Section 3
Master Responses

3.1 INTRODUCTION

Following a review of all of the comments received on the eBART Draft EIR, it was apparent that some comments were raised on multiple occasions by many different commentors. Rather than providing individual response on these particular comments, BART has developed a comprehensive "master response" to answer the comments. Master Responses have been prepared and are included in this section for the following comments:

Master Response 1: Why is BART pursuing a DMU train? This master response addresses why BART has selected DMU.

Master Response 2: Why not conventional BART? This master response acknowledges that Contra Costa County residents have been paying since BART's inception and explains why BART elected not to use existing BART technology in extending rail transit services to east Contra Costa County.

Master Response 3: Are there any drawbacks to using electric-based technology? This master response addresses the evaluation undertaken by BART to consider different technologies and why BART elected not to pursue electric propulsion at this time.

Master Response 4: What alternative fuels were considered, including biofuels, instead of diesel? This master response addresses other fuel sources that BART considered for eBART service and the potential for a diesel-hybrid vehicle.

Master Response 5: What are the health risks from diesel emissions associated with the DMU trains? This master response addresses whether the diesel emissions from the proposed DMU trains would pose significant health risks for populations along the project corridor.

Master Response 6: What are the project's benefits? This master response describes the benefits of the Proposed Project.

Master Response 7: How are the Ridership Development Plans being prepared by the cities affected by the Proposed Project, and vice versa? This master response addresses the relationship between the Proposed Project and the Ridership Development Plans.

3.2 MASTER RESPONSES

Master Response 1: Why is BART pursuing a DMU train?

The most frequent comment on the Draft EIR did not concern the adequacy of the environmental analysis, but rather the proposal to advance DMU technology as the Proposed Project instead of the existing electric, heavy-rail technology currently used throughout the BART system (referred to in the Draft EIR as the "BART Extension Alternative"). Background information concerning the review process that preceded identification of the Proposed Project and the selection of DMU technology is included throughout the Draft EIR. This Master Response summarizes all of that information in one place for convenience.

Since the inception of BART, it was envisioned that the system could extend eastward in Contra Costa County beyond the original plan's terminus in Concord. A number of extension studies have been conducted over the years, including the Pittsburg-Antioch Corridor Study in the late 1980s.[1] That study considered busways, light rail transit, commuter rail, and BART extensions between Concord (the terminus at the time) and the City of Brentwood. Even then, approximately 20 years ago, it was recognized that future transportation demands would not be satisfied by highway improvements alone. On September 29, 1988, the BART Board recommended an extension of BART to Antioch in two stages: 1) from Concord to Pittsburg, and 2) from Pittsburg to East Antioch. This study led to the extension of BART to the Pittsburg/Bay Point BART Station in 1996 in concert with the SR 4 widening improvements. However, there were not sufficient funds to complete the BART extension or the widening of SR 4 to Antioch. Continued growth pressures and SR 4 congestion prompted local policy makers, in conjunction with the Contra Costa Transportation Authority (CCTA) and BART, to revisit the prior 1988 study and again examine a comprehensive range of transit alternative options for the SR 4 East Corridor in 2001. The fundamental purpose of that study (SR 4 East Corridor Transit Study – Summary Report (2002)) was to determine the transit improvements that would be most timely and effective for providing East County residents and employees with alternatives to auto travel in the short and medium term.

Transit options considered in the feasibility study included extensions of the existing BART system, packages involving extensions using self propelled diesel railcars (or DMUs) instead of BART, commuter rail services on existing railroad tracks, packages involving the use of buses on an exclusive busway (BRT), and an express bus package. In 2002, after reviewing and evaluating each alternative package in the SR4 East Corridor Transit Study, local policy makers unanimously recommended advancement of a transit extension based on DMU technology. This recommendation led to the proposed eBART Project. The Proposed Project serves as a functional extension of the BART system but can be constructed at a much lower cost than a typical BART extension. In addition, the Proposed Project is intended to satisfy the

[1] BART, Pittsburg-Antioch Corridor Alternatives Analysis/Draft Environmental Impact Report, Volume 1, August 1988.

goal of local policy makers that the project preserve the opportunity for future construction of heavy-rail BART technology if funding becomes available and ridership warrants this higher-capacity technology.

Funding Considerations. The capital cost of the Proposed Project using DMU technology would be less expensive than most of the alternatives analyzed in the Draft EIR, which include the BART Extension Alternative as well as electric Light Rail Vehicle (LRV) and Bus Rapid Transit (BRT) Alternatives. Approximately $502 million in local and state funds is available for the Proposed Project, while the estimated capital cost associated with the Proposed Project utilizing DMU technology is $479 million (in 2009 dollars). In comparison, the capital costs associated with other alternative technologies, with the exception of one BRT Alternative, would be higher. The capital costs associated with the LRV Alternative would be $521 million (2009) while the capital costs associated with the BART Extension Alternative would be higher still at $1.173 billion (2009). Only BRT technology under Option A (which proposes use of existing on- and off-ramps for BRT station ingress and egress), with a capital cost of $393 million, would be less expensive than the Proposed Project. Furthermore, the operational costs of the Proposed Project would be less than those of the BRT or BART Alternatives. The annual operational costs associated with the Proposed Project are $8.3 million (2009). In comparison, the operational costs associated with BRT under Options A and B (which proposes dedicated busways for ingress and egress at Hillcrest, and an enhanced connection to the Pittsburg/Bay Point BART Station) would be $10.2 million and $11.0 million, respectively, and the operational costs associated with the BART Extension Alternative would be $14.0 million. Only LRV technology, with an operational cost of $6.9 million, would be less expensive than the Proposed Project.

Since the LRV and BART Extension Alternatives could not be funded with available resources, pursuing those alternatives would require securing additional funding sources, thus delaying rail service in the corridor.

Timing Considerations. BART needs to act soon in order to construct the Proposed Project concurrently with the scheduled widening of SR 4 being undertaken by Caltrans and the CCTA. If the Proposed Project were delayed, the motoring public and residential and commercial uses along SR 4 would be heavily impacted since construction for the SR 4 widening would occur, followed by a second disruption shortly thereafter for construction of the Proposed Project. BART, Caltrans, and CCTA seek to avoid such a lengthy disruption to SR 4 and any extended inconvenience to the motoring public. The integration of SR 4 and Proposed Project construction schedules is an important project objective and will allow more efficient construction of elements common to both projects and reduce overall costs of each.

Appropriate Technology. Ridership forecasts for the Proposed Project indicate that average daily ridership would be approximately 3,900 riders in Year 2015 and about 10,100 riders in Year 2030. Based on the number of proposed trips, each train would average 125 riders per train in 2015 and 325 riders per train in 2030. Initially, the Proposed Project would operate

with a two-car configuration, which would be expanded to a three-car configuration as demand increases. As each DMU car can accommodate approximately 220 riders, the proposed configuration would adequately meet anticipated demand.

In comparison, the ridership forecast for the BART Extension Alternative indicates that average daily ridership would be approximately 4,200 riders in Year 2015 and 12,000 riders in Year 2030. Based on the number of proposed trips, each train would average 135 riders per train in 2015 and 385 riders per train in 2030. BART trains are typically configured with 10 cars that have the capacity to carry approximately 1,000 riders. As a result, BART trains would operate with excess capacity between the Hillcrest Avenue Station and the Pittsburg/Bay Point Station. This would result in much higher operating costs than those of the shorter DMU trains.

Satisfaction of Regional Guidelines for Transit Extensions. The use of DMU technology as proposed would satisfy BART and the Metropolitan Transportation Commission's (MTC) transit extension policies, which recommend that projects should have sufficient ridership to support the capital investment in transit. In particular, the Proposed Project would satisfy the BART System Expansion Policy ridership threshold for DMU technology. Under the System Expansion Policy, the corridor-wide ridership threshold necessary to justify investment for the Proposed Project utilizing the DMU technology is 5,801 patron entries and exits for an average weekday in 2030. The projected ridership of 10,100 entries and exits from the two eBART stations by 2030 would be almost double the ridership threshold. In addition, the Proposed Project meets the housing unit threshold for commuter rail listed in MTC Resolution #3434 – Transit-Oriented Development (TOD) Policy for Regional Transit Extension Projects. The MTC threshold requires an average of 2,200 housing units per station, within one-half mile of all stations (including the existing station to which the extension will connect). The number of existing and future housing units around the Pittsburg/Bay Point, Railroad Avenue, and Hillcrest Avenue Stations (with the implementation of the Ridership Development Plans by the cities of Pittsburg and Antioch) is projected at an average of 3,433 housing units per station, which is 1,233 units above the threshold.

In comparison, while the projected ridership of 10,100 daily trips for the LRV Alternative would satisfy BART's System Expansion Policy ridership threshold of 6,327 daily trips for LRV technology, the projected ridership of 12,000 daily trips for the BART Extension Alternative would not satisfy BART's ridership threshold of 14,000 daily trips for conventional BART technology.

With implementation of the Ridership Development Plans, the residential units within a one-half mile radius of the three stations (Pittsburg/Bay Point, Railroad, and Hillcrest) under the LRV Alternative would meet the MTC criteria. In comparison, the two stations (Pittsburg/Bay Point and Hillcrest) under the BART Extension Alternative would not justify the extension of transit using these technologies along the eBART corridor per MTC criteria. According to the Pittsburg/Bay Point BART Station Area Specific Plan Final EIR, the Railroad Avenue Specific

Plan, and Hillcrest Station Area Specific Plan, the three stations along the corridor proposed under the LRV Alternative would average 3,433 dwelling units within a one-half mile radius of the stations, while the two stations along the corridor proposed under the BART Extension Alternative would average 3,678 units within a one-half mile radius of the stations. MTC criteria for LRV and BART technology are 3,330 and 3,850 dwelling units within a one-half mile radius of each station, respectively.

Future Flexibility. The use of DMU technology provides flexibility for future transit enhancement in East County. The lower cost DMU technology is ideally suited in terms of its costs and capacity, to provide both near-term service to Pittsburg and Antioch and the capacity for future extension to Byron/Discovery Bay with stops in Oakley and Brentwood, which the available funding cannot support at this time. In addition, the right-of-way and the structures for the DMU technology have been designed to be fully compatible with BART heavy-rail technology. Should future conditions change as such to warrant the provision of conventional BART service, it will be feasible to convert the DMU service to conventional BART technology.

Master Response 2: Why not conventional BART?

BART's choice for a preferred technology to extend transit services into eastern Contra Costa County is based on a number of factors, including environmental impacts, operational considerations, cost effectiveness, available funding, and ease of implementation. The Draft EIR focuses on the environmental tradeoffs of different transit technologies, but also presents other information on the feasibility of a BART extension. However, a number of commentors suggested that Contra Costa County residents, who have been contributing tax revenue to the BART district for years, should be served by conventional BART technology. While Master Response 1 identifies the rationale behind selecting the DMU, this response addresses the County's contributions to the BART system and BART's evaluation of providing conventional BART technology.

Original BART System Plans and Funding. The original BART system was designed to provide rail service in Contra Costa County as far east as the City of Concord. Early maps show a "possible future extension" from Concord to Pittsburg, Antioch and Brentwood. The BART extension to Pittsburg/Bay Point was opened in December 1996, and demonstrates the commitment to extend rail service beyond the original system and as far as feasible throughout the County.

Residents of San Francisco, Alameda and Contra Costa Counties have supported the BART system with property and sales taxes for nearly 50 years. Property taxes were first levied in fiscal year (FY) 1959 to fund system planning, and later construction and operation. The State Legislature passed a sales tax in the three counties in FY 1970 to provide additional funding for system construction, and in FY 1976 sales tax revenue began to be used to fund operating costs.

The 1959 property tax was retired in 1999, after proceeds paid off the construction bonds. (A BART line item on property tax bills today is for BART's earthquake safety program, as approved by voters in the three BART counties.)

Funds for East Contra Costa County Extension. Funds collected via the property and sales taxes have been used to plan and build the original BART system, plan and build the extensions, and operate the system for the past 36 years. There has never been a separate fund collected and set aside for a BART extension to East County, or to any other location. Moreover, although East Contra Costa communities have been paying for BART costs since 1959 through taxes, given the historically rural nature of the area, neither property nor sales taxes generated a substantial amount until rapid development began in the 1990s.

The property and sales tax collected from East Contra Costa communities would not cover the cost of a BART extension to Antioch using any of the reviewed technologies evaluated in the Draft EIR. In 2000, BART completed an analysis of estimated property and sales tax revenues generated by community from 1959 through 1999. The cities of Antioch, Brentwood, and Pittsburg generated a total of $103 million in the 40-year period. (Oakley was not incorporated as a city prior to 1999, so that revenues generated by Oakley area residents are not traceable.) While substantial, resources of $103 million are insufficient to construct a DMU, LRV, BRT, or conventional BART extension to Antioch. The extension of conventional BART from Concord to Pittsburg/Bay Point was a $480 million project, so an amount substantially greater than the total generated by East County cities in 40 years was invested in the extension that has been in service for 12 years.

With regard to technology choice, conventional BART capital costs are approximately two and one-half times those of DMU, the proposed technology (see Table 5-10 of the Draft EIR.) Conventional BART was used in the extensions to Pittsburg/Bay Point and Dublin/Pleasanton partly because substantial funding was available in the 1990s. Approximately one-third of the $480 million for Pittsburg/Bay Point extension came from state sources. Given the current funding situation in Sacramento, BART believes the public would be better served with a less expensive rail system sooner, rather than a BART system later. Keeping in mind that nothing about the DMU system would preclude it from being converted to conventional BART in the future, the balance of costs and available resources for the proposed project strongly supports the selection of the DMU technology.

Feasibility of Conventional BART Technology. An extension using conventional BART technology (BART Extension Alternative) is considered in the alternatives analysis presented in Section 5 of the Draft EIR. The BART Extension Alternative would extend the existing BART system using electric heavy-rail technology east from its present terminus at the Pittsburg/Bay Point BART Station to a new terminus station near Hillcrest Avenue in the City of Antioch. The Pittsburg/Bay Point BART Station would not have to be modified in order to accommodate the extension of BART to the east. Passengers would simply continue riding the system and would not need to transfer as they would with the Proposed Project at the transfer platform.

The new eastern terminus of the system would be the Hillcrest Avenue Station. This alternative would not have a station at Railroad Avenue. Ancillary facilities would include a maintenance facility that would require 25 acres of land, traction power substations, controls and signals and interface with existing transit services.

Cost Considerations. As discussed in Master Response 1, the BART Extension Alternative from Pittsburg/Bay Point Station to the Hillcrest Avenue Station is projected to have a capital cost of $1.173 billion and an annual operating cost of $14.0 million (in 2009 dollars). These higher capital costs are due to the cost of additional rail cars and maintenance facilities, while the higher operating costs are due to a significant increase in maintenance and operations personnel.

Environmental Considerations. As discussed in Section 5 of the Draft EIR, the BART Extension Alternative would result in more environmental effects at the Hillcrest Avenue Station because of additional land requirements for station and maintenance facilities. Thus, the land required for the BART Extension Alternative would affect 0.44 acres of coastal/valley fresh water marsh and 0.01 acres of a pond, and result in the loss of habitat for several special status species, including Swainson's hawk and nesting birds. In comparison, the Hillcrest Avenue Station under the Proposed Project would not affect wetlands, since no wetlands are found within the median of SR 4 where these facilities are proposed or within the land to the north of SR 4 where the station parking and maintenance annex would be located. However, construction and operation of the Hillcrest Avenue Station under the Proposed Project would still result in the loss of habitat for several special status species, including Swainson's hawk and nesting birds.

The State has been confronted over recent years with uncertainties about the ability of the transmission system to handle peak electricity demand. The increased electricity demand associated with the BART Extension Alternative results in a potentially significant impact that would not occur with the Proposed Project.

Satisfaction of Project Objectives. The BART Extension Alternative would *not* satisfy the project objectives as well as the Proposed Project. Specifically, the BART Extension Alternation would not be as effective as the Proposed Project at enhancing financial feasibility; balancing short, medium, and long-term strategies, providing a cost-effective technology to the eBART corridor, or satisfying BART and regional policies for transit extensions.

With respect to financial feasibility, the cost of investing in heavy-rail BART technology is two and one-half times more costly than the Proposed Project. Funds are not available at this time to construct the BART Extension Alternative, if it were selected. Funding considerations for the Proposed Project as compared to the BART Extension Alternative are discussed in Master Response 1.

With respect to the second project objective, this alternative would not balance short- and long-term strategies for the corridor because it requires construction of the most costly transit

improvements that are not currently fundable, rather than constructing less costly improvements in the near term that can be adapted to conventional BART technology at a later date. Since the BART Extension Alternative cannot be implemented with currently available funds, it would not satisfy the short-term strategy of implementing transit service in the eBART corridor. The longer-term strategy calls for a transition to heavy-rail BART technology when funding and ridership demand warrant such a conversion, rather than doing so when the more expensive technology is not yet warranted. Additionally, the BART Extension Alternative would terminate outside the SR4 median, at a location north of SR4 and alongside the Union Pacific Railroad (UPRR) right of way, increasing the cost and complexity of extending tracks back to the Bypass median. Alternatively, future extensions could serve the rest of East County by traveling parallel to the UPRR Mococo Line. However, land acquisition costs and displacements would be significant, or would need to utilize the UPRR right of way, which may be difficult given the UPRR's intent to increase freight service activity on the corridor. As a result, this alternative has limited options for future phases.

With respect to being "technology appropriate," the BART Extension Alternative has considerable capacity to carry passengers, with each 10-car train capable of carrying approximately 1000 passengers. However, in 2030, eBART ridership is projected at an average of 325 per train. As explained in Master Response 1, the Proposed Project would meet projected demand while a conventional BART train would have extra capacity that would go unused.

Satisfaction of Regional Guidelines for Transit Extensions. Finally, the BART Extension Alternative would *not* satisfy BART or MTC extension policies, which recommend that projects should have sufficient ridership to support the capital investment in transit. A discussion of the ability of the BART Extension Alternative to meet regional guidelines for transit extensions is provided in Master Response 1.

Summary. BART remains committed to pursuing extensions in compliance with its System Expansion Policy. The Policy, adopted in 1999, states, "It is imperative that BART, as a steward of public funding for transportation investments, continue to ensure cost-effective transportation investment decisions, protect the taxpayers' investment in the District's physical infrastructure, ensure the financial health and sustainability of the District, and enhance the Bay Area's environment and quality of life." With this guidance, BART will continue to pursue extension opportunities, including those beyond the Hillcrest Avenue Station.

However, based on the eBART EIR, the impacts of the BART Extension Alternative would be greater than under the Proposed Project using DMU technology. The BART Extension Alternative at this time would not meet the project objectives of enhancing financial feasibility; balancing short, medium, and long-term strategies; providing a cost-effective technology to the eBART corridor; or satisfying BART and regional policies for transit extensions.

Master Response 3: Are there any drawbacks to using electric-based technology?

The choice between a diesel technology and an electrical transit system is an important environmental, financial, and policy question. As discussed in Master Response 2, the electric heavy-rail technology utilized in the rest of the BART system is not cost effective in the 10-mile eBART corridor and provides too much capacity for projected ridership, and therefore is not considered a feasible option along the eBART corridor at this time. Therefore, to provide a comparative assessment between electric and diesel technologies, the proposed DMU technology should be compared against a more realistic electric-powered alternative that could be implemented along the eBART corridor, such as Light Rail Vehicles (LRVs). For this reason, an LRV Alternative is considered in the alternatives analysis presented in Section 5 of the Draft EIR. The LRV Alternative would operate in the same alignment as the Proposed Project and would use vehicles similar to the DMU, but powered by electricity. The LRV Alternative would require the installation of overhead catenary systems, which would transmit the electricity to propel the vehicles. The catenary systems would be approximately 20 to 25 feet above the top-of-rail. Also, the LRV Alternative would require traction power substations along the route to provide electricity to propel the vehicles. The transfer platform and LRV stations would be identical to those described for the Proposed Project. In addition, the maintenance and servicing facilities would be identical to those described for the Proposed Project. Because of these similarities and the availability of the right-of-way, adoption and implementation of the Proposed Project with DMU technology would not preclude a future conversion to the LRV Alternative.

Cost Considerations. As discussed in Master Response 1, the LRV Alternative is estimated to cost $521.0 million in capital costs in year 2009 dollars. This cost is higher than the costs of the Proposed Project due to the added cost of the overhead wiring and electrical power distribution system, although the LRV vehicles would be slightly less expensive than the DMU vehicles. The capital costs of implementing the LRV system is estimated at $42 million more than for the DMUs in 2009 dollars (see Table 5-10 in the Draft EIR).

The annual operating cost for the LRV Alternative is $6.9 million in year 2009 dollars. The operating cost for the LRV Alternative would be less than the $8.3 million annually for the Proposed Project, due to the savings related to the use of electrical energy as compared to diesel fuel.[2]

These cost considerations represent the primary difference between the Proposed Project with DMU technology and the LRV Alternative. As discussed in the following paragraphs, other considerations are largely equivalent between the two technologies. Accordingly, the LRV Alternative is not recommended at this time for cost reasons. However, BART may wish to further consider the LRV Alternative in the event that additional funding becomes available at a

[2] The operating cost analysis for the DMU technology assumes diesel fuel costs of $4.00 per gallon. This is a very high cost assumption, since BART would be able to buy fuel in bulk at rates lower than the typical consumer price.

future date. The environmental analysis in the Final EIR provides a full evaluation of the LRV Alternative should such funding become available.

Energy Efficiency. The comparative analysis on pages 5-109 and 5-116 in Section 5 of the Draft EIR shows that the energy consumption and emissions characteristics of the LRVs are better than those of the DMUs. The LRVs have slightly better acceleration and deceleration characteristics than DMUs, resulting in a one-minute savings in the one-way travel time, and consume about 15 percent less energy per round trip.

However, the underlying purpose of a major transit investment in the SR 4 corridor is to reduce auto travel. The DMU and LRV options would be equally effective in achieving this goal. The CCTA travel model forecasts of ridership and auto travel for the year 2030 suggest that the Proposed Project would reduce weekday auto travel by 340,000 miles, regardless of whether diesel or electric power is chosen. This reduction represents about 13,600 gallons of auto fuel saved each day. In comparison, the fuel consumption of the DMU service is about 1,360 gallons per day and the equivalent fuel consumption of the LRV service would be about 1,225 gallons. As a result, the energy consumption difference between diesel and electric is a relatively small compared to the major fuel savings that would occur with either transit technology. The additional fuel savings provided by using the LRV compared to the DMU is about one percent of the fuel savings that would result from auto trip reduction from people diverted to the eBART corridor transit service.

Air Emissions. Based on an operating plan identical to the Proposed Project (20 hours of revenue service per day), the resulting CO_2 emissions for the LRV Alternative would be 6,060 pounds per day.[3] This is less than the emissions from the proposed DMU vehicles of 22,020 pounds per day. As a result, the LRV Alternative would have even greater net reductions in greenhouse gas emissions than the Proposed Project.

The Proposed Project would reduce automobile travel by 340,000 vehicle miles per day, which represents a decrease of 264,000 pounds of CO_2. Further decreases in CO_2 by using an LRV system rather than DMU would be approximately 16,000 pounds of CO_2, which is about 6 percent of the reductions achieved by elimination of the automobile trips. As with energy efficiency, the difference in CO_2 emissions between diesel and electric is a relatively minor compared to the reduction in overall emissions savings that would occur with either transit technology.

Unlike the Proposed Project, the LRV Alternative would not generate diesel fuel emissions. Instead, electrical power would be used to operate the LRV trains, which would result in some increase of CO_2 and criteria pollutant emissions (i.e., ozone precursors, PM_{10}, and CO) from the fossil fuel power plants generating that electricity. Since most electricity used in the Bay Area is generated by power plants outside this area, the expected net result under the LRV

[3] LTK Engineers Services, Draft eBART Phase I Project to Hillcrest Terminal, DMU and LRV Comparison, March 17, 2008.

Alternative would be a slight decrease in criteria pollutant emissions from Bay Area sources. Coal-fueled power plants would be the source for some of the electricity needed to operate the LRVs. BART currently gets about 9 percent of its power from coal power plants, none of which are located in California. Thus, the LRV Alternative may result in higher criteria pollutant emissions at those power plants, wherever they are located, which would not occur with the Proposed Project. However, the criteria pollutant emissions increases at those power plants attributable to the LRV Alternative may be partially offset in the future, because BART is planning to increase the renewable portion of its electricity use and reduce the portion originating from coal power plants.

Other Environmental Considerations. As described in Section 5 of the Draft EIR, the LRV Alternative would have environmental effects similar to the Proposed Project, because the route, stations, and maintenance facilities would be identical. The principal difference is the additional visual impact from the overhead catenary system to supply power and the additional land and related impacts to accommodate the traction power substations. While these impacts represent additional impacts that would not occur with the Proposed Project, they are considered less than significant.

Finally, as with the BART Extension Alternative, reliance on electricity as the energy source for propulsion could be also an environmental issue for the LRV Alternative. As discussed under Master Response 2, there is uncertainty regarding the ability of California's transmission system to handle peak demand and, thus, this represents a potentially significant impact that would not occur with the Proposed Project. However, the Cal-ISO has conducted various studies, all of which have shown that the Greater Bay Area (including the area of the Proposed Project) is expected to have sufficient internal generation resources and transmission capability under normal summer peak operating conditions when all transmission systems are in service. However, under contingency conditions (when summer peak demand occurs during a loss of one or two elements associated with the transmission system), certain transmission lines and transformers may overload. As a result, Cal-ISO has proposed measures that would ensure the system can handle the contingency conditions. More importantly, BART is not likely to experience a loss of power during a planned outage because BART's lines are on outage Block 50, which serves essential services (such as certain large hospitals). PG&E normally exempts this Block from rotating outages. In addition, BART's stations have two feeds (that are not on Block 50) and each feed is on a different outage block so both feeds would not be simultaneously blacked out. As such, rotating outages would not be expected to adversely affect LRV operations.

Future Extensions. At present, the funding identified for the Proposed Project would be sufficient only to cover the capital costs of the DMU service. Thus, the $42 million additional cost of the LRV technology is a significant factor in the comparison of the two technologies. It is important to note that the capital cost differential between the LRV service and the DMU increases with the length of the system. In other words, future extensions of LRV service would require additional capital costs for overhead catenary system and the power substations.

This suggests that for future extensions in the eBART corridor beyond Hillcrest Avenue, or for other long-distance alignments, the DMU investment would be even more cost effective than the LRV investment. Any comparison of DMU versus LRV should consider the possibility that the additional capital needed to implement LRV ($42 million) could be invested in extending rail transit further east along the SR 4 corridor. Travel demand studies indicate that roughly a 40 percent increase in transit ridership would occur if the eBART alignment could be extended to an Oakley station site three miles east of the proposed Hillcrest Avenue Station. An Oakley station would draw another 4,000 eBART riders per day. These additional 4,000 transit riders would reduce CO_2 emissions by eight times the reduction attained by shifting from diesel to electric between Pittsburg/Bay Point and the Hillcrest Avenue Station (130,800 lbs/day saved due to reduced auto travel minus the increase of additional CO_2 for DMU service vs. 16,000 lbs/day saved by electrifying the alignment to the Hillcrest Avenue Station). These benefits are apparent even with the estimated $60 to $80 million additional funding necessary for the three-mile extension to Oakley, compared to the estimated additional $42 million needed for the LRV system to the Hillcrest Avenue Station.

Master Response 4: What alternative fuels were considered, including biofuels, instead of diesel?

Commentors on the Draft EIR expressed concern over the use of diesel fuels, because it would mean continued reliance on a fossil fuel, and inquired if BART had considered other potential fuels to power the DMU vehicles. The following Master Response describes BART's consideration of alternative fuels.

Biodiesel Fuels. The Proposed Project assumes the use of ultra low sulfur diesel fuel. Diesel engines are to some extent flexible in the source of the fuel that they burn. Diesel can be synthesized from many types of organic matter (biodiesel). The most popular sources today are soy beans and grape seeds. Currently, many transit agencies are testing a mixture of biodiesel and petrodiesel, typically 5 to 20 percent biodiesel (B5 to B20). While there are technical challenges associated with biodiesel, such as cold temperature operation, fuel quality, and some material incompatibilities such as gaskets or fuel hoses, these issues can be overcome.

The use of biodiesel reduces most air emissions except nitrogen oxide (NOx). Use of biodiesel increases the production of NOx emissions, which increases ozone pollution (smog) at near-ground levels. The reduction of ground level ozone is so important, and EPA Tier 3 NOx limits for diesel engines are already so stringent, that most engine manufacturers no longer approve of the use of biodiesel. In other words, the use of biodiesel would make their engines EPA Tier 3 non-compliant.

The greatest challenge to biodiesel is the secondary impact it has on the environment. The rapid growth in demand for biodiesel fuels and the planting of biofuel sources rather than other crops has diverted food away from the food chain, thus increasing food prices. The demand to plant biofuels has also increased the pressure to cultivate virgin land, particularly forests

(which absorb CO_2) for additional fuel crop plantations. Until technologies are available to produce biofuels directly from wood, algae, or grass, the use of biofuels remains very controversial. Regardless, it may be decades before biofuels will have a lowering impact on diesel prices. [4]

At this time, challenges associated with biodiesel are greater than its benefits. Biodiesel produces a greater amount of NOx (smog) than petrodiesel and results in higher food prices and conversion of virgin land to agricultural uses. BART will consider the use of biofuels as this technology develops and improves; however, at this time, BART believes that ultra low sulfur diesel fuel is the most appropriate fuel for the DMU vehicles.

Natural Gas. Other alternative fuels include natural gas (methane) and hydrogen, which can be stored under pressure and burned directly by a modified diesel engine. These gases are considered "green" in that they can be recovered from natural sources such as algae ponds or landfills (methane), or by making hydrogen from electricity generated by clean sources such as wind. Theoretically, a DMU could be powered by natural gas, such as compressed natural gas (CNG) or liquefied natural gas (LNG), similar to transit buses. Although some older, modified vehicles are running in Germany, currently there are no CNG or LNG powered multiple units on the market. There are a number of reasons why CNG has never established itself in rail transportation. The tank design required to safely contain compressed or liquefied gases would have to be designed to withstand the high mechanical loads to which rail vehicles are designed. This would result in a relatively small capacity, and the tanks would be quite heavy. This limited capacity and the fact that the energy content of CNG is less than diesel fuel would necessitate refueling of the vehicles during revenue hours, while diesel-operated vehicles normally are fueled only once per day. With the development of clean diesel (EPA Tier 3), interest in natural gas-powered rail vehicles has diminished to a large extent because emission levels similar to those produced by natural gas are achievable with clean diesel without the need for major design changes or performance constraints.

Hybrid Drive. A hybrid drive stores the energy produced during the braking cycle for use at a later time, for instance, when the vehicle accelerates again. This technology is very well suited for transit applications, in that the frequent starts and stops can use the energy recovery feature to advantage. Hybrid drives can be adapted for DMUs, but the vehicle would require a diesel-electric drive. Such diesel-electric DMUs are available, and the eBART project would allow the use of such vehicles.

Several vehicle builders have experimented with hybrid features, and the technology is proven to be viable in rail applications. However, the hybrid feature is not readily available, although there are some hybrid vehicles in use in Japan on an experimental basis. Moreover, the additional development and component costs increase the vehicle cost to a point beyond the funding available to the eBART project, especially with such a small vehicle order (eight

[4] LTK Engineers Services, Draft eBART Phase I Project to Hillcrest Terminal, DMU and LRV Comparison, March 17, 2008.

vehicles). Other projects worldwide are in a similar situation. A large order of DMUs with hybrid technology has never occurred. The future price of diesel fuel might influence the deployment of this technology at some point.

Master Response 5: Are there health risks associated with the diesel emissions predicted from the DMU trains?

The diesel engines to be used in the project's DMUs belong to a newer generation of engines known as "clean diesel." As discussed in Section 3.11, Air Quality, of the Draft EIR, DMU engines would comply with stringent EPA Tier 4 emissions standards for new diesel engines, with substantially lower emissions than from older engines. BART intends to use Tier 4-compliant engines with the start of operations in 2015. The project's DMU diesel engines would burn ultra-low sulfur diesel (ULSD) fuel that would meet state and federal fuel quality standards. The low sulfur content of this fuel helps reduce emissions of diesel particulate matter. The Tier 4 standards for new engines of the size expected to be used by the DMUs would reduce particulate matter and nitrogen oxide emissions by about 90 percent or more as compared to engines meeting the current standards.

In terms of the health implications from project-related emissions, Impact AQ-7, beginning on page 3.11-27 of the Draft EIR, indicates that the increase in diesel emissions from the Proposed Project would not pose a significant health risk. The analysis leading to this conclusion used CAL3QHCR, an EPA air pollutant dispersion model approved for investigating exposure to particulate matter (such as diesel particulate), to determine the expected levels of diesel particulate along the project's route. To help assure that potential risks are identified and addressed, EPA-approved models such as CAL3QHCR are designed to overpredict rather than underpredict pollutant concentrations. The analysis also used toxicology risk factors for diesel exhaust, which were developed by the California Office of Environmental Health Hazard Assessment (OEHHA 1998) using human epidemiological data with a margin of safety.[5] These risk factors are applied to modeled pollutant concentrations to arrive at estimates of potential risk.

The potential health risk was analyzed at the residences closest to SR 4 where the air quality models indicate that exposure to project-related diesel particulate concentrations would be the highest. For purposes of the analysis, the so-called "Maximally Exposed Individual" (MEI) is situated at the location of highest modeled pollutant concentrations. The analysis assumes that the MEI is exposed to the highest modeled pollutant concentration continuously for a period of 70 years; in other words, that the resident never leaves that location over the 70-year period. In actuality, residents come and go from their homes for work, school, shopping, recreation, and other reasons, so that the assumption of a 70-year exposure to the peak project pollutant

[5] Office of Environmental Health Hazard Assessment (OEHHA). 1998. *Proposed Identification of Diesel Exhaust as a Toxic Air Contaminant, Part B, Health Risk Assessment for Diesel Exhaust.* Prepared by California Environmental Protection Agency, Office of Environmental Health Hazard Assessment. May. ftp://ftp.arb.ca.gov/carbis/regact/diesltac/partb.pdf. Accessed December 3, 2008.

concentration substantially overstates any anticipated actual exposure. The safety factors built into the dispersion model and toxicology risk factors also make it much more likely than not that predicted risks are overestimated.

When the health risk analysis for the project was performed in the manner described above, the maximum modeled cancer risk from exposure to DMU particulate matter emissions is three in one million at the location of the MEI. At any other location in the project area, such as schools and residences, the anticipated cancer risk predictions would be lower than three in one million. Because the MEI's anticipated exposure to project-related diesel emissions (as modeled) results in a predicted cancer risk which is below the significance threshold of 10 in one million, anticipated health risks to individuals living near the project corridor from diesel particulate matter would be less than significant.

Master Response 6: What are the project's benefits?

An environmental impact report prepared pursuant to CEQA must address the significant *adverse* impacts on the environment (Public Resources Code, Section 21068). Accordingly, the identification of beneficial effects of the Proposed Project or any of the Hillcrest Avenue Station options considered in an environmental document, while useful in understanding a project's merits, is not an environmental "impact" in the sense of CEQA and an EIR is not required to evaluate these relative benefits.

Nevertheless, BART wishes to emphasize, for the benefit of the public and decision makers, the extent to which the Proposed Project or any of the Hillcrest Avenue Station options may improve upon existing conditions or those conditions that would occur under a No Project scenario. In these cases, the change to the environment is reported in the Draft EIR as a benefit. Implementation of the Proposed Project would result in beneficial impacts in terms of reducing freeway congestion, air emissions, and energy consumption. Notably, the Proposed Project would improve freeway operations when compared to the No Project conditions in 2015 and 2030. As discussed in Section 3.2, Transportation, in Impact TR-3 and Impact TR-4 (beginning on page 3.2-72) of the Draft EIR, all freeway segments that were studied in the Draft EIR would operate at equal to or better than 2015 and 2030 No Project conditions. As discussed in Section 3.11, Air Quality, of the Draft EIR, the Proposed Project would also support and advance implementation of the Clean Air Plan as it is listed as a proposed transportation control measure in the Bay Area Air Quality Management District's Bay Area 2005 Ozone Strategy. In addition to its beneficial effect on reducing regional ozone emissions, the Proposed Project would result in a net reduction in regional greenhouse gases. Section 3.11, Air Quality, Impact AQ-3 (beginning on page 3.11-23) of the Draft EIR explains that while operation of the proposed DMU vehicles would result in greenhouse gas emissions, the Proposed Project would result in a reduction of regional vehicle miles traveled because people would drive less in favor of using the improved transit. This reduction in vehicle miles traveled in turn would decrease CO_2 emissions and the net effect would be an overall reduction in CO_2 emissions. Likewise, the overall reduction in CO_2 emissions, as well as other

emissions, would result in a net reduction in regional air emissions, which would be consistent with and supportive of the goals of the Bay Area 2005 Ozone Strategy. Finally, the Proposed Project would result in a net reduction in energy and petroleum consumption. Section 3.15, Impact EN-1 (beginning on page 3.15-10) of the Draft EIR explains that while the operation of the proposed DMU trains would increase energy demand, the reduction in energy demand by motorists that are diverted from driving more than offsets the increased energy use by the DMU trains.

In addition to the environmental benefits associated with the Proposed Project, the extension of DMU service would be consistent with and supportive of local and regional policies and plans to promote or enhance transit-oriented development. Both the cities of Pittsburg and Antioch have policy statements in their General Plans to encourage "smart" growth that would promote infill development and allow a higher intensity and greater mix of uses around transit facilities. Each of the cities has also prepared Specific Plans around the proposed eBART stations to transform the areas around the stations to higher density, mixed use areas that would be more supportive of transit (see Master Response 7 for additional details regarding these plans). The Proposed Project would provide a catalyst for this smart growth to occur in Pittsburg and Antioch.

Master Response 7: What is a Ridership Development Plan (RDP) and what does it have to do with eBART?

In 1999, as part of its Strategic Plan, BART adopted the System Expansion Policy (SEP). The SEP identifies a uniform set of criteria to be applied to all new extensions and infill stations of the BART transit system. One of the key criteria for evaluating proposed projects under the SEP is "transit-supportive land use" based on land use plans, policies, and controls adopted by local jurisdictions. This criterion is based on the assumption that land uses that encourage higher population densities near transit stations will generate increased numbers of riders for the BART system, justifying the investment in constructing the new stations and alignment infrastructure. Conversely, land uses encouraging lower density will generate fewer riders, making it more difficult to justify an investment in transit expansion.

For a project to be favorably rated under the SEP, cities or counties in which proposed transit stations will be located must demonstrate transit-supportive land use goals and polices that will help meet project-specific, corridor-wide ridership thresholds established by BART. If the corridor-wide ridership threshold is not already projected to be met under existing land use plans and policies, local jurisdictions must adopt and implement Ridership Development Plans (RDPs), which can take the form of General Plan amendments, Specific Plans, zoning amendments, access improvements, or other actions selected at the discretion of the local jurisdictions.

The Proposed Project is the first project to be evaluated under the SEP. The Proposed Project includes two new passenger stations, one located at Railroad Avenue in the City of Pittsburg, and the other located near Hillcrest Avenue in the City of Antioch. Consistent with the SEP,

Pittsburg and Antioch have developed RDPs, in the form of new area Specific Plans, for the two proposed new stations. When the BART Board of Directors decides whether to adopt the Proposed Project, the Board will evaluate whether the Proposed Project is consistent with the SEP and whether the proposed new stations can collectively meet the corridor-wide ridership threshold of 5,801 daily riders (entries and exits) in the year 2030, established by BART. As part of the ridership evaluation, the Board will consider the project's expected ridership under existing land use plans and policies, as well as increased ridership that is anticipated from the cities' respective RDPs.

The City of Pittsburg released the Draft Railroad Avenue Specific Plan and its accompanying Draft EIR for public review on February 26, 2009. Due to the timing of its RDP release, the City of Pittsburg will be unable to hold a public hearing to consider the Specific Plan and its EIR prior to the BART Board's consideration of the Proposed Project.

The City of Antioch released the Draft Hillcrest Station Area Specific Plan and its accompanying Draft EIR on January 21, 2009. The City of Antioch plans to consider its Specific Plan and certify the EIR prior to the date the BART Board is scheduled to consider the Proposed Project. Therefore, as of the publication of this document, it is anticipated, but not certain, that the City of Antioch will have taken final action enabling the BART Board to rely on the adoption of the Specific Plan.

As discussed in the Summary section of the Draft EIR, pages S-10 – S-11, and the Introduction section, pages 1-15 – 1-16, BART and the cities originally anticipated that the RDPs would be completed prior to the BART Board of Directors' consideration of the Proposed Project, including the eBART EIR. Delaying consideration of the Proposed Project until the cities have completed the RDP process is not feasible due to the need to coordinate the Proposed Project construction with the construction of the Caltrans SR 4 widening project (see pages 2-42 to 2-43 of the Draft EIR).

Regardless of the status of either city's RDP, the analysis in the Draft EIR demonstrates that the SEP ridership threshold for the Proposed Project would be met by expected growth consistent with current land use plans for the two station areas, without taking into account any additional growth that would be allowed under the RDPs (see Tables 1-2 and 3.3-6 of the Draft EIR[6]). In particular, the projected ridership for the Railroad Avenue Station, not including ridership attributable to the Specific Plan, would be 1,900 daily riders. Projected ridership for the Hillcrest Avenue Station, not including ridership attributable to the Specific Plan, would be 8,200 daily riders, which exceeds the SEP ridership threshold of 5,801 for the Proposed Project. Considering the two stations together, the projected ridership of 10,100 daily riders

[6] Footnote *a* to Tables 1-2 and 3.3-6, indicating that the ridership figures in these tables include ridership attributable to the Ridership Development Plans, is incorrect. This footnote has been deleted; see Section 6, Revisions to the Draft EIR. As discussed in the Draft EIR on pages 1-15, the ridership figures presented in Tables 1-2 and 3.3-6 for the year 2030 were based on ABAG Projections 2003, which incorporate expected regional growth consistent with current land use plans for the area, without taking into account the RDPs.

more than satisfies the SEP threshold. Accordingly, it is not necessary for the Specific Plans to be finalized in order for BART to find that the SEP goals are met.

BART anticipates further increases in ridership, beyond those under currently existing land use plans, attributable to implementation of the Specific Plans. The City of Pittsburg's Draft Railroad Avenue Specific Plan provides development standards and guidance for the area encompassing an approximately one-half mile radius around the proposed eBART station at Railroad Avenue. Through rezoning and related actions, Pittsburg's Specific Plan would provide opportunities for the development of about 1,845 new residential units and approximately 1,004,000 square feet of new commercial space within a compact mixed-use development district adjacent to the proposed station.

The City of Antioch's Draft Hillcrest Station Area Specific Plan would re-designate the land in and around the proposed Hillcrest Avenue Station locations as Office and Residential Transit-Oriented Development (TOD), as well as some Community Retail. The Specific Plan would provide opportunities for a maximum development at buildout of up to 2,500 residential units and 2,500,000 square feet of office and retail uses within a half-mile radius of the proposed eBART station. To be consistent with this EIR, the Hillcrest Station Area Specific Plan includes several eBART station location options, including the Proposed Project as characterized in this EIR (the Median Station option), a Median Station East Alternative (the Revised Median Station East option in this EIR), and a potential future eBART station alternative located further east and closer to SR 160 (the Northside East Station option). The land use designations in the Hillcrest Station Area Specific Plan would result in ridership that would satisfy the SEP threshold regardless of which Hillcrest Avenue Station option the BART Board ultimately elects to approve.

The Hillcrest Station Area Specific Plan also recognizes the need for flexibility by designating land sufficient for the Proposed Project's opening-day parking of approximately 1,000 spaces and planning for additional parking as needed. Specifically, the eBART EIR provides for an additional 1,600 parking spaces that would be needed at the Hillcrest Avenue Station by 2030, and the Hillcrest Station Area Specific Plan acknowledges this need both by promoting future structured parking and by permitting surface parking in areas designated in the Specific Plan as Office TOD. The Hillcrest Station Area Specific Plan also provides sufficient flexibility to accommodate the proposed maintenance facility.

Together, the RDPs of Pittsburg and Antioch would support the development of about 4,345 residential units and approximately 3.5 million square feet of commercial space at buildout, all within a half-mile of the two proposed eBART stations.

In summary, the Proposed Project's ridership, based on expected regional growth consistent with current land use plans, as well as with the increased development density to be provided under the cities' respective Specific Plans, will satisfy the ridership threshold established under the SEP. Based on these facts, the BART Board can evaluate the Proposed Project in accordance with the SEP prior to the cities' final actions to adopt their RDPs. Revisions have

been made to the Draft EIR to clarify the process by which the BART Board will consider the Proposed Project pursuant to the SEP (see Section 6 of this document).

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