SPECIAL MEETING
AGENDA
PENINSULA CORRIDOR JOINT POWERS BOARD
Bacciocco Auditorium, 2nd Floor
1250 San Carlos Avenue, San Carlos CA 94070

January 10, 2019 - Thursday

1. Call to Order
2. Roll Call
3. Caltrain Business Plan Quarterly Update
4. Public Comment For Items on the Agenda
   Comments by each individual speaker shall be limited to two (2) minutes
5. Adjourn
INFORMATION FOR THE PUBLIC

All items appearing on the agenda are subject to action by the Board. Staff recommendations are subject to change by the Board.

If you have questions on the agenda, please contact the JPB Secretary at 650.508.6242. Agendas are available on the Caltrain website at www.caltrain.com. Communications to the Board of Directors can be e-mailed to board@caltrain.com.

Location, Date and Time of Regular Meetings
Regular meetings are held at the San Mateo County Transit District Administrative Building located at 1250 San Carlos Avenue, San Carlos, one block west of the San Carlos Caltrain Station on El Camino Real, accessible by SamTrans bus Routes ECR, FLX, 260, 295 and 398. Additional transit information can be obtained by calling 1.800.660.4287 or 511.

The JPB meets regularly on the first Thursday of the month at 10 a.m. The JPB Citizens Advisory Committee meets regularly on the third Wednesday of the month at 5:40 p.m. at the same location. Date, time and place may change as necessary.

Public Comment
If you wish to address the Board, please fill out a speaker’s card located on the agenda table and hand it to the JPB Secretary. If you have anything that you wish distributed to the Board and included for the official record, please hand it to the JPB Secretary, who will distribute the information to the Board members and staff.

Public testimony by each individual speaker shall be limited to two minutes and items raised that require a response will be deferred for staff reply.

Accessibility for Individuals with Disabilities
Upon request, the JPB will provide for written agenda materials in appropriate alternative formats, or disability-related modification or accommodation, including auxiliary aids or services, to enable individuals with disabilities to participate in public meetings. Please send a written request, including your name, mailing address, phone number and brief description of the requested materials and a preferred alternative format or auxiliary aid or service at least two days before the meeting. Requests should be mailed to the JPB Secretary at Peninsula Corridor Joint Powers Board, 1250 San Carlos Avenue, San Carlos, CA 94070-1306; or emailed to board@caltrain.com; or by phone at 650.508.6242, or TDD 650.508.6448.

Availability of Public Records
All public records relating to an open session item on this agenda, which are not exempt from disclosure pursuant to the California Public Records Act, that are distributed to a majority of the legislative body will be available for public inspection at 1250 San Carlos Avenue, San Carlos, CA 94070-1306, at the same time that the public records are distributed or made available to the legislative body.
TO: Joint Powers Board

THROUGH: Jim Hartnett
Executive Director

FROM: Michelle Bouchard
Chief Operating Officer, Caltrain

SUBJECT: CALTRAIN BUSINESS PLAN - QUARTERLY UPDATE

ACTION
Staff Coordinating Council recommends the Board of Directors (Board) receive a PowerPoint presentation providing a quarterly update on Caltrain Business Plan activities and progress from October through December of 2018.

SIGNIFICANCE
Peninsula Corridor Joint Powers Board (JPB) staff has prepared a Caltrain Business Plan quarterly update describing project activities and progress from October through December of 2018. This presentation will be given as part of a special session to be held in advance of the regularly scheduled Board meeting. The quarterly update will provide the Board with an opportunity to ask questions about project activities and to provide feedback and direction on the Business Plan.

BUDGET IMPACT
There is no budget impact associated with receiving this PowerPoint presentation.

BACKGROUND
In 2017, the JPB secured full funding for the Peninsula Corridor Electrification Project and issued notices to proceed to its contractors for corridor electrification and purchase of Electric Multiple Unit railcars. Now that construction on this long-awaited project is underway, the agency has the opportunity to articulate a long-term business strategy for the future of the system.

The initial concept for a Caltrain “Business Plan” was brought to the Board in April of 2017. The Board reviewed a draft scope of work for the Business Plan in December of 2017 and adopted a final Business Strategy and Scope of Work in February of 2018. The Business Plan has been scoped to include long-range demand modeling, and service and infrastructure planning, as well as organizational analysis and an assessment of Caltrain’s interface with the communities it traverses. It is an extensive planning effort that includes outreach in multiple venues. The plan will be completed in 2019.

Prepared by: Sebastian Petty, Senior Policy Advisor 650.622.7831
Caltrain Business Plan

JANUARY 2019

Quarterly Update

PCJPB Special Meeting – Agenda Item# 3
Different Ways to Grow
What is the Caltrain Business Plan?

**Why**

Addresses the future potential of the railroad over the next 20-30 years. It will assess the benefits, impacts, and costs of different service visions, building the case for investment and a plan for implementation.

**Why**

Allows the community and stakeholders to engage in developing a more certain, achievable, financially feasible future for the railroad based on local, regional, and statewide needs.
What Will the Business Plan Cover?

Technical Tracks

Service
- Number of trains
- Frequency of service
- Number of people riding the trains
- Infrastructure needs to support different service levels

Business Case
- Value from investments (past, present, and future)
- Infrastructure and operating costs
- Potential sources of revenue

Community Interface
- Benefits and impacts to surrounding communities
- Corridor management strategies and consensus building
- Equity considerations

Organization
- Organizational structure of Caltrain including governance and delivery approaches
- Funding mechanisms to support future service
Where Are We in the Process?

We Are Here
Planning for Service in 2040
Service Planning Overview

- Understanding the 2040 Baseline
- The Growing Market for Rail
- Developing “High Growth” Service Concepts
- 2040 Service Scenarios
Choosing a Vision - How Will the Railroad Grow?

What
In the Spring of 2019 the team will present three growth scenarios to the Board. One “baseline” scenario will reflect past and ongoing Blended System planning efforts while two new scenarios will explore higher levels of growth. Each scenario will provide a detailed picture of how the railroad could grow over the next 20-30 years. The Board will be asked to choose one of these growth scenarios as the “Service Vision” for the corridor.

Why
In selecting a long range Service Vision the Board will answer the question “How should the railroad grow?” This will allow Caltrain to further optimize and refine the Vision while developing a Business Plan that builds towards the future in a consistent and efficient manner.
Growth Scenarios - Different Ways to Grow

- **2018**: Current Operations
- **2022**: Start of Electrified Operations
- **2033**: High Speed Rail Phase 1
- **2040**: Service Vision
The Caltrain corridor is not a blank slate. Service can be improved and expanded but tradeoffs and choices are required across all scenarios. There is no perfect answer.

1. **Service Differentiation**
   How can local, regional and high speed services be blended and balanced on the corridor to best serve multiple markets?

2. **Peak Service Volume**
   How much growth in peak train traffic volume can the corridor support and what kinds of growth may be required to meet long term demand?

3. **Service Investments**
   What types of investments into operations, systems and infrastructure will be required to achieve the desired types and volumes of service?
Key Concept

Improving Service Requires Investment

Delivery of the “Baseline,” “Moderate” and “High” Growth scenarios all require substantial investments in the corridor. These investments will take many different forms.

Operations
- Increased service coordination and expanded operations to maximize the use of physical infrastructure

Systems
- Improved train performance
- Fleet expansion
- Improved train control and signaling

Infrastructure
- Track enhancement and expansion
- Station and terminal improvements
- Grade crossing investments
Key Concept

Grade Separations are Critical

All of the scenarios being considered involve significant increases in the number of trains per hour operating in the corridor.

The Business Plan will consider the costs and challenges associated with grade separations and improvements to at-grade crossings as part of the overall plan.
Developing and Evaluating Growth Scenarios

Choosing a long range “Service Vision” is not just about picking which service pattern looks the best- it requires evaluating which package of service and investments will deliver the best value to the corridor and the region.

Service

This update describes the process used to develop different illustrative 2040 service concepts. The different concepts shown are not proposals or recommendations. They represent an indicative range of options for how Caltrain service could grow given different levels of investment in the corridor.

Business Case

During the spring of 2019 the Business Plan team will develop a detailed “Business Case” analysis for each of the different growth scenarios. The Business Case will quantify the financial implications and wider costs and benefits of each growth scenario.
Understanding the 2040 Baseline

Service Planning Overview
Understanding the 2040 Baseline
The Growing Market for Rail
Developing “High Growth” Service Concepts
2040 Service Scenarios
Baseline Growth

- **2018**: Current Operations
- **2022**: Start of Electrified Operations
- **2033**: High Speed Rail Phase 1
- **2040 Service Vision**

Types of Growth:
- High Growth
- Moderate Growth
- Baseline Growth
2040 Baseline

The “Baseline” growth scenario includes service assumptions that meet the JPB’s existing policy commitments and reflect past and ongoing Blended System planning.

**Operating Parameters**
- Blended service with 10 trains per hour, per direction north of San Jose (6 Caltrain, 4 HSR)
- Blended operations with existing/committed levels of Caltrain service assumed south of San Jose (equivalent of 4 round trip Caltrain trains per day)

**Service Pattern**
- Historically, Caltrain has planned to operate a skip stop service after electrification
- Blended service planning with HSR has carried forward this concept
- There is some flexibility in service levels and stopping patterns at individual stations
Features
- Skip stop patterns with 60-65 minute run times
- Most stations receive 2 or 4 TPHPD, with a few stations receiving 6 TPHPD in both directions
- Schedule varies by direction with 10 minute frequencies at San Francisco and San Jose

Passing Tracks
- Uses existing locations at Bayshore and Lawrence stations.
- HSR station with dedicated tracks assumed at Millbrae.

Options with Service Structure
- Flexibility in service levels at individual stations

1Includes minor modifications to standardize Caltrain and HSR service patterns
Off-Peak & Weekend

Features

- Same skip stop patterns at hourly headways
- Most stations receive service every 30 or 60 minutes

Peak period service equivalent to 4 northbound AM trains and 4 southbound PM trains
- Replicates committed service levels within parameters of new, blended infrastructure
- Gilroy Station served by 2 Caltrain trains per hour and 2 HSR trains per hour
- Connection to Central Coast rail service at Gilroy
- No off-peak or weekend service south of Tamien

Passing Tracks

- None

Options with Service Structure

- Service levels between Morgan Hill and San Martin could be varied based on further demand analysis and policy direction
The Growing Market for Rail

- Service Planning Overview
- Understanding the 2040 Baseline
- The Growing Market for Rail
- Developing “High Growth” Service Concepts
- 2040 Service Scenarios
2040 Demand

The Caltrain corridor is growing
• Corridor expected to add 1.2 million people and jobs within 2 miles of Caltrain (+40%)¹
• 80% of growth expected in San Francisco and Santa Clara Counties

Major transit investments are opening new travel markets to Caltrain
• Downtown Extension and Central Subway to provide more direct connections to downtown San Francisco
• Dumbarton Rail, BART to San Jose, and improvements to Capitol Corridor and ACE to strengthen connectivity with East Bay
• HSR and Salinas rail extensions to increase interregional travel demand

¹Based on Plan Bay Area forecasts and approved projects by individual cities
2040 Land Use & Transportation Context

Indicates a station where substantial growth beyond Plan Bay Area forecasts is anticipated, but not yet approved.

- **1/2 Mile Station Area**
  - 1 million people and jobs within 1/2 mile of Caltrain stations

- **2 Mile Station Area**
  - 4.2 million people and jobs within 2 miles of Caltrain stations

*Indicates a station where substantial growth beyond Plan Bay Area forecasts is anticipated, but not yet approved.*
Exploring the Potential Long Term Demand for Caltrain Service

Using Plan Bay Area numbers for projected growth in jobs and housing, an unconstrained model run of high frequency, all-day BART-like service in the Caltrain corridor suggests that by 2040 there could be underlying demand for nearly 250,000 daily trips on the system.

### Description

<table>
<thead>
<tr>
<th></th>
<th>2017: 92 Trains/Day</th>
<th>2040: ~360 Trains/Day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daily</td>
<td>62,000</td>
<td>243,000</td>
</tr>
<tr>
<td>Peak</td>
<td>50,000</td>
<td>188,000</td>
</tr>
<tr>
<td>Off-Peak</td>
<td>12,000</td>
<td>55,000</td>
</tr>
</tbody>
</table>
Throughput Demand vs. Capacity

To comfortably serve the full potential market for rail in 2040, Caltrain would need to operate 8 trains per hour, per direction (TPHPD) with 10 car trains or 12 TPHPD with 8 or 10 car trains

Seated capacity based on Stadler EMU with different door and bike car configurations. Does not include consideration of potential HSR capacity to serve demand
Developing “High Growth” Service Concepts

Service Planning Overview
Understanding the 2040 Baseline
The 2040 Market for Rail
Developing “High Growth” Service Concepts
2040 Service Scenarios
Growth Scenarios - Different Ways to Grow

- **2018**: Current Operations
- **2022**: Start of Electrified Operations
- **2033**: High Speed Rail Phase 1
- **2040 Service Vision**

- **Baseline Growth**
- **Moderate Growth**
- **High Growth**
What was the Process for Developing the Higher Growth Service Plans?

This work was undertaken in October through December of 2018 with the engagement and review of partner agency staff, the City and County Staff Working Group, The Business Plan Ad Hoc Committee and the Local Policy Maker Group.

Detailed presentations can be found at www.caltrain2040.org.

Service Planning Steps

1. Develop service planning parameters, and goals
2. Identify initial service approaches
3. Develop detailed SF – SJ peak hour concepts
4. Screen and evaluate detailed service concepts
5. Expand service concepts to include service to South San Jose and Gilroy
6. Consider off-peak and weekend service levels and develop all-day and weekend service plans
### 1. Service Planning Parameters

The following rail operating parameters are used as the starting point for 2040 service planning. Some variation to these parameters may be explored as service planning progresses.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>HSR</th>
<th>Caltrain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum headway between trains*</td>
<td>2 minutes</td>
<td>2 minutes</td>
</tr>
<tr>
<td>Turnaround time at terminal</td>
<td>20 minutes</td>
<td>20 minutes</td>
</tr>
<tr>
<td>Minimum station dwell time**</td>
<td>2 minutes</td>
<td>1.0 (high-ridership stations)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.7 (low-ridership stations)</td>
</tr>
<tr>
<td>Train equipment</td>
<td>High speed trainset</td>
<td>8-car electric multiple unit trainset</td>
</tr>
<tr>
<td>Speed limit</td>
<td>110 MPH</td>
<td>110 MPH</td>
</tr>
<tr>
<td>Recovery time</td>
<td>10% distributed</td>
<td>10% distributed</td>
</tr>
</tbody>
</table>

*Assumes investment in new signal system  **Assumes investment to achieve level-boarding
1. **Maximize Ridership** - with fast and frequent service between major markets

2. **Improve Coverage and Connectivity** - by ensuring that most stations are connected with frequent service

3. **Enhance Capacity and Convenience** - with service that is comfortable and easy to understand

4. **“Right Size” New Infrastructure** - by investing strategically to provide corridor-wide benefits
2. Identifying Initial Service Approaches

The service planning work began by initially considering three different “approaches” or styles of service that could be used on the corridor in 2040.

Illustrative peak hour service concepts were then developed using each of the three different approaches.
3. Initial Illustrative Service Concepts

### Zone Express

- **A - 12 Trains**
  - San Francisco
  - 22nd St
  - Bayshore
- **B - 16 Trains**
  - South San Francisco
  - San Bruno
  - Millbrae
  - Broadway
  - Burlingame
  - San Mateo
  - Hayward Park
  - Hillsdale
  - Belmont
  - San Carlos
  - Redwood City
  - Atherton
  - Menlo Park
  - Palo Alto
  - California Ave
  - San Antonio
  - Mountain View
  - Sunnyvale
  - Lawrence
  - Santa Clara
  - College Park
  - San Jose Diridon

### Local/Express (Minimal Passing Tracks)

- **C - 12 Trains**
- **D - 16 Trains**

### Local/Express (Expanded Passing Tracks)

- **E - 12 Trains**
- **F - 16 Trains**

### Skip Stop

- **G - 16 Trains**

---

Conceptual 4-track segment or station

Station service level TBD through further analysis

High Speed Rail

Assumes standardized HSR service; the 2018 HSR Business Plan expects 2 trains per hour, per direction at Millbrae
4. Initial Screening

Concepts Not Recommended for Further Evaluation

**B - Zone Express 16 Trains**
- Infrastructure needs are extensive and incompatible with other service options
- Increased train throughput does not result in additional service at most stations

**E - Local/Express 12 Trains (Expanded Passing Tracks)**
- Requires significantly more infrastructure to achieve the same throughput as other 12-train concepts
- Infrastructure is compatible with and builds toward Local/Express 16-train concept (option F). Can be considered as a variant of this option.

**G - Skip Stop 16 Trains**
- Challenging internal connectivity and service legibility
- Increased train throughput does not result in additional service at most stations
- Similar to and compatible with Local/Express 16 Train pattern with less passing tracks (option D)- can be considered as a variant of this option

Assumes standardized HSR service; the 2018 HSR Business Plan expects 2 trains per hour, per direction at Millbrae

---

**Zone Express B - 16 Trains**
- San Francisco
- 22nd St
- Bayshore
- South San Francisco
- San Bruno
- Millbrae
- Broadway
- Burlingame
- San Mateo
- Hayward Park
- Hillsdale
- Belmont
- San Carlos
- Redwood City
- Atherton
- Menlo Park
- Palo Alto
- California Ave
- San Antonio
- Mountain View
- Sunnyvale
- Lawrence
- Santa Clara
- College Park
- San Jose Diridon

**Local / Express E - 12 Trains**

**Skip Stop G - 16 Trains**
4. Initial Screening Results

<table>
<thead>
<tr>
<th>Zone Express</th>
<th>Local/Express (Minimal Passing Tracks)</th>
<th>Local/Express (Expanded Passing Tracks)</th>
<th>Skip Stop</th>
</tr>
</thead>
<tbody>
<tr>
<td>A - 12 Trains</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>B - 16 Trains</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>C - 12 Trains</td>
<td>4</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>D - 16 Trains</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>E - 12 Trains</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>F - 16 Trains</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>G - 16 Trains</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

- San Francisco
- 22nd St
- Bayshore
- South San Francisco
- San Bruno
- Millbrae
- Broadway
- Burlingame
- San Mateo
- Hayward Park
- Hillsdale
- Belmont
- San Carlos
- Redwood City
- Atherton
- Menlo Park
- Palo Alto
- California Ave
- San Antonio
- Mountain View
- Sunnyvale
- Lawrence
- Santa Clara
- College Park
- San Jose Diridon

Assumes standardized HSR service; the 2018 HSR Business Plan expects 2 trains per hour, per direction at Millbrae.

Removed through Screening Process

Local/Express (Expanded Passing Tracks)
## 4. Detailed Evaluation

<table>
<thead>
<tr>
<th>Goal</th>
<th>Metric</th>
<th>Existing</th>
<th>Minimal Passing Tracks</th>
<th>Expanded Passing Track</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Maximize Ridership</strong></td>
<td>Provide high frequency service</td>
<td>0 Stations</td>
<td>6 Stations</td>
<td>14 Stations</td>
</tr>
<tr>
<td></td>
<td>Number of stations served every 10 minutes or more</td>
<td>5 TPH</td>
<td>A - 12 TPH Zone Express</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>C - 12 TPH Local/Express</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>D - 16 TPH Local/Express</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>F - 16 TPH Local/Express</td>
<td></td>
</tr>
<tr>
<td><strong>2. Improve Connectivity</strong></td>
<td>Improve travel times between major markets</td>
<td>55 Minutes</td>
<td>32 Minutes</td>
<td>24 Minutes</td>
</tr>
<tr>
<td></td>
<td>Average travel times plus wait times between major stations</td>
<td></td>
<td>A - 12 TPH Zone Express</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>C - 12 TPH Local/Express</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>D - 16 TPH Local/Express</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>F - 16 TPH Local/Express</td>
<td></td>
</tr>
<tr>
<td><strong>3. Enhance Convenience</strong></td>
<td>Achieve 15-minute frequencies at most stations</td>
<td>17 Stations</td>
<td>4 Stations</td>
<td>4 stations</td>
</tr>
<tr>
<td></td>
<td>Number of stations without service every 15 minutes</td>
<td></td>
<td>A - 12 TPH Zone Express</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>C - 12 TPH Local/Express</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>D - 16 TPH Local/Express</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>F - 16 TPH Local/Express</td>
<td></td>
</tr>
<tr>
<td><strong>4. “Right Size” Infrastructure</strong></td>
<td>Maintain connectivity between stations</td>
<td>83%*** (at 60 min headways)</td>
<td>66%</td>
<td>99%</td>
</tr>
<tr>
<td></td>
<td>Percentage of stations directly connected by local train without a transfer</td>
<td></td>
<td>A - 12 TPH Zone Express</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>C - 12 TPH Local/Express</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>D - 16 TPH Local/Express</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>F - 16 TPH Local/Express</td>
<td></td>
</tr>
<tr>
<td><strong>A - Zone Express 12 TPH</strong></td>
<td>Provide capacity responsive to 2040 demand</td>
<td>35%</td>
<td>80%</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>% 2040 demand relative to seated capacity²</td>
<td></td>
<td>A - 12 TPH Zone Express</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>C - 12 TPH Local/Express</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>D - 16 TPH Local/Express</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>F - 16 TPH Local/Express</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Provide legible service structure</td>
<td>High Complexity</td>
<td>Moderate Complexity</td>
<td>Low Complexity</td>
</tr>
<tr>
<td></td>
<td>Complexity of stopping pattern</td>
<td></td>
<td>A - 12 TPH Zone Express</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>C - 12 TPH Local/Express</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>D - 16 TPH Local/Express</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>F - 16 TPH Local/Express</td>
<td></td>
</tr>
<tr>
<td><strong>D – Local/Express 16 TPH</strong></td>
<td>Minimize mainline track expansions</td>
<td>0</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Miles of new passing track</td>
<td></td>
<td>A - 12 TPH Zone Express</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>C - 12 TPH Local/Express</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>D - 16 TPH Local/Express</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>F - 16 TPH Local/Express</td>
<td></td>
</tr>
</tbody>
</table>

### A - Zone Express 12 TPH
- Insufficient capacity to fully meet future demand
- Longest average travel times
- Least stations with high-frequency service

### D – Local/Express 16 TPH
- High complexity and poor connectivity
- 15% of stations are not connected at all due to skip stop service
4. Evaluation Results

Zone Express

12 Trains

San Francisco
22nd St

Bayshore

South San Francisco
San Bruno

Millbrae
Broadway
Burlingame
San Mateo
Hayward Park
Hillsdale
Belmont
San Carlos

Redwood City
Atherton
Menlo Park
Palo Alto
California Ave

San Antonio
Mountain View
Sunnyvale
Lawrence

Santa Clara
College Park
San Jose Diridon

Removed through Evaluation Process

Local/Express (Reduced Passing Tracks)

12 Trains

San Francisco
22nd St

Bayshore

South San Francisco
San Bruno

Millbrae
Broadway
Burlingame
San Mateo
Hayward Park
Hillsdale
Belmont
San Carlos

Redwood City
Atherton
Menlo Park
Palo Alto
California Ave

San Antonio
Mountain View
Sunnyvale
Lawrence

Santa Clara
College Park
San Jose Diridon

Removed through Screening Process

Local/Express

12 Trains

San Francisco
22nd St

Bayshore

South San Francisco
San Bruno

Millbrae
Broadway
Burlingame
San Mateo
Hayward Park
Hillsdale
Belmont
San Carlos

Redwood City
Atherton
Menlo Park
Palo Alto
California Ave

San Antonio
Mountain View
Sunnyvale
Lawrence

Santa Clara
College Park
San Jose Diridon

Removed through Evaluation Process

Skip Stop

16 Trains

San Francisco
22nd St

Bayshore

South San Francisco
San Bruno

Millbrae
Broadway
Burlingame
San Mateo
Hayward Park
Hillsdale
Belmont
San Carlos

Redwood City
Atherton
Menlo Park
Palo Alto
California Ave

San Antonio
Mountain View
Sunnyvale
Lawrence

Santa Clara
College Park
San Jose Diridon

Removed through Screening Process

4. Evaluation Results

Removed through Screening Process

Removed through Evaluation Process

Removed through Screening Process

Removed through Evaluation Process

Removal level TBD through further analysis

Evaluation Results

Removed through Evaluation Process

Removed through Screening Process

Removed through Evaluation Process

Removed through Screening Process

Removed through Evaluation Process
5. Expanding Concepts South of San Jose

North of San Jose
- Corridor between San Francisco and Tamien owned by Caltrain
- Electrification under construction
- Caltrain will share corridor with HSR

South of San Jose
- Union Pacific owns existing corridor between Tamien and Gilroy
- HSR and State of California negotiating with UP
- 2018 HSR Business Plan contemplates building two electrified tracks alongside non-electrified freight track
- Creates an opportunity to extend electrified Caltrain service south to Gilroy
Opportunities and Challenges South of San Jose

Track Capacity is Constrained
• Caltrain service is limited by operational constraints of a two track corridor
• HSR plans to operate up to 8 trains per hour, per direction south of San Jose

Demand is Unevenly Distributed
• Southern San Jose stations serve densely populated area with bidirectional demand
• Morgan Hill, San Martin, and Gilroy serve fewer people with directionally peaked demand
Transportation and Land Use Context

Indicates a station where substantial growth beyond Plan Bay Area forecasts is anticipated, but not yet approved.
Indicates a station where substantial growth beyond Plan Bay Area forecasts is anticipated, but not yet approved.
Expanding Concepts South of San Jose

1. Two Track Corridor
   - 8-12 TPH at Tamien, depending on mainline service levels
   - 2 TPH south of Tamien except San Martin

2. Conceptual Turn Tracks at Blossom Hill
   - 8-12 TPH at Tamien, depending on mainline service levels
   - 4 TPH at Capitol and Blossom Hill
   - 2 TPH at Morgan Hill and Gilroy

3. Conceptual Four Track Corridor
   - 8-12 TPH at Tamien, depending on mainline service levels
   - 8 TPH at Capitol and Blossom Hill
   - 2 TPH at Morgan Hill and Gilroy

All scenarios subject to further analysis to confirm compatibility with planned HSR service.

To San Francisco
- San Jose
- Tamien
- Capitol
- Blossom Hill
- Morgan Hill
- San Martin
- Gilroy

Station service level TBD through further analysis

High Speed Rail

Conceptual 4-track segment or station
Off-peak and weekend service provides unique opportunities and challenges for Caltrain

- The Caltrain corridor has very high all-day travel demand, 7 days a week
- Demand for off-peak service may increase overtime along with corridor development and densities
- Early morning, midday, evening, and weekend periods all present different challenges and opportunities related to operating costs and work windows for construction and maintenance

6. Develop All Day Service Plans
Off-Peak & Weekend Demand

Existing Off-Peak Service
- Most Caltrain service and ridership occurs during the morning and evening periods. Hourly midday and evening service captures a very small market share.
- US-101 experiences a 14-hour bidirectional peak period from 6 AM to 8 PM.

Existing Weekend Service
- Hourly weekend service that primarily serves long-distance trips and captures a very small market share.
- US-101 experiences a 12-hour peak period from 9 AM to 9 PM with volumes near weekday levels.

Based on US-101, BART, and Caltrain person trip volumes at San Francisco County line. Volumes are comparable along most of Caltrain corridor.
Off-Peak Demand: BART vs. Caltrain

**Transbay Corridor**
BART serves about 20-30% of midday and weekend travel on the Transbay corridor, whereas Caltrain serves about 2-3% of travel on the Peninsula.

**Caltrain Corridor**
Assuming similar peaking patterns to BART, Caltrain may serve approximately 4,000-5,000 passengers per hour during the midday and evening periods.

2040 potential based on unconstrained ridership forecast and assumed similar peaking patterns to BART service in San Mateo County. BART provides approximately 3-6 more service compared to Caltrain.
**Off-Peak Service: BART vs. Caltrain**

**Transbay Corridor**
BART operates up to 20 TPH during peak periods depending on direction. Service decreases to 16 TPH during midday period and 6 TPH during evening period (with variable train lengths).

**Caltrain Corridor**
Caltrain operates up to 5 TPH during peak periods. Service decrease to 2 TPH during peak shoulder periods and 1 TPH during midday and evening periods.
Weekend Demand: BART vs. Caltrain

Transbay Corridor
BART serves about 20-30% of weekend travel on the Transbay corridor, whereas Caltrain serves about 3-4% of travel on the Peninsula.

Caltrain Corridor
Assuming similar weekend service to BART, Caltrain may serve approximately 4,000-5,000 passengers per hour during most of the day on weekends.
Weekend Service: BART vs. Caltrain

**Transbay Corridor**
BART operates 12 TPH during the late morning to late afternoon period. Mornings and evenings are served by 6 TPH.

**Caltrain Corridor**
Caltrain operates 1 TPH throughout the day, with one additional Baby Bullet in the late morning and early evening.
Off-Peak & Weekend Service Options

Caltrain may serve Early Morning, Midday, Evening, and Weekend periods with various potential service types depending on demand and construction/maintenance needs.

Infrastructure and fleet are sized for peak hour service—meaning that service levels during weekend and off-peak times can more easily be adjusted and adapted.
2040 Service Scenarios

Service Planning Overview
Understanding the 2040 Baseline
The 2040 Market for Rail
Developing “High Growth” Service Concepts

2040 Service Scenarios
This update describes the process used to develop different illustrative 2040 service concepts. The different concepts shown are not proposals or recommendations. They represent a credible range of options for how Caltrain service could grow given different levels of investment in the corridor.

Choosing a long range “Service Vision” is not just about picking which service pattern looks the best— it requires evaluating which package of service and investments will deliver the best value to the corridor and the region.

During the spring of 2019 the Business Plan team will develop a detailed “Business Case” analysis for each of the different growth scenarios. The Business Case will quantify the financial implications and wider costs and benefits of each growth scenario.
2040 Service Scenarios

- **Baseline Growth**
- **Moderate Growth**
- **High Growth**

**Timeline:**
- **2018 Current Operations**
- **2022 Start of Electrified Operations**
- **2033 High Speed Rail Phase 1**
- **2040 Service Vision**

**Amount of Investment/Number of Trains**

**Design Year**
Features

• Blended service with up to 10 TPH north of Tamien (6 Caltrain + 4 HSR) and up to 10 TPH south of Tamien (2 Caltrain + 8 HSR)
• Three skip stop patterns with 2 TPH – most stations are served by 2 or 4 TPH, with a few receiving 6 TPH
• Some origin-destination pairs are not served at all

Options & Considerations

• Service approach is consistent with PCEP and HSR EIRs
• Opportunity to consider alternative service approaches later in Business Plan process

Passing Track Needs

• <1 mile of new passing tracks at Millbrae associated with HSR station plus use of existing passing tracks at Bayshore and Lawrence
Baseline Growth Scenario – Full Day

- **WEEKDAY SERVICE**
  - 6 TPH during morning and evening peak periods (3 skip stop patterns at 2 TPH)
  - 3 TPH during morning and evening off-peak periods (3 skip stop patterns at 1 TPH)
  - HSR operates 4 TPH during peak period and 3 TPH during off-peak periods

- **WEEKEND SERVICE**
  - 3 TPH during morning and evening peak periods (3 skip stop patterns at 1 TPH)
  - HSR operates three trains per hour

Charts depict Caltrain arrivals only.
Baseline Growth – South of Tamien

• Caltrain: 4 TPH throughout the day
• HSR: 8 TPH during peak periods and 4 TPH during off-peak periods

WEEKDAY SERVICE

WEEKEND SERVICE

NO WEEKEND CALTRAIN SERVICE

Charts depict Caltrain arrivals only
**Features**

- A majority of stations served by 4 TPH local stop line, but Mid-Peninsula stations are serviced with 2 TPH skip stop pattern
- Express line serving major markets – some stations receive 8 TPH
- Timed local/express transfer at Redwood City

**Passing Track Needs**

- Up to 4 miles of new 4-track segments and stations: Hayward Park to Hillsdale, at Redwood City, and a 4-track station in northern Santa Clara county (Palo Alto, California Ave, San Antonio or Mountain View. California Ave Shown)

**Options & Considerations**

- To minimize passing track requirements, each local pattern can only stop twice between San Bruno and Hillsdale - in particular, San Mateo is underserved and lacks direct connection to Millbrae
- Each local pattern can only stop once between Hillsdale and Redwood City
- Atherton, College Park, and San Martin served on an hourly or exception basis
Moderate Growth Scenario – Full Day

WEEKDAY SERVICE

- 8 TPH during morning and evening peak periods (4 local and 4 express trains)
- 6 TPH during early AM, midday, and evenings (2 local and 4 express trains)
- HSR operates 4 TPH during peak period and 3 TPH during off-peak periods

WEEKEND SERVICE

- 6 TPH during early AM, midday, and evenings (2 local and 4 express trains)
- HSR operates 3 TPH

Charts depict Caltrain arrivals only
Moderate Growth – Capitol & Blossom Hill

- Caltrain: 4 TPH throughout the day
- HSR: 8 TPH during peak periods and 4 TPH during off-peak periods

WEEKDAY SERVICE

Assumes 4 track turnaround at Blossom Hill station

Charts depict Caltrain arrivals only
Moderate Growth – Morgan Hill & Gilroy

- Caltrain: 2 TPH during peak periods and 1 TPH during off-peak periods
- HSR: 8 TPH during peak periods (3 stopping at Gilroy) and 4 TPH during off-peak periods (2 stopping at Gilroy)

WEEKDAY SERVICE

- Caltrain: 1 TPH throughout the day
- HSR: 4 TPH throughout the day (2 stopping at Gilroy)

WEEKEND SERVICE

Assumes 4 track turnaround at Blossom Hill station

Charts depict Caltrain arrivals only
High Growth Scenarios (12+4 Trains)

Features
- Nearly complete local stop service - almost all stations receiving at least 4 TPH
- Two express lines serving major markets – many stations receive 8 or 12 TPH

Passing Track Needs
- Requires up to 15 miles of new 4 track segments: South San Francisco to Millbrae, Hayward Park to Redwood City, and northern Santa Clara County between Palo Alto and Mountain View stations (shown: California Avenue to north of Mountain View)

Options & Considerations
- SSF-Millbrae passing track enables second express line; this line cannot stop north of Burlingame
- Tradeoff between infrastructure and service along Mid-Peninsula - some flexibility in length of passing tracks versus number and location of stops
- Flexible 5 mile passing track segment somewhere between Palo Alto and Mountain View
- Atherton, College Park, and San Martin served on an hourly or exception basis
High Growth Scenario – Full Day

WEEKDAY SERVICE

- 12 TPH during morning and evening peak periods (4 local and 8 express trains)
- 6 TPH during early AM, midday, and evenings (2 local and 4 express trains)
- HSR operates 4 TPH during peak period and 3 TPH during off-peak periods

WEEKEND SERVICE

- 6 TPH during early AM, midday, and evenings (2 local and 4 express trains)
- HSR operates 3 TPH

Charts depict Caltrain arrivals only.
High Growth – Capitol & Blossom Hill

- Caltrain: 4 TPH throughout the day
- HSR: 8 TPH during peak periods and 4 TPH during off-peak periods

Assumes 4 track turnaround at Blossom Hill station

Charts depict Caltrain arrivals only
High Growth – Morgan Hill & Gilroy

- **Caltrain**: 2 TPH during peak periods and 1 TPH during off-peak periods
- **HSR**: 8 TPH during peak periods (3 stopping at Gilroy) and 4 TPH during off-peak periods (2 stopping at Gilroy)

**WEEKDAY SERVICE**

- **Caltrain**: 1 TPH throughout the day
- **HSR**: 4 TPH throughout the day (2 stopping at Gilroy)

**WEEKEND SERVICE**

Assumes 4 track turnaround at Blossom Hill station

Charts depict Caltrain arrivals only
Next Steps in Developing the Service Vision

Upcoming Work

• Detailed terminal planning working sessions with Caltrain partners
• Continued exploration of service variations and options
• Simulation, confirmation and refinement of service concepts
• Capital costing, ridership projections and business model integration
• Ongoing discussions with local jurisdictions
Community Interface & Outreach Update
Round 1 Community Interface Meetings

Purpose
Introduce Business Plan and understand breadth of community interface concerns

Attendees
City and county staff representing public works, planning, economic development, and city managers offices + Caltrain Community Interface team

When
September – October 2018
Community Interface Meeting Results

Service Priorities

Prioritized Caltrain Service Improvements

- More Commute Service
- Increased Frequency
- Reduced Travel Times
- Multimodal access
- Regional Connections
- Better off-peak service midday/evenings

Number Responses

Most Important
Moderately Important

Caltrain
Community Interface Meeting Results

Key Themes

Service Levels & Schedules
Travel demand and mode split goals in relation to existing and anticipated roadway congestion

Physical Corridor
Grade crossings, grade separations, and the stretches of fencing, walls, and vegetation in between

Land Development
Placemaking, jobs-housing balance, transit-oriented development, and zoning changes

Station Connectivity & Access
Local first/last mile solutions, multi-modal access, and equitable incentive programs
## Outreach Activities to Date

### July – December Timeline

<table>
<thead>
<tr>
<th>Activity</th>
<th>July</th>
<th>August</th>
<th>September</th>
<th>October</th>
<th>November</th>
<th>December</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Policy Maker Group</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>City/County Staff Coordinating Group</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Project Partner Committee</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Community Interface Meetings (One Per Jurisdiction)</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Stakeholder Advisory Group</td>
<td>●</td>
<td></td>
<td></td>
<td>●</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Partner General Manager</td>
<td>●</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Website &amp; Survey Launch</td>
<td>●</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Community Meetings (One Per County)</td>
<td>●</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sister Agency Presentations</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Outreach Activities to Date
July – December by the Numbers

Stakeholders Engaged

21 Jurisdictions
26 Public Agencies
39 Stakeholder Group Meetings
93 Organizations in Stakeholder Advisory Group

Public Outreach

18 Public Meetings and Presentations
700+ Survey Responses
2,600 Website Hits
27,000 Social Media Engagements
Business Plan Website is Up!

- Project timeline
- Project summary
- Corridor-wide factsheet
- Jurisdiction-specific factsheets
- Monthly presentations
- Glossary of key terms
- FAQs

www.caltrain2040.org
Upcoming Outreach Activities
Planned for Winter and Spring of 2019

- **Project Stakeholders**: Continued meetings and engagement
- **Community Interface**: Second round of meetings with jurisdictions
- **Public Forums**: At SPUR and online (Reddit)
- **Community Meetings**: Second round of public meetings
- **Online Open House**: Hosted on project website
FOR MORE INFORMATION
WWW.CALTRAIN.COM