



**CHAPTER 8**  
**Financial Analysis and**  
**Comparison of Alternatives**



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## 8.0 FINANCIAL ANALYSIS AND COMPARISON OF ALTERNATIVES

This chapter presents the financial analysis and comparison of alternatives conducted for the Crenshaw/Los Angeles International Airport (LAX) Transit Corridor Project alternatives.

Chapter 2.0, Alternatives Considered, presents the alternatives evaluated in this Final Environmental Impact Statement/Final Environmental Impact Report (FEIS/FEIR). The alternatives include a No-Build Alternative and the Locally Preferred Alternative (LPA). The LPA has five design options and two minimum operable segment (MOS) alternatives. Chapters 3.0, Transportation Impacts, Chapter 4.0, Affected Environment/Environmental Consequences of the Alignment and Stations, and Chapter 5.0, Affected Environment/Environmental Consequences of the Maintenance Facility, describe in detail the effects of the alternatives on the environment. The Executive Summary provides a summary of these environmental effects.

### 8.1 Financial Analysis

The financial analysis performed for the project describes Metro's capacity to finance the estimated capital and operating and maintenance (O&M) costs of the LPA and design options. Capital costs are the construction and start-up costs for the project, including the costs of guideway construction, vehicles, and any system facilities necessary before the project can begin operation. O&M costs are the costs associated with the regular operation of the new transportation facility and vehicles. Costs for labor, vehicle maintenance, and overall facility maintenance are all included in this category of operating and maintenance costs.

This section discusses both types of costs, presents the proposed capital and O&M financing plans, and then identifies Metro's ability to finance the proposed project using anticipated sources of revenues. The cost and revenues presented in this chapter reflect an update to the costs and revenues presented in the Draft Environmental Impact Statement/Draft Environmental Impact Report (DEIS/DEIR). This analysis will assist the Federal Transit Administration (FTA), Metro, city officials, and the general public in understanding and evaluating Metro's financial capacity to construct the Crenshaw/LAX Transit Corridor Project LPA and to operate and maintain the existing transit system.

#### 8.1.1 Capital Costs

This section presents the capital cost estimates for the LPA and 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.

The capital cost estimates were developed using FTA guidelines for estimating capital costs by Standard Cost Category (SCC). The SCC estimate summarizes the capital cost of the components of the project by cost category, such as guideway, stations, support facilities, site work and special conditions, systems, right-of-way, and vehicles. The estimates also include costs for professional services and unallocated contingency. The capital costs are expressed in 2010 dollars and are based on the cost methodology presented in the In-Progress Capital

Cost Estimate and Preliminary Engineering drawing set completed in April 2011. Labor, materials and equipments costs are based on current market prices in the project area.

In addition to base year costs, year-of-expenditure (YOE) cost estimates were developed for the financial analysis of the project. The YOE capital cost estimates are based on the project implementation schedule and escalation rates established by Metro for its Long Range Transportation Plan (LRTP). The expenditures are planned to occur between 2011 and 2020. Most of the major expenditures for construction of the major components of the project are expected to occur between 2013 and 2018. As the project schedule is developed further through the remainder of Preliminary Engineering, cash flow and YOE dollars will be updated.

Table 8-1 presents the estimated capital cost (in thousands of 2010 dollars) by SCC, total capital cost, and YOE capital costs for the revised LPA, which includes an extended below-grade section between Exposition Boulevard and 48<sup>th</sup> Street. The revised LPA is estimated to cost a total of \$1.589 billion in 2010 dollars. The YOE capital costs are estimated to total \$1.810 billion.

**Table 8-1. Capital Cost Estimates  
 Refined LPA (with Incorporated Design Options to the Project Definition)  
 (Thousands 2010 Dollars)**

SCC Code	Cost Categories	2010 Base Year Cost	YOE Costs
10	Guideway and Track Elements	\$424,280	\$487,608
20	Stations, Stops, Terminals, Intermodal	\$128,337	\$150,736
30	Support Facilities: Yards, Shops, Administrative Buildings	\$65,732	\$75,255
40	Sitework and Special Conditions	\$242,392	\$276,913
50	Systems	\$111,013	\$133,414
	Subtotal Construction (10-50)	\$971,754	\$1,123,926
60	Right-of-Way, Land, Existing Improvements	\$133,913	\$145,321
70	Vehicles	\$87,780	\$87,780
80	Professional Services	\$255,982	\$293,754
90	Unallocated Contingency	\$115,525	\$135,318
	Metro Planning/Environmental Costs	\$24,200	\$24,200
	Total Cost	\$1,589,154	\$1,810,299

Note-Project costs include the incorporation of the Partially-Covered LAX Trench Option.  
 Source: Hatch Mott McDonald, 2011.

Table 8-2 presents the estimate capital costs (in thousands of 2010 dollars and year of expenditure dollars) for each of the design options and MOSs. The cost estimates for the design options providing for the additional stations range from \$9.42 million, or \$11.58 million in YOE dollars, for the at-grade optional Aviation/Manchester Station to \$106.31 million, or \$130.74 million in YOE dollars, for the optional Crenshaw/Vernon Station. The cut-and-cover crossing at Centinela is estimated to cost \$20.6 million, or \$25.33 million in YOE dollars. The Partially-Covered LAX Trench Option would result in a cost savings of \$41 million or \$46.4 million in YOE. (Since consultation with FAA suggests that the



**Table 8-2. Capital Cost Estimates for Design Options and MOSs  
(Thousands 2010 Dollars)**

<b>Design Options and MOSs</b>	<b>Change in Cost over LPA</b>	<b>Change in YOE Cost over LPA</b>
Optional Crenshaw/Vernon Station	+\$106,306	+\$130,742
Optional Aviation/Manchester Station (Aerial)	+\$66,500	+\$81,786
Optional Aviation/Manchester Station (At-grade)	+\$9,416	+\$11,581
Cut-and-Cover Crossing at Centinela	+\$20,599	+\$25,334
Partially-Covered LAX Trench Option	-\$40,964	-\$46,463
MOS-Century with Southern Terminus at Aviation/Century Station	-\$122,850	-\$140,230
MOS-King with Northern Terminus at Crenshaw/King Station	-\$257.52	-\$293,960

Source: Hatch Mott McDonald, 2011.

Partially-Covered LAX Trench Option is potentially acceptable for the initial temporary period, these savings will be accounted for in the costs of the Project Definition).

The MOSs would reduce capital costs because of the shorter alignment over the LPA. MOS-Century, with the southern terminus at the Aviation/Century Station, would reduce the base year capital cost by \$122.85 million, or \$140.23 million in YOE dollars. MOS-King, with the northern terminus at the Crenshaw/ King Station, would reduce the base year capital cost by \$257.52 million, or \$293.96 million in YOE dollars. No cost estimate was developed for the alternative southwest portal at the Crenshaw/King Station and would only be implemented with private funding or dedication of property or permanent construction easement by the adjacent property owner. Implementation of the alternative portal location could result in a potential savings to the project.

The capital cost estimates developed for the project have incorporated a number of value engineering changes designed to reduce the estimated cost of the project. Value engineering is defined as an organized effort to analyze the various functions of the project (i.e., facilities, systems, equipment) by a multi-disciplined group for the purpose of achieving the required function at the lowest total cost. The changes incorporated into the Preliminary Engineering drawing set include:

- Alignment revisions and reduced right-of-way acquisitions along the Harbor Subdivision
- La Brea Station shifted from La Brea Avenue to just east of Market Street along Florence Avenue
- Aerial alignment modifications at Manchester Avenue
- Modification of ventilation system in cut-and-cover segments
- Reduced right-of-way acquisitions along Crenshaw Boulevard
- Modification of guideway and station configuration at Aviation/Century Station

Additional value engineering will continue throughout the preliminary engineering phase in an attempt to further reduce the cost of the project. Certain changes are included in the current capital cost estimates shown in Table 8-1 and include items, such as:

- Abandonment of the Burlington Northern Santa Fe (BNSF) freight track with reduced property acquisitions and utility relocations
- Incorporating the Partially Covered LAX Trench design option as an interim solution – This involves modifying the fully covered trench along LAX segment between 111th and 104th Streets to partially covered segments immediately adjacent to south runways subject to conclusion of discussions with FAA. The full build-out of a fully covered trench will be deferred to a future date when Metro funding is planned and budgeted to support the additional covered segments.

Table 8-3 shows the total cost of the project accounting for the Partially-Covered LAX Trench Option. This project definition (with the Partially-Covered LAX Trench Option included) and cost will be used in the development of the project financial plan. It is important to note that funding for the maintenance facility at Arbor Vitae/Bellanca is designated to come from several projects, including the Crenshaw/LAX Transit Project. In December 2010, the Metro Board adopted a policy to pursue a Consolidated Development Strategy for the development of maintenance and service facilities. According to the policy, planning for maintenance facilities in southwestern Los Angeles County should account for the fleet requirements of several lines and projects and the costs of the consolidated yard will be allocated according to each project’s need. In this case, the Arbor Vitae/Bellanca site is planned for an initial opening day capacity of 45 LRVs and an ultimate build-out capacity of 82 LRVs. The Crenshaw/LAX Transit Corridor Project accounts for approximately 49 percent of the 2035 capacity and is therefore assigned 49 percent of the cost (including construction and right-of-way) of the maintenance facility. In addition to the Crenshaw/LAX Transit Corridor Project, funding for the remaining share of the maintenance facility will be assigned to the general growth of the existing segments of the Metro Green Line and two other transit extensions – the South Bay Metro Green Line Extension, and the Metro Green Line Extension to LAX. These other projects are primarily funded by the same local sources of funding, primarily the Measure R Sales Tax, so their contributions to the development of the maintenance facility is anticipated to come from Measure R.

**Table 8-3. Capital Cost Estimates for Revised LPA, Partially-Covered LAX Trench, and Project Definition**

Project Elements	Cost (2010 Base Year Dollars)	Cost (YOE Dollars)
LPA	\$1,589,154	\$1,810,299
Partially-Covered LAX Trench	\$(40,964)	\$(46,463)
Project Definition (total with included design option)	\$1,548,190	\$1,763,836

Source: Hatch Mott McDonald, 2011.



### **8.1.2 Operating and Maintenance Costs**

This section summarizes the O&M cost estimates for the Project (LPA with Partially-Covered LAX Trench Option), in comparison to the No-Build Alternative. The O&M costs were estimated using a resource cost build-up model based on the current Metro heavy rail transit (HRT), LRT, Bus Rapid Transit (BRT), and bus operating costs and then converted to YOE dollars for input to the financial plan.

Based on the O&M cost model, it is estimated that the Project (LPA with Partially-Covered LAX Trench Option) in 2030 will cost an additional \$51.3 million annually to operate and maintain, compared to the No-Build Alternative. The provision of rail security for the LPA is estimated to cost an additional \$10.4 million, resulting in a total annual increase of \$61.7 million. The inclusion of the Aviation/Manchester Station and Crenshaw/Vernon Station options would result in a slight increase in the annual O&M cost, as compared to the LPA. The MOSs would reduce the length of the Crenshaw line by approximately 0.5 to 1 mile, which would reduce the annual O&M cost compared to the full length LPA.

### **8.1.3 Capital Financial Plan**

This section summarizes the proposed capital financial plan for the Project including a general description of the proposed funding sources, funds from these sources, identification of any shortfalls, and results of cash flow analysis.

#### **8.1.3.1 Capital Funding Sources**

The proposed funding sources include the following:

- **Federal:**
  - ▶ Federal Transportation Infrastructure Finance and Innovation Act (TIFIA) - The TIFIA of 1998 established a Federal credit program for eligible transportation projects of national or regional significance under which the U.S. Department of Transportation (may provide three forms of credit assistance – secured (direct) loans, loan guarantees, and standby lines of credit.
  - ▶ Section 5309 Bus Discretionary - The Section 5309 Bus and Bus Related Equipment and Facilities program (Bus program) provides capital assistance for new and replacement buses, related equipment, and facilities. It is a discretionary program to supplement formula funding in both urbanized and rural areas. This was allocated in two separate grants. An initial grant supported the alternatives analysis and preliminary design. A second grant, initially intended for Los Angeles World Airports, supports the design of an intermodal transfer facility to serve the airport.
  - ▶ Congestion Mitigation and Air Quality (CMAQ) - The CMAQ program is a federal formula grant program for use on projects that contribute to attainment of national ambient air quality standards. As part of the 2009 LRTP, Metro has programmed CMAQ funds as a source of capital funding for new rail and bus transit lines including the Metro Expo Line (Phase 1), Crenshaw/LAX Line, Regional Connector, rail system improvements, rail fleet procurement, and for Metro Bus and Metro Rapid Bus projects. CMAQ is also programmed for rail and bus operations and can be used for the first three years of operation of individual new rail and bus projects.

- ▶ Regional Surface Transportation Program (RSTP) - The RSTP provides capital costs identified in Section 133 of Title 23 of the United States Code for transit projects eligible for assistance under the Federal Transit Act and other transportation enhancement activities
- ▶ Section 5339 Alternatives Analysis Program - The Section 5339 Alternatives Analysis Program assists potential sponsors of major capital investments in the evaluation of all reasonable modal and multimodal alternatives and general alignment options to address transportation needs in a defined travel corridor.
- Local/State:
  - ▶ Los Angeles County Transportation Sales Tax, Measure R - Measure R is a half-cent transportation sales tax approved in November 2008 by Los Angeles County voters to meet the transportation needs of Los Angeles County.
  - ▶ Los Angeles County Proposition A and Proposition C Countywide Transportation Sales Tax - Collection of the tax began on July 1, 2009 for public transit purposes (rail expansion, local street improvements, traffic reduction, better public transportation, and quality of life) for a period of 30 years.
  - ▶ Los Angeles County local cities and county contributions - To assist in funding the Measure R program of projects, Metro has proposed for consideration that local jurisdictions provide a three percent local match for projects. Metro is working with cities, the County of Los Angeles, the Metro Technical Advisory Committee, and sub-regional entities on an appropriate policy to support this. Issues currently being addressed include timing, clarification as to what constitutes a local match, definition of how to determine proportional share, and discussion of whether the three percent match changes if there is an increase or decrease in total project cost.
  - ▶ State Proposition 1B Public Transportation Modernization, Improvement, and Service Enhancement Account (PTMISEA) - Approved by California voters statewide in 2007, Proposition 1B PTMISEA funds are distributed by formula to transit operators and regional agencies for use in rehabilitation, safety or modernization improvements, capital service enhancements or expansions, new capital projects, bus rapid transit improvements, or for rolling stock procurement, rehabilitation or replacement.
  - ▶ State Regional Improvement Program (STIP) - RIP funding is programmed in the State Transportation Improvement Program (STIP). Within the STIP, 75 percent of the funding is allocated and programmed by the regional transportation planning agencies such as Metro under the RIP. The remaining 25 percent is programmed by the State under the Interregional Improvement Program. The primary source of RIP funding is the federal Surface Transportation Program (STP).

The Los Angeles County Measure R program would be the primary capital funding source for the project. This is the third half-cent transportation sales tax within the Los Angeles County with the others being Proposition A and Proposition C. Metro is responsible for administering Measure R revenues.

Measure R revenues flow to Metro which then allocates the revenues in accordance with legally binding allocation rules delineated by Los Angeles County Ordinance #08-01, Metro





Formula Allocation Procedure, and Metro Board actions. Ordinance #08-01 mandates that 65 percent of Measure R revenues are to be allocated to rail or bus transit. Further, Ordinance #08-01 specifies that 35 percent of Measure R revenues must be allocated to the 12 capital expansion projects included in the Long-Range Capital Plan that it delineates. The Crenshaw/LAX Transit Corridor Project is included in these 12 projects.

Table 8-4 provides the Outline of the Measure R Expenditure Categories for the 30 years, FY 2010-2039. Table 8-5 provides the details of the Measure R Expenditure Plan for the 30 years, FY 2010-2039, as adopted by the Metro Board of Directors on July 24, 2008.

As originally planned, Measure R was expected to generate a portion of the revenues necessary to fund the Crenshaw/LAX Transit Corridor Project on a pay-as-you-go basis. However, in October 2010 Metro received a TIFIA federal loan to assure the project implementations time frame and potentially accelerate the schedule of the project. The TIFIA loan is to be repaid through Measure R funds.

In addition to sales tax revenues from Measure R and Proposition A and C, the other major funding sources are State Proposition 1B (PTMISEA), and CMAQ funds.



**Table 8-4. 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
<b>TOTAL PROGRAMS</b>					
1.5% for Administration		100%	\$689	\$8,373	\$39,400
<b>GRAND TOTAL</b>			<b>\$700</b>	<b>\$8,500</b>	<b>\$40,000</b>





Table 8-5. 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 3% except as noted)		
9		Gold Line Eastside Extension	\$1,310	\$-	\$1,271	\$1,271				FY 2022- 24	FY 2033-35
10		Gold Line Foothill Light Rail Transit Extension	\$758	\$735	\$-	\$735				FY 2010- 12	FY 2015-17
11		Green Line Extension to Los Angeles International Airport	\$200	\$-	\$200	\$200				FY 2010- 12	FY 2015-28 <sup>d</sup>
12		Green Line Extension: Redondo Beach Station to South Bay Corridor	\$280	\$-	\$272	\$272				FY 2028- 30	FY 2033-35
13		San Fernando Valley I-405 Corridor Connection (match to total project cost)	TBD	\$-	\$1,000	\$1,000				FY 2030- 32	FY 2038-39
14		San Fernando Valley North-South Rapidways (Canoga Corridor) - project acceleration	\$188	\$32 <sup>e</sup>	\$150	\$182				FY 2010- 12	FY 2014-16
15		San Fernando Valley East North-South Rapidways - project acceleration	\$70	\$68.5 <sup>e</sup>	\$-	\$68.5				FY 2013- 15	FY 2016-18
16		West Santa Ana Branch Corridor (match to total project cost)	TBD	\$-	\$240	\$240				FY 2015- 17*	FY 2025- 27*
17		Westside Subway Extension - to be opened in segments	\$4,200 <sup>f</sup>	\$900	\$3,174	\$4,074				FY 2013- 15	FY 2034-36



Table 8-5. 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 FY 2010	Expected Completion FY 2039
				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	\$173	\$3,103	\$3,276	\$2,200	\$1,015	\$840*	FY 2010	FY 2039
19		<b>Total New Rail and/or Bus Rapid Transit Capital Projects</b>	<b>\$18,939<sup>h</sup></b>	<b>\$3,408.5</b>	<b>\$10,381.5</b>	<b>\$13,790</b>	<b>\$2,908</b>	<b>\$1,554</b>	<b>\$1,965</b>	FY 2010	FY 2039
20	Highway Capital Projects	<b>Highway Projects: Capital Projects-Carpool Lanes, Highways, Goods Movement, Grade Separations, and Soundwalls</b>									
21			<b>Escalated \$</b>								
22		Alameda Corridor East Grade Separations Phase II	\$1,123	\$200	\$200	\$400	\$200	\$336	\$187 <sup>i</sup>	As funds become available	As funds become available
23		BNSF Grade Separations in Gateway Cities	\$35	\$-	\$35	\$35	\$-	\$-	\$-	As funds become available	As funds become available
24		Countywide Soundwall Construction (Metro regional list and Monterey Park/SR-60)	\$250	\$250	\$-	\$250	\$-	\$-	\$-	FY 2010	FY 2039
25		High Desert Corridor (environmental)	\$33	\$-	\$33	\$33	\$-	\$-	\$-	As funds become available	As funds become available
26		Interstate 5/St. Route 14 Capacity Enhancement	\$161	\$90.8	\$-	90.8	\$15	\$41	\$14 <sup>j</sup>	FY 2010	FY 2013-15
27		Interstate 5 Capacity Enhancement from I-605 to Orange County Line	\$1,240	\$264.8	\$-	\$264.8	\$78	\$834	\$63 <sup>j</sup>	FY 2010	FY 2016-17
28		I-5 Capacity Enhancement from SR-134 to SR-170	\$610	\$271.5	\$-	\$271.5	\$50	\$264	\$24 <sup>j</sup>	FY 2010	FY 2013



Table 8-5. 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 FY 2015
				Minimum	Additional	Total	Federal Funding	State Funding	Local Funding (Rail is 3% except as noted)		
29		I-5 Carmenita Road Interchange Improvement	\$389	\$-	\$138	\$138	\$97	\$154	\$-	FY 2010	FY 2015
30			<b>Current 2008 \$</b>								
31		Highway Operational Improvements in Arroyo Verdugo subregion	\$170	\$-	\$170	\$170	To be determined	To be determined	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 8-5. 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 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		<b>Total Capital Projects Highway: Carpool Lanes, Highways, Goods Movements, Grade Separations, and Soundwalls</b>	<b>\$22,337</b>	<b>\$1,215.1</b>	<b>\$6,664.9</b>	<b>\$7,880</b>	<b>TBD</b>	<b>TBD</b>	<b>\$288</b>	<b>FY 2010</b>	<b>FY 2039</b>
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*	Not Applicable			<b>FY 2010</b>	<b>FY 2039</b>



Table 8-5. 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)		
42	Ops	Rail Operations (New Transit Project Operations and Maintenance)	5%	\$-	\$1,970	\$1,970 <sup>k</sup>				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% <sup>1</sup>	\$250	\$5,660	\$5,910 <sup>k</sup>				FY 2010	FY 2039
44	Tran. Cap.	Metro Rail Capital Projects - System Improvements, Rail Yards, and Rail Cars	2%	\$-	\$788	\$788 <sup>k</sup>				FY 2010	FY 2039
45	Tran. Cap.	MetroLink Capital Improvement Projects within Los Angeles County (Operations, Maintenance, and Expansion)	3%	\$70	\$1,112	\$1,182 <sup>k</sup>				FY 2010	FY 2039
46	<i>Subtotal Transit and Highway Capital Projects</i>		<b>\$41,276<sup>m</sup></b>	<b>\$4,623.6</b>	<b>\$17,046</b>	<b>\$21,670</b>	<b>\$2,908</b>	<b>\$1,554</b>	<b>\$2,253</b>	FY 2010	FY 2039





Table 8-5. 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)		
47	<i>Subtotal page 4</i>			<b>\$320.0</b>	<b>\$17,410</b>	<b>\$17,730</b>	Not Applicable				
48	1.5% for Administration		N/A	\$10	\$590	\$600			FY 2010	FY 2039	
49	<b>Total</b>			<b>\$4,953.6</b>	<b>\$35,046</b>	<b>\$40,000</b>	<b>\$2,908</b>	<b>\$1,554</b>	<b>\$2,253</b>	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/LAX 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 Crenshaw 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.
  - Crenshaw/LAX Project acceleration cost is in (\$2008) dollars identified in Measure R expenditure Plan.
- 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).

### 8.1.3.2 Capital Funds by Source

Table 8-6 provides a summary of the revenues estimated from each of the identified capital funding sources, and compares the revenues to the YOE cost estimated for the LPA. 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/LAX Transit Corridor Project:

- \$1,207 million from Measure R
- \$93.4 million from Proposition C
- \$13.9 million from Proposition A
- \$51.4 million from local cities/County contribution assumed in Measure R
- \$201.2 million from State Proposition 1B PTMISEA
- \$50.2 million from State Regional Improvement Program, STIP
- \$68.2 million from CMAQ
- \$20.0 million from RSTP
- \$8.6 million from FTA Section 5309 Bus Program
- \$1.2 million from federal earmarked funds in prior years (Section 5339 Alternatives Analysis program)

The above listed sources would provide a total of \$1,715 million in capital revenues in YOE dollars. Based on the YOE capital cost estimate of \$1,763.8 million for the LPA, and the estimated revenues, a capital shortfall of \$48.8 million is estimated for the LPA. This shortfall would need to be addressed by identification of additional funds or by other actions, including the value engineering actions previously described.

### 8.1.3.3 Identified Capital Funding Shortfalls

To address shortfalls with Measure R projects, the Metro Board has adopted a Unified Cost Management Process and Policy for actions to take prior to the project advancing to the next project milestone, which for the Crenshaw/LAX Corridor would be the approval of this FEIS/FEIR and entry into final design. These actions, in order of completion, are:

- Value engineering and scope reduction
- New local agency funding resources
- Shorter segmentation
- Other cost reductions within transit corridor
- Other cost reductions within the same sub-region
- Countywide transit cost reductions

As identified previously, Metro has completed a number of value engineering refinements to the project and will continue to refine the project through completion of the preliminary engineering phase to further reduce the cost of the project.



Table 8-6. Capital Funds by Source for LPA (Millions of YOE Dollars)

Item	Expenditure/Revenue
<b>Year of Expenditure Capital Costs</b>	
Total Capital Cost	\$1,763.8
<b>Revenues by Source</b>	
Federal TIFIA Loan Repaid by Measure R 35%	\$545.9
Local Measure R 35% Cash/Bonds	\$661.1
Subtotal Measure R 35%	\$1,207.0
Local Proposition C 25%	\$93.4
Local Proposition A 35%	\$13.9
Local Agency Contributions	\$51.4
State Proposition 1B PTMISEA	\$201.2
State Regional Improvement Program (RIP)	\$50.2
Federal CMAQ	\$68.2
Federal RSTP	\$20.0
Federal Section 5309 Bus	\$8.6
Federal Other <sup>1</sup>	\$1.2
<b>Total</b>	<b>\$1,715.0</b>
<b>Additional Revenues Needed for Shortfall</b>	<b>\$48.8</b>
<b>Total Revenues Needed</b>	<b>\$1,763.8</b>

Source: Metro Regional Programming Division.

<sup>1</sup>Earmarked funds originally directed to Los Angeles World Airports. Used for planning/design of an intermodal transit center at the Aviation/Century Station.

In addition to continuing value engineering, Metro is assuming the local jurisdiction match for transit projects to total 3 percent if the cost of the LPA. This change is estimated to increase the local agency funding for the project by \$2 million in YOE dollars. The combination of the cost clarifications and local agency funding could reduce the shortfall from approximately \$48.8 to \$15.8 million. If this shortfall cannot be offset by value engineering refinements or resulting market conditions through competitive bidding, construction of the shorter segments of the LPA would have to be considered prior to advancement to the next project milestone. The costs of both MOSs are within the estimated capital revenues identified for the project.

**8.1.3.4 Cash Flow Analysis**

The results of the cash flow analysis showing the projected LPA capital expenditures and revenues by fiscal year in YOE dollars are presented in Table 8-7. The analysis indicates the adequacy of the combined capital revenues available to Metro to fund the capital expenditures of the Project (LPA with Partially-Covered LAX Trench Option) both cumulatively and by fiscal year. Because the total capital expenditures for the Project exceed the combined revenues, there will be annual shortfalls.



Table 8-7. Capital Cash Flow for LPA (Thousands YOY Dollars)

	Prior	FY 10	FY 11	FY 12	FY 13	FY 14	FY 15	FY 16	FY 17	FY 18	FY 19	FY 20	Total
<b>YEAR OF EXPENDITURE DOLLARS</b>													
10 GUIDEWAY & TRACK ELEMENTS	-	-	-	-	25,800	106,100	145,700	122,000	48,300	5,000	2,600	2,600	458,000
20 STATIONS, STOPS, TERMINALS, INTERMODAL	-	-	-	-	-	6,500	22,400	28,800	32,000	26,900	-	-	116,500
30 SUPPORT FACILITIES: YARDS, SHOPS, ADMIN. BLDGS	-	-	-	-	-	-	51,300	38,400	14,800	15,300	-	-	119,800
40 SITEWORK & SPECIAL CONDITIONS	-	-	2,500	20,500	20,500	58,100	59,900	75,700	43,300	4,100	3,100	-	267,200
50 SYSTEMS	-	-	-	-	-	-	6,700	43,900	56,500	32,000	1,500	-	140,600
60 ROW, LAND, EXISTING IMPROVEMENTS	-	-	-	14,400	70,000	43,800	-	-	-	-	-	-	128,300
70 VEHICLES (20)	-	-	-	-	-	-	-	30,700	39,500	17,600	-	-	87,800
80 PROFESSIONAL SERV (applies to Cats. 10-50)	-	11,700	18,900	27,600	39,000	44,300	42,500	27,700	25,100	12,400	3,800	3,800	253,000
90 UNALLOCATED CONTINGENCY	-	200	2,300	6,400	7,500	24,200	26,500	25,200	22,900	4,500	-	-	119,700
SUBTOTAL	-	11,900	38,100	150,300	261,000	354,400	408,400	287,400	148,800	24,000	6,500	6,500	1,690,800
PLANNING/ENVIRONMENTAL	5,000	9,600	9,400	200									24,200
<b>TOTAL PROJECT COSTS</b>	5,000	9,600	21,300	38,300	150,300	261,000	354,400	408,400	287,400	148,800	24,000	6,500	1,715,000
<b>FUNDING SOURCES (subject to change)</b>													
<b>Local</b>													
Proposition A 35%			4,800								6,700	2,400	13,900
Proposition C 25%	457		3,600			2,200	68,700	18,400					93,400
TIFIA Loan (Measure R)								125,500	272,400	147,700	300		545,900
Measure R Cash		3,800	11,100			246,300	271,500	107,800	15,000	1,100	4,500		661,100
Local Agency Contributions 3%								51,400					51,400
<b>Subtotal Local</b>	457	3,800	19,500			248,500	340,200	303,100	287,400	148,800	11,500	2,400	1,365,700
<b>State</b>													
Prop 1B PTMISEA				38,300	150,300	12,500							201,200
Regional Improvement Program	535		1,800					31,300			12,500	4,100	50,200
<b>Subtotal State</b>	535	0	1,800	38,300	150,300	12,500		31,300	0	0	12,500	4,100	251,400



**Table 8-7. Capital Cash Flow for LPA (Thousands YOE Dollars) (continued)**

	Prior	FY 10	FY 11	FY 12	FY 13	FY 14	FY 15	FY 16	FY 17	FY 18	FY 19	FY 20	Total
<b>Federal</b>													
Section 5309 Bus and Bus-Related	2,800	5,800											8,600
Congestion Mitigation and Air Quality (CMAQ)							14,200	54,000					68,200
Regional Surface Transportation Prog (RSTP)								20,000					20,000
Other	1,200												1,200
<b>Subtotal Federal</b>	<b>4,000</b>	<b>5,800</b>		<b>0</b>	<b>0</b>	<b>0</b>	<b>14,200</b>	<b>74,000</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>98,000</b>
<b>Total Funding Sources</b>	<b>5,000</b>	<b>9,600</b>	<b>21,300</b>	<b>38,300</b>	<b>150,300</b>	<b>261,000</b>	<b>354,400</b>	<b>408,400</b>	<b>287,400</b>	<b>148,800</b>	<b>24,000</b>	<b>6,500</b>	<b>1,715,000</b>
<b>Surplus/(Shortfall)</b>	(0)	(0)	(0)	(0)	(0)	(0)	0	(0)	(0)	(0)	(0)	(0)	(0)

1. Based on May 5, 2011 draft Preliminary Engineering cost estimate.

2. Costs broken out by FTA Standard Cost Category.

3. SCC Section 70 - Vehicles not escalated, it is assumed that vehicles would be procured using a forward pricing contract.

4. Base year costs are in July 2010 dollars and are escalated at 2% for FY 11 and 3% annually beginning FY12.

5. Prior years are actual expenditures or committed values.

6. Costs will be reevaluated again in June, 2011.

Source: Metro, 2011.

#### 8.1.4 Operations and Maintenance Finance Plan

This section summarizes the proposed O&M financial plan for the LPA including a general description of the proposed funding sources, funds from these sources, and cash flow analysis.

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 LPA and design options assuming revenue service operation in 2018. Table 8-8 shows a summary of sources and uses of funds for the operations and maintenance of the Crenshaw/LAX Transit Corridor. All O&M costs 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 8-9 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 and maintain them through 2040.

#### 8.1.5 Cost Risks and Uncertainties

As with any large infrastructure project in its planning stages, the LPA includes several sources of risks and uncertainties that could potentially affect the capital and operating cost and revenue assumptions.

From a capital cost perspective, they include inflationary risks, the construction schedule, scope, and the cost and schedule of the other Metro projects. On the revenue side, major risks include Measure R revenue shortfalls, the inability to obtain necessary financing, and the availability and timing of funds.

Key areas of risk from an O&M cost perspective are related to cost escalation for labor or fuel and real increases in unit O&M costs for the project or system upon completion. From a revenue perspective, areas of uncertainty include ridership and fare revenue forecasts and sales tax revenues.

### 8.2 Comparative Analysis of the Alternatives

This section presents the results of the comparative analysis of the LPA and No-Build Alternative across a variety of performance criteria typically used to assess transportation projects. The following criteria were used to compare the performance of the alternatives.

- Regional Connectivity
- Environmental Effects
- Economic Development/Land Use
- Community Support
- Capital and Operating Costs
- Cost-Effectiveness



Table 8-8. Operations and Maintenance Cash Flow for the Crenshaw/LAX Transit Corridor

Crenshaw LRT Operations Funding (\$ in millions YOY)	2018	2019	2020	2020	2021	2021	2022	2022	2023	2023	2024	2024	2025	2025	2026	2026	2027	2027	2028	2028	2029	2029	2030	2030	2031	2031	2032	2032	2033	2033	2034	2034	2035	2035	2036	2036	2037	2037	2038	2038	2039	2039	2040	2040
	Total	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040																				
<b>New Rail Service Costs</b>																																												
Crenshaw	1,113.1	41.9	42.8	43.5	44.2	45.0	45.8	46.2	46.9	47.7	48.7	49.4	50.4	51.3	52.5	53.2	54.3	55.3	56.7	57.5	58.7	59.8	61.2																					
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	1,338.9	50.4	51.5	52.3	53.2	54.1	55.0	55.6	56.4	57.3	58.6	59.5	60.6	61.7	63.1	64.1	65.3	66.6	68.1	69.2	70.6	72.0	73.6																					
<b>CMAQ Funding Assumed</b>																																												
Crenshaw CMAQ Funding Assumed	72.8	23.8	24.3	24.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-																					
<b>Other Funding Assumed</b>																																												
Fares	367.2	12.1	12.4	13.3	13.4	14.0	14.2	14.9	15.1	15.7	15.9	16.6	16.8	17.5	17.7	18.3	18.5	19.1	19.3	20.0	20.2	21.0	21.2																					
Measure R Rail Operations (5%)	114.3	2.1	2.1	2.0	4.3	4.5	4.7	4.9	5.1	5.2	5.4	5.6	5.8	6.0	6.2	6.5	6.7	6.9	7.2	7.4	7.6	7.9	-																					
Proposition A35%	314.5	4.5	4.8	4.2	10.3	17.4	17.4	13.9	13.9	13.3	14.3	15.2	15.5	15.0	14.4	14.3	16.5	17.0	17.9	17.6	17.7	18.0	21.5																					
Proposition C5%	32.4	0.2	0.3	0.3	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.9	2.0	2.1	2.2	2.3	2.5	2.6	2.7																					
Proposition C40%	245.3	3.2	3.8	5.2	18.9	9.8	8.9	11.7	12.0	12.6	12.3	11.2	11.4	11.8	13.2	13.2	11.4	11.1	11.1	11.4	12.0	11.7	17.3																					
STA - Population Share	95.1	2.3	2.2	2.0	4.3	4.3	4.4	4.4	4.5	4.4	4.5	4.5	4.6	4.6	4.7	4.8	4.8	4.9	4.9	5.0	5.0	5.1	5.1																					
Section 5309	82.7	1.8	1.2	0.4	0.7	2.7	4.0	4.1	4.1	4.1	4.2	4.2	4.3	4.4	4.4	4.5	4.6	4.7	4.7	4.8	4.9	4.9	5.0																					
Section 5340	14.5	0.3	0.3	0.3	0.6	0.6	0.6	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.8	0.8																					
<b>Total Funding</b>	<b>1,338.9</b>	<b>50.4</b>	<b>51.5</b>	<b>52.3</b>	<b>53.2</b>	<b>54.1</b>	<b>55.0</b>	<b>55.6</b>	<b>56.4</b>	<b>57.3</b>	<b>58.6</b>	<b>59.5</b>	<b>60.6</b>	<b>61.7</b>	<b>63.1</b>	<b>64.1</b>	<b>65.3</b>	<b>66.6</b>	<b>68.1</b>	<b>69.2</b>	<b>70.6</b>	<b>72.0</b>	<b>73.6</b>																					

Source: Metro, 2011.



Table 8-9. 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	2025	
		(\$ in millions YOE)																	
<b>SOURCES OF FUNDS</b>																			
<b>Local</b>																			
1	Fares - Red/Purple Lines	29.0	34.8	35.2	39.7	40.2	46.2	46.8	49.7	50.3	54.0	54.7	58.4	74.5	77.3	78.2	82.4		
2	Fares - Blue Line (including Expo & Reg'l Conn.)	16.5	19.8	28.8	32.0	32.4	37.2	43.8	47.2	47.8	51.3	55.5	59.1	59.8	62.4	63.1	66.5		
3	Fares - Green Line	7.2	8.7	8.8	9.9	10.0	11.5	11.7	12.4	12.5	17.9	18.2	19.4	19.7	20.5	20.8	21.9		
4	Fares - Gold Line (including Eastside & Foothill)	8.0	8.7	8.8	9.9	10.0	11.5	18.7	19.8	20.1	21.5	21.8	29.6	30.0	31.2	31.6	33.3		
5	Fares - Crenshaw Line	-	-	-	-	-	-	-	-	-	12.1	12.4	13.3	13.4	14.0	14.2	14.9		
6	Fares - West Santa Ana Line	-	-	-	-	-	-	-	-	-	-	-	9.9	10.1	10.5	10.6	11.2		
8	Proposition A 35%	41.0	26.8	23.2	36.5	41.1	42.3	53.0	59.4	58.0	70.0	81.4	80.0	96.0	180.0	180.0	137.0		
9	Proposition C 5 % (Security)	-	-	-	-	-	0.4	1.5	2.6	3.6	4.6	5.7	6.8	8.0	9.2	10.6	12.0		
10	Proposition C 40 % (Discretionary)	78.3	-	35.0	20.4	23.0	20.0	34.8	21.6	27.6	70.1	86.0	134.3	228.0	117.7	107.0	140.5		
11	TDA Article 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
13	Other (Advertising, General, Misc)	1.6	8.0	8.2	8.3	8.5	25.0	25.5	28.0	26.5	27.1	27.6	28.1	28.6	29.1	29.5	29.9		
14	Measure R Sales Tax	26.5	28.9	30.9	33.2	35.5	37.6	39.7	41.7	43.7	45.8	47.9	50.0	52.1	54.3	56.5	58.9		
15	<b>Subtotal Local</b>	<b>208.1</b>	<b>135.6</b>	<b>178.9</b>	<b>189.9</b>	<b>200.7</b>	<b>231.9</b>	<b>275.5</b>	<b>282.4</b>	<b>290.2</b>	<b>374.4</b>	<b>411.3</b>	<b>488.8</b>	<b>620.1</b>	<b>606.1</b>	<b>602.2</b>	<b>608.4</b>		
16	<b>State</b>																		
17	STA - Population Share	-	52.8	47.3	47.3	47.6	48.1	48.6	49.0	49.5	50.0	50.5	51.0	51.5	52.1	52.6	53.1		
18	<b>Subtotal State</b>	-	<b>52.8</b>	<b>47.3</b>	<b>47.3</b>	<b>47.6</b>	<b>48.1</b>	<b>48.6</b>	<b>49.0</b>	<b>49.5</b>	<b>50.0</b>	<b>50.5</b>	<b>51.0</b>	<b>51.5</b>	<b>52.1</b>	<b>52.6</b>	<b>53.1</b>		
19	<b>Federal</b>																		
20	Section 5309 Fixed Guideway Modernization	37.9	40.3	40.9	41.4	42.0	42.6	43.2	43.8	43.2	39.8	27.8	9.8	8.1	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	9.0	29.2	20.4	21.3	-	28.4	28.5	29.0	32.6	33.3	53.2	-	-	-	-		
24	<b>Subtotal Federal</b>	<b>53.4</b>	<b>55.8</b>	<b>76.7</b>	<b>68.5</b>	<b>70.1</b>	<b>49.5</b>	<b>78.6</b>	<b>79.4</b>	<b>79.4</b>	<b>79.7</b>	<b>68.5</b>	<b>70.5</b>	<b>15.7</b>	<b>40.5</b>	<b>56.1</b>	<b>56.9</b>		
25	<b>TOTAL SOURCES</b>	<b>261.5</b>	<b>244.1</b>	<b>303.0</b>	<b>305.7</b>	<b>318.4</b>	<b>329.4</b>	<b>402.7</b>	<b>410.8</b>	<b>419.2</b>	<b>504.1</b>	<b>530.3</b>	<b>610.4</b>	<b>687.4</b>	<b>698.6</b>	<b>710.8</b>	<b>718.4</b>		





Table 8-9. 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	2025	
		(\$ in millions)																	
26	<b>USES OF FUNDS</b>																		
27	Red/Purple Line	72.0	70.2	72.0	74.0	76.1	79.4	81.7	82.0	83.7	85.4	87.3	95.6	97.3	98.9	100.6	101.7		
28	Westside Subway Extension	-	-	-	-	-	-	-	-	-	-	-	-	-	53.2	54.1	55.0	55.6	
29	Blue Line	71.8	71.1	73.7	75.9	79.4	79.5	84.0	85.4	87.1	92.2	94.2	95.8	97.4	99.0	100.7	101.8		
30	Green Line	25.8	25.5	26.3	26.9	28.2	28.1	28.9	30.5	31.1	49.4	50.5	51.3	52.2	53.1	54.0	54.6		
31	Gold Line - Pasadena (including Foothill)	23.0	24.2	24.7	25.5	26.7	26.7	52.3	53.1	54.2	55.3	56.6	57.4	58.4	59.4	60.5	61.0		
32	Gold Line - Eastside Extension	15.4	15.1	15.5	16.0	16.8	16.7	17.1	17.3	17.7	18.0	18.5	40.5	41.2	41.8	42.7	43.0		
33	Blue Line - Exposition Phase I	-	-	33.8	34.9	36.5	36.5	37.2	38.9	39.7	40.5	41.4	42.1	42.8	43.5	44.3	44.8		
34	Blue Line - Exposition Phase II	-	-	-	-	-	-	24.3	24.6	25.1	25.6	26.2	26.6	27.1	27.5	28.0	28.3		
35	Crenshaw Line	-	-	-	-	-	-	-	-	-	41.9	42.8	43.5	44.2	45.0	45.8	46.2		
36	West Santa Ana Line	-	-	-	-	-	-	-	-	-	-	-	34.2	34.7	35.3	36.0	36.3		
37	Regional Connector	-	-	-	-	-	-	-	-	-	-	12.5	12.7	12.9	13.1	13.3	13.5		
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	22.9	25.1	38.7	39.3	40.0	40.4		
39	Rail Security - Blue Line incl. Expo/Reg'l Conn.	12.2	12.5	19.0	19.4	19.7	20.1	25.4	26.0	26.5	27.6	30.4	30.9	31.4	31.9	32.5	32.8		
40	Rail Security - Green Line	6.5	6.6	6.9	6.9	7.1	7.2	7.4	7.8	8.0	12.7	13.0	13.2	13.4	13.6	13.9	14.0		
41	Rail Security - Gold Line including Eastside	12.5	13.4	13.7	13.9	14.2	14.5	23.3	23.6	24.1	24.6	25.2	32.8	33.4	34.0	34.6	34.9		
42	Rail Security - Crenshaw Line	-	-	-	-	-	-	-	-	-	8.5	8.7	8.8	9.0	9.1	9.3	9.4		
43	Rail Security - West Santa Ana Line	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
44	Red Line special anti-terrorism activities	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
45	Subtotal Metro	257.7	257.7	305.3	313.1	324.9	329.4	402.7	410.8	419.2	504.1	530.3	610.4	687.4	698.6	710.8	718.4		
	<b>TOTAL USES</b>	257.7	257.7	305.3	313.1	324.9	329.4	402.7	410.8	419.2	504.1	530.3	610.4	687.4	698.6	710.8	718.4		
	<b>CASH BALANCE</b>																		
	Beginning Fiscal Year Cash Balance	26.0	29.8	16.3	13.9	6.5	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	3.8	(13.5)	(2.4)	(7.5)	(6.5)	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	29.8	16.3	13.9	6.5	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 8-9. 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	
		2026		2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	
		(\$ in millions)															
<b>SOURCES OF FUNDS</b>																	
<b>Local</b>																	
1	Fares - Red/Purple Lines	83.4	86.9	88.0	91.8	92.9	96.4	97.6	100.8	102.0	105.3	106.6	110.1	111.5	115.7	117.1	
2	Fares - Blue Line (including Expo & Reg'l Conn.)	67.3	70.2	71.0	74.1	75.0	77.8	78.8	81.3	82.3	85.0	86.1	88.9	90.0	93.4	94.5	
3	Fares - Green Line	22.1	23.1	23.4	24.4	24.7	25.6	25.9	26.8	27.1	28.0	28.3	29.2	29.6	30.7	31.1	
4	Fares - Gold Line (including Eastside & Foothill)	33.7	35.1	35.6	37.1	37.5	38.9	39.4	40.7	41.2	42.6	43.1	44.5	45.1	46.7	47.3	
5	Fares - Crenshaw Line	15.1	15.7	15.9	16.6	16.8	17.5	17.7	18.3	18.5	19.1	19.3	20.0	20.2	21.0	21.2	
6	Fares - West Santa Ana Line	11.3	11.8	12.0	12.5	12.6	13.1	13.3	13.7	13.9	14.3	14.5	15.0	15.2	15.7	15.9	
8	Proposition A 35%	136.0	132.0	143.0	153.0	156.0	150.0	142.0	138.0	165.0	170.0	180.0	175.0	176.0	179.0	220.0	
9	Proposition C 5 % (Security)	13.5	14.8	16.2	17.5	18.8	20.0	21.3	22.6	24.1	25.5	26.9	28.3	29.8	31.2	32.6	
10	Proposition C 40 % (Discretionary)	143.6	154.1	150.4	136.2	139.1	144.3	161.0	159.3	138.4	134.4	134.8	138.2	145.0	141.5	208.9	
11	TDA Article 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13	Other (Advertising, General, Misc)	30.3	30.8	31.4	32.0	32.6	33.2	33.8	34.4	35.1	35.8	36.5	37.2	38.0	38.7	39.4	
14	Measure R Sales Tax	61.3	63.7	66.2	68.6	71.1	73.5	75.9	78.5	81.2	84.0	86.6	89.5	92.4	95.1	-	
15	<b>Subtotal Local</b>	<b>617.7</b>	<b>638.3</b>	<b>653.0</b>	<b>663.6</b>	<b>677.0</b>	<b>690.2</b>	<b>706.6</b>	<b>714.3</b>	<b>728.8</b>	<b>744.0</b>	<b>762.7</b>	<b>775.8</b>	<b>792.6</b>	<b>808.6</b>	<b>828.1</b>	
<b>State</b>																	
17	STA - Population Share	53.6	54.2	54.7	55.3	55.8	56.4	56.9	57.5	58.1	58.7	59.2	59.8	60.4	61.0	61.7	
18	<b>Subtotal State</b>	<b>53.6</b>	<b>54.2</b>	<b>54.7</b>	<b>55.3</b>	<b>55.8</b>	<b>56.4</b>	<b>56.9</b>	<b>57.5</b>	<b>58.1</b>	<b>58.7</b>	<b>59.2</b>	<b>59.8</b>	<b>60.4</b>	<b>61.0</b>	<b>61.7</b>	
<b>Federal</b>																	
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)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
24	<b>Subtotal Federal</b>	<b>57.7</b>	<b>58.5</b>	<b>59.3</b>	<b>60.1</b>	<b>61.0</b>	<b>61.8</b>	<b>62.7</b>	<b>63.6</b>	<b>64.5</b>	<b>65.4</b>	<b>66.3</b>	<b>67.2</b>	<b>68.2</b>	<b>69.1</b>	<b>70.1</b>	
25	<b>TOTAL SOURCES</b>	<b>729.0</b>	<b>751.0</b>	<b>767.1</b>	<b>779.0</b>	<b>793.8</b>	<b>808.4</b>	<b>826.2</b>	<b>835.4</b>	<b>851.4</b>	<b>868.0</b>	<b>888.3</b>	<b>902.9</b>	<b>921.2</b>	<b>938.8</b>	<b>959.9</b>	



Table 8-9. Operations and Maintenance Cash Flow for the Metro Rail System (continued)

	2025 2026	2026 2027	2027 2028	2028 2029	2029 2030	2030 2031	2031 2032	2032 2033	2033 2034	2034 2035	2035 2036	2036 2037	2037 2038	2038 2039	2039 2040
<b>26</b>	<b>USES OF FUNDS</b>														
27	103.2	113.0	115.3	117.2	119.4	121.6	124.2	126.2	128.6	131.1	134.1	136.4	139.1	141.8	144.9
28	56.4	57.3	58.5	59.5	60.6	61.7	63.1	60.6	61.7	62.9	64.4	65.5	66.8	68.1	69.6
29	103.3	105.0	107.2	108.9	111.0	113.0	115.4	117.3	119.5	121.8	124.6	126.7	129.3	131.8	134.7
30	55.4	56.3	57.4	58.4	59.5	60.6	61.9	62.8	64.1	65.3	66.8	67.9	69.3	70.6	72.2
31	61.9	62.9	64.3	65.3	66.5	67.8	69.3	70.3	71.7	73.0	74.8	76.0	77.5	79.0	80.9
32	43.6	44.3	45.4	46.0	46.9	47.7	48.9	49.5	50.5	51.5	52.8	53.5	54.6	55.7	57.1
33	45.4	46.1	47.1	47.9	48.8	49.7	50.7	51.5	52.5	53.6	54.8	55.7	56.8	57.9	59.2
34	28.7	29.2	29.8	30.3	30.9	31.4	32.1	32.6	33.2	33.9	34.7	35.2	36.0	36.7	37.5
35	46.9	47.7	48.7	49.4	50.4	51.3	52.5	53.2	54.3	55.3	56.7	57.5	58.7	59.8	61.2
36	36.8	37.4	30.4	30.8	31.4	31.9	32.7	33.2	33.8	34.4	35.3	35.8	36.6	37.3	38.2
37	13.7	13.9	14.2	14.4	14.7	15.0	15.3	15.5	15.8	16.1	16.5	16.8	17.1	17.4	17.8
38	41.0	43.8	44.7	45.5	46.3	47.2	48.2	48.9	49.9	50.9	52.0	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	14.2	14.4	14.7	15.0	15.3	15.6	15.9	16.1	16.4	16.8	17.1	17.4	17.8	18.1	18.5
41	35.4	36.0	36.8	37.4	38.1	38.8	39.7	40.2	41.0	41.8	42.8	43.5	44.4	45.2	46.3
42	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
43	-	-	7.9	8.1	8.2	8.4	8.5	8.7	8.8	9.0	9.2	9.4	9.6	9.7	9.9
44															
45	729.0	751.0	767.1	779.0	793.8	808.4	826.2	835.4	851.4	868.0	888.3	902.9	921.2	938.8	959.9
	<b>729.0</b>	<b>751.0</b>	<b>767.1</b>	<b>779.0</b>	<b>793.8</b>	<b>808.4</b>	<b>826.2</b>	<b>835.4</b>	<b>851.4</b>	<b>868.0</b>	<b>888.3</b>	<b>902.9</b>	<b>921.2</b>	<b>938.8</b>	<b>959.9</b>
<b>CASH BALANCE</b>															
	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
	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
	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: Metro, 2011.

- Financial Capability
- Ridership
- Travel Time Savings

### 8.2.1 Regional Connectivity

The LPA 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 No-Build Alternative would not increase regional connectivity and improve access to major activity centers and travel markets in West Los Angeles, Hollywood and Downtown Los Angeles.

### 8.2.2 Environmental Effects

The No-Build Alternative would not include construction activity, as a result, it would not have impacts related to displacement (no property acquisition or relocation would be necessary), or construction air quality. The LPA would result in potentially adverse construction effects. Implementation of mitigation would reduce all of these effects to less than adverse. However, the project would result in a significant impact to air quality during construction under CEQA (no adverse effect under NEPA). The LPA would result in lower regional vehicle miles of travel (VMT) and a reduction in Greenhouse Gases when compared to the No-Build Alternative.

The design options and MOSs would not result in any additional adverse effects than described for the LPA. The Site #14 – Arbor Vitae/Bellanca maintenance facility would result in adverse effects from displacement and relocation, economic and fiscal effects, noise and air quality during construction. All other potential adverse effects would be mitigated to less than adverse levels.

### 8.2.3 Economic Development and Land Use

The No-Build Alternative 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 LPA, design options, and MOSs would increase accessibility to Edward Vincent Jr. (from Florence/West Station), Leimert Park (from Crenshaw/Vernon or Crenshaw/King Stations, and Grevillea Park (from Florence/La Brea Station) and would improve public transit access to 33 community facilities and public services located within 0.25 mile. The LPA would also result in 400 additional construction jobs and a \$73.2 million increase in economic output during construction and 250 additional jobs and \$20.9 million increase in economic output during operation. The No-Build Alternative would not result in additional jobs or economic output.

The LPA, design options and MOSs follow the same general alignment and the same land use policies apply. The response of developers to invest in station areas may be slightly higher for the LPA compared to the MOSs. The optional stations (Aviation/Manchester and Crenshaw/Vernon) could provide additional development opportunities when compared to the LPA.

**8.2.4 Community Support**

There were 1,234 comments received during the circulation period for the DEIS/DEIR. There were 198 written comments and oral comments made by 53 speakers received during the circulation period for the Supplemental Draft Environmental Impact Statement/Recirculated Draft Environmental Impact Report (SDEIS/RDEIR). Comments were received from federal, state, and local agencies, elected officials, community organizations, transit advocates, and from members of the general public. The most frequent comment topics for the DEIS/DEIR included alignments/routes, mode, public safety, traffic and parking, historic and cultural resources, connectivity, environmental justice and economic development. The most frequent comment topics for the SDEIS/RDEIR were regarding the proposed maintenance facility alternatives, focusing on noise, economics, displacement, construction, traffic and air quality.

**Alignments/Routes**

Many of the received comments concerned potential connections to existing transit lines, particularly the Metro Red, Purple, Blue, and Green Lines, as well as the Exposition Light Rail Transit LRT Line (under construction). Particular interests focused on regional connectivity, especially active venues and destination centers, such as Hollywood, LAX, South Bay, Downtown Los Angeles, and the Westside. 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. Several comments indicated less desire for a connection at Wilshire Boulevard/Crenshaw Boulevard.

**Mode**

Mode was a frequent comment topic. Most remarks expressed support for light rail transit (LRT), as opposed to bus-based services. Stakeholders urged the consideration of grade separations (either below grade or at grade). Many commenters urged for a fully-grade separated alignment. There was concern that an at-grade alignment would degrade the aesthetics, culture, and history of portions of the Crenshaw/LAX Transit 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. There were several comments from residents who requested the same level of service and amenities that affluent communities receive.

Comments relating to bus services varied. 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, as opposed to light rail, and would cause less disruption, would cost less, and could be implemented sooner. Some comments were not in support of any additional bus services. Other comments suggested a continued need for local and circulator bus services.

**Maintenance Facility**

Comments received related to maintenance facilities, primarily related to noise, economics, displacement, construction, traffic and air quality. Primarily these comments were related to the Site #17 – Marine/Redondo Beach and Division 22 Northern

Expansion Alternatives, which were not selected as the preferred maintenance facility site.

### **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 grade-crossings.

### **Traffic and Parking**

Generally, the concerns regarded potential increases in congestion during construction and potentially during LRT operations. Specifically, Slauson Avenue was cited as a concern for many commenters.

### **Historic and Cultural Resources**

Preservation of the character, culture, and history of the Crenshaw/LAX Transit Corridor were paramount. Stakeholders expressed a fear that the community would change, and that minority and small business owners 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**

Equity issues were strongly expressed. 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.

## **8.2.5 Capital and Operating Costs**

The capital cost for the Project (LPA with Partially-Covered LAX Trench Option) is estimated at \$1.55 billion in 2010 dollars, or \$1.76 billion in YOE dollars (see Table 8-1). The cost estimates for each of the design options providing for the additional stations range from \$9.42 million, or \$11.58 million in YOE dollars, for the at-grade optional Aviation/Manchester Station to \$106.31 million, or \$130.74 million in YOE dollars, for the optional Crenshaw/Vernon Station. The cut-and-cover crossing at Centinela is estimated to cost \$20.6 million, or \$25.33 million in YOE dollars. The Partially-Covered LAX Trench Option, which is included in the project costs, would result in a cost savings of \$41 million or \$46.5 million in YOE. This savings is already reflected in the cost



estimate. The MOSs would reduce capital costs because of the shorter alignment over the LPA. MOS-Century, with the southern terminus at the Aviation/Century Station, would reduce the base year capital cost by \$122.85 million, or \$140.23 million in YOE dollars. MOS-King, with the northern terminus at the Crenshaw/King Station, would reduce the base year capital cost by \$257.52 million, or \$293.96 million in YOE dollars.

The Project will cost an additional \$51.3 million annually to operate and maintain, compared to the No-Build Alternative. The provision of rail security for the Project is estimated to cost an additional \$10.4 million, resulting in a total annual increase of \$61.7 million. The inclusion of the Aviation/Manchester Station and Crenshaw/Vernon Station options would result in a slight increase in the annual O&M cost, as compared to the Project. The MOSs would reduce the annual O&M cost compared to the full length Project.

### **8.2.6 Cost Effectiveness**

The LPA, MOSs, and design options were determined to rate less than the FTA Medium rating necessary to qualify for a cost effectiveness rating under FTA guidance in effect as of September 2009.

### **8.2.7 Financial Capability**

The Los Angeles County Measure R program, approved by the voters in November 2008, would be the primary capital funding source for the proposed project. Measure R along with other sources of funds would provide a total of \$1,715.0 million in year of expenditure funds that could be used to finance the capital costs of the LPA. The Measure R funds would be used to repay the TFIA loan obtained to accelerate or maintain the implementation of the project.

Based on the year of expenditure capital costs of the LPA and the estimated revenues, a combination of cost reductions and/or additional revenues will need to be identified to fully fund the capital costs of the LPA and design options. Only the MOSs could be funded without cost reductions or additional funding. The gap, or shortfall in funding for the LPA, is estimated at \$48.8 million.

As identified previously, Metro has completed a number of value engineering refinements to the project and will continue to refine the project through completion of the preliminary engineering phase to further reduce the cost of the project. The combination of the \$31 million funding transfer and local agency funding would reduce the shortfall from \$48.8 to \$15.8 million. Despite the need to close a small gap between the project cost and budget, this estimated shortfall for LPA would not present a great enough revenue shortfall to render the project as financially infeasible.

The current Metro LRTP provides funding through the existing local sources (Prop A/Prop C) and additional Measure R revenues to fund the operating and maintenance costs of the LPA and design options, including the MOSs.

### 8.2.8 Ridership

The LPA would result in 12,625 daily boarding in 2030. The optional stations would increase ridership by approximately 500 daily boardings. The MOSs would decrease ridership by approximately 4,500 daily boardings.

### 8.2.9 Travel Time Savings

The LPA would have a travel time savings of 21.6 minutes saved traveling from the Exposition Line to the Metro Green Line in 2030. The No-Build Alternative would not result in any travel time savings. The optional station design options would increase travel times by approximately two minutes compared to the LPA. The cut-and-cover crossing at Centinela would increase travel times compared to the LPA. The alternate southwest portal at King would have no effect on travel time. The MOSs would not connect the two rail lines and travel times would increase significantly with a rail to bus transfer needed to complete the connection.

## 8.3 Trade Offs Analysis

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

The No-Build Alternative would not achieve the level of mobility and accessibility needed by communities within the Crenshaw/LAX 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 continue to increase, greenhouse gas emissions would remain unchecked and the corridor communities would continue to rely on non-renewable energy sources.

The LPA contains a combination of exclusive right-of-way segments (at-grade, below grade and elevated), which minimizes conflicts with traffic and provides faster and more reliable travel times. The speeds associated with the LPA offers the greatest potential improvement in ridership over the No-Build Alternative. Travel times are more reliable over the long run as congestion on the roadway network affect vehicle traffic. The LPA is also able to take advantage of existing transit investments, such as the Metro Green Line. Consequently, service on the LPA can provide connections more deeply into the South Bay Area along the Metro Green Line. In addition, a portion of the LPA also facilitates the extension of the Metro Green Line in the direction of LAX. Importantly, the substantial infrastructure investment associated with the LPA is typically more catalytic in encouraging transit-supportive land uses envisioned by many communities within the corridor. Two of the design options for the LPA include optional stations at Manchester near Westchester and Vernon near Leimert Park. The inclusion of stations at these locations could spur transit-oriented development and provide access to these communities. However, a station at Vernon Avenue would be required to be below-grade





and would cost approximately \$130.74 million in YOE dollars. In addition, the Crenshaw/King Station is located approximately 0.6-mile from the optional Crenshaw/Vernon Station, which would lead to duplicated service. The Aviation/Manchester Station has one of the lower ridership projections and many members of the community expressed concern about locating transit infrastructure, such as a park-and-ride lot adjacent to their community. The cut-and-cover crossing at Centinela would provide a grade-separation across Centinela Avenue which could improve operational reliability along this segment of the Harbor Subdivision and facilitate the flow of vehicular traffic along Centinela Avenue. However, the lack of significant traffic and safety impacts at this intersection does not require its inclusion into the LPA. The alternate southwest portal at the Crenshaw/King Station would provide increased access to the Baldwin Hills Crenshaw Plaza. Inclusion of this option would require the granting of easements for the portal and/or private funding.

The LPA has significantly higher capital costs compared to the No-Build Alternative, requiring greater financial resources. The at-grade portion of the alignment from 39th Street to Exposition Boulevard that was determined to be infeasible introduced significant new costs above those for the Base LRT Alternative in the DEIS/DEIR that caused the LPA to exceed the limits of the established financial plan for the project. The cost for the LPA increased to \$1.76 billion in YOE dollars, which exceeds the projected revenues of \$1.715 billion in the financial plan. Additional cost savings and potential funding sources need to be identified which could help bridge the gap in funding should the final cost estimate after further value engineering exceed the financial plan. The MOSs offer shorter project alignment alternatives which would fit within the financial plan for the project.

In general, the environmental effects of the MOSs are similar to those described for the LPA. However, a shorter terminus would shift some of the local circulation patterns and parking demand to the new termini at either the Crenshaw/King or Aviation/Century Stations. The implementation of one of the MOSs would result in a substantial reduction in regional connectivity compared to the LPA. The bus connection to make the additional connections between the Metro Green and Exposition Lines would substantially increase travel times for both MOSs and ridership projections show a 60 percent decrease in daily boardings. This would result in a significant reduction in the ability to achieve the project goals of regional connectivity and mobility when compared to the LPA.



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