Agenda Item #3-Presentation,
Shared at Meeting
XCAP Meeting - Jan. 29, 2020

Palo Alto XCAP

January 29 2020

Overview

Presenter:

- Sebastian Petty, Deputy Chief of Planning

Focus:

- Caltrain Business Plan
- Caltrain Long-Range Plans
- Agency Policy and Process

Not able to provide detailed answers to questions about specific standards, engineering or construction concepts or specific comments on individual alternatives being considered

Questions

Caltrain Operations Now

- Is there any reason that Caltrain can’t increase schedules to 6 trains/hour in each direction before electrification is complete, to alleviate overcrowding and standees on many trains?
- Why doesn’t Caltrain run more midday service now?

Electrification Schedule

- Is the overall electrification project on schedule? If not, what is the new estimated completion date?
- What are the risks to the schedule?

Operations After Electrification

- According to best information, current Caltrain funding is sufficient for new EMU trainsets to replace only 75% of the current fleet. Is this true? How much of the current fleet of diesel engines and diesel-hauled coaches will remain in operation to support current schedules? Are there any plans to get funding to replace the remaining 25% of the diesel engine and coach fleet with EMU trainsets?

- How is mixing diesel and electric expected to impact the schedules in the short term and does this delay more frequent midday service until Caltrain is fully electrified?

- How much of the current fleet of engines and coaches will be needed to cover a service increase to 6 trains/hour/direction? Are there any plans to get funding for the additional EMU trainsets needed?

Operations After Electrification

- How will diesel-engine powered trains affect overall schedules as headways are reduced, since diesel engine powered trains cannot accelerate or decelerate as fast EMU trainsets?
- How many years until the current MP 36 and F40 engines reach end of life? Will they be replaced with new diesel engines or with EMU trainsets?
- How much of the current fleet of engines and coaches will be needed to cover a service increase to 6 trains/hour/direction? Are there any plans to get funding for the additional EMU trainsets needed?

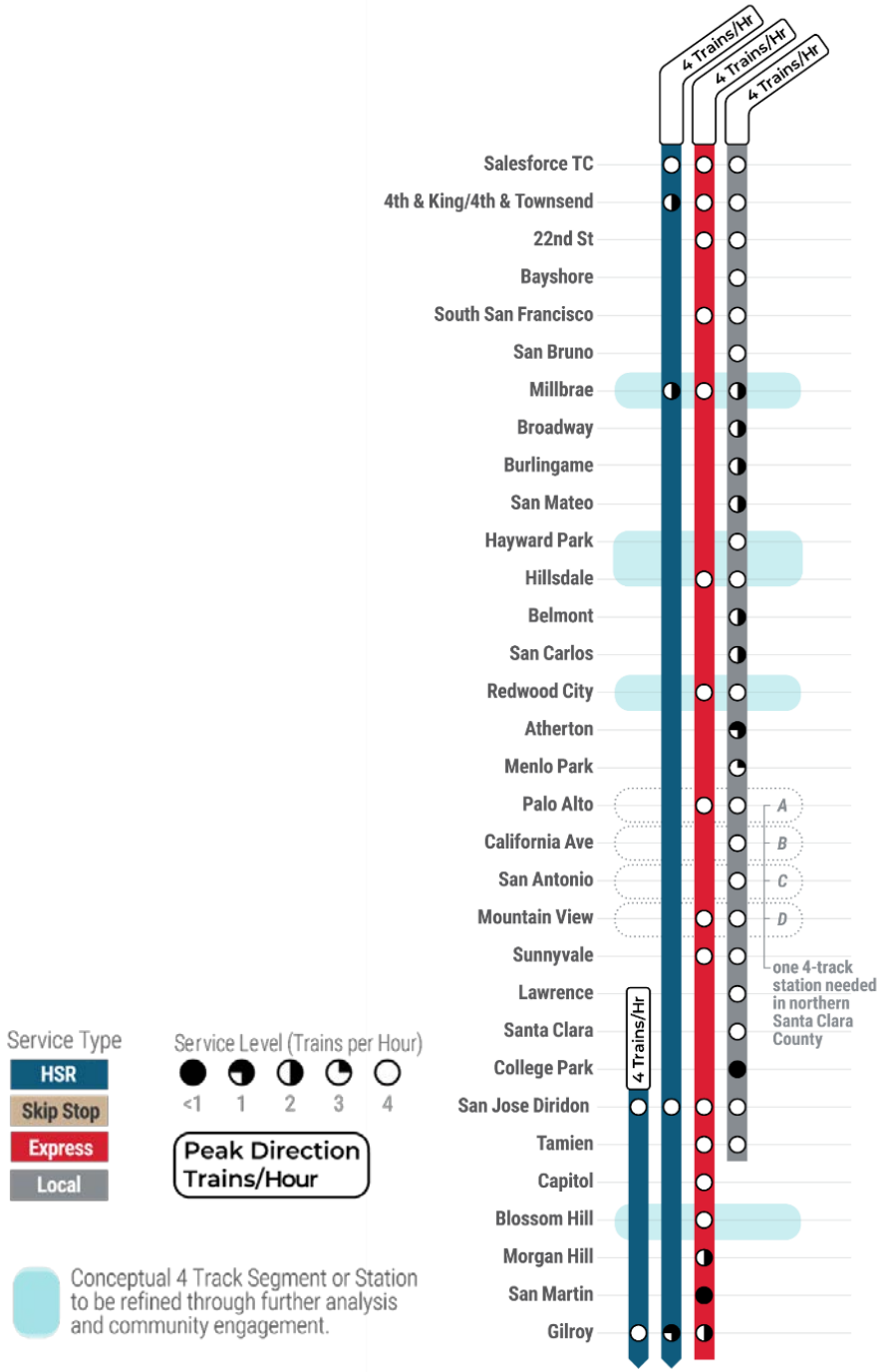
Operations After Electrification

- We know Caltrain plans to run more trains once electrified and the Business Plan shows Caltrain will run much more frequent all day service in the future. When will Caltrain release information of what happens in the in between (2023 - ?) When might midday service significantly increase? We are trying to understand when we will “feel the pain” of gridlock - so any understanding of even the process to determine the service post 2023 is helpful.

Caltrain's 2040 Service Vision

Illustrative Service Details

Trains per Hour, per Direction	Peak: 8 Caltrain + 4 HSR Off-Peak: Up to 6 Caltrain + 3 HSR
Stopping Pattern	Local / Express with timed transfer in Mid Peninsula
Travel Time, STC-Diridon	61 Min (Express) 85 Min (Local)
New Passing Tracks	Millbrae, Hayward Park-Hillsdale, Redwood City area, Northern Santa Clara County, Blossom Hill
Service Plan Description	• Local and Express trains each operating at 15-minute frequencies with timed cross-platform transfer at Redwood City • All trains serve Sales For Transit Center • Trains serve Capitol and Blossom Hill every 15 minutes and Morgan Hill and Gilroy every 30 minutes • Skip stop pattern for some mid-Peninsula stations



Caltrain's 2040 Service Vision - Investments

CAPITAL COSTS

$23 BILLION
TOTAL CAPITAL COSTS*

Capital costs include all projects from SF to Gilroy, knitting together a connected corridor with greatly improved service.

$9.4B
GRADE SEPARATIONS

$7.8B
TERMINAL IMPROVEMENTS

$3.3B
RAIL INFRASTRUCTURE AND SYSTEMS

$1.4B
STATION IMPROVEMENTS

$1.1B
FLEET UPGRADES

OPERATING COSTS

$370 MILLION
2040 ANNUAL OPERATING COSTS*

Caltrain is one of the leanest, most efficient transit services in the country. Today's annual operating and maintenance costs are $135 million, and 73% is covered by fares. The vision would benefit from a similarly high farebox recovery ratio.

$266M
OPERATING COSTS COVERED BY FAREBOX (72%)

$104M
ANNUAL OPERATING INVESTMENT NEEDED (28%)

Getting to the 2040 Vision

The “path” of milestone service improvements and investments used in initial Business Plan work was based on a simplified version of the existing plans of Caltrain and its partner agencies

Amount of Investment / Number of Trains

2018
Diesel Fleet

- 5 Caltrain trains per hour, per direction (phpd), existing varied schedule
- Hourly off peak service

2022
Start of Electrified Operations

- 6 Caltrain trains phpd, skip stop service
- Expansion to 7-car trains
- 30 minute off peak service

2029
HSR Valley to Valley & Downtown Extension

- 6 Caltrain trains phpd, skip stop service
- Full electrification and expansion to 8- car trains
- 30 minute off peak service
- Service to Downtown SF via DTX
- Up to 2 HSR phpd

2033
High Speed Rail Phase 1, SF to LA

- 6 Caltrain trains phpd
- 8- car trains
- Skip stop service
- 30 minute off peak service
- Service to Downtown SF via DTX
- Up to 4 HSR phpd

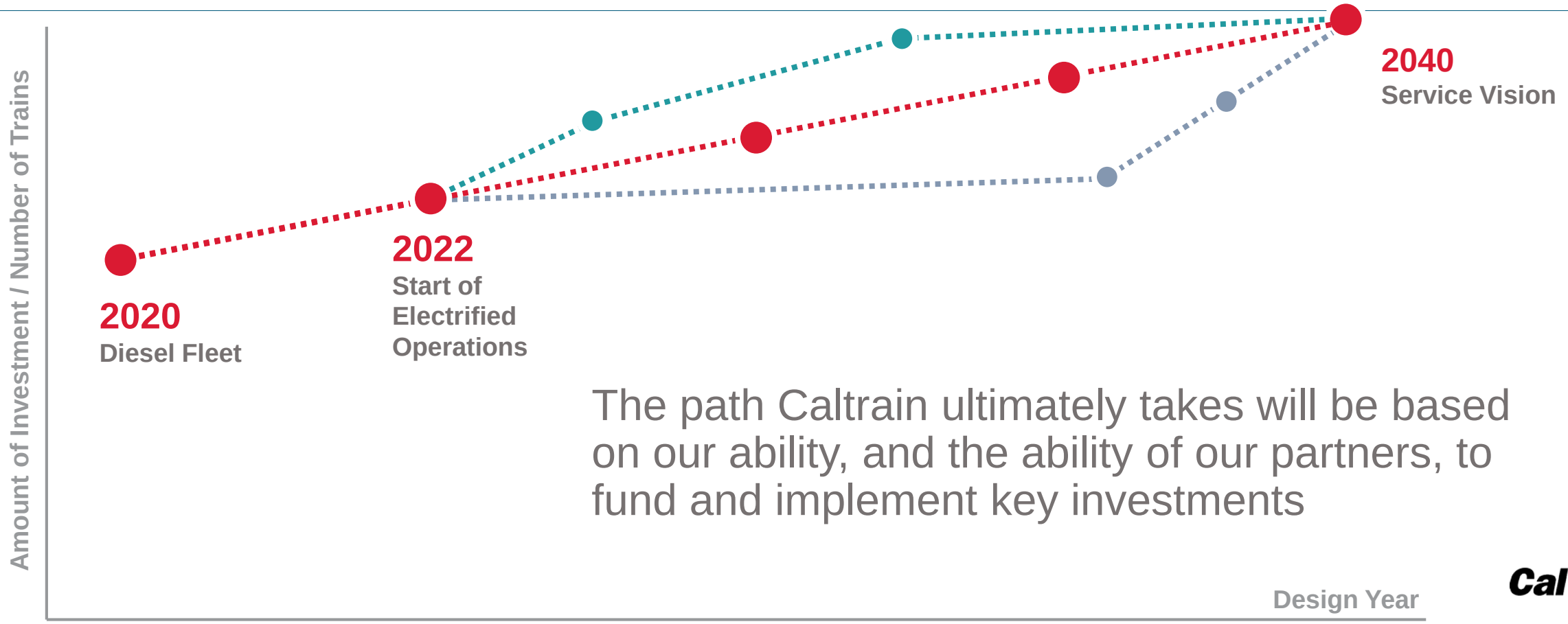
2040
Service Vision

- 8 Caltrain trains phpd, regular express + local service
- Up to 10-car train lengths
- Up to 10 min off peak service
- Service to Downtown SF via DTX
- Significantly increased service to South San Jose and South Santa Clara County
- Up to 4 HSR phpd

Design Year

Getting to the 2040 Vision

With a long-range Service Vision established, we can optimize our approach. We can explore different "paths" or incremental steps that allow us to deliver improved service sooner



The path Caltrain ultimately takes will be based on our ability, and the ability of our partners, to fund and implement key investments

Understanding Demand

Daily ridership demand for Caltrain service will likely exceed 90,000 passengers in the next decade. This growth is driven by several factors:

Latent Demand

Improving Caltrain service and increasing capacity will make Caltrain more appealing for a wider range of trips

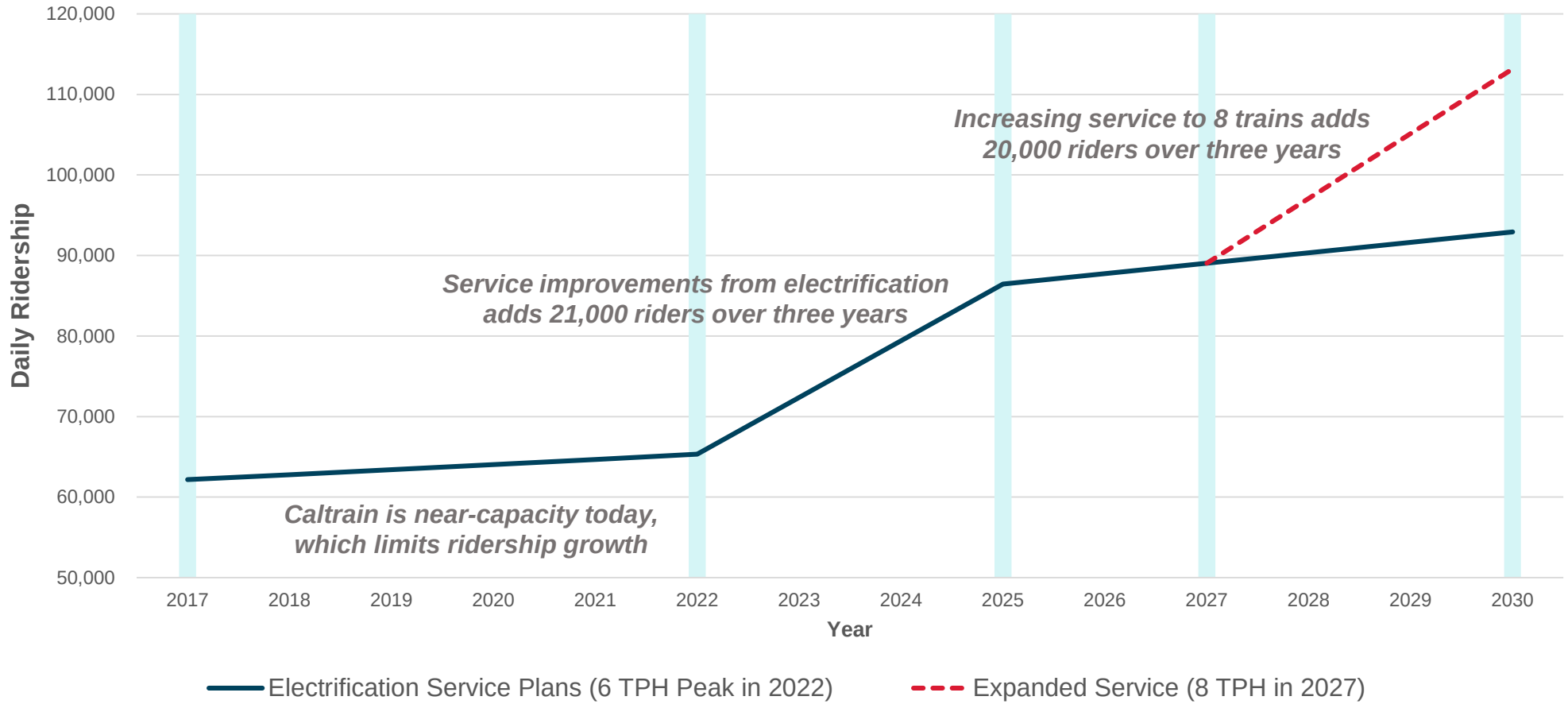
Population and Employment Growth

Station areas will add over 100,000 new residents and employees within ½ mile of Caltrain stations, a ~30% increase over existing

Improved Connectivity

New connections like the Central Subway will extend Caltrain's reach

Change in Weekday Ridership Over Time



Adding Capacity and Increasing Service to Grow Ridership

Toward the end of the 2020s, Caltrain is expected to reach capacity during peak hours.

Caltrain will not be able to accommodate additional ridership growth in the 2030s without adding capacity. This poses a challenge for accomodating land use growth, DTX, Dumbarton rail, and other potential changes on the corridor.

While smaller, interim improvements may ease capacity, the most significant improvement to service and capacity involves expanding service to eight trains per hour, per direction.

An Interim Step- Not the Full 2040 Service Vision

Increasing mainline service in the mid- to late 2020's would be an interim step- not the full implementation of the 2040 Service Vision.

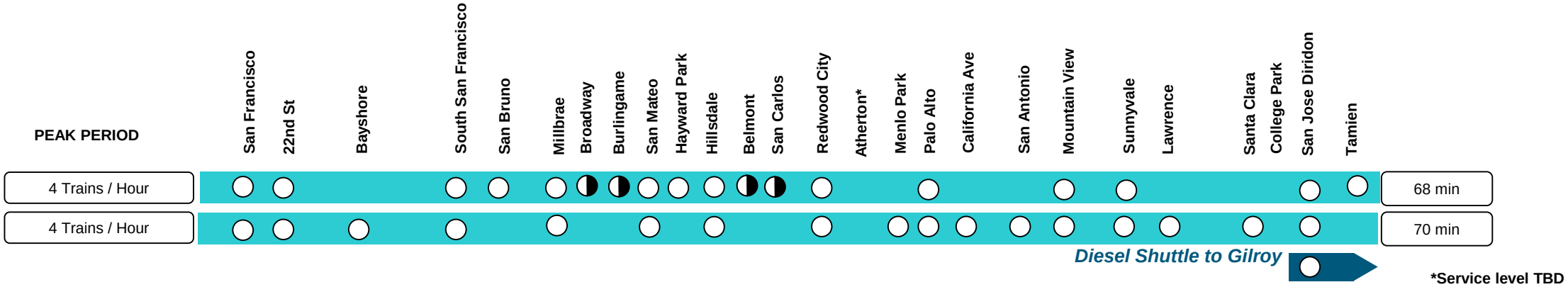
Major investments at terminals and in passing tracks infrastructure are not assumed.

Making near-term, tactical investments to increase service to 8 trains per hour per direction would *precede* the full buildout of the 2040 Service Vision. As such, many important aspects of the 2040 Service Vision would not yet be fully achieved, including:

- Ability to operate a peak-hour express / local service pattern with timed transfers
- Ability to lengthen trains to 8- or 10-cars
- Direct service to downtown San Francisco
- Greatly expanded and electrified service south of Tamien Station to Gilroy

Fully achieving the 2040 Service Vision would require the overall buildout discussed and documented in the Business Plan process to date.

8 Train Illustrative Service Plan

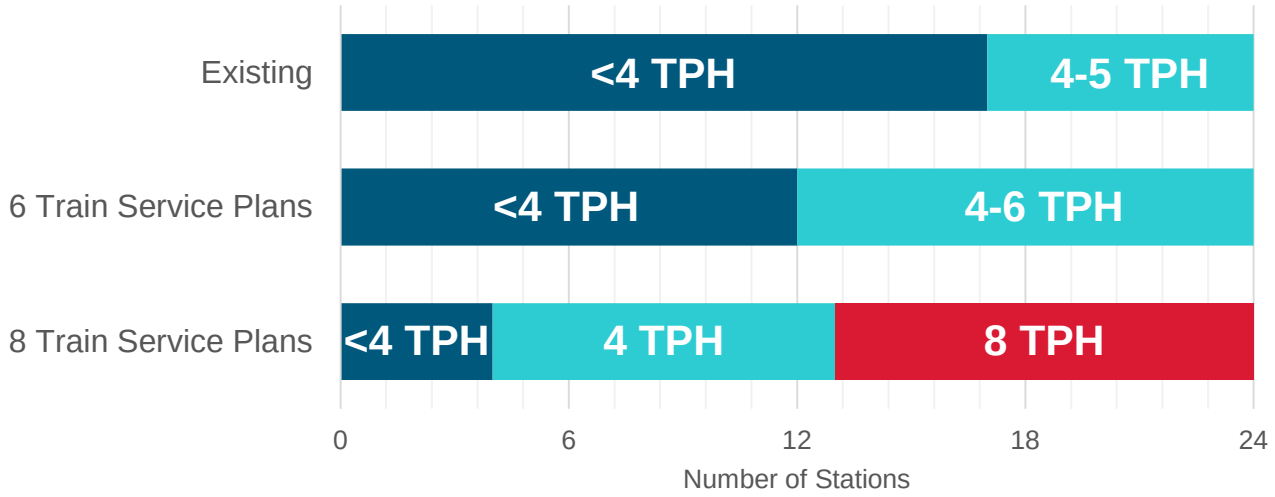


- An 8-train Caltrain service would likely look like a hybrid of the zone express and skip stop patterns with 8 trains per hour, per direction.
- There is limited flexibility in the service structure due to lack of new passing tracks and the constraints of Caltrain's existing signal system.
- Diesel service to/from Gilroy would terminate at San Jose with a timed transfer mainline service. This service could be increased to 5 round trips per day and would have more flexibility to customize departure and arrival times based on public input.

Increasing Service at Stations

Increasing service from six to eight trains per hour, per direction enables more frequent service to more stations.

With an interim 8 tphpd service, 20 of 24 mainline stations would receive at least four trains per hour, per direction, and nearly half of stations would receive eight trains per hour, per direction.

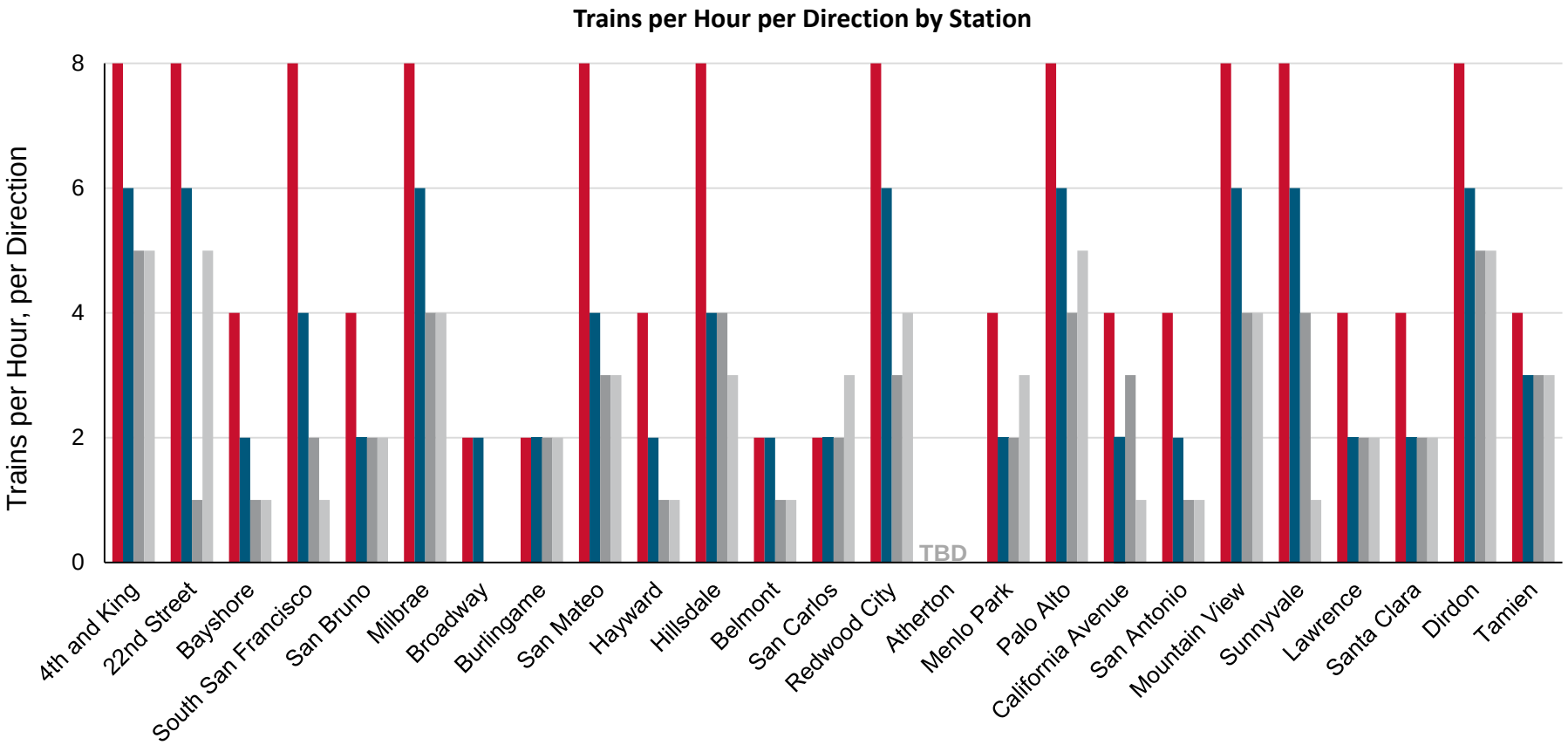


Increasing Service to Stations

20 stations could receive at least four trains per hour, per direction.

Illustrative Change in Peak Period Service Levels

- Illustrative service at expanded “8tph plan”
- Illustrative service at initial CalMod level
- Existing NB AM/SB PM
- Existing SB AM/NB PM



Overall Investments

The following parallel and programmatic investments are assumed to be occurring throughout the 2020's- they are needed to support the overall success of the system and the full implementation of the 2040 Service Vision

Grade Separations

Planning and construction of grade separations and grade crossing improvements

Station Improvements

Programmatic improvements to Caltrain stations and investments in station access and connectivity

Major Investments

Work on major terminal projects (including Diridon and DTX), major station investments, and partner projects including HSR

What Specific Incremental Investments and Changes Would be Needed?

The following key investments would specifically be needed to implement an interim 8-tph service. These investments are consistent with the overall program assumed in the 2040 Service Vision

Expanded EMU Fleet

To provide 8 tphpd direction mainline service, Caltrain will need to expand its EMU fleet

More Train Storage

The railroad will need to add storage capacity to accommodate additional trainsets

Holdout Rule Elimination

Once 8 trains per hour per direction are operating on the corridor, remaining “holdout” rule stations will need to be rebuilt or closed

What Specific Incremental Investments and Changes Would be Needed?

The following key investments would specifically be needed to implement an interim 8-tph service. These investments are consistent with the overall program assumed in the 2040 Service Vision

Level Boarding

Level boarding is needed to ensure reliability and to keep dwell times as short as possible

Gilroy-SJ Shuttle Service

Remaining diesel service south of Tamien would be converted to a shuttle service until the UP corridor is rebuilt and electrified. Service levels could be increased to 5 round trips per day under existing agreements with UP

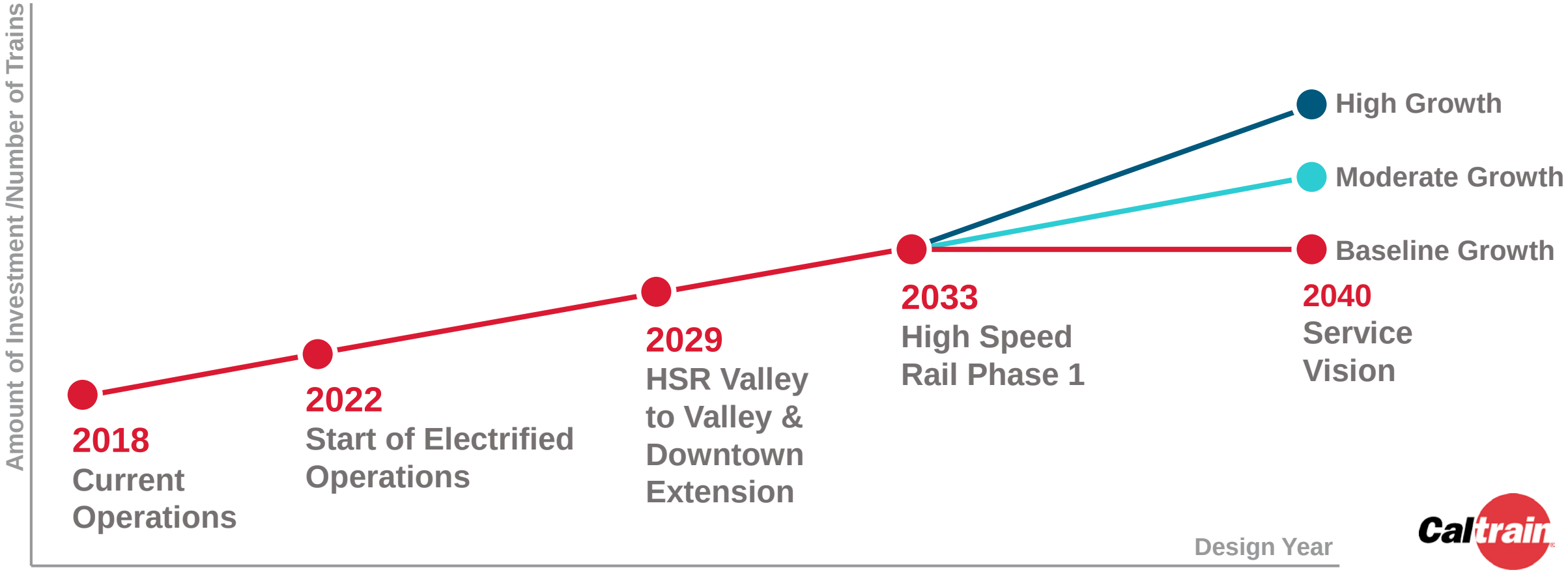
Minor Track Work

Minor track work would be needed to accommodate increased train volumes around Diridon Station

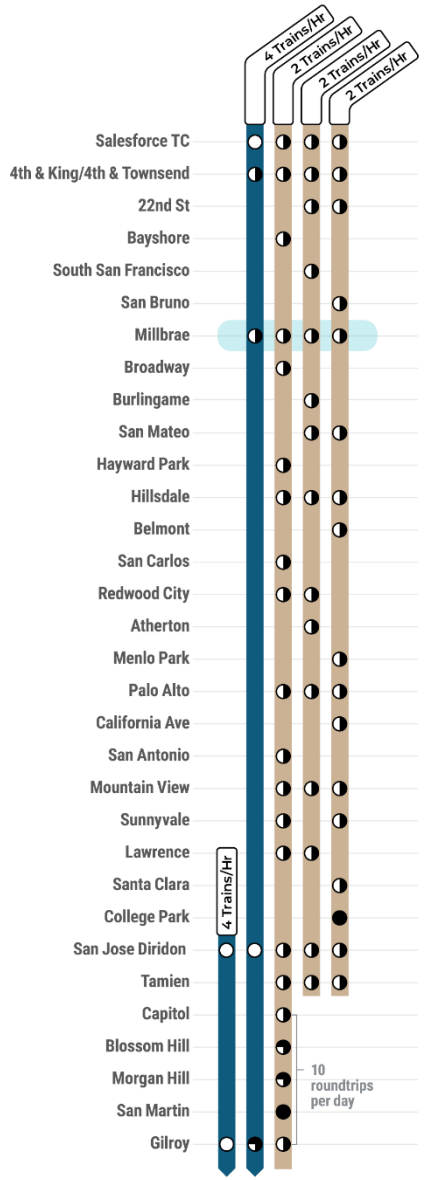
Passing Tracks in Palo Alto

- What is our contingency plan if we need passing lane(s) in Palo Alto? How do we get some more definitive information about four-tracking requirements from Caltrain?
- Can we overlay any possible future four-track passing sections against the current maps of alternatives?

How Much Service Should Caltrain Provide?



2040 Baseline Growth Scenario



Trains per Hour, per Direction	Peak: 6 Caltrain + 4 HSR Off-Peak: 3 Caltrain + 3 HSR
Stopping Pattern	Skip stop
Travel Time, STC-Diridon	69-73 Min
New Passing Tracks	Millbrae
Service Plan Description	• Bunched service results in irregular Caltrain headways; each pattern arrives over span of 10 minutes, then a 20-minute gap between trains • Three half-hourly skip stop patterns each with similar travel times • South of Tamien, peak-direction skip stop service with 10 round trips per day

Service Type

- HSR
- Skip Stop
- Express
- Local

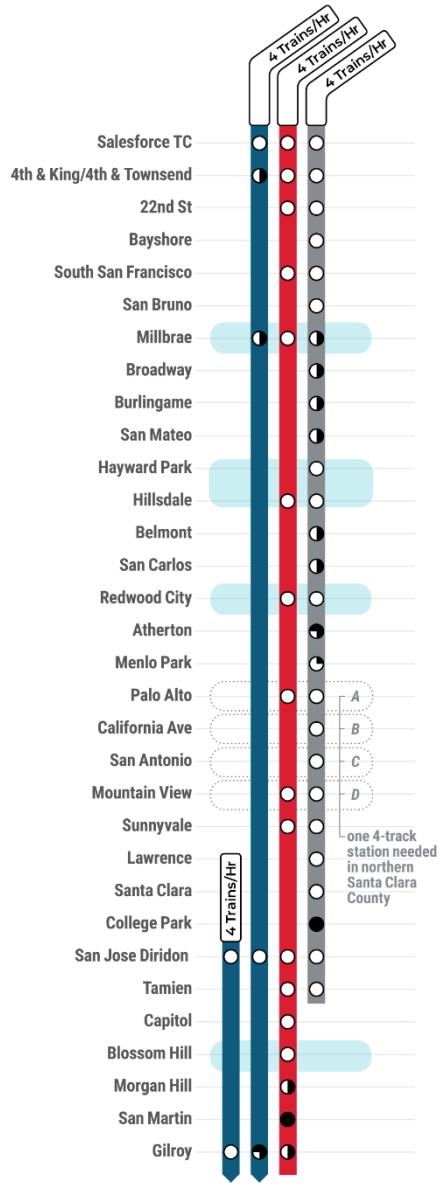
Service Level (Trains per Hour)

<1 1 2 3 4

Peak Direction Trains/Hour

Conceptual 4 Track Segment or Station to be refined through further analysis and community engagement.

2040 Moderate Growth Scenario



Trains per Hour, per Direction	Peak: 8 Caltrain + 4 HSR Off-Peak: 6 Caltrain + 3 HSR
Stopping Pattern	Local / Express with timed transfer at Redwood City
Travel Time, STC-Diridon	61 Min (Express) 85 Min (Local)
New Passing Tracks	Millbrae, Hayward Park-Hillsdale, Redwood City, Northern Santa Clara County, Blossom Hill
Service Plan Description	• Local and Express trains each operating at 15-minute frequencies with timed cross-platform transfer at Redwood City • Skip stop pattern for some mid-Peninsula stations; some origin-destination pairs not served at all • Trains serve Capitol and Blossom Hill every 15 minutes and Morgan Hill and Gilroy every 30 minutes

Service Type

- HSR
- Skip Stop
- Express
- Local

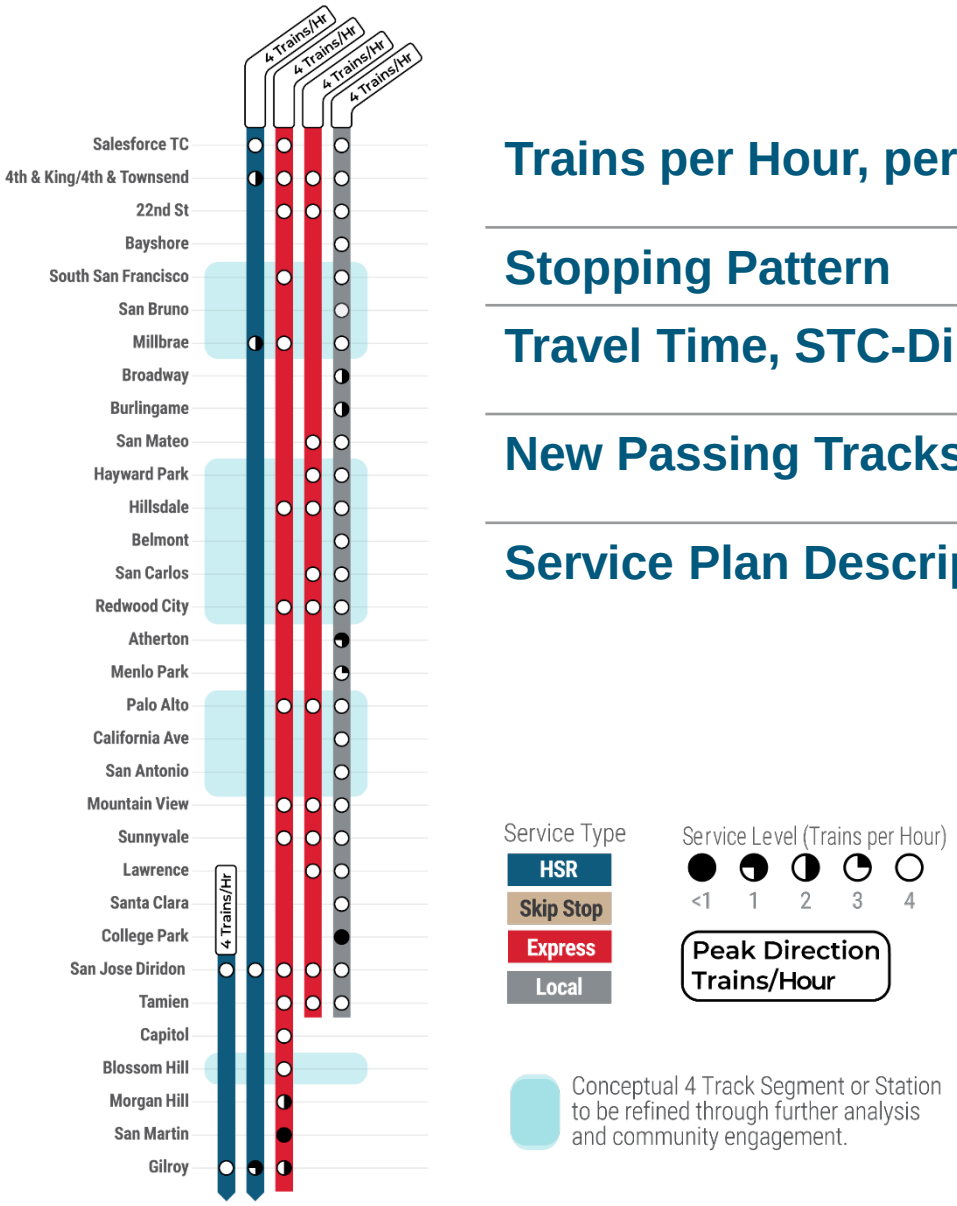
Service Level (Trains per Hour)

<1 1 2 3 4

Peak Direction Trains/Hour

Conceptual 4 Track Segment or Station to be refined through further analysis and community engagement.

2040 High Growth Scenario



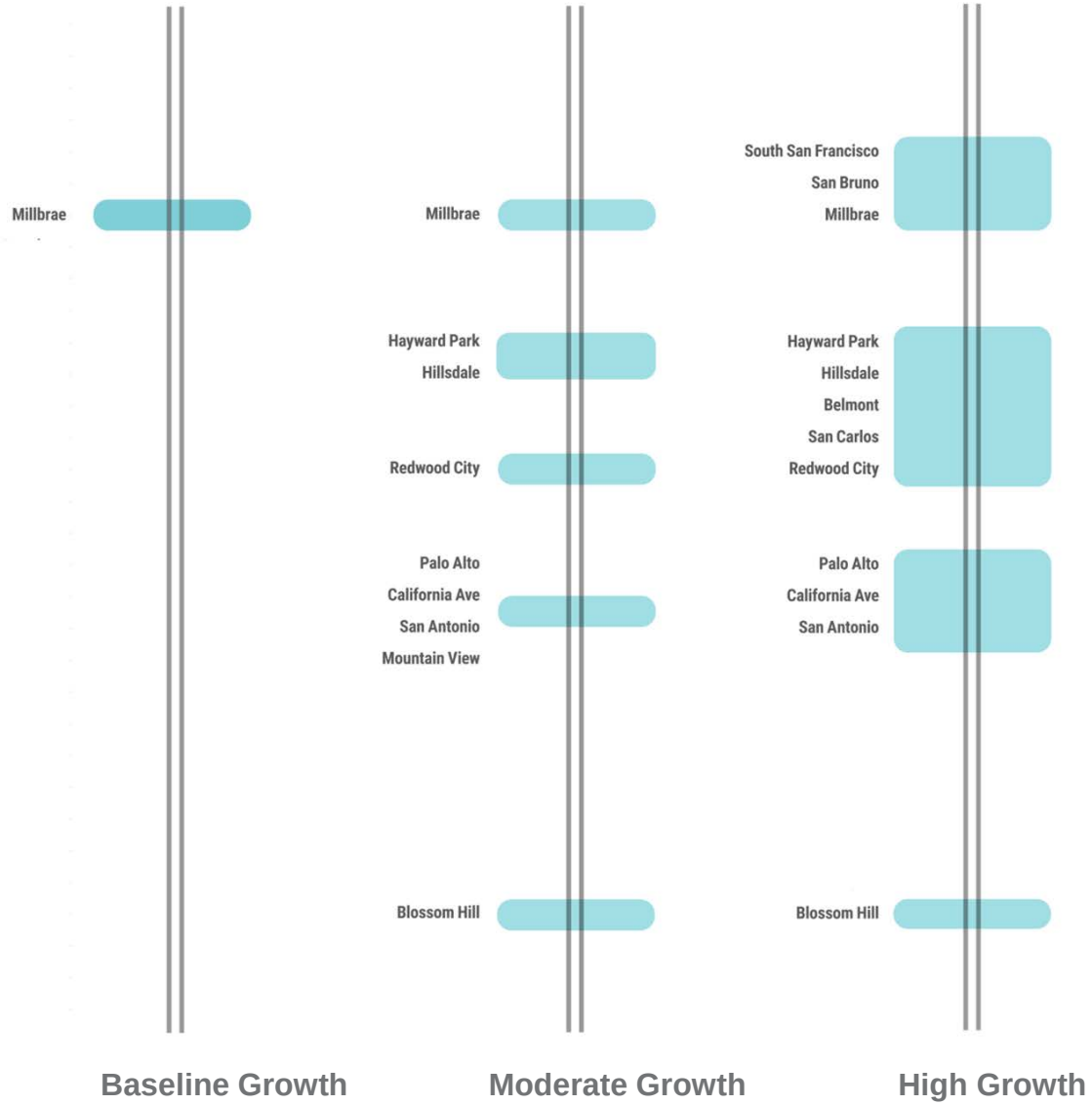
Trains per Hour, per Direction	Peak: 12 Caltrain + 4 HSR Off-Peak: 6 Caltrain + 3 HSR
Stopping Pattern	Local / Express A / Express B with timed transfer at Redwood City
Travel Time, STC-Diridon	61 Min (Express A) 82 Min (Local)
New Passing Tracks	South San Francisco-Millbrae, Hayward Park-Redwood City, northern Santa Clara County, Blossom Hill
Service Plan Description	• Local and Express A trains each operating at 15-minute frequencies with timed cross-platform transfer at Redwood City • Express B trains operate every 15 minutes between 4th & King and Tamien • Local trains make nearly all stops • Trains serve Capitol and Blossom Hill every 15 minutes and Morgan Hill and Gilroy every 30 mins

New 4 Track Infrastructure Required

The **Moderate and High Growth** service plans require passing track infrastructure to support blended service with HSR, so that faster trains can pass slower trains at multiple points in the corridor

Conceptual 4 Track Segment or Station to be refined through further analysis and community engagement.

	Metric	Baseline Growth	Moderate Growth	High Growth
Infrastructure	Passing Tracks Needed	<1 Mile	<5 Miles	15-20 Miles



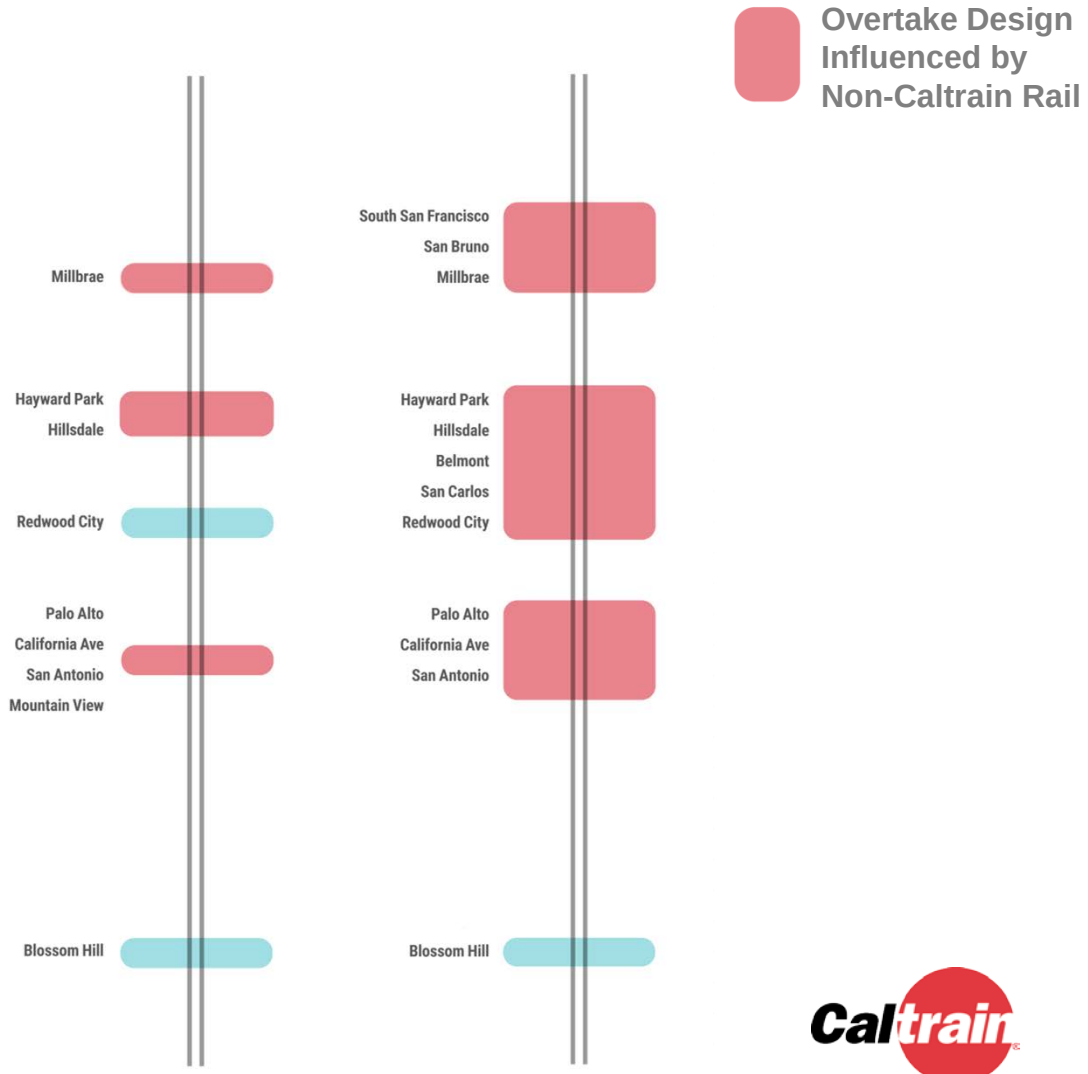
Implications of Uncertainty to Growth Scenarios

The **High Growth Scenario** most directly accommodates large-scale corridor sharing and expanded service, but the details of this scenario - including potential stopping patterns and location and extent of required infrastructure - are also highly influenced by state and regional projects.

The **Moderate Growth Scenario** does not directly accommodate the same level of growth but has infrastructure that can be more discretely planned. It has the potential to scale up as regional projects are further confirmed, defined, and funded.

4-Track Infrastructure Uncertainty

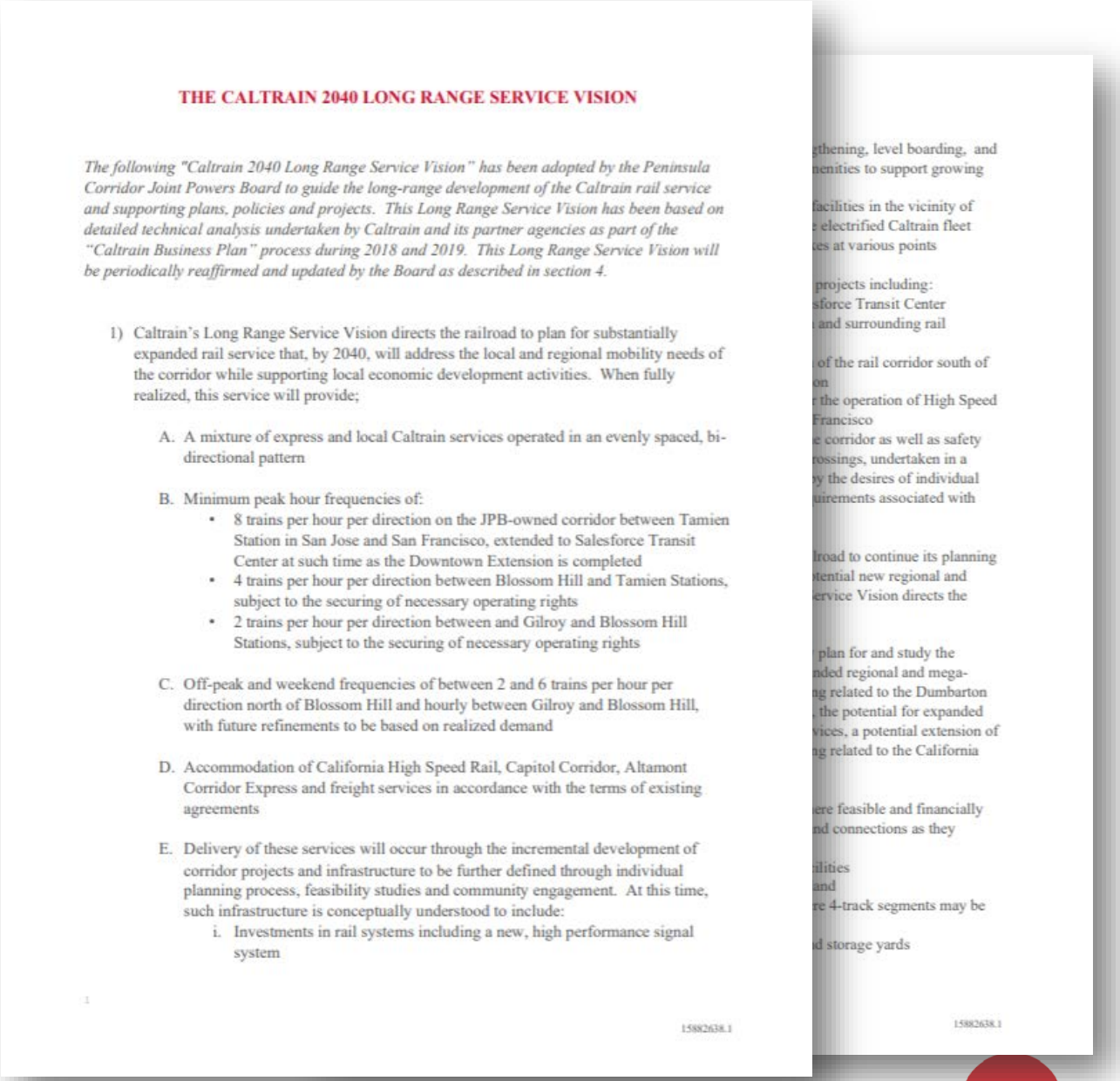
Segments Dependent on Design Input/Timing of Regional and State Projects



Board Policy

The Board Adopted A Long Range Service Vision in October of 2019. <u>This document define agency policy</u>

https://caltrain2040.org/wp-content/uploads/Caltrain-Business-Plan-Final-Service-Vision.pdf



THE CALTRAIN 2040 LONG RANGE SERVICE VISION

The following "Caltrain 2040 Long Range Service Vision" has been adopted by the Peninsula Corridor Joint Powers Board to guide the long-range development of the Caltrain rail service and supporting plans, policies and projects. This Long Range Service Vision has been based on detailed technical analysis undertaken by Caltrain and its partner agencies as part of the "Caltrain Business Plan" process during 2018 and 2019. This Long Range Service Vision will be periodically reaffirmed and updated by the Board as described in section 4.

1) Caltrain's Long Range Service Vision directs the railroad to plan for substantially expanded rail service that, by 2040, will address the local and regional mobility needs of the corridor while supporting local economic development activities. When fully realized, this service will provide;

   A. A mixture of express and local Caltrain services operated in an evenly spaced, bi-directional pattern

   B. Minimum peak hour frequencies of:
      - 8 trains per hour per direction on the JPB-owned corridor between Tamien Station in San Jose and San Francisco, extended to Salesforce Transit Center at such time as the Downtown Extension is completed
      - 4 trains per hour per direction between Blossom Hill and Tamien Stations, subject to the securing of necessary operating rights
      - 2 trains per hour per direction between and Gilroy and Blossom Hill Stations, subject to the securing of necessary operating rights

   C. Off-peak and weekend frequencies of between 2 and 6 trains per hour per direction north of Blossom Hill and hourly between Gilroy and Blossom Hill, with future refinements to be based on realized demand

   D. Accommodation of California High Speed Rail, Capitol Corridor, Altamont Corridor Express and freight services in accordance with the terms of existing agreements

   E. Delivery of these services will occur through the incremental development of corridor projects and infrastructure to be further defined through individual planning process, feasibility studies and community engagement. At this time, such infrastructure is conceptually understood to include:
      i. Investments in rail systems including a new, high performance signal system

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facilities in the vicinity of
electrified Caltrain fleet
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projects including:
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and surrounding rail

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https://caltrain2040.org/wp-content/uploads/Caltrain-Business-Plan-Final-Service-Vision.pdf

2) Caltrain's Long Range Service Vision further directs the railroad to continue its planning for a potential "higher" growth level of service as well as potential new regional and mega-regional connections. Specifically, the Long Range Service Vision directs the railroad to:

A. Work with regional and state partners to collectively plan for and study the feasibility of higher levels of service as well as expanded regional and mega-regional rail connections. This work includes planning related to the Dumbarton Rail Corridor, a potential second Transbay Crossing, the potential for expanded Altamont Corridor Express and Capitol Corridor services, a potential extension of rail service to Monterey county, and ongoing planning related to the California High Speed Rail system.

B. To take certain specific actions to anticipate and, where feasible and financially practicable, facilitate, such higher levels of service and connections as they specifically relate to:

i. The planning of rail terminals and related facilities
ii. The sale or permanent encumbrance of JPB land
iii. The design of grade separations in areas where 4-track segments may be required
iv. The sizing of future maintenance facilities and storage yards

Passing Tracks in Palo Alto

- Caltrain has said they would like cities to select an alternative that doesn't "preclude" four tracks - which of these options doesn't preclude 4 tracks: viaduct, hybrid, trench, tunnel?
- How could a trench or a viaduct be widened to accommodate 4 tracks?

Passing Tracks in Palo Alto

- If passing tracks are required as part of a grade crossing separation design, will Caltrain pay for the incremental cost of design and construction? Ongoing maintenance?
- Will Caltrain share costs for a four-track alternative, in advance of when Caltrain would actually need to use the passing tracks?

Business Plan And Overall Planning

- Does Caltrain intend to develop a comprehensive plan for replacement of all the grade crossings between San Francisco and San Jose?
- Does Caltrain intend to develop a funding mechanism to support such a comprehensive plan?
- Are there state and local agencies that we can work with better so that we are all planning a regional solution rather than a town-by-town solution?

Caltrain's Systemwide Steps on Grade Separations

There is a significant body of work remaining to address the issue of at grade crossings in the Caltrain corridor

Caltrain plans to continue advancing a corridor wide conversation regarding the construction, funding and design of grade separations while continuing to support the advancement of individual city-led projects

Within the Business Plan

- Incorporate grade crossing investment estimates into overall corridor costing and business case analysis
- Continue peer review of corridor wide grade separation case studies and examples

Beyond the Business Plan

- Develop corridor wide grade separation strategy, potentially addressing;
  - Risk assessment and prioritization factors
  - Construction standards and methods
  - Project coordination and sequencing
  - Community resourcing and organizing
  - Funding analysis and strategy

For individual City projects

- Continue working with cities and county partners to support advancement of individual grade separation plans and projects

Business Plan And Overall Planning

- In the absence of a comprehensive plan, does Caltrain intend to provide assistance to crossing elimination projects, city by city?

- On average, what percentage of funding have cities contributed to grade separations in the past? What was the main source of funding for these grade separations historically? Has any tax measure ever been raised just to pay for grade separations (and not other general transit capital projects)?

Business Plan And Overall Planning

- Are there any legal requirements for Embarcadero grade separation to continue to include a Stanford stop (if changed in the future for any reason)? Who is responsible for Stanford Station? Does the City or Caltrain have an arrangement with Stanford that must be considered? Are there any scenarios contemplated in Caltrain's business plan service vision that continue to provide service to the Stanford station?

- If a viaduct or a tunnel is built, can the City have amenities, such as bike paths, as part of an easement, or would all of the land be controlled by Caltrain. If there are no amenities, is Caltrain accountable to control weeds, graffiti, etc.?

- If existing tracks are removed for viaducts or tunnels, will Caltrain create bike paths? If not, what is the intended use of this space?

Business Plan And Overall Planning

- Is there anything that regulates how long of a stretch between crossover switches? Is there a requirement for the maximum spacing in miles between crossover switches?
- Are there any large projects that are in the works but have not been completed that might change the technical requirements (like 1% grade) on the Caltrain corridor in the future in a way that could impact our decision? For example, is there a plan to remove freight that is in the works but has stagnated? What is the likelihood of any surprises through the design review process (re Caltrain, etc.)?
- Has Caltrain developed standards for tunnels that have only electric trains (same standards that will be used for going into TransBay terminal),? If not, when are they expected?

Business Plan And Overall Planning

- Is there anything that regulates how long of a stretch between crossover switches? Is there a requirement for the maximum spacing in miles between crossover switches?
- Are there any large projects that are in the works but have not been completed that might change the technical requirements (like 1% grade) on the Caltrain corridor in the future in a way that could impact our decision? For example, is there a plan to remove freight that is in the works but has stagnated? What is the likelihood of any surprises through the design review process (re Caltrain, etc.)?
- Has Caltrain developed standards for tunnels that have only electric trains (same standards that will be used for going into TransBay terminal),? If not, when are they expected?

Business Plan And Overall Planning

- How will Union Pacific (or a future short line operator) operate trains on a 2% grade? More power on each train, or shorter trains? What would be the noise impact of more power or engines operating at full throttle on a 2% grade?
- For design exceptions such as 2% vertical grades, is the City required to negotiate with Caltrain, or can the City negotiate directly with Union Pacific RR?

FOR MORE INFORMATION

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