Expanding BART Peak Period Trains via Construction of a Vehicle Overhaul and Heavy Repair Shop

Application to the

California State Transportation Agency's 2016 Transit and Intercity Rail Capital Program

Bay Area Rapid Transit District

April 2016

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SAN FRANCISCO BAY AREA RAPID TRANSIT DISTRICT
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April 5, 2016

Mr. Brian P. Kelly
Secretary
California State Transportation Agency
915 Capitol Mall, Suite 350B
Sacramento, CA 95814

Dear Secretary Kelly:

Please find attached the San Francisco Bay Area Rapid Transit District's (BART) application for funding in the 2016 Transit and Intercity Rail Capital Program (TIRCP).

Successful award of the grant will result in the construction of a vehicle overhaul heavy repair facility in Alameda County needed to enable increased BART service capacity on overcrowded trains into downtown San Francisco provided by the addition of new rail vehicles to the existing fleet. As a result of this project and the resulting added passenger capacity, transit is expected to attract current automobile users to ride transit, improve reliability of the BART service, and enhance transit access throughout the San Francisco Bay Area.

In the near future this project will also support the Santa Clara Valley Transportation Authority with their efforts to implement the planned expansion of the BART system to San Jose and enhance BART system direct connectivity to the State's high-speed train system and its facilities.

As General Manager, I authorize and approve this application.

Thank you for the funding opportunity.

Sincerely,

General Manager

BEFORE THE BOARD OF DIRECTORS OF THE
SAN FRANCISCO BAY AREA RAPID TRANSIT DISTRICT

In the Matter of Authorizing the Filing of Applications, Providing Supporting Documents, and Executing Funding Agreements with the United States Government, the State of California, and other Entities

Resolution No. 5223

WHEREAS, the San Francisco Bay Area Rapid Transit District ("BART") is eligible to receive Federal and/or State funding for certain transportation planning related activities through the U.S. Department of Transportation and the California Department of Transportation; and

WHEREAS, pursuant to Board Resolutions Nos. 4372, 4373, 4898 and the Annual Budget Resolution, the BART General Manager is authorized to file funding applications and execute funding agreements with the United States Government and the State of California and with any other entity; and

WHEREAS, a Fund Transfer Agreement is needed to be executed with the California Department of Transportation before such funds can be claimed through the Transportation Planning Grant Programs; and

WHEREAS, funding agreements from the United States Government or the State of California will impose certain obligations upon the applicant, including the provision by the applicant of the project's local share of costs; and

WHEREAS, it would be in the best interests of the District for the General Manager to have standing authorization to apply, on behalf of the District, for funds from entities and to file necessary documents and execute funding agreements.

NOW, THEREFORE, BE IT RESOLVED by the BART Board of Directors:

1. That the BART General Manager, or her/his designee, is authorized to execute and file all applications on behalf of the BART for funds for District projects and activities with any agency of the United States Government or the State of California or any other entity.

2. That the BART General Manager, or her/his designee, is authorized to execute and file with such applications any assurance or other document required by the funding entity for the subject project.

3. That the BART General Manager, or her/his designee, is authorized to furnish such additional information as the funding entity may require in connection with the application or funding agreement for the subject project.

SAN FRANCISCO BAY AREA RAPID TRANSIT DISTRICT
CERTIFIED A TRUE COPY

KENNETH A. DURON, DISTRICT SECRETARY

Adopted October 24, 2013

70070v1

4. That the BART General Manager, or her/his designee, is authorized to execute all funding agreements on behalf of BART with any agency of the United States Govemment or the State of California or any other entity

5. That the BART General Manager is authorized to execute and file applications on behalf of BART for funds for BART District projects and activities with any private entity, but execution of funding agreements with a private entity requires approval of the BART Board of Directors.

This Resolution supersedes Board Resolution No. 4898 dated October 9, 2003.

2. Project Narrative Document

2.1. Title Page

Element	Project Details
Project title	Provision of Expanded BART Peak Period Trains via Construction of a Vehicle Overhaul and Heavy Repair Shop (VOHRS)
Location	The Hayward Maintenance Complex VOHRS (HMC-VOHRS) is located in the city of Hayward in Alameda County, California. However, the expanded peak period BART service and associated benefits would be realized throughout BART's service area, which reaches the counties of Alameda, Contra Costa, San Francisco, and San Mateo.
Project mode	Heavy Rail
Project priority	Not applicable
Lead applicant	Bay Area Rapid Transit District (BART)
Co-applicant	None
TIRCP funding requested	$50,000,000
Proposed non-TIRCP funding requested	$13,476,845 (Low Carbon Transit Operations Program [LCTOP] funding) $312,740,694 (BART capital and operating funds)
Result of GHG calculations	■ 0.0027 metric ton carbon dioxide-equivalent (CO_2e) per dollar of TIRCP funding requested ■ 0.0021 metric ton CO_2e per dollar of Greenhouse Gas Reduction Fund (GGRF) funding requested

2.2. Point of Contact

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Oakland, CA 94604-2688
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2.3. Funding Requested

Table 1 presents the total Transit and Intercity Rail Capital Program (TIRCP) funding requested, the amount of Low Carbon Transit Operations Program (LCTOP) funding requested, the non-TIRCP program matching funds, and the total project cost. The Bay Area Rapid Transit District (BART) is requesting $50 million from the TIRCP and $13.5 million from the LCTOP, for a total of $63.5 million from the

Greenhouse Gas Reduction Fund (GGRF). All proposed non-GGRF matching funds will be provided by the BART through allocations from its baseline capital (federal, state, local) and operating funds.

Table 1. Funding Requested for the HMC-VOHRS and Expanded Peak Period Fleet[a]

	$2016 millions
Amount of TIRCP funding requested	$50.0
Amount of LCTOP funding requested	$13.5
Proposed BART capital and operating funding	$312.7
Total project cost	$376.2

[a] The HMC-VOHRS will support the expanded peak period fleet, which in turn will deliver the project benefits discussed below. Accordingly, the total project cost reflects both the HMC-VOHRS ($166,217,539) and expanded peak period fleet ($210,000,000) since both are required to achieve the stated project benefits. Note that the new cars are to be fully funded as part of a separate contract. The requested TIRCP funds would directly support the HMC-VOHRS, whereas the requested LCTOP funds would support procurement of the expanded peak period fleet.

2.4. Eligibility Criteria

BART is a public agency that operates the largest passenger rail service in the San Francisco Bay Area. The Hayward Maintenance Complex—Vehicle Overhaul and Heavy Repair Shop (HMC-VOHRS) is a rail capital project that will enhance the BART system by expanding and improving maintenance facilities in Hayward to accommodate new rail cars added to the fleet to address crowding. The facility will also support future increases in system demand from BART's Warm Springs and Silicon Valley extensions and will provide maintenance services integral to BART's planned connectivity to Caltrain and the High Speed Rail (HSR) system.

2.5. Project Summary

This project consists of constructing a new vehicle overhaul and heavy repair shop in Hayward, California, that will ensure adequate maintenance and repair capacity to support newly purchased cars. With BART ridership growing 2.3 percent per year on average over the past decade, trains are becoming crowded, and the added cars that are maintained, repaired, and stored at the new HMC-VOHRS will be vital to ensuring that transit remains a viable alternative to driving. This project will reduce vehicle miles traveled (VMT) by improving the quality of service, reducing crowding for riders, and supporting continued growth of the BART system. The many disadvantaged communities (DACs) located along the BART system will benefit from increased capacity and reduced crowding. Several of the Bay Area's priority development areas are centered around BART stations, and this project supports additional transit capacity that will enable these areas to grow, which will help to realize the Bay Area's Sustainable Communities Strategy.

2.6. Detailed Project Description

To prevent overcrowding and meet future demand, BART is investing in expanding its fleet by purchasing new cars. These new cars will alleviate crowding and improve rider comfort on Transbay trains during peak periods, which will make transit a more attractive alternative to driving, thereby increasing ridership and reducing emissions. Over the long term, these cars will also carry new riders due to BART's expansion via the Warm Springs and Silicon Valley extensions as well as its integration with California HSR and other connecting transit services. The HMC-VOHRS will also support system expansion by facilitating more transit-oriented development. Since 50 percent of BART's stations serve DACs, disadvantaged residents of the Bay Area stand to benefit greatly from the reduced crowding and more comfortable service that the new cars will bring.

Adding new BART cars will reduce greenhouse gas (GHG) emissions significantly by inducing people to use transit rather than drive, and these new cars will lead to only a minimal increase in BART's operational GHG emissions. Virtually all of BART's electricity (99.6 percent) is supplied by the Northern California Power Agency (NCPA), with hydroelectric and geothermal resources currently producing approximately 50 percent of NCPA's power. The GHG estimates included in this TIRCP application—which are based on guidance provided by the California Air Resources Board (ARB), which advises TIRCP applicants to use default statewide electricity emissions factors—overstate the GHG emissions associated with added electricity consumption by BART trains and underestimate total GHG reductions.

The HMC-VOHRS will be constructed in the Hayward Yard, which is one of four rail vehicle maintenance yards serving the BART system with train storage, train washing, and general maintenance facilities for the BART fleet. BART's current fleet of 669 cars can all be stored at the four existing yards and serviced at the existing vehicle maintenance shops. As the fleet expands to meet future needs, additional maintenance and storage will be necessary, both to accommodate the expected number of cars and to minimize non–revenue train movements to begin and end daily service.

The larger Hayward Maintenance Complex Project—of which the HMC-VOHRS is a key part—will acquire and improve three properties on the west side of the existing Hayward Yard and construct additional storage tracks for a maximum of 250 cars on undeveloped BART property on the east side of the Hayward Yard. The HMC-VOHRS will be necessary to maintain the additional cars. The 50,000-square-foot building will provide 14 vehicle maintenance pits and lifts, turntables, and associated maintenance equipment.

The HMC-VOHRS will provide maintenance and repair services critical to addressing current crowding on the BART system. Over the past 5 years, ridership on BART has increased by nearly 25 percent, or over 75,000 trips, on a typical weekday. In 2014, weekday ridership averaged over 410,000 and in peak months reached as high as 440,000. Growth is occurring across the system, but the greatest increases are in the constrained Transbay corridor, which saw 50,000 additional daily trips between 2010 and 2014. Peak-hour, peak-direction trains now often reach 120 to 140 passengers per car, far above BART's standard of 115 per car.

To help alleviate crowding, BART has invested in expanding its fleet, with 66 new cars planned to start service in 2018. During the peak period, BART Transbay trains are typically 8–10 cars long. The new cars will increase system capacity by expanding all peak period Transbay trains to 10 cars. The four existing yards and maintenance facilities do not have adequate storage or equipment to properly service the expanded fleet. Accordingly, the HMC-VOHRS is necessary to provide sufficient maintenance and repair capacity for BART's new car fleet. Without the HMC-VOHRS, BART would not be able to expand the peak period trains to 10 cars, and as such, would not be able to accommodate the anticipate growth in ridership or address existing and forecasted overcrowding issues. The project will therefore enable expansion of BART's peak period fleet, which will provide benefits to all BART riders in the form of reduced crowding and travel delay.

2.7. Evaluation Criteria

2.7.1. Useful Life

The useful life of the project is determined by the 25-year life of the 66 new cars, which is the standard useful life of transit vehicles as specified by the Federal Transit Administration.

2.7.2. Primary Criteria

2.7.2.1. GHG reduction

Consistent with ARB's (2016) *Greenhouse Gas Quantification Methodology for the California State Transportation Agency Transit and Intercity Rail Capital Program Greenhouse Gas Reduction Fund FY 2016-17* (TIRCP GHG Guidance), CO_2e emissions reductions for the first operational year (Yr1) (2018) and the final operational year (YrF) (2043) were estimated based on project operating data. Table 2 summarizes the Yr1 and YrF reductions, as well as lifetime CO_2e reductions, which were quantified assuming a 25-year project life. Results are presented in terms of TIRCP and total GGRF funds requested per metric ton CO_2e reduced and lifetime CO_2e reductions per TIRCP and total GGRF funds requested.

The emissions reductions presented in Table 2 were estimated using the ARB's *Greenhouse Gas Emission Reduction Calculator for the California State Transportation Agency (CalSTA) Transit and Intercity Rail Capital Program (TIRCP) Greenhouse Gas Reduction Fund Fiscal Year 2016-17* (ARB TIRCP Calculator). The following inputs to the ARB TIRCP Calculator were made.

- Transit service type: Train
- Year 1 (Yr1): 2018
- Year F (YrF): 2043
- County: Alameda
- Yr1 and YrF days of operation (D): 250
- Yr1 average unlinked daily ridership (R): 9,468

- YrF average unlinked daily ridership (R): 9,468
- Adjustment (A): 0.83
- Length (L): 13.00 miles
- Fuel type: Electric (Heavy Rail)
- Annual units of fuel: 12,719,970 kilowatt-hours (kWh)
- TIRCP funds requested: $50,000,000
- Total GGRF funds requested: $63,476,845

Table 2. Greenhouse Gas Results

Parameter	Result
Yr1 CO_2e reductions (metric tons)	7,845
YrF CO_2e reductions (metric tons)	2,996
Project lifetime (years)	25
Lifetime CO_2e reductions (metric tons)	135,505
TIRCP funding requested ($2016)	$50,000,000
Total GGRF funding requested ($2016)	$63,476,845
Cost per metric ton CO_2e reduced	
TIRCP funding ÷ lifetime reductions	$369
Total GGRF funding ÷ lifetime reductions	$468
CO_2e reductions per requested funding	
Lifetime reductions ÷ TIRCP funding	0.0027
Lifetime reductions ÷ total GGRF funding	0.0021

Daily ridership was calculated using the assumptions and methods discussed below in Section 2.7.2.2, *Ridership*. While BART operates 365 days per year, the analysis used 250 operating days per year to estimate project benefits, which would occur on weekdays during peak travel times. The modeling assumed TIRCP defaults for the adjustment factor (A) and length of the average automobile trip reduced (L). The adjustment factor is for long-distance commuter service. The average automobile trip length for BART riders was obtained from Table D-1 in the 2016 TIRCP Guidance.

Annual units of fuel were estimated based on the increased traction power consumption associated with the expanded peak period fleet. Operation of BART's existing fleet consumes 289,136 megawatt-hours (MWh) per year, or approximately 432 MWh per car per year (assuming 669 cars). Each car in the existing fleet operates an average of 8.3 hours per day, 7 days per week. Peak service is provided on weekdays from 6am to 9am and 3pm to 6pm (6 hours per day). The project would expand peak operations by 66 cars. The new cars would have improved energy efficiency and use 10 percent less

electricity than the existing service vehicles. Accordingly, the net project increase in annual peak period traction power electricity was estimated using Equation 1.

EQUATION 1

$$Fuel = (E_c \div Days_1) * Percent\ Peak\ * Cars * Days_2 * EE * Conv$$

Where

Fuel	= Net project increase in annual traction power electricity use; 12,719,970 kWh
E_c	= Existing annual traction power electricity use per car; 432 MWh
$Days_1$	= Total operating days per year for existing service; 365
Percent Peak	= Percent of peak period hours per weekday; 72% (6 hours/8.3 hours)
Cars	= Net project increase in peak period cars; 66
$Days_2$	= Weekdays per year for expanded fleet; 250
EE	= Energy efficiency improvement factor for new cars; 90%
Conv	= Conversion factor from MWh to kWh; 1,000

The ARB TIRCP Calculator quantifies GHG emissions associated with electricity consumption based on emission factors for the statewide grid average power mix. Virtually all of BART's electricity (99.6 percent) is supplied by NCPA. NCPA has a power mix of geothermal, hydroelectric, and natural gas resources (Lodi Energy Center), with hydroelectric and geothermal resources currently producing approximately 50 percent of NCPA's power. BART also has a Strategic Energy Plan that includes renewable energy procurement goals of 75 percent by 2017 and 100 percent by 2020. Accordingly, project emissions reported by the ARB TIRCP Calculator overstate actual GHGs associated with added electricity consumption. Given BART's existing NCPA power supply contract and future renewable energy goals, the project cost effectiveness reported in Table 2 is conservative.

2.7.2.2. Ridership

The HMC-VOHRS is necessary to support adding new capacity to BART trains during the peak period, which will relieve crowding and improve rider comfort, leading to increased ridership. Currently, BART trains are so crowded during the morning peak hour that passengers boarding trains bound for San Francisco at stations in the South Bay and inner East Bay face standing-room only conditions, and standees on more crowded lines can have less than 6 square feet of space per person. Studies have shown that people perceive their trips as taking longer in more crowded conditions (see sources 1–3 in Table 3). In some cases, these perceived delays turn into actual delays when riders end up waiting for the next train in hopes that it will be less crowded than the current one, adding time to their trips. Since travel time—whether perceived or actual—is a key determinant of transit ridership, it is necessary to add capacity to BART trains to enable ridership to continue growing. The HMC-VOHRS will maintain the

66 new vehicles that are necessary for BART to run 10 cars on all trains traveling in the peak direction (currently, most Transbay trains during the peak period are 8–10 cars long).

Increased ridership to be achieved by the expanded peak period trains was estimated based on available research on crowding effects and perceived travel time. The impact of reduced crowding on perceived travel time was calculated using data from three studies. The studies surveyed riders to identify the relationship between the "crowding factor," which represents the increase in perceived travel time due to crowding, and the "passenger load factor," which is the number of passengers divided by the number of seats. Table 3 summarizes the survey results.

Table 3. Passenger Load Factors and Associated Crowding Factors from Research

Passenger load factor	Crowding factor	Source[a]
0.8	0%	1
0.9	5%	3
1.0	10%	1
1.0	11%	3
1.1	24%	3
1.2	14%	2
1.2	36%	3
1.3	47%	3
1.4	26%	2
1.4	57%	3
1.5	67%	3
1.6	60%	1
1.6	67%	3
2.0	74%	1

[a] [1] Douglas Economics. 2006. *Value and Demand Effect on Rail Service Attributes*. Australian RailCorp. Cited in Litman, T. 2008. Valuing Transit Service Quality Improvements. *Journal of Public Transportation* 11(2). Available: http://www.nctr.usf.edu/jpt/pdf/JPT11-2Litman.pdf.
[2] Passenger Demand Forecasting Council (UK). 2002. *Passenger Demand Forecasting Handbook*. Cited in Litman, T. 2008. Valuing Transit Service Quality Improvements. *Journal of Public Transportation* 11(2). Available: http://www.nctr.usf.edu/jpt/pdf/JPT11-2Litman.pdf.
[3] Derived from Ryus, P. 2013. Transit Capacity and Quality of Service Manual. 3rd edition. Transit Cooperative Research Program Report 165. Transportation Research Board of the National Academy of Sciences. Exhibit 4-7, p. 4-13. Available: http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp_rpt_165ch-04.pdf. This study quantified separate crowding factors for seated and standing passengers; for this application's analysis, an aggregate load factor was created by averaging the two factors, weighted by the proportion of seated/standing riders.

Next, a regression analysis was conducted to quantify the relationship between the passenger load and crowding factors shown in Table 3. A log-log function was used to relate the two variables, as shown in Equation 2.

EQUATION 2

Crowding factor = $0.1379 * e^{3.078 * \ln(\text{passenger load factor})}$

This function has an R^2 value of 0.751, meaning that it explains over 75 percent of the variation in the data points. Figure 1 shows the function plotted against the data points shown in Table 3, the curve fits the data reasonably well.

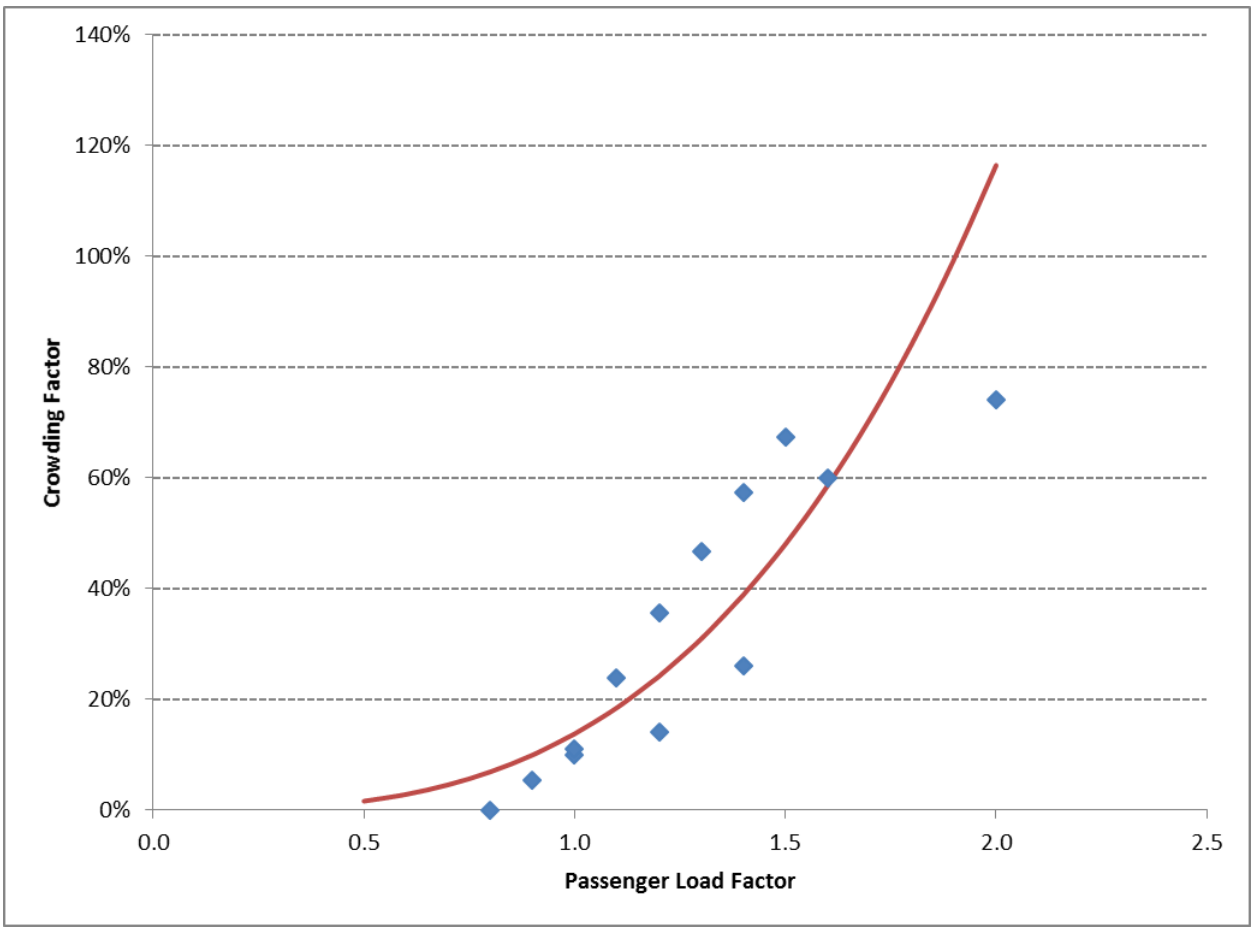

Figure 1. Log-Log Function Relating Crowding Factor to Passenger Load Factor and Data Points from Research Studies

Passenger load factors, crowding factors, and perceived travel times based on Equation 2 and data from the BART system were then calculated for both the morning and evening peak hours and the two

shoulder hours before and after the peaks, both with- and without project effects. Table 4 summarizes these calculations.

Table 4. With- and Without-Project Crowding and Perceived Travel Time Calculations

Assumption	Peak period		Shoulder period		Notes
	Without Project	With Project	Without Project	With Project	
A. Average cars per Transbay train	9.09	10	9.09	10	
B. Passengers per car for peak direction trains	124	113	96	87	Without project value comes from BART operations data for the Transbay Tunnel. With project value assumes the same overall passenger load spread across 10-car trains rather than 9-car trains.
C. Seats per car	57	57	57	57	BART fleet data
D. Passenger load factor for peak direction trains	2.18	1.98	1.69	1.53	D = C / B
E. Crowding factor for peak direction trains	151%	113%	69%	51%	Calculated based on Equation 2
F. Perceived travel time as a percentage of actual travel time for peak direction trains	251%	213%	169%	151%	E = 1 + D
G. Percent change in perceived travel time		-15.3%		-10.4%	Percent change between without and with-project results
H. Ridership elasticity to in-vehicle travel time		-0.6		-0.6	JHK & Associates, CM/AQ Evaluation Model, Texas Transportation Institute, 1995[1]
I. Percent increase in peak direction ridership		9.2%		6.2%	I = G * H
J. Estimated peak direction ridership (FY 17)		54,193		72,805	BART Passenger Flow model and Short Range Transit Plan
K. Estimated increase in peak direction ridership (FY 17)		4,980		4,488	K = I * J

[1] An elasticity relates the percent change in one variable to the change in another variable, so an elasticity of -0.6 means that a 10 percent increase in travel time corresponds to a 6 percent decrease in ridership. For variables that measure behavior change that occurs over time, it is common to specify both short-run elasticities that measure initial impacts and long-run elasticities that happen over time (in this case, it will take awhile for word to circulate that trains are less crowded and draw more people into the BART system). The long-run elasticity was used to measure behavior change over the 25-year project period.

Based on these calculations, increasing peak direction BART trains from the current average length of 9.09 cars to 10 cars will reduce perceived travel time by 9.2 percent during the peak and 6.2 percent during the shoulder hours, based on the relative difference between current perceived travel times and projected with-project perceived travel time. These values were multiplied by -0.6, which is a long-run elasticity relating ridership to in-vehicle travel time to estimate the percent change in peak period ridership achieved by the expanded fleet. The percentage increase in peak ridership was then multiplied by the current weekday peak direction ridership during each period, accounting for projected ridership growth between current numbers and the year when the new cars would go into service. We made the conservative assumption that baseline ridership would be the same in both Yr1 (2018) and YrF (2043), although continued growth on the BART system will likely yield additional riders in YrF.

We estimate that the increased comfort due to the new cars will draw 9,468 new riders per day to the BART system (4,980 during peak hours and 4,488 during shoulders).

2.7.2.3. Transit Integration

BART is the Bay Area's second largest transit network and currently operates and maintains 45 stations and 107 miles of revenue track, serving an average of 423,120 passenger trips every weekday in the counties of Alameda, Contra Costa, San Francisco, and San Mateo. BART currently connects riders with a number of other transit service operators, such as Caltrain, Amtrak (Capitol Corridor), MUNI, AC Transit, SamTrans, and Golden Gate Transit (Figure 2).

Transit agencies that are either currently connected to the BART system or have plans for integration will benefit from growth in BART services and maintenance capacity, as BART provides its passengers with connecting access to destinations throughout the Bay Area.

Increasing BART capacity is particularly important for accommodating new transfers to the BART system from California's HSR, which is currently under construction. Once built out, the HSR system is estimated to bring 24,100 daily entries and exits to the SF Transbay Terminal and 2,500 to Millbrae. These new trips would yield approximately 3,300 transfers to BART.

The HMC-VOHRS is a key component of the larger HMC project, which will serve as the maintenance complex for cars added to the system as part of the Warm Springs and Silicon Valley extensions, which will connect BART to Caltrain and the HSR system. The Santa Clara Valley Transportation Authority (VTA) is a partner in the development of the larger HMC project and has signed a Cost Sharing Agreement with BART on the project's development. As a central part of the HMC, the VOHRS will support the overall fleet maintenance required to support the Warm Springs and Silicon Valley extensions and connections to other transit systems.

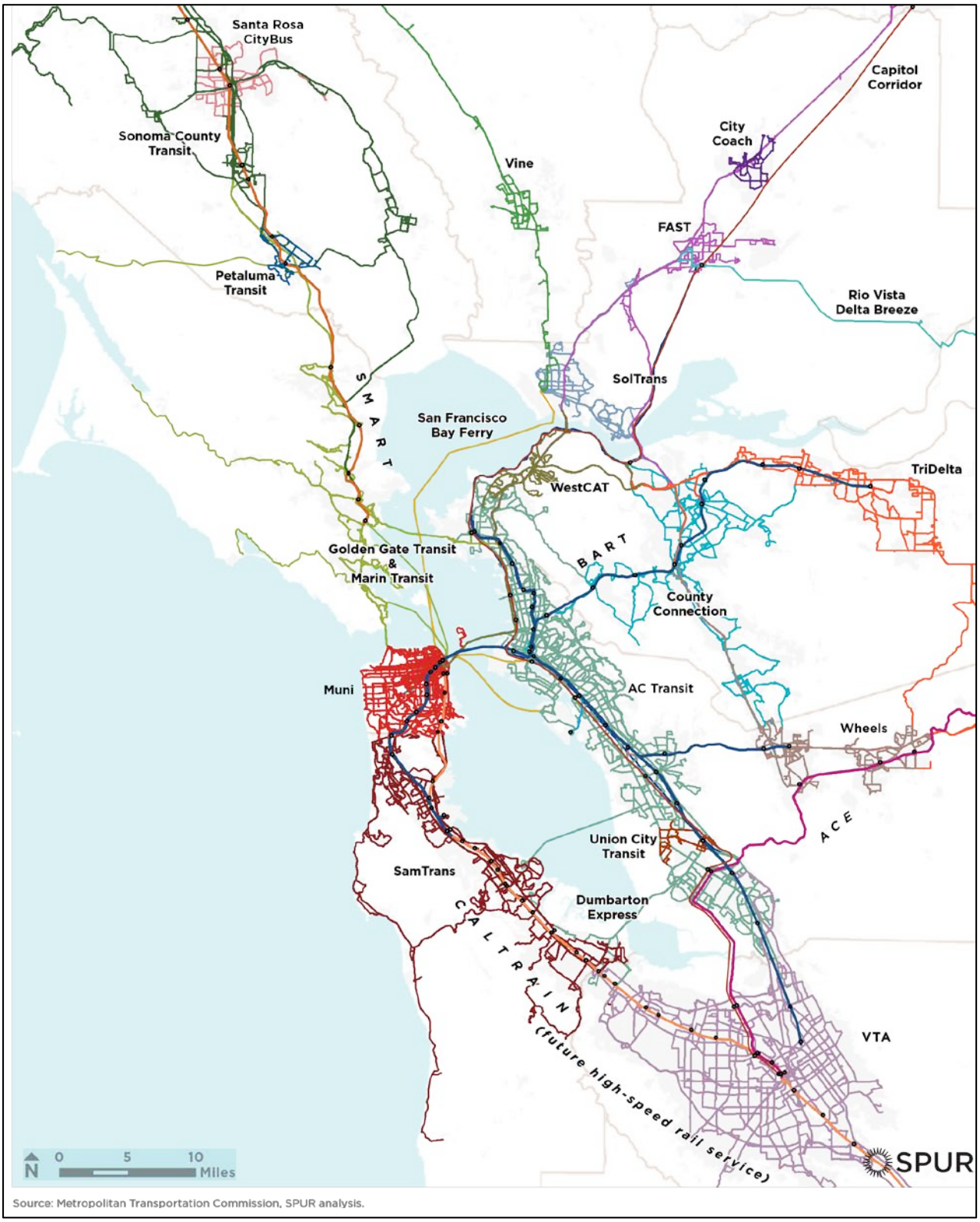

Figure 2. Bay Area Transit Operator Map

2.7.2.4. Improved Safety

The HMC-VOHRS will ensure that the new peak period cars added to the BART system will receive the maintenance and servicing necessary to operate safely and efficiently throughout their lifetime. The new peak period cars are part of BART's Fleet of the Future and include many new safety features. BART's new car design includes tripod poles that are strategically placed to give riders additional support, especially during times of peak hour crowding (Figure 3).

Figure 3. Interior of New BART Car, Tripod Poles

To address the needs of customers with vision and hearing impairments, the new BART cars include interior and exterior digital displays, inter-car barriers, automated announcements, and pole markings to improve contrast. For customers with mobility impairments, the new BART cars include different-colored priority seating, floor marking for wheelchair areas, seats that are higher off the floor making it easier to sit down and stand up, intercoms located near doors, and a separate door for bicycles.

2.7.3. Secondary Criteria

2.7.3.1. Sustainable Communities Strategies Co-Benefits

Reduced VMT through Growth in Ridership

As stated in Section 2.7.2.2, *Ridership*, the expanded peak period trains will increase BART peak direction ridership by approximately 4.7 percent. Based on a ridership increase of 9,468, an average trip length of 13 miles, and an adjustment factor for transit dependency of 0.83, the ARB TIRCP Calculator estimates that implementation of the project will reduce regional VMT by 25.5 million miles per year. Over the 25-

year life of the project, this equates to approximately 638.5 million vehicle miles reduced as result of the project.

Housing Development

The HMC-VOHRS is a critical component of BART's efforts to reduce crowding by adding new peak period cars and building overall system growth. Sufficient capacity for the maintenance and repair of new cars will help BART maintain its fleet in a state of good repair and contribute to high quality BART service. Sustaining high quality transit service is integral to supporting the continued housing growth in many communities throughout the Bay Area that have planned new development around BART stations. These include 22 Transit-Oriented Development (TOD) projects currently underway on BART-owned property near stations, representing over $3 billion in private investment. These projects will add 6,917 new housing units within walking distance of BART stations. In general, BART's TOD Policy encourages and supports high quality TOD, including new housing within walking distance of BART stations. In addition, the TOD Policy land use strategies, which ensure that TOD opportunities are explicitly accounted for in acquisition of new properties, location of new station sites, and the design and construction of station facilities.

Attractiveness of Transit

The new peak period cars supported by the HMC-VOHRS will help bolster the attractiveness of transit by reducing crowding on BART trains. Overcrowding can significantly impact both train and passenger on-time performance. BART statistics show that increasing the number of passengers per car from 107 to 120 decreases train on-time performance by almost 45 percent and passenger on-time performance by over 25 percent as boardings take more time and/or riders delay their trips to wait for a less crowded train.

The newly designed cars also include features that make it more pleasant for people to ride, including the following.

- Easy to clean, wipeable seats.
- 50 percent more doors, making getting on and off the train faster and easier.
- Improved cooling system that distributes air directly to the ceilings, making it more comfortable for standees on hot days.
- Micro plug doors that seal out noise, making rides more quiet and pleasant.
- Digital displays and recorded announcements for announcing train stops and train destinations.

The addition of the HMC-VOHRS and new peak period cars will contribute to high quality BART service that attracts riders and new development. BART proactively supports TOD in and around its stations. In addition to new housing units, the 22 TOD projects in which BART is currently engaged will bring 292,100 square feet of retail and 467,000 square feet of commercial space within walking distance of

BART stations in the Bay Area. These developments will support local job growth that is transit accessible, reducing the number of VMT for commuting purposes. The Bay Area's Sustainable Communities Strategy calls for a 33 percent increase in the share of housing units located in priority development areas (PDAs) that are well served by transit, many of which are centered around BART stations. By supporting TOD in these areas, BART is contributing to the Sustainable Communities Strategy goal of reducing per capita GHG emissions in 2035 by 16 percent.

Expanding Existing Rail and Public Transit Systems

The HMC-VOHRS is a key component of the larger HMC project, which will serve as the maintenance facility for cars added to the system as part of the Warm Springs and Silicon Valley extensions that will connect BART to Caltrain and the HSR station in San Jose.

Acceleration of Later Phases

Not applicable.

Connectivity, Integration, and Coordination

Please see Section 2.7.2.3, *Transit Integration*.

Clean Vehicle Technology

The newly designed peak period cars that will be supported by the HMC-VOHRS include state-of-the-art clean vehicle technology features. The new cars are 10 percent more efficient than those currently in service, largely due to improvements to the regenerative braking system. They are designed to be extremely lightweight, with most of the exterior constructed out of aluminum. Aluminum is abundant, does not rust, and when properly finished, reflects heat and light, keeping the train cars cool and reducing air conditioning costs. It is lightweight but strong, yet fairly easy to work with, reducing the energy investment during the manufacturing process. Additionally, aluminum is easily and readily recyclable, making it very low impact when the cars are eventually retired and dismantled. Because the new BART cars are so lightweight (weighing 15,000–20,000 pounds less than a Washington Metro car, for example), they will use significantly less energy over their lifetimes.

In addition to the natural heat and light reflection properties of aluminum, each car will be equipped with a white roof that will deflect heat and light away from the interior of the train. The white roof will help lessen the load on the interior cooling system, keeping passengers comfortable and decreasing energy consumption. To reduce heating and cooling energy, the new cars will be equipped with an energy saving mode, during which time doors will open at stations only when a passenger is standing in front of them; the doors will have redundant sensors to detect persons wishing to enter or exit the train. By opening doors only when necessary, the energy saving mode will help reduce the amount of lost heat or air conditioning from the cars. The new cars will use an LED lighting system to sense the amount of available sunlight in each car and adjust lighting intensity automatically, saving additional energy.

BART cars are currently powered by electricity that is 53 percent renewable and will run on even cleaner power in the future. While most transit agencies receive their power from local utilities under standard rates, BART is an exception because it has statutory authority to procure its own power supply. BART has a Strategic Energy Plan that includes renewable energy procurement goals of 75 percent by 2017 and 100 percent by 2020.

Active Transportation

The addition of the HMC-VOHRS and new peak period cars will contribute to high quality BART service that attracts riders and new development. BART proactively supports TOD in and around its stations. In 2015, over 40 percent of BART riders accessed stations by bicycling and walking (Figure 4). By increasing ridership, the expanded peak period trains will yield a proportional increase in bicycling/walking trips to BART stations.

BART is updating its Station Access Policy to guide access practices and investments through 2025. The revised Station Access Policy prioritizes investments to improve active transportation mode share and safety, so in the future the percentage of riders who use active transportation to reach BART may be even larger. Figure 5 depicts BART's station access investment priorities, with walking and bicycling receiving the highest investments of all access types.

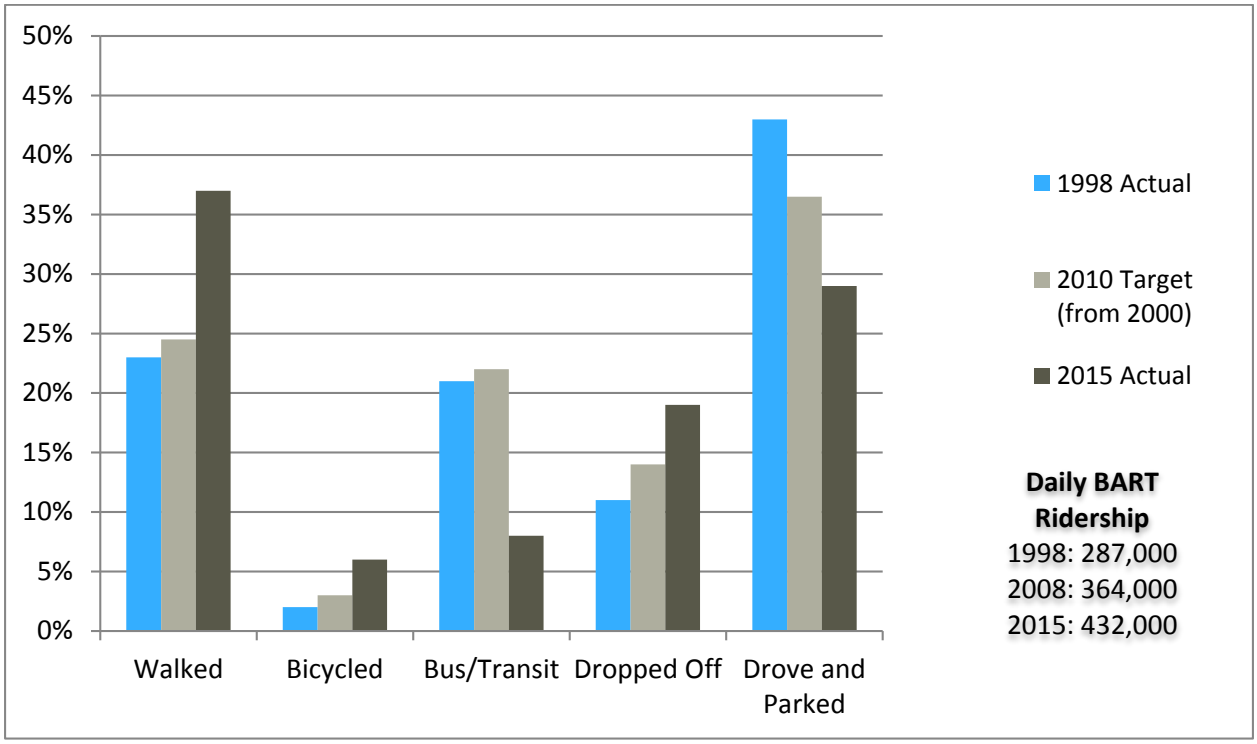

Figure 4. BART Station Access Mode Share

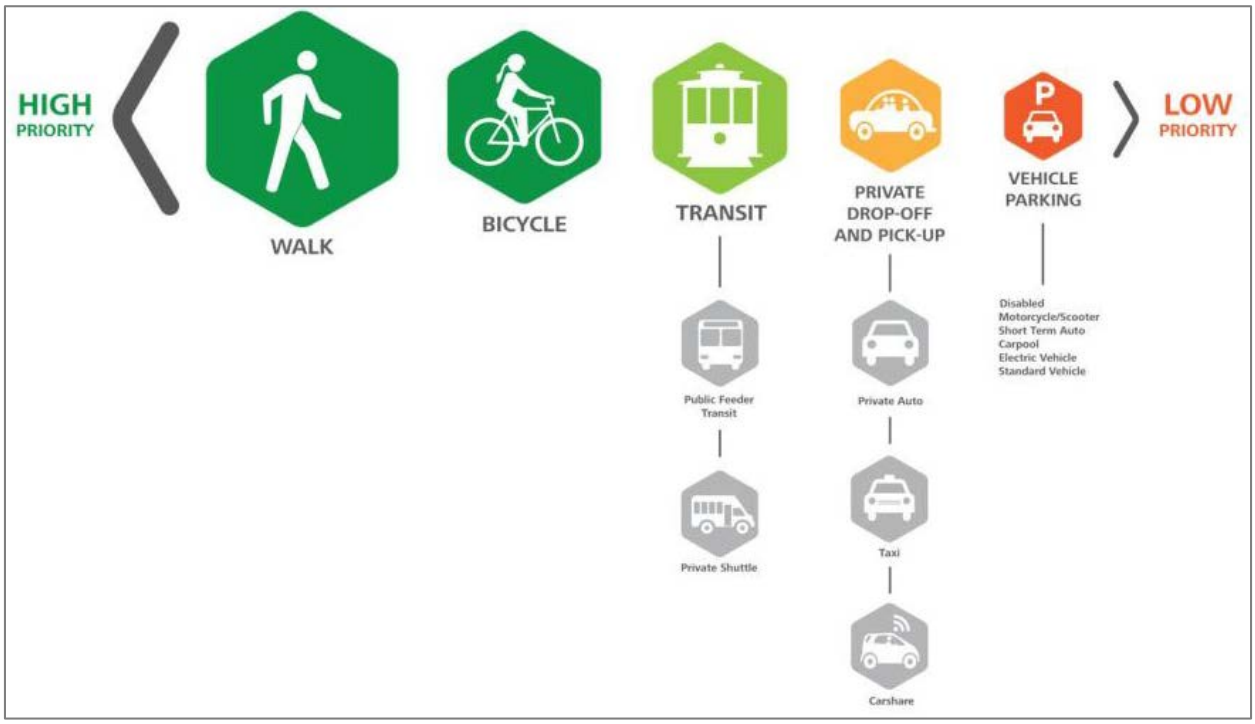

Figure 5. BART Station Access Investment Priorities

In addition, the newly designed peak period trains include bicycle racks in each train, making it easier for riders to get to their destinations by bicycle once they have arrived at their stop. This improvement will help facilitate growth in bicycle station access.

Public Health

The addition of the HMC-VOHRS and the expanded peak period cars it serves will improve public health by increasing station access by walking and bicycling (as detailed in the *Active Transportation* section above) and improving regional air quality. By making BART service more comfortable, reliable, and convenient, the project will support ridership growth that displaces automobile travel. Reducing the number of miles driven by vehicles in the Bay Area improves air quality by reducing criteria pollutant emissions, which will improve respiratory health and other impacts throughout the region. Reductions in criteria pollutants is particularly important for communities located along high-traffic roadways. Since 50 percent of BART stations serve DACs, the public health benefits of the project are largely concentrated in these areas.

Air Quality Impacts

As discussed above, the HMC-VOHRS would support an annual VMT reduction of 25.5 million miles, which equates to 638.5 million vehicle miles reduced over the 25-year life of the project. Removing single occupancy vehicles from the transportation network would reduce criteria pollutant emissions generated throughout the San Francisco Bay Area. Since BART trains are electric-powered, operation of

the 10-car trains would not generate additional criteria pollutants locally. However, the increased peak period electricity consumption (12,719,970 kWh) would result in a slight emissions increase at offsite power plants.

Local and regional criteria pollutant savings associated with the reduced VMT were estimated using emission factors from the ARB's EMFAC2014 model for Yr1 (2018) and YrF (2043) conditions. Table 5 summarizes the results of the modeling, as well as lifetime emissions reductions, which were quantified assuming a 25-year project life. Operation of the expanded peak fleet would result in a minor increase in electricity-related emissions. However, given that virtually all of BART's electricity (99.6 percent) is supplied by the NCPA, whose power portfolio is 50 percent emissions-free, added electricity generation associated with the project is expected to be minor in comparison to the reductions achieved by displaced VMT. Moreover, by the time the expanded fleet would operate, BART expects to procure virtually all its power from renewable resources.

All criteria pollutants have known health and environmental effects. For example, ozone can aggregative respiratory and cardiovascular disease, impair cardiopulmonary function, and irritate the eyes. Carbon monoxide exposure can impair mental function and fetal development and reduce an individual's tolerance for exercise. Finally, exposure to particulate matter and sulfur dioxide can reduce lung function, aggregative respiratory diseases, and reduce visibility (California Air Resources Board 2005). Emissions reductions achieved by displaced VMT, which would occur throughout the Bay Area, may reduce or avoid these and other health effects associated with adverse air quality. The public health improvements achieved by the project may also yield direct and indirect economic co-benefits, including reduced costs of hospitalization and medications, as well as the value placed by individuals on avoiding the illness.

Table 5. Criteria Pollutant Results from Displaced VMT (pounds per year) [a,b]

Parameter	VMT Reduced	ROG[c]	NO_X[c]	CO	PM10	PM2.5	SO_2
Yr1	25,539,930	1,364	6,495	58,042	2,622	1,094	199
YrF	25,539,930	234	1,347	17,625	2,561	1,037	123
Lifetime Reductions[d]	638,498,250	19,971	98,021	945,842	64,789	26,639	4,024

[a] Unlike the GHG analysis (see Section 2.7.2.1, *GHG Reduction*), which uses well-to-wheel (WTW) emission factors, criteria pollutant reductions are estimated using exhaust-only emission factors due to increased uncertainty and regionalism associated with criteria pollutant emissions. Criteria pollutant emission factors were obtained from the ARB's EMFAC2014 model.

[b] Emissions savings from displaced VMT would occur throughout the Bay Area. Minor increases in electricity-related emissions may occur at the Lodi Energy Center (natural gas power plant) and other fossil-fuel generating resources used to supply the increased peak period power.

[c] ROG and NO_X are ozone precursors.

[d] Calculated based on a 25-year project life ((YrF reductions + Yr1 reductions/2)*25).

2.7.3.2. Benefits to Disadvantaged Communities

The HMC-VOHRS will support the addition of more peak period trains that will help to relieve crowding and improve riders' experiences throughout the BART system. The project will provide improved transit and intercity rail service for all stations, including the 50 percent that are located in or walking distance of DACs, as shown in Figure 6.

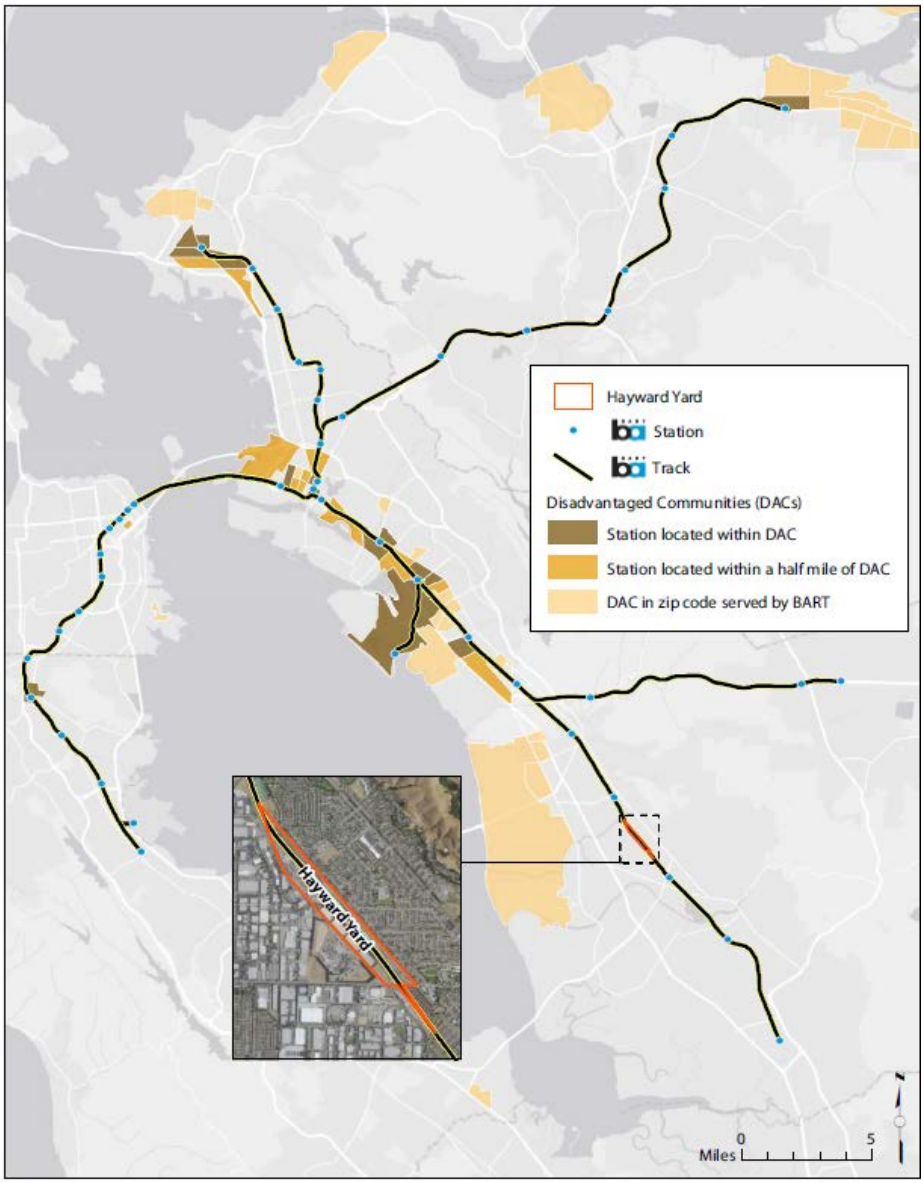

Figure 6. BART System Disadvantaged Community Map

BART's newly-adopted affordable housing policy requires housing developments on BART-owned land near stations to include at least 20 percent affordable housing units. New development that results from improving service will therefore provide additional housing opportunities for low-income DAC residents.

2.7.3.3. Project Collaboration

The HMC-VOHRS is a key component of the larger HMC project, which will serve as the maintenance facility for BART's Fleet of the Future and cars added to the system as part of the Warm Springs and Silicon Valley extensions, which will connect BART to Caltrain and the HSR system. BART has partnered with VTA, which is providing nearly 30 percent of the funding for the larger HMC project. The two agencies have signed a memorandum of understanding (MOU) on the project's development. Details of the MOU include the following.

- BART conducts the real estate acquisition.
- VTA funds the land acquisition and a share of relocation costs.
- VTA takes title to the property.
- VTA makes a fixed investment of $125.3 million toward design and construction.
- BART conducts all engineering and construction activities.
- BART completes all work necessary to accommodate Berryessa rail vehicles.
- VTA conveys property to BART after all HMC facilities are occupied and operational.

2.7.3.4. Geographic Equity

Service increase will benefit DACs as described in Section 2.7.3.2, *Benefits to Disadvantaged Communities*, and further through connections with other transit operators, as described in Section 2.7.2.3, *Transit Integration*.

2.7.3.5. MTP/Sustainable Communities Strategy

Compared to other regions in California, the Bay Area has mature transit infrastructure that requires more funding to operate, maintain, and renovate. Plan Bay Area, the Regional Transportation Plan/Sustainable Communities Strategy for the San Francisco Bay Area, relies largely on maintaining and managing the current transit system to achieve the GHG reductions forecast in the plan.[2] The 66 new cars needed to operate all peak direction trains with 10 cars are part of a $3 billion package to replace aging BART and Caltrain cars. This package is included as part of a larger $38 billion transit operating and capital improvement for BART that is designated as a regional project in the Plan Bay Area project list.[3]

2.7.3.6. Goods Movement

Not applicable.

[2] Metropolitan Transportation Commission. 2013. *Plan Bay Area*. Chapter 4: Investments. Pages 69–70. Available: http://mtc.ca.gov/sites/default/files/4-Investments.pdf.

[3] See Project 94525 at http://planbayarea.org/pdf/final_supplemental_reports/FINAL_PBA_Project_List.pdf.

2.7.3.7. Supplemental Funding

The non-TIRCP HMC-VOHRS project costs will be funded by BART through allocations of operational and capital funds.

2.7.3.8. Multimodal Integration

BART stations serve as multimodal hubs where bus, taxi, hospital and student shuttles, and personal vehicles connect. Increased passenger carrying capacity strengthens this connection (also see Section 2.7.2.3, *Transit Integration*).

2.7.3.9. Service Expansion Financial Plan

The expense associated with service expansion will be covered by a combination of operating revenues including passenger fares along with advertising and sales tax revenues.

2.8. Impacts on Other Projects

As discussed previously, the HMC-VOHRS, as part of the larger HMC project, will support BART extensions and future connections to other transit systems. Please see Section 2.7.2.3, *Transit Integration*, for details on the HMC-VOHRS project's impacts on other BART, VTA, and other transit agency projects planned or underway in the region.

2.9. Project Implementation and Management

The larger HMC project is being implemented by staff assigned/dedicated to the HMC project.

Direct staff includes a project manager and one principal engineer. The project manager is responsible for maintaining the overall program budget and schedule and has a consultant budgeter/scheduler to assist in this task. In conjunction with the principal engineer, the project manager also oversees active construction contracts and the consultant Resident Engineer staff that interfaces directly with construction contractors. Design coordination and management are overseen by a consultant design manager. This project manager has direct oversight of the consultant design review team and the consultant section designers.

To maintain financial control, the project controls group of Planning, Development, and Construction has assigned a financial analyst to coordinate the program's financial reports and input data into BART's financial system.

2.10. Project Readiness

The HMC-VOHRS, as part of the larger HMC project, has completed environmental protection requirements through the Initial Study of Mitigated Negative Declaration (IS-MND) and Design is underway

BART has executed an agreement with VTA regarding transfer and use of the land that will host the HMC. For more information on this agreement, see Section 2.7.3.3, *Project Collaboration*.

3. Statement of Work

3.1. Project Scope

3.1.1. Detailed Project Description

The project will entail the construction of a complete new VOHRS at the HMC, including 14 vehicle maintenance pits and lifts, turntables, and associated maintenance equipment. The 60,000-square-foot steel frame building will have steel roofing and siding. Also included are three all-electric forklifts, extension of trackwork into the building, a paint booth for revenue vehicles, a basement, platform level access, a transfer table, installation of train control and traction power from the BART mainline along the new spur track to the this facility, and final site improvements such as entrance and roadway signage. The VOHRS building will also include provisions for rooftop solar power and an emergency electric generator.

The larger HMC project would acquire and improve three properties on the west side of the existing Hayward Yard for a larger primary repair shop, a new component repair shop, a vehicle overhaul shop, a new central parts warehouse, and a new maintenance and engineering repair shop. It also includes the construction of additional storage tracks for a maximum of 250 vehicles on undeveloped BART property on the east side of the Hayward Yard.

BART has completed planning, design, and environmental review for the HMC, including the HMC-VOHRS. Remaining project tasks are listed below, and the schedule in this section includes information on key milestones for each task.

- Site, track, and systems improvements: BART has a construction contract in place for this component of the work.
- Component repair shop and main shop: BART has a construction contract in place for this component of the work.
- Construction of component repair shop generator: the anticipated timing of this and subsequent tasks is contingent on the progress of the two tasks listed above.
- Construction of the central warehouse.

- M&E shop—seismic retrofit.
- M&E shop—interior work.
- Vehicle overhaul shop.
- Perimeter landscaping and security fencing.

The facility will provide maintenance and repair services critical to addressing current crowding on the BART system. Over the past 5 years, ridership on BART has increased by nearly 25 percent, or over 75,000 trips, on a typical weekday. In 2014, weekday ridership averaged over 410,000 and in peak months reached as high as 440,000. Growth is occurring across the system, but the greatest increases are in the constrained Transbay corridor, which saw 50,000 additional daily trips between 2010 and 2014. Peak-hour, peak-direction trains now typically range from 120 to 140 passengers per car, far above BART's standard of 115 per car.

To help alleviate crowding, BART has invested in expanding its fleet, with 66 new cars planned to start service in 2018. These new cars will increase system capacity by expanding peak period trains from 8 cars to 10 cars. The four existing yards and maintenance facilities do not have adequate storage or equipment to properly service the expanded fleet. Accordingly, the HMC-VOHRS is necessary to provide sufficient maintenance and repair capacity for BART's new car fleet. Without the HMC-VOHRS, BART would not be able to expand the peak period trains to 10 cars and could not accommodate the anticipate growth in ridership nor address existing and forecasted overcrowding issues. The project will therefore enable expansion of BART's peak period fleet, which will provide benefits to all BART riders in the form of reduced crowding and travel delay. The HMC-VOHRS will also support system expansion by facilitating more transit connections and TOD. These benefits will be realized in DACs throughout the Bay Area, as 50 percent of BART stations are located in or near DACs.

3.1.2. Project Map

The located of the HMC-VOHRS is shown in Figure 7. It will be constructed within the existing BART maintenance yard in the city of Hayward in Alameda County, California, and located between the Hayward and South Hayward BART stations.

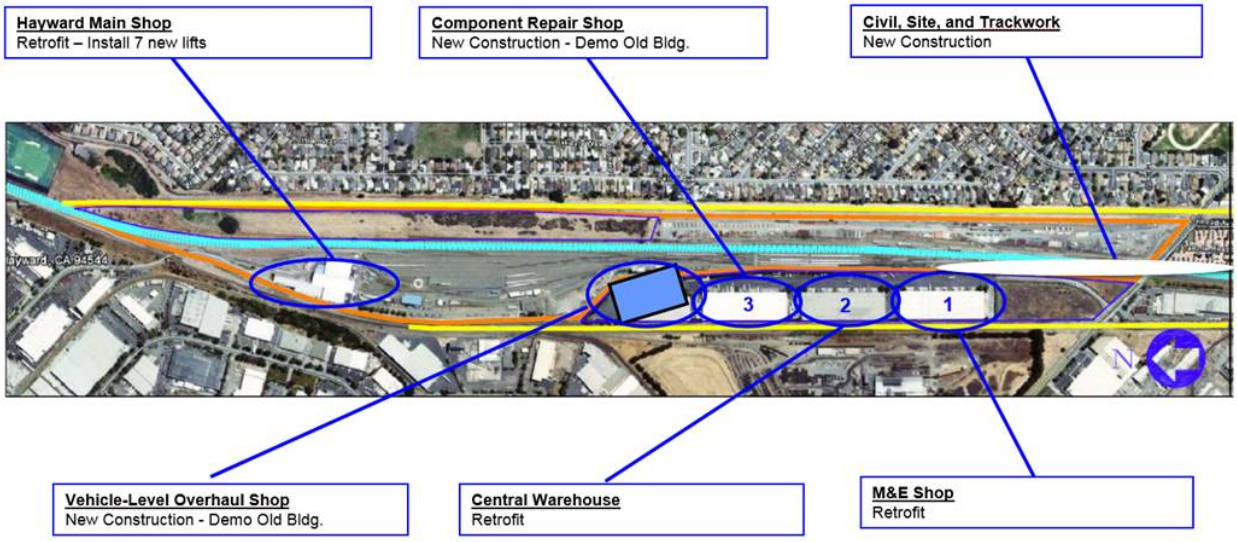

Figure 7. Vehicle Overhaul and Heavy Repair Shop Location

3.2. Project Costs

Direct construction costs and indirect project costs are presented in Table 6. The total project cost for the HMC-VOHRS (in $2016) is $166.2 million. Total project cost inclusive of the expanded peak period fleet is $376.2 million. BART is requesting $50 million in TIRCP funds for the HMC-VOHRS and $13.5 million in LCTOP funds for the expanded peak period fleet.

Table 6. HMC-VOHRS Detailed Project Costs (with Expanded Peak Period Fleet)

Project Item	Cost $2016
VOHRS Costs	
Guideway and track	$5,913,000
Support facilities	$50,310,000
Site work and special conditions	$7,202,000
Systems/electrical	$3,784,000
Subtotal (Direct Construction Costs)	*$67,209,000*
Contractor mark-up	$40,402,000
Mobilization	$0
Insurance	$0
BART soft costs	$20,434,322
Contingency	$10,761,000
Escalation	$17,756,000
Program contingency	$9,655,217

Project Item	Cost $2016
Subtotal (Indirect Costs)	*$99,008,539*
Subtotal VOHRS costs	*$166,217,539*
New Car Costs[a]	
Subtotal cost of new cars	$210,000,000
Total Cost	**$376,217,539**

[a] The HMC-VOHRS will support the expanded peak period fleet, which in turn will deliver the project benefits discussed above. Accordingly, the total project cost reflects both the HMC-VOHRS ($166,217,539) and expanded peak period fleet ($210,000,000) since both are required to achieve the stated project benefits.

The remaining costs not funded by the TIRCP or LCTOP ($312.7 million) will be provided by BART using capital and operating funds, including funds from four inflation-based fare increases to be implemented between Fiscal Year (FY) 2014 and FY2020. The need for these allocations, based on project schedules, will put a great deal of pressure on future operating budgets. The timing associated with these allocations is reflected in the projected annual operating shortfalls. BART is working to develop strategies to address the timing issue in order to reduce pressure on future operating budgets. If the impact of these timing issues cannot be fully mitigated, then BART staff will consider other financial strategies, which may include short-term financing or borrowing from operating reserves.

3.3. Project Schedule

The HMC schedule is presented in Table 7.

The first two tasks in the project are in the construction phase; the table shows detailed construction milestones for those tasks and the anticipated schedule for the remaining tasks. Key milestones in acquiring new cars are also shown for reference.

Table 7. Project Schedule

	2016				2017				2018				2019				2020			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Site, Track, and Systems	1				2															
Component Repair Shop and Main Shop					3		4		5											
Component Repair Shop Generator																				
Central Warehouse																				
M&E Shop – Seismic Retrofit																				
M&E Shop – Interior Work																				
Vehicle Overhaul Shop (VOHRS)																				
Delivery of 66 new cars											5									

Engineering
Contracting
Construction

Milestones:

1 Completion of all utilities.

2 Contract completion.

3 Completion of all work in the Hayward Main Repair Bay.

4 Completion of all work in the Component Repair Shop.

5 Substantial completion of all work.

3.4. Ongoing Operations and Maintenance

System operations and maintenance costs will be covered by a combination of operating revenues, mainly fares and advertising revenues, and local sales taxes. For example, to help fund the BART system's extensive capital needs, a program of small regular inflation-based fare increases has been implemented to generate revenue, with the most recent increase occurring January 1, 2016.

The fare increase amount is determined by averaging national and local inflation over a 2-year period and then subtracting 0.5 percent to account for BART's productivity improvements. This calculation results in a 2016 fare increase of 3.4 percent, with all fares rounded to the nearest nickel. New revenue from the fare increase, and the previously implemented January 2014 increase is dedicated to BART's "Big 3" capital needs which includes the HMC program.

3.5. Scalability

Not applicable; this project must be built in its entirety.

3.6. Project Programming Request Form

The Project Programming Request (PPR) Form is included on the following three pages.

STATE OF CALIFORNIA ● DEPARTMENT OF TRANSPORTATION

PROJECT PROGRAMMING REQUEST

DTP-0001 (REV. 2/10) *General Instructions*

☑ New Project ☐ Amendment (Existing Project)				Date:	04/05/16
Caltrans District	**EA**	**PPNO**	**MPO ID**		**TCRP No.**
04	R312T	2147D	MTC		1.2

County	**Route/Corridor**	**PM Bk**	**PM Ahd**	**Project Sponsor/Lead Agency**	
SCL				SF BART	
				MPO	**Element**
				MTC	MT

Project Mgr/Contact	**Phone**	**E-mail Address**
Kevin Sanderson	(510) 287-4819	ksander@bart.gov

Project Title

BART Warm Springs to Berryessa: Expanding BART Peak Period Trains via Constuction of a Vehicle Overhaul

Location, Project Limits, Description, Scope of Work, Legislative Description

A segment of the BART -Warm Springs to Berryessa Project. Comprised of an entirely new vehicle overhaul shop, component repair shop, central warehouse, maintenance and engineering shop and storage area, additional railcar access and enhanced vehicle inspection area; additional storage for railcars, flyovers and connecting trackwork. Also includes utility relocation; construction of an access road from Sandoval Way; M&E

Component	**Implementing Agency**	**Reimbursements**
PA&ED	BART	
PS&E	BART	
Right of Way	BART	
Construction	BART	

Legislative Districts

Assembly:	20	**Senate:**	13
Congressional:	13		

Purpose and Need

Expands and improves BART's Hayward Yard facilities to accommodate future system demand/growth and will support the BART Warm Springs to San Jose/Santa Clara extension and connections to other transit systems.

Project Benefits

The Hayward Yard is located just north of the Warm Springs and Silicon Valley Berryessa Extensions, allowing for efficient access to these southern extensions. Expanding the M&E Storage Yard and connecting the new facilities to the main line will allow BART to have the means to maintain the system in a state of good repair,have the necessary outdoor area to store M&E materials and equipment, & quickly and efficiently access mainline track from the Hayward Yard.

Project Milestone			**Proposed**
Project Study Report Approved			
Begin Environmental (PA&ED) Phase			01/01/11
Circulate Draft Environmental Document	**Document Type**	CE/CE	
Draft Project Report			
End Environmental Phase (PA&ED Milestone)			09/21/11
Begin Design (PS&E) Phase			10/01/11
End Design Phase (Ready to List for Advertisement Milestone)			10/31/16
Begin Right of Way Phase			10/01/11
End Right of Way Phase (Right of Way Certification Milestone)			04/30/14
Begin Construction Phase (Contract Award Milestone)			12/30/14
End Construction Phase (Construction Contract Acceptance Milestone)			06/30/19
Begin Closeout Phase			07/01/19
End Closeout Phase (Closeout Report)			01/31/20

STATE OF CALIFORNIA ● DEPARTMENT OF TRANSPORTATION

PROJECT PROGRAMMING REQUEST

DTP-0001 (REV. 2/10)

Date: 04/05/16

County	CT District	PPNO	TCRP Project No.	EA
SCL	04	2147D	1.2	R312T

Project Title: BART Warm Springs to Berryessa: Expanding BART Peak Period Trains via Constuction of a Vehicle Overhaul and Heavy Repair S

Proposed Total Project Cost

Component	Prior	10/11	11/12	12/13	13/14	14/15	15/16+	Total
E&P (PA&ED)								
PS&E			5,300	7,700			12,000	25,000
R/W SUP (CT)								
CON SUP (CT)								
R/W				5,900	50,000			55,900
CON					113,400	78,639	159,994	352,033
TOTAL			5,300	13,600	163,400	78,639	171,994	432,933

Notes

Fund No. 1: 2008 Proposition 1A HSR Connectivity funding

Program Code

Proposed Funding

Component	Prior	10/11	11/12	12/13	13/14	14/15	15/16+	Total	Funding Agency
E&P (PA&ED)									CTC
PS&E									BART formula share
R/W SUP (CT)									
CON SUP (CT)									
R/W									
CON						78,639		78,639	
TOTAL						78,639		78,639	

Fund No. 2:

Program Code

Proposed Funding

Component	Prior	10/11	11/12	12/13	13/14	14/15	15/16+	Total	Funding Agency
E&P (PA&ED)									Santa Clara VTA
PS&E									SCC STIP 30.10.070.625
R/W SUP (CT)									
CON SUP (CT)									
R/W									
CON					50,440			50,440	
TOTAL					50,440			50,440	

Fund No. 3:

Program Code

Proposed Funding

Component	Prior	10/11	11/12	12/13	13/14	14/15	15/16+	Total	Funding Agency
E&P (PA&ED)									Santa Clara VTA
PS&E			5,300	6,600				11,900	County Measure A sales tax
R/W SUP (CT)									
CON SUP (CT)									
R/W					50,000			50,000	
CON					62,960			62,960	
TOTAL			5,300	6,600	112,960			124,860	

STATE OF CALIFORNIA ● DEPARTMENT OF TRANSPORTATION

PROJECT PROGRAMMING REQUEST

DTP-0001 (REV. 2/10)

Date: 04/05/16

County	CT District	PPNO	TCRP Project No.	EA
SCL	04	2147D	1.2	R312T

Project Title: BART Warm Springs to Berryessa: Expanding BART Peak Period Trains via Constuction of a Vehicle Overhaul and Heavy Repair S

Fund No. 4:

Program Code

Proposed Funding

Component	Prior	10/11	11/12	12/13	13/14	14/15	15/16+	Total
E&P (PA&ED)								
PS&E				1,100			12,000	13,100
R/W SUP (CT)								
CON SUP (CT)								
R/W				5,900				5,900
CON							109,994	109,994
TOTAL				7,000			121,994	128,994

Funding Agency

BART

Operating to Capital Allocations

Fund No. 5:

Program Code

Proposed Funding

CalSTA

Component	Prior	10/11	11/12	12/13	13/14	14/15	15/16+	Total
E&P (PA&ED)								
PS&E								
R/W SUP (CT)								
CON SUP (CT)								
R/W								
CON							50,000	50,000
TOTAL							50,000	50,000

Funding Agency

CalSTA: Transit Intercity Rail Capital Program

Fund No. 6:

Program Code

Proposed Funding

Component	Prior	10/11	11/12	12/13	13/14	14/15	15/16+	Total
E&P (PA&ED)								
PS&E								
R/W SUP (CT)								
CON SUP (CT)								
R/W								
CON								
TOTAL								

Funding Agency

Fund No. 7:

Program Code

Proposed Funding

Component	Prior	10/11	11/12	12/13	13/14	14/15	15/16+	Total
E&P (PA&ED)								
PS&E								
R/W SUP (CT)								
CON SUP (CT)								
R/W								
CON								
TOTAL								

Funding Agency

4. Support Documentation

4.1. Cost Estimate Certification

The cost estimate certification has been included in the cover letter at the beginning of this application.

4.2. Critical Stakeholder Support

BART has partnered with the State of California and VTA to implement the HMC program to leverage their respective investments of $78.639M of High Speed Rail Connectivity funding and $125.3M of Santa Clara County Measure A transportation sales tax. Further, BART and the Metropolitan Transportation Commission (MTC) have resolved to deliver the HMC program in MTC's Resolution #4123 dated December 2013.

4.3. Letter from MPO

MTC's letter of support stating that the VOHRS is consistent with its Sustainable Communities Strategy is below. MTC provided a single letter of support for multiple projects in the Bay Area that are applying for TICRP funding; the VOHRS is the sixth one listed in the table shown in the letter.

METROPOLITAN
TRANSPORTATION
COMMISSION

Joseph P. Bort MetroCenter
101 Eighth Street
Oakland, CA 94607-4700
TEL 510.817.5700
TTY/TDD 510.817.5769
FAX 510.817.5848
EMAIL info@mtc.ca.gov
WEB www.mtc.ca.gov

March 31, 2016

Ms. Jila Priebe, Chief
Division of Rail and Mass Transportation
Office of Program and Policy Management (MS 39)
P.O. Box 942874
Sacramento, CA 94274-0001

RE: Bay Area Applications to 2016 Transit and Intercity Rail Capital Program

Dear Ms. Priebe:

The 2016 Transit and Intercity Rail Capital Program requires support documentation from MPOs indicating consistency with the applicable Sustainable Communities Strategy. This letter confirms that the projects listed below are consistent with Plan Bay Area, the Regional Transportation Plan and Sustainable Communities Strategy.

Project Sponsor	Project Title
AC Transit	Purchase of Forty-two Buses to Support AC Transit's New Service Expansion Plan and Transbay Service
Peninsula Corridor Joint Powers Board (Caltrain)	Peninsula Corridor Electrification Project
City of Fairfield	Fairfield/Vacaville Intermodal Station
Golden Gate Bridge, Highway and Transportation District	Purchase Seventy (70) 40-Foot Diesel-Electric Hybrid Buses
Livermore-Amador Valley Transit Authority (LAVTA)	LAVTA ZEB Commuter Bus Lines Project
San Francisco Bay Area Rapid Transit (BART)	Hayward Maintenance Complex (HMC): Vehicle Overhaul Heavy Repair Shop
San Francisco Municipal Transportation Agency (SFMTA)	Light Rail Modernization and Expansion Program

(Table continues on next page)

Ms. Jila Priebe, Chief
March 30, 2016

Project Sponsor	Project Title
Santa Clara Valley Transportation Authority (VTA)	BART Extension to San Jose/Santa Clara (SVSX)
Sonoma-Marin Area Rail Transit District (SMART)	SMART Rail Extension North to Windsor
Transbay Joint Powers Authority (TJPA)	Bus Storage Facility
Western Contra Costa Transit Authority (WestCAT)	Addition of Three Double-Decker Buses to WestCAT's LYNX Route

Please note that staff expects MTC will also be recommending a *priority list* of TIRCP projects to CalSTA and Caltrans in May.

Sincerely,

Steve Heminger
Executive Director

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4.4. Other Letters of Support

Not applicable.

4.5. Disadvantaged Communities Benefits

BART stations are located within the following DAC zip codes (Figure 6).

- 94014
- 94565
- 94577
- 94601
- 94607
- 94612
- 94621
- 94801
- 94804

BART stations are located within a half-mile of the following DAC zip codes (Figure 6).

- 94102
- 94107
- 94578
- 94601
- 94606
- 94607
- 94608
- 94609
- 94612
- 94621
- 94804

4.6. Other Support Documentation

Not applicable.