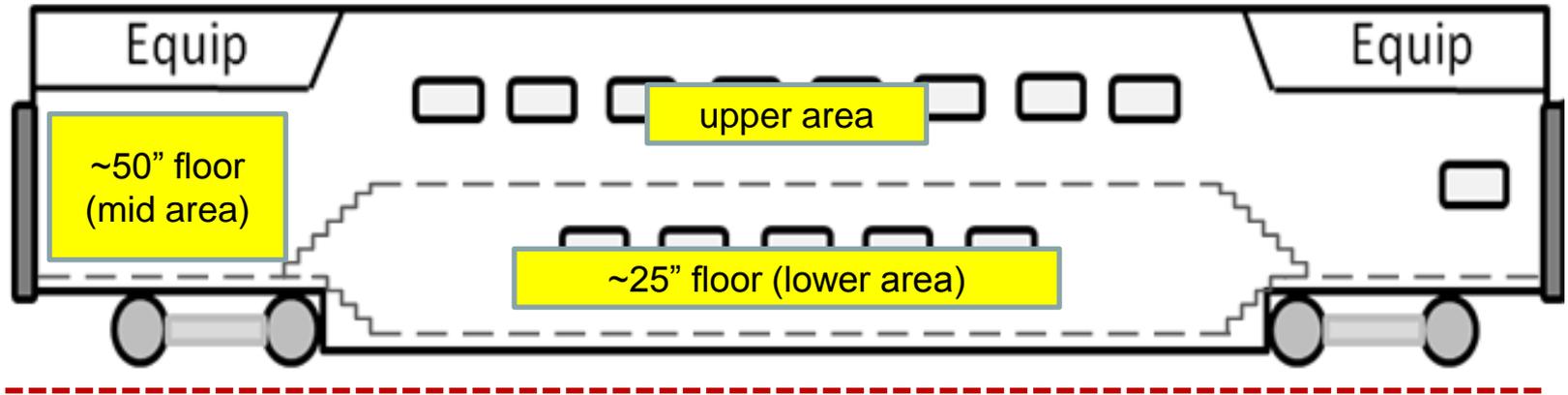
# Caltrain Operational Assessment



# Analysis

- 2 Modification Options
- 2 Timeframes
  - 2020 electrified service without HSR
  - Future blended service with HSR
- Focus Areas
  - Boarding for passengers with and without bikes, ADA
  - Passenger circulation within the cars
  - Operational changes

# Terminology



**Platform 8" Above Top of Rail (ATOR)**



Double Door



Single Door

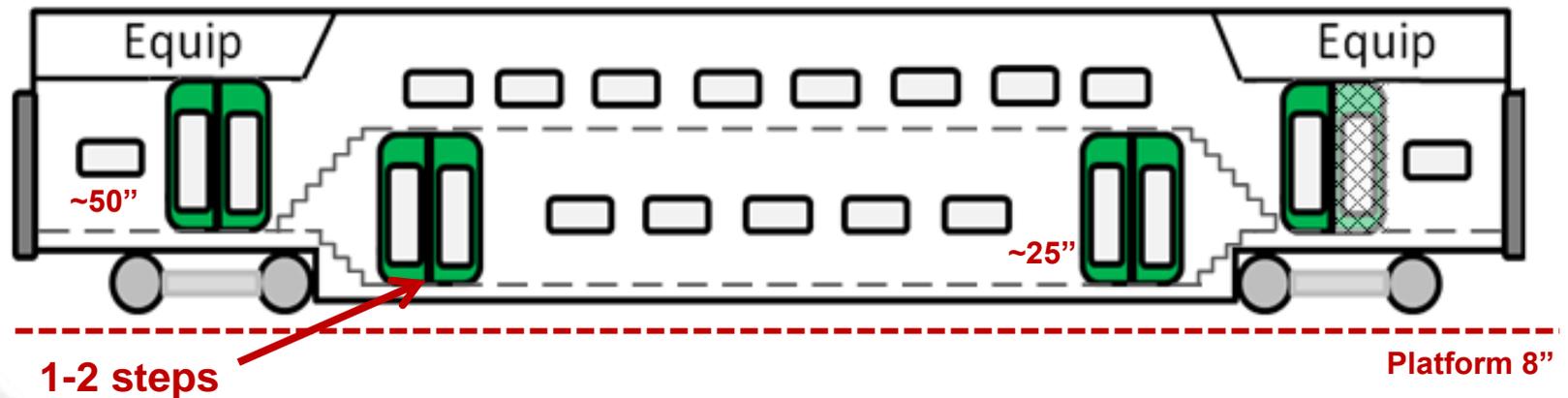
Notes: Caltrain EMU Floor ATOR: 22" - 25" (for this presentation ~25"); HSR Train Floor ATOR: 48" - 51" (for this presentation ~50")

# **2020 Evaluation Mixed EMU and Diesel Service (Using Existing Stations)**



# Modification A (2020)

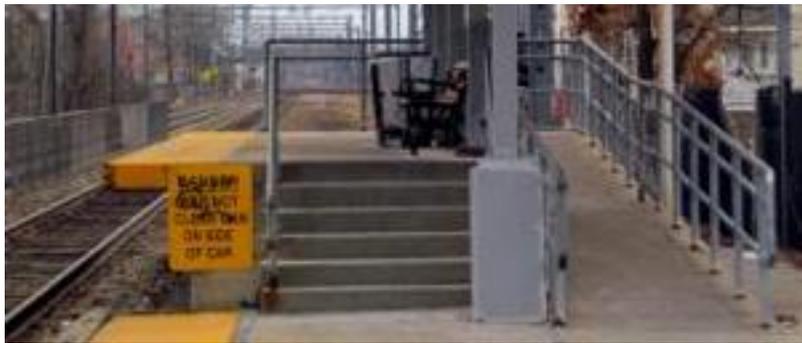
## Cars with More Doors



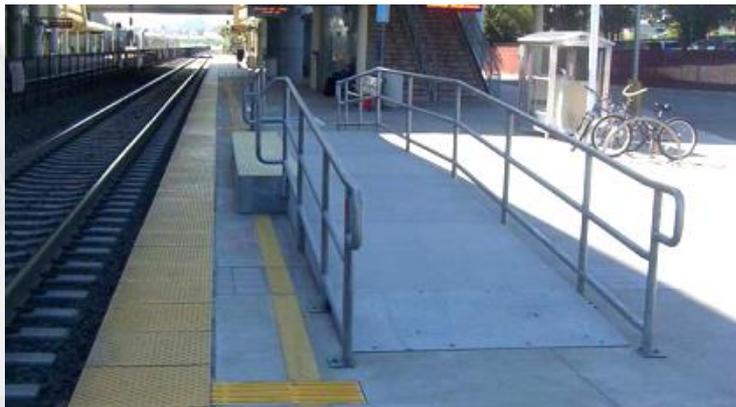
- 4 double doors (located: ~25" & ~50")
- ~50" double doors may not be feasible
- Passengers / bikes use ~25" doors (1-2 steps)
- ADA location TBD
  - Located at ~50" (use high doors: need high blocks / wayside lift)
  - Located at ~25" (use low doors: need mini high / wayside lift)

# Modification A (2020) continued

## *Cars with More Doors*



High Block



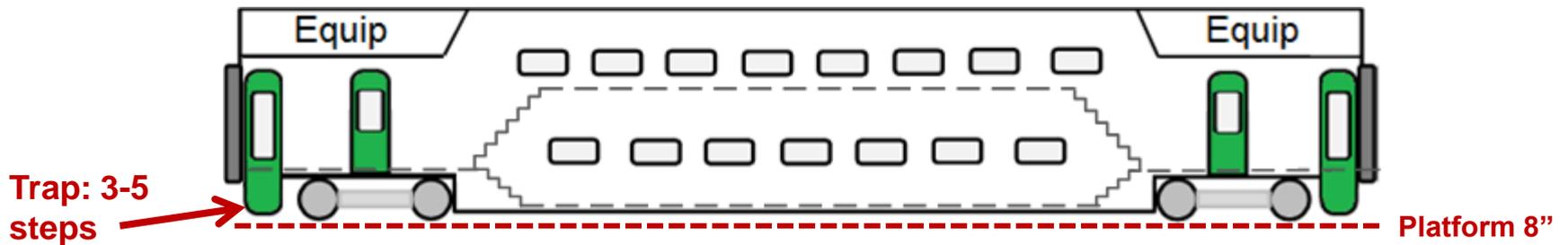
Mini High



Wayside lift

# Modification B (2020)

## Cars with Traps



Open Trap



Close Trap



Single Door w/  
Trap

# Modification B (2020) continued

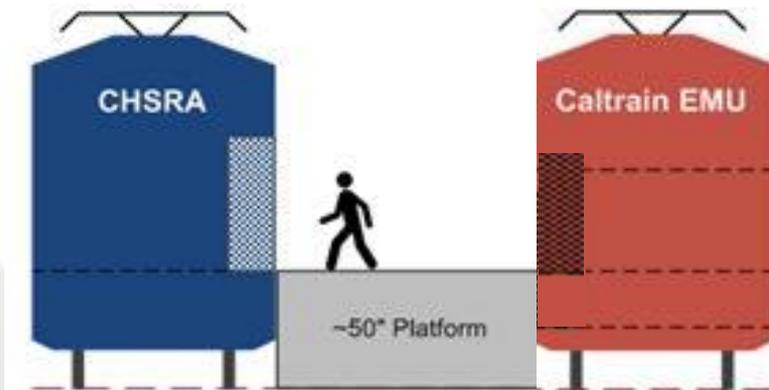
## *Cars with Traps*

- 2 single doors w/ traps, 2 single doors no trap
  - All doors to ~50" floor
- Single door access (longer dwell)
- Passengers/bikes use doors w/ traps (3-5 steps)
  - Taller first step or step stool needed
  - Bikes located ~25" level (additional internal steps down)
- ADA location ~50" level
  - At stations high blocks / wayside lifts
- Automatic / manual traps

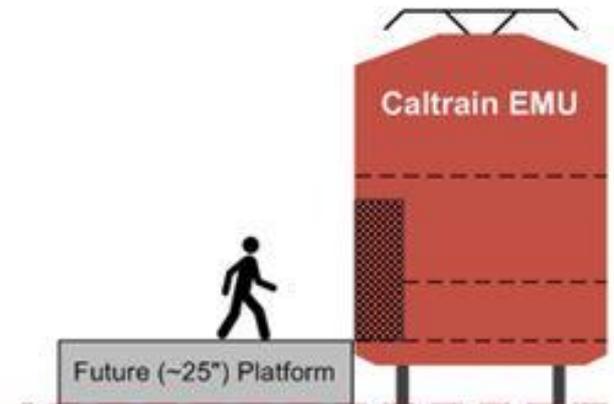
# **Future Blended System Evaluation Full Fleet EMU Service**

**(HSR and Modified Level Boarding Stations)**

# Scenario 1: Shared Platform at HSR Stations Only

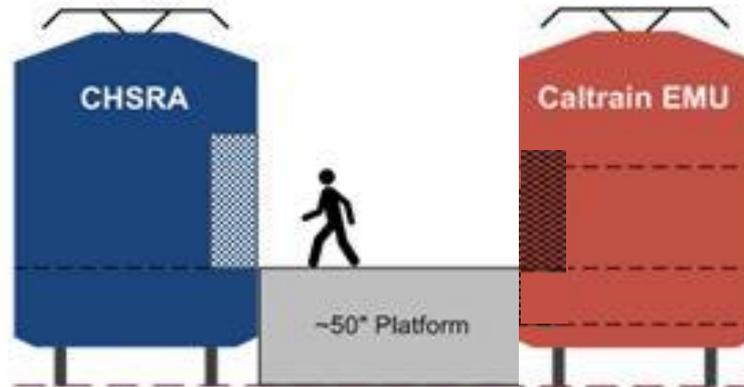


2-3 Stations: Caltrain / HSR  
Stations Common Platforms ~50"



25 Stations: Caltrain Level  
Boarding ~25"

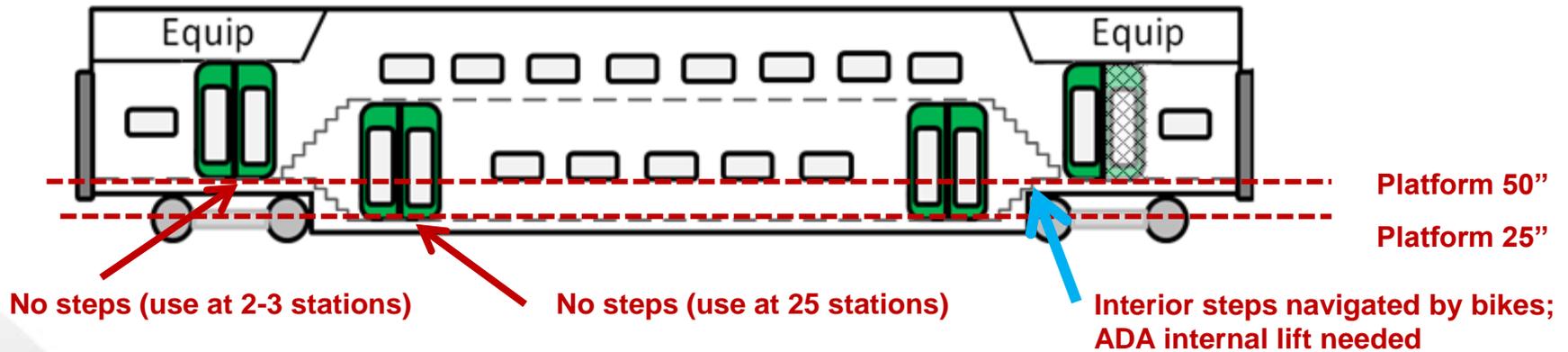
# Scenario 2: Shared Platforms at All Stations



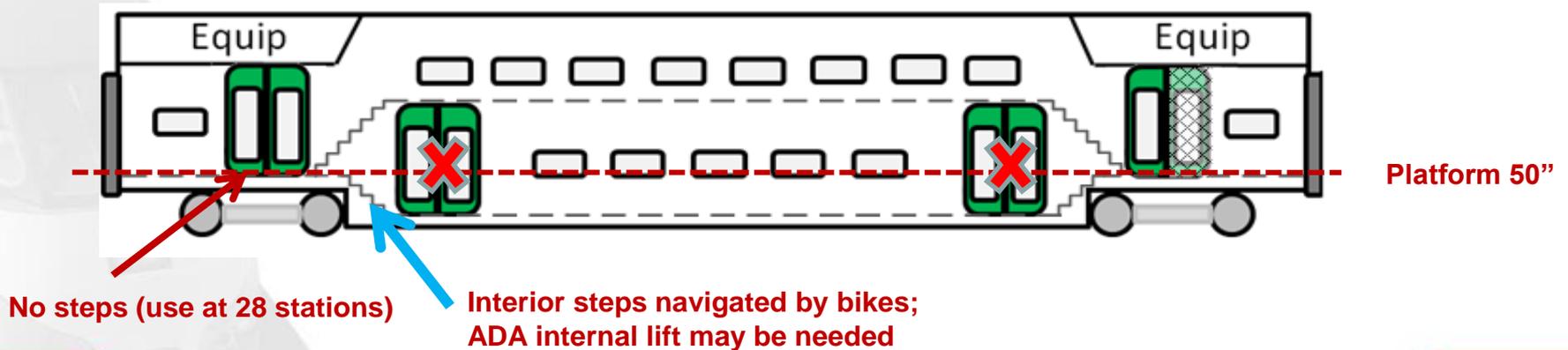
28 Stations: Caltrain / HSR Stations  
Common Platforms ~50"

# Modification A (Future)

## Scenario 1: Shared at 2 – 3 Stations



## Scenario 2: Shared at All Stations



# Modification A (Future Scenarios)

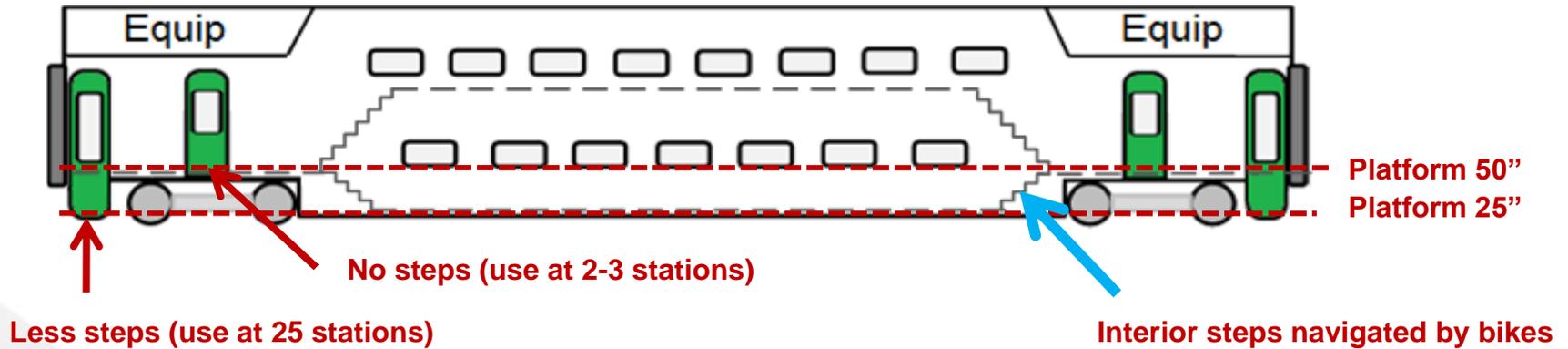
- Scenario 1: Shared at 2 – 3 Stations
  - Continue using both doors
  - Seats cannot be restored
  - Interior lift needed
  - Interior circulation challenges
- Scenario 2: Shared at All Stations
  - Seal low doors and use high doors only
  - Interior reconfiguration / restore seats
  - Bike circulation and storage challenge
  - Interior lift needed if ADA ~25" level



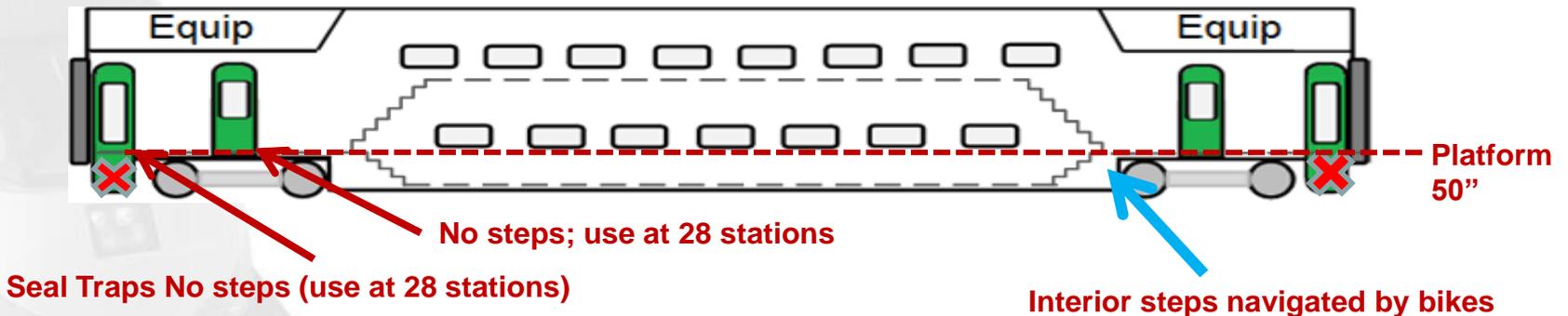
Interior lift

# Modification B (Future)

## Scenario 1: Shared at 2 – 3 Stations



## Scenario 2: Shared at All Stations



## Modification B (Future Scenarios)

- Scenario 1: Shared at 2 - 3 Stations
  - Continue using traps (longer dwell)
  - Interior circulation challenges
- Scenario 2: Shared at All Stations
  - Seal traps
  - Single door (dwell impacts)
  - Bike circulation and storage challenge

# Potential Path Forward



# Framework

- HSR / Caltrain blended system partnership
- Blended system not yet defined
  - Community planning
  - Environmental evaluation
- Early investment program (defined / environmentally cleared)
  - CBOSS PTC (2015)
  - Electrification Project (2020)
- Need to make EMU design decision now to not preclude common platforms w/ HSR in future

# Cars with More Doors Option

- Challenges Associated with More Doors
  - Seat loss / Passenger circulation inside car
- Short-term Solution (2020)
  - Design car with 2 sets of doors
  - Keep high doors sealed / use low doors
  - Car configured similar to original EMUs (mitigate challenges)
  - Request HSR to fund modification costs
- Future Blended System (TBD)
  - Evaluate use of high doors (~50")
  - Associated car interior reconfiguration

# Future Blended Service

- Additional Work Needed
- Community Planning / Environmental Review
- Blended System Definition
  - Service Plan
  - System Upgrades
  - Infrastructure (passing tracks, maintenance facility)
  - HSR Stations / Caltrain Station Modifications

# Next Steps

# May – July Activities

- Public Meetings
- Release Draft RFP to Car Builders
- June JPB
  - Update on proposed path forward
  - Seats/Standees/Bikes/Bathroom balance
- July JPB
  - Release EMU RFP
  - Regional funding plan update

# Questions

website: [www.caltrain.com/emu](http://www.caltrain.com/emu)

email: [calmod@caltrain.com](mailto:calmod@caltrain.com)