# Section 2.0 Alternatives Considered

# 2.1 Screening and Selection Process

At the start of the AA study, an initial set of conceptual alternatives considered for the Regional Connector was developed based on review of previous studies and an initial evaluation of the existing conditions including obvious land use constraints due to new developments, operational constraints that would affect the current system, and placement issues that could have adverse affects on community preservation. A total of 36 alternatives were identified as the initial set of conceptual alternatives. The initial set of conceptual alternatives represents appropriate alignments along various corridors within the PSA that would link the 7<sup>th</sup> St./Metro Center Station and Little Tokyo/Arts District Station, and would in turn connect the entire regional system. Among the alignment alternatives were various configurations (aerial, at-grade, and underground) and station locations. In addition, a No-Build and Transportation System Management (TSM) alternative were also considered in the evaluation. The initial set of conceptual alternatives was presented to the community and agencies during the early scoping period. Figure 2-1 represents all potential street corridors within the Regional Connector PSA and includes the initial set of conceptual alternatives that were presented in the early scoping process.

Preliminary screening of the 36 alternatives resulted in eight Alternatives Identified for Initial Screening, of which three alternatives have minor variations. The Alternatives Identified for Initial Screening are presented in the Draft Alternatives Identification Report (January 2008) as well as in Section 2.2 of this document. The Preliminary Screening was conducted consistent with the goals and objectives established during the early scoping.

The intent of the initial screening process was to further reduce the Regional Connector alternatives from the eight Alternatives Identified for Initial Screening to a more refined number of alternatives that meet the project's goals and objectives, have been identified as technically feasible, and are viable for further study in the DEIR/DEIS. This process is depicted in Figure 2-2.

The development of alternatives for screening can be summarized as follows:

Identification of an Initial Set of Conceptual Alternatives – Conceptual alternatives were identified based on previous studies. Alternatives previously studied but no longer viable due to changes in land-use, availability of property as formerly vacant property may now have been developed into multi-story office/housing or other use, and/or construction of new rail lines making previously studied alternatives less efficient, less flexible in terms of operations, and more costly were not included in the Initial Set of Conceptual Alternatives. There were 36 conceptual alternatives identified during this process.





Metro



- Alternatives Identified for Screening Based on input received from the Early Scoping process and initial engineering analysis, the initial set of conceptual alternatives were prescreened based on clear issues related to constructability, right of way constraints, impacts of configurations and operational concerns. This prescreening resulted in the Alternative Identified for Screening. There were eight alternatives with a few variations identified during this process. The preliminary screening is presented in the Draft Alternatives Identification Report (January 2008).
- Initial Screening of Alternatives The initial screening of the eight alternatives using the goals, objectives, and evaluation criteria established for the Regional Connector. These eight alternatives were identified during the Early Scoping Process with input from the public, stakeholders and agencies and detailed in the Alternatives Methodology Report. These eight alternatives are compared across the board using a multi-criteria comparison method model. The result of the initial screening was the identification of a reduced set of promising alternatives that will be further detailed for engineering, environmental and urban design opportunities and issues. The initial screening of alternatives can be found in the Draft Initial Screening of Alternatives Report (April 2008).



Metro



# 2.1.1 Previous Studies

The Regional Connector was originally conceived in 1993 as part of the Metro Blue Line extension to Pasadena. The project was not pursued due to funding availability and the Metro Red Line was identified as an interim link until the system matured. Since 1993, a few studies were conducted to determine new possible alternatives considering the changing land-uses and expanding rail system. An overview of these past studies can be seen in Section 1.3.

# 2.1.2 Metro/FTA Scoping

As part of the FTA New Starts criteria, a scoping period during the AA must be conducted in order to inform the public, organizations, and local, regional, state, and federal agencies on all issues concerning the project, including benefits, costs, and impacts. The Early Scoping Process for the Regional Connector project occurred over a 30-day period in October and November 2007 and was initiated with the publication of the Early Scoping Notice in the Federal Register on October 31, 2007. In addition to the Early Scoping Notice, a Public Notice was developed to notify the public about the Study, its associated meetings, as well as other opportunities for stakeholders to provide their input prior to the deadline for public comment concerning the scope of the AA. A copy of the Public Notice, as well as other detailed Scoping Information, can be found in the Project Early Scoping Report, March 2008.

# 2.1.3 Screening Criteria

The Alternatives Identified for Screening were selected based on their feasibility given the street configuration and dense development in the downtown area. Several light rail alignments were adapted from previous studies and reports, and additional ones were added and synthesized from combinations of others. Particular thought was given to making sure routes provide better coverage of major activity centers within the downtown area between 7<sup>th</sup> St./Metro Center and the Gold Line Eastside Extension.

Some of the formerly proposed routes were not considered because they made use of previously vacant parcels where new dense developments have since been constructed.

Some of these parcels included the new location of significant buildings, such as the LAPD Headquarters, the Grand Avenue Project, and the Caltrans Headquarters Building. Alignments which required a significant number of acquisitions and/or relocation were also removed from consideration. Likewise, some smaller, narrow street alignments that were surrounded mostly by industrial uses now have adjacent dense residential developments nearby, and these noise-sensitive land uses would be incompatible with light rail trains such as in a narrow alleyway right of way.



Figure 2-3 Aerial Bridge





In addition, some previous studies had identified several alternatives that included a significant amount of aerial configurations, as seen in Figure 2-3, with the purpose of reducing vehicular traffic and allowing for easier grade changes. However, comments received during the early scoping period showed little support for aerial configurations due to aesthetics and sensitive land uses. Also, it was determined that traffic improvements would not be fully achieved as lane reductions would still be necessary for aerial beam supports.

Other alignments which were screened and removed from consideration included those which considered a new extension from the recently constructed Metro Gold Line LRT bridge over the 101 freeway, as seen in Figures 2-4 and 2-5. Those proposed alignments would require a major alteration and, in some instance, complete demolition and reconstruction. These options would not be financially feasible for the project.



Figure 2-4LRT Bridge over 101 Freeway



Figure 2-5 LRT Bridge Extension





Finally, a number of previous studies included the possible use of the 3<sup>rd</sup> St. tunnel for a segment of various alternatives. After further evaluation to the current conditions of the tunnel, including new land uses and proposed developments, various factors were identified that would not make use of the tunnel viable in either a single or dual track configuration. The tunnel, as seen in Figure 2-6, is located directly below residential housing and modifications could result in adverse affects such as noise, vibrations, and construction issues due to the narrow width.





Figure 2-6 3rd St. Tunnel

# 2.1.4 Evaluation Criteria Development

Specific evaluation criteria were developed during the Early Scoping Process with input requested from the community and agency for each objective for the purpose of measuring the ability of each alternative identified for screening to meet the project goals and objectives, as shown in the Table 2-1. These specific evaluation criteria were used in the initial screening process. An additional level in the goals/objectives/evaluation criteria hierarchy is the performance measures. Performance measures are very specific and detailed measures that were established for each evaluation criteria for the purpose of measuring the performance of the alternatives according to each evaluation criteria. The results of the initial screening process for each goal/objective/criterion evaluated are presented in Tables 2-2 through 2-8 for Goals 1 through 7, respectively



	Table 2-1	
Regional Connector Goals,	Objectives, and	Performance Measures

Goal		Objectives	Initial Scrooning Critoria (Dorformanco Magcuros)	Final Screening Criteria (Performance
1	Support Community Planning Efforts Support the progression of the regional center area as an integrated destination and a dynamic and livable area accommodating projected growth in a sustainable manner	<ul> <li>Support land use policies and Community Plans</li> <li>Support and coordinate with development and redevelopment efforts</li> <li>Support the City's effort to improve urban design and the pedestrian environment by contributing to a healthy environment</li> <li>Support efforts to improve safety and security for downtown residents, employees and visitors</li> <li>Support transit dependent communities</li> </ul>	<ul> <li>Population, Population Density, Households, Household Density for year 2030 ¼ mile of alignment</li> <li>Transit Oriented Design supportive plans and policies in place (Score 1 -worst to 5 -best)</li> <li>Number of jobs, employment density for year 2030 within a ¼ mile of alignment</li> <li>Number of direct connections to key activity centers within ¼ mile of alignment (Score 1 -worst to 5 -best)</li> <li>Number of opportunities for redevelopment within ¼ mile of alignment (underdeveloped or underutilized properties along alternative alignment)</li> </ul>	<ul> <li>Number of planned development projects in the area over the next 10 years, including residential/office space/commercial units within a 1/4 mile of stations</li> <li>Number of connections with sidewalks that support the City's Downtown Street Standards</li> </ul>
2	Support Public Involvement and Community Preservation Incorporate the public in the planning process and balance the benefits and impacts while preserving communities in the area, such as Little Tokyo/Arts District, Bunker Hill, Civic	<ul> <li>Balance the benefits and impacts to low income and minority communities</li> <li>Enable workers and visitors to gain access to the regional center to increase its economic vitality and benefit from its economic opportunity</li> </ul>	<ul> <li>Evaluation of potential disproportionate effects: Environmental justice effects will be evaluated per CEOA/NEPA requirements (Score 1 to 5)</li> <li>Initial areas identified for potential acquisitions for stations and alignment (does not include actually in construction) within ¼ mile of alignment</li> <li>Evaluation of potential disproportionate effects: Number of low income HH within¼ mile of proposed alignment</li> <li>Number of residents by ethnicity within ¼ mile of alignment (US Census)</li> <li>Urban fit potential for alignment and for stations, including physical scale, visual fit, and cultural preservation (Score 1 to 5)</li> <li>Percentage of service grade separated</li> <li>Community Acceptance (High, Medium, Low)</li> </ul>	<ul> <li>Number of potential acquisitions</li> <li>Percentage of service grade separated</li> <li>Evaluation of potential disproportionate effects and risk to environmental justice populations related to construction activities (Score 1 to 5)</li> <li>Urban fit potential, including pedestrian accessibility and urban design enhancement opportunities (Score 1 to 5)</li> </ul>





		Regional Connector Go	als. Objectives, and Performance Measures	5
3	Improve Mobility and Accessibility both Locally and Regionally Develop an efficient and sustainable level of mobility within LA County to accommodate planned growth and a livable environment	<ul> <li>Improve the connectivity of the regional transit service and provide a more attractive travel alternative for residents, workers and visitors in the region</li> <li>Facilitate sustainable regional development</li> <li>Increase ridership of the Metro transit system and reduce single occupancy trips</li> <li>Maintain or enhance transit services to the transit dependent</li> <li>Improve travel time for transit users system-wide</li> <li>Improve person throughput</li> <li>Reduce growth of congestion in corridor</li> </ul>	<ul> <li>Increase in daily transit boardings (amount of transit users increased compared to No Build)</li> <li>New daily transit trips compared to No Build and Transportation System Management (TSM) alternatives</li> <li>Traffic impacts (Number of intersections with E or F Level of Service)</li> <li>Reduction in number of transfers system-wide by operational plan of alignment (daily reductions at US &amp; 7th/Metro)</li> <li>Total number of lanes reduced (cumulative for all streets)</li> <li>Number of potentially impacted intersections</li> <li>Peak period travel time through Regional Connector Alignment (including 5 min for each transfer)</li> <li>Number of parking spaces potentially affected</li> <li>Number of driveways affected</li> <li>Daily hours of transportation user benefits (Compared to No Build)</li> </ul>	<ul> <li>Hours of transportation user benefits</li> <li>Congestion relief (Reduction in highway travel demand in the corridor)</li> <li>Comparison of highway, bus, and fixed guideway peak period travel times between major travel pairs (Run times, head ways, average speed, station spacing)</li> <li>Peak period travel time (door to door)</li> <li>Travel time savings (Union Station to 7th/Flower)</li> <li>Reduction in Vehicle Miles Traveled (VMT) (VMT compared to No Build)</li> <li>Assessment of expandability (Score 1 to 5)</li> </ul>
4	Support Efforts to Improve Environmental Quality Minimize adverse environmental impacts	<ul> <li>Minimize adverse environmental impacts</li> <li>Implement mitigation measures to reduce environmental effects to acceptable levels</li> <li>Reduce emissions and improve air quality</li> </ul>	<ul> <li>Noise (Number of curves for LRT alignment)</li> <li>Potential visual impacts to notable architectural resources within ¼ mile of alignment (Score 1 to 5)</li> <li>Number of Potential Sensitive Receptors within ¼ mile of alignment (Score 1 to 5)</li> <li>Potential impacts to historically significant locations within ¼ mile alignment (Score 1 to 5)</li> <li>Geologic and geotechnical issues along alignment (Score 1 to 5)</li> </ul>	<ul> <li>Expected level of impacts after mitigation to biological, social, and physical resources will be evaluated per CEQA/NEPA requirements (Score 1 to 5)</li> <li>Reductions in PM10, NOx, and SOx emissions</li> <li>Reduction in carbon footprint for average user</li> </ul>

#### Table 2-1 Regional Connector Goals, Objectives, and Performance Measure





		<b>U</b>	· · ·	
5	Provide a Cost Effective Alternative Transportation System Develop a system that serves as an alternative to travel economically	<ul> <li>Increase ridership on the Metro system</li> <li>Minimize cost per passenger</li> <li>Maximize travel time savings</li> </ul>	<ul> <li>Rough order of magnitude annual O&amp;M (2008\$) costs per alignment (millions)</li> <li>User cost - Cost effectiveness compared to No Build (\$/hour of transit user benefit)</li> </ul>	<ul> <li>Annualized cost per hour of transit system user benefit compared to No Build and Transportation System Management (TSM) alternatives</li> <li>Annual O&amp;M costs</li> </ul>
6	Achieve a Financially Feasible Project Develop a project that maximizes opportunities for funding and financing and that is financially sustainable	<ul> <li>Opportunities for private/public funding</li> <li>Opportunities for Federal and outside funding</li> </ul>	<ul> <li>ROM Capital costs — total and per mile per alignment (2008\$) (millions)</li> <li>Evaluation of availability and eligibility of capital funds at federal/state/local levels to construct, operate and maintain (Score 1 to 5)</li> </ul>	• Capital cost estimate disaggregated by right of way (ROW), guideway, stations, yards, and vehicles on a cost per mile basis
7	Provide a Safe and Secure Alternative Transportation System Develop a project that is safe for riders, pedestrians, and drivers while meeting the regions needs for security	<ul> <li>Secure entire alignment, stations, track and other facilities</li> <li>Develop direct and indirect safety measures that exceed safety precautions typical of the Metro system</li> <li>Develop a system that balances the need for accessibility and mobility with security</li> <li>Develop a system that uses accessibility and mobility as measures for safety and security</li> </ul>	<ul> <li>Safety - determined to be able to provide measures typical of requirements per ADA, per typical CPUC requirements, fire life safety guidelines, and per Metro Design Guidelines for access to and from stations (amount grade separated) (Score 1 to 5)</li> <li>Number of emergency facilities located within ¼ mile of the alignment, i.e., fire stations, police stations, hospitals.</li> <li>Number of public events within ¼ mile of alignment</li> </ul>	<ul> <li>Number of crossing with high pedestrian activities on a daily basis</li> <li>Number of events along the alignment</li> <li>Number of potential issues related to accessibility and line of sight for pedestrians and vehicle drivers (Score 1 to 5)</li> </ul>

# Table 2-1 Regional Connector Goals, Objectives, and Performance Measures



# Table 2-2 Goal 1: Support Community Planning Efforts

Goal 1: Support Community

\*Support land use policies and Community Plans \*Support and coordinate with development and redevelopment efforts \*Support the City's efforts to improve urban design and the pedestrian environment by contributing to a healthy environment

Planning Efforts	*Support efforts to improve safety and *Support transit dependent communi	l security for downtown resident ties	s, employees and visitors	oreacting ( see in sourcestore)							
Alternative	la	1Ь	2	3a	3Ь	4a	4b	5	6	7	8
Total Length of Alignment (Miles)	1.83	1.83	1.88	2.03	2.03	1.62	1.62	1.62	1.65	1.69	1.67
Total Area within One Quarter Mile of Alignment	1.04	1.04	1.11	1.02	1.02	0.98	0.98	0.98	0.98	1	0.98
1.a Population, Population Density, Households, Housing Density for year 2030 within 1/4 mile of alignments											
Population (within 1/4 mile of alignment)	11,926	11,926	11,323	10,889	10,889	10,997	10,997	10,997	10,997	10,760	10,997
Population (within 1/4 mile of all stations)	2,038	4,073	3,091	6,578	8,245	7,786	6,119	6,119	6,437	5,449	6,119
Population Density (within 1/4 mile of alignment)	11,467 persons per square mile	11,467 persons per square mile	10,201 persons per square mile	10,675 persons per square mile	10,675 persons per square mile	11,201 persons per square mile	11,201 persons per square mile	11,201 persons per square mile	11,201 persons per square mile	10,760 persons per square mile	11,201 persons per square mile
Households (within 1/4 mile of alignment)	9,122	9,122	7,794	8,523	8,523	8,744	8,744	8,744	8,744	8,467	8,744
Households (within 1/4 mile of all stations)	1,611	3,047	2,128	5,002	6,183	5,770	4,589	4,589	5,003	4,132	4,589
Household Density (within 1/4 mile of alignment)	8,771 units per square mile	8,771 units per square mile	7,022 units per square mile	8,356 units per square mile	8,356 units per square mile	8,922 units per square mile	8,922 units per square mile	8,922 units per square mile	8,922 units per square mile	8,467 units per square mile	8,922 units per square mile
1.b Transit Oriented Design supportive plans and policies in place (Score 1 -worst- to 5-best)											
	Low number of stations to take advantage of TOD plans and policies *LA City Ceneral Plan *CRA Identified Redevelopment Areas *CRA Identified Redevelopment Areas *CRA City Center Redevelopment Plan *Little Tokyo Planning & Design Guidelines	Same as 1a	°LA City General Plan °CRA 2006 Streetcar Study °CRA City Center Redevelopment Plan °Little Tokyo Planning & Design Guidelines	*LA City General Plan *CRA 2006 Streetcar Study *CRA Identified Redevelopment Areas *CRA City Center Redevelopment Plan *Little Tokyo Planning & Design Guidelines	<b>4</b> Same as 3a	Track alignment on And Street between Central and Los Angeles is inconsistent with TOD plans *LA City Ceneral Plan *CRA Identified Redevelopment Areas *CRA City Center Redevelopment Plan *Little Tokyo Planning & Design Guidelines	Track alignment on 2nd Street between Central and Los Angeles is inconsistent with TOD plans *CRA City General Plan *CRA Identified Redevelopment Areas *CRA City Center Redevelopment Plan *Little Tokyo Planning & Design Guidelines	5 Same as 3a	Inis alternative requires removal of the existing Little Tokyo/Arts District Station which is inconsistent with TOD plans. *LA City General Plan *CRA 2006 Streetcar Study *CRA Identified Redevelopment Areas *CRA City Center Redevelopment Plan *Little Tokyo Planning & Design Guidelines	Same as 1a	This alternative requires removal of the existing Liftle Tolyo/Arst District Station which is inconsistent with TOD plans. •LA City General Plan •CRA 2006 Streetcar Study *CRA Identified Redevelopment Areas *CRA City Center Redevelopment Plan *Little Tokyo Planning & Design Guidelines
1.c Number of jobs, employment density for year 2030 within 1/4 mile of alignment											
Employment (within 1/4 mile of alignment)	129,833	129,833	150,997	133,888	133,888	124,110	124,110	124,110	124,110	132,547	124,110
Employment (within 1/4 mile of all stations)	46,153	44,062	76,366	107,310	109,174	79,395	77,531	77,531	71,066	84,699	77,531
Employment Density (within 1/4 mile of alignment)	129,833 jobs per square mile	124,839 jobs per square mile	136,033 jobs per square mile	131,263 jobs per square mile	131,263 jobs per square mile	126,643 jobs per square mile	126,643 jobs per square mile	126,643 jobs per square mile	126,643 jobs per square mile	132,547 jobs per square mile	126,643 jobs per square mile
1.d Number of direct connections to key activity centers within 1/4 mile of alignment (Score 1 -worse to 5-best)	2 (based on the number of stations for this alternative)	2 (based on the number of stations for this alternative)	3	5	5	5	5	5	3 (based on the removal of the Little Tokyo/Arts District Station for this alternative)	4 (based on single platform versus split platform)	3 (based on the removal of the Little Tokyo/Arts District Station for this alternative)
Scores by Station:	2nd @ Spring, Main & Broadway 5	2nd @ Spring, Main & Broadway 5	Temple between Los Angeles Streets and Aliso 5	Split Platforms @ Main and Los Angeles 5	Split Platforms @ Main and Los Angeles 5	2nd @ Spring, Main and Broadway 5	2nd @ Spring, Main & Broadway 5	2nd between Spring & Main 5	2nd between Los Angeles & San Pedro 5	Los Angeles between 1st & Temple 5	2nd between Spring & Main 5
	Between 5th & 6th on Flower	Between 3rd & 4th on Flower	Temple Street, Dewap Road and Hope Streets 4	2nd & Hope under Grand Avenue Development 5	2nd & Hope under Grand Avenue Development 5	2nd & Hope under Grand Avenue Development 5	2nd & Hope under Grand Avenue Development 5	2nd & Hope under Grand Avenue Development 5	2nd & Hope under Grand Avenue Development 5	2nd & Hope under Grand Avenue Development 5	2nd & Hope under Grand Avenue Development 5
			Between 5th & 6th on Flower 5	Between 4th & 5th on Flower 5	Between 3rd & 4th on Flower 3	Between 3rd & 4th on Flower 3	Between 4th & 5th on Flower 5	Between 4th & 5th on Flower 4	5th & Flower 5	Between 5th & 6th on Flower 5	Between 4th & 5th on Flower 5
<ol> <li>Number of opportunities for redevelopment within 1/4 mile of alignment (underdeveloped or underutilized properties along alternative alignment)</li> </ol>	9	9	5	8	8	9	9	9	9	8	9

\* NOTE: Score 1-5 is use for some criteria where 1 = WORST and 5 = BEST

# Table 2-3 Goal 2: Support Public Involvement and Community Preservation

\*Balance the benefits and impacts to low income and minority communities

Goal 2:			*Enable workers and visitors to ga vitality and benefit from its econo	ain access to the regional cente mic opportunity	r to increase its economic						
Support Public Involvement	t and Community Pres	ervation	,,	······,							
Alternative	la	1Ь	2	3a	3b	4a	4b	5	6	7	8
Total Length of Alignment (Miles)	1.83	1.83	1.88	2.03	2.03	1.62	1.62	1.62	1.65	1.69	1.67
Total Area within One Quarter Mile of Alignment	1.04	1.04	1.11	1.02	1.02	0.98	0.98	0.98	0.98	1	0.98
2.a Evaluation of potential disproportionate effects : Environmental justice effect will be evaluated per CEQA/NEPA requirements (Score 1 to 5)	1	1	4	4	4	1	1	2	5	4	5
2.b Initial areas identified for potential acquisitions for stations and alignment (does not include actually in construction) within 1/4 mile of alignment	4 Locations	3 Locations	2 Locations	2 Locations	1 Location	4 Locations	5 Locations	4 Locations	5 Locations	2 Locations	5 Locations
2.c Evaluation of potential disproportionate effects: Number of low income HH within 1/4 mile of proposed alignment											
# of Low income HH	3,390/9,602 or 35.3%	3,390/9,602 or 35.3%	2,590/8,830 or 29.3%	3,702/10,680 or 34.7%	3,702/10,680 or 34.7%	3,390/9,602 or 35.3%	3,390/9,602 or 35.3%	3,390/9,602 or 35.3%	3,390/9,602 or 35.3%	3,702/10,680 or 34.7%	3,390/9,602 or 35.3%
Number of SROs and Shelters	20 (approximately 1,042 beds/rooms)	20 (approximately 1,042 beds/rooms)	16 (approximately873 beds/rooms)	19 (approximately 997 beds/rooms)	19 (approximately 997 beds/rooms)	20 (approximately 1,042 beds/rooms)	20 (approximately 1,042 beds/rooms)	20 (approximately 1,042 beds/rooms)	20 (approximately 1,042 beds/rooms)	19 (approximately 997 beds/rooms)	20 (approximately 1,042 beds/rooms)
Number of Homeless Service Providers	9	9	5	9	9	9	9	9	9	9	9
2.d Number of residents by ethnicity within 1/4 mile of alignment (US Census)											
	White 3,163 African American	White 3,163 African American	White 2,146 African American	White 3,105 African American	White 3,105	White 3,163 African American	White 3,163 African American	White 3,163 African American	White 3,163	White 3,105 African American	White 3,163 African American
	3,390	3,390	2,359	3,437	African American 3,437	3,390	3,390	3,390	African American 3,390	3,437	3,390
	American Indian/Eskimo 119	American Indian/Eskimo 119	American Indian/Eskimo 54	American Indian/Eskimo 103	American Indian/Eskimo 103	American Indian/Eskimo 119	American Indian/Eskimo 119	American Indian/Eskimo 119	American Indian/Eskimo 119	American Indian/Eskimo 103	American Indian/Eskimo 119
	Asian 4,699	Asian 4,699	Asian 8,635	Asian 8,978	Asian 8,978	Asian 4,699	Asian 4,699	Asian 4,699	Asian 4,699	Asian 8,978	Asian 4,699
	Hawaiian/PI 23	Hawaiian/PI 23	Hawaiian/ PI 23	Hawaiian/PI 23	Hawaiian/PI 23	Hawaiian/PI 23	Hawaiian/PI 23	Hawaiian/PI 23	Hawaiian/PI 23	Hawaiian/PI 23	Hawaiian/PI 23
	Other 54	Other 54	Other 48	Other 60	Other 60	Other 54	Other 54	Other 54	Other 54	Other 60	Other 54
	Two or More 322	Two or More 322	Two or More 275	Two or More 334	Two or More 334	Two or More 322	Two or More 334	Two or More 322			
	Hispanic 7.769	Hispanic 7.769	Hispanic 8.810	Hispanic 5.861	Hispanic 5.861	Hispanic 7,769	Hispanic 7.769	Hispanic 7.769	Hispanic 7.769	Hispanic 5.861	Hispanic 7.769
2.e Urban fit potential for alignments and for stations, including physical scale, visual fit.											
and cultural preservation	1	1	3	4	4	2	2	4	3	4	3
Scores by Station:	2nd @ Spring, Main& Broadway <b>3</b>	2nd @ Spring, Main& Broadway <b>3</b>	Temple & Los Angeles 5	Split Platform @ Los Angeles Street and Main Street <b>4</b>	Split Platform @ Los Angeles Street and Main Street <b>5,4</b>	2nd @ Spring, Main& Broadway <b>4</b>	2nd @ Spring, Main& Broadway <b>4</b>	2nd between Main and Spring <b>4</b>	Los Angeles and San Pedro on 2nd <b>3</b>	Los Angeles Street between 1st and Temple	2nd between Main and Spring <b>4</b>
	Between 5th & 6th on Flower <b>5</b>	Between 3rd & 4th on Flower <b>2</b>	Temple Street, Dewap Road & Hope Street <b>4</b>	2nd & Hope under Grand Avenue Development <b>5</b>	2nd & Hope under Grand Avenue Development 5	2nd & Hope under Grand Avenue Development <b>5</b>	2nd & Hope under Grand Avenue Development	2nd & Hope under Grand Avenue Development <b>5</b>			
			Between 5th & 6th on Flower 5	Between 4th & 5th on Flower <b>3</b>	Between 3rd & 4th on Flower 2	Between 3rd & 4th on Flower <b>2</b>	Between 4th & 5th on Flower <b>3</b>	Between 4th & 5th on Flower <b>3</b>	5th on Flower 5	Between 5th & 6th on Flower 5	Between 4th & 5th on Flower <b>3</b>
2.f Percentage of service grade separated	22%	13%	39%	34%	21%	24%	34%	91%	103%	32%	103%
Total underground - new tunnel & existing 2nd St. tunnel	44%	33%	36%	46%	38%	49%	60%	94%	*103% (includes grade separating some of the Eastside Extension)	56%	103%
2.g Community Acceptance (High, Medium, Low)	Low	Low	Medium	High	High	Medium	Medium	High	Low	Medium	Low

\* NOTE: Score 1-5 is use for some criteria where 1 = WORST and 5 = BEST



Table 2-4 Goal 3: Improve Mobility and Availability both Locally and Regionally

Goal 3: Improve Mobility and Access Locally and Regionally	ibility both	*Im *Fa *M: *Im *Im *Re	prove the connectivity of cilitate sustainable regior crease ridership of the Ma aintain or enhance transi iprove travel time for tran prove person throughpu duce growth of congestic	the region nal develop etro transif services t sit users s t on in corric	aal transit service and provid oment t system and reduce single o so the transit dependent ystem-wide dor	e a more a occupany t	ttractive travel alternative	e for reside	ents, workers and visitors	in the region												
Alternative	la		1b		2		3a		3b		<b>4</b> a		4b		5		6		7		8	
Total Length of Alignment (Miles)	1.83		1.83		1.88		2.03		2.03		1.62		1.62		1.62		1.65		1.69		1.67	
Total Area within One Quarter Mile of Alignment	1.04		1.04		1.11		1.02		1.02		0.98		0.98		0.98		0.98		1		0.98	
3.a Increase in daily transit boardings (amount of transit users increased compared to No Build)	9,570	1	9,570	1	8,590	1	10,125	2	10,125	2	11,524	2	11,524	2	19,768	5	14,457	3	10,125	2	14,457	3
3.b New daily transit trips compared to No Build and Transportation System Management (TSM) alternatives																						
No Build	5,787	2	5,787	2	4,670	1	5,165	2	5,165	2	6,984	4	6,984	4	8,099	5	7,548	4	5,165	2	7,548	4
3.c Traffic impacts ( <u>Number of</u> <u>intersections</u> with E or F Level of Service)	5		5		4		3		3		5		5		1		1		2		1	
3.d Reduction in number of transfers system-wide by operational plan of alignment (Daily reductions at US & 7th/Metro)	21,100	2	21,100	2	18,400	1	20,600	2	20,600	2	22,100	3	22,100	3	25,900	5	23,200	3	20,600	2	23,200	3
3.e Total number of lanes reduced (cumulative for all streets)	19		22		21		24		27		20		17		0		0		21		0	
3.f Number of potentially impacted intersections	11		12		12		12		13		10		9		1		1		10		1	
3.g Peak period travel time through Regional Connector Alignment (including 5 min foe each transfer)																						
North-South : US to 7th/Metro	12.60 min		12.60 min		11.80 min		11.50 mir	1	11.50 mir	1	12.30 mir	1	12.30 mir	1	7.60 min		7.10 min		11.50 mii	ı	7.10 mir	1
East-West: 1st /Utah (to US) to 7th/Metro	10.70 min		10.70 min		12.55 min		11.95 mir	ı	11.95 mir	1	10.40 mir	1	10.40 mir	ı	6.85 min		6.40 min		11.95 mii	n	6.40 mir	1
3.h Number of Left Turn Pockets affected	3		5		15		8		10		2		0		4		3		10		3	
3.i Number of on-street public parking spaces	99		99		31		88		88		99		99		0		0		70		0	
3.j Number of driveways affected	21		25		21		26		30		22		18		2		0		21		0	
3.k daily hours of transportation user benefits (Compared to No Build)	8,855		8,855		7,231		8,938		8,938		9,271		9,271		12,045		11,222		8,938		11,222	

\* NOTE: Score 1-5 is use for some criteria where 1 = WORST and 5 = BEST

Note for 3c,3e,3f,3h,3i: Assumptions: -Center running LRT with center stations. -Train envelope (influence area) for one center running track and no station is 13 feet = one lane width. -Train envelope (influence area) for one center running track and no station is 26 feet = two lane widths. -Train envelope (influence area) for two center running tracks and no station is 26 feet = two lane widths. -Train envelope (influence area) for two center running tracks and no station is 26 feet = two lane widths. -Train envelope (influence area) for two center running tracks and no station is 26 feet = two lane widths. -Train envelope (influence area) for two center running tracks with center station is 39 feet = three lane widths. -For all alternative alignments it is assumed that at least one traffic lane will be available and operational in each direction. -Right of way will be provided if difference between the street curb to curb width and the train envelope is less than the width needed to accomodate a traffic lane in each direction of travel.



# Table 2-5 Goal 4: Support Efforts to Improve Environmental Quality

Goal 4: Support Efforts to Improve Environmental Quality		*Minir *Imple *Reduc	nize adverse environme ment mitigation measu ce emissions and impro	ental impacts ures to reduce environmen ove air quality	al effects to :	acceptable levels															
Alternative	la		1Ь	2		3a		3Ь		4a		4b		5		6		7		8	
Total Length of Alignment (Miles)	1.83		1.83	1.88		2.03		2.03		1.62		1.62		1.62		1.65		1.69		1.67	
Total Area within One Quarter Mile of Alignment	1.04		1.04	1.11		1.02		1.02		0.98		0.98		0.98		0.98		1		0.98	
4.a Noise (Number of curves for LRT alignment)	5		5	5		6		6		3		3		3		2		4		2	
4.b Potential visual impacts to notable architectural resources within 1/4 mile of alignment (Score 1 to 5)	2		5	3		1		2		5		3		4		5		1		5	
4.c Number of Potential Sensitive Receptors within a 1/4 mile of alignment (Score 1 to 5)	5		5	4		5		5		5		5		5		5		5		5	
4.d Potential impacts to historically significant locations within 1/4 of alignment (Score 1 to 5)	203	4	203	4 188	5	217	2	217	2	203	4	203	4	203	4	203	4	209	3	203 4	
4.e Geologic and geotechnical issues along alignment (Score 1 to 5)	3		4	3		2		2		2		2		1		1		2		1	
Length Underground	2,000 ft		1200 ft	1900 ft	3	3,000 ft (w/pu	nch)	2,050 ft (w/pun	ich)	2,000 ft (w/pun	ch)	2,800 ft (w/pun	ch)	7,500 ft		8,200 ft		3,000 ft (w/pund	ch)	8,300 ft	

\* NOTE: Score 1-5 is use for some criteria where 1 = WORST and 5 = BEST

# Table 2-6 Goal 5: Provide a Cost Effective Alternative Transportation System

Goal 5: Provide a Cost Effective Alte Transportation System	ernative	*	Increase ridership on Minimize cost per pa Maximize travel time	the Me ssenger savings	ro system																	
Alternative	la		1b		2		3a		3b		<b>4</b> a		4b		5		6		7		8	
Total Length of Alignment (Miles)	1.83		1.83		1.88		2.03		2.03		1.62		1.62		1.62		1.65		1.69		1.67	
Total Area within One Quarter Mile of Alignment	1.04		1.04		1.11		1.02		1.02		0.98		0.98		0.98		0.98		1		0.98	
5.a Rough order of magnitude annual O & M (2008 \$) costs per alignment (Millions)	\$17 M	1	\$17 M	1	\$17 M	1	\$17 M	1	\$17 M	1	\$17 M	1	\$17 M	1	\$2 M	5	\$2 M	5	\$17 M	1	\$2 M	5
5.b User cost - Cost Effectiveness compared to Bo Build (\$/hour of transit user benefit)	21	2	19	3	26	1	25	1	23	2	21	2	23	2	13	5	15	4	25	1	15	4

\* NOTE: Score 1-5 is use for some criteria where 1 = WORST and 5 = BEST



# Table 2-7 Goal 6: Achieve a Financially Feasible Project

Goal 6: Achieve a Financially Feasible P	roject		*Opportunities for p *Opportunities for F	rivate/pi ederal ai	ublic funding nd outside funding																	
Alternative	la		1b		2		3a		3b		4a		4b		5		6		7		8	
Total Length of Alignment (Miles)	1.83		1.83		1.88		2.03		2.03		1.62		1.62		1.62		1.65		1.69		1.67	
Total Area within One Quarter Mile of Alignment	1.04		1.04		1.11		1.02		1.02		0.98		0.98		0.98		0.98		1		0.98	
<ul> <li>6.a ROM Capital costs- total and per mile per alignment (millions) (2008 \$)</li> <li>6.b Evaluation of availability and eligibility of capital funds at federal/state/local levels to construct, operate and maintain (Score 1 to 5)</li> </ul>	\$528 \$301	4	\$441 \$254	5	\$561 \$322	3	\$707 \$424	1	\$640 \$339	2	\$571 \$367	3	\$658 \$418	2 2	\$643 \$414	2	\$740 \$477	1	\$693 \$385	2	\$744 \$473	1
Federal (CEI)	2		3		1		1		2		2		2		5		4		1		4	
State (Cost)	4		5		3		1		2		3		2		2		1		2		1	
Local (Cost & subway restriction)	4		5		3		1		2		3		2		1		1		2		1	

\* NOTE: Score 1-5 is use for some criteria where 1 = WORST and 5 = BEST

# Table 2-8 Goal 7: Provide a Safe and Secure Alternative Transportation System

Goal 7: Provide a Safe and Secure Alternative 1 System	Fransportatior	*S *C *C	ecure entire alignme evelop direct and ir evelop a system the evelop a system the	ent, statio Idirect saf at balance at uses ac	ns, track and other faci ety measures that exce s the need for accessib cessibility and mobility	lities ed safety p ility and mo as measur	recausions typical of th obility with security es for safety and securi	e Metro ty	system													
Alternative	la		1b		2		3a		3b		4a		4b		5		6		7		8	
Total Length of Alignment (Miles)	1.83		1.83		1.88		2.03		2.03		1.62		1.62		1.62		1.65		1.69		1.67	
Total Area within One Quarter Mile of Alignment	1.04		1.04		1.11		1.02		1.02	-	0.98		0.98		0.98		0.98		1		0.98	
7.a Safety- determined to be able to provide measures typical of requirements per ADA, per typical CPUC requirements, fire life safety guidelines, and per Metro Design Guidelines for access to and from stations (amount grade separated) (Score 1 to 5)	22%	1	13%	1	39%	2	34%	2	21%	1	24%	1	34%	2	91%	5	103% !	5	32%	2	103%	5
Total underground - new tunnel, existing 2nd Street tunnel and aerial	44%		33%		36%		46%		38%		49%		60%		94%		*103% (includes grade separating some the Eastside Extension)	eof	56%		103%	
7.b Number of emergency facilities located within 1/4 mile of the alignment, i.e., fire stations, police stations, hospitals.	4		4		4		4		4		4		4		4		4		4		4	
7.c Number of public events with 1/4 mile alignment	14		14		14		14		14		14		14		14		14		14		14	

\* NOTE: Score 1-5 is use for some criteria where 1 = WORST and 5 = BEST





# 2.2 Screening and Selection Process

Based on comments from the early scoping process and further analysis of the initial set of conceptual alternatives, a set of alternatives identified for screening was presented to the public in the early scoping process. As described in Section 2.1.4, eight conceptual alternatives were selected for initial screening through the criteria and performance measures. A detailed corridor description is provided for each alternative, including a description of the alignment configurations and station locations in Table 2-9. Individual maps and their associated engineering plans, as well as an issues & constraints table, Table 2-10, used in the analysis of the alternatives identified for initial screening follow.

The results of the criteria analysis was the further refinement of the eight alternatives to the two promising alternatives, one having a slight variation. These two alternatives are the At-Grade Emphasis LRT Alternative and the Underground Emphasis LRT Alternative. These alternatives are recommended for further analysis, along with the No-Build and TSM alternatives, in the DEIR/DEIS, and are described in Section 2.3.

The No-Build and TSM Alternatives are presented in Sections 2.3.1 and 2.3.2, respectively and will be carried through into the environmental process as required by Metro. An in-depth evaluation of the evaluation criteria, scoring methods, and results can be found in the Initial Screening Report produced in April 2008.



	Table 2	-9 Alternatives Identified for Initia	al Screening Stations and Cor	figurations
Alternative	Mode	Configuration	Stations	Comments
Та	LRT	Underground / At-Grade	2 : One underground station located on Flower St. between 5th St. & 6th St. One at-grade station located on 2nd St. between Spring St. & Main St.	Underground Segments: Flower St. headed north from 7th/Metro Center until north of 4th St., just below 3rd St At-Grade Segments: Remaining alignment including under 2nd St tunnel
1Ь	LRT	Underground / At-Grade	2: One at-grade station located on Flower St. between 4th St. & 3rd St. One at-grade station located on 2nd St. between Spring St. & Main St.	Underground Segments: Flower St. headed north from 7th/Metro Center until north of 5th St., just below 4th St. At-Grade Segments: Remaining alignment including under 2nd St tunnel
2	LRT	Underground / At-Grade / Aerial	3: One underground station located on Flower St. between 5th St. & 6th St. One aerial station located on Dewap Rd. & Temple St. One at-grade station located on Temple St. between Los Angeles St. & Judge John Aiso	Underground Segments: Flower St. headed north from 7th/Metro Center until north of 4th St., just below 3rd St. At-Grade Segments: 3rd St. and Figueroa St. and Temple St. Aerial Segments: Dewap Rd. headed north to Temple St.
3a	LRT	Underground / At-Grade	3: One underground station located on Flower St. between 5th St. & 4th St. One underground station located under Grand Ave Development One at-grade split station located adjacent to City Hall parcel, between Main St. & Los Angeles St.	Underground Segments: Flower St. headed north from 7th/Metro Center until north of 4th St., just below 3rd St. and partial underground before 'punch' through 2nd St. tunnel. At-Grade Segments: Remaining alignment including under 2nd St. tunnel



	Table 2-9 Alternatives Identified for Initial Screening Stations and Configurations				
Alternative	Mode	Configuration	Stations	Comments	
3Ь	LRT	Underground / At-Grade	3: One at-grade station located on Flower St. between 3rd St. & 4th St. One underground station located under Grand Ave Development One at-grade split station located adjacent to City Hall parcel, between Main St. & Los Angeles St.	Underground Segments: Flower St. headed north from 7th/Metro Center until north of 5th St., just below 4th St. and partial underground before 'punch' through 2nd St. tunnel. At-Grade Segments: Remaining alignment including under 2nd tunnel	
4a	LRT	Underground / At-Grade	3: One at-grade station located on Flower St. between 3rd St. & 4th St. One underground station located under Grand Ave Development One at-grade station located on 2nd St. between Spring St. & Main St.	Underground Segments: Flower St. headed north from 7th/Metro Center until north of 5th St., just below 4th St. and partial underground before 'punch' through 2nd St. tunnel. At-Grade Segments: Remaining alignment including under 2nd tunnel	
4b	LRT	Underground / At-Grade	3: One underground station located between 4th St. & 5th St. One underground station located under Grand Ave Development One at-grade station located on 2nd St. between Spring St. & Main St.	Underground Segments: Flower St. headed north from 7th/Metro Center until north of 4th St., just below 3rd St. and partial underground before 'punch' through 2nd St. tunnel. At-Grade Segments: Remaining alignment including under 2nd St. tunnel	
5	LRT	Underground / At-Grade	3: One underground station located on Flower St. between 4th St. & 5th St. One underground station located under Grand Ave Development One underground station located on 2nd St. between Spring St. & Main St.	Underground Segments: Flower St. headed north from 7th/Metro Center, under 2nd St. tunnel, until the vicinity of Central Ave. At-Grade Segments: Segment crossing Office Depot parcel	



Table 2-9 Alternatives Identified for Initial Screening Stations and Configurations						
Alternative	Mode	Configuration	Stations	Comments		
6	LRT	Underground / At-Grade	3: One underground station located at intersection of Flower St. & 5th St. One underground station located under Grand Ave Development One underground station located on 2nd St. between Los Angeles St. & San Pedro St.	Underground Segments: Entire alignment		
7	LRT	Underground / At-Grade	3: One underground station located on Flower St. between 5th St. & 6th St. One underground station located under Grand Ave Development One at-grade station located on Los Angeles St. between Temple St. & 1st St.	Underground Segments: Flower St. headed north from 7th/Metro Center until north of 4th St., just below 3rd St. and partial underground before 'punch' through 2nd St. tunnel. At-Grade Segments: Remaining alignment including 2nd St tunnel		
8	IRT	Underground / At-Grade	3: One underground station located on Flower St. between 4th St. & 5th St. One underground station located under Grande Ave Development One underground station located on Office Depot	Underground Segments: Entire alignment		





## Figure 2-7 Alternative 1a



Figure 2-8 Plan View of Alternative 1a









### Figure 2-9 Alternative 1b













#### Figure 2-11 Alternative 2





Figure 2-12 Plan View of Alternative 2



Metro



## Figure 2-13 Alternative 3a



# Figure 2-14 Plan View of Alternative 3a



Metro



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Figure 2-15 Alternative 3b



# Figure 2-16 Plan View of Alternative 3b



Metro





Figure 2-17 Alternative 4a





# Figure 2-18 Plan View of Alternative 4a





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### Figure 2-19 Alternative 4b



Figure 2-20 Plan View of Alternative 4b



Metro





Figure 2-21 Alternative 5





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## Figure 2-22 Plan View of Alternative 5







Figure 2-23 Alternative 6



# Figure 2-24 Plan View of Alternative 6



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### Figure 2-25 Alternative 7





# Figure 2-26 Plan View of Alternative 7







Figure 2-27 Alternative 8











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## Table 2-10 Constraints and Opportunities

General Station Location	Alignment	Constraints/Issues	Opportunities
and at botware Main At and Anting At	to the doub	*Narrow ROW on 2nd St *LAPD Headquarters currently under construction may cause traffic/emergency issues *Pedeestrian safety outside high volume location Chebicate the backforms read as but UPD parabatic	*N ewly revitalized 2nd St. restaurants/bars/art spaces would be easily accessible *Station would be located in central location to LA Times, LAPD, Caltrans and only 1 block from City Hall and Civic Center *Modern/architectually significant design can be incorporated into LAPD Headquarters
2nd St. between Main St. and Spring St.	1a, 1b, 4a, 4b	*Station set backfrom street onto LAPD property	"Station will serve adjacent Little Tokyo community and Block & residential nousing
Flower St. between 5th St and 6th St.	1a, 2, 7	*Station must be located considerably below Arco Plaza underground shopping center- geotechnical/soil issues *Arco Plaza underground shopping center - physical as well as noise, vibration	*Opportunity to incorporate station into Arco Plaza shopping center *Opportunity to incorporate station into Central Library *Central location to financial/business core
Flower St. between 3rd St and 4th St.	1b, 3b, 4a	*Station is located in partially isolated area *Station is located undemeath pedestrian bridge - contrsuction issues *Station may cause security issues at World Trade Center	*Station is located adjacent to World Trade Center *Station is located within walking distance of business as well as residential properties
Temple St. between Los Angeles St. and Judge John Also St.	2	*Station is located adjacent to federal buildings as well as new metropolitan detention center which may cause security issues *Transiert activity at station would need constant vigilance	*Station is adjacent to Civic Center *Station is located next to arts' centers such as MOCA's Geffen, The Japanese American Museum, and the future Children's Art Park *Station design may tie into the adjacent arts institutions *Opportunities to revitalize the LA Mali
Dewapp St. between Figueroa St. and Hope St.	2	*Structural issues on elevated Dewapp St. *DWP poperty availability *Pedestrian safety at station and Hope St. due to 101 fwy on/off ramps	*Station serves city offices such as DWP, Health Services Administration, and the Los Angeles building *Station is located adjacent to Grand Ave Project and arts' centers such as Dorothy Chandler and Disney Hall *Station is one block from Our Lady of the Angels Cathedral
Flower St. between 4th St. and 5th St.	3a, 4b, 5, 8	*Station located under Bonaventure Hotel - noise/vibration issues	*Station is located in central location to financial core and LA Library *Central location and popular stop among tourists and visitors to downtown Los Angeles
Grand Avenue Development	3a, 3b, 4a, 4b, 5, 6, 7, 8	*Adverse effects to 2nd St. tunnel structure *Incorporation of station into residential housing above *Incorporation of station adjacent to Grand Ave Project underground parking/storage/facilities *Location of entrance/exit portal on street level	*Incorporation of station design and artwork with the Grand Ave Development *Ideal location for tourists and visitors to arts/theater districts - encourage activity *Exit from station would be located at the top of Bunker Hill, making for easier pedestrian movement *Station portals can serve both upper Grand Ave as well as businesses on 3rd and Flower
Main St. and Los Angeles St. between Temple St. and 1st St. (Couplet)	3a, 3b	*Station is located on City Hall Parcel - possible security issues *Station would cause for removal of public open space	*Station serves Civic Center and public services buildings *Station is located one block from Little Tokyo district *Station can serve as 'link' for the eastern portion of future Civic Park
Los Angeles St. between Temple St. and 1st St.	7	*Station would require removal of center median/trees on Los Angeles St. *Station is adjacent to metropolitan detention center - possible security issues	*Station serves Civic Center and public services buildings *Station is located one block from Little Tokyo district
2nd St. between Main St. and Spring St.	5,8	*Station may conflict with LAPD underground facilities *Station may conflict with LA Times underground facilities	*Station does not impact surface level traffic and/or narrow 2nd St. ROW *Station serves surrounding Civic and arts establishments *Station is within reasonable walking distance of Little Tokyo district and Historic Core
2nd St. between Los Angeles St. and San Pedro St.	6	*Station and portals may cause noise issues for Block 8 residential development above	*Station is adjacent to Little Tokyo district and may incorporate art/cultual architecture *Station is in relatively close distance to all Little Tokyo residential housing *Opportunity to incorporate station into Block 8 development *Station is located adjacent to Historic Core and new Arts districts along 3rd St.
5th St. and Flower St. (Under Intersection)	6	*Station must be located considerably below Arco Plaza underground shopping center- geotechnical/soil issues *Arco Plaza underground shopping center - physical as well as noise, vibration	*Opportunity to incorporate station into Arco Plaza shopping center *Opportunity to incorporate station into Central Library *Central location to financial/business core



# 2.3 Definition of Alternatives for further Study

The Regional Connector alternatives recommended for further study will provide a direct connection from the Metro Gold Line at Alameda St. to the existing underground 7<sup>th</sup> St./Metro Center Station with at least three new stations locations. As the project continues to be refined from an environmental and engineering perspective, alignments, station locations and configurations may need to be adjusted. In addition, supporting ancillary facilities such as traction power substations, ventilations shafts, station emergency exits, etc. will be detailed in the next phase of the study.

Through the Initial Screening process, and feedback received from the public and public agencies, certain alternatives began to consistently rate better than others. The technical analysis of goals and objectives through the performance measures scores also helped understand the major differences and affects/impacts of one alternative versus another. A multi-criteria ranking model was used for the comparison of each of the conceptual alternatives. The specific details of the performance measures and their scoring process can be found in the Initial Screening of Alternatives Report prepared in September 2008. The results of this were recommendations as to which alternatives generally performed well and which seemed to accomplish the goals and objectives of the project. There are two build alternatives which performed well across all measures and which are recommended for further study. They are the At-Grade Emphasis LRT Alternative and the Underground Emphasis LRT Alternative. These two alternatives, along with the No Build and TSM alternatives, are recommended for further study.

A detailed description of the At Grade Alternative and the Underground Alternative is provided in the following sections, as well as the description of the No Build and TSM Alternative.

## 2.3.1 No Build

The No Build alternative includes all existing transportation facilities as well as all committed transportation projects outlined in the Metro Long-Range Transportation Plan (2001) and the Southern California Association of Governments' Regional Transportation Plan (2004). This includes the Metro Gold Line Eastside Extension scheduled to open in 2009, the first and second phase of the Metro Exposition Line scheduled to open in 2010, and the second phase of the Metro Rapid Bus expansion plan scheduled to be completed in 2008.

The PSA is presently served by 112 bus routes and two rail lines. The types of transit service include traditional line-haul bus service, peak-hour freeway express buses, downtown circulator shuttles, HRT, and LRT. Along heavily-traveled corridors, Metro also operates limited stop and rapid bus service. Though Metro provides the majority of the transit service in downtown Los Angeles, the following transit operators also provide bus service to the project area: LADOT, Antelope Valley Transit Authority, City of Gardena, City of Santa Clarita, City of Santa Monica (Big Blue Bus), Foothill Transit, City of Montebello (Montebello Bus Lines), Orange County Transportation Authority, and City of Torrance (Torrance Transit). Appendix B contains a list of transit lines serving the Regional Connector PSA, and Appendix





C shows the lines that closely parallel the proposed Regional Connector. At present, the Metro Red Line is the most frequently traveled route along the corridor.

There are multiple operators serving the downtown area because it is a regional employment hub and outlying cities have elected to provide what is mostly peak-hour, peak-direction commuter bus service for their residents. Many of these routes use 40-ft. high floor, high seatback buses intended for long distance highway travel, but some agencies use traditional transit buses as well. The majority of the municipally-provided services originating east of downtown use the El Monte Busway, high capacity bus-carpool lanes constructed in 1976, which parallel the San Bernardino Freeway (I-10). Similarly, the commuter buses coming from points south and southeast of downtown primarily use the Harbor Transitway, completed in 1996. LADOT is an exception as it provides both long distance freeway commute service, as well as frequent DASH service along short, circular routes within the downtown area using 30 ft. buses. In addition to public transit services, several high-rise office tenants within the Regional Connector PSA offer shuttle bus service to Union Station for their employees.

The majority of transit service in the PSA, as well as the Los Angeles region, is provided by Metro, which operates a number of short and long-distance radial lines, as well as limited owl service, cross-town service, express service, and a regional heavy rail subway and light rail network. Metro's transit services vary considerably in speed and capacity. The agency's most basic routes provide line-haul services to and from downtown along arterial streets. Heavilytraveled routes often have overlaid limited-stop or Metro Rapid service, and additional Metro Rapid lines are scheduled to open by June 2008. Metro Rapid service includes traffic signal priority, short headways, and infrequent stops, which increase corridor average bus speeds by about 3 mph over local service, which typically operates in the 9-12 mph range. Metro currently provides Metro Rapid Bus service into the Regional Connector PSA from major intersections along Beverly Blvd., Wilshire Blvd., Whittier Blvd., South Broadway, Olympic Blvd., Pico Blvd., Central Ave., Long Beach Blvd., Cesar E. Chavez Ave., Garvey Ave., San Fernando Rd., and Hawthorne Blvd. Additionally, Metro Rapid Express rush hour service to downtown commenced in June 2007 with the opening of line 940 (Hawthorne Blvd. Rapid Express), but was subsequently cancelled in June 2008. Line 920 (Wilshire Blvd. Rapid Express) between Vermont Ave. and Ocean Ave. in Santa Monica is the only remaining Rapid Express service in the county. Metro Rapid Express service is essentially the same as Metro Rapid service, but serves only 1/3 of the Metro Rapid route's stops, providing a slight increase in speed.

Metro's fleet consists primarily of 40 ft. buses, but the agency uses its recently-purchased 45 ft. and 60 ft. buses to expand capacity on lines where shorter headways are impractical. Within the Regional Connector PSA, these lines include 4 (Santa Monica Blvd.), 720 (Wilshire Blvd./Whittier Blvd. Rapid), 728 (Olympic Blvd. Rapid), 745 (South Broadway Rapid), and 760 (Long Beach Blvd. Rapid). Additionally, Foothill Transit operates 60 ft. buses into the PSA from Montclair along the El Monte Busway.

Bus service runs in a grid pattern through the downtown area, with most lines terminating at its periphery after having passed through. Nearly all streets within the Regional Connector





PSA have bus service during peak hours, as seen in Figure 2-29. As part of the Regional Connector some route restructuring would be required to ensure effective transfers and nonduplication of service. Some of the most heavily-served streets in the PSA include 1<sup>st</sup> St., the 4<sup>th</sup> St./5<sup>th</sup> St. couplet, Hill St., Broadway, the Main St./Spring St. couplet, and the Grand St./Olive St. couplet. The most heavily used bus lines tend to be those running in the eastwest direction, though a number of busy lines run in a southerly direction from downtown as well. On several routes, headways shrink to less than five minutes during rush hour. Some stops are served by over a dozen lines during peak hours, and the above mentioned streets often become crowded with buses. Of the numerous bus routes serving downtown, 28 pass within one block of both termini of the Regional Connector corridor: Union Station and 7th St. Metro Center Station. The 18 of these lines operated by Metro exhibit nearly 16,000 daily boardings and alightings within the PSA.

Major Metro transit lines in the project study area include: 714 – Beverly Blvd. Rapid, 720 – Wilshire Blvd./Whittier Blvd. Rapid, 728 – Olympic Blvd. Rapid, 730 – Pico Blvd. (East) Rapid, 740 – Hawthorne Blvd. Rapid, 745 – South Broadway Rapid, 753 – Central Ave. Rapid, 760 – Long Beach Blvd. Rapid, 770 – Garvey Ave./Cesar Chavez Ave. Rapid, 794 – San Fernando Rd. Rapid, Metro Red Line to North Hollywood and Wilshire/Western, Metro Blue Line to Long Beach, Metro Gold Line to Pasadena and East Los Angeles (under construction), and Metro Expo Line to Culver City (under construction). These lines operate during the mornings, peak period, midday, and evening hours, and some local buses provide overnight service. As of July 2008, Metro had completed its plans to begin new Rapid service on most major arterial streets throughout the county.





Figure 2-29 No Build





## 2.3.2 Transportation System Management

The TSM alternative would imitate the proposed light rail link between 7<sup>th</sup> St./Metro Center Station and Union Station using two shuttle bus routes. Buses would run frequently, perhaps just a few minutes apart during peak hours, and the routes would be designed to move passengers between the two stations as quickly as possible. Intermediate stops would provide additional transit coverage of Bunker Hill, Little Tokyo, and the Civic Center. A variety of bus sizes could be used to tailor capacity to demand, ranging from 30 ft. DASH style buses to 60 ft. articulated buses.

In addition to frequent headways, Regional Connector shuttle buses could employ a Transit Priority System (TPS) similar to the ones currently used on Metro Rapid lines within the City of Los Angeles. Due to the constant pick up and discharge of passengers, buses fall out of signal progression, lengthening the time spent at red lights. Installation of a TPS system or recoordination of the signals along the TSM would counter this effect. Transponders mounted to the undersides of the buses would trigger detector loops embedded in the pavement in advance of each signalized intersection along the route. Upon detecting the bus, the city's central Automated Traffic Surveillance and Control (ATSAC) system would trigger the signal controller to grant additional green phase time to the oncoming bus (usually 10-15% of the total cycle time), up to once per cycle. The existing Metro Rapid lines have shown TPS to keep buses moving quickly, reduce trip times, and increase passenger throughput. Use of existing or creation of new bus only lanes where right of way is available could also improve travel speeds.

<u>Grand/Temple/Los Angeles Alignment</u> This alignment is similar to the existing LADOT DASH Line B service. Buses travel from Chinatown to 7<sup>th</sup> St./Metro Center using Los Angeles St., Temple St., and Grand Ave. The route could be easily modified to serve the Little Tokyo/Arts District Station by using Alameda St. instead of Los Angeles St. between Temple St. and Union Station. Service currently operates every 8 minutes, but the frequency could be increased to make the line more convenient to Regional Connector passengers. This alignment provides good coverage of the Bunker Hill and Civic Center areas, but bypasses most of Little Tokyo, as shown in Figure 2-30.

<u>Figueroa/Flower/2<sup>nd</sup>/3<sup>rd</sup>/Alameda Alignment</u> This alignment would take advantage of the existing northbound bus-only lane on Figueroa St. and the light usage of 2<sup>nd</sup> and 3<sup>rd</sup> Sts. by other bus service. TPS would be easier to implement because buses would only travel in one direction along most streets, and signal priority conflicts between two competing buses would thus be mostly eliminated. The alignment passes by both the Little Tokyo/Arts District Station and Union Station, so easy connections would be available to both East Los Angeles and Pasadena passengers. This route provides good coverage of Little Tokyo and the southern edge of the Civic Center, but passengers would be required to undertake a two-block uphill climb to reach Bunker Hill, as shown in Figure 2-30.

Bus speeds along the two TSM routes were approximated using eight time runs (two per route, per direction) conducted during the afternoon peak period on Monday, May 5, 2008. Table 2-11 through 2-16 shows the distance between arbitrarily selected time points along





each route, the time it took to traverse each segment, and the corresponding speed. The time runs were performed without pulling over to simulate picking up and discharging passengers, so an estimated dwell time of thirty seconds was used to account for the time penalty of stopping. Both of the TSM bus routes have two terminal stops and six intermediate stops, so the total dwell time estimate added to each run was three minutes. Overall, the calculations predicted average speeds of 9-12mph, a range similar to the observed speeds of Metro's local bus service. Thus, a typical trip on the Upper Grand TSM route during the weekday afternoon peak period would take approximately 11-13 minutes, and a trip on the 2<sup>nd</sup> St. route would take 11-15 minutes.

A few potential data limitations arose as a result of not having a transit bus available to conduct the time runs. The time runs were conducted using a small car, which was capable of much better handling, braking, and acceleration performance than a typical bus. This enabled the car to attain much shorter trip times than the TSM service likely would. The driver avoided maneuvers that would be difficult for a bus to perform, but it would have been unsafe and disruptive to traffic flow for a passenger car to drive slowly enough to imitate the speed of a bus. Similarly, pulling over and stopping at each of the proposed TSM bus stops would have interrupted existing bus service and violated the "no stopping anytime" restriction signs posted at the bus zones. Another potential source of delay is the tendency for buses to fall out of the street's signal progression bandwidth during dwells, forcing the buses to wait through additional red light phases. As such, the thirty second dwell time estimate was used to account not only for the time that the bus would actually be stopped, but also the slower speed and additional red light wait time that would be incurred. Additionally, there was one intersection along the Upper Grand TSM route where only buses are allowed to turn left  $(7^{th})$ St. and Olive St.). In order to proceed along the route without violating the left turn restriction, the driver had to estimate the wait time needed to make the left turn, and then detour around the block to continue north on Olive St. It is unlikely, however, that this deviation from the TSM route significantly affected the recorded trip time.



Table 2-11 Upper Grand Route Southbound	(via Los Angeles)	4:08 PM	4:31 PM		
Timepoint	Distance (miles) <sup>2</sup>	Time Run 1 (mm:ss)	Time Run 2 (mm:ss)	Avg. Time (mm:ss)	Avg. Speed (mph)
Alameda St & Los Angeles St.	0.00	00:00	00:00	00:00	
Temple St. & Los Angeles St.	0.30	01:10	01:10	01:10	15.4
Temple St. & Broadway	0.22	00:20	00:27	00:23	33.7
Grand Ave. & 1st St.	0.46	02:38	02:42	02:40	10.4
Grand Ave. & 3rd St.	0.23	00:30	00:37	00:34	24.7
Grand Ave. & 5th St.	0.25	01:34	02:02	01:48	8.3
7th St. & Flower St.	0.40	03:43	02:03	02:53	8.3
<u>Total (without stops):</u>	1.86	09:55	09:01	09:28	11.8
Total Dwell Time (Avg. Dwell x # Stops):		03:00	03:00	03:00	
Trip Time with Stops:		12:55	12:01	12:28	9.0

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Table 2-12 Upper Grand Route Northbound	(via Los Angeles)	4:18 PM	4:41 PM		
Timepoint	Distance (miles) <sup>2</sup>	Time Run 1 (mm:ss)	Time Run 2 (mm:ss)	Avg. Time (mm:ss)	Avg. Speed (mph)
7th St. & Flower St.	0.00	00:00	00:00	00:00	
Grand Ave. & 5th St.	0.56	02:29	03:12	02:51	11.8
Grand Ave. & 3rd St.	0.25	00:41	01:00	00:51	17.8
Grand Ave. & 1st St.	0.23	00:38	00:49	00:44	19.0
Temple St. & Broadway	0.46	01:34	01:40	01:37	17.1
Temple St. & Los Angeles St.	0.22	01:16	01:15	01:15	10.5
Alameda St & Los Angeles St.	0.30	01:15	01:15	01:15	14.4
<u>Total (without stops):</u>	2.02	07:53	09:11	08:32	14.2
Total Dwell Time (Avg. Dwell x # Stops):		03:00	03:00	03:00	
Trip Time with Stops:		10:53	12:11	11:32	10.5



Table 2-13 Upper Grand Route Southbound	(via Alameda)³	4:08 PM	4:31 PM		
Timepoint	Distance (miles) <sup>2</sup>	Time Run 1 (mm:ss)	Time Run 2 (mm:ss)	Avg. Time (mm:ss)	Avg. Speed (mph)
Alameda St & Los Angeles St.	0.00	00:00	00:00	00:00	
Alameda St. & Temple St.	0.34	01:10	01:00	01:05	18.8
Temple St. & Los Angeles St.	0.22	01:03	01:05	01:04	12.4
Temple St. & Broadway	0.22	00:20	00:27	00:23	33.7
Grand Ave. & 1st St.	0.46	02:38	02:42	02:40	10.4
Grand Ave. & 3rd St.	0.23	00:30	00:37	00:34	24.7
Grand Ave. & 5th St.	0.25	01:34	02:02	01:48	8.3
7th St. & Flower St.	0.40	03:43	02:03	02:53	8.3
<u>Total (without stops):</u>	2.12	10:58	09:56	10:27	12.2
Total Dwell Time (Avg. Dwell x # Stops):		03:00	03:00	03:00	
Trip Time with Stops:		13:58	12:56	13:27	9.5

Table 2-14 Upper Grand Route Northbound	(via Alameda)³	4:18 PM	4:41 PM		
Timepoint	Distance (miles)²	Time Run 1 (mm:ss)	Time Run 2 (mm:ss)	Avg. Time (mm:ss)	Avg. Speed (mph)
7th St. & Flower St.	0.00	00:00	00:00	00:00	
Grand Ave. & 5th St.	0.56	02:29	03:12	02:51	11.8
Grand Ave. & 3rd St.	0.25	00:41	01:00	00:51	17.8
Grand Ave. & 1st St.	0.23	00:38	00:49	00:44	19.0
Temple St. & Broadway	0.46	01:34	01:40	01:37	17.1
Temple St. & Los Angeles St.	0.22	01:16	01:15	01:15	10.5
Alameda St. & Temple St.	0.22	00:46	00:36	00:41	19.3
Alameda St & Los Angeles St.	0.34	01:16	02:43	02:00	10.2
<u>Total (without stops):</u>	2.28	08:40	11:15	09:58	13.7
<u>Total Dwell Time (Avg. Dwell x # Stops):</u>		03:00	03:00	03:00	
Trip Time with Stops:		11:40	14:15	12:58	10.6



Table 2-15 2 <sup>nd</sup> St. Route Southbound		3:10 PM	3:45 PM		
Timepoint	Distance (miles)²	Time Run 1 (mm:ss)	Time Run 2 (mm:ss)	Avg. Time (mm:ss)	Avg. Speed (mph)
Alameda St & Los Angeles St.	0.00	00:00	00:00	00:00	
Alameda St. & 1st St.	0.50	01:55	02:34	02:15	13.4
3rd St. btwn. Main St. & Los Angeles St.	0.74	01:51	02:08	02:00	22.3
3rd St. & Broadway	0.21	01:39	01:33	01:36	7.9
Flower St. & 3rd St.	0.39	00:58	00:59	00:59	24.0
Flower St. & 5th St.	0.25	00:31	00:28	00:29	30.5
Flower St. & 7th St.	0.25	00:47	00:48	00:47	18.9
<u>Total (without stops):</u>	2.34	07:41	08:30	08:06	17.4
<u>Total Dwell Time (Avg. Dwell x # Stops):</u>		03:00	03:00	03:00	
Trip Time with Stops:		10:41	11:30	11:05	12.7

Table 2-16 2 <sup>nd</sup> St. Route Northbound		3:30 PM	3:54 PM		
Timepoint	Distance (miles)²	Time Run 1 (mm:ss)	Time Run 2 (mm:ss)	Avg. Time (mm:ss)	Avg. Speed (mph)
Figueroa St. & 7th St.	0.00	00:00	00:00	00:00	
Figueroa St. & 5th St.	0.25	00:40	00:47	00:44	20.7
Figueroa St. & 3rd St.	0.25	01:11	01:10	01:11	12.8
2nd St. & Broadway	0.61	02:49	01:48	02:18	15.9
2nd St. @ Caltrans Building	0.20	02:02	01:31	01:46	6.8
Alameda St. & 1st St.	0.59	03:50	03:52	03:51	9.2
Alameda St & Los Angeles St.	0.50	02:28	02:41	02:35	11.7
<u>Total (without stops):</u>	2.40	13:00	11:49	12:25	11.6
<u>Total Dwell Time (Avg. Dwell x # Stops):</u>		03:00	03:00	03:00	
<u>Trip Time with Stops:</u>		16:00	14:49	15:25	9.3

<sup>1</sup> Excluding terminal stops

<sup>2</sup> Source: ESRI

<sup>3</sup> Includes optional detour to serve Little Tokyo station, times estimated using test runs via Los Angeles St.





Figure 2-30 TSM Alternative





## 2.3.3 At-Grade Emphasis LRT Alternative (Option A & B)

Conceptually, the At-Grade Emphasis LRT Alternative, as shown in Figure 2-31, will provide a direct connection from the Metro Gold Line at Temple St. to the existing underground 7<sup>th</sup> St./Metro Center Station with at least three new station locations. The current concept is to extend dual track service from the Metro Gold Line at Temple Street using a "Y" track configuration across Alameda. It is anticipated that the Regional Connector will provide the most flexibility for train operation and utilize existing traffic and parking lanes to travel. The tracks would extend to the west across Alameda St. and run along the south side of Temple St. In order to accommodate the turning radius for the trains, the existing mechanically structure earth (MSE) ramp which connects tracks from the bridge over the 101 freeway to the tracks on surface just north of Temple Street will need to be adjusted to provide a steeper grade. This change in slope will allow for an improved turning movement by trains heading south to west or heading east to north.

As trains continue west on Temple St. in a dual track configuration, the trackway will return to the center of Temple St. As the trackway arrives at Los Angeles St., the alignment splits into two single track alignments. One trackway would continue west to Main St. while the other trackway continues south on Los Angeles St. The track alignments would run on the eastern side of both streets and a split station would be planned for each track alignment just north of 1<sup>st</sup> St. The track alignments then would continue south across 1<sup>st</sup> St. At 2<sup>nd</sup> St., the track on Los Angeles St. heads west where it then reconnects with the track on Main St. Both track alignments would return to a dual track configuration.

At 2<sup>nd</sup> St., adjacent to Broadway Ave. and Spring St., another split station is possible if property was acquired and easements provided on adjacent properties. The station would be split between the two blocks. This station is currently optional and will be further analyzed for ridership and cost implications in the next phase of the project. With or without a station, the street would be transit dedicated with the two travel lanes and two parking lanes reduced to a single travel lane primarily for access to parking lots or loading zones. This type of configuration would extend from Los Angeles St. to Hill St.

As the track alignment continue west past Hill St., the track alignment would be on the southern side of the street and enter into the existing  $2^{nd}$  St. tunnel. This alignment would then reduce the  $2^{nd}$  St. tunnel from four travel lanes to at least one and potentially two travel lanes pending further detailed engineering. About half-way through the  $2^{nd}$  St. tunnel, the alignments then would veer to the south, "punching" through the tunnel wall. This would place the alignment in close proximity to Grand Ave. and the second station is planned in this vicinity.

Using the natural grade change of the hillside, the alignment would then resurface from a portal, off street, just north of 3<sup>rd</sup> St. It would cross 3<sup>rd</sup> St. at-grade and continue south on Flower St. A third station is contemplated on or under Flower St. either at-





grade south of  $3^{rd}$  St. or underground south of  $5^{th}$  St. In either case, south of  $3^{rd}$  St. and north of  $5^{th}$  St., the track alignment then enters into a portal in order to be fully underground before reaching  $5^{th}$  St.

The now underground track alignment then directly connects to the 7<sup>th</sup> St./Metro Center Station under Flower St. This alignment assumes street running service which allows the trains to operate by existing traffic signals and does not require crossing gates and bells normally.

## **Construction Assumptions**

Construction of this alternative assumes using the center of the street for staging and construction of the at-grade areas. Utilization of the 2nd Street tunnel for construction will also be necessary. Cut and cover construction techniques will be used for the underground segment from 7th and Flower to 3rd and Flower as well as at the Grand Avenue Station. Specific locations adjacent to the alignment may be used for some storage, vehicle equipment, offices and materials. Specific locations will be identified when further engineering is conducted during the later phases of this project and as part of the EIR/EIS process.

The At-Grade Emphasis LRT Alternative accomplishes many of the goals and objectives of this project. Both alternatives connect major activity centers within the PSA while introducing an element of pedestrian integration through the at-grade configuration. The couplet arrangement along Main St. and Los Angeles St. provides for creative ways to integrate the system through urban design with the surrounding Civic Center and municipal activities as well as the growing Little Tokyo community. An at-grade system allows pedestrians to physically see and understand the pattern of a train as a way to give direction. The alternative also provides a unique opportunity to incorporate an integrated pedestrian transit mall along the 2<sup>nd</sup> St urban landscape.

Figures 2-32 through 2-41 provides a detailed look at street configurations and engineering constraints, followed by real world examples of the alignments, station locations, and urban design elements. The At-Grade Emphasis LRT Option A and B are identical, with the exception of the station locations on Flower St. For display purposes, characteristics of the at-grade station on Flower St. in Option B are shown at the end of all renderings that pertain to both Option A and B.



Figure 2-31 At-Grade Emphasis LRT Option A & B





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# Figure 2-35 At-Grade Emphasis LRT Alternative Option A Continued Grand Avenue Station & Portal



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Figure 2-36 At-Grade Emphasis LRT Alternative Option A Continued 7<sup>th</sup> St./Metro Center Station to Underground Station on Flower St.













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# Figure 2-39 At-Grade Emphasis LRT Alternative Option B Continued 2<sup>nd</sup> St. Corridor at main and Los Angeles Sts.



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Figure 2-41 At-Grade Emphasis LRT Alternative Option B Continued





At-Grade Emphasis LRT Option A & B – Alameda St. underpass looking north from  $1^{st}$  St.



At-Grade Emphasis LRT Option A & B – Alameda St. underpass looking north from Alameda and  $1^{\rm st}$  St. intersection





At-Grade Emphasis LRT Option A & B - Alameda St. underpass looking north on Alameda and Temple St. intersection



At-Grade Emphasis LRT Option A & B – Alameda St. underpass at Temple and Alameda St. intersection





At-Grade Emphasis LRT Option A & B – Alameda and Temple St. intersection





At-Grade Emphasis LRT Option A & B – Split station at City Hall along Los Angeles and Main



At-Grade Emphasis LRT Option A & B – Split Station at City Hall





At-Grade Emphasis LRT Option A & B – Main St. station looking north from  $1^{st}$  St.



At-Grade Emphasis LRT Option A & B – Los Angeles St. station





At-Grade Emphasis LRT Option A & B – Los Angeles St. looking north from  $1^{st}$  St.



At-Grade Emphasis LRT Option A & B – Main St. looking north from  $2^{nd}$  St.





At-Grade Emphasis LRT Option A & B – Main St. looking south between Main and Temple St.



At-Grade Emphasis LRT Option A & B – Temple St. between Los Angeles and Main Sts.





At-Grade Emphasis LRT Option A &  $B-2^{{\scriptscriptstyle nd}}$  St. looking west from Broadway



At-Grade Emphasis LRT Option A &  $B-2^{{\mbox{\tiny nd}}}$  St. looking east from Broadway




At-Grade Emphasis LRT Option A &  $B-2^{^{nd}}$  St. looking east from Broadway



At-Grade Emphasis LRT Option A &  $B-2^{^{nd}}$  St. looking west between Main and Spring Sts.





At-Grade Emphasis LRT Option A &  $B-2^{\mbox{\tiny nd}}$  and Spring St. intersection



At-Grade Emphasis LRT Option A &  $B - 2^{nd}$  St. at Main St.





At-Grade Emphasis LRT Option A &  $B - 2^{nd}$  St. looking east at Main St. intersection



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At-Grade Emphasis LRT Option B – Flower and 3<sup>rd</sup> St. intersection looking northeast from Flower St.



At-Grade Emphasis LRT Option B – Flower St. between  $3^{rd}$  and  $4^{th}$  Sts.





At-Grade Emphasis LRT Option B-Flower St. looking southwest from  $3^{{\mbox{\tiny rd}}}$  St.



At-Grade Emphasis LRT Option B – Flower and  $3^{rd}$  St. intersection looking south from  $3^{rd}$  St.





At-Grade Emphasis LRT Option B – Flower St. looking north from  $4^{th}$  St.



At-Grade Emphasis LRT Option  $\mathsf{B}-\mathsf{Flower}$  St. and station looking south





At-Grade Emphasis LRT Option B-Flower St. and station looking south from  $3^{\mbox{\tiny rd}}$  St.





# 2.3.4 Underground Emphasis LRT Alternative

The Underground Emphasis LRT Alternative, as shown in Figure 2-42, is in the current level of design as the At-Grade Emphasis LRT Alternative. This alternative uses the same type of "Y" dual track configuration as the at-grade alternative but in a south west direction south from the Little Tokyo/Arts District Station across 1st and Alameda Streets and simultaneously into private property. For this alternative, it is anticipated that the property within the area bounded by Central Avenue, 1st Street, Alameda Street and 2nd Street will need to be acquired to construct a portal and to allow for the construction of tunnels that would extend west under 2nd Street.

After entering into the portal at this location, the alignment would utilize twin tunnels that would extend west under 2nd Street. A new station is planned between Broadway and Little Tokyo in the vicinity of Los Angeles Street. The alignment continues west underground with a 2nd station in the vicinity of Grand Avenue and Hope as the alignment then veers south. A final underground station is located in the vicinity of 5th Street. The tunnels then directly connect to the 7th Street Metro Center Station.

#### Construction Assumptions

It is the assumption that utilization of tunnel boring machines (TBM) to create the twin tunnels necessary for this predominantly underground alignment alternative will be required in order to avoid surface impacts. Cut and cover construction techniques will likely be utilized for the 2nd Street Station, Grand Avenue Station, 5th/Flower Station and the 2nd Street staging area for the launching of TBMs. As the project continues to be further engineered during the EIR/EIS process and preliminary engineering and final design, the location of ancillary facilities and needs for additional staging areas will be identified.

The Underground Emphasis LRT Alternative also accomplishes many of the project objectives. Many of the comments received in the early scoping period expressed support for an underground configuration due to the dense conditions of the PSA and concerns of congestion and safety. Due to the built out environment of the downtown, thorough analysis was conducted to identify available and appropriate station and portal locations which would benefit the most users and engage the surrounding street level environment.

Due to the high volume level of the Alameda corridor, the incorporation of an underpass would keep vehicular, pedestrian, and rail movements separate, creating a constant flow of movement. This intersection, located on the north eastern edge of Little Tokyo, would serve as a 'gateway' into the growing community and could create an opportunity to create a vibrant and engaging activity center. Figures 2-43 through 4-46 show the engineering conditions of the alignment followed by real world examples.



#### Figure 2-42 Underground Emphasis LRT Alternative







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# Figure 2-44 Underground Emphasis LRT Alternative Continued 2<sup>nd</sup> St. Corridor between Los Angeles and Olive St.







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Underground Emphasis LRT Alternative – Intersection of Alameda and 1<sup>st</sup> St. looking southwest





Underground Emphasis LRT Alternative – Alameda St. underpass looking south



Underground Emphasis LRT Alternative – Alameda St. underpass looking south on Alameda St.





Underground Emphasis LRT Alternative – Alameda St. and pedestrian bridge looking south



Underground Emphasis LRT Alternative – Alameda St. looking south from Temple St.





Underground Emphasis LRT Alternative  $-2^{nd}$  and Los Angeles St. intersection looking southwest on  $2^{nd}$  St.



Underground Emphasis LRT Alternative –  $2^{nd}$  St. between Main and Los Angeles Sts.





Underground Emphasis LRT Alternative  $-\,2^{\mbox{\tiny nd}}$  St. and Los Angeles St .intersection



Underground Emphasis LRT Alternative  $-2^{nd}$  St. underground alignment and station





Underground Emphasis LRT Alternative  $-2^{nd}$  St. underground looking east from Los Angeles St.



Underground Emphasis LRT Alternative  $-2^{nd}$  St. underground looking east from Los Angeles St.





Underground Emphasis LRT Alternative – Flower St. underground and station



Underground Emphasis LRT Alternative – intersection of Flower and  $5^{th}$  St. looking northwest





Underground Emphasis LRT Alternative – Flower St. looking north from  $5^{th}$  St.



# **2.3.5 Station Locations**

The At Grade Emphasis LRT Alternative and Underground Emphasis LRT Alternative have a set of station locations which serve various parts of the PSA. Station locations were chosen through the investigation of past studies, the current downtown dynamics and travel characteristics, and the two recommended alternative alignments.

### 2.3.5.1 Underground Station on Flower St.

The underground location of a station on Flower St. would be between 5<sup>th</sup> and 6<sup>th</sup> Sts. in the heart of the financial core. The station location would serve the extremely high density of workers in the surrounding businesses, including the Bonaventure Hotel, 444 Flower, Arco Plaza, the downtown library, and other businesses. As seen in Figure 2-47, the station represents a center platform configuration. Station portals would be located on the eastern and western side corner of Flower at 5<sup>th</sup> St. These locations allow users to come up to street level and instantly assess their surroundings and likewise giving pedestrians a visual point of transit service.



Figure 2-47 Underground Station on Flower St.

Currently, the area is an important activity center in the PSA as it is surrounded both by notable business towers as well as significant institutions which attract tourism. Previously, the idea of possibly creating a joint use station with adjacent businesses had been analyzed, these two being the Bonaventure Hotel and the underground Arco Plaza. However, further analysis must be conducted in order to evaluate all possibilities. The opportunities to create pedestrian linkages and bike centers does exists however as an aid to reenergize these underutilized urban spaces.





The at-grade station on Flower St. is located between  $3^{rd}$  and  $4^{th}$  St. The station is a center platform configuration which allows for northbound and southbound trains on either side as well as two lanes of traffic for vehicular movements, as seen in Figure 2-48. The station utilizes stairs on either end, allowing for users and pedestrians to enter/exit onto crosswalks, one located across the  $3^{rd}$  St intersection and the other located mid-block on Flower St. between  $3^{rd}$  and  $4^{th}$  St.

The station is located on the northern end of Flower St. in front of the World Trade Center and BP Plaza. Traditionally an underutilized space, this station provides an opportunity to reintroduce a vibrant urban experience through the use of street treatments, landscaping, and street furniture. Because the station location is close to an important on-ramp to the 110 fwy, the use of these elements can soften the overall environment and make it more pedestrian and transit friendly. Also, the World Trade Center is a multiuse facility which apart from being home to a number of import/export companies and law offices, has currently teamed with teaching institutions to provide instruction and classroom locations for students in the central city school district. A station in this location would facilitate these services for all while still being a short walk away from the financial core.



Figure 2-48 At-Grade Station on Flower St.



### 2.3.5.3 Grand Avenue Station

The Grand Avenue Station is located under the 2<sup>nd</sup> St. vehicular bridge. This station is part of a much larger vision for the City of Los Angeles' future plans to create a vibrant new regional center with mixed commercial, residential, and entertainment uses. The station would be incorporated into the underground facility with direct access to street level activities.

Because the length of the station tunnel is diagonally angled, access to both Upper and Lower Grand could be a possibility. In this instance, workers and residents along 3<sup>rd</sup> St. would have access to Grande Ave and vice versa. The Grand Avenue project is projected to be a first class destination point not only for city residents but for tourists alike. Comments received during the early scoping period showed a high interest in having a station in this location.

#### 2.3.5.4 Split Station (City Hall)

The At-Grade Emphasis LRT Alternative has a split station design with platforms on both Main St. and Los Angeles St. The Main St. platform is located on the eastern side of the street and is used by southbound trains and the Los Angeles St. platform is also located on the eastern side of the street and is used by northbound trains, as seen in Figure 2-49. The width of both streets allows for four lanes to remain for vehicular traffic.

The split platform design allows for transit users and pedestrians alike to have a free flowing, through passage in the outdoor plaza area, while providing visual directions for train movements. The station is situated on the eastern portion of the Civic Center and is walking distance from federal and municipal buildings as well new developments which have high levels of activity, such as the LAPD Headquarters currently under construction and the Caltrans building. The Little Tokyo community is also within 2 blocks of the station, which makes this a good location for a variety of users to take advantage of.



Figure 2-49 Split Station (City Hall)



Located next to historically significant City Hall, the station design incorporates elements which would maintain the feel of the environment. Urban design treatments can be used to enhance the station identity and give the user a unique transit experience.

## 2.3.5.5 Underground Station on 2<sup>nd</sup> St.

The underground station on 2<sup>nd</sup> St. is located between Main St. and Los Angeles St. The station is a center platform configuration and sits directly beneath the newly constructed LAPD Headquarters building. Portals are located on either side of 2<sup>nd</sup> St at Los Angeles St. as seen in Figure 2-50. Although the street environment in this location is very dense and built out, the portals fit well in terms of visibility and location. The portal on the southern side is adjacent to the St. Vibiana Arts complex and Little Tokyo library and on the north is next to the Caltrans building.



Figure 2-50 Underground Station on 2<sup>nd</sup> St.

The station supports the eclectic street environment of residents and downtown workers. Currently, there are various residential developments which are planned or under construction in this vicinity. The St. Vibiana Arts complex is a planned residential development which will have over 300 units. Across the street is the Block 8 development which will play a significant role in shaping the Little Tokyo community while at the same time creating the missing 'link' along the 2<sup>nd</sup> St. corridor. These residential complexes, along with many redeveloped buildings are breathing life back into this district which is now home to a variety of sidewalk restaurants, bars, and art galleries.





The At-Grade Emphasis LRT Alternative has the possibility for an optional split station on 2<sup>nd</sup> St. between Main St. and Broadway. One station would be located directly in front of the new LAPD Headquarters with an elevated platform which would create a secured, green open space on the parcel. A second station would be located on the south side of 2<sup>nd</sup> St. between Spring St. and Broadway. All pedestrian movements at all intersections would remain the same, however, east-west vehicular traffic would not be allowed due to the space needed for train movements. Currently, the parcel adjacent to the station between Spring St. and Broadway serves as a surface parking lot; however plans for a residential complex have been identified. Other surrounding buildings are the LA Times as well as the future home of the Federal Courthouse.

This split station serves many purposes. Still centrally located to the Civic Center and within walking distance of Little Tokyo, the station is closer to the western end of 2<sup>nd</sup> St. and Broadway. During the early scoping process, some comments expressed the interest to incorporate a station with Broadway St which is a main corridor in the PSA. Currently, the City of LA is looking to 'Bring Back Broadway' as a way to rehabilitate businesses and create a major activity center. The location of the split station would support the needs of people traveling to Broadway while supporting future plans such as the possible addition of a Trolley line. Coordination will exist with the 'Bringing Back Broadway' committee in order to remain up to date on project developments in future phases.



Figure 2-51 Optional Station on 2<sup>nd</sup> St.

