Operations Update

BART Board 2020 Workshop

Operations: Fleet Status

FOTF Project & Legacy Fleet Decommissioning

BART Board 2020 Workshop

Fleet of the Future Car Production
Car Shell Assembly - Sahagun, Mexico

- Car 210 Being Produced
- Current rate = 15 Cars Per Month

Fleet of the Future Car Production

- Final Assembly Transitioning to Pittsburg, CA
  - Currently Underway
  - Full Transition expected by the end of 2020

1st BART Fleet of the Future Car Built in California!

Reliability Improvement Efforts

- Technical issues identified through operational & maintenance experience are documented and tracked through a collaborative effort to identify root cause and remedial action.
- Typically results in special inspection, repair and/or modifications. Implementation can be a significant strain on resources with costs for all parts and labor usually covered by the manufacturer's warranty.
- Major upgrades implemented in production at car 166.
- Cars 1-165 will not operate with cars 166 and above until they have been retrofitted to the new configuration
- 50% spare ratio required to meet service requirements and enable modification and retrofit work. Spare ratio will be reduced as reliability improvements are realized.

Reliability Work Execution

Global:

- Performed at all BART facilities
- BART personnel with vendor support as needed (and vice-versa)
- Typically less than 1 shift to complete
- May or may not require shop space
- 3 Car impact to availability
- Current Open mods to be completed by March

Reliability Work Execution

Hayward Shop Only :

- Performed in newly refurbished Hayward Shop
- Combination of BART & Bombardier labor
- 1 or more shifts to complete
- Requires dedicated shop space
- 2 Car impact to availability
- Current Scope to be completed by May

Reliability Work Execution

Pittsburg:

- Performed in Bombardier Plant
- Resourced by Bombardier
- Duration not yet defined (expected to take at least 1 week)
- Requires dedicated space and support
- 15 car impact to availability
- May take over 1 year to complete 165 cars

Legacy Fleet Decommissioning

10 Cars Fully Decommissioned

- Parts harvested to enable continued operation of obsolete equipment
- Scrap value received for car shell and remaining parts

Legacy Fleet Retirement – Next Steps

- New Decommissioning Manager expected this month
- Public outreach through 2020 (collect input/requests)
- Complete Pilot Decommissioning (Up to 15 cars)
- Present pilot project lessons learned
- Staff to recommend legacy fleet retirement plan and associated costs - # of cars to museums, # of cars to Fire Departments, etc.
- Decommissioning to commence in Summer 2021

Contingency Fleet

- ***Least reliable C cars are being set aside initially***
- ***A/B cars to be added based on condition & performance***
- ***Allows vital resources to be repurposed for new fleet reliability improvements***
- ***Special maintenance program established to ensure readiness if needed***
- ***Retire as FOTF attains state of full readiness***

Operations: Fleet & Service Plan

BART Board 2020 Workshop

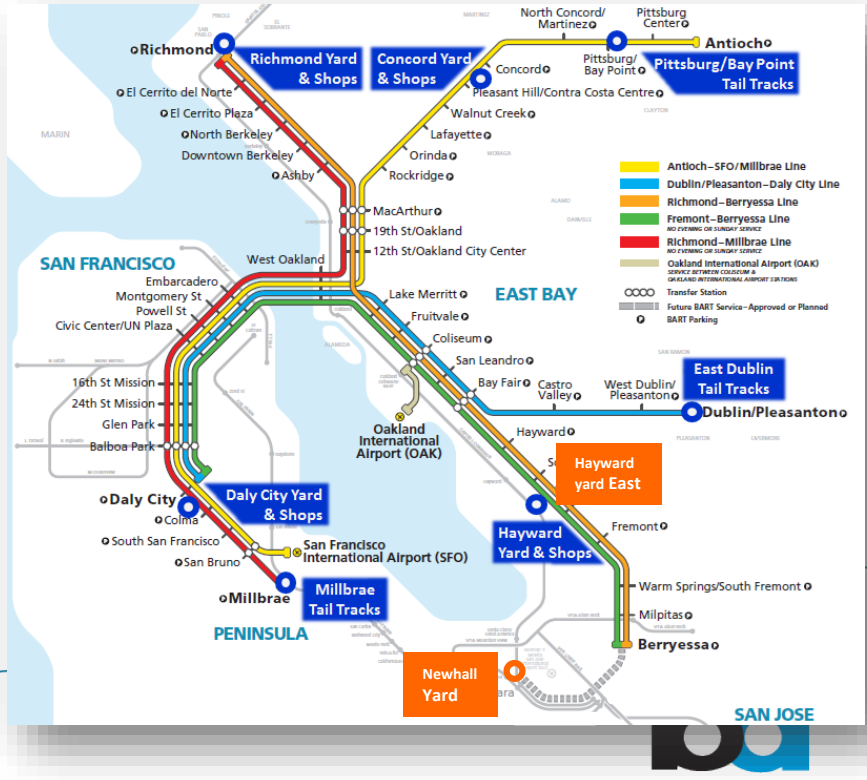
Service Progress

Growing and Modernizing the Fleet

- Accepted 139 new cars
- Decommissioned 10 legacy cars
- Retired 12 legacy cars
- Fleet size totaled 796 cars as of February 4th

Service Enhancements

- 9 Fleet of the Future trains in regular service:
  - 2 trains each on Yellow, Green, Blue & Red lines
  - 1 train on the Orange line
- Lengthened legacy car trains on Orange, Red, Blue, Green & Yellow lines
  - ***Orange:*** *2 trains from 6 to 8 cars*
  - ***Red:*** *1 train from 9 to10 cars*
  - ***Blue:*** *2 trains from 9 to10 cars*
  - ***Green:*** *All base trains at 10 cars*
  - ***Yellow:*** *All base trains at 10 cars*



Fleet Management Strategies

Fleet of the Future (D- and E-cars)

- Achieve consistent car acceptance rate
- Improve service reliability rate
- Manage pre- and post-mod fleets
  - Initiate Mod production lines, with up to 20 cars out of service
  - Manage incompatibilities of mod sub-fleets

Fleet Management Strategies

Legacy Fleet (A-, B- and C-cars)

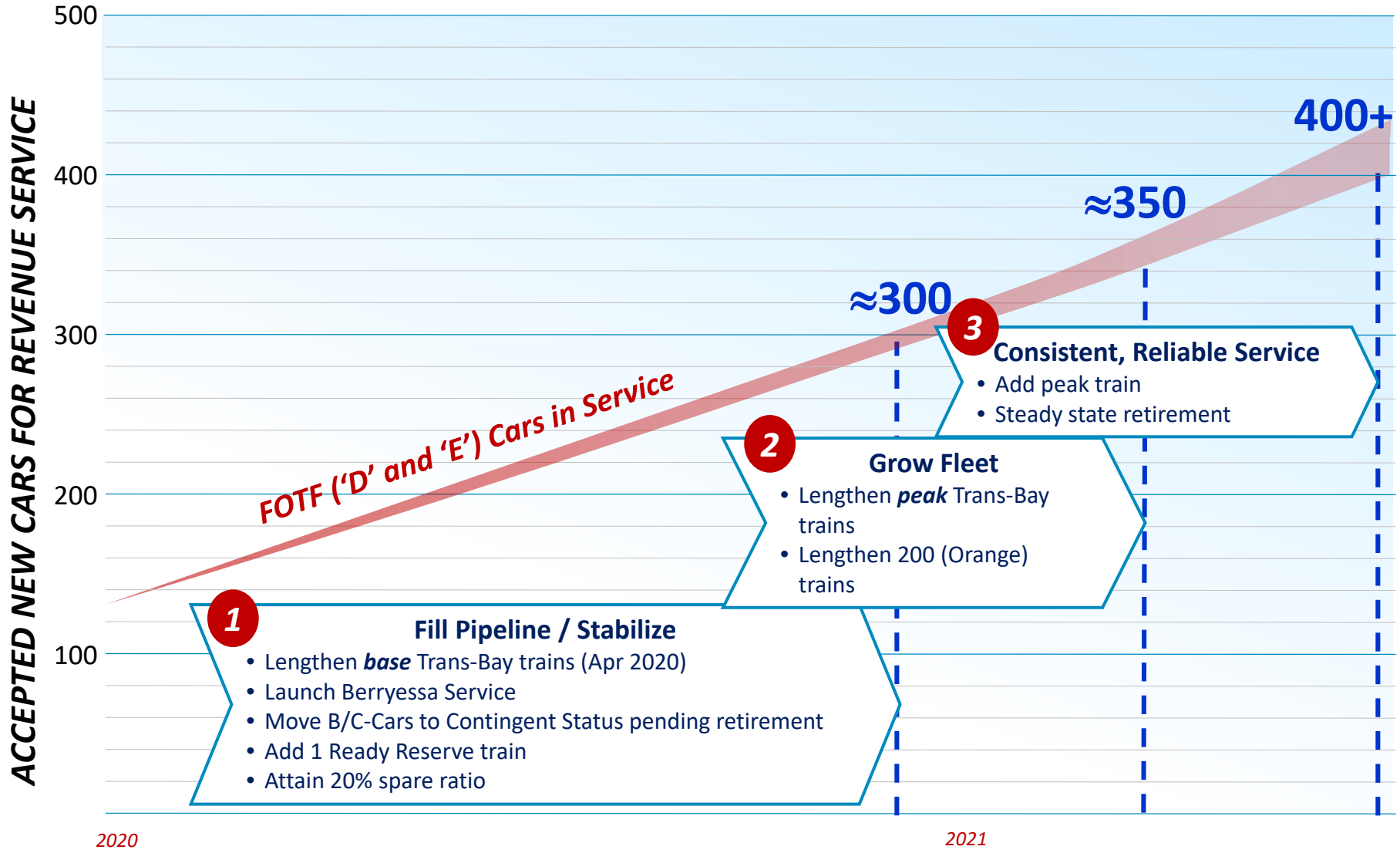
- Attain stable car reliability without overinvesting
- Retire least reliable cars and those with major defects

Fleet Management Strategies

Overall Service Priorities

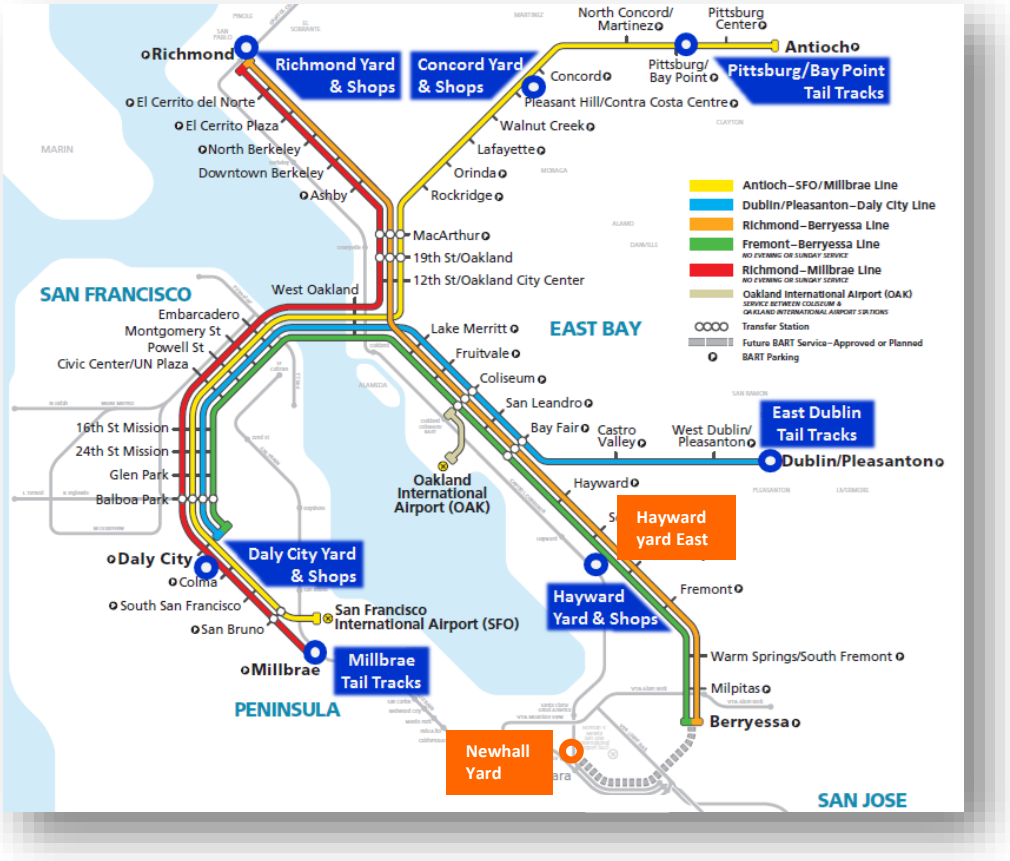
1. Lengthen Trans-Bay base trains to 10 cars (April 2020)
2. Ensure car availability for Berryessa opening
3. Re-establish Ready Reserve trains to protect system reliability
4. Lengthen Trans-Bay peak trains

Service Priorities as the Fleet Grows



Berryessa Extension Service Plan

- Two-route service
- No change to headways
- Service plan requires 58 cars



Operations: System Rebuilding & Service Impacts Update

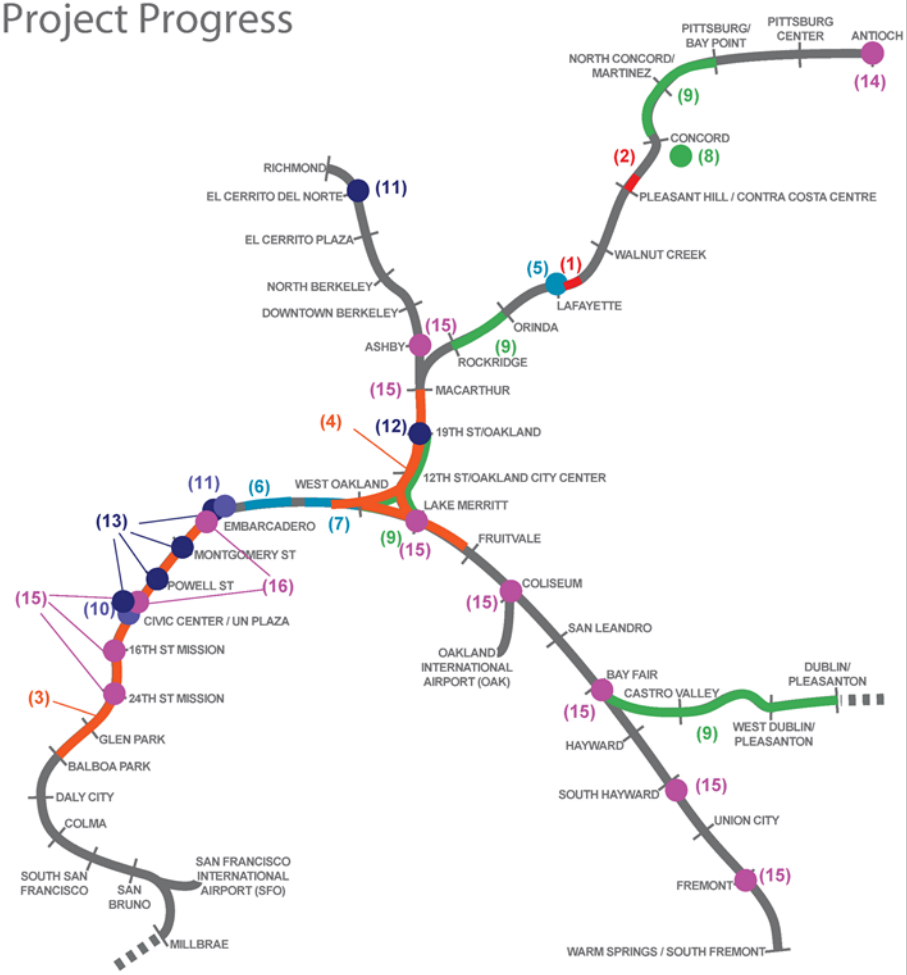
BART Board 2020 Workshop

Agenda

- Magnitude of Effort
- Forward Looking
- Internal vs External Discussion
- Major Projects Scheduled Over Next Two Years

Active RR Projects in Aug 2019 - Feb 2020

Measure RR -
Project Progress



Renew Track

1 C35 Track Interlocking Replacement – Substantial Completion
2 C55 Track Interlocking Replacement – Substantial Completion

Renew Power Infrastructure

3 M-Line 34.5kV Single Tracking for Conduit Installation
4 K-Line 34.5kv Cable Replacement – Ongoing In-house Construction*

Renew Tunnel & Structures

5 Platform Edge Repair at Lafayette Station – Substantial Completion*
6 TBT Cross Passage Doors – Ongoing Construction
7 Aerial Fall Protection M-Line – Ongoing Construction

Renew Mechanical

8 Concord Yard Wheel Truing Facility – Advertised*
9 Coverboard Enhancement – Ongoing Construction*

Design/Engineer to Relieve Crowding

10 Civic Center Station Scissor Stairs - Site Mobilization
11 Embarcadero New Platform Elevator – Advertised*

Renew Stations

12 19th Street Station Modernization – Issued NTP
13 Market Street Canopies – Advertised*

Expand Safe Access

14 eBART Antioch Parking Lot Contract – Awarded
15 ADA Lighting Improvements – Substantial Completion*
16 Embarcadero and Civic Center Bike Station Modernization – Start Construction*

Replace Train Control/Increase Capacity

17 Design Support During Construction On-Call Contract (s) for Train Control Modernization Project – Advertised (Not Mapped)*

34.5 kV Cable Replacement M-Line

Scope:	✓ Perform all work to replace 34.5 kV Feeder Cable Sections along the M1 and M2 Tracks between the MVS Switching Station and MBP, MGP, MTF, MSS, MPS & MTW Traction Power Substations. ✓ Demolish, remove, and dispose of existing cable system. Furnish, install, test and commission new 34.5kV cables. ✓ Install new fiber optic cable backbone system along the M1 and M2 tracks between train control rooms from Balboa Park to the MTW vent structure.
Estimated Duration:	✓ 5.5 years
Bid Amount:	✓ $82M
Award Date:	✓ August 2018
Impact to Service:	✓ 26 Single Tracking Sundays per year

TP-10 Substation Replacements

Scope:	✓ Perform all work to install eight (8) District Substations(CWC, MDC, KOW, MBP, KWS, MPS, KMA & MTS) with the options of two additional Substations (MVS & MSS) with new and completely functioning traction power equipment at each of the TPF sites. ✓ Options to furnish and install Reversible Controlled Rectifiers at CWC and KMA. ✓ Install 14 ETTS (Emergency Transfer and Trip Stations) equipment, raceways, and modification to existing DC Switchgear controls in the TPF and the TCR.
Estimated Duration:	✓ 5 years
Bid Amount:	✓ $130M (Engineering estimate)
Estimated Award Date:	✓ Spring 2021
Impact to Service	✓ None/ Off-Mainline Work

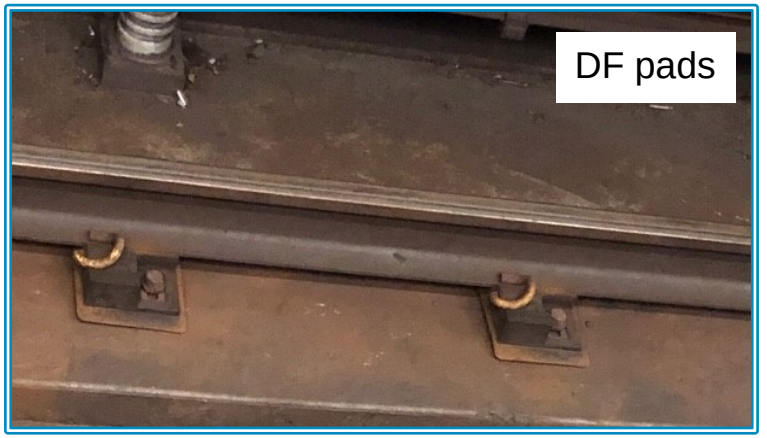
Rail Replacement (Rail Relay)

Scope:	✓ **Replace 90 miles of worn running rail in Legacy System.** ✓ **This project will be performed in conjunction with the Direct Fixation Pads Project by BART forces.**
Estimated Duration:	✓ **10 Years**
Estimated Amount:	✓ **$80,500,000**
Award Date:	✓ **BART Internal Forces**
Impact to Service:	✓ **None/ Blanket Work**

Rail Relay

Direct Fixation (DF) Pads

Scope:	✓ **Replace Direct Fixation Pads that have reached the end of their lifecycle on A, C, M, and R lines with new DF pads.** ✓ **Goal is to replace 20,000 DF Pads per year with a dedicated crew. Currently replacement rates are 10,000 per year.** ✓ **This project will be performed in conjunction with the Rail Wear Replacement Project and as directed by track inspectors in locations where needed.**
Estimated Duration:	✓ **10 Years**
Estimated Amount:	✓ **$16,500,000**
Award Date:	✓ **BART Internal Forces**
Impact to Service:	✓ **None/ Coordinated with Other Shutdowns**



Production Rail Profiling Services

Scope:	✓ **Provide production rail profiling services to optimize the rail head profile improving the wheel/rail interaction and removing irregularities from worn rails on the District's main line tracks in Contra Costa, San Francisco, and Alameda Counties.** ✓ **214 Track miles (2 Phases for 428 miles of Rail re-profiling)**
Estimated Duration:	✓ **One 1 year, with the option to extend the Agreement for up to two (2) additional one-year periods for a maximum duration of three (3) years.**
Bid Amount:	✓ **$12,636,749.00**
Award Date:	✓ **September 2019**
Impact to Service:	✓ **None/ Blanket Work**


Rail Grinder

Orinda Interlocking Renewal Project

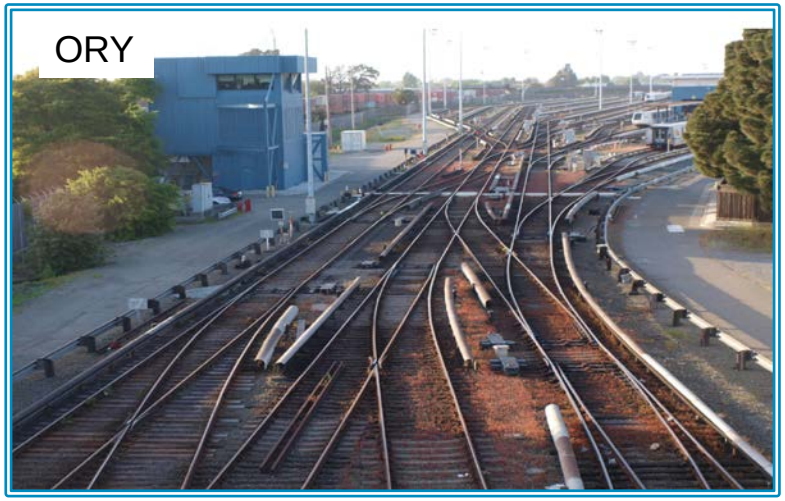
Scope:	✓ **Perform all work to rebuild critical District Infrastructure of Track Interlocking at Orinda** ✓ **Includes mobilization and traffic control, demolition and subdrainage, trackwork and special trackwork, 200ft of standby track, 2 crossovers, traction power and train control, SPSC cabinet, new undertrack conduit and 2500 cable run to Train Control Room.** ✓ **Prepare and develop traffic control plans as specified and required by BART and authorities having jurisdiction of the work and service area(s).**
Estimated Duration:	✓ **1.5 years**
Bid Amount:	✓ **$9.87M**
Award Date:	✓ **July 2019**
Impact to Service:	✓ **5 Weekend Shutdowns**

Restraining Rail Replacement

Scope:	✓ **Remove and replace 1.66 miles of vertical restraining rail and fastener assemblies that hold the restraining rail in place on nine tight curves nearing the end of their design life.** ✓ **Restraining Rail Replacement project began in 2016. The following curves have been completed: C-104, C-204, CX-04, M-203, MX-03, Y- 304, Y-404.** ✓ **Curves C-101 and C-201 are scheduled to be completed by May 2020.**
Estimated Duration:	✓ **3 Years**
Estimated Amount:	✓ **$6,000,000**
Award Date:	✓ **BART Internal Forces**
Impact to Service:	✓ **None/ Blanket Work**

Richmond Yard Track Rehabilitation Project

Scope:	✓ **Replace the existing 90RA rail with 119RE rail, replace 35 existing turnouts, add one new turnout and a new 1000' track in order to increase storage capacity for new FOTF cars.** ✓ **The extension of all tracks require a purchase of a 1.5 acres strip of land parcel from BNSF.** ✓ **The Richmond Yard Track Rehabilitation Project will standardize all rail and provide a longer service life and improved safety for the next 50 years.**
Estimated Duration:	✓ **3 Years**
Estimated Amount:	✓ **$29,700,000**
Award Date:	✓ **BART Internal Forces**
Impact to Service:	✓ **None/ Off-Mainline Work**



Off-Track Flash Butt Welding at ORY

Scope:	✓ **Fabricate continuous welded rail (CWR) strings, from 40-foot sections of rail, using electric flash butt welding method at Richmond Yard.** ✓ **CWR stings will be installed in Richmond Yard to replace the 90RE rails with the new , continuously welded, 119RE rails.** ✓ **Approximately 44,000 feet of new rails - in 400-foot rail strings - will be installed in Richmond Yard.**
Estimated Duration:	✓ **1.5 Years**
Estimated Amount:	✓ **$11,000,000**
Estimated Award Date:	✓ **May 2021**
Impact to Service:	✓ **None/ Blanket Work**

Electric Flash Butt Welding

Frog Capital Maintenance Project

Scope:	✓ **The old frog profiles were designed for the old cylindrical wheel profile. FOTF wheel profiles has caused the District to re-profile the existing frog shape to help reduce vertical impact loading and deterioration of the frog point and tread surface area.**
Estimated Duration:	✓ **5.5 Years**
Estimated Amount:	✓ **$4,600,000**
Award Date:	✓ **BART Internal Forces**
Impact to Service:	✓ **None/ Blanket Work**

Conformal Frog Welding

Safety Barriers Replacement Phase 3

Scope:	✓ **Perform all operations to construct fences gates and other permanent District approved physical barriers for the assets and facilities system wide.** **Project Site Locations:** ➢ **MW-12 - MP 14.4 to 14.9, Walnut Creek, CA** ➢ **Jones Rd - MP 16.7 to MP16.8, Walnut Creek CA** ➢ **MW-14 - L Line MP 11.0, San Leandro CA** ➢ **MW-15 - Union City** ➢ **MW-17 - C Line MP 18.5, Concord CA** ➢ **MW-09 - C Line MP 4.6, Oakland, CA** ➢ **CHB, at 5th Ave and East 7th St, Oakland, CA** ✓ **Additional location maybe included at the discretion of the District subject to available funding.**
Estimated Duration:	✓ **1.5 years**
Bid Amount:	✓ **$890,000.00**
Award Date:	✓ **July 2019**
Impact to Service	✓ **None/ Off-Mainline Work**

Coverboard Enhancement Projects

Scope:	✓ **Perform all work to move and replace wayside coverboards primarily on the L-Line and a portion of the A-Line.** ✓ **Work to be performed includes furnishing and installation of all coverboard brackets within the limits of work as well as coverboard mounting hardware (plastic pins, aluminum collars, stainless cotter pins) as well as additional support bracket assemblies where existing support intervals are six feet or greater.**
Estimated Duration:	✓ **2.5 years**
Bid Amount:	✓ **$7.2M**
Award Date:	✓ **October 2018**
Impact to Service:	✓ **Single Tracking During Non-Peak Hours**

A65/A75 (Hayward) Interlocking Renewal

Scope:	✓ **Perform all work to rebuild critical District Infrastructure of Track Interlocking near Hayward and South Hayward Stations** ✓ **Includes mobilization, demolition, renewal of trackwork and special trackwork including 3 crossovers and 2 mainline turnouts accessing the Hayward Maintenance Complex. Also inclusive of traction power and train control renewal in the limits of work and installation of new SPSC cabinet and control wiring (Enabling works) in anticipation of CBTC.**
Estimated Duration:	✓ **2 years**
Bid Amount:	✓ **$16.9M**
Award Date:	✓ **Jan 2020**
Impact to Service:	✓ **10 Weekend Shut Downs**

Questions/Comments?

Thank You!