VTA’s BART Silicon Valley Phase II Extension

Santa Clara Community Working Group

December 3, 2015

Agenda

• Follow-up Items and Work Plan
• New Starts Project Development & Schedule Update
• Construction Methods and Approach
  – Meeting objectives
  – Approach to construction for environmental clearance
  – Construction techniques
  – Next steps
• Next Steps
Role of the CWG

- Be project liaisons
- Receive briefings on technical areas
- Receive project updates
- Build an understanding of the project
- Collaborate with VTA
- Contribute to the successful delivery of the project

Your Role as a CWG Member

- Attend CWG meetings
  - Bring your own binder (BYOB)
- Be honest
- Provide feedback
- Get informed
- Disseminate accurate information
- Act as conduits for information to community at large
Role of the CWG Team

<table>
<thead>
<tr>
<th>CWG Team Member</th>
<th>Role</th>
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<tbody>
<tr>
<td>Eileen Goodwin</td>
<td>Facilitator</td>
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<td>Angela Sipp</td>
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<td>Phase II Project Manager</td>
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<td>Technical Lead</td>
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<td>City of Santa Clara – Planning Liaison</td>
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Upcoming Meetings

Public BART Phase II Financial Update Workshop
- January 2016

Station Walking Tours
- March 2016

CWG Meetings
- February 11, 2016
- April 14, 2016

VTA Board of Directors
- December 10, 2015

BART Silicon Valley Program Working Committee
- December 7, 2015
Follow-up Items and Work Plan

- Dollar amounts being added to the sales tax expenditure maps
- How many vehicles taken off roadway with change of headways from 15 min. to 12 min. for entire BART system
- Cost of operations and maintenance from Diridon to Santa Clara stations
- No effect on archaeological area at Santa Clara station

New Starts Project Development and Schedule Update

Leyla Hedayat, Phase II Project Manager
New Starts Program

- New Starts is part of the Federal Transit Administration’s primary grant program for funding major transit capital investments. Project Development is the first phase of New Starts.

- VTA is in a strong position to initiate pursuit of New Starts funding due to the following:
  - Momentum of the Phase I project
  - Progress of environmental and Community Working Group activities
  - Financial strategy to close the Phase II funding gap
  - Uncertainty of future federal funding and criteria
  - Project cost increases over time
  - Strong economy and active development

Entry into Project Development

- Applicant letter includes:
  - Project description and map
  - Purpose and need
  - Key corridor studies
  - Current levels of transit service
  - Cost estimate
  - Project Development funding commitment
  - Timeline to complete Project Development

- FTA has 45 days to review and notify Congress and Project Sponsor of Entry into Project Development phase.

- Project Development requires completion of environmental process within two years.

- VTA’s application letter will include a 4-station project with Newhall Yard Maintenance facility (Alum Rock, Downtown San Jose, Diridon and Santa Clara).
Environmental Schedule Update

Construction Methods and Approach

Leyla Hedayat, Phase II Project Manager
Overview

• Meeting Objectives
• Approach to Construction for Environmental Clearance
• Construction Techniques (Mike Lehnen, Engineering Team)
• Next Steps

Meeting Objectives

• Purpose of environmental clearance and the process
• General overview of construction techniques
• Construction techniques that will be evaluated in the environmental document
Approach to Construction for Environmental Clearance

- Environmentally clear project leaving flexibility to the contractor to construct
- Review other projects and lessons learned during construction
- Develop a Construction Education & Outreach Plan
  - CWG meeting topic in February 2017
  - City partners will review prior to implementation after the Record of Decision and before major construction
- Prior to construction extensive coordination with VTA operations
  - Bus bridge for Light rail, rerouting of bus services during construction

VTA’s BART Silicon Valley Phase II Extension

Community Working Group (CWG) Presentation
Construction Techniques of Tunnels and Underground Facilities

Michael Lehnen, P.E.
Vice President
Hatch Mott MacDonald
Agenda

1. Overview

2. Construction of Tunnels:
   - Bored Tunnels
   - Cross Passages
   - Tunnel Portals

3. Construction of Typical Cut-and-Cover Stations

4. Station Construction:
   - Alum Rock Station
   - Downtown San Jose Station
   - Diridon Station
   - Santa Clara At-Grade Station

5. Mid-Tunnel Vent Structure Construction:
   - Santa Clara / 13th Mid-Tunnel Vent Shaft
   - Stockton Ave Mid-Tunnel Vent Shaft

6. Newhall Yard Maintenance Facility

1. Phase II Overview

- Overall length: 5¼ miles
- Three cut-and-cover stations, each 950 ft long:
  - Alum Rock
  - Downtown San Jose (1500 ft long with crossover)
  - Diridon
- One at-grade station:
  - Santa Clara
- Two cut-and-cover mid-tunnel vent structures:
  - Santa Clara / 13th Street
  - Stockton Ave
- Length of twin bored running tunnels:
  - 4½ miles
- Newhall Yard Maintenance Facility
Phase II Alignment

2. Construction of Tunnels

Typical Phase II Bored Tunnel Cross Section
Tunnel Boring Machine – General Layout

- Cutterhead (with soil conditioning ports)
- Bulkhead
- Compressed Air Lock
- Screw Conveyor
- Excavation Chamber
- Drive Motors
- Thrust Rams
- Segment Erector
- Tunnel Lining
- Tail Seals

Earth Pressure Balance Machine Tunneling: Machine and Segmental Lining Animation

Hatch Mott MacDonald
Bored Tunnel Cross Passages

- Connect the two bored tunnels at regular intervals along the alignment (33 total)
- Ability to adjust spacing to accommodate site features
- Required by BART and NFPA 130 as means of providing safe refuge in the event of an emergency
- Small but complex structures
- Multiple steps in the construction sequence:
  1. Ground improvement (if necessary)
  2. Tunnel liner support
  3. Tunnel liner breakout
  4. Excavation
  5. Install waterproofing and concrete liner
  6. Install doors and other finishes
- Also house equipment
  - Standpipe
  - Communications
  - Radio

Cross Passages
Ground Improvement

- Excavation Stability
  - Groundwater control
  - Improved soil strength due to poor ground conditions
- Common Methods
  - Permeation Grouting
  - Jet Grouting
  - Dewatering
- Used at:
  - Bored tunnel / structure interfaces
  - Cross passages
- Installed from:
  - Ground surface
  - Inside bored tunnels

Tunnel Portals
East Portal

East Portal – Construction Staging Area (CSA)
West Portal

• Work at the West Portal will be staged within the overall Newhall Yard site

West Portal – Typical Contractor’s Worksite
3. Construction of Typical Cut & Cover Stations

Step 1: Support of Excavation (SOE) Wall Installation
Reinforced Concrete Slurry Walls

Deep Soil Mix (DSM) Wall
Step 2: Excavation, Decking & Temp Utility Support
Step 3: Continue Excavation & Add Internal Bracing
Step 4: Excavation & Decking Complete, Traffic Reinstated, Tunneling into Excavation
Step 5: Construct Structure & Restore Street
4. Construction of Underground Stations

Example Underground Station Model – Los Angeles Regional Connector Project

Advance Utility Relocations

- Old and at-risk utilities, or in conflict with the Support Of Excavation (SOE) walls
- Main trunk lines (services to be addressed by tunnel / station contractor)
- Typically performed with localized traffic control measures
Typical Scenario – Advance Utility Relocations

Typical utility arrangement in heavily congested urban environment
Phase II Alignment

Black outlines represent Construction Staging Areas (CSA)

Alum Rock Station
LA Metro – Universal City Station Excavation (similar site constraints as Alum Rock)

Downtown San Jose Station – East Option
Downtown San Jose Station – West Option

CSAs combination of:
• VTA owned property
• Temporary areas
• Public roadways (as-needed)

Underground Track Crossover
Diridon Station

Sample Urban Subway Entrances
Santa Clara Station (At-Grade)

Typical Contractor CSA Uses and Activities

- Secured, fenced areas
- Site offices / construction trailers
- Employee parking
- Temporary site power and utilities
- Material and equipment storage
- Muck (excavated material) stockpiling prior removal
- Storage sheds for miscellaneous tools and equipment
- Temporary CSA roads to accommodate truck and other vehicle access
Typical Contractor CSA Layout

4. Construction of Mid-Tunnel Vent Structures

• Mid-Tunnel Vent Shaft – Santa Clara/13th
• Mid-Tunnel Vent Shaft Options – Stockton

• Mid-Tunnel Vent Shaft Cross Section
5. Newhall Yard Maintenance Facility

Primary Maintenance Facility Construction Activities (after tunnel construction):

• Excavation and removal of contaminated material
• Excavations for building foundations and subsurface recesses
• Installation of site drainage systems
• Utility relocations and new utility installation
• Construction of industrial type buildings
• Construction of electrical substations and electrical systems facilities
• Track construction
• Site grading and roadway construction
• Final site finishing, fencing, and restoration activities

Questions & Answers
Next Steps

- Review/refine construction methodology and approach
- Research projects and their approach to community engagement during construction
- Determine project delivery strategy
  - Need to know project delivery method to enter New Starts Engineering phase (Fall 2017)

Discussion

Eileen Goodwin, Facilitator
Next Steps

- Next meeting: Thursday, February 11, 2015 ~ 4:00-6:00 PM,
  Santa Clara Chamber of Commerce – 1850 Warburton Avenue, Santa Clara ~ BYOB
  - Caltrain Electrification (Caltrain Staff)
  - High Speed Rail project update (HSR Staff)
  - Airport People Mover/Automated Transit Network update (CSJ Staff)
  - VTA related projects within the BART corridor (VTA Staff)
  - Financial Update of BART Phase II (VTA Staff)
  - Construction Mitigation Best Practice Research (VTA Staff)

- Action Items