



5.0 COST AND PERFORMANCE CONSIDERATIONS

This chapter presents the results of the evaluation and trade-offs analysis conducted for the Crenshaw Transit Corridor Project alternatives. This chapter summarizes the analyses presented in the other Draft Environmental Impact Statement/Environmental Impact Report (EIS/EIR) chapters. For each alternative, it includes the qualitative and quantitative evaluation so that the Los Angeles County Metropolitan Transportation Authority (Metro) Board of Directors can compare and contrast the benefits, costs, transportation impacts, and environmental consequences to the stated evaluation criteria presented in Chapter 2.0, Alternatives Considered. Considering these evaluation results will help facilitate selection of the Locally Preferred Alternative (LPA) for improving transit in the Crenshaw Transit Corridor.

5.1 Summary of Alternatives

Chapter 2.0, Alternatives Considered, presents the alternatives evaluated in this Draft EIS/EIR. The alternatives include No Build Alternative, a Transportation Systems Management (TSM) Alternative, and two build alternatives. The Build Alternatives consist of a Bus Rapid Transit (BRT) Alternative and a Light Rail Transit (LRT) Alternative, with six LRT Alternative design options. The primary difference between the alternatives is the level of transit service within the Crenshaw Transit Corridor. Following is a summary of the alternatives under consideration.

5.1.1 No-Build Alternative

The No-Build Alternative serves as a basis for the evaluation of transportation and environmental impacts of the LPA and build alternatives. The No-Build Alternative includes: (1) all existing highway and transit services and facilities; (2) the current Metro *2001 Long Range Transportation Plan* (LRTP) committed highway and transit projects that are environmentally cleared or under construction; and (3) the SCAG *2008 RTP* committed highway and transit projects.

5.1.2 TSM Alternative

The TSM Alternative enhances the No-Build Alternative by expanding the Metro Rapid bus services operating in the Crenshaw Transit Corridor. Under the TSM Alternative, a new Metro Rapid line would be added along Crenshaw Boulevard, La Brea Avenue, and Hawthorne Boulevard to complement the existing Metro Rapid Lines 710 and 740. The new Metro Rapid line would operate from the Metro Purple Line Wilshire/Western Station to the Metro Green Line Aviation/LAX Station. It would operate along Wilshire and Crenshaw Boulevards, to Florence Avenue, and then along Florence Avenue and Aviation Boulevard to the Metro Green Line Aviation/LAX Station, located at the Aviation Boulevard/Imperial Highway intersection.

5.1.3 BRT Alternative

The BRT Alternative would travel in mixed-traffic and in exclusive curb lanes and provide new transit services in the Crenshaw Transit Corridor. The BRT alignment would extend

approximately 12 miles from the Metro Purple Line Wilshire/Western Station to the Metro Green Line Aviation/LAX Station. The BRT Alternative would use low-floor, compressed natural gas (CNG) powered, articulated vehicles, with multi-doors for boarding. Enhanced BRT stops and stations would be constructed for passengers to access the system. The BRT Alternative would include a total of 12 stations.

5.1.4 Light Rail Transit Alternative

The LRT Alternative would operate using high-floor articulated vehicles, electrically powered by an overhead wire, and operating along a new, two direction fixed guideway. The alternative would include seven stations, park-and-ride and bus transfer facilities at the stations, a vehicle maintenance and operations facility, and traction power substations. The LRT alignment would extend approximately 8.5 miles from the Expo LRT line (under construction) at the Crenshaw/Exposition Boulevards intersection to the Metro Green Line Aviation/LAX Station. The LRT alignment would be double-tracked and would be comprised of at-grade street, at-grade railroad, aerial, and below-grade sections. The operating plan for the LRT Alternative would provide for service operating between the Metro Green Line Redondo Beach Station and the Exposition/ Crenshaw Station termini.

Six additional LRT Alternative design options are being considered as variations of the Base LRT Alternative. These design options may be included as part of the LRT Alternative based upon results of environmental analysis and public comment. These design options include the following:

- LRT Alternative Design Option 1 provides for an aerial station at Century Boulevard instead of an at-grade station at LAX.
- LRT Alternative Design Option 2 involves an aerial crossing instead of an at-grade crossing at Manchester Avenue.
- LRT Alternative Design Option 3 provides for a cut and cover crossing instead of an at-grade crossing at Centinela Avenue.
- LRT Alternative Design Option 4 provides for a cut and cover alignment instead of an aerial alignment between Victoria Avenue and 60th Street.
- LRT Alternative Design Option 5 provides a below-grade station at Vernon Avenue in Leimert Park.
- LRT Alternative Design Option 6 provides for a below-grade alignment between 39th Street and Exposition with a below-grade station at Crenshaw Boulevard and Exposition Boulevard.

5.2 Transportation and Environmental Impact Analysis

This section presents a summary of the alternatives under consideration and the results of the analysis of transportation and environmental impacts discussed in Chapter 3.0, Transportation Impacts and Chapter 4.0, Affected Environment and Environmental Consequences.



5.2.1 No-Build and Build Alternatives

Table 5-1 compares the benefits, transportation and environmental consequences of the build alternatives in relation to the No-Build Alternative.

The BRT Alternative and Base LRT Alternative improve north-south transit service and mobility to a greater degree than the TSM and No Build Alternatives. The No Build Alternative would not improve travel time between the Exposition Line and the Metro Green Line. The TSM Alternative would improve travel time by 10.5 minutes during peak travel periods and 11.2 minutes during off-peak travel times. The BRT Alternative and the Base LRT Alternative would improve travel times by 17.2 minutes and 21.6 minutes, respectively.

The estimated TSM Alternative 2030 daily boardings are 9,415 compared to 16,683 for the BRT Alternative and 12,628 for the Base LRT Alternative (13,148 for the LRT Alternative with Design Options). Because the BRT Alternative connects to the Metro Red Line and the Base LRT Alternative connects to the Exposition Line, which is a shorter distance, the BRT Alternative has a greater number of boardings.

For the No Build Alternative, the estimated 2030 daily system linked fixed guideway trips is 331,994 compared to 332,247 for the TSM Alternative, 333,141 for the BRT Alternative, and 336,425 for the Base LRT Alternative. The No-Build and TSM Alternatives would not be consistent with several existing land use policies encouraging transit-oriented uses. The No-Build Alternative in particular would limit future opportunities for development at stations. The TSM Alternative would be consistent with some local land use policies by enhancing transportation, but would not provide modal options, or increase opportunities for redevelopment. However, as these alternatives would not include construction activity, they would not have impacts related to displacement (no property acquisition or relocation would be necessary), or construction air quality. Both the BRT and LRT Alternatives would require mitigation for temporary construction impacts and would result in adverse construction air quality impacts. The LRT Alternative would also have an adverse air quality impact due to exceedance of the Federal NOx threshold, and while it would result in a reduction in Greenhouse Gases when compared to the No-Build, the decrease would be less than the project Greenhouse Gas decrease under the BRT Alternative and generally similar to that under the TSM Alternative.

All alternatives would result in increased visual impacts. The TSM and No-Build Alternatives would result in impacts as the result of increased congestion, while the BRT Alternative would remove vegetation and result in new sources of light or glare, the LRT Alternative would remove landscaping, add elevated structures, and a fixed guideway with overhead wires and poles in the middle of Crenshaw Boulevard. The BRT and LRT Alternatives would also result in adverse effects to historic resources to the Century Lounge and Angelus Funeral Home, respectively. The TSM and No-Build Alternatives would not result in an adverse effect to a historic resource.

Each of the alternatives would have a disproportionate adverse environmental justice effect, for the TSM and No-Build Alternatives the effect would be related to transit equity and traffic congestion along Crenshaw Boulevard, while the BRT Alternative would result



Table 5-1. Summary of Impacts of Alternatives

Project Goal/Criteria/Measure	No-Build Alternative	TSM Alternative	BRT Alternative	LRT Alternative
Transportation				
2030 Daily System Linked Fixed Guideway Trips	331,994	332,247	333,141	336,425
2030 Daily Boardings		9,412	16,680	13,144
2030 Travel Time Savings (minutes) – Exposition Line to Metro Green Line	None	<ul style="list-style-type: none"> ▪ 10.5 Peak ▪ 11.2 Off-peak 	17.2	21.6
On-Street Parking Spaces Affected	None	None	<ul style="list-style-type: none"> ▪ 4 Southbound permanently lost ▪ 118 existing Northbound peak period restrictions ▪ 129 existing Southbound peak period restrictions 	<ul style="list-style-type: none"> ▪ 163 Northbound permanently lost ▪ 132 Southbound permanently lost
Station Area Parking	None	None	Additional 500 (minimum) parking spaces (approximately 100 park and ride)	Additional 500 (minimum) parking spaces (approximately 100 spaces per park and ride)
Environmental				
Land Use and Development				
Regional Land Use	No Adverse Effect	No Adverse Effect	No Adverse Effect	No Adverse Effect
Local Land Use and Development	Potential Adverse Effects, limited opportunity to infill development at stations, no alternative transportation mode, and increased congestion	No Adverse Effect, improves mobility and transportation options	No Adverse Effect, would improve mobility and transportation options and provide redevelopment and transportation oriented development opportunities	No Adverse Effect, would improve mobility and transportation options and provide redevelopment and transportation oriented development opportunities
Division of Established Community	No Adverse Effect, would not divide an established community	No Adverse Effect, would not divide an established community	No Adverse Effect, would not divide an established community	No Adverse Effect, would not divide an established community



Table 5-1. Summary of Impacts of Alternatives (continued)

Project Goal/Criteria/Measure	No-Build Alternative	TSM Alternative	BRT Alternative	LRT Alternative
City of Los Angeles Transportation Policy	Not Consistent, would not result in station area development or increased redevelopment intensity	Not Consistent, would not result in station area development or increased redevelopment intensity	Consistent, would provide opportunity for low density redevelopment in residential areas and high density redevelopment along Crenshaw Blvd.	Consistent, would provide opportunity for low density redevelopment in residential areas and high density redevelopment along Crenshaw Blvd.
City of Los Angeles General Plan, - Transportation and Land Use Elements	Not Consistent, would not expand access to neighborhoods or improve mobility	<ul style="list-style-type: none"> Not Consistent with the Transportation Element, would not use the Harbor Subdivision right-of-way <ul style="list-style-type: none"> Consistent with the Land Use Element, would improve public transit 	Consistent with the Transportation and Land Use Elements, would use the Harbor Subdivision right-of-way, improve public transit, and provide an alternative to the automobile	Consistent with the Transportation and Land Use Elements, would use the Harbor Subdivision right-of-way, improve public transit, and provide an alternative to the automobile
County of Los Angeles General Plan	Not Consistent, would not stimulate transportation oriented development	Not Consistent, would not stimulate transportation oriented development	Consistent, would stimulate transportation oriented development in the station areas	Consistent, would stimulate transportation oriented development in the station areas
City of Inglewood General Plan	Not Consistent, does not enhance transportation system	Consistent, would enhance transportation with minimum capital investment	Consistent, would provide connections to South Bay, LAX, and downtown Los Angeles	Consistent, would provide connections to South Bay, LAX, and downtown Los Angeles
City of El Segundo General Plan	Not Consistent, would not provide regional transit connectivity	Consistent, would provide opportunities for regional connectivity at the Metro Green Line Aviation Station	Consistent, would provide opportunities for regional connectivity at the Metro Green Line Aviation Station	Consistent, would provide opportunities for regional connectivity at the Metro Green Line Aviation Station



Table 5-1. Summary of Impacts of Alternatives (continued)

Project Goal/Criteria/Measure	No-Build Alternative	TSM Alternative	BRT Alternative	LRT Alternative
City of Hawthorne General Plan	Not Consistent, would not provide a transportation modal option	Moderately Consistent, would provide transportation improvements, but not a transportation modal option	Consistent, would provide transportation modal option	Consistent, would provide transportation modal option
City of Los Angeles Municipal Code RAS and Density Bonus Ordinance	Not Consistent, does not provide opportunity for increased intensity of redevelopment	Not Consistent, does not provide opportunity for increased intensity of redevelopment	Consistent, would provide the foundation for increased intensity of commercial redevelopment and residential development along the Crenshaw Blvd.	Consistent, would provide the foundation for increased intensity of commercial redevelopment and residential development along the Crenshaw Blvd.
West Adams, Baldwin Hills, Leimert Park, Westchester Playa del Rey, and Wilshire Community Plans	Not Consistent, would not reduce trips, congestion, or air pollution or enhance job opportunities and quality of life	Not Consistent, would not reduce trips, congestion, or air pollution or enhance job opportunities and quality of life	Consistent, would reduce automobile trips, congestion, and air pollution and enhance job opportunities and quality of life	<ul style="list-style-type: none"> Consistent, would reduce automobile trips, congestion, and air pollution and enhance job opportunities and quality of life Is not within the Wilshire Community Plan area.
Crenshaw Corridor Specific Plan	Not Consistent, would not enhance community through mobility	Consistent, would enhance community mobility	Consistent, would enhance the community through increased mobility while preserving the visual character	Consistent, would enhance the community through increased mobility while minimizing impacts on the visual character
Park Mile Specific Plan	Consistent, would maintain low density residential area and park-like setting	Consistent, would maintain low density residential area and park-like setting	Consistent, would maintain low density residential area and park-like setting	Is not within the Park Mile Specific Plan area
CRA/LA, Mid-City Corridors and Crenshaw and Crenshaw/Slaughter Corridors Redevelopment Projects	Not Consistent with redevelopment policies related to transit and would not provide transit improvements along Crenshaw Blvd.	Consistent, would provide limited redevelopment opportunities and improve transit along Crenshaw Blvd.	Consistent, would improve pedestrian, automobile, minimal impacts on parking, and improve mass transit plus improve connectivity and plus adhere to the streetscape goals	Consistent, would improve pedestrian, automobile, minimal impacts on parking, and improve mass transit plus improve connectivity, streetscape goals would be affected, but mitigated



Table 5-1. Summary of Impacts of Alternatives (continued)

Project Goal/Criteria/Measure	No-Build Alternative	TSM Alternative	BRT Alternative	LRT Alternative
LAX Master Plan	Not Consistent, would not connect the airport to other mass transportation facilities, except the Metro Green Line	Not Consistent, would not connect the airport to other mass transportation facilities, except the Metro Green Line	Consistent, would provide connection from the airport to the Metro Green Line and other mass transportation facilities	Consistent, would provide connection from the airport to the Metro Green Line and other mass transportation facilities
Displacements and Relocation	None	None	<ul style="list-style-type: none"> ▪ 35 partial parcels ▪ 1 full parcel on West 71st Street, which is a residence 	<ul style="list-style-type: none"> ▪ 50 partial parcels, 15 on Crenshaw Blvd. ▪ 6 full parcels, 1 on Crenshaw Blvd. and 1 is a residence
Community Cohesion	No Adverse Effect	No Adverse Effect	No Adverse Effect	Less-than-Adverse Effect with mitigation resulting from aerial structure in Hyde Park
Visual	No Adverse Effect	No Adverse Effect	<ul style="list-style-type: none"> ▪ Potential Adverse Effect ▪ Mature palm trees removed at Edward Vincent Jr. Park ▪ Vegetation removed between a residential neighborhood and the rail right-of-way, exposing residences to new sources of light and glare. 	<ul style="list-style-type: none"> ▪ Potential Adverse Effect ▪ Land uses near Exposition and Crenshaw Boulevards removed ▪ Fixed guideway in the middle of Crenshaw Boulevard with overhead wires and overhead contact system (OCS) poles ▪ Landscape, medians, and frontage roads removed. ▪ Portal structures added to the street median. ▪ Elevated structure added in the median of Crenshaw Boulevard between 59th Street and the Harbor Subdivision. ▪ Along the Harbor Subdivision, adjacent landscaping screening near residences along La Colina Drive removed increasing residences' exposure to light and glare.



Table 5-1. Summary of Impacts of Alternatives (continued)

Project Goal/Criteria/Measure	No-Build Alternative	TSM Alternative	BRT Alternative	LRT Alternative
Air Quality	No Adverse Effect	<ul style="list-style-type: none"> No Adverse Effect 2,275 tons per year reduction in Green House Gases 	<ul style="list-style-type: none"> No Adverse Effect 23,053 tons per year reduction in Green House Gases 	<ul style="list-style-type: none"> Adverse Effect, NO_x exceeds federal threshold 3,249 tons per year increase in Green House Gases
Noise and Vibration	No Adverse Effect	No Adverse Effect	No Adverse Effect	<ul style="list-style-type: none"> Adverse Effect Moderate LRT pass by noise impact between 54th St. and Victoria Ave. Moderate at-grade signal noise impacts at Centinela Ave. and West Blvd. Moderate special traffic work noise impact at the Expo Line station and at the Century Blvd. station
Ecosystems and Biological Resources	No Adverse Effect	No Adverse Effect	<ul style="list-style-type: none"> Less-than-Adverse Effect with mitigation Mature palm trees removed at Edward Vincent Jr. Park Native trees and vegetation removed 	<ul style="list-style-type: none"> Less-than-Adverse Effect with mitigation Mature palm trees removed at Edward Vincent Jr. Park Native trees and vegetation removed
Geotechnical	<ul style="list-style-type: none"> Less-than Adverse Effect with mitigation Potential Adverse Effect for ground deformation from Newport-Inglewood fault 	<ul style="list-style-type: none"> Less-than-Adverse Effect with mitigation Potential Adverse Effect for ground deformation from Newport-Inglewood fault 	<ul style="list-style-type: none"> Less-than-Adverse Effect with mitigation Potential Adverse Effect if subsurface gases encountered for ground deformation from Newport-Inglewood fault, from liquefaction, of seismically induced settlement 	<ul style="list-style-type: none"> Less-than-Adverse Effect with mitigation Potential Adverse Effect if subsurface gases encountered and for ground deformation from Newport-Inglewood fault, from liquefaction, of seismically induced settlement



Table 5-1. Summary of Impacts of Alternatives (continued)

Project Goal/Criteria/Measure	No-Build Alternative	TSM Alternative	BRT Alternative	LRT Alternative
Water	No Adverse Effect	No Adverse Effect	No Adverse Effect	No Adverse Effect
Energy	No Adverse Effect	No Adverse Effect. 44,006,374 less BTUs per year	No Adverse Effect BTUs per year	No Adverse Effect, 52,599,515 less BTUs per year
Historic, Archaeological, Paleontological	No Adverse Effect	No Adverse Effect	Adverse effect from partial take of Century Lounge	<ul style="list-style-type: none"> ▪ Adverse effect to Angelus Funeral Home from proposed TPSS site immediately north and from take of Century Lounge ▪ Potential Adverse Effects to Department of Water and Power, May Company Department Store (now Macy's Department Store), Broadway Department Store (now Wal-Mart), Maverick's Flat and Leimert Park and in the rare case of potential settlement and damage that may result during excavation.
Parklands and Community Facilities	No Adverse Effect	No Adverse Effect	No Adverse Effect	<ul style="list-style-type: none"> ▪ Increased accessibility to Edward Vincent Jr. (from West Station), Leimert Park (from Vernon Station, and Grevillea Park (from La Brea Station) ▪ Improves public transit access to 33 community facilities and public services located within 0.25 mile
	No Adverse Effect	No Adverse Effect	<ul style="list-style-type: none"> ▪ Edward Vincent Jr. Park – de minimis Section 4(f) effect for removing the mature palm trees, but not affecting the park features, uses, or attributes ▪ Increased accessibility from public transit to Edward Vincent Jr. (from West Station), Leimert Park (from Vernon Station, and Grevillea Park (from La Brea Station) ▪ Improves public transit access to 51 community facilities and public services located within 0.25 mile 	<ul style="list-style-type: none"> ▪ Improved accessibility to Edward Vincent Jr. (from West Station), Leimert Park (from Vernon Station, and Grevillea Park (from La Brea Station) ▪ Improves public transit access to 33 community facilities and public services located within 0.25 mile



Table 5-1. Summary of Impacts of Alternatives (continued)

Project Goal/Criteria/Measure	No-Build Alternative	TSM Alternative	BRT Alternative	LRT Alternative
Economic	No Adverse Effect	No Adverse Effect <ul style="list-style-type: none"> ▪ 250 additional jobs, 108 transit operations ▪ \$20.9 million increase in economic output ▪ \$12.1 million increase in household earnings ▪ 0 property tax loss 	No Adverse Effect <ul style="list-style-type: none"> ▪ 240 additional jobs, 98 transit operations ▪ \$20.3 million increase in economic output ▪ \$11.7 million increase in household earnings ▪ \$148,300 property tax loss 	No Adverse Effect <ul style="list-style-type: none"> ▪ 880 additional jobs, 272 transit operations ▪ \$73.2 million increase in economic output ▪ \$42.4 million increase in household earnings ▪ \$113,500 property tax loss
Safety and Security	No Adverse Effect	No Adverse Effect	<ul style="list-style-type: none"> ▪ No Adverse Effects with mitigation ▪ Harbor Subdivision 19 existing at-grade crossings would be signalized and have warning devices and fencing installed between crossings, near Faithful Central Bible Church ▪ Stations will include monitoring equipment and be lighted to avoid shadows ▪ Station pedestrian crossings near schools would be monitored and a crossing guard provided, if necessary during construction 	<ul style="list-style-type: none"> ▪ No Adverse Effects with mitigation ▪ Train crossings would occur with traffic signals ▪ Pedestrian and motorist gates and visual and audible warning devices would be provided ▪ Stations will include monitoring equipment and be lighted to avoid shadows ▪ Station pedestrian crossings near schools would be monitored and a crossing guard provided, if necessary during construction



Table 5-1. Summary of Impacts of Alternatives (continued)

Project Goal/Criteria/Measure	No-Build Alternative	TSM Alternative	BRT Alternative	LRT Alternative
Construction	No Adverse Effect	No Adverse Effect	<ul style="list-style-type: none"> ▪ No Adverse Effect with mitigation, except air quality ▪ Temporary construction noise, vibration, street closures, cars using neighborhood streets to avoid construction, visible staging areas with equipment, stockpiles and concrete barriers, increased emissions, and pedestrian and motor vehicle access, safety, and security effects ▪ Temporary lighting may affect residential areas by exposing residents to glare from unshielded light sources or by increasing ambient nighttime light levels. ▪ 2,000 construction jobs 	<ul style="list-style-type: none"> ▪ No Adverse Effects with mitigation, except air quality ▪ Temporary construction noise, vibration, street closures, cars using neighborhood streets to avoid construction, visible staging areas with equipment, stockpiles and concrete barriers, increased emissions, and pedestrian and motor vehicle access, safety, and security effects ▪ Temporary lighting may affect residential areas by exposing residents to glare from unshielded light sources or by increasing ambient nighttime light levels. ▪ 4,400 construction jobs
Growth Inducing	No Adverse Effect	No Adverse Effect	No Adverse Effect	No Adverse Effect



Table 5-1. Summary of Impacts of Alternatives (continued)

Project Goal/Criteria/Measure	No-Build Alternative	TSM Alternative	BRT Alternative	LRT Alternative
Cumulative Impacts	No Adverse Effect	No Adverse Effect <ul style="list-style-type: none"> ▪ Decrease in VMT enhances traffic circulation ▪ Decrease in energy consumption 	No Adverse Effect <ul style="list-style-type: none"> ▪ Decrease in VMT enhances traffic circulation ▪ Displacement and relocation ▪ Decrease in energy consumption 	No Adverse Effect except air quality <ul style="list-style-type: none"> ▪ Decrease in VMT enhances traffic circulation ▪ Displacement and relocation ▪ Division of Hyde Park Community ▪ Increase in green house gases ▪ Decrease in energy consumption
Environmental Justice	Disproportionate Adverse Effects related to transit service equity and traffic congestion along Crenshaw Boulevard, Florence Avenue and Aviation Boulevard	Disproportionate Adverse Effects related to traffic congestion along Crenshaw Boulevard	Disproportionate Adverse Effects related to aesthetics and parklands adjacent to and along Edward Vincent Jr. Park	Disproportionate Adverse Effects related to community cohesion and aesthetics in Hyde park area on Crenshaw Boulevard

Source: Parsons Brinckerhoff, 2009



in a disproportionate adverse effect related to aesthetics and parklands adjacent to and along Edward Vincent Jr. Park. The LRT Alternative would have disproportionate impacts related to community cohesion and aesthetics in the Hyde Park area on Crenshaw Boulevard.

5.2.2 LRT Design Options

Table 5-2 summarizes the transportation impacts and environmental consequences of the LRT design options in comparison to the Base LRT Alternative.

Effects related to the six LRT design options would generally be similar. However, Design Option 5 (a subway station at Vernon Avenue near Leimert Park) would result in a potentially adverse land use effect related to the intensification of development near Leimert Park. In addition, Design Options 3, 4 and 5 would each result in additional property acquisitions beyond the Base LRT Alternative. Design Option 3 (a cut and cover crossing instead of an at-grade crossing at Centinela Avenue) would result in an adverse visual effect due to the removal of mature palm trees along Crenshaw Boulevard at Edward Vincent Jr. Park.

5.2.3 Maintenance and Operations Facilities

Two maintenance and operations facilities are currently under consideration as part of the proposed project. A summary of impacts of the two maintenance and operations facility sites is presented in Table 5-3.

Maintenance and Operations Facility B is an approximately 16 acre site bound by 83rd Street, the Harbor Subdivision right-of-way and Isis Avenue. Maintenance and Operations Facility D is an approximately 14 acre site near the Metro Green Line and bound by the Harbor Subdivision right-of-way, and Union Pacific Branch Line and Rosecrans Avenue. The two maintenance and operations facilities would result in similar effects, both would be generally consistent with local land use policies, but would result in unmitigatable air quality impacts. Maintenance and Operations Facility D would require mitigation for an impact related to the removal of native trees and vegetation that would be removed in association with the proposed facility. This site would have fewer displacements of existing uses. There is generally a buffer between this site and adjacent industrial uses and residential neighborhoods lie far from the site. Maintenance and Operations Facility B would result in a potentially adverse effect related to historic resources due to a partial take of the Kaiser Homes' production plant. Both sites would either be consistent with or not result in an adverse effect related to the remaining project goals, criteria and measures.



Table 5-2. Summary of Impacts of LRT Alternative Design Options

Project Goal/Criteria/Measure	LRT Design Option 1	LRT Design Option 2	LRT Design Option 3	LRT Design Option 4	LRT Design Option 5	LRT Design Option 6
Environmental						
Land Use and Development						
Regional Land Use	No Adverse Effect	No Adverse Effect	No Adverse Effect	No Adverse Effect	No Adverse Effect	No Adverse Effect
Local Land Use and Development	No Adverse Effect	No Adverse Effect	No Adverse Effect	No Adverse Effect	Potential Adverse Effect, intensification of high density development in the Leimert Park area may result in an adverse effect	No Adverse Effect
Division of Established Community	No Adverse Effect	No Adverse Effect	No Adverse Effect	No Adverse Effect	No Adverse Effect	No Adverse Effect
City of Los Angeles Transportation Policy	Consistent	Consistent	Consistent	Consistent	Consistent	Consistent
City of Los Angeles General Plan, - Transportation and Land Use Elements	More Consistent than the Base LRT Alternative, the improved traffic flows on the surrounding streets would result in better mobility for the area	More Consistent than the Base LRT Alternative, the improved traffic flows on the surrounding streets would result in better mobility for the area	More Consistent than the Base LRT Alternative, the improved traffic flows on the surrounding streets would result in better mobility for the area	More Consistent than the Base LRT Alternative, the improved traffic flows on the surrounding streets would result in better mobility for the area	More Consistent than the Base LRT Alternative, the improved traffic flows on the surrounding streets would result in better mobility for the area	More Consistent than the Base LRT Alternative, the improved traffic flows on the surrounding streets would result in better mobility for the area
County of Los Angeles General Plan	Consistent	Consistent	Consistent	Consistent	Consistent	Consistent
City of Inglewood General Plan	Consistent	Consistent	Consistent	Consistent	Consistent	Consistent



Table 5-2. Summary of Impacts of LRT Alternative Design Options (continued)

Project Goal/Criteria/Measure	LRT Design Option 1	LRT Design Option 2	LRT Design Option 3	LRT Design Option 4	LRT Design Option 5	LRT Design Option 6
City of El Segundo General Plan	Consistent	Consistent	Consistent	Consistent	Consistent	Consistent
City of Hawthorne General Plan	Consistent	Consistent	Consistent	Consistent	Consistent	Consistent
City of Los Angeles Municipal Code RAS and Density Bonus Ordinance	Consistent	Consistent	Consistent	Consistent	Consistent	Consistent
West Adams, Baldwin Hills, Leimert Park, Westchester Playa del Rey and Wilshire Community Plans	Consistent	Consistent	Consistent	Consistent	Consistent	Consistent
Crenshaw Corridor Specific Plan	Consistent, would enhance the community through increased mobility while preserving the visual character	Consistent, would enhance the community through increased mobility while preserving the visual character	Not within the specific plan area	Consistent, would increase the mobility through the area and preserve the low-density residential character of the community more than the Base LRT Alternative.	Consistent, would preserve low-density residential community and not affect the character of the surrounding residential community.	Consistent, would preserve low-density residential community and not affect the character of the surrounding residential community.
Park Mile Specific Plan	Consistent, would maintain low density residential area and park-like setting	Consistent, would maintain low density residential area and park-like setting	Not within the specific plan area	Not within the specific plan area	Not within the specific plan area	Not within the specific plan area
CRA/LA, Mid-City Corridors and Crenshaw and Crenshaw/Slaughter	More Consistent than the Base LRT Alternative because it would be located	More Consistent than the Base LRT Alternative because it would be better	More Consistent than the Base LRT Alternative because it would better enhance	More Consistent than the Base LRT Alternative because it would be better	More Consistent than the Base LRT Alternative because it would be better	More Consistent than the Base LRT Alternative because it would be better



Table 5-2. Summary of Impacts of LRT Alternative Design Options (continued)

Project Goal/Criteria/Measure	LRT Design Option 1	LRT Design Option 2	LRT Design Option 3	LRT Design Option 4	LRT Design Option 5	LRT Design Option 6
Corridors Redevelopment Projects	closer to Century Boulevard where the majority of pedestrian activity in the area occurs.	enhance automobile circulation, eliminating delay from light rail vehicle crossings	automobile circulation, eliminating delay from light rail vehicle crossings	enhance automobile circulation, eliminating delay from light rail vehicle crossings	enhance automobile circulation, eliminating delay from light rail vehicle crossings	enhance automobile circulation, eliminating delay from light rail vehicle crossings
LAX Master Plan	More Consistent than the Base LRT Alternative, the LAX connection point would facilitate connections with passengers from transit services other than light rail traveling along the Harbor Subdivision right-of-way	Consistent, would develop a connection point to LAX	Consistent, would develop a connection point to LAX	Consistent, would develop a connection point to LAX	Consistent, would develop a connection point to LAX	Consistent, would develop a connection point to LAX
Displacements	None	None	1 partial parcel	<ul style="list-style-type: none"> ▪ 3 partial parcels, 1 on Greshaw Blvd. ▪ 2 full parcels, 1 on Greshaw Blvd. 	1 partial parcel on Greshaw Blvd.	None
Community Cohesion	No Adverse Effect	No Adverse Effect	No Adverse Effect	No Adverse Effect	No Adverse Effect	No Adverse Effect



Table 5-2. Summary of Impacts of LRT Alternative Design Options (continued)

Project Goal/Criteria/Measure	LRT Design Option 1	LRT Design Option 2	LRT Design Option 3	LRT Design Option 4	LRT Design Option 5	LRT Design Option 6	
Visual	Less than Adverse Effect	Less than Adverse Effect	<ul style="list-style-type: none"> ▪ Less-than-Adverse Effect with Mitigation ▪ Mature palm trees removed along Crenshaw Blvd. at Edward Vincent Jr. Park 	Less than Adverse Effect	Less than Adverse Effect	Less than Adverse Effect	
Air Quality	<ul style="list-style-type: none"> ▪ Adverse Effect ▪ NO_x exceeds federal regional threshold ▪ 3,249 tons per year increase in Green House Gases 	<ul style="list-style-type: none"> ▪ Adverse Effect ▪ NO_x exceeds federal regional threshold ▪ 3,249 tons per year increase in Green House Gases 	<ul style="list-style-type: none"> ▪ Adverse Effect ▪ NO_x exceeds federal regional threshold ▪ 3,249 tons per year increase in Green House Gases 	<ul style="list-style-type: none"> ▪ Adverse Effect ▪ NO_x exceeds federal regional threshold ▪ 3,249 tons per year increase in Green House Gases 	<ul style="list-style-type: none"> ▪ Adverse Effect, ▪ NO_x exceeds federal regional threshold ▪ 3,249 tons per year increase in Green House Gases 	<ul style="list-style-type: none"> ▪ Adverse Effect ▪ NO_x exceeds federal regional threshold ▪ 3,249 tons per year increase in Green House Gases 	
Noise and Vibration	<ul style="list-style-type: none"> ▪ Adverse Effect ▪ Moderate LRT pass by noise impact between 54th St. and Victoria Ave. ▪ Moderate at-grade signal noise impacts at Centinela Ave. and West Blvd. ▪ Moderate special traffic work noise impact at the Expo Line station and at the Century Blvd. 	<ul style="list-style-type: none"> ▪ Adverse Effect ▪ Moderate LRT pass by noise impact between 54th St. and Victoria Ave. ▪ Moderate at-grade signal noise impacts at Centinela Ave. and West Blvd. ▪ Moderate special traffic work noise impact at the Expo Line station and at the Century Blvd. 	<ul style="list-style-type: none"> ▪ Adverse Effect ▪ Moderate LRT pass by noise impact between 54th St. and Victoria Ave. ▪ Moderate at-grade signal noise impacts at West Blvd. ▪ Moderate special traffic work noise impact at the Expo Line station and at the Century Blvd. 	<ul style="list-style-type: none"> ▪ Adverse Effect ▪ Moderate LRT pass by noise impact between 54th St. and 60th St. ▪ Moderate at-grade signal noise impacts at Centinela Ave. and West Blvd. ▪ Moderate special traffic work noise impact at the Expo Line station and at the Century Blvd. 	<ul style="list-style-type: none"> ▪ Adverse Effect ▪ Moderate LRT pass by noise impact between 54th St. and Victoria Ave. ▪ Moderate at-grade signal noise impacts at Centinela Ave. and West Blvd. ▪ Moderate special traffic work noise impact at the Expo Line station and at the Century Blvd. 	<ul style="list-style-type: none"> ▪ Adverse Effect ▪ Moderate LRT pass by noise impact between 54th St. and Victoria Ave. ▪ Moderate at-grade signal noise impacts at Centinela Ave. and West Blvd. ▪ Moderate special traffic work noise impact at the Expo Line station and at the Century Blvd. 	<ul style="list-style-type: none"> ▪ Adverse Effect ▪ Moderate LRT pass by noise impact between 54th St. and Victoria Ave. ▪ Moderate at-grade signal noise impacts at Centinela Ave. and West Blvd. ▪ Moderate special traffic work noise impact at the Expo Line station and at the Century Blvd.



Table 5-2. Summary of Impacts of LRT Alternative Design Options (continued)

Project Goal/Criteria/Measure	LRT Design Option 1	LRT Design Option 2	LRT Design Option 3	LRT Design Option 4	LRT Design Option 5	LRT Design Option 6	
Ecosystems and Biological Resources	station ■ Less than Adverse Effect with mitigation ■ Mature palm trees removed at Edward Vincent Jr. Park ■ Native trees and vegetation removed	station ■ Less than Adverse Effect with mitigation ■ Mature palm trees removed at Edward Vincent Jr. Park ■ Native trees and vegetation removed	station ■ Less than Adverse Effect with mitigation ■ Mature palm trees removed at Edward Vincent Jr. Park ■ Native trees and vegetation removed	station ■ Less than Adverse Effect with mitigation. ■ Mature palm trees removed at Edward Vincent Jr. Park ■ Native trees and vegetation removed	station ■ Less than Adverse Effect with mitigation ■ Mature palm trees removed at Edward Vincent Jr. Park ■ Native trees and vegetation removed	station ■ Less than Adverse Effect with mitigation ■ Mature palm trees removed at Edward Vincent Jr. Park ■ Native trees and vegetation removed	
Geotechnical	■ Less than Adverse Effect with mitigation. ■ Potential Adverse Effect ■ Discovery of subsurface gases ■ Ground deformation from Newport-Inglewood fault ■ Seismically induced settlement No Adverse Effect	■ Less than Adverse Effect with mitigation. ■ Potential Adverse Effect ■ Discovery of subsurface gases ■ Ground deformation from Newport-Inglewood fault ■ Seismically induced settlement No Adverse Effect	■ Less than Adverse Effect with mitigation. ■ Potential Adverse Effect ■ Discovery of subsurface gases ■ Ground deformation from Newport-Inglewood fault ■ Seismically induced settlement No Adverse Effect	■ Less than Adverse Effect with mitigation. ■ Potential Adverse Effect ■ Discovery of subsurface gases ■ Ground deformation from Newport-Inglewood fault ■ Seismically induced settlement No Adverse Effect	■ Less than Adverse Effect with mitigation. ■ Potential Adverse Effect ■ Discovery of subsurface gases ■ Ground deformation from Newport-Inglewood fault ■ Seismically induced settlement No Adverse Effect	■ Less than Adverse Effect with mitigation. ■ Potential Adverse Effect ■ Discovery of subsurface gases ■ Ground deformation from Newport-Inglewood fault ■ Seismically induced settlement No Adverse Effect	■ Less than Adverse Effect with mitigation. ■ Potential Adverse Effect ■ Discovery of subsurface gases ■ Ground deformation from Newport-Inglewood fault ■ Seismically induced settlement No Adverse Effect
Water	No Adverse Effect	No Adverse Effect	No Adverse Effect	No Adverse Effect	No Adverse Effect	No Adverse Effect	



Table 5-2. Summary of Impacts of LRT Alternative Design Options (continued)

Project Goal/Criteria/Measure	LRT Design Option 1	LRT Design Option 2	LRT Design Option 3	LRT Design Option 4	LRT Design Option 5	LRT Design Option 6
Historic, Archaeological, Paleontological	<ul style="list-style-type: none"> Adverse Effect to Angelus Funeral Home from proposed TPSS site immediately north and from partial take of Century Lounge Potential Adverse Effects to Department of Water and Power, May Company Department Store (now Macy's Department Store), Broadway Department Store (now Wal-Mart), Maverick's Flat and Leimert Park and in the rare case of potential settlement and damage that may result during excavation. 	<ul style="list-style-type: none"> Adverse Effect to Angelus Funeral Home from proposed TPSS site immediately north and from partial take of Century Lounge Potential Adverse Effects to Department of Water and Power, May Company Department Store (now Macy's Department Store), Broadway Department Store (now Wal-Mart), Maverick's Flat and Leimert Park and in the rare case of potential settlement and damage that may result during excavation. 	<ul style="list-style-type: none"> Adverse Effect to Angelus Funeral Home from proposed TPSS site immediately north and from partial take of Century Lounge Potential Adverse Effects to Department of Water and Power, May Company Department Store (now Macy's Department Store), Broadway Department Store (now Wal-Mart), Maverick's Flat and Leimert Park and in the rare case of potential settlement and damage that may result during excavation. 	<ul style="list-style-type: none"> Adverse Effect to Angelus Funeral Home from proposed TPSS site immediately north and from partial take of Century Lounge Potential Adverse Effects to Department of Water and Power, May Company Department Store (now Macy's Department Store), Broadway Department Store (now Wal-Mart), Maverick's Flat and Leimert Park and in the rare case of potential settlement and damage that may result during excavation. 	<ul style="list-style-type: none"> Adverse Effect to Angelus Funeral Home from proposed TPSS site immediately north and from partial take of Century Lounge Potential Adverse Effects to Department of Water and Power, May Company Department Store (now Macy's Department Store), Broadway Department Store (now Wal-Mart), Maverick's Flat and Leimert Park and in the rare case of potential settlement and damage that may result during excavation. 	<ul style="list-style-type: none"> Adverse Effect to Angelus Funeral Home from proposed TPSS site immediately north and from partial take of Century Lounge Potential Adverse Effects to Department of Water and Power, May Company Department Store (now Macy's Department Store), Broadway Department Store (now Wal-Mart), Maverick's Flat and Leimert Park and in the rare case of potential settlement and damage that may result during excavation.



Table 5-2. Summary of Impacts of LRT Alternative Design Options (continued)

Project Goal/Criteria/Measure	LRT Design Option 1	LRT Design Option 2	LRT Design Option 3	LRT Design Option 4	LRT Design Option 5	LRT Design Option 6
Parklands and Community Facilities	No Adverse Effect	No Adverse Effect	No Adverse Effect, Edward Vincent Jr. Park – de minimis Section 4(f) effect for removing the mature palm trees, but not affecting the park features, uses, or attributes	No Adverse Effect	No Adverse Effect	No Adverse Effect
Economic	<ul style="list-style-type: none"> ▪ No Adverse Effect ▪ 880 additional jobs, 272 transit operations ▪ \$73.2 million increase in economic output ▪ \$42.4 million increase in household earnings ▪ \$113,500 property tax loss 	<ul style="list-style-type: none"> ▪ No Adverse Effect ▪ 880 additional jobs, 272 transit operations ▪ \$73.2 million increase in economic output ▪ \$42.4 million increase in household earnings ▪ \$113,500 property tax loss 	<ul style="list-style-type: none"> ▪ No Adverse Effect ▪ 880 additional jobs, 272 transit operations ▪ \$73.2 million increase in economic output ▪ \$42.4 million increase in household earnings ▪ \$113,500 property tax loss 	<ul style="list-style-type: none"> ▪ No Adverse Effect ▪ 880 additional jobs, 272 transit operations ▪ \$73.2 million increase in economic output ▪ \$42.4 million increase in household earnings ▪ \$113,500 property tax loss 	<ul style="list-style-type: none"> ▪ No Adverse Effect ▪ 880 additional jobs, 272 transit operations ▪ \$73.2 million increase in economic output ▪ \$42.4 million increase in household earnings ▪ \$113,500 property tax loss 	<ul style="list-style-type: none"> ▪ No Adverse Effect ▪ 880 additional jobs, 272 transit operations ▪ \$73.2 million increase in economic output ▪ \$42.4 million increase in household earnings ▪ \$113,500 property tax loss



Table 5-2. Summary of Impacts of LRT Alternative Design Options (continued)

Project Goal/Criteria/Measure	LRT Design Option 1	LRT Design Option 2	LRT Design Option 3	LRT Design Option 4	LRT Design Option 5	LRT Design Option 6	
Safety and Security	<ul style="list-style-type: none"> No Adverse Effects with mitigation Train crossings would occur with traffic signals Pedestrian and motorist gates and visual and audible warning devices would be provided Stations will include monitoring equipment and be lighted to avoid shadows 	<ul style="list-style-type: none"> No Adverse Effects with mitigation Would enhance pedestrian safety, they can cross under aerial structure. Train crossings would occur with traffic signals Pedestrian and motorist gates and visual and audible warning devices would be provided Stations will include monitoring equipment and be lighted to avoid shadows 	<ul style="list-style-type: none"> No Adverse Effects with mitigation Would eliminate collisions with trains, LRVs, pedestrians, or motorists at Centinela Ave. Train crossings would occur with traffic signals Pedestrian and motorist gates and visual and audible warning devices would be provided Stations will include monitoring equipment and be lighted to avoid shadows 	<ul style="list-style-type: none"> No Adverse Effects with mitigation Train crossings would occur with traffic signals Pedestrian and motorist gates and visual and audible warning devices would be provided Stations will include monitoring equipment and be lighted to avoid shadows 	<ul style="list-style-type: none"> No Adverse Effects with mitigation Train crossings would occur with traffic signals Pedestrian and motorist gates and visual and audible warning devices would be provided Stations will include monitoring equipment and be lighted to avoid shadows 	<ul style="list-style-type: none"> No Adverse Effects with mitigation Would eliminate collisions LRVs, and motorists Train crossings would occur with traffic signals Pedestrian and motorist gates and visual and audible warning devices would be provided Stations will include monitoring equipment and be lighted to avoid shadows 	
Construction Impacts	<ul style="list-style-type: none"> No Adverse Effects with mitigation, except air quality Temporary construction noise, vibration, street closures, cars using neighborhood 	<ul style="list-style-type: none"> No Adverse Effects with mitigation, except air quality Temporary construction noise, vibration, street closures, cars using neighborhood 	<ul style="list-style-type: none"> No Adverse Effects with mitigation, except air quality Temporary construction noise, vibration, street closures, cars using neighborhood 	<ul style="list-style-type: none"> No Adverse Effects with mitigation, except air quality Temporary construction noise, vibration, street closures, cars using neighborhood 	<ul style="list-style-type: none"> No Adverse Effects with mitigation, except air quality Temporary construction noise, vibration, street closures, cars using neighborhood 	<ul style="list-style-type: none"> No Adverse Effects with mitigation, except air quality Temporary construction noise, vibration, street closures, cars using neighborhood 	<ul style="list-style-type: none"> No Adverse Effects with mitigation, except air quality Temporary construction noise, vibration, street closures, cars using neighborhood



Table 5-2. Summary of Impacts of LRT Alternative Design Options (continued)

Project Goal/Criteria/Measure	LRT Design Option 1	LRT Design Option 2	LRT Design Option 3	LRT Design Option 4	LRT Design Option 5	LRT Design Option 6
	<p>streets to avoid construction, visible staging areas with equipment, stockpiles and concrete barriers, increased emissions, and pedestrian and motor vehicle access, safety, and security effects</p> <ul style="list-style-type: none"> ■ Potential nighttime glare may affect a motel at Century and Aviation Boulevards ■ Increased construction period compared to the LRT Base Alternative 	<p>streets to avoid construction, visible staging areas with equipment, stockpiles and concrete barriers, increased emissions, and pedestrian and motor vehicle access, safety, and security effects</p> <ul style="list-style-type: none"> ■ There are no sensitive uses located at Manchester Avenue and the Harbor Subdivision right-of-way that would be affected by nighttime construction lighting ■ Increased construction period compared to the LRT Base Alternative 	<p>staging areas with equipment, stockpiles and concrete barriers, increased emissions, and pedestrian and motor vehicle access, safety, and security effects</p> <ul style="list-style-type: none"> ■ Potential nighttime glare may affect the residences located along La Colina Drive ■ Increased construction period compared to the LRT Base Alternative 	<p>streets to avoid construction, visible staging areas with equipment, stockpiles and concrete barriers, increased emissions, and pedestrian and motor vehicle access, safety, and security effects</p> <ul style="list-style-type: none"> ■ Potential nighttime glare may affect the multi-family residences and motel along Crenshaw Boulevard, south of 60th Street and West Angeles Villas, a senior living complex at Crenshaw Boulevard and 60th Street ■ Increased construction period compared to the LRT Base Alternative 	<p>streets to avoid construction, visible staging areas with equipment, stockpiles and concrete barriers, increased emissions, and pedestrian and motor vehicle access, safety, and security effects</p> <ul style="list-style-type: none"> ■ Potential nighttime glare may affect the residential and other sensitive uses east of the station ■ Increased construction period compared to the LRT Base Alternative 	<p>streets to avoid construction, visible staging areas with equipment, stockpiles and concrete barriers, increased emissions, and pedestrian and motor vehicle access, safety, and security effects</p> <ul style="list-style-type: none"> ■ Potential nighttime glare may affect the multi-family residences and other sensitive uses along Crenshaw Boulevard ■ Increased construction period compared to the LRT Base Alternative



Table 5-2. Summary of Impacts of LRT Alternative Design Options (continued)

Project Goal/Criteria/Measure	LRT Design Option 1	LRT Design Option 2	LRT Design Option 3	LRT Design Option 4	LRT Design Option 5	LRT Design Option 6	
Growth Inducing	No Adverse Effect <ul style="list-style-type: none"> No Adverse Effect except air quality Decrease in VMT enhances traffic circulation Displacement and relocation Division of Hyde Park Community Increase in green house gases Decrease in energy consumption 	No Adverse Effect <ul style="list-style-type: none"> No Adverse Effect except air quality Decrease in VMT enhances traffic circulation Displacement and relocation Division of Hyde Park Community Increase in green house gases Decrease in energy consumption 	No Adverse Effect <ul style="list-style-type: none"> No Adverse Effect except air quality Decrease in VMT enhances traffic circulation Displacement and relocation Division of Hyde Park Community Increase in green house gases Decrease in energy consumption 	No Adverse Effect <ul style="list-style-type: none"> No Adverse Effect except air quality Decrease in VMT enhances traffic circulation Displacement and relocation Division of Hyde Park Community Increase in green house gases Decrease in energy consumption 	No Adverse Effect <ul style="list-style-type: none"> No Adverse Effect except air quality Decrease in VMT enhances traffic circulation Displacement and relocation Division of Hyde Park Community Increase in green house gases Decrease in energy consumption 	No Adverse Effect <ul style="list-style-type: none"> No Adverse Effect except air quality Decrease in VMT enhances traffic circulation Displacement and relocation Division of Hyde Park Community Increase in green house gases Decrease in energy consumption 	
Cumulative Impacts	No Adverse Effect <ul style="list-style-type: none"> No Adverse Effect except air quality Decrease in VMT enhances traffic circulation Displacement and relocation Division of Hyde Park Community Increase in green house gases Decrease in energy consumption 	No Adverse Effect <ul style="list-style-type: none"> No Adverse Effect except air quality Decrease in VMT enhances traffic circulation Displacement and relocation Division of Hyde Park Community Increase in green house gases Decrease in energy consumption 	No Adverse Effect <ul style="list-style-type: none"> No Adverse Effect except air quality Decrease in VMT enhances traffic circulation Displacement and relocation Division of Hyde Park Community Increase in green house gases Decrease in energy consumption 	No Adverse Effect <ul style="list-style-type: none"> No Adverse Effect except air quality Decrease in VMT enhances traffic circulation Displacement and relocation Division of Hyde Park Community Increase in green house gases Decrease in energy consumption 	No Adverse Effect <ul style="list-style-type: none"> No Adverse Effect except air quality Decrease in VMT enhances traffic circulation Displacement and relocation Division of Hyde Park Community Increase in green house gases Decrease in energy consumption 	No Adverse Effect <ul style="list-style-type: none"> No Adverse Effect except air quality Decrease in VMT enhances traffic circulation Displacement and relocation Division of Hyde Park Community Increase in green house gases Decrease in energy consumption 	No Adverse Effect <ul style="list-style-type: none"> No Adverse Effect except air quality Decrease in VMT enhances traffic circulation Displacement and relocation Division of Hyde Park Community Increase in green house gases Decrease in energy consumption
Environmental Justice	No Disproportionate Adverse Effects	No Disproportionate Adverse Effects	No Disproportionate Adverse Effects	No Disproportionate Adverse Effects	No Disproportionate Adverse Effects	No Disproportionate Adverse Effects	

Source: Parsons Brinckerhoff, 2009

Table 5-3. Summary of Impacts of Maintenance and Operations Facilities

Project Goal/Criteria/Measure	Maintenance and Operations Facility B	Maintenance and Operations Facility D
Description	Approximately 16.3 acres and bound by 83rd Street, Harbor Subdivision right-of-way, and Isis Avenue	Approximately 14.8 acres and in close proximity to the Metro Green Line and bound by the Harbor Subdivision, a Union Pacific Branch Line and Rosecrans Avenue
Environment		
Land Use and Development		
Regional Land Use	No Adverse Effect	No Adverse Effect
Local Land Use and Development	Consistent	Consistent
Division of Established Community	No Adverse Effect	No Adverse Effect
City of Los Angeles Transportation Policy	Consistent	Consistent
City of Los Angeles General Plan, - Transportation and Land Use Elements	Consistent	Consistent
County of Los Angeles General Plan	Consistent	Consistent
City of Inglewood General Plan	Consistent	Consistent
City of El Segundo General Plan	Consistent	Consistent
City of Hawthorne General Plan	Consistent	Consistent
City of Los Angeles Municipal Code RAS and Density Bonus Ordinance	Consistent	Consistent
West Adams, Baldwin Hills, Leimert Park, Westchester Playa Del Rey and Wilshire Community Plans	Consistent	Consistent
Crenshaw Corridor Specific Plan	Not Applicable	Not Applicable
Park Mile Specific Plan	Not Applicable	Not Applicable
CRA/LA, Mid-City Corridors and Crenshaw and Crenshaw/Slauson Corridors Redevelopment Projects	Consistent	Consistent
LAX Master Plan	Not Applicable	Not Applicable
Displacements	<ul style="list-style-type: none"> ▪ 8 partial parcels ▪ 9 full parcels 	<ul style="list-style-type: none"> ▪ 10 partial parcels ▪ 3 full parcel
Community Cohesion	No Adverse Effect	No Adverse Effect
Visual Quality	No Adverse Effect	No Adverse Effect
Air Quality	Adverse Effect, no mitigation feasible	Adverse Effect, no mitigation feasible
Noise and Vibration	No Adverse Effect	No Adverse Effect
Ecosystems and Biological Resources	No Adverse Effect	<ul style="list-style-type: none"> ▪ No Adverse effect with mitigation. ▪ Native trees and vegetation removed



Table 5-3. Summary of Impacts of Maintenance and Operations Facilities (continued)

Project Goal/Criteria/Measure	Maintenance and Operations Facility B	Maintenance and Operations Facility D
Geotechnical	No Adverse Effect with mitigation	No Adverse Effect with mitigation
Water	No Adverse Effect	No Adverse Effect
Historic, Archaeological, Paleontological	Potential Adverse Effect to Kaiser Homes' production plant from a partial take	No Adverse Effect
Parklands and Community Facilities	No Adverse Effect	No Adverse Effect
Economic	No Adverse Effect, 17 industrial/commercial structures displaced and \$113,500 property tax loss	No Adverse Effect, \$72,100 property tax loss
Safety and Security	No Adverse Effect	No Adverse Effect
Construction	No Adverse Effect with mitigation	No Adverse Effect with mitigation
Growth Inducing	No Adverse Effect	No Adverse Effect
Cumulative Impacts	No Adverse Effect	No Adverse Effect
Environmental Justice	No Adverse Effect	No Adverse Effect

Source: Parsons Brinckerhoff, 2009

5.3 Cost and Financial Analysis

The cost of a transportation investment consists of capital costs, and operating and maintenance (O&M) costs. Capital costs are the start-up costs for the project, including the costs of guideway construction, vehicles, and any system facilities necessary before the project can begin operation. Operating and maintenance costs are the costs associated with the regular running of a new transportation facility. Costs such as labor, vehicle maintenance, and overall facility maintenance all fall into this category of operating and maintenance costs.

This section discusses both types of costs, presents the proposed capital financing plan, and then analyzes Metro's ability to finance the build alternatives.

5.3.1 Capital Costs

This section summarizes the capital cost estimates for the TSM Alternative, the BRT Alternative, and the Base LRT Alternative and the six LRT Alternative design options. The No-Build Alternative does not have any associated capital costs for comparative purposes as they are considered in the overall financial capability of Metro along with the other alternatives under consideration. The capital cost methodology and capital cost estimates are found in the Final Capital Cost Report (Parsons Brinckerhoff, March 23, 2009).

The capital cost estimates were prepared with all costs expressed in 2008 dollars and were based on the cost methodology presented in the *Final Capital Cost Report* and the conceptual engineering plan set. The methodology used is consistent with Federal

Transit Administration (FTA) guidelines for estimating capital costs. The basis of the FTA guidance is the Standard Cost Category (SCC), which enables all potentially FTA-funded projects to develop cost estimates that summarize into the Standard Cost Categories identified by FTA.

Table 5-4 presents the total capital costs (in thousands of 2008 dollars and year of expenditure dollars) for the TSM Alternative, BRT Alternative, and the Base LRT Alternative. Table 5-5 presents the total capital costs (in thousands of 2008 dollars and year of expenditure dollars) for the six LRT Alternative Design Options discussed in Chapter 2, along with a LRT cost estimate for the alternative which incorporates all six design options. The TSM Alternative capital cost is estimated at \$25.4 million, the BRT Alternative at \$554 million, and the LRT Alternatives range from \$1.306 billion to \$1.767 billion in 2008 dollars. The year of expenditure cost is \$30 million for the TSM Alternative, \$648 million for the BRT Alternative, and the LRT Alternatives ranges from \$1.525 billion to \$2.065 billion.

5.3.2 Operating and Maintenance Costs

This section summarizes the O&M cost estimates for the No Build, TSM, BRT, and Base LRT Alternatives. The O&M costs were estimated using a resource cost build-up model based on the current Metro heavy rail transit (HRT), LRT, BRT, and bus operating costs and the incremental bus costs for the other municipal bus systems in the study area (Santa Monica, Culver City, Los Angeles Department of Transportation (LADOT) and Torrance). The operating and maintenance cost methodology and cost estimates are found in the *Final Operating and Maintenance Cost Estimate Report* (PB March 26, 2009).

**Table 5-4. Capital Cost Estimates – TSM, BRT, and Base LRT Alternatives
 (Thousands 2008 Dollars)**

SCC Code	Cost Categories	TSM	BRT Alternative	Base LRT Alternative
10	Guideway and Track Elements		107,758	339,718
20	Stations, Stops, Terminals, Intermodal	375	76,500	139,500
30	Support Facilities: Yards, Shops, Administrative Buildings	1,250	32,650	55,625
40	Sitework and Special Conditions		76,175	139,314
50	Systems	5,590	30,127	69,704
	Construction Subtotal	7,215	323,210	743,861
60	Right-of-Way, Land, Existing Improvements	-	56,160	109,793
70	Vehicles	13,499	26,028	87,780
80	Professional Services	2,381	98,579	245,474
90	Unallocated Contingency	2,309	50,398	118,691
100	Finance Charges	-	-	-
	Total Cost (2008) Dollars (\$1,000)	25,404	554,375	1,305,598
	Year of Expenditure Cost	30,000	647,649	1,525,266
	Total Length in Miles		11.3	8.5

Source: Parsons Brinckerhoff, 2009



Table 5-5. Capital Cost Estimates – LRT Alternative Design Options (Thousands 2008 Dollars)

SCC Code	Cost Categories	Base LRT + LRT Design Option 1	Base LRT + LRT Design Option 2	Base LRT + LRT Design Option 3	Base LRT + LRT Design Option 4	Base LRT + LRT Design Option 5	Base LRT + LRT Design Option 6	Base LRT + LRT Design Options inclusive 1 thru 6
10	Guideway and Track Elements	339,718	349,841	346,768	357,715	339,718	400,031	435,201
20	Stations, Stops, Terminals, Intermodal	146,500	139,500	139,500	139,500	235,500	229,875	335,625
30	Support Facilities: Yards, Shops, Administrative Buildings	55,625	55,625	55,625	55,625	55,625	55,625	55,625
40	Sitework and Special Conditions	140,014	140,327	140,007	140,908	148,958	154,129	167,862
50	Systems	69,704	69,704	69,704	69,704	70,141	69,704	68,304
	Construction Cost Subtotal	751,561	754,996	751,603	763,451	849,942	909,363	1,062,616
60	Right-of-Way, Land, Existing Improvements	109,793	109,793	111,540	109,793	109,793	104,034	105,690
70	Vehicles	87,780	87,780	87,780	87,780	87,780	87,780	87,780
80	Professional Services	248,015	249,149	248,029	251,939	280,481	300,090	350,663
90	Unallocated Contingency	119,715	120,172	119,895	121,296	132,800	140,127	160,675
100	Finance Charges	-	-	-	-	-	-	-
	Total Cost (2008) Dollars (\$1,000)	1,316,863	1,321,889	1,318,848	1,334,259	1,460,795	1,541,394	1,767,424
	Net Incremental Cost of Design Option	11,265	16,291	13,250	28,661	155,197	235,796	461,826
	Year of Expenditure Cost	1,538,426	1,544,298	1,540,745	1,558,749	1,706,575	1,800,735	2,064,794

Source: Parsons Brinckerhoff, 2009

Table 5-6 presents the annual O&M costs for each alternative and option in 2008 dollars based on the proposed operations in 2030. The table also shows the incremental O&M costs for each alternative compared to the No Build and TSM Alternatives.

The LRT Alternatives have the greatest change in O&M compared to the No Build and TSM Alternatives. The LRT Alternatives will cost an additional \$45 million to \$55 million annually to operate and maintain over the No Build condition. The BRT Alternative will cost an additional \$20 million annually.

5.3.3 Financial Analysis

This section summarizes the conceptual capital and operating financial plans for the alternatives under consideration. A general description of the proposed revenue sources, commitment of these sources, and the identification of any shortfalls is provided.

The conceptually proposed funding sources include the following:

- Federal:
 - ▶ FTA Section 5309 Bus Discretionary
 - ▶ Congestion Mitigation and Air Quality (CMAQ)
- Local/State:
 - ▶ New Los Angeles County Transportation Sales Tax, Measure R
 - ▶ Los Angeles County Proposition A and Proposition C Countywide Transportation Sales Tax
 - ▶ Los Angeles County local cities and county contributions
 - ▶ Regional Improvement Program (RIP)

While not currently included in the funding proposal, other potential funding sources may include:

- Federal:
 - ▶ FTA Section 5307
 - ▶ FTA Section 5309 Fixed Guideway
 - ▶ Surface Transportation Program (STP)

The recently approved Los Angeles County Measure R program would be the primary capital funding source for the BRT and LRT Alternatives. Measure R is a half-cent sales tax for Los Angeles County that would finance new transportation projects and programs, and accelerate many of those already in the pipeline-everything from new rail and/or bus rapid transit projects, commuter rail improvements, Metro Rail system improvements, highway projects, improved countywide and local bus operations and local city sponsored transportation improvements. Measure R was approved by the voters in November 2008 and became law January 2, 2009 and with the tax took effect in July 2009. Table 5-7 provides the Outline of the Measure R Expenditure Categories for the 30 years, FY 2010-2039. Table 5-8 provides the Details of the Measure R Expenditure Plan for the 30 years, FY 2010-2039.



Table 5-6. Annual Operating and Maintenance Cost Estimates (Millions 2008 Dollars)

Provider	Mode	No Build	TSM – BRT	TSM - LRT	BRT	Base LRT	LRT Design Option 1	LRT Design Option 2	LRT Design Option 3	LRT Design Option 4	LRT Design Option 5	LRT Design Option 6	LRT Design Options 1 thru 6
Metro	HRT	114.2	114.2	114.2	114.2	114.2	114.2	114.2	114.2	114.2	114.2	114.2	114.2
Metro	LRT	242.7	242.7	242.7	242.7	284.9	284.9	285.0	285.1	285.2	285.3	285.5	294.6
Metro	Bus	1,227.2	1,238.3	1,234.6	1,246.8	1,228.7	1,228.7	1,228.7	1,228.7	1,228.7	1,228.7	1,228.7	1,228.7
Metro	Total	1,584.1	1,595.2	1,591.5	1,603.7	1,627.8	1,627.8	1,627.9	1,628.0	1,628.1	1,628.2	1,628.4	1,637.5
Santa Monica	Bus	75.7	75.7	75.7	75.3	75.7	75.7	75.7	75.7	75.7	75.7	75.7	75.7
Culver City	Bus	22.2	22.2	22.2	21.4	22.2	22.2	22.2	22.2	22.2	22.2	22.2	22.2
LADOT	Bus	61.2	61.2	61.2	61.2	61.2	61.2	61.2	61.2	61.2	61.2	61.2	61.2
Torrance	Bus	29.8	29.8	29.8	31.1	31.1	31.1	31.1	31.1	31.1	31.1	31.1	31.1
Others	Total	188.9	188.9	188.9	189.0	190.2	190.2	190.2	190.2	190.2	190.2	190.2	190.2
Total		1,773.0	1,784.1	1,780.4	1,792.7	1,818.0	1,818.0	1,818.1	1,818.2	1,818.3	1,818.4	1,818.6	1,827.7
Change from No Build		-	11.1	7.4	19.7	45.0	45.0	45.1	45.2	45.3	45.4	45.6	54.7
Change from TSM		-	-	-	8.6	37.6	37.6	37.7	37.8	37.9	38.0	38.2	47.3

Source: Parsons Brinckerhoff, 2009



**Table 5-7. Proposed One-Half Cent Sales Tax for Transportation
 Outline of Expenditure Categories
 Sunsets in 30 Years: Fiscal Year (FY) 2010-2039
 (millions)**

Subfund	Program	% of Sales Tax (net of administration)	First Year Amount	10-Year Amount	30-Year Amount
Transit Capital	New Rail and/or Bus Rapid Transit Capital Projects - project definition depends on final environmental review process	35%	\$241	\$2,930	\$13,790
Transit Capital	Metrolink Capital Improvement Projects within Los Angeles County (Operations, Maintenance, and Expansion)	3%	\$21	\$251	\$1,182
Transit Capital	Metro Rail Capital - System Improvements, Rail Yards, and Rail Cars	2%	\$14	\$167	\$788
Highway Capital	Carpool Lanes, Highways, Goods Movement, Grade Separations, and Soundwalls	20%	\$138	\$1,675	\$7,880
Operations	Rail Operations (New Transit Project Operations and Maintenance)	5%	\$34	\$419	\$1,970
Operations	Bus Operations (Countywide Bus Service Operations, Maintenance, and Expansion. Suspend a scheduled July 1, 2009 Metro fare increase for one year and freeze all Metro Student, Senior, Disabled, and Medicare fares through June 30, 2013 by instead using Metro's Formula Allocation Procedure share of this subfund.)	20%	\$138	\$1,675	\$7,880
Local Return	Major street resurfacing, rehabilitation and reconstruction; pothole repair; left turn signals; bikeways; pedestrian improvements; streetscapes; signal synchronization; and transit. (Local Return to the Incorporated Cities within Los Angeles County and to Los Angeles County for the Unincorporated Area of the County on a Per Capita Basis.)	15%	\$103	\$1,256	\$5,910
TOTAL PROGRAMS		100%	\$689	\$8,373	\$39,400
1.5% for Administration			\$11	\$127	\$600
GRAND TOTAL			\$700	\$8,500	\$40,000



Table 5-8. Proposed One-Half Cent Sales Tax for Transportation: Expenditure Plan

30 Years, Fiscal Year (FY) 2010 - 2039
As Adopted by the Los Angeles County Metropolitan Transportation Authority Board of Directors July 24, 2008
(\$ in millions)

for reference only - not priority order	Subfund	Potential Project in Alphabetical Order by Category (project definition depends on final environmental process)	Cost Estimate	New Sales Tax (Assembly Bill 2321)			Other Funds			Funds Available Beginning	Expected Completion
				Minimum	Additional	Total	Federal Funding	State Funding	Local Funding (Rail is 3% except as noted)		
1	Transit Capital Projects	<i>Transit Projects: New Rail and/or Bus Rapid Transit Capital Projects. Could include rail improvements or exclusive bus rapid transit improvements in designated corridors.</i>	Escalated \$								
2											
3		Eastside Light Rail Access (Gold Line)	\$30	\$-	\$30	\$-	\$-	\$-		FY 2010	FY 2013
4		Exposition Boulevard Light Rail Transit	\$1,632 ^a	\$-	\$925	\$-	\$353	\$354	FY 2010- 12	FY 2010- 12	FY 2013-15
5		Metro and Municipal Regional Clean Fuel Bus Capital Facilities and Rolling Stock (Metro's share to be used for clean fuel buses)	\$150	\$-	\$150	\$-	\$-	\$-		FY 2010	FY 2039
6		Regional Connector (links local rail lines)	\$1,320	\$-	\$160	\$-	\$708	\$266 ^b		FY 2014- 16	FY 2023-25
7		Current 2008 \$									
8		Crenshaw Transit Corridor - project acceleration	\$1,470	\$971.5	\$1,207	To be determined	\$263 ^c			FY 2010- 12	FY 2016-18



Table 5-8. Proposed One-Half Cent Sales Tax for Transportation: Expenditure Plan (continued)

for reference only - priority order	Subfund	Potential Project in Alphabetical Order by Category (project definition depends on final environmental process)	Cost Estimate	New Sales Tax (Assembly Bill 2321)			Other Funds			Funds Available Beginning	Expected Completion
				Minimum	Additional	Total	Federal Funding	State Funding	Local Funding (Rail is except as noted)		
9		Gold Line Eastside Extension	\$1,310	\$-	\$1,271	\$1,271			\$39	FY 2022- 24	FY 2033-35
10		Gold Line Foothill Light Rail Transit Extension	\$758	\$735	\$-	\$735			\$23	FY 2010- 12	FY 2015-17
11		Green Line Extension to Los Angeles International Airport	\$200	\$-	\$200	\$200			TBD ^d	FY 2010- 12	FY 2015-28 ^d
12		Green Line Extension: Redondo Beach Station to South Bay Corridor	\$280	\$-	\$272	\$272			\$8	FY 2028- 30	FY 2033-35
13		San Fernando Valley I-405 Corridor Connection (match to total project cost)	TBD	\$-	\$1,000	\$1,000			\$31	FY 2030- 32	FY 2038-39
14		San Fernando Valley North-South Rapidways (Canoga Corridor) - project acceleration	\$188	\$32 ^e	\$150	\$182			\$6	FY 2010- 12	FY 2014-16
15		San Fernando Valley East North-South Rapidways - project acceleration	\$70	\$68.5 ^e	\$-	\$68.5			\$2	FY 2013- 15	FY 2016-18
16		West Santa Ana Branch Corridor (match to total project cost)	TBD	\$-	\$240	\$240			\$7	FY 2015- 17*	FY 2025- 27*
17		Westside Subway Extension - to be opened in segments	\$4,200 ^f	\$900	\$3,174	\$4,074			\$126	FY 2013- 15	FY 2034-36



Table 5-8. Proposed One-Half Cent Sales Tax for Transportation: Expenditure Plan (continued)

For reference only - not priority order	Subfund	Potential Project in Alphabetical Order by Category (project definition depends on final environmental process)	Cost Estimate	New Sales Tax (Assembly Bill 2321)			Other Funds			Funds Available Beginning FY 2010	Expected Completion
				Minimum	Additional	Total	Federal Funding	State Funding	Local Funding (Rail is 3% except as noted)		
18		Capital Project Contingency (Transit)-Escalation Allowance for lines 8-17 to be based on year of construction	\$7,331	\$3,103	\$3,276	\$2,200	\$1,015	\$840 [*]	FY 2010	FY 2039	
19		Total New Rail and/or Bus Rapid Transit Capital Projects	\$18,939^h	\$10,381.5	\$13,790	\$2,908	\$1,554	\$1,965	FY 2010	FY 2039	
20	Highway Capital Projects	Highway Projects: Capital Projects-Carpool Lanes, Highways, Goods Movement, Grade Separations, and Soundwalls									
21			Escalated \$								
22			Alameda Corridor East Grade Separations Phase II	\$1,123	\$200	\$400	\$200	\$336	\$187 ⁱ	As funds become available	
23			BNSF Grade Separations in Gateway Cities	\$35	\$35	\$35	\$-	\$-	\$-	As funds become available	
24			Countywide Soundwall Construction (Metro regional list and Monterey Park/SR-60)	\$250	\$-	\$250	\$-	\$-	\$-	FY 2010	FY 2039
25			High Desert Corridor (environmental)	\$33	\$33	\$33	\$-	\$-	\$-	As funds become available	
26			Interstate 5 / St. Route 14 Capacity Enhancement	\$161	\$-	90.8	\$15	\$41	\$14 ^j	FY 2010	FY 2013-15
27		Interstate 5 Capacity Enhancement from I-605 to Orange County Line	\$1,240	\$-	\$264.8	\$78	\$834	\$63 ^j	FY 2010	FY 2016-17	



Table 5-8. Proposed One-Half Cent Sales Tax for Transportation: Expenditure Plan (continued)

For reference only - not priority order	Subfund	Potential Project in Alphabetical Order by Category (project definition depends on final environmental process)	Cost Estimate	New Sales Tax (Assembly Bill 2321)			Other Funds			Funds Available Beginning FY 2010	Expected Completion
				Minimum	Additional	Total	Federal Funding	State Funding	Local Funding (Rail is 3% except as noted)		
28		I-5 Capacity Enhancement from SR-134 to SR-170	\$610	\$-	\$271.5	\$50	\$264	\$24 ¹	FY 2010	FY 2013	
29		I-5 Carmelita Road Interchange Improvement	\$389	\$-	\$138	\$97	\$154	\$- ¹	FY 2010	FY 2015	
30			Current 2008 \$								
31		Highway Operational Improvements in Arroyo Verdugo subregion	\$170	\$170	\$170	To be determined			As funds become available		
32		Highway Operational Improvements in Las Virgenes/Malibu subregion	\$175	\$175	\$175						
33		Interstate 405, I-110, I-105, and SR-91 Ramp and Interchange Improvements (South Bay)	\$906	\$906	\$906						
34		Interstate 5 North Capacity Enhancements from SR-14 to Kern County Line (Truck Lanes)	\$2,800	\$410	\$410						
35		Interstate 605 Corridor "Hot Spot" Interchanges	\$2,410	\$590	\$590						
36		Interstate 710 North Gap Closure (tunnel)	\$3,730	\$780	\$780						
37		Interstate 710 South and/or Early Action Projects	\$5,460	\$590	\$590						



Table 5-8. Proposed One-Half Cent Sales Tax for Transportation: Expenditure Plan (continued)

for reference only - not priority order	Subfund	Potential Project in Alphabetical Order by Category (project definition depends on final environmental process)	Cost Estimate	New Sales Tax (Assembly Bill 2321)			Other Funds			Funds Available Beginning	Expected Completion
				Minimum	Additional	Total	Federal Funding	State Funding	Local Funding (Rail is 3% except as noted)		
38		State Route 138 Capacity Enhancements	\$270	\$-	\$200	\$200					
39		Capital Project Contingency (Highway)- Escalation Allowance for lines 31-38 to be based on year of construction	\$2,575	\$-	\$2,575.9	\$2,576					
40		Total Capital Projects Highway: Carpool Lanes, Highways, Goods Movements, Grade Separations, and Soundwalls	\$22,337	\$1,215.1	\$6,664.9	\$7,880	TBD	TBD	\$288	FY 2010	FY 2039



Table 5-8. Proposed One-Half Cent Sales Tax for Transportation: Expenditure Plan (continued)

for reference only - not priority order	Subfund	Operating and Capital Programs	Percent of New Sales Tax Net Revenues	New Sales Tax (Assembly Bill 2321)			Other Funds			Funds Available Beginning	Expected Completion
				Minimum	Additional	Total Escalated	Federal Funding	State Funding	Local Funding (Rail is 3% except as noted)		
41	Ops	Bus Operations (Countywide Bus Service Operations, Maintenance, and Expansion. Suspend a scheduled July 1, 2009 Metro fare increase for one year and freeze all Metro Student, Senior, Disabled, and Medicare fares through June 30, 2013 by instead using Metro's Formula Allocation Procedure share of this subfund.)	20%	\$-	\$7,880	\$7,880 ^k	Not Applicable			FY 2010	FY 2039
42	Ops	Rail Operations (New Transit Project Operations and Maintenance)	5%	\$-	\$1,970	\$1,970 ^k				FY 2010	FY 2039
43	Local Return	Major street resurfacing, rehabilitation and reconstruction; pothole repair; left turn signals; bikeways; pedestrian improvements; streetcapes; signal synchronization; and transit.	15% ¹	\$250	\$5,660	\$5,910 ^k				FY 2010	FY 2039
44	Tran. Cap.	Metro Rail Capital Projects - System Improvements, Rail Yards, and Rail Cars	2%	\$-	\$788	\$788 ^k				FY 2010	FY 2039



Table 5-8. Proposed One-Half Cent Sales Tax for Transportation: Expenditure Plan (continued)

Priority order only - not for reference	Subfund	Operating and Capital Programs	Percent of New Sales Tax Net Revenues	New Sales Tax (Assembly Bill 2321)			Other Funds			Funds Available Beginning FY 2010	Expected Completion FY 2039
				Minimum	Additional	Total Escalated	Federal Funding	State Funding	Local Funding (Rail is 3% except as noted)		
45	Tran. Cap.	MetroLink Capital Improvement Projects within Los Angeles County (Operations, Maintenance, and Expansion)	3%	\$70	\$1,112	\$1,182 ^k				FY 2010	FY 2039
46	Subtotal Transit and Highway Capital Projects		\$ 41,276	\$4,623.6	\$17,046	\$21,670	\$2,908	\$1,554	\$2,253	FY 2010	FY 2039
47	Subtotal page 4			\$320.0	\$17,410	\$17,730	Not Applicable				
48	1.5% for Administration		N/A	\$10	\$590	\$600				FY 2010	FY 2039
49	Total			\$4,953.6	\$35,046	\$40,000	\$2,908	\$1,554	\$2,253	FY 2010	FY 2039

Notes:

- The Exposition Blvd Light Rail Transit project includes the following funds: Prop 1B Transit Modernization funds (\$250 M), State Transportation Improvement Program funds (\$103 M), Metro Propositions A and C funds (\$354 M).
 - Systemwide ridership forecasts indicate need for a Regional Connector downtown. This expenditure plan assumes that Metro Long Range Transportation Plan funds freed-up from the Exposition Phase II project by passage of this sales tax will be redirected to the Regional Connector project by the Metro Board.
 - Local funding for the Crenshaw Transit Corridor assumes a 3% local contribution (\$44 M) and a Metro Long Range Transportation Plan contribution (\$219 M).
 - Local funding target and project schedule to be determined due to potential LAX contribution. First segment is included in the Greshaw project.
 - The San Fernando Valley North-South Rapidways minimum of \$100 M is divided between the East and Canoga segments.
 - Unescalated cost estimate to Westwood.
 - Assumes a 3% local contribution to the Escalation Allowance (\$225 M) and a Metro Long Range Transportation Plan contribution for project scheduling risk (\$615 M).
 - Total new rail and/or bus rapid transit capital projects cost estimate subject to change when cost estimates are developed for the San Fernando Valley I-405 Corridor Connection (line 13) and the West Santa Ana Branch Corridor (line 16).
 - The precise amounts of Federal and local funding for the Alameda Corridor East Grade Separations Phase II project are subject to change.
 - For projects funded from other sources on or before December 31, 2008, the funds freed-up by passage of this sales tax shall remain in the subregion in which the project is located for projects or programs of regional significance (per AB 2321).
 - Amounts are estimates. Actual amounts will be based on percentage of actual sales tax receipts net of administration.
 - Local Return to the incorporated cities within Los Angeles County and to Los Angeles County for the unincorporated area of the County on a per capita basis per annual California Department of Finance population data.
 - The total project cost estimate for the transit and highway capital projects of \$41.2 B includes \$12.9 B in as yet unidentified federal, state, local, and public-private partnership funds for highway projects.
- Legend: Ops = Operations; Tran. Cap. = Transit Capital; SR = State Route; I = Interstate
- * The West Santa Ana Branch matching funds would be accelerated by utilizing Long Range Transportation Plan resources freed-up by the use of new sales tax funds on the I-5 Capacity Enhancement from I-605 to Orange County Line project (line 27).

For consideration of the financial analysis of the alternatives, Table 5-9 provides a summary of year of expenditure capital costs and revenues for the alternatives under consideration. As identified in the table, Measure R and other capital funding sources are estimated to provide the following revenues in year of expenditure dollars for the Crenshaw Corridor Transit Project:

- \$1,267.4 million from Measure R
- \$600,000 from Proposition C
- \$51.5 million from local cities/County contribution assumed in Measure R
- \$328.7 million from RIP or additional Measure R
- \$5.5 million from FTA Section 5309 Bus Program
- \$106.1 from CMAQ
- \$1.6 million from federal earmarked funds in prior years

The above listed sources would provide a total of \$1,761.4 million in capital revenues. Based on the year of expenditure costs of the alternatives under consideration and the estimated revenues, Metro can fund all the alternatives except the LRT Alternative Design Option 6 and the combination of Design Options 1 through 6. The capital shortfall for these design options ranges from \$92 to \$356 million in year of expenditure dollars. Due to the national economic downturn and the State of California's move to completely eliminate State Transit Assistance funds for at four more years, very significant financial challenges emerge in securing funds for the identified shortfalls.

Table 5-10 provides a cash flow for the expected capital expenditures for the Crenshaw Transit Corridor for scenarios where the project cost fits within \$1,761.4 in year of expenditure dollars.

The proposed Metro LRTP provides sufficient funding through the existing local sources (Prop A/Prop C) and additional Measure R revenues to fund the operating and maintenance costs of any of the proposal alternatives assuming revenue service operation in 2018. Table 5-11 shows a summary of sources and uses of funds for the Operations and Maintenance of the Crenshaw Transit Corridor. All operations and maintenance needs are covered by projected revenues. Furthermore, there is sufficient capacity within projected revenue sources to support the operation of Metro's full program of transit services as identified in Measure R and the LRTP. Table 5-12 shows a summary of sources and uses of funds for the operation of Metro's rail system. This analysis demonstrates the ability for Metro to not only construct the identified projects in the LRTP, but to operate them through 2040.



Table 5-9. Year of Expenditure Capital Costs and Revenues (Millions of Dollars)

Cost and Revenue	LRT Crenshaw	Alternatives									
		TSM	BRT	Base LRT	LRT Opt 1	LRT Opt 2	LRT Opt 3	LRT Opt 4	LRT Opt 5	LRT Opt 6	LRT Opt 1 to 6
Capital Cost - Year of Expenditure		\$30.0	\$648.0	\$1,525.0	\$1,538.0	\$1,544.0	\$1,541.0	\$1,559.0	\$1,707.0	\$1,801.0	\$2,065.0
Interest				\$46.4	\$46.4	\$46.4	\$46.4	\$46.4	\$46.4	\$46.4	\$46.4
Total Capital Cost		\$30.0	\$648.0	\$1,571.4	\$1,584.4	\$1,590.4	\$1,587.4	\$1,605.4	\$1,753.4	\$1,847.4	\$2,111.4
Revenue Sources											
Measure R	\$1,267.4	\$30.0	\$648.0	\$1,267.4	\$1,267.4	\$1,267.4	\$1,267.4	\$1,267.4	\$1,267.4	\$1,267.4	\$1,267.4
Prop C 25%	\$0.6			\$0.6	\$0.6	\$0.6	\$0.6	\$0.6	\$0.6	\$0.6	\$0.6
Local County/Cities Contribution	\$51.5			\$51.5	\$51.5	\$51.5	\$51.5	\$51.5	\$51.5	\$51.5	\$51.5
Additional Measure R or Regional Improvement Program (State) (STIP), allocation to be determined	\$328.7			\$251.9	\$264.9	\$270.9	\$267.9	\$285.9	\$328.7	\$328.7	\$328.7
CMAQ	\$106.1								\$105.2	\$106.1	\$106.1
Federal Earmark (Prior Years)	\$1.6									\$1.6	\$1.6
Other Sources Needed for Shortfall										\$91.5	\$355.5
Total Revenues Needed	\$1,761.4	\$30.0	\$648.0	\$1,571.4	\$1,584.4	\$1,590.4	\$1,587.4	\$1,605.4	\$1,753.4	\$1,847.4	\$2,111.4

Source: Parsons Brinckerhoff, 2009



Table 5-10. Crenshaw Transit Corridor Capital Cash Flow (for Funding Available)

	Total FY 10-27	Expenditure / Revenue by Fiscal Year																		
		Prior Years	2009 2010	2010 2011	2011 2012	2012 2013	2013 2014	2014 2015	2015 2016	2016 2017	2017 2018	2018 2019	2019 2020	2020 2021	2021 2022	2022 2023	2023 2024	2024 2025	2025 2026	2026 2027
Total Capital Costs inflated	1,698.7		41.2	62.4	231.4	256.5	272.7	280.9	267.6	203.0	83.0									
Environmental/Planning	16.3	5.3	11.0																	
Subtotal	1,715.0	5.3	11.0	62.4	231.4	256.5	272.7	280.9	267.6	203.0	83.0	-	-	-	-	-	-	-	-	-
Net Bridge Loan Interest Payments	46.4					2.7	2.7	4.5	5.5	6.0	5.6	5.0	4.3	4.2	2.0	1.1	1.1	1.1	0.9	0.9
TOTAL COST including interest	1,761.4	5.3	11.0	62.4	231.4	259.2	275.4	285.4	273.1	209.1	88.6	5.0	4.3	4.2	2.0	1.1	1.1	1.1	0.9	0.9
Potential Funding																				
Local Agency Funds [3% of project costs]	51.5		1.2	1.9	7.5	7.7	8.2	8.4	8.0	6.1	2.5									
Measure R	1,267.4		8.1	37.8	223.9	174.6	66.6	133.6	174.3	174.8	81.9	21.8	7.7	58.1	25.1	1.7	4.6	1.5	10.7	
Proposition C 25%	0.6	0.6																		
Additional Measure R or RIP, Allocation TBD	328.7	0.5	2.2			21.47	125.2	78.1	42.3	39.9	19									
CMAQ	106.1						30.5	40.1	35.5											
Sect 5309 Bus/Bus Facilities (earmark)	5.5	2.6	2.9																	
Federal Other	1.6	1.6																		
Bridge Loan	0.0					55.5	44.9	25.2	13.1	(11.8)	(14.9)	(16.8)	(3.4)	(53.9)	(23.1)	(0.7)	(3.6)	(0.6)	(9.8)	
Total Potential Funding	1,761.4	5.3	11.0	62.4	231.4	259.2	275.4	285.4	273.1	209.1	88.6	5.0	4.3	4.2	2.0	1.1	1.1	1.1	0.9	0.9

Assumes a Revenue Operations Date (ROD) 6/30/2018

Source: Recommended Expenditure Plan dated July 23, 2009, subject to change pending adoption of a revised Expenditure Plan as part of Metro's LRTP.



Table 5-11. Operations and Maintenance Cash Flow for the Crenshaw Transit Corridor

Crenshaw LRT Operations Funding (\$ in millions YOY)	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
	Total	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
New Rail Service Costs																							
Crenshaw	1,026.2	38.6	39.5	40.1	40.8	41.4	42.2	42.6	43.2	43.9	44.9	45.6	46.4	47.3	48.4	49.1	50.0	51.0	52.2	53.0	54.1	55.2	56.4
Crenshaw Security	225.7	8.5	8.7	8.8	9.0	9.1	9.3	9.4	9.5	9.7	9.9	10.0	10.2	10.4	10.6	10.8	11.0	11.2	11.5	11.7	11.9	12.1	12.4
Total Crenshaw Operations Costs	1,251.9	47.1	48.2	48.9	49.8	50.6	51.5	52.0	52.8	53.6	54.8	55.6	56.7	57.7	59.0	61.0	62.2	63.7	64.7	66.0	67.3	68.8	
CMAQ Funding Assumed																							
Crenshaw CMAQ Funding Assumed	66.2	21.6	22.1	22.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other Funding Assumed																							
Fares	346.3	11.6	11.9	12.3	12.5	13.0	13.1	13.9	14.1	14.9	15.1	15.7	15.9	16.4	16.6	17.2	17.4	18.1	18.3	19.0	19.3	19.9	20.1
Measure R Rail Operations (5%)	164.4	3.1	3.1	3.2	7.0	7.1	7.2	7.3	7.4	7.5	7.7	7.8	7.9	8.1	8.3	8.4	8.5	8.7	8.9	9.1	9.2	9.4	9.6
Proposition A35%	212.7	4.3	4.4	4.5	9.0	9.1	9.3	9.4	9.5	9.7	9.9	10.0	10.2	10.4	10.6	10.8	11.0	11.2	11.5	11.7	11.9	12.1	12.4
Proposition C5%	35.6	0.8	0.8	0.8	1.5	1.5	1.5	1.6	1.6	1.6	1.6	1.7	1.7	1.7	1.8	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.1
Proposition C40%	186.3	3.0	3.0	3.1	8.0	8.1	8.2	8.3	8.4	8.6	8.8	8.9	9.1	9.2	9.4	9.6	9.8	10.0	10.2	10.4	10.6	10.8	11.0
STA - Population Share	117.0	2.0	2.1	2.1	5.0	5.1	5.1	5.2	5.3	5.4	5.5	5.6	5.7	5.8	5.9	6.0	6.1	6.2	6.4	6.5	6.6	6.7	6.9
Section 5309	123.5	0.8	0.8	0.5	6.9	6.8	7.0	6.3	6.5	6.0	6.3	6.0	6.2	6.1	6.4	6.1	6.4	6.2	6.5	6.2	6.5	6.4	6.7
Total Funding	1,251.9	47.1	48.2	48.9	49.8	50.6	51.5	52.0	52.8	53.6	54.8	55.6	56.7	57.7	59.0	61.0	62.2	63.7	64.7	66.0	67.3	68.8	

Source: Recommended Expenditure Plan dated July 23, 2009, subject to change pending adoption of a revised Expenditure Plan as part of Metro's LRTP.



Table 5-12. Operations and Maintenance Cash Flow for the Metro Rail System

		2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
		2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
		(\$ in millions YOY)															
SOURCES OF FUNDS																	
Local																	
1	Fares - Red/Purple Lines	29.0	34.9	35.3	40.7	41.2	44.1	44.6	46.6	47.2	49.3	55.0	57.1	57.9	60.0	60.8	64.6
2	Fares - Blue Line (including Expo & Reg'l Conn.)	16.5	28.5	29.3	33.8	34.2	36.6	43.7	45.5	46.1	48.2	48.8	50.8	51.4	53.3	54.0	57.4
3	Fares - Green Line	7.2	8.7	8.8	10.1	10.3	11.0	11.1	11.6	11.8	12.3	12.4	13.0	13.1	13.6	13.8	14.6
4	Fares - Gold Line (including Eastside & Foothill)	8.0	8.7	8.9	10.2	10.3	11.0	11.2	11.7	19.0	19.6	19.9	20.7	20.9	21.7	22.0	23.4
5	Fares - Crenshaw Line	-	-	-	-	-	-	-	-	-	14.1	14.5	15.0	15.2	15.8	16.0	17.0
6	Fares - West Santa Ana Line	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	Proposition A 35%	21.7	24.1	26.2	29.7	31.3	28.4	28.8	34.2	51.8	63.0	70.7	73.8	81.8	143.9	140.1	101.1
9	Proposition C 5 % (Security)	-	-	-	-	1.6	2.9	4.2	5.3	6.4	7.6	8.8	10.1	11.6	13.1	14.7	16.1
10	Proposition C 40 % (Discretionary)	87.1	46.4	54.0	43.4	0.1	58.7	88.1	48.3	57.2	60.7	67.3	107.8	102.5	38.2	28.4	56.9
11	TDA Article 4	-	35.0	30.0	40.0	65.0	-	-	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
13	Other (Advertising, General, Misc)	1.6	1.6	1.7	1.7	1.8	1.8	1.8	1.9	1.9	1.9	2.0	2.0	2.0	2.1	2.1	2.1
14	Measure R Sales Tax	21.9	31.6	33.2	35.5	38.3	40.6	42.9	45.0	47.1	49.3	51.6	54.0	56.5	59.0	61.5	63.8
15	Subtotal Local	193.1	219.5	227.4	245.1	233.9	235.1	276.5	260.1	298.4	336.2	360.9	414.2	423.0	430.8	423.3	427.0
State																	
16	STA - Population Share	-	-	-	-	41.7	42.6	43.5	44.4	45.3	46.3	47.3	48.3	49.3	50.3	51.4	52.4
18	Subtotal State	-	-	-	-	41.7	42.6	43.5	44.4	45.3	46.3	47.3	48.3	49.3	50.3	51.4	52.4
Federal																	
20	Section 5309 Fixed Guideway Modernization	37.9	40.3	40.9	41.4	42.0	42.6	43.2	43.8	17.8	39.8	35.9	24.7	23.5	32.7	48.3	48.9
21	Section 5340 Growing States and High Density	6.4	6.5	6.6	6.7	6.8	6.9	7.0	7.1	7.2	7.3	7.4	7.5	7.6	7.7	7.8	7.9
22	Homeland Security Grants	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23	CMAQ (Gold/Expo/Crenshaw/New Lines Operations)	9.1	28.9	29.2	18.6	-	-	-	-	26.3	26.8	37.0	9.7	9.8	-	-	-
24	Subtotal Federal	53.4	75.7	76.7	66.8	48.8	49.5	50.2	50.9	51.3	73.9	80.3	41.9	41.0	40.5	56.1	56.9
25	TOTAL SOURCES	246.5	295.3	304.1	311.9	324.5	327.2	370.2	355.4	395.1	456.4	488.5	504.4	513.2	521.6	530.7	536.4



Table 5-12. Operations and Maintenance Cash Flow for the Metro Rail System (continued)

		2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	
		2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	
		(\$ in millions)																
26	USES OF FUNDS																	
27	Red/Purple Line	72.0	67.0	68.8	70.6	72.7	75.9	78.0	78.4	80.0	81.6	83.4	91.3	92.9	94.4	96.1	97.1	
28	Subway Extension Segments 1, 2, and 3	-	-	-	-	-	-	-	-	-	-	17.0	17.3	17.6	17.9	18.2	18.4	
29	Blue Line	71.8	71.9	74.5	76.8	80.6	80.0	85.7	78.9	80.5	85.2	87.1	88.5	90.0	91.5	93.0	94.1	
30	Green Line	25.8	25.8	26.6	27.2	28.6	28.3	29.5	28.0	28.5	31.2	31.9	32.4	32.9	33.5	34.0	34.4	
31	Gold Line - Pasadena (including Foothill)	23.0	24.5	25.1	25.8	27.2	26.9	27.9	25.2	49.5	50.5	51.7	52.4	53.3	54.2	55.2	55.8	
32	Gold Line - Eastside Extension	15.4	15.3	15.7	16.2	17.0	16.9	17.5	15.8	16.1	16.5	16.9	17.1	17.4	17.7	18.0	18.2	
33	Blue Line - Exposition Phase I	-	33.5	34.2	35.2	37.0	36.7	37.9	36.0	36.7	37.4	38.3	38.9	39.6	40.2	40.9	41.3	
34	Blue Line - Exposition Phase II	-	-	-	-	-	-	24.8	22.8	23.2	23.7	24.2	24.6	25.0	25.4	25.9	26.2	
35	Crenshaw Line	-	-	-	-	-	-	-	-	-	47.1	48.2	48.9	49.8	50.6	51.5	52.0	
36	West Santa Ana Line	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
37	Regional Connector	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
38	Rail Security - Red Line	18.6	19.0	19.6	19.9	20.3	20.7	21.2	21.5	21.9	22.4	27.6	29.8	30.3	30.8	31.3	31.7	
39	Rail Security - Blue Line incl. Expo/Reg'l Conn.	12.2	18.4	19.0	19.4	19.7	20.1	25.4	26.0	26.5	27.6	28.2	28.7	29.2	29.7	30.2	30.5	
40	Rail Security - Green Line	6.5	6.6	6.9	6.9	7.1	7.2	7.4	7.8	8.0	8.7	8.9	9.1	9.2	9.4	9.5	9.6	
41	Rail Security - Gold Line including Eastside	12.5	13.4	13.7	13.9	14.2	14.5	14.9	15.1	24.1	24.6	25.2	25.5	26.0	26.4	26.9	27.2	
42	Rail Security - Crenshaw Line	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
43	Rail Security - West Santa Ana Line	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
44	Red Line special anti-terrorism activities	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
45	Subtotal Metro	257.7	295.4	304.1	311.9	324.5	327.2	370.2	355.4	395.1	456.4	488.5	504.4	513.2	521.6	530.7	536.4	
	TOTAL USES	257.7	295.4	304.1	311.9	324.5	327.2	370.2	355.4	395.1	456.4	488.5	504.4	513.2	521.6	530.7	536.4	
	CASH BALANCE																	
	Beginning Fiscal Year Cash Balance	11.4	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Annual Net Change to Cash Balance	(11.3)	(0.1)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Ending Fiscal Year Cash Balance	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	



Table 5-12. Operations and Maintenance Cash Flow for the Metro Rail System (continued)

		2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
		2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	
		(\$ in millions)															
SOURCES OF FUNDS																	
Local																	
1	Fares - Red/Purple Lines	65.4	75.4	76.4	79.6	80.6	83.3	84.3	87.4	88.5	91.8	92.9	100.5	101.8	105.1	106.4	
2	Fares - Blue Line (including Expo & Reg'l Comm.)	61.9	65.1	65.9	68.7	69.6	71.8	72.7	75.4	76.3	79.2	80.2	83.2	84.2	87.0	88.1	
3	Fares - Green Line	14.8	15.6	15.8	17.8	18.0	18.6	18.8	19.5	19.7	20.5	25.1	25.9	26.2	27.1	27.4	
4	Fares - Gold Line (including Eastside & Foothill)	23.7	25.0	25.3	26.3	26.7	27.5	27.9	28.9	29.3	30.4	38.5	39.8	40.3	41.6	42.1	
5	Fares - Crenshaw Line	17.2	18.1	18.4	19.1	19.4	20.0	20.3	21.0	21.3	22.1	22.3	23.2	23.5	24.2	24.5	
6	Fares - West Santa Ana Line	-	(2.3)	8.4	8.5	8.6	8.9	9.0	9.3	9.4	9.8	9.9	10.3	10.4	10.7	10.9	
8	Proposition A 35%	137.7	133.1	177.8	143.2	177.7	118.9	122.2	106.1	101.9	106.8	103.4	170.5	124.6	127.3	125.1	
9	Proposition C 5 % (Security)	17.5	18.8	20.2	21.5	22.8	24.1	25.4	26.7	28.1	29.5	30.9	32.5	34.1	35.6	37.2	
10	Proposition C 40 % (Discretionary)	24.5	43.7	12.7	53.9	3.9	77.6	86.9	125.7	134.4	128.3	158.6	93.6	145.6	166.4	289.2	
11	TDA Article 4	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	
13	Other (Advertising, General, Misc)	2.2	2.2	2.2	2.3	2.3	2.4	2.4	2.5	2.5	2.6	2.6	2.7	2.7	2.8	2.8	
14	Measure R Sales Tax	66.2	68.5	71.0	73.4	76.0	78.4	80.9	83.4	86.1	88.7	91.6	94.5	97.6	100.5	-	
15	Subtotal Local	441.0	473.2	503.9	524.4	515.5	541.6	560.7	595.8	607.5	619.5	666.0	686.6	700.9	738.4	763.8	
State																	
16	STA - Population Share	53.5	54.7	55.8	57.0	58.2	59.4	60.7	61.9	63.2	64.6	65.9	67.3	68.7	70.2	71.6	
18	Subtotal State	53.5	54.7	55.8	57.0	58.2	59.4	60.7	61.9	63.2	64.6	65.9	67.3	68.7	70.2	71.6	
Federal																	
20	Section 5309 Fixed Guideway Modernization	49.6	50.3	51.0	51.7	52.5	53.2	54.0	54.7	55.5	56.2	57.0	57.8	58.6	59.5	60.3	
21	Section 5340 Growing States and High Density	8.0	8.2	8.3	8.4	8.5	8.6	8.7	8.9	9.0	9.1	9.2	9.4	9.5	9.6	9.8	
22	Homeland Security Grants	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
23	CMAQ (Gold/Expo/Crenshaw/New Lines Operations)	7.1	19.2	35.2	28.3	47.8	32.3	26.4	-	-	-	22.6	30.6	31.2	8.0	-	
24	Subtotal Federal	64.8	77.7	94.5	88.4	108.8	94.2	89.1	63.6	64.5	65.4	88.8	97.8	99.4	77.1	70.1	
25	TOTAL SOURCES	559.3	605.6	654.3	669.8	682.5	695.1	710.4	721.3	735.2	749.5	820.8	851.8	869.0	885.7	905.5	



Table 5-12. Operations and Maintenance Cash Flow for the Metro Rail System (continued)

	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	
USES OF FUNDS																
26																
27		98.5	107.9	110.2	111.9	114.1	116.2	118.7	120.5	122.9	125.2	128.1	130.3	132.9	135.5	138.4
28		18.7	40.4	41.3	41.9	42.7	43.5	44.5	45.2	46.0	46.9	48.0	62.5	63.8	65.0	66.4
29		95.4	97.0	99.0	100.6	102.5	104.4	106.6	108.3	110.4	112.5	115.1	117.1	119.4	121.7	124.4
30		34.9	35.5	36.2	41.0	41.8	42.6	43.5	44.2	45.0	45.9	61.3	62.4	63.6	64.9	66.3
31		56.6	57.5	58.8	59.6	60.8	61.9	63.3	64.2	65.4	66.7	68.3	69.4	70.8	72.2	73.8
32		18.4	18.7	19.2	19.4	19.8	20.2	20.7	20.9	21.3	21.7	48.2	48.9	49.9	50.8	52.1
33		41.9	42.6	43.5	44.2	45.1	45.9	46.9	47.6	48.5	49.5	50.6	51.5	52.5	53.5	54.7
34		26.5	27.0	27.6	28.0	28.5	29.0	29.7	30.1	30.7	31.3	32.1	32.6	33.2	33.9	34.6
35		52.8	53.6	54.8	55.6	56.7	57.7	47.1	47.8	48.7	49.6	50.8	51.6	52.7	53.7	54.9
36		-	(7.8)	27.8	28.2	28.8	29.3	30.0	30.4	31.0	31.6	32.4	32.8	33.5	34.2	35.0
37		12.6	12.8	13.1	13.3	13.6	13.8	14.1	14.3	14.6	14.9	15.2	15.5	15.8	16.1	16.5
38		32.2	40.7	41.5	42.2	43.0	43.8	44.8	45.5	46.3	47.2	48.3	52.9	54.0	55.0	56.2
39		33.3	33.9	34.6	35.1	35.8	36.5	37.2	37.8	38.6	39.3	40.2	40.9	41.7	42.5	43.5
40		9.8	9.9	10.1	11.5	11.7	11.9	12.2	12.3	12.6	12.8	17.1	17.4	17.8	18.1	18.5
41		27.6	28.0	28.7	29.1	29.6	30.2	30.9	31.3	31.9	32.5	42.8	43.5	44.4	45.2	46.3
42		-	-	-	-	-	-	11.9	12.1	12.4	12.6	12.8	13.1	13.4	13.6	13.9
43		-	7.8	7.9	8.1	8.2	8.4	8.6	8.7	8.9	9.1	9.2	9.4	9.6	9.8	10.0
44																
45		559.3	605.6	654.3	669.8	682.5	695.1	710.4	721.3	735.2	749.5	820.8	851.8	869.0	885.7	905.5
	TOTAL USES	559.3	605.6	654.3	669.8	682.5	695.1	710.4	721.3	735.2	749.5	820.8	851.8	869.0	885.7	905.5
CASH BALANCE																
	Beginning Fiscal Year Cash Balance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Annual Net Change to Cash Balance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Ending Fiscal Year Cash Balance	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

NOTES:

1. Transit Corridor Revenue Operation Dates: Eastside - 7/09, Expo Ph.I - 7/10, Expo Ph.II - 6/15, Gold Fthl - 6/17; Crenshaw Ph.I - 6/18, Reg'l Conn - 6/26, Sub Ext Seg I - 6/19, West Santa Ana - 6/27, Sub Ext Seg 2 - 6/26, Sub Ext Seg 3 - 6/36; Green So Bay - 6/35, Gold East Ext - 6/35

Source: Recommended Expenditure Plan dated July 23, 2009, subject to change pending adoption of a revised Expenditure Plan as part of Metro's LRTP.

5.4 FTA New Starts Evaluation

The Section 5309 New Starts Program is the federal government’s primary program for providing financial support to locally-planned, implemented, and operated fixed-guideway transit major capital investments. The New Starts evaluation process is used in conjunction with the evaluation process under National Environmental Protection Act (NEPA), for which this Alternatives Analysis (AA)/Draft EIS/EIR was prepared. If FTA Section 5309 funds are used as a funding source, the proposed project will be subject to the FTA New Starts evaluation and rating process when Metro requests approval to begin the preliminary engineering (PE) phase of project development. This section describes how FTA evaluates projects for its New Starts funding recommendations.

Each year FTA submits its Annual Report on New Starts to Congress as a companion document to the agency’s annual budget submitted by the President (FTA, 2006). The report provides recommendations for allocation of New Starts funds under Section 5309 of Title 49 of the United States Code. The Transportation Equity Act for the 21st Century (TEA-21) requires that FTA use the following project justification criteria to evaluate New Starts projects: mobility improvements; environmental benefits; cost effectiveness; operating efficiencies; transit-supportive existing land use, policies and future patterns; and other factors. FTA must also consider the local financial commitment for the proposed project. Collectively, the criteria are intended to measure the overall merits of the project and the sponsor’s ability to build and operate the proposed project.

FTA reviews the project justification and local financial commitment criteria for candidate projects and assigns a rating for each criterion. A candidate project is given an overall rating of “High”, “Medium-High”, “Medium”, “Medium-Low” or “Low”, based on ratings assigned by FTA to each of the project justification and local financial commitment criteria identified above. These ratings are important, as FTA considers them in its decision to recommend projects for New Starts funding. Specifically, FTA will not recommend funding for projects that are rated “Medium-Low” or “Low.” However, a “High”, “Medium-High” or “Medium” rating does not automatically guarantee a funding recommendation.

The current draft of the Metro LRTP financial element does not show New Starts funding for the Crenshaw Transit Corridor Project. However, other types of federal funds are a key component of the project’s financial plan. As such, factors affecting the New Starts project justification ratings for both the BRT Alternative and the LRT Alternative are presented at a very general level in Table 5-13.

5.5 Comparative Analysis of the Alternatives

This section presents the results of the comparative analysis of the proposed alternatives across a variety of performance criteria typically used to assess transportation projects. The following criteria, as presented in Table 2-1 in Chapter 2.0, Alternatives Considered, were used to compare the performance of the alternatives.

- Regional Connectivity
- Environmental Effects



Table 5-13. New Starts Evaluation Ratings

Project Justification Criteria	Factors for Evaluation
Cost Effectiveness	<ul style="list-style-type: none"> ▪ Lower than Medium rating according to FTA guidance as applicable September 2009.
Transit Supportive Land Use	<ul style="list-style-type: none"> ▪ Moderate residential densities. ▪ Prominent activity centers along the corridor including Baldwin Hills / Crenshaw Plaza, Leimert Park commercial district, downtown Inglewood, Century Boulevard corridor, and Los Angeles International Airport ▪ Plans support clustering of development around potential station sites
Mobility Improvements	<ul style="list-style-type: none"> ▪ Improves service in a significantly transit-dependent corridor
Environmental Benefits	<ul style="list-style-type: none"> ▪ Supports pedestrian activity around station areas and transit accessibility to activity centers. Minor changes to regional VMT and emissions.
Operating Efficiencies	<ul style="list-style-type: none"> ▪ Connections to Expo Line and Metro Green Line enable more direct connections within the countywide rapid transit system. ▪ Ability to serve transit demand with lower fleet size and higher capacity service

Source: Metro, 2009

- Economic Development/Land Use
- Community Support
- Capital and Operating Costs
- Cost-Effectiveness
- Financial Capability
- Federal New Starts Funding Criteria
- Ridership
- Travel Time Savings

5.5.1 Regional Connectivity

Each of the alternatives, with the exception of the No-Build Alternative would increase regional connectivity and improve access to major activity centers and travel markets in West Los Angeles, Hollywood and Downtown Los Angeles. However, the TSM Alternative would not provide a connection from the airport to other mass transportation facilities, as would be provided under the BRT and LRT Alternatives.

5.5.2 Environmental Effects

The No-Build and TSM Alternatives would not include construction activity, as a result, they would not have impacts related to displacement (no property acquisition or relocation would be necessary), or construction air quality. Both the BRT and LRT Alternatives would require mitigation for temporary construction impacts and would

result in adverse construction air quality impacts. The LRT Alternative would also have an adverse air quality impact due to exceedance of the Federal NO_x threshold, and while it would result in a reduction in Greenhouse Gases when compared to the No-Build, the decrease would be less than the project Greenhouse Gas decrease under the BRT Alternative and generally similar to that under the TSM Alternative.

All alternatives would result in increased visual impacts. The TSM and No-Build Alternatives would result in impacts as the result of increased congestion, while the BRT Alternative would remove vegetation and result in new sources of light or glare, the LRT Alternative would remove landscaping, add elevated structures, and a fixed guideway with overhead wires and poles in the middle of Crenshaw Boulevard. The BRT and LRT Alternatives would also result in adverse effects to historic resources to the Century Lounge and Angelus Funeral Home, respectively. The TSM and No-Build Alternatives would not result in an adverse effect to a historic resource.

Each of the alternatives would have a disproportionate adverse environmental justice effect, for the TSM and No-Build Alternatives the effect would be related to transit equity and traffic congestion along Crenshaw Boulevard, while the BRT Alternative would result in a disproportionate adverse effect related to aesthetics and parklands adjacent to and along Edward Vincent Jr. Park. The LRT Alternative would have disproportionate impacts related to community cohesion and aesthetics in the Hyde Park area on Crenshaw Boulevard.

5.5.3 Economic Development and Land Use

The No-Build and TSM Alternatives would not be consistent with several existing land use policies encouraging transit-oriented uses. The No-Build Alternative in particular would limit future opportunities for development at stations. The TSM Alternative would be consistent with some local land use policies by enhancing transportation, but would not provide modal options, or increase opportunities for redevelopment.

The BRT Alternative would increase accessibility from public transit to Edward Vincent Jr. (from West Station), Leimert Park (from Vernon Station, and Grevillea Park (from La Brea Station) and improves public transit access to 51 community facilities and public services located within 0.25 mile. The LRT Alternative would also increased accessibility to Edward Vincent Jr. (from West Station), Leimert Park (from Vernon Station, and Grevillea Park (from La Brea Station) and would improves public transit access to 33 community facilities and public services located within 0.25 mile. The LRT Alternative would also result in 880 additional jobs and a \$73.2 million increase in economic output compared to 240 additional jobs and \$20.3 million increase in output under the BRT Alternative and 250 additional jobs and \$20.9 million increase in economic output. The No-Build Alternative would not result in an additional jobs or economic output.

Both the BRT Alternative and the LRT Alternative follow the same general alignment and the same land use policies apply to both alternatives. The response of developers to invest in station areas may be slightly higher for the LRT alternative.

**5.5.4 Community Support**

There were 365 comments received during the scoping period. The most frequent comment topics included alignments/routes, mode, public safety, traffic and parking, historic and cultural resources, connectivity, environmental justice and economic development.

- **Alignment/Route** - Many of the comments concerned potential connections to existing transit lines, particularly the Metro Red, Purple, Blue, and Green Lines, as well as the Exposition (Expo) Light Rail Transit (LRT) line (under construction). Recommendations were made to design new routes, such as an alignment from La Brea Avenue/Wilshire Boulevard with connections to Venice Boulevard/San Vicente Boulevard then south along Crenshaw Boulevard.
- **Mode** - Most remarks expressed support for LRT, as opposed to bus-based services. Stakeholders urged the consideration of grade separations (either below grade or at grade). There was concern that an at-grade alignment would degrade the aesthetics, culture, and history of portions of the Crenshaw Corridor, particularly in the Leimert Park area. Comments were received pertaining to the safety of LRT at crossings and the interaction of vehicular traffic with LRT. Some of the comments were in support of bus services because they were perceived as having less of a negative impact on the aesthetics and culture of the area. Some felt that buses were safer than light rail, would cause less disruption, would cost less, and could be implemented sooner.
- **Public Safety** - Stakeholders articulated concern over LRT with regard to its proximity to schools and the safe interaction between LRT and vehicular/pedestrian traffic, particularly at crossings.
- **Traffic and Parking** - Generally, the concerns regarded potential increases in congestion during construction and potentially during LRT/BRT operations.
- **Historic and Cultural Resources** - Preservation of the character, culture, and history of the Crenshaw Corridor were paramount. Stakeholders expressed a fear that the community would change, and that minority and small owned business could be impacted. Leimert Park Village and Hyde Park were areas mentioned frequently with regard to preservation.
- **Connectivity** - Participants expressed a desire for regional connectivity and efficiency, with a focused attention on connections to LAX, the Westside, Downtown Los Angeles, the South Bay and the Metro Red, Green, Blue, and Purple Lines.
- **Environmental Justice** - Community stakeholders wanted the same level of investment and consideration that more affluent communities would receive. Comments expressed that negative impacts should be mitigated to the extent possible and that the quality of life should be protected from degradation.
- **Economic Development** - A few comments referenced the potential for transit to allow for enhanced economic vitality. Others expressed concern for the perceived potential loss of existing businesses along Crenshaw Boulevard.

5.5.5 Capital and Operating Costs

The TSM Alternative capital cost is estimated at \$25.4 million, the BRT Alternative at \$554 million, and the LRT Alternatives range from \$1.306 billion to \$1.767 billion in 2008 dollars (see Table 5-7).

The LRT Alternatives have the greatest change in O&M compared to the No Build and TSM Alternatives. The LRT Alternatives will cost an additional \$45 million to \$55 million annually to operate and maintain over the No Build condition. The BRT Alternative will cost an additional \$20 million annually.

5.5.6 Cost Effectiveness

All of the alternatives were determined to rate less than the FTA Medium rating necessary to qualify for New Starts funding under FTA guidance in effect as of September 2009.

5.5.7 Financial Capability

The recently approved Los Angeles County Measure R program, approved by the voters in November 2008, would be the primary capital funding source for the BRT and LRT Alternatives. Measure R along and other sources of funds would provide a total of \$1,761.4 million in year of expenditure funds that could be used to finance the capital costs for the alternatives. The above listed sources would provide a total of \$1,761.4 million in capital revenues. Based on the year of expenditure costs of the alternatives under consideration and the estimated revenues, Metro can fund all the alternatives except the LRT Alternative Design Options 5 through 6. The capital shortfall for these design options ranges from \$92 to \$356 million in year of expenditure dollars (see Table 5-7). Due to the national economic downturn and the State of California's move to completely eliminate State Transit Assistance funds for at four more years, very significant financial challenges emerge in securing funds for the identified shortfalls.

The current Metro LRTP provides sufficient funding through the existing local sources (Prop A/Prop C) and additional Measure R revenues to fund the operating and maintenance costs of any of the proposal alternatives.

5.5.8 Federal New Starts Funding Criteria

The FTA project justification criteria for evaluation of New Starts projects include cost effectiveness; mobility improvements; environmental benefits; operating efficiencies; transit-supportive existing land use, policies and future patterns; and other factors. FTA must also consider the local financial commitment for the proposed project. Collectively, the criteria are intended to measure the overall merits of the project and the sponsor's ability to build and operate the proposed project.

A preliminary assessment of factors affecting ratings for the New Starts Criteria is presented in Table 5-13. As both build alternatives follow the same general alignment, both alternatives may have similar performance with respect to the Transit-Supportive Land Use Criterion. Mobility improvements may be more pronounced for certain sections



of the corridor for the LRT corridor due to faster travel times. Both corridors serve the same transit-dependent population.

5.5.9 Ridership

The BRT Alternative would result in the highest number of daily boardings with 16,683 daily boardings in the year 2030. The LRT Alternative would result in 12,628 daily boardings (13,148 daily boardings with design options) and the TSM Alternative would result in 9,415 daily boardings in 2030. The No-Build Alternative would not result in any new daily boardings, as no new improvements would occur.

LRT ridership is expected to be lower than BRT ridership because its route is shorter-terminating at the Exposition Line Crenshaw station rather than at the Metro Purple Line Wilshire/Western Station. However, for the comparable segment between the Exposition Line and the Metro Green Line, the LRT Alternative has higher ridership (9,781 compared to 8,290 for the BRT Alternative). The LRT Alternative also has a higher number of passengers transferring from the Metro Green Line (2,837 compared to 1,370 for the BRT Alternative).

5.5.10 Travel Time Savings

The LRT Alternative would have the greatest travel time savings, resulting in a savings of 21.6 minutes saved traveling from the Exposition Line to the Metro Green Line in 2030. The BRT Alternative would result in a savings of 17.2 minutes, while the TSM Alternative would result in a savings of 10.5 minutes in the peak period and 11.2 minutes in the off-peak period. The No-Build Alternative would not result in any travel time savings.

5.6 Issues to be Resolved/Areas of Controversy

Based on the outcome of the alternatives analysis and screening process and technical transit planning considerations, in addition to input received during the interagency coordination process, a series of issues (listed below) that remain to be resolved have been identified. These issues must be addressed and resolved as the project moved forward through the DEIS/DEIR process and to the selection of a LPA by the Metro Board.

Community Acceptance of the TSM and BRT Alternatives as a Credible Mobility Improvement over Existing Metro Rapid Bus Service. Crenshaw Boulevard currently features Rapid Bus service that supplements local bus service along the corridor. The TSM and BRT Alternatives described in the DEIS/DEIR distinguish small incremental travel time improvements over the existing service. Existing bus service and future options are subject to traffic delays as a portion of these services will have to operate in mixed traffic. The Metro Board will have to consider whether these options are viable long-term solutions to mobility needs in the Crenshaw Corridor.

Potential Future Northern Extension of the LRT Alternative. As presented in the DEIS/DEIR, all of the build alternatives provide a bus connection to the Metro Purple Line Wilshire/Western subway station. This bus connection is achieved through service in mixed traffic and, as a result, the reliability of the connection travel time is subject to traffic congestion and delays. If the Metro Purple Line is extended westward, then the

future connection options from the Crenshaw Corridor should be accounted for. The Alternatives Analysis process conducted for the Crenshaw Corridor screened out a LRT connection to the Metro Purple Line due to cost effectiveness considerations. The connection would have to be entirely underground due to the narrow right-of-way on Crenshaw Boulevard, making the option cost prohibitive. If a connection is to be achieved between a Crenshaw Corridor LRT Alternative and the Metro Purple Line, a Metro feasibility study has found that an LRT connection towards the west, such as the Wilshire Boulevard/La Brea Avenue intersection rather than Crenshaw/Wilshire Boulevards intersection would be the most attractive option. In order to resolve this issue, Metro Board deliberation of the Crenshaw Corridor LRT Alternative and of the related Westside Extension Project should consider measures that would not pre-empt this future. Implementation of the TSM or BRT alternatives may also consider re-alignment of routes to serve Wilshire/La Brea upon implementation of the Westside Extension Project.

Crenshaw Transit Corridor Light Rail Alternative Connection to the Exposition Light Rail.

The Base LRT Alternative under consideration would cross the Exposition Light Rail Line at-grade. This type of crossing would have the potential to create severe traffic delays during peak periods when both lines would operate at high train frequencies. The at-grade connection would also require that the Exposition platform be rebuilt and extended. Grade separation of the crossing between the two lines would reduce traffic flow considerations and eliminate the expense of the platform rebuild. The only viable grade separation would be to bring the Crenshaw LRT underground at Exposition. This would introduce a different set of construction impacts associated with building an underground station. The Metro Board will have to consider the extent of the underground Crenshaw LRT segment. The DEIS/DEIR considered a design option to extend the underground segment from Exposition Boulevard to 39th Street. The effect of this option would create a below-grade segment that extends from Exposition Boulevard to 48th Street, a distance of approximately 1.5 miles. The increased cost would require additional funding.

Light Rail Station Area Development Potential that is Consistent with Community Goals and Objectives. One key aspect in obtaining federal funding for transit improvements is whether local communities encourage transit-supporting or transit-oriented land uses. Similarly, California, with impetus from Senate Bill 375, has also focused on transit-supporting land uses as a means to reduce greenhouse gas emissions. Transit-supporting land uses often result in an increase in development density and intensity. The Metro Board must weigh Federal and State mandates against community concerns regarding over-development or changes in the character of corridor communities. Although all proposed station areas are subject to this concern, Leimert Park Village residents in particular have expressed concern about increased development.

Light Rail Station Location(s) between Martin Luther King Jr. Boulevard and Vernon Avenue. Related to the issue of transit-supporting land use and induced growth is the pending location of the LRT station between Martin Luther King Jr. Boulevard and Vernon Avenue. The LRT Alternative indicates two below-grade LRT stations; a station at Martin Luther King Jr. Boulevard and an optional station at Vernon Avenue, adjacent to Leimert Park. These prospective station locations are approximately 1/2 mile apart. An additional station would increase LRT travel times.



As proposed with the Design Option, one station would serve the Baldwin Hills Crenshaw Plaza shopping center and the other would serve Leimert Park Village. The Metro Board should consider whether two stations are necessary and whether the added expense of a Leimert Park Station (near Vernon Avenue) is warranted. Since the alignment is underground at this location, the cost of an additional station is more significant. Public comments received expressed concern about the intensity of new development that may be attracted to Leimert Park Village if there is an adjacent station.

Light Rail Underground Construction Method between 39th Street and 48th Street. One of the most disruptive forms of underground transit construction is the cut-and-cover method. This method requires excavation of the underground trench, and then temporarily covering the trench with wooden planks or concrete or metal panels while the subway is constructed beneath. In the section of Crenshaw Boulevard between 39th Street and 48th Street, this construction technique would likely have adverse effects on traffic flow and to the accessibility for local businesses. The tunnel-boring technique would be less disruptive to the community but requires stations to be located deeper than with the cut-and-cover method. This technique involves an underground machine that creates the subway structure without disrupting the surface. The Metro Board must consider whether tunnel boring is a viable option for this segment. Typically short segments are not cost-effective; however, if the underground LRT segment extends from 39th Street to 48th Street to address the Exposition LRT/Crenshaw

LRT grade separation, then tunnel boring may be economically feasible. It is important to note that even if tunnel boring is feasible, the Crenshaw/Martin Luther King Station and the optional Crenshaw/Vernon Station would continue to be constructed through the cut-and-cover technique.

Light Rail Northern Portal Location and Baldwin Hills Crenshaw Plaza Access. The Base LRT Alternative would transition into an underground alignment near (immediately to the north of) 39th Street. Access to the Baldwin Hills Crenshaw Plaza is south of 39th Street. Future redevelopment plans for the plaza may place an even greater emphasis on access and circulation at the 39th Street location. The placement of the underground portal will be an important consideration that may affect the future operations of the plaza.

Treatment of Frontage Roads and Parking From Coliseum to Martin Luther King Jr. Boulevard and from 48th Street to Slauson Avenue. In a number of segments along Crenshaw Boulevard, north of Slauson Avenue, the street features one-way frontage roads that are separated from the main traffic lanes of Crenshaw Boulevard by a raised median. To maintain the current number of traffic lanes and to accommodate LRT or BRT in semi-exclusive rights-of-way, the frontage roads would be reconfigured or eliminated. This change has implications for the loss of curb parking along Crenshaw Boulevard, convenient access to Crenshaw Boulevard businesses, and alteration in street landscaping. Public input through the urban design and station area planning process will be necessary to fully reveal community and business concerns and identify acceptable solutions.

Streetscape and Urban Design Treatments to Mitigate the Loss of Mature Median Trees between 48th Street and 54th Street. Since the 1960s (after the termination of the streetcar service in Crenshaw Boulevard), the median of Crenshaw Boulevard has been landscaped from 48th Street to 54th Street. Along this section of the Crenshaw Boulevard median are

intervals of mature trees that provide visual relief from the wide Crenshaw Boulevard right-of-way and provide a landscape underpinning supporting Crenshaw Boulevard's designation as a scenic highway by the City of Los Angeles for the station north of Slauson Avenue. LRT improvements in this section of Crenshaw Boulevard would require the removal of these trees. At issue is whether there are urban design and landscaping options that will effectively mitigate this visual loss. Plans for the LRT Alternative in this section currently propose widening of sidewalks with additional landscaping for pedestrians. The DEIS/DEIR anticipates that community input during station area planning exercises will provide a firm basis to provide adequate mitigation and resolution of this issue.

Pedestrian Safety Improvements at Nearby Schools. A number of private and public schools are either adjacent to or near Crenshaw Boulevard. There is also a private school near the Harbor Subdivision and Centinela Avenue crossing. The Metro Board will need to consider whether additional pedestrian safety measures are warranted, beyond Metro's current pedestrian safety program, to address young pedestrians.

Effective Urban Design and Structure Design Treatments to Mitigate the Impact of an Elevated Structure between 60th Street and the Harbor Subdivision. The Base LRT Alternative includes construction of an aerial/elevated structure within the median of Crenshaw Boulevard between 60th Street and the Harbor Subdivision railroad. The aerial trackbed structure would be located on columns spaced at intervals within the street. It is anticipated that the columns would be at least 8 feet in diameter and the structure would be over 20 feet in height. Catenary poles necessary to supply power to the LRT system would be mounted atop the structure and would extend the overall height of the elevated guideway to over 30 feet. The placement of this type of structure within the middle of Crenshaw Boulevard will result in a marked change in visual character. Overall, Crenshaw Boulevard may appear to be narrower, there would be shaded and shadowed areas, and the placement of columns would limit sight distances for motorist and pedestrians.

Outside of the design option to place the LRT alignment underground, it is anticipated that community input will be focused on methods and measures to reduce the visual effect of the structure to a point where community consensus is achieved. The Advanced Conceptual Engineering (ACE)/Preliminary Engineering (PE) phase would address these issues if the Base LRT Alternative is selected as the LPA. Specifically, the PE phase would identify urban design solutions including design options for the structure, lighting, solar access, landscaping and architectural and artistic treatments.

West Boulevard Station Location. Under the Base LRT Alternative, a station is located west of West Boulevard in the City of Inglewood. Community input received from residents in the Hyde Park community favor moving the station eastward toward Crenshaw Boulevard to provide a better connection with transit services on Crenshaw Boulevard and on Florence Avenue potentially providing improved access from communities to the south along Crenshaw Boulevard, such as Morningside Park. Such a location may provide for revitalization along a corridor between Crenshaw Boulevard and West Boulevard. Some community residents in the City of Inglewood favor the continued location of the station west of West Boulevard, where there may also be transit-oriented development opportunities on vacant parking lots and other under-utilized parcels. The potential location of a station



adjacent to West Boulevard also could be perceived as a catalyst to change along West Boulevard that has remained dormant for many years.

Connection to Hollywood Park Redevelopment. As discussed above, Metro received comments during meetings in the City of Inglewood that the alignment should be re-directed to serve the City of Inglewood's focus and investment in the Hollywood Park area. Metro reviewed ridership and cost data and concluded that the proposed Base LRT alignment along the Harbor Subdivision that does not directly connect to the Hollywood Park Redevelopment area remains the most viable and cost-effective option. The Base LRT alignment serves downtown Inglewood employment with a proposed station at La Brea Avenue. The issue remains, however, as to how Hollywood Park can be connected to light rail, perhaps through enhancement of local transit connections or coordination with local developers regarding the provision of shuttle service.

Burlington Northern Santa Fe Use of the Harbor Subdivision Railroad. One of the most significant constraints to transit use of the Harbor Subdivision is the issue of whether Burlington Northern Santa Fe (BNSF) will maintain railroad operations within the right-of-way. Maintaining BNSF operations in the Harbor Subdivision would require the relocation of the railroad tracks to allow for either BRT or LRT operations. The continued use by BNSF also adds to construction cost, as well as a new element to grade crossings, where there would be crossing signals for either the LRT or BRT vehicles and a separate signal system for railroad operations. Metro has had discussions with BNSF to determine whether the abandonment (during construction and/or permanently) of the Crenshaw Corridor portion of the Harbor Subdivision (Crenshaw Boulevard to Imperial Highway) is possible.

Metro Harbor Subdivision Alternatives Analysis Study. The long term use of the Harbor Subdivision railroad right-of-way is currently being studied by Metro. Decisions related to the Crenshaw Corridor Transit Project will have an effect on future planning for the entire Harbor Subdivision. The Metro Board, in its deliberation on the Crenshaw Corridor Transit Project, will need to consider opportunities and limitations that may be imposed on connections to the South Bay and more broadly the entire railroad corridor from downtown Los Angeles to the harbor area.

Grade Separation at Centinela Avenue. The application of Metro's Grade Crossing Policy is presented in the conclusions of the DEIS/DEIR. At this stage in the analysis, the assessment concludes that no grade separation is needed at Centinela Avenue and the Harbor Subdivision adjacent to Florence Boulevard. Comments received through the community outreach process indicated community concerns regarding access to Edward Vincent Jr. Park (Centinela Park), a nearby private school and church that may be addressed through a grade separation. The grade of Centinela Avenue affects the operation of vehicles through the intersection. The DEIS/DEIR contains a design option for a grade separation at Centinela Avenue to address these concerns. Such grade separation may require more extensive construction in the short term and may create some impacts to the palm trees adjacent to the additional railroad right-of-way.

Specific Effects on Landmark Palm Trees near Centinela Avenue and Mitigation Options. One of the most noticeable visual elements along the Harbor Subdivision in the City of Inglewood is the dual row of palm trees. These palms generally mark the southern boundary

of Edward Vincent Park. The impact assessment for the both the BRT and LRT Alternatives indicated that the guideway requirements would likely require the removal of some portion of the northern most row of palm trees. It is Metro's intent to hold focused community urban design and station area meetings in Inglewood to address this issue and design measures to mitigate the visual impact.

Grade Separation at Manchester. The application of Metro's Grade Crossing Policy is presented in the conclusions of the DEIS/DEIR. At this stage in the analysis, the assessment concludes that no grade separation is needed at Centinela Avenue and the Harbor Subdivision adjacent to Florence Boulevard. Comments received through the community outreach process indicated community concerns regarding access to Edward Vincent Jr. Park (Centinela Park), a nearby private school and church that may be addressed through a grade separation. The grade of Centinela Avenue affects the operation of vehicles through the intersection. The DEIS/DEIR contains a design option for a grade separation at Centinela Avenue to address these concerns. Such grade separation may require more extensive construction in the short term and may create some impacts to the palm trees adjacent to the additional railroad right-of-way.

Role of the Aviation / Manchester Station. Located at the edge of the Westchester district of the City of Los Angeles rather than its center, the proposed Aviation / Manchester has one of the lower potentials for ridership growth among the stations along the proposed transit investment. The immediate area lacks a cohesion as it includes a mix of commercial and industrial uses at the border between the Cities of Los Angeles and Inglewood. Curves of the alignment and the potential for an elevated crossing make the location of this station right at Manchester difficult. Nonetheless, this location would be the most convenient location for residents of Westchester to access the Crenshaw Transit Corridor. If there is a station at this location, its siting and configuration would need to balance competing modes of access, including pedestrian access from the residential neighborhood immediately to the north, transit access along Manchester and Florence, and automobile / park-and-ride access from arterials such as Manchester Avenue/Boulevard, Aviation Boulevard, and La Cienega Boulevard.

Connection between Crenshaw Transit Project and the Los Angeles International Airport. The lack of a convenient connection to LAX from Metro's rail transit system has been under discussion for many years. The nearest rail transit stop to LAX is the Aviation/Imperial Green Line station (approximately 1.5 miles from the LAX terminals). The Crenshaw Corridor Transit Project creates the opportunity to bring a transit connection closer to LAX. The DEIS/DEIR proposes either a BRT or LRT station at Century Boulevard and Aviation Boulevard. Metro's coordination with LAX indicates that an "automated people mover" from the terminal area may be planned to connect to this area at some time in the future. The Metro Board, as part of the consideration of the LPA, must consider the certainty and time frame of construction of this important connection, as well as address renewed interest in providing a direct rail transit connection into the LAX terminal area.

Availability of LRT/BRT Maintenance Yard Sites in Westchester or El Segundo. Both of the BRT and LRT Alternatives require new maintenance yards to service the expanded bus or rail vehicle fleets. Adequate size sites are difficult to find. Two candidate sites are identified in the DEIS/DEIR. One site is located in the Westchester area of Los Angeles along the Harbor



Subdivision near Manchester Avenue/Florence Avenue, and the other is located near Rosecrans and Sepulveda Boulevards in the City of El Segundo. Both sites have unique issues that require resolution to make the creation of maintenance facility site viable. The Westchester site would displace an existing Los Angeles County maintenance yard other light industrial uses and a community theater. It also is adjacent to a residential neighborhood. Issues of concern are whether the County is able to relocate their facility and whether adequate relocation sites can be found for displaced light industrial businesses. For the El Segundo site, the City has expressed concerns that the location of a new maintenance yard would affect planned commercial/retail development sites and street extensions important to the City of El Segundo. Also, the El Segundo site may preclude the reconfiguration of BNSF and Union Pacific railroad storage tracks serving the El Segundo Standard Oil Refinery on the west side of Sepulveda Boulevard.

Project Phasing. As discussed in the DEIS/DEIR, transit improvements in the Crenshaw Corridor have been studied and discussed since the early 1990s. As the process moves forward toward selecting an LPA and the sequencing of funding a new system, the discussion may have to address the phasing of the project. Important consideration will revolve around starting construction at the northern end near the LRT Line project or at the southern end near the Metro Green Line. Availability of a connection to a maintenance facility will affect this discussion. Additional consideration includes the length and the interim termini of any potential phases. Overall, if funding availability affects the timing of construction the Metro Board will have to consider the community concern over the timing of transit improvements that will take place on the main trunk of Crenshaw Boulevard.

5.7 Trade Offs Analysis

Consideration of all alternatives is required in order to draw a conclusion about the proper investment for the Crenshaw Transit Corridor. Each alternative – the No-Build Alternative, the TSM Alternative, the BRT Alternative, and the LRT Alternative must be evaluated against many different factors and variables. Weighing each of the factors inevitably involves tradeoffs among features of each alternatives and between alternatives.

The No-Build Alternative would not achieve the level of mobility and accessibility needed by communities within the Crenshaw Transit Corridor. These communities contain a disproportionately high concentration of minority and low income households. Additionally, the No-Build Alternative would not create the infrastructure necessary to shift the corridor communities from fossil fuel-oriented travel to a viable transit alternative. As a result, VMT within the corridor would remain unchanged, greenhouse gas emissions would remain unchecked and the corridor communities would continue to rely on non-renewable energy sources.

Currently, portions of the corridor are served by Metro's Rapid Bus. The TSM Alternative would represent a modest change over existing transit service. TSM bus service related improvements would present limited opportunities for increases in ridership and would not serve as a strong catalyst for attracting transit-supportive land uses and economic development to the corridor, as would be expected with a greater transit investment in a more permanent fixed guideway.

Both build alternatives – the BRT Alternative and the LRT Alternative – have relative merits and deficiencies.

The BRT Alternative provides many incremental improvements beyond the TSM Alternative. It reduces travel time and improves reliability of bus transit service, especially in locations where exclusive rights-of-way can be secured, such as along the Harbor Subdivision and in sections of Crenshaw Boulevard. The BRT Alternative also provides additional focus for nodes of activity that occur at BRT stations. The BRT Alternative includes service which can operate in existing roadways beyond the area of investment in physical infrastructure. This feature allows the BRT Alternative to extend service to the Wilshire Boulevard Corridor, attracting more riders making that connection.

The BRT Alternative does have a several limitations. While providing expanded transit service and connections to the regional transit system, the physical constraints of travel corridors (especially arterial corridors) make exclusive transit lanes difficult to secure along the entire length of such corridors. In the case of the Crenshaw Corridor, the semi-exclusive lanes in Crenshaw Boulevard are shared with right-turning vehicles. This configuration may result in conflicts with right-turning vehicles as well as local buses. As a result, BRT travel times and reliability along Crenshaw Boulevard would improve only marginally compared to the conventional rapid bus service. The difference may degrade over time. There are constraints for the BRT Alternative along the Harbor Subdivision, as well. Minimum lane widths for the BRT busway, especially along the Harbor Subdivision create impacts including the need to purchase additional property in selected locations and parkland impacts. Constraints on speeds along the right-of-way at crossings with other streets increase travel times and diminish ridership potential.

Many similar factors are important to consider for the LRT Alternative. The LRT Alternative does have a longer length of combined exclusive right-of-way segments (at-grade, below grade and elevated), leading to fewer conflicts with traffic and faster and more reliable travel times. The relatively higher speeds associated with the LRT Alternative offers the greatest potential improvement in ridership. Travel times are more reliable over the long run as congestion on the roadway network affect vehicle traffic. The LRT Alternative is also able to take advantage of existing transit investments, such as the Metro Green Line. Consequently, service on the LRT Alternative can provide connections more deeply into the South Bay Area along the Metro Green Line. In addition, a portion of the LRT Alternative also facilitates the extension of the Metro Green Line in the direction of LAX. Importantly, the substantial infrastructure investment associated with the LRT Alternative is typically more catalytic in encouraging transit-supportive land uses envisioned by many communities within the corridor.

The LRT Alternative also has limitations. The LRT alternative is estimated to have significantly higher capital costs compared to the TSM and BRT Alternatives, requiring greater financial resources. The LRT Alternative is constrained in terms of where it can operate, unlike BRT, which can operate in many different types of service environments. The physical constraints and high cost associated with extending LRT service north of the Exposition Line limits the market for the LRT Alternative and connections to the dense Wilshire Corridor. In some cases, the LRT Alternative infrastructure creates more significant visual and construction impacts. In some other cases, especially along



Crenshaw Boulevard, the LRT Alternative is subject to the disadvantages of delays at arterial street intersections, similar to the TSM and BRT Alternatives. When compared to the other alternatives under consideration, the higher capital cost can be considered with respect to LRT's higher carrying capacity, operational reliability and catalytic influence on economic development within and adjacent to station areas along the route.

The BRT and LRT Alternatives differ in the extent of benefits and costs and in the time frame over which those benefits and costs are realized. The next stage of this environmental review will involve public review of these tradeoffs and the entire environmental analysis and the comparative performance of the alternatives. Public comments will inform the ultimate selection of a locally preferred alternative by the Metro Board.

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