7. COMPARISON OF ALTERNATIVES

7.1 Introduction

Six alternatives have been evaluated in detail in this DEIR for the Exposition Corridor Transit Project Phase 2 (Expo Phase 2): the No-Build Alternative, the Transportation Systems Management (TSM) Alternative, and four Light-Rail Transit (LRT) Alternatives. Using the detailed information and analysis contained in other sections of this document, this chapter compares the various alternatives according to their performance with respect to environmental performance, cost effectiveness, and achievement of project goals. Each of the alternatives is briefly described below. Detailed descriptions of the alternatives are included in Chapter 2 (Project Alternatives).

7.1.1 No-Build Alternative

The No-Build Alternative consists of the existing transit services as well as improvements explicitly committed to be constructed by the year 2030 as defined in the Southern California Association of Governments (SCAG) 2008 Regional Transportation Plan (RTP) and the Metro Long Range Transportation Plan (2001, currently being updated). The No-Build Alternative is used for comparison purposes in order to assess the relative benefits and impacts of constructing a new transit project versus constructing only projects which are already funded and planned for in the RTP.

7.1.2 Transportation Systems Management (TSM) Alternative

The Transportation Systems Management (TSM) Alternative identifies transit improvements above and beyond the No-Build Alternative with the goal of improving transit services as much as possible without major capital investments in new infrastructure, and specifically without constructing an LRT Alternative.

The TSM Alternative would include three basic components: addition of a rapid bus route connecting downtown Culver City with downtown Santa Monica; associated service improvements on selected north/south routes to feed stops along the new rapid bus route; and service improvements on selected routes connecting Westside communities to the Expo Phase 1 LRT terminus.

7.1.3 Light-Rail Transit (LRT) Alternatives

The four LRT Alternatives consist of the various combinations of five alignment segments defined through the screening process (refer to Appendix H). The segments correspond roughly to physical boundaries between areas of the project, or alternate street alignments that the project would follow, and each LRT Alternative is comprised of some combination of three segments. There are two alternate alignments on both the east and west ends of the project (Segment 1 [Expo ROW] and Segment 1a [Venice/Sepulveda] and Segment 3 [Olympic] and Segment 3a [Colorado], respectively) joined by a common center segment (Segment 2 [Sepulveda to Cloverfield]). These alternatives would begin at the terminus of the Expo Phase 1

in Culver City and would terminate in downtown Santa Monica in the vicinity of 4th Street and Colorado Avenue. Depending on the alternative, the alignments between these two points would vary as described below:

LRT Alternative 1 (Expo ROW–Olympic Alternative, Segments 1, 2, and 3)

LRT Alternative 1 (LRT 1) would utilize approximately 5 miles of the existing Exposition ROW from the Expo Phase 1 terminus until reaching Olympic Boulevard in Santa Monica. From that point, the alternative would follow Olympic Boulevard to the proposed terminus station at Colorado/4th Street.

LRT Alternative 2 (Expo ROW–Colorado Alternative, Segments 1, 2, and 3a)

LRT Alternative 2 (LRT 2) would also utilize the existing Exposition ROW from the Expo Phase 1 terminus until reaching Olympic Boulevard in Santa Monica. From that point, the alternative would continue within the Exposition ROW to west of 19th Street, then diverge from the ROW and enter onto Colorado Avenue to the proposed terminus station at Colorado/4th Street.

LRT Alternative 3 (Venice/Sepulveda–Olympic Alternative, Segments 1a, 2, and 3)

LRT Alternative 3 (LRT 3) would begin at the Expo Phase 1 terminus and follow Venice Boulevard to Sepulveda Boulevard, where it would turn north and follow Sepulveda until reaching the Exposition ROW. The alternative would then continue westward along the Exposition ROW to Olympic Boulevard in Santa Monica. From that point, the alternative would follow Olympic Boulevard to the proposed terminus station at Colorado/4th Street.

LRT Alternative 4 (Venice/Sepulveda–Colorado Alternative, Segments 1a, 2, and 3a)

LRT Alternative 4 (LRT 4) would begin at the Expo Phase 1 terminus and follow Venice Boulevard to Sepulveda Boulevard, where it would turn north and follow Sepulveda until reaching the Exposition ROW. The alignment would then continue westward along the Exposition ROW to west of 19th Street, then diverge from the ROW and enter onto Colorado Avenue to the proposed terminus station at Colorado/4th Street.

7.2 Environmental Performance

The DEIR has provided a comprehensive evaluation of the environmental impacts of the project alternatives. When compared to the No-Build and TSM Alternatives, any of the LRT Alternatives provide many beneficial effects including the following:

- Improved mobility for people on the Westside
- Improved access to jobs, education, and housing for low-income and minority populations
- Improved access to cultural and community facilities
- Long-term air quality and climate change improvements

Several areas of impact function as key differentiators in summarizing the potentially negative impacts of the LRT Alternatives. While impacts may have been identified in other resource

areas, they either impact all alternatives equally or do not otherwise serve to differentiate between the alternatives.

7.2.1 Transportation/Traffic

LRT Alternative 1 (Expo ROW–Olympic Alternative, Segments 1, 2, and 3)

No traffic impacts that could not be mitigated were identified.

LRT Alternative 2 (Expo ROW–Colorado Alternative, Segments 1, 2, and 3a)

No traffic impacts that could not be mitigated were identified.

LRT Alternative 3 (Venice/Sepulveda–Olympic Alternative, Segments 1a, 2, and 3)

LRT 3 results in two intersection impacts that cannot be mitigated: Sepulveda Boulevard/Palms Boulevard and Girard Avenue/Midvale Avenue/Venice Boulevard.

LRT Alternative 4 (Venice/Sepulveda–Colorado Alternative, Segments 1a, 2, and 3a)

LRT 4 results in two intersection impacts that cannot be mitigated: Sepulveda Boulevard/Palms Boulevard and Girard Avenue/Midvale Avenue/Venice Boulevard.

7.2.2 Aesthetics

LRT Alternative 1 (Expo ROW–Olympic Alternative, Segments 1, 2, and 3)

Visual quality impacts would be experienced in the Expo/Westwood Station area associated with the placement of a transit corridor and related amenities in this single-family neighborhood. Also, removal of the coral trees and the reconfiguration of Olympic Boulevard would result in a loss of an important aesthetic feature. These impacts cannot be mitigated, although efforts would be made through the design process to ameliorate the impacts.

LRT Alternative 2 (Expo ROW–Colorado Alternative, Segments 1, 2, and 3a)

Visual quality impacts would be experienced in the Expo/Westwood Station area associated with the placement of a transit corridor and related amenities in this single-family neighborhood. This impact cannot be mitigated, although efforts would be made through the design process to ameliorate the impact.

LRT Alternative 3 (Venice/Sepulveda–Olympic Alternative, Segments 1a, 2, and 3)

Visual quality impacts would be experienced along Venice and Sepulveda Boulevards associated with property acquisitions, the reconfigured streetscape, the removal of the existing landscaping, the loss of existing street trees, and the visual dominance of the aerial portions of LRT 3. Also, removal of the coral trees and the reconfiguration of Olympic Boulevard would result in a loss of an important aesthetic feature. These impacts cannot be mitigated, although efforts would be made through the design process to ameliorate the impacts.

LRT Alternative 4 (Venice/Sepulveda–Colorado Alternative, Segments 1a, 2, and 3a)

Visual quality impacts would be experienced along Venice and Sepulveda Boulevards associated with property acquisitions, the reconfigured streetscape, the removal of the existing landscaping, the loss of existing street trees, and the visual dominance of the aerial portions of LRT 4. This impact cannot be mitigated, although efforts would be made through the design process to ameliorate the impact.

7.2.3 Cultural Resources

LRT Alternative 1 (Expo ROW–Olympic Alternative, Segments 1, 2, and 3)

LRT 1 has a potential impact on one registered historic resource and one potentially eligible historic resource. With mitigation, no impact would occur.

LRT Alternative 2 (Expo ROW–Colorado Alternative, Segments 1, 2, and 3a)

LRT 2 has a potential impact on one registered historic resource, one eligible resource, and one potentially eligible resource. With mitigation, no impact would occur.

LRT Alternative 3 (Venice/Sepulveda–Olympic Alternative, Segments 1a, 2, and 3)

LRT 3 has a potential impact on one registered historic resource, one eligible, and four potentially eligible historic resources. With mitigation, no impact would occur.

LRT Alternative 4 (Venice/Sepulveda–Colorado Alternative, Segments 1a, 2, and 3a)

LRT 4 has a potential impact on one registered historic resource, one eligible resource, and five potentially eligible historic resources. With mitigation, no impact would occur.

7.2.4 Socioeconomics

LRT Alternative 1 (Expo ROW–Olympic Alternative, Segments 1, 2, and 3)

LRT 1 would result in up to 62 total property acquisitions, 13 full acquisitions, and 49 partial acquisitions, including an estimated 5 individual resident relocations. All impacts would be mitigated through adherence to the California *Relocation Assistance Act*.

LRT Alternative 2 (Expo ROW–Colorado Alternative, Segments 1, 2, and 3a)

LRT 2 would result in up to 83 property acquisitions, 13 full acquisitions, and 70 partial acquisitions, including an estimated 3 individual resident relocations. All impacts would be mitigated through adherence to the California *Relocation Assistance Act*.

LRT Alternative 3 (Venice/Sepulveda–Olympic Alternative, Segments 1a, 2, and 3)

LRT 3 would result in up to 194 property acquisitions, 44 full acquisitions, and 150 partial acquisitions, including an estimated 256 individual resident relocations. All impacts would be mitigated through adherence to the California *Relocation Assistance Act*.

LRT Alternative 4 (Venice/Sepulveda–Colorado Alternative, Segments 1a, 2, and 3a)

LRT 4 would result in up to 215 property acquisitions, 44 full acquisitions, and 171 partial acquisitions, including an estimated 254 individual resident relocations. All impacts would be mitigated through adherence to the California *Relocation Assistance Act*.

7.2.5 Construction Impacts

LRT Alternative 1 (Expo ROW–Olympic Alternative, Segments 1, 2, and 3)

Construction in the median of Olympic Boulevard will cause some traffic disruption during the period of construction.

LRT Alternative 2 (Expo ROW–Colorado Alternative, Segments 1, 2, and 3a)

Construction in the middle of Colorado Avenue will create measurable traffic disruption during the period of construction.

LRT Alternative 3 (Venice/Sepulveda–Olympic Alternative, Segments 1a, 2, and 3)

Construction in the middle of the highly traveled Venice and Sepulveda Boulevards would create substantive traffic disruption for much of the project construction period.

LRT Alternative 4 (Venice/Sepulveda–Colorado Alternative, Segments 1a, 2, and 3a)

Construction in the median of the highly traveled Venice and Sepulveda Boulevards would create substantive traffic disruption for much of the project construction period. Construction in the middle of Colorado Avenue will create measurable traffic disruption during the period of construction as well.

7.2.6 Summary of Environmental Performance

In summary, LRT 1 (Expo ROW–Olympic Alternative) and LRT 2 (Expo ROW–Colorado Alternative) would have fewer traffic impacts; lower property acquisition, residential relocation, and related disruption; less disturbance to culturally sensitive resources; and less traffic disruption during construction. LRT 1 would result in long-term impacts on the Expo/Westwood Station area community and the coral trees on Olympic Boulevard. Selection of LRT 2 versus LRT 1 would mitigate the impacts on the coral trees, although traffic disruption on Colorado Avenue would be greater during construction than on Olympic Boulevard.

7.3 Cost Effectiveness/Performance Measures

Although cost efficiency and effectiveness measures are not required by the CEQA process, the Exposition Metro Line Construction Authority (Expo Authority) has elected to include this information to highlight the differences among the various alternatives in order to assist decision-makers and the public in considering the trade-offs among the alternatives.

Key performance measures related to capital costs, operating costs, user benefit, and cost effectiveness indices are shown in Table 7.3-1 (Cost Effectiveness and Other Performance

Table 7.3-1 Cost Effectiveness and Other Performance Measures of the TSM and LRT Alternatives

Measures	TSM	LRT 1 Expo ROW–Olympic	LRT 2 Expo ROW–Colorado	LRT 3 Venice/ Sepulveda–Olympic	LRT 4 Venice/ Sepulveda–Colorado
Cost Effectiveness Measures					
Annual User Benefit Hours	1,160,871	3,972,637	3,949,064	3,557,885	3,571,264
Cost per Annual Hour of User Benefit	$13.70	$20.21	$20.01	$32.76	$32.23
Additional Performance Measures					
2030 Weekday Boardings (Phase 2 Only)	10,296	36,653	36,412	35,880	35,849
Annual Passenger Miles	9,218,518	67,157,984	66,214,479	65,993,574	65,607,943
Annual Transit Dependent User Benefits	731,072	2,506,989	2,478,638	2,224,753	2,224,116
New Transit Trips	3,397	11,010	10,980	10,250	10,320
Percent of Project Trips that are New Transit Trips	33%	30%	30%	30%	29%

SOURCE: AECOM, SUMMIT Model, October 2008

Measures of the TSM and the LRT Alternatives) and discussed below. Key elements in developing the relative performance of the alternative are further described as follows:

- *Annual User Benefit Hours*—User benefit reflects the annual travel time savings, as measured by hours of transportation system user benefits in 2030 anticipated from the proposed project compared to the TSM Alternative.
- *Cost per Annual Hour of User Benefit*—The incremental cost per annual hour of user benefit is an FTA measure. It compares an incremental total annualized cost—including capital, operating, and maintenance—to the increment of annual hours of user benefit.

There are various Performance Measures used to evaluate the effectiveness of a transit project. Each is defined below and shown in Table 7.3-1 (Cost Effectiveness and Other Performance Measures of the TSM and the LRT Alternatives).

- *Weekday Boardings*—The number of people who will use the LRT Alternative at sometime during an average weekday. These numbers are projected for 2030.
- *Annual Passenger Miles*—The annual miles the project users will travel on the project annually.
- *Annual Transit Dependent User Benefits*—The annual travel time savings experienced by transit dependent users of the project (those that depend on transit as a major form of transportation).
- *New Transit Trips*—The number of trips on the project that are completely new to transit. These trips represent trips previously taken in cars, by walking or bicycle, or not taken at all. This number does **not** include trips that people may have been taking previously in whole or in part on transit (bus or rail), but shifted to the new project because it better meets their transportation needs.
- *Percent of New Transit Trips*—The percent of all trips on the project that are new transit trips as described above.

7.3.1 Performance Summary

Overall, the four LRT Alternatives perform better than the TSM Alternative with over three times the weekday boardings. The LRT Alternatives would serve a broader range of trips for transit dependents, as indicated by the higher transit dependent user benefit.

The LRT Alternatives are all closely comparable to one another for most performance measures, although LRT 1 and LRT 2 perform slightly better than the others in most evaluation categories. The slight ridership benefit of LRT 1 and LRT 2 over LRT 3 and LRT 4 is generally attributed to the faster travel on the almost 1-mile-shorter Expo ROW alignment. The slight ridership benefit of LRT 3 over LRT 4 is generally attributed to the faster speeds on the aerial structure of the Olympic Boulevard alignment as opposed to the slower travel speed of the “on-street” Colorado Avenue. These variations are generally within the margin of error of the model and therefore would not constitute a significant difference.

7.3.2 Cost Effectiveness Summary

As stated above, although federal funding is not being sought for the project, a comparison of the TSM and LRT Alternatives using the effectiveness approach for project seeking such funding may be illuminating. For example, the FTA requires that projects seeking New Starts funds carry a cost effectiveness rating of at least "medium" to advance in the funding decision process. A cost effectiveness of $16.00 to $24.49[79] is currently required to achieve a medium rating. Projects receiving a rating of medium-low ($24.50 to $30.49) or low ($30.50 or above) are not eligible to continue to compete for New Starts funds.

Cost effectiveness begins to differentiate the LRT Alternatives in a measurable way. As presented in Chapter 8 (Financial Considerations), the capital and operating costs of LRT 3 and LRT 4 are more expensive to build and operate than LRT 1 and LRT 2. Conversely, the boardings and user benefit of LRT 3 and LRT 4 are slightly lower than LRT 1 and LRT 2, primarily related to increased travel time resulting from the longer distance traveled on LRT 3 and LRT 4. As a result, the LRT 1 and LRT 2 carry a cost-effectiveness of $20.01 to $20.21 depending on the west-end alignment, whereas LRT 3 and LRT 4 carry a cost effectiveness of $32.23 to $32.76. The TSM Alternative has a cost effectiveness rating of $13.70.

If federal funding were being sought, LRT 1 and LRT 2 and the TSM Alternative would fall within the ranking for funding eligibility. LRT 3 and LRT 4, using Venice and Sepulveda Boulevards, would not. The FTA has neither reviewed nor approved these estimates.

7.3.3 Summary of Cost Effectiveness and Performance Measures

The performance of a project must be considered in context with the project costs. The TSM Alternative is the least costly at $44 million, and the most cost effective at $13.70. However, with only 10,296 boardings in 2030, the TSM Alternative does not substantially address the transit needs of the study area.

LRT 1 and LRT 2 provide the best ridership return on investment for all users, and provide the most cost-effective service, related to the lower capital construction and operating costs. While LRT 1 is somewhat more costly, it does contribute a higher user benefit (hours of travel time saved) than LRT 2.

7.4 Project Goals and Objectives

Chapter 1 (Introduction) outlines four goals, with several objectives for each goal, for the project. Analysis of how well each alternative would fulfill the goals and objectives is summarized in Table 7.4-1 (Project Alternatives Goal Conformance) and discussed below.

[79] Reporting Instructions for the Section 5309 New Starts Criteria, July 2008.

Table 7.4-1 Purpose and Need Goal Conformance

Goal/Alternative	TSM	LRT 1 Expo ROW–Olympic	LRT 2 Expo ROW–Colorado	LRT 3 Venice/ Sepulveda–Olympic	LRT 4 Venice/ Sepulveda–Colorado
Goal 1: Improve mobility and improve regional connectivity	○	●	●	●	●
Goal 2: Protect and enhance the environment	⊖	●	●	⊖	⊖
Goal 3: Promote Transit-supportive land use and economic development	○	●	●	●	●
Goal 4: Develop an affordable and cost-effective system	⊖	●	●	○	○

SOURCE: DMJM Harris, 2008

● = Good Conformance ⊖ = Moderate Conformance ○ = Poor Conformance

7.4.1 Improve Mobility and Regional Connectivity

Each of the LRT Alternatives would meet this goal by readily:

- Integrating into the existing regional transit network
- Providing a safe means of transportation between the Westside and Downtown
- Connecting to downtown Los Angeles, the Westside and Santa Monica
- Providing seamless access to the existing regional transit system
- Serving east/west travel patterns
- Offering alternatives to highly-congested roadways
- Expanding transportation system capacity

Each LRT Alternative would also decrease travel time as demonstrated by the weekday user benefit hours accrued to each. LRT 1 and LRT 2 would provide marginally faster travel times.

The TSM Alternative would achieve some of these objectives, but to a significantly lesser degree than the LRT Alternatives.

7.4.2 Protect and Enhance the Environment

All LRT Alternatives would include environmental impacts that could be mitigated through various measures. The analysis of environmental effects earlier in the chapter notes that LRT 1 and LRT 2 would have fewer traffic impacts, lower property acquisition and related effects, less disturbance to culturally sensitive resources, and less traffic disruption during construction. Selection of LRT 1 would result in long-term impacts on the Expo/Westwood Station area

community and the coral trees on Olympic Boulevard. Selection of LRT 2 would mitigate the impact on the coral trees, although traffic disruption on Colorado Avenue would be greater during construction than on Olympic Boulevard. LRT 1 and LRT 2 are the environmentally superior alternatives.

The TSM Alternative would have the least environmental impact, but would not provide the same long term transportation system capacity expansion, energy, and air quality advantages as the LRT Alternatives.

7.4.3 Promote Transit-Supportive Land Use and Economic Development

Each LRT Alternative would support this goal by:

- Accommodating existing and future population and job growth on the Westside by providing a high-capacity transit service as an alternative to the congested I-10 freeway and adjacent east/west streets
- Enhancing opportunities for transit-oriented development in the corridor through the provision of an efficient, high-capacity transit alternative
- Supporting downtown Los Angeles as a regional employment and commercial center
- Linking urban centers
- Encouraging development in planned activity centers
- Generating investment in neighborhoods and commercial areas
- Promoting transit-supportive land use development policies
- Creating jobs

In addition, each LRT Alternative would provide transit service to existing major trip attractors and generators in the corridor and improve access to jobs and major activity centers. LRT 1 and LRT 2 would accomplish this somewhat more effectively with the decreased travel times associated with shorter routes and higher average speed.

The TSM Alternative would not encourage development in association with transit stops, or generate measurable investment in neighborhoods or commercial land use. As a result, the TSM Alternative would not substantially support this goal.

7.4.4 Develop an Affordable and Cost-Effective System

As described in Section 7.3.2 (Cost-Effectiveness Summary), LRT 1 and LRT 2 would be the most cost-effective alternatives to address added transit capacity on the Westside. The Metro Long Range Transportation Plan budget provides adequate operating funds to support the operation of the LRT Alternatives.

The TSM Alternative would be the most cost-effective improvement, but would not meet the high-capacity objective of the project. As stated earlier, it would also not meet the needs of the Westside.

7.5 Summary

LRT 1 (Expo ROW–Olympic Alternative) and LRT 2 (Expo ROW–Colorado Alternative) have an advantage over LRT 3 (Venice/Sepulveda–Olympic Alternative) and LRT 4 (Venice/Sepulveda–Colorado Alternative) in terms of basic environmental compatibility, performance, and conformance with the goals of the Project. In addition, LRT 1 and LRT 2 perform significantly better from a cost-effectiveness perspective.