

*January 2008*



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*LAX/Metro Green Line  
Interagency Task Force  
Report of 2007 Proceedings*



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# 1. INTRODUCTION

This report documents the proceedings of the LAX/Metro Green Line Interagency Task Force meetings that took place during April, May, and June of 2007. As described in more detail in Section 2 of this report, the LAX/Metro Green Line Interagency Task Force (Task Force) consists of Los Angeles World Airports (LAWA), Los Angeles County Metropolitan Transportation Authority (Metro, formerly MTA) and other agencies and stakeholders brought together in response to a Los Angeles City Council motion which sought to renew efforts to provide a direct transit connection from the Metro Green Line to Los Angeles International Airport (LAX).

The following provides a brief summary of the contents of each section of this report.

## **Section 1 - Introduction**

Section 1 provides a discussion of the purpose of this report.

## **Section 2 - Background and Purpose of the LAX/Metro Green Line Interagency Task Force**

This section provides a discussion of the background and purpose of the Task Force, and identifies the Task Force members.

## **Section 3 - Task Force Meetings**

This section identifies the date and general purpose of each Task Force meeting.

## **Section 4 - Conceptual Green Line Alternatives**

Section 4 provides a brief description of each of the conceptual Green Line alternatives that were developed for consideration by the Task Force. This section also illustrates transit interface options at Century Boulevard/Aviation Boulevard, cross sections and profiles along specific segments of the alignments, and Aviation Boulevard variations that were developed for consideration by the Task Force.

## **Section 5 - Green Line Conceptual Alternatives Comparative Analysis**

This section provides a comparative analysis of the alternatives. It was developed as a tool to assist Task Force members in determining which alternative(s) had the most promise for further consideration as part of the LAX Specific Plan Amendment Study (SPAS).

## **Section 6 - Coordination with FAA**

This section provides a brief discussion of the purpose and outcome of consultation between LAWA, Metro, and the Federal Aviation Administration (FAA) staff regarding the use of Aviation Boulevard for extension of the Green Line.

## **Section 7 - Task Force Recommendations**

Section 7 discusses the overall recommendations by the Task Force regarding which alternatives hold the most promise for further consideration by LAWA in their planning of facilities as part of the LAX SPAS.

## **Attachments**

A table identifying the attendees at each Task Force meeting is provided in Attachment A to this report. In addition, numerous handout materials to facilitate meeting discussions were provided by LAWA at the Task Force meetings. The final versions of LAWA handout materials are identified below and are included as attachments to this report.

- A LAX/Metro Green Line Interagency Task Force Meeting Attendance Log
- B Fact Sheets
- C Green Line Conceptual Alternatives
- D Transit Interface at Century Boulevard/Aviation Boulevard Options

- E Variations at Aviation Boulevard
- F Cross Sections and Profiles
- G Comparative Analysis
- H Alternative B (Modified) and Alternative J Conceptual Alternatives

## **2. BACKGROUND AND PURPOSE OF THE LAX/METRO GREEN LINE INTERAGENCY TASK FORCE**

### **History of the Project to Extend the Green Line to LAX**

In August 1989, the Los Angeles County Transportation Commission (LACTC) certified the Final EIR for the Metro Green Line Northern Extension. The extension project was approved for implementation by LACTC in March 1990, but was halted due to concerns by the Federal Aviation Administration that the Green Line extension could adversely affect airport operations. As a result of those concerns, an LAX/Metro Green Line Interagency Task Force, consisting of LACTC, City of Los Angeles (Mayor's office, City Council office, Department of Airports, Department of Transportation, Planning Department), County Supervisor's office, Caltrans, FAA, and the Southern California Rapid Transit District, was established in 1991 to create a plan for extending the Metro Green Line to LAX. This Task Force developed a 5-mile Green Line extension plan from the I-105 to Marina del Rey. The alignment of the Green Line extension, approved by Metro's Board of Directors in 1994 and environmentally cleared, still remains Metro's officially recommended alignment until such time that a more formal public planning process is undertaken. Due to subsequent funding constraints, the extension was never constructed and the Task Force was disbanded.

In the absence of the planned extension, the closest existing Green Line station to LAX is at the southeast corner of Aviation Boulevard and Imperial Highway, approximately 1.5 miles southeast of the LAX Central Terminal Area (CTA). In order to reach LAX, riders from the Green Line currently walk from the aerial station to the ground floor plaza and transfer to an LAX shuttle. The LAX Shuttle takes Green Line riders in each direction directly from the Aviation Station plaza to terminals within the CTA at no charge.

At the Special Board Meeting of June 29, 2006, the Metro Board of Directors voted to have Metro staff "put together those studies that they already made regarding moving the Green Line to LAX and coordinate with the City of Los Angeles and LAX in attempting to study what would be required and the financial cost of moving the Green Line to LAX."

In July 2006, Los Angeles City Councilman Bill Rosendahl introduced a City Council Motion calling for the re-establishment of the Los Angeles International Airport /Metro Green Line Interagency Task Force to develop a proposal for implementing a Minimum Operable Segment (MOS) within the vicinity of LAX. Specifically, this MOS of the Green Line would include a two station segment between the existing station at Aviation Boulevard and Imperial Highway and the intersection of Lincoln Boulevard and Sepulveda Boulevard. Councilman Rosendahl's motion also requested that the LAWA Board of Airport Commissioners include the MOS as part of the LAX Specific Plan Amendment Study (described below). On August 11, 2006, the Los Angeles City Council voted unanimously to approve Councilman Rosendahl's motion to renew efforts to extend the Green Line to LAX.

As a result of Councilman Rosendahl's motion, LAWA invited staff from Metro, the agency responsible for regional transportation planning, to serve in an advisory role to LAWA as various Green Line alternatives were considered. Representatives from other public agencies, offices of elected officials, and transit stakeholders were also invited to join this new LAX/Metro Green Line Interagency Task Force. Participation in the Task Force was voluntary and recommendations of the Task Force are advisory in nature only. The members of the LAX/Metro Green Line Interagency Task Force are identified below. It should be noted that the individuals listed may not have attended all or any of the Task Force meetings. Attendance at individual meetings is summarized in Attachment A.

**LAX/Metro Green Line Interagency Task Force Members**

<u>Name</u>		<u>Title</u>	<u>Agency</u>
Ken	Alpern	President, The Transit Coalition	Friends of the Green Line/The Transit Coalition
Brian	Armstrong	Manager	Federal Aviation Administration, Los Angeles Airports District Office
Grieg	Asher	Planning Deputy	Office of Councilmember Rosendahl, District 11
Ralph	Avila	City Planner	City of Los Angeles Planning Department
Renee	Berlin	Executive Officer	Los Angeles County Metropolitan Transportation Authority (Metro)- Transportation Development and Implementation
Jim	Bickhart	Associate Director of Transportation	City of Los Angeles, Office of the Mayor
Michael	Bohlke	Assistant Chief of Staff	Office of Los Angeles County Supervisor Burke, 2nd District
Susan	Bok	Supervising Transportation Planner	City of Los Angeles Department of Transportation
Mike	Bonin	Chief of Staff	Office of Councilmember Rosendahl, District 11
Jacob	Brothers	CASW	Los Angeles World Airports
Yvonne	Burke	The Honorable Supervisor	Los Angeles County Board of Supervisors, 2nd District
Robert	Burlingham	Transportation Planning Associate	Los Angeles World Airports
Michael	Calzada	Executive Assistant to City Administrator	City of Inglewood
Tomas	Carranza	Transportation Engineer	City of Los Angeles Department of Transportation
Marc	Carrel	Deputy Chief of Staff	Office of Congresswoman Jane Harman
Diana	Chang	Management Analyst	Culver City Transportation Department
Michael	Davies	Supervising Transportation Planner	City of Los Angeles Department of Transportation
Mike	Doucette	Chief Airport Planner II	Los Angeles World Airports
Jessica	Duboff	Field Representative	Office of Congresswoman Jane Harman
Steven	Finton	Director of Public Works	City of El Segundo, Public Works Department
Jerry	Givens	Acting City Administrator	City of Inglewood
Herb	Glasgow	Senior City Planner	Los Angeles World Airports
Victor	Globa	Environmental Protection Specialist	Federal Aviation Administration
Gail	Goldberg	Director of Planning	City of Los Angeles Planning Department
Sean	Haeri	Senior Transportation Engineer	City of Los Angeles Department of Transportation
Gordon	Hamilton	Senior City Planner	City of Los Angeles Planning Department
Carol	Inge	Chief Planning Officer	Los Angeles County Metropolitan Transportation Authority (Metro)
Gloria	Jeff	General Manager	City of Los Angeles Department of Transportation
Dave	Kessler	Regional Environmental Protection Specialist	Federal Aviation Administration, Airports Division
Don	Knabe	The Honorable Supervisor	Los Angeles County Board of Supervisors, 4th District
Ted	Lieu	The Honorable Assemblymember	California State Assembly, 53rd District
Gina Marie	Lindsey	Executive Director	Los Angeles World Airports
Brenda	Martinez-Sidhom	Community Program Director	Los Angeles World Airports

**LAX/Metro Green Line Interagency Task Force Members**

<b><u>Name</u></b>		<b><u>Title</u></b>	<b><u>Agency</u></b>
Barbara	Martinoff	Chief Management Analyst	Los Angeles World Airports
Samson	Mengistu	Acting Executive Director	Los Angeles World Airports
David	Mieger	Deputy Executive Officer, Westside Area Planning	Los Angeles County Metropolitan Transportation Authority (Metro)
Stephanie	Molen	Field Representative	California State Assembly, Office of Assemblymember Ted Lieu, 53rd District
Steve	Napolitano	Field Deputy	Los Angeles County Board of Supervisors, Office of Don Knabe, 4th District
Sylvia	Patsouras	Commissioner	Board of Airport Commissioners
Alexander	Pugh	Senior Public Policy Manager	Los Angeles Area Chamber of Commerce
Bart	Reed	Executive Director	The Transit Coalition
Jim	Ritchie	Deputy Executive Director	Los Angeles World Airports
Bill	Rosendahl	The Honorable Councilmember	Los Angeles City Council, District 11
Phil	Tate	Legislative Deputy	Los Angeles City Council, Office of Bill Rosendahl, District 11
Ray	Tellis	Program Specialist	US Department of Transportation, Federal Transit Authority/Federal Highway Administration
Patrick	Tomcheck	Senior Transportation Engineer	Los Angeles World Airports
Patricia	Torres	Government Relations	Los Angeles County Metropolitan Transportation Authority (Metro)
Marisa	Yeager	Government Relations	Los Angeles County Metropolitan Transportation Authority (Metro)



### **Relationship to the LAX Specific Plan Amendment Study**

In December 2004, the Los Angeles City Council approved the LAX Master Plan, which provides the strategic framework for future improvements at LAX. Subsequent to this approval, a number of lawsuits were filed against the LAX Master Plan. In early 2006, Los Angeles Mayor Antonio R. Villaraigosa and the Los Angeles City Council gave final approval to a settlement of the lawsuits. The "Stipulated Settlement" was also approved by the plaintiffs, including the city councils of Culver City, El Segundo and Inglewood; the Los Angeles County Board of Supervisors; and the Board of the Alliance for a Regional Solution to Airport Congestion (ARSAC).

Section V of the Stipulated Settlement requires that LAWA undertake a Specific Plan Amendment Study (SPAS) to identify alternative designs, technologies, and configurations for the LAX Master Plan Program that would provide solutions to the problems that certain of the LAX Master Plan facilities were designed to address. The Stipulated Settlement also includes a provision requiring that "LAWA will study feasible methods to connect LAX to the Green Line in ways that will maximize the use of public transit to LAX" (Section XII).

The efforts of the reformulated Task Force were intended to address both of these requirements. This Task Force did not have decision-making authority regarding regional transit planning; rather the goal of this advisory group was to provide input in determining the transit assumptions that should be considered as part of LAWA's Specific Plan Amendment Study. To this end, the new Task Force studied feasible options for providing a direct transit connection from the Green Line to LAX and evaluated a number of alternative alignments.

This report documents alternatives considered by the reformulated Task Force regarding which conceptual Green Line extension alternative(s) should be carried forward and considered as part of the LAX SPAS. LAWA intends to include the Green Line extension alternative(s) recommended by the Task Force at a conceptual level in the LAX SPAS EIR to ensure that potential transit connections are not precluded during the planning of airport facilities. However, it should be noted that the LAX SPAS EIR is not intended to provide environmental clearance for approval or construction of a Green Line extension to LAX. As the agency responsible for the continuous improvement of an efficient and effective transportation system for Los Angeles County, Metro is the lead agency responsible for preparing project-level environmental documentation and clearance, as well as for all planning, funding, and construction activities, associated with any extension of the Green Line. The recommendations of the Task Force do not in any way alter or usurp adopted funding priorities for regional transit or the CEQA/NEPA requirements and public planning process which is required for the development of public transit projects.

### **3. TASK FORCE MEETINGS**

The newly formed LAX/Metro Green Line Interagency Task Force met five times in 2007. The date and general purpose of each meeting are identified below. A table identifying the attendees at each Task Force meeting is provided in Attachment A to this report.

**April 10, 2007 Meeting** – Introductory meeting, outlining the purpose and goals of the Task Force and remarks by key stakeholders. Presentation by LAWA addressing the Task Force purpose, planning process, and LAWA's objectives and issues and by Metro identifying regional transit context, historical background of the Green Line extension planning process and obstacles previously encountered, and current transit demand and opportunities.

**May 1, 2007 Meeting** - Working session to review and receive Task Force member comments on an information package provided by LAWA that included LAX/transit fact sheets (see Attachment B of this report) and preliminary conceptual alternatives for providing direct transit connection from the Metro Green Line to LAX.

**May 29, 2007 Meeting** - Working session to review and receive Task Force member comments on new and revised conceptual Green Line extension alternatives and on a preliminary comparative analysis for the conceptual alternatives.

**June 13, 2007 Meeting** - Working session to receive comments from the Task Force on the refined comparative analysis for the conceptual Green Line alternatives.

**June 26, 2007 Meeting** - Working session to review each of the conceptual alternatives and receive Task Force member opinions on which alternative(s) should be carried forward as part of LAWA's SPAS.

As discussed in Section 1 above, numerous handout materials to facilitate meeting discussions were provided by LAWA at the Task Force meetings. The final versions of LAWA handout materials are included as attachments to this report. The consultants that assisted LAWA in the preparation of the handout materials and this report are identified below:

#### **LAWA Technical Consultant Team – LAX/Metro Green Line Interagency Task Force Meeting Materials and Report of Proceedings**

Robin Ijams	Associate & Sr. Project Manager	Camp Dresser & McKee, Inc.
James De la Loza	Vice President, Transportation Services	Camp Dresser & McKee, Inc.
Ray Sosa	Senior Project Manager	Camp Dresser & McKee, Inc.
Cindy Sugimoto	Associate Principal	Lea+Elliott, Inc.
Julie Gaa	Principal	JBG Environmental Consulting
Richard Stanger	Consultant	
Tatiana Ortiz	Principal	Zecua Design Group
Wendy Lex	Principal	Lex Consulting

### **4. CONCEPTUAL GREEN LINE ALTERNATIVES**

Ten conceptual alternatives for providing a direct transit connection from the Metro Green Line to LAX were considered by the Task Force. The following table provides a brief description of each of the ten conceptual alternatives. A graphic depiction and more detailed description for each alternative are provided in Attachment C of this report.

**Conceptual Green Line Alternatives**

No.	Alternative Title	Brief Description
A	Approved Master Plan Automated People Mover (APM1)	The APM included in the LAX Master Plan, with a modification to the alignment. The connection between the planned Intermodal Transit Center (ITC) and the Aviation Station is still via a 600' pedestrian bridge with moving walkway as proposed in the Master Plan.
B <i>Modified</i>	MTA Green Line North Extension with Modified Stations	MTA Plan as recommended in 1994 SEIR with modified station location in Lot C to provide direct interface with APM. Modified alignment and station near intersection of Century and Aviation Boulevards to provide linkage to potential future APM station at this intersection and possible ITC at Manchester Square. <sup>1</sup>
C	Green Line Extended with Transfer Station at Manchester Square	Extends Green Line on Aviation Boulevard with a transfer station to a future APM station at Manchester Square and potentially relocated Intermodal Transportation Center. The extension continues on 98 <sup>th</sup> Street, Airport Boulevard, and Westchester Parkway. <sup>1</sup>
D	Green Line Extended with Transfer Station at RAC	Extends Green Line on Aviation Boulevard, 98 <sup>th</sup> Street, and Airport Boulevard with a transfer station to the APM near the Consolidated Rent-A-Car (RAC) facility. The extension continues on Westchester Parkway. <sup>1</sup>
E <i>Modified</i>	Green Line Extended into CTA via Century Boulevard (Tunnel)	Extends Green Line into the CTA via Century Boulevard in a partially-tunneled alignment that allows continuation north of LAX. Modified alignment and station near intersection of Century and Aviation Boulevards to provide linkage to potential future APM station at this intersection. <sup>1</sup>
F	Green Line Extended into CTA via Tunnel under South Airfield	Extends Green Line into the CTA using a tunnel which runs diagonally from the Aviation Station to the CTA. <sup>1</sup>
G	Green Line Extended into CTA via Widened Sepulveda Tunnel	Extends Green Line into the CTA from the Mariposa Station via a widened Sepulveda Tunnel.
H	Green Line Extended into CTA (Elevated Loop)	Extends Green Line into the CTA via Century Boulevard on an elevated alignment that circles the CTA over the terminals, back to Century Boulevard, and northerly through Lot C. <sup>1</sup>
I	Green Line Extended into CTA via Century Boulevard (Elevated)	Extends Green Line into the CTA via Century Boulevard on an elevated in-and-out alignment, back to Century Boulevard, and northerly through Lot C. <sup>1</sup>
J	Green Line Extended with Transfer Stations at Manchester Square and RAC	Extends Green Line on Aviation Boulevard, Century Boulevard, and Airport Boulevard with transfer stations at Manchester Square (with possible ITC) and RAC. The extension continues on Westchester Parkway. <sup>1</sup>

<sup>1</sup> Under this alternative, the Green Line would branch at the existing turnout just west of the Aviation Station. The design of this alignment will be determined by Metro in the future. For purposes of this analysis, the branch is assumed to offer an east-west operation only. However, it could be designed to allow a north-south operation as well.

Four options (Options A through D) for providing transit interface at the Century Boulevard/Aviation Boulevard intersection associated with conceptual Green Line Alternatives B (Modified), E (Modified), I, and J were considered by the Task Force. A graphic depiction of each of the four transit interface options at Century Boulevard/Aviation Boulevard is provided in Attachment D of this report. Tables which provide walk distance and level change comparisons between the four transit interface options are also included in Attachment D.

Two variations for extending the Green Line north from the Aviation station while avoiding the Runway Protection Zone (RPZ) for the south airfield runways were developed and considered by the Task Force. Graphic depictions and more detailed descriptions for both these variations are provided in Attachment E of this report.

Various cross sections and profiles were provided to Task Force members for informational and discussion purposes. Cross sections were provided for Aviation Boulevard. Profiles were provided for Aviation Boulevard, Alternative B (Modified) through Lot C, and Alternative E (Modified) along Century Boulevard. These cross sections and profiles are provided in Attachment F of this report.

## **5. GREEN LINE CONCEPTUAL ALTERNATIVES COMPARATIVE ANALYSIS**

A comparative analysis of the ten conceptual Green Line alternatives was prepared to assist the Task Force members in narrowing down the number of conceptual alternatives to be further considered by LAWA. For comparison purposes, each of the ten conceptual alternatives was evaluated using criteria involving constructability/capital cost, quality of service, safety and security, and environmental considerations. As part of the analysis, a color-coded matrix summarizing the results of the comparative analysis for each alternative was provided to the Task Force. The analysis is provided as Attachment G of this report.

## **6. COORDINATION WITH FAA**

During the May 29th, 2007 and June 13, 2007 Task Force meetings, representatives from the FAA expressed concerns that the overhead catenary lines for the proposed Green Line along the portion of Aviation Boulevard through the RPZ of the south airfield would cause interference with navigational aids for approaching aircraft. Most of the conceptual Green Line extension alternatives utilize the Aviation Boulevard corridor through the RPZ. To address the FAA's concern, LAWA and Metro staff met with FAA staff on August 15, 2007 to discuss design measures that could be used along the Aviation Boulevard corridor to avoid potential interference with navigational aids and ensure the ongoing safety of airport operations at LAX. At the conclusion of the meeting there was a general understanding that an acceptable solution to avoid interference with navigational aids would be to place the Green Line in a covered trench through the Aviation Boulevard segment within the RPZ. However, FAA staff require further studies to be conducted before they will commit to this solution. The three agencies agreed to work cooperatively as the planning and design processes for future transit along the Aviation Boulevard corridor continues.

The attendees at the August 15, 2007 LAWA/Metro/FAA meeting were:

Mike Doucette	LAWA
Pat Tomcheck	LAWA
David Mieger	Metro
Renee Berlin	Metro
Dennis Henderson	Metro consultant
Alex Matamoros	FAA

Ruben Cabalbag	FAA
Roger Savoie	FAA
Margie Drilling	FAA
Victor Globa	FAA

Although not specifically discussed at the August 15, 2007 meeting, it should be noted that, to address similar FAA airport safety concerns for conceptual Green Line alternatives near the eastern end of the north airfield runways, any portion of the Green Line alignment within the RPZ of the north runway(s) would be below grade, as indicated on the conceptual Green Line alternative depictions included in Attachment C of this report.

## **7. TASK FORCE RECOMMENDATIONS**

### **LAX Specific Plan Amendment Study**

During the June 26, 2007 Task Force meeting, Task Force members identified which conceptual alternative(s) they preferred in providing a direct transit connection from the Metro Green Line at the Aviation/Imperial station to LAX. Task Force members agreed that the Alternative B (Modified) alignment should be included in the LAX Specific Plan Amendment Study. Metro representatives indicated that Alternative B was the only alternative that had undergone environmental review and certification, and as such, could not be supplanted unless a new environmental process was undertaken. Metro representatives generally favored Alternative B or B (Modified). LAWA representatives expressed their concern about the disruption to the operation of Lot C (and future Consolidated Rent-a-Car facility) by the alignment of Alternative B or B (Modified) through their property. LAWA believes that Alternative J provides an improved connection between the Green Line and the proposed Automated People Mover without the potential impacts to Lot C and therefore it also needed to be further studied as part of the airport's planning process. In the end, the Task Force agreed that both Alternative B (Modified) and Alternative J could be carried forward in the planning of airport facilities, including the APM, as part of the LAX SPAS. Enlarged graphic depictions for Alternative B (Modified) and Alternative J are provided in Attachment H of this report.

In addition, the Task Force advised that Option C be carried forward as the Century Boulevard/Aviation Boulevard transit interface option as part of both Alternative B (Modified) and Alternative J.

As a result of the Task Force's suggestions, Alternative B (Modified) and Alternative J will be included at a conceptual level in the LAX SPAS EIR to ensure that potential transit connections are not precluded during the planning of airport facilities by LAWA. The LAX SPAS EIR will not provide environmental clearance for approval/construction of a Green Line extension to LAX. Metro is the lead agency responsible for preparing project-level environmental documentation and clearance, as well as for all planning, funding, and construction activities, associated with any extension of the Green Line.

### **Coordination with Crenshaw-Prairie Line**

The Task Force recognizes that decisions made by Metro regarding the Crenshaw-Prairie transit line may significantly impact future opportunities for the Green Line extension, particularly since one proposed alignment for the Crenshaw-Prairie line is to utilize the same corridor along the west side of Aviation Boulevard that is proposed for the extension of the Green Line. Therefore, the Task Force recommends that Metro take this report's findings into consideration as part of the Alternatives Analysis for the Crenshaw-Prairie line so as not to preclude a possible future extension of the Metro Green Line to the north to directly serve LAX.

### **Further Studies/Next Steps**

This report and its recommendations should be considered one step in an ongoing process to study the extension of the Green Line to the north. In order to maintain the momentum developed by the Task Force, it is recommended that studies be conducted to resolve unanswered issues regarding the

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extension. Therefore, the Task Force recommends that the process continue in the development of solutions to the technical concerns expressed by the FAA regarding the proposed alignment of the Green Line through the runway protection zones. These issues include the proposed grade of the tracks and the potential interference with aircraft navigation systems. The FAA, Metro and LAWA will need to participate in the development of solutions to these technical issues. The Task Force also recommends that the City of Los Angeles study the traffic impacts of routing the Green Line on an elevated structure in the center of Airport Boulevard between Century Boulevard and 96<sup>th</sup> Street.

The Task Force further acknowledges that Metro is the responsible lead agency for any environmental clearances of a Metro Green Line extension and that LAWA needs to preserve the right-of-way for this extension as it moves forward with the implementation of its Master Plan. It also recognizes that further engineering studies are necessary to preserve the needed right-of-way so as not to preclude the future extension. Therefore, the Task Force recommends that the City of Los Angeles in conjunction with LAWA, Metro, Federal, State and local elected officials as well as other Task Force members seek funding to conduct these further studies. Task Force members will continue to emphasize the importance of extending the Green Line to increase its priority within the region's transit plan.

The Task Force recommends that right-of-way required for Alternative B (Modified) and Alternative J be preserved pending a final determination of the future Green Line alignment.

# **Attachment A**

**LAX/Metro Green Line  
Interagency Task Force  
Meeting Attendance Log**





## LAX/Metro Green Line Interagency Task Force Meeting Attendance Log

Name	Agency/Affiliation	Date of Attendance				
		4/10/2007	5/1/2007	5/29/2007	6/13/2007	6/26/2007
Alpern, Ken	Friends of the Green Line/The Transit Coalition	X	X	X		X
Armstrong, Brian	Federal Aviation Administration, Los Angeles Airports District Office				X	
Asher, Grieg	Office of Councilmember Rosendahl, District 11	X	X	X	X	X
Avila, Ralph	City of Los Angeles Planning Department		X	X	X	X
Berlin, Renee	Los Angeles County Metropolitan Transportation Authority (Metro)	X	X			
Bickhart, Jim	City of Los Angeles, Office of the Mayor	X				
Bok, Susan	City of Los Angeles Department of Transportation		X		X	
Bonin, Mike	Office of Councilmember Rosendahl, District 11	X				
Brothers, Jacob	Los Angeles World Airports				X	X
Burlingham, Robert	Los Angeles World Airports				X	X
Calzada, Michael	City of Inglewood	X				
Carranza, Tomas	City of Los Angeles Department of Transportation	X	X	X		X
Carrel, Marc	Office of Congresswoman Jane Harman		X		X	X
Cole, John	UniModal Transportation Solutions, Inc.			X		
Davies, Michael	City of Los Angeles Department of Transportation		X			
Dennis, Don	Los Angeles World Airports	X	X			
De la Loza, James	CDM	X	X	X		
Doucette, Mike	Los Angeles World Airports	X	X	X	X	X
Duboff, Jessica	Office of Congresswoman Jane Harman		X	X	X	
Gaa, Julie	JBG Environmental Consulting			X	X	X
Glasgow, Herb	Los Angeles World Airports		X		X	
Globa, Victor	Federal Aviation Administration			X		
Haeri, Sean	City of Los Angeles Department of Transportation			X		
Hamilton, Gordon	City of Los Angeles Planning Department	X		X	X	X
Ijams, Robin	CDM	X	X	X	X	X
Martinez-Sidhom, Brenda	Los Angeles World Airports			X	X	
Martinoff, Barbara	Los Angeles World Airports	X	X	X		X
Mengistu, Samson	Los Angeles World Airports	X				
Mieger, David	Los Angeles County Metropolitan Transportation Authority (Metro)	X	X	X	X	X
Molen, Stephanie	California State Assembly, Office of Assemblymember Ted Lieu, 53rd District	X	X	X	X	
Napolitano, Steve	Los Angeles County Board of Supervisors, Office of Don Knabe, 4th District	X		X		
Okazaki, James	WILCO Management International, Inc.	X		X	X	X
Perkins, Chris	UniModal Transportation Solutions, Inc.			X		
Reed, Bart	The Transit Coalition		X	X	X	X
Ritchie, Jim	Los Angeles World Airports		X	X		
Sosa, Ray	CDM	X	X	X		
Stanger, Richard		X		X	X	X
Sugimoto, Cindy	Lea & Elliott, Inc.	X	X	X	X	X
Tellis, Ray	US Department of Transportation, Federal Transit Authority/Federal Highway Administration	X	X			
Tomcheck, Patrick	Los Angeles World Airports	X	X	X	X	X
Torres, Patricia	Los Angeles County Metropolitan Transportation Authority (Metro)				X	X
Yeager, Marisa	Los Angeles County Metropolitan Transportation Authority (Metro)		X			



# **Attachment B**

## **Fact Sheets**



# **Attachment B-1**

## **Existing LAX Transit Connections**



## Local Bus

Local public bus service in Los Angeles operates under existing traffic conditions on the local street network. Local service is maintained and operated by either the Los Angeles County Metropolitan Transportation Authority (Metro) or municipal bus operators serving a city or group of cities. Bus stops are indicated by signs and may or may not have bus benches and/or shelters provided by the local jurisdiction. Local bus service to LAX is currently provided by Metro Bus, Santa Monica Big Blue Bus, Culver CityBus, Torrance Transit and LADOT Express Bus. These buses are typically 45 feet in length and carry approximately 55 passengers seated and standing.



## Metro Bus

### Operator

Metro provides bus service throughout Los Angeles County. Maintenance and operation of Metro Bus is primarily the responsibility of Metro. While the maintenance and operation of some Metro Bus routes are contracted out to private operators, these routes still maintain the Metro Bus logos.



### Routes

Metro currently operates eight Metro Bus Lines serving LAX:

- ▶ Line 42 - service between Patsaouras Transit Plaza (Union Station) in downtown Los Angeles and LAX City Bus Center. The LAX City Bus Center is located on 96th Street east of Sepulveda Boulevard. The LAX Parking Lot C shuttle brings passengers from the Bus Center to the Central Terminal Area at no additional charge.
- ▶ Line 111 - service between Whittier and LAX City Bus Center
- ▶ Line 117 - service between Downey and LAX City Bus Center
- ▶ Line 120 – service along Imperial Highway between Wilmington Avenue and the Metro Green Line Aviation Station.
- ▶ Line 232 - service between Long Beach Transit Mall and LAX City Bus Center
- ▶ Line 315 – peak-hours-only service between Playa Del Rey, LAX City Bus Center and Norwalk
- ▶ Line 439 – express service between Patsaouras Transit Plaza in Downtown Los Angeles, LAX City Bus Center and Redondo Beach
- ▶ Line 625 – peak-hours-only service between Westchester, Aviation/I-105 Metro Green Line Station and LAX City Bus Center

### Operating Hours/Frequency

Peak and non-peak frequency varies from bus line to bus line. Hours of operation are generally 5 a.m. until 11 p.m.

### Connection to LAX

Metro bus service connects to LAX at bus stops in the vicinity of the Central Terminal Area, at the LAX City Bus Center and at the Metro Green Line Aviation Station. LAX operates free shuttles between the Central Terminal Area and the LAX City Bus Center and between the Central Terminal Area and the Metro Green Line Aviation Station.



## Santa Monica Big Blue Bus Lines

### Operator

Santa Monica Big Blue Bus Lines provides bus service within the City of Santa Monica and major destinations beyond the City of Santa Monica limits.

### Routes

Santa Monica Big Blue Bus Lines provides one local route to LAX:

- ▶ Line 3 – Initiates from UCLA, traverses downtown Santa Monica and then heads south on Lincoln Boulevard, Manchester Boulevard and Sepulveda Boulevard with the final destination being the Metro Green Line Aviation Station. A Big Blue Bus Rapid 3 also operates during the peak hours in the peak direction. See the Rapid Bus sheet for additional information.

### Operating Hours/Frequency

Line operates from 5:30 a.m. until 12:30 a.m.

### Connection to LAX

Santa Monica Big Blue Bus service connects to the LAX City Bus Center and the Metro Green Line Aviation Station.

## Culver City Bus Lines

### Operator

Culver City Bus Lines provides bus service within the City of Culver City and major destinations beyond the City of Culver city limits.

### Routes

Culver City Bus Lines provides one route to LAX:

- ▶ Line 6 - Culver City to LAX

### Operating Hours/Frequency

Line 6 operates generally from 5:30 a.m. until 11:40 p.m.

### Connection to LAX

Culver City Bus Lines service connects to LAX at bus stops at the LAX City Bus Center and the Metro Green Line Aviation Station. From the LAX City Bus Center and the Metro Green Line Station, a rider can transfer to a shuttle to reach the airport's Central Terminal Area.

## Torrance Transit

### Operator

Torrance Transit provides bus service within the City of Torrance and major destinations beyond the City of Torrance limits.

### Routes

Torrance Transit provides one route to LAX:

- ▶ Line 8 - Culver City to LAX

### Operating Hours/Frequency

Line 8 operates generally from 6 a.m. until 10:30 p.m.

### Connection to LAX

Torrance Transit service connects to LAX at the LAX City Bus Center. From the City Bus Center, a rider can transfer to a free shuttle to reach the airport's Central Terminal Area.

## LADOT Express Bus

### Operator

The Los Angeles Department of Transportation provides 15 express routes from various locations to downtown Los Angeles.

### Routes

LADOT Express Bus provides one route to LAX:

- ▶ Line 438 – Redondo Beach to downtown Los Angeles

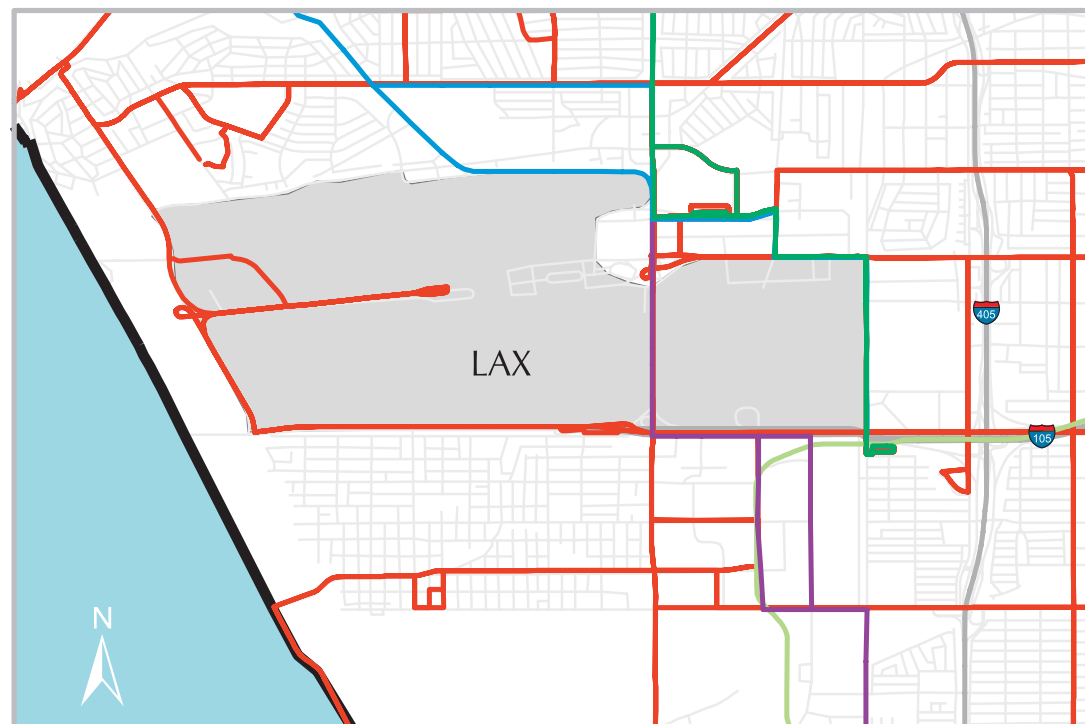
### Operating Hours/Frequency

Line 438 operates during the peak hours in the peak direction.

### Connection to LAX

LADOT Express Bus service connects to LAX at the Metro Green Line Aviation Station. From this station, a rider can transfer to a free shuttle to reach the airport's Central Terminal Area.

Local Bus Service



### Legend

- Culver City Bus
- Santa Monica Big Blue Bus
- Torrance Transit
- Metro Rail Green Line
- Metro Bus Lines



## Rapid Bus

Rapid bus service was developed by the Los Angeles County Metropolitan Transportation Authority (Metro). Although each municipal bus operation is slightly different, rapid bus is typically characterized by the following:

- ▶ Use of existing streets.
- ▶ Buses advance through traffic by utilizing signal synchronization technology.
- ▶ Bus stops are approximately every mile and are served by special bus shelters with “next bus arriving” electronic signage.
- ▶ Higher than normal headways (time between buses), usually 5-7 minutes during peak hours and 10-15 during off-peak hours.
- ▶ Buses and shelters are unique compared to the Metro Bus system and bus stops are independent of local bus service.

Rapid bus service to LAX is currently provided by Metro and Santa Monica Big Blue Bus. Rapid buses are typically 45 feet in length carrying approximately 55 passengers seated and standing.



### Metro

#### Operator

Metro operates Rapid Bus service throughout Los Angeles County. There are currently 15 lines in operation with a number of new lines planned for operation over the next several years, depending on funding. Maintenance and operation of Metro Rapid Bus is primarily the responsibility of Metro.

#### Routes

Metro currently operates five Metro Rapid Bus Lines, primarily north and south, with connections to the Metro Green Line. Lines 710, 740, 745, 754 and 757 utilize Hawthorne Boulevard, Crenshaw Boulevard, Western Boulevard, Vermont Avenue, and Broadway respectively, and connect at Metro Green Line Stations providing a transfer access to LAX.

#### Operating Hours/Frequency

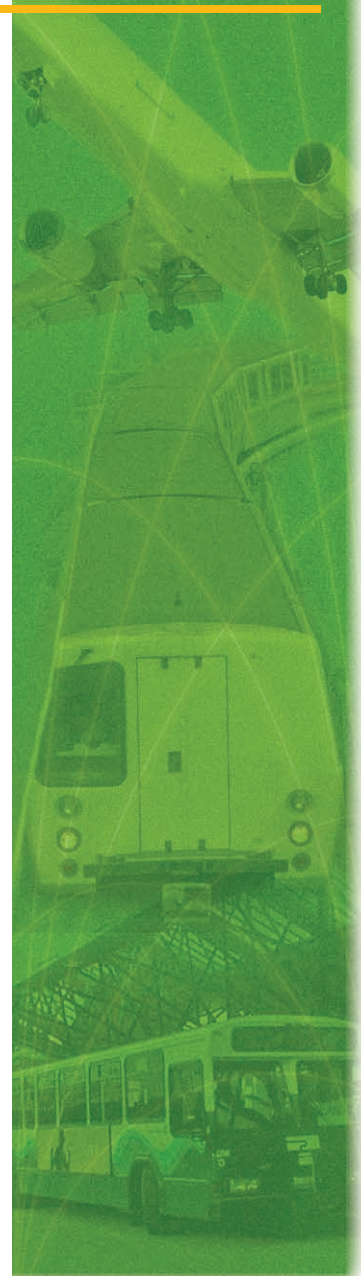
Peak and non-peak frequency varies from bus line to bus line. Hours of operation are normally 5 a.m. until 11 p.m.

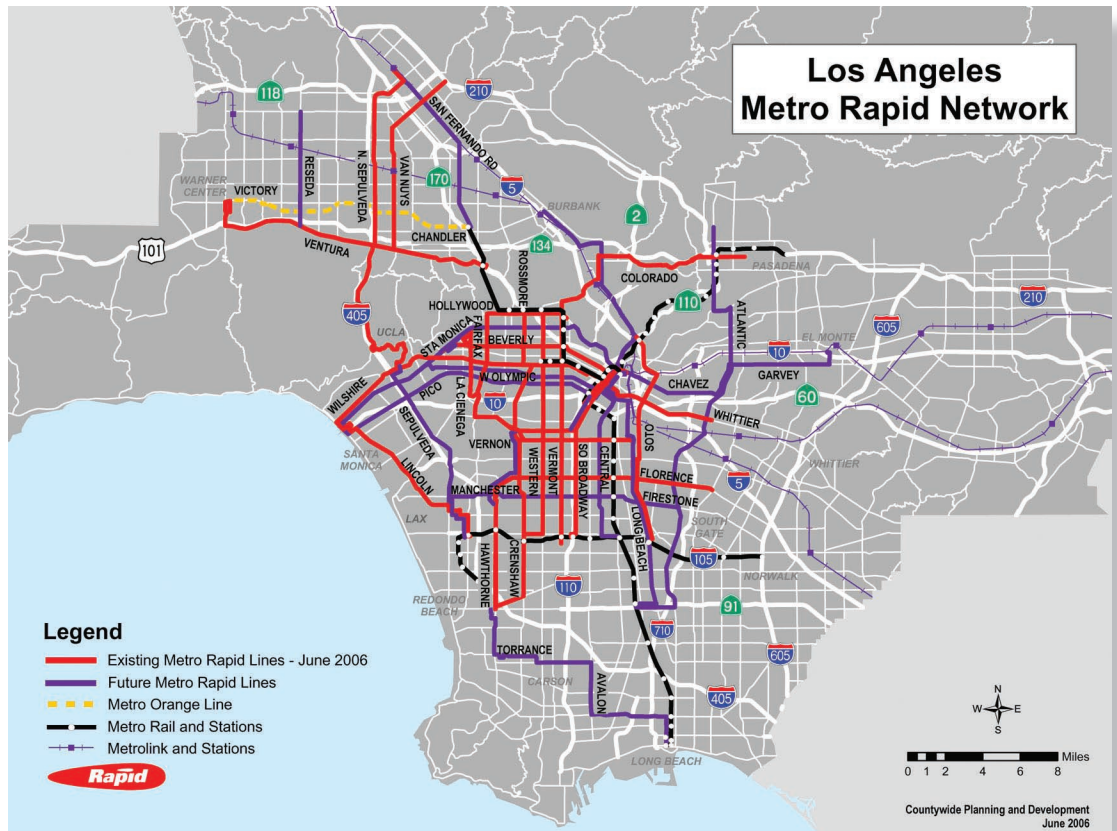
#### Connection to LAX

Metro Rapid Bus service provides a transfer connection to the Metro Green Line Aviation Station. From this station, airport employees and travelers can access an LAX shuttle bus servicing the Central Terminal Area for no additional charge.



*LAX/Metro Green Line  
Interagency Task Force*





## Santa Monica Big Blue Bus

### Operator

Santa Monica Municipal Bus Lines, or Big Blue Bus, maintains and operates a fleet of over 200 hundred buses for an area of over 50 square miles and includes service to other cities including Los Angeles and the Bay cities.

### Routes

Santa Monica Bus Lines provides rapid bus service, called Rapid 3, within the City of Santa Monica and major destinations beyond the City of Santa Monica limits including LAX. Rapid 3 primarily utilizes Lincoln Boulevard, with short runs on Sepulveda Boulevard, Century Boulevard and Aviation Boulevard.

### Operating Hours/Frequency

Rapid 3 operates from 6 a.m. until 10 a.m. and from 2 p.m. until 7 p.m. every 15 minutes during the weekdays.

### Connection to LAX

Rapid 3 bus service provides a transfer connection to the Metro Green Line Aviation Station. From this station, airport employees and travelers can access an LAX shuttle bus servicing the Central Terminal Area for no additional charge.

## Rail

### Metro Green Line

The Metro Green Line is a light rail line, running east-west through Los Angeles County, serving the communities of Norwalk, Downey, Lynwood, Watts, Inglewood, Lennox, El Segundo, Manhattan Beach and Redondo Beach. It currently maintains daily ridership of approximately 32,000 passenger boardings daily and is approximately 20 miles long.

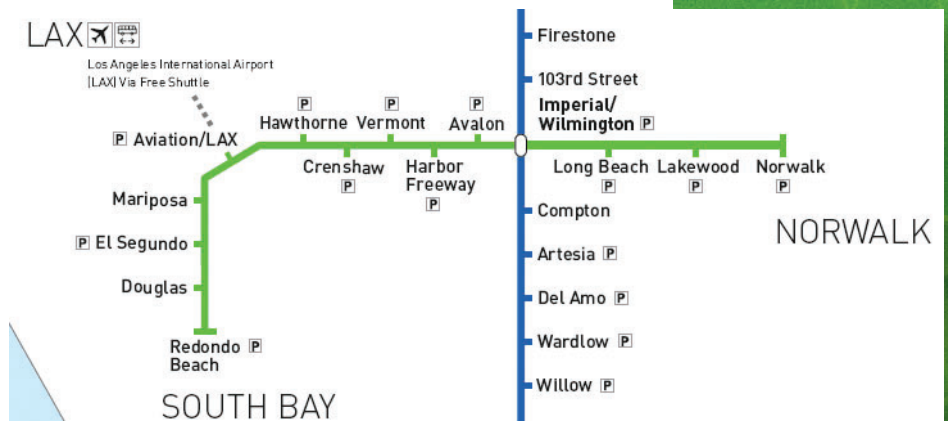
LAX/Metro Green Line  
Interagency Task Force

### Operator

Maintenance and operation of the Metro Green Line is the responsibility of the Los Angeles County Metropolitan Transportation Authority (Metro).

### Alignment

The Metro Green Line runs on an elevated dual track system between the City of Norwalk to the City of Redondo Beach predominantly within the median of the I-105 freeway, with the exception of an approximately two mile segment at the western end of the alignment. Just west of the Metro Green Line Aviation Station, the alignment heads south about 1.5 miles. This southern segment contains four stations all in aerial configuration. The line ends on the northern border of the City of Redondo Beach. The storage and maintenance facility is located on the west side of the line between the Redondo Beach and Douglas Stations.

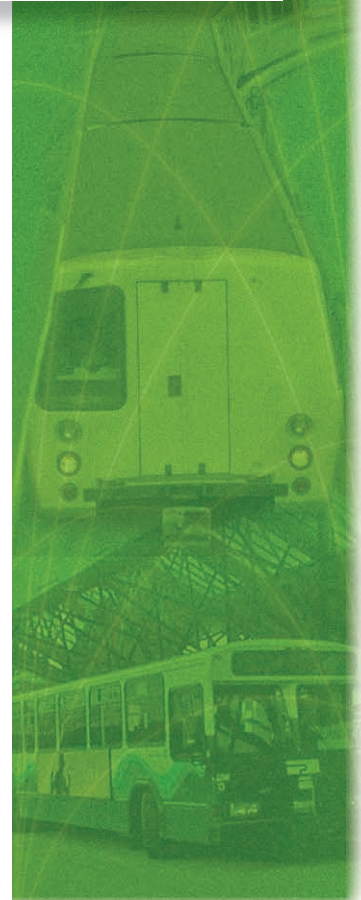


### Stations

There are a total of fourteen center platform stations, located either within the median of I-105 or on an elevated structure. Stations are well lit for security, maintain security cameras, and are individually designed with artwork to reflect community themes. All stations are accessible per Americans with Disabilities Act (ADA) requirements and operate per the honor system (i.e., there are no turnstiles for payment verification). All stations are built to accommodate three-car trains consistent with light rail stations within Los Angeles County. The Metro Green Line Aviation Station, located on Aviation Boulevard at Imperial Highway, is the station closest in proximity to LAX.

### Capacity

Metro Green Line trains currently operate with two cars per train but can be expanded to incorporate a third car. Each vehicle has a capacity of 76 seated and 100 standing passengers. Frequency of trains can provide for greater capacity of the entire line.





### ***Operating Hours/Frequency***

The Metro Green Line service begins between 5:30 a.m. to 6:00 a.m. and ends between 12:00 a.m. and 12:30 a.m., depending on the location along the alignment. Metro Green Line operations can run 24 hours if the demand arises, or run with limited service during later hours. Currently, the line operates at 7-10 minutes during the weekday morning and evening peak periods, and every 15 minutes during the weekday off-peak period. Weekend and evening service operates every 15-20 minutes.

### ***LAX Ridership***

Metro Green Line ridership is currently approximately 32,000 daily weekday riders. The number of riders traveling from the Metro Green Line Aviation Station to the airport's Central Terminal Area using the free shuttle service is approximately 1,700 daily.

### ***Connection to LAX***

Access to LAX from the Metro Green Line occurs at the Metro Green Line Aviation Station. Riders from the Metro Green Line walk from the aerial station to the ground floor plaza and transfer to an LAX shuttle. The Aviation Station Facility also contains drop-off areas for Metro Rapid buses and parking for private vehicles. The LAX Shuttle takes approximately 1,700 daily riders in each direction directly from the facility to terminals within the Central Terminal Area.

# **Attachment B-2**

## **Regional Transportation Corridors**



## Lincoln Boulevard Corridor

The Lincoln Corridor (State Route 1) is the highly congested 5-mile portion of Lincoln Boulevard between Interstate 10 (Santa Monica Freeway) and Manchester Boulevard. Generally, total right-of-way width for Lincoln Boulevard is 100 feet, including two 12-foot lanes and an 8-foot parking lane in either direction, a 12-foot left turn lane and 12-foot sidewalks on either side of the street.

The Lincoln Corridor Task Force, consisting of State of California Department of Transportation (Caltrans), Culver City, the City of Los Angeles, the City of Santa Monica and the County of Los Angeles, was formed to identify potential transportation enhancements that would reduce congestion along the Lincoln Corridor. The Southern California Association of Governments, the California Coastal Commission and the Los Angeles County Metropolitan Transportation Authority (Metro) are ex-officio members of the Lincoln Corridor Task Force providing technical support.

Land uses along the Lincoln Corridor are primarily low-rise commercial and industrial, with some multifamily/single family residential along or in the vicinity of the Corridor.

Currently, Caltrans is constructing corridor improvements to increase capacity, improve traffic flow, and enhance safety. Lincoln Boulevard is being widened and realigned from Loyola Marymount University (LMU) Drive to south of Bali Way in Marina del Rey. Upon completion of this construction, there will be four lanes northbound from LMU Drive to Jefferson Boulevard and four lanes southbound from Jefferson Boulevard, narrowing to three lanes north of LMU Drive. Caltrans is also currently widening Lincoln Boulevard from La Tijera Boulevard to LMU Drive to provide an additional northbound lane. These widening projects are scheduled for completion in summer 2008. The intersection of Lincoln Boulevard and Sepulveda Boulevard was widened to four lanes in each direction earlier this year.

LAX/Metro Green Line  
Interagency Task Force

### Alignment

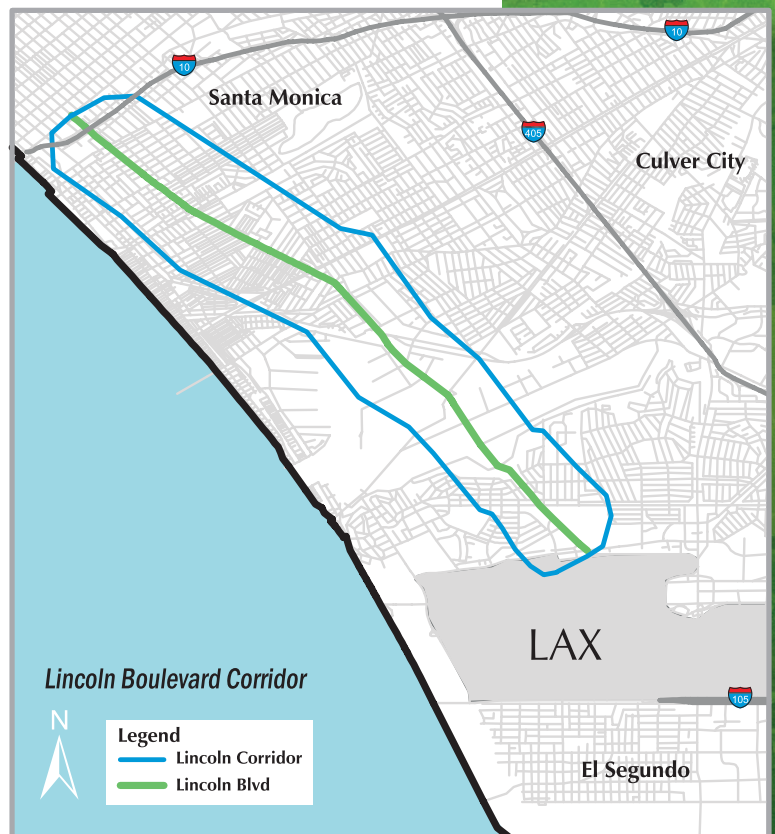
The Lincoln Corridor alignment extends along Lincoln Boulevard from near Interstate 10 in the vicinity of downtown Santa Monica south to Manchester Boulevard.

### Transit Modes Being Considered

Passenger transit along the Lincoln Corridor could include Bus Rapid Transit (BRT) or Light Rail Transit (LRT).

### Planning Stage

SCAG completed Phase 1 of a two-part study in 2004 with input from the Lincoln Corridor Task Force, including Metro, to determine potential projects to relieve traffic congestion along the Lincoln Corridor, gauge community acceptance, and identify potential issues. The second phase, which includes an engineering and environmental feasibility analysis, has not yet been initiated. As part of the recently initiated Metro Exposition Phase II study, analysis on the ability of the Metro Expo Line to connect a light rail line at Lincoln Boulevard will be examined. At this point in time, however, there are no studies being performed by Metro or other entities related to providing direct transit connection to LAX from Santa Monica.





## **Funding Status**

Metro is evaluating a Green Line LAX North Corridor in the update of the Long Range Transportation Plan. Alignments under consideration include Lincoln Boulevard and/or Sepulveda Boulevard.

## **Issues**

- ▶ Lincoln Boulevard within the Lincoln Corridor is a wide street but also highly congested.
- ▶ Noise and visual impact issues have yet to be analyzed and determined. There is a potential for aerial configurations.
- ▶ No direct connection to LAX currently proposed/studied.
- ▶ Detailed cost estimates have not been developed.

## **Connection to LAX**

The 2004 Phase 1 study of the Lincoln Corridor by SCAG did not identify a direct transit interface with LAX. Previous studies of the Metro Green Line Northern Extension identified a potential connection with the airport in the Lot C long-term parking lot or possibly near Lincoln/Sepulveda Boulevards.



## Crenshaw-Prairie Corridor

The Crenshaw-Prairie Corridor is approximately 11 miles long, and connects four cities: Los Angeles, Inglewood, Hawthorne, and El Segundo. Metro has been evaluating transit alternatives for the Crenshaw-Prairie Corridor for the past 10 years.

The Crenshaw-Prairie Corridor traverses diverse communities that contain primarily multi-family and single-family residential uses with light commercial north of the Harbor Subdivision. South along the Harbor Subdivision, land-use includes medium-rise office, commercial and industrial uses.

LAX/Metro Green Line Interagency Task Force

### Alignment

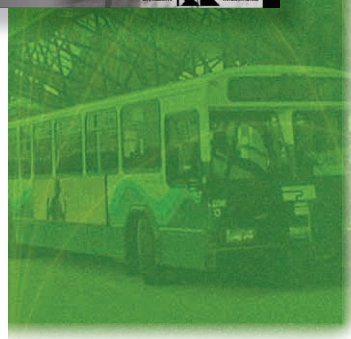
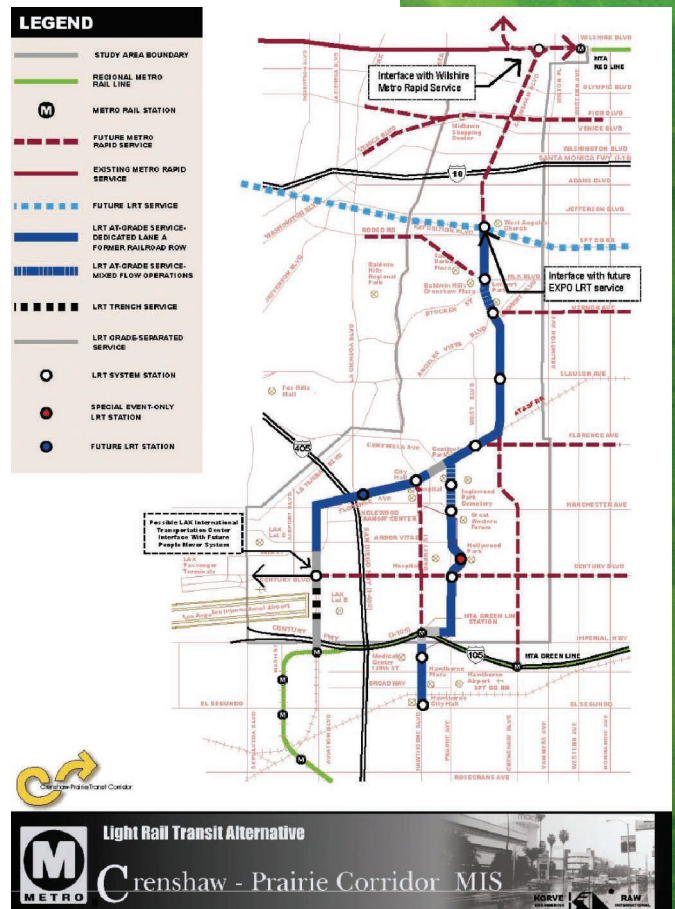
There are two general Crenshaw-Prairie Corridor alternative alignments under consideration. One alignment would initiate at the Metro Red Line Western Station at Wilshire and Western Boulevards, traverse Wilshire Boulevard to Crenshaw Boulevard, and then turn south. The other alignment would initiate at Exposition Boulevard with a direct connection to the Metro Expo Line. Both alternatives would then utilize Crenshaw Boulevard south to the Harbor Subdivision right-of-way (ROW) at Florence Avenue. There are also two alignment alternatives for the southern portion of this route. One alternative would continue along the Harbor Subdivision as it heads southeast and then turns south just east of LAX. This alternative would connect to the Metro Green Line Aviation Station. The second alternative would utilize a small portion of the Harbor Subdivision, also heading southwest, but then would continue south in the vicinity of downtown Inglewood or Hollywood Park, connecting with the Metro Green Line Hawthorne Station. This alignment would continue south past I-405 and the Metro Green Line to the City of Hawthorne.

### Transit Modes Being Considered

Passenger transit along the Crenshaw-Prairie Corridor could include Bus Rapid Transit (BRT) or Light Rail Transit (LRT).

### Planning Stage

A major investment study for the Crenshaw-Prairie Corridor was completed in 2003. Metro recently procured consultant services to produce a combined Alternatives Analysis/Environmental Impact Statement/Environmental Impact Report in support of an application for Federal Transit Administration New Starts funding. The consultant is scheduled to initiate work in May 2007. Scoping meetings for the project are scheduled for October 2007, with the draft EIR expected to be completed in 18 months. The scoping meetings will include the possible interface between the Crenshaw-Prairie Corridor and the proposed LAX Automated People Mover (APM) and the Green Line.





## Funding Status

Metro has identified the Crenshaw-Prairie Corridor in its Long Range Transportation Plan, which identifies potential funding sources. A recent request for proposals for services in support of the Crenshaw-Prairie Corridor project indicated that Federal Transit Administration New Starts funding will be pursued to help fund this project. As part of the New Starts process, the Crenshaw-Prairie Corridor project will compete with projects across the Country for federal funding.

## Issues

- ▶ ROW limitations exist for portions of the alignment. This is true considering the existing track ROW along Aviation Boulevard could potentially be shared with freight operations and potentially another mode servicing the Harbor Subdivision east of Crenshaw Boulevard. If the same mode is selected for each Corridor, then the conflicts and ROW issues are reduced.
- ▶ Street widths near Liemert Park are very narrow and costly tunneling options are likely to be needed.
- ▶ Detailed cost estimates have not been developed.
- ▶ Conflicts between existing freight rail operations along the Harbor Subdivision portion of the alignment and any mode selected for this alignment must be resolved.
- ▶ Potential environmental impacts have not been evaluated.

## Connection to LAX

The Crenshaw-Prairie Corridor is being considered for two modes: BRT & LRT. If the LRT mode is selected, the LRT could interface directly with both the Metro Expo Line and the Metro Green Line. This seamless integration would occur more easily with an alignment that interfaces at the Metro Green Line Aviation Station. A transfer would need to occur between the LRT and the planned LAX Automated People Mover at either the Metro Green Line Aviation Station or an additional station not yet constructed by Metro as part of the new Crenshaw-Prairie LRT service.

If BRT is selected as the mode, the BRT will have transfer connections to an Automated People Mover potentially at the corner of Century and Aviation Boulevards and at the Metro Green Line Aviation Station.

## Harbor Subdivision

The Harbor Subdivision is a single-track main line of the Burlington Northern Santa Fe (BNSF) Railway that stretches 26 miles between the rail yards of downtown Los Angeles and the ports of Los Angeles and Long Beach across southwestern Los Angeles County. The right-of-way (ROW) served as a primary rail corridor for Port-related cargo prior to the opening of the Alameda Corridor. The ROW is currently owned by Metro, although BNSF maintains operating rights and currently runs limited freight rail operations along the line. The ROW width ranges from 35 feet to 140 feet. There are a hundreds of leases along the ROW, including crude oil, natural gas, and aviation fuel pipelines. With the exception of fiber optics leases, these leases can be terminated.

Land uses along the corridor are a mix of residential, commercial/office, and light and heavy industrial. Commercial and industrial uses generally front the alignment; however, low density residential uses are located immediately behind much of this commercial/industrial use.

LAX/Metro Green Line  
Interagency Task Force

## Alignment

The Harbor Subdivision extends from just south of downtown Los Angeles, west to the LAX area and then southeast to Wilmington. From downtown Los Angeles, it parallels Slauson Avenue and then heads southwest crossing Crenshaw Boulevard at Florence Avenue. At Aviation Boulevard adjacent to LAX, the alignment heads south past the I-105 and the Metro Green Line Aviation Station, before turning southeast towards its terminus.

## Transit Modes Being Considered

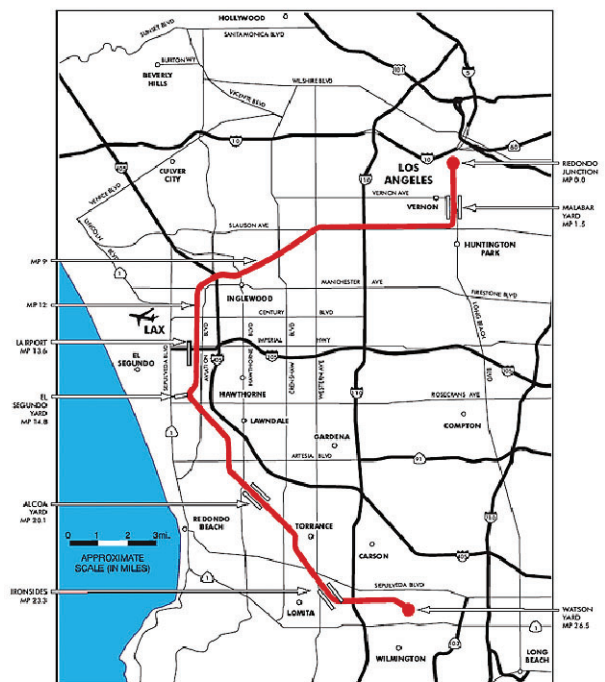
Passenger transit along the Harbor Subdivision could include Bus Rapid Transit (BRT), Light Rail Transit (LRT) or Diesel Multiple Unit (DMU).

## Planning Stage

Metro has only conducted initial feasibility studies for passenger service along the Harbor Subdivision. Recent Board Action in January 2007 directed staff to pursue the next phase of studies, which includes an alternatives analysis.

## Funding Status

Metro has not identified a project for the Harbor Subdivision in the Metro Long Range Transportation Plan.

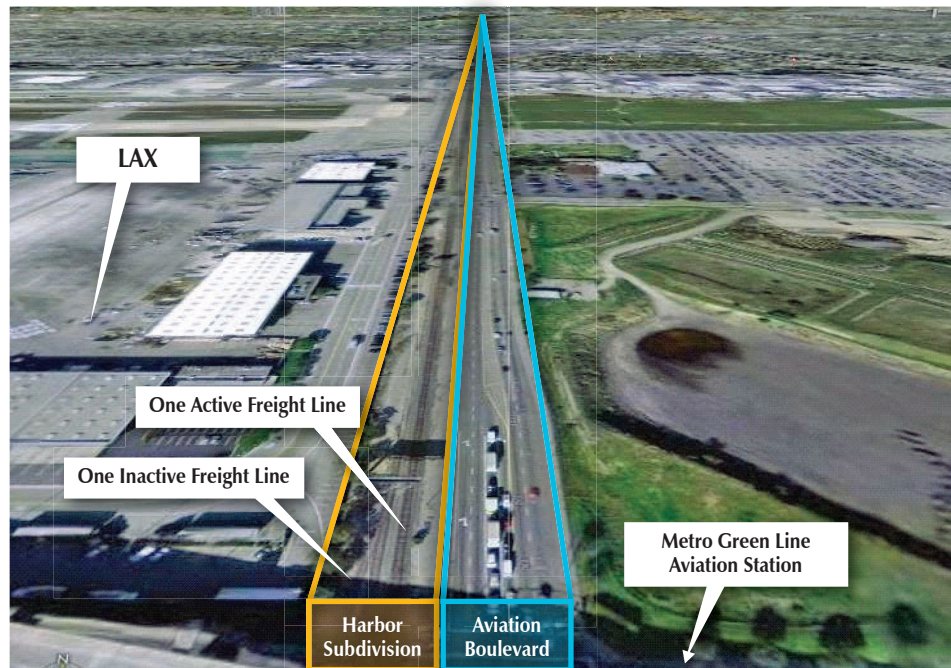


## Issues

- ▶ Two potential future Corridor projects – a project serving the Crenshaw-Prairie Corridor and a project serving the Harbor Subdivision east of Crenshaw Boulevard - could utilize the same portion of Harbor Subdivision. This includes a portion along Aviation Boulevard. If two different modes are selected for each Corridor, ROW issues will need to be addressed.
- ▶ Conflicts exist between existing freight rail operations and any mode selected for this alignment must be resolved.
- ▶ Both LRT and DMU service would require certain infrastructure, including the possible creation of grade separations to improve safety and avoid traffic conflicts with congested arterials, Grade separations for LRT or DMU modes, as required per Metro's Grade Separation Policy, could inflate project costs dramatically.
- ▶ Detailed cost estimates have not been developed.
- ▶ LRT would require an overhead catenary system within a constrained ROW.
- ▶ Potential environmental impacts have not been evaluated.
- ▶ This corridor has not been studied to any great extent and the community input process has not been initiated.

## Connection to LAX

Any transit mode utilizing the Harbor Subdivision, whether BRT, LRT or DMU, would need to connect by transfer to either the existing shuttle service from the Metro Green Line Aviation Station to the Central Terminal Area or the planned Automated People Mover to be constructed from the Central Terminal Area to the Consolidated Rent-A-Car facility and/or the Intermodal Transportation Center.



# **Attachment B-3**

## **Miscellaneous**



# Automated People Mover (APM)

APMs are fully-automated (driverless), fixed-guideway grade-separated/exclusive right-of-way transit systems.



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Interagency Task Force*

## Proposed LAX APM Characteristics

- ▶ Electric-powered, 40-foot, rubber-tired, steel wheel-rail, or magnetically levitated vehicles
- ▶ 4 vehicles (cars) per train
- ▶ 2 to 3 minute headways (time between trains)
- ▶ Baggage carts allowed on non-secure APM vehicles
- ▶ Efficient, reliable, and convenient

## Approved LAX APM Alignments

The LAX Master Plan, approved by the Los Angeles City Council in December 2004, includes:  
1) a two-route Landside APM and 2) an Airside APM.

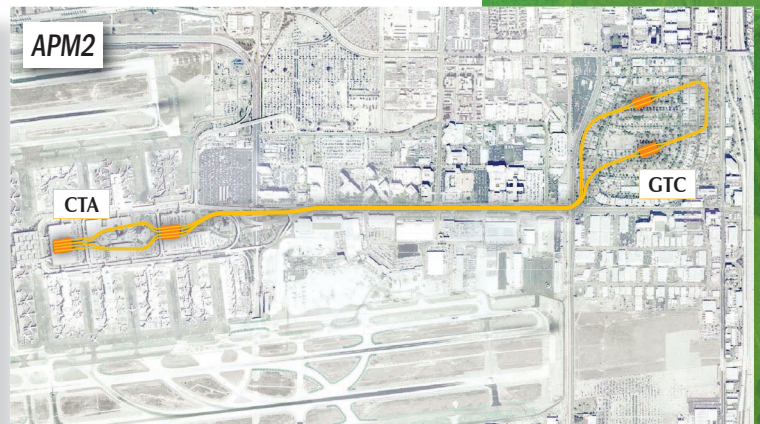
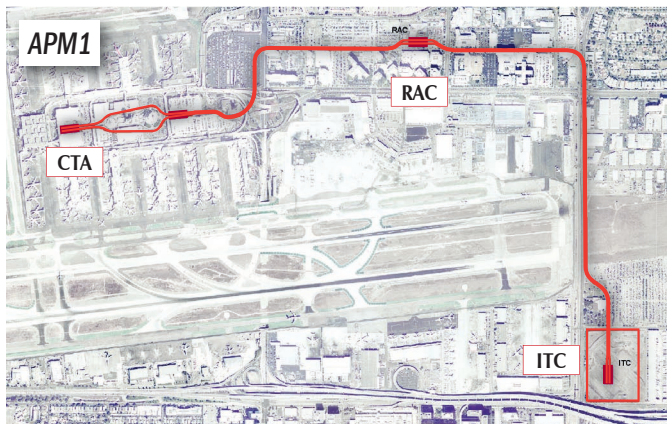
### Landside APM

- ▶ APM 1 - a non-secure elevated system that would connect the CTA, the Consolidated Rent-A-Car Facility (RAC) and the Intermodal Transportation Center (ITC).
- ▶ APM 2 - a non-secure elevated system that would connect the CTA to the Ground Transportation Center (GTC). The APM 2 was approved by the City Council with conditions.

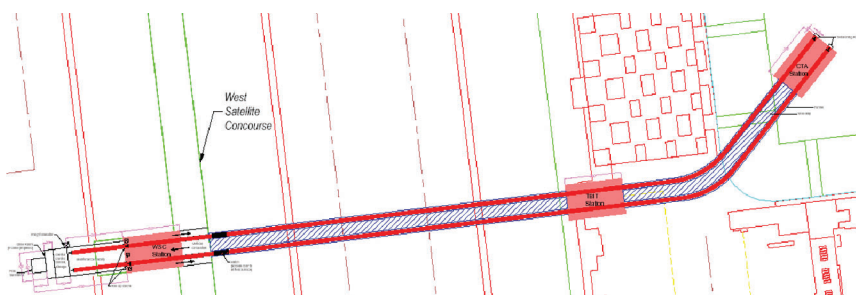
### Airside APM

- ▶ Secure underground system that would connect the western CTA, the Tom Bradley International Terminal (TBIT), and a new West Satellite Concourse (WSC).

## Master Plan Landside APM



## Master Plan Airside APM



## Typical APM Technologies

### Rubber-Tired Automated Guideway Transit



Bombardier Innovia



Siemens VAL



IHI / Niigata - NTS



Mitsubishi Crystal Mover



Bombardier CX-100

### Automated Rail



Bombardier ALRT II

### Large Monorail / Maglev



Bombardier M-VI Monorail



Hitachi Monorail



Itochu HSST Linimo Maglev



# Transit Modes:

## Bus Rapid Transit (BRT), Light Rail Transit (LRT), and Diesel Multiple Unit (DMU)



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Interagency Task Force*

### Bus Rapid Transit

Bus Rapid Transit (BRT) is a mass transit system that predominantly utilizes a dedicated roadway, dedicated lane or converted rail right-of-way to provide exclusive bus service. BRT systems are identified as eligible for federal funding under the Federal Transit Administration's New Starts Program.

#### Key Features:

- ▶ Utilizes articulated buses operating at higher frequencies
- ▶ Offers pre-payment
- ▶ Stops at stations similar to light rail lines
- ▶ Park & ride lots provided for riders
- ▶ Where possible, utilizes signal synchronization or other signal priority system



#### Discriminators:

- ▶ BRT systems are normally less expensive than fixed rail systems.
- ▶ Vehicles are less expensive than LRT and DMU.
- ▶ Maintenance costs are higher than fixed rail systems due to roadway maintenance and increase labor costs.

### Light Rail Transit

Light Rail Transit (LRT) uses electric-powered train cars that operate on steel tracks either individually or in groups, primarily on exclusive rights-of-way but can also travel on streets with vehicular traffic on an embedded track.

#### Key Features:

- ▶ Currently over 50 miles of LRT system exists in Los Angeles County.
- ▶ LRT train cars are wider than normal bus vehicles and can accommodate bikes and luggage.
- ▶ LRT cars are equipped with technology to maintain balance for the riders creating a smoother ride.
- ▶ LRT stations and cars are well-lit, maintain security cameras, and are secured by contracted Sheriff personnel.
- ▶ All stations are Americans with Disabilities Act (ADA) accessible and some stations provide park & ride facilities.
- ▶ If on streets, LRT can operate safely following traffic signal indications. If on a separate right of way, LRT systems utilize typical train crossing mechanisms such as bells, flashing lights, signage and crossing gates to separate the auto traffic from the train guideway.



### ***Discriminators:***

- ▶ In comparison to BRT, LRT systems' higher cost items include track-work, station platforms and canopies, train cars, electrical catenary poles and wiring, traction power substations, real estate acquisition for park & ride lots and other supporting facilities.
- ▶ The guide-way is a fixed system and train cars are normally grouped into three-car trains making sharp turn more difficult but not impossible.
- ▶ California Public Utility Commission regulations strictly guide safety mechanisms as well as Metro policy. This includes the use of train crossing gates.
- ▶ Grade separation, such as bridges and tunnels, are costly and normally required additional right-of-way.
- ▶ Potential environmental impacts include traffic, noise, vibration and community facility impacts.

### **Diesel Multiple Units**

Diesel Multiple Units (DMUs) are individual diesel passenger locomotives using freight rail that can be linked for greater passenger capacity per train or run individually.

#### ***Key Features:***

- ▶ DMU trains run on existing freight rail and are guided by California Public Utility Commission regulations for train crossing safety.
- ▶ There is no existing DMU service in Los Angeles County.
- ▶ There are no existing maintenance yards serving DMU in Los Angeles.
- ▶ Stations would require property acquisition
- ▶ Park & ride lots can serve a DMU system as well.



### ***Discriminators:***

- ▶ DMU systems can run on existing freight lines. This makes the DMU system more cost effective than BRT or LRT but also makes the system highly inflexible. Coordination between freight operations that utilize existing freight tracks, if required, would increase cost and create constructability issues.
- ▶ Due to construction, right-of-way impacts may be greater or the same as LRT systems.
- ▶ Diesel locomotives create greater noise, air quality, and vibration impacts due to the weight and technology used for the train car.

## FlyAways

A FlyAway is a facility which allows airline passengers and employees to park nearer to their point of origin and board a LAWA-operated bus to the airport.



*LAX/Metro Green Line  
Interagency Task Force*

### FlyAway Characteristics

- ▶ Safe, inexpensive parking for passengers
- ▶ Convenient parking for “meeters and greeters”
- ▶ Bus ticket sales
- ▶ Easy access
- ▶ Baggage handling
- ▶ Express (non-stop) service to and from the airport on a comfortable, over-the-road coach (as opposed to standard public transit buses)



### Existing LAX FlyAway Locations

LAWA currently has three FlyAway locations: one at **Van Nuys Airport** has operated for over 32 years, **Union Station** in downtown Los Angeles opened in March 2006 and **Westwood Village/UCLA** opened in June 2007.

### Potential Future LAX FlyAway Locations

Measures to mitigate future air quality impacts associated with the LAX Master Plan, as contained in the LAX Master Plan Final EIR, require additional service capacity from eight FlyAway service terminals. LAWA is in the process of analyzing potential additional FlyAway locations. Potential LAX FlyAway sites may include, but are not limited to, the following:

- ▶ West San Fernando Valley/Eastern Ventura County
- ▶ Santa Monica/Pacific Palisades
- ▶ Long Beach/South Bay/San Pedro
- ▶ East San Fernando Valley
- ▶ San Gabriel Valley
- ▶ Southeast Los Angeles County
- ▶ North Los Angeles County







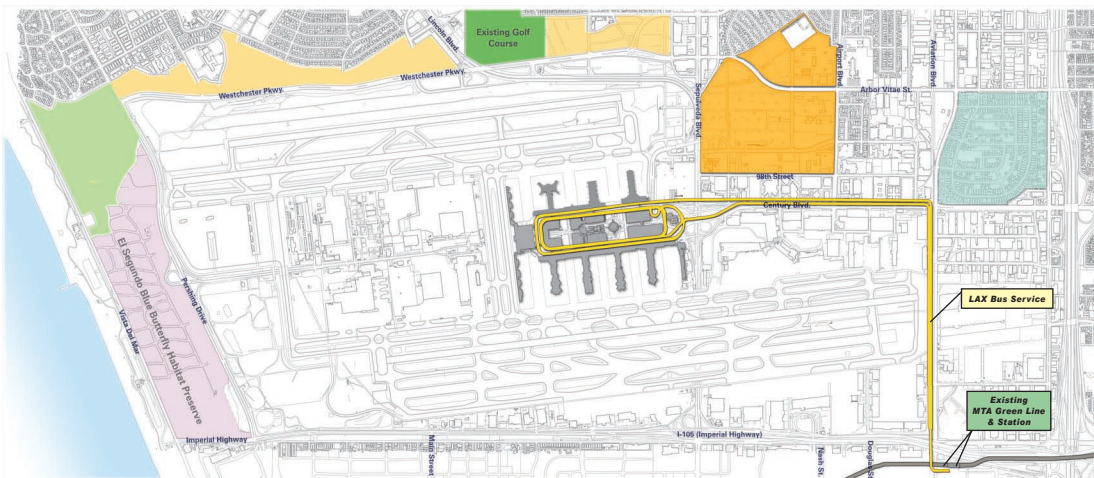
## Green Line to LAX Interface Alternatives

*LAX/Metro Green Line  
Interagency Task Force*

### Existing Metro Green Line Transit Service to LAX

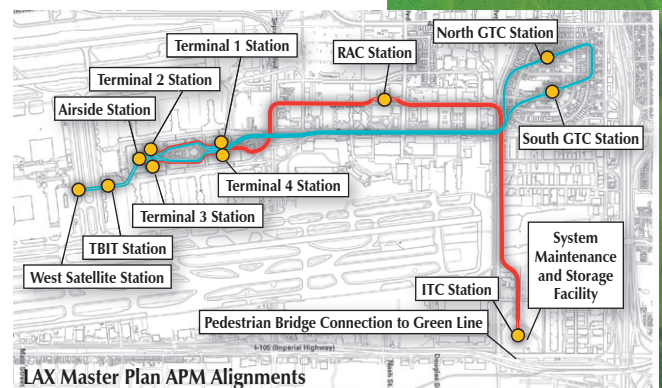
Currently, access to LAX from the Metro Green Line occurs at the Metro Green Line Aviation Station. Riders from the Metro Green Line walk from the aerial station to the ground floor plaza and transfer to a free LAX shuttle. The LAX Shuttle takes riders directly to terminals within the Central Terminal Area (CTA).

#### Existing Conditions/Bus Service



### LAX Master Plan Automated People Mover (APM)

The LAX Master Plan, approved by the Los Angeles City Council in December 2004, includes a Landside APM (LAPM) with two routes and an Airside APM (AAPM). The LAPM is planned as a non-secure elevated system that would connect the CTA and three new remote passenger facilities: the Consolidated Rent-A-Car Facility (RAC), Intermodal Transportation Center (ITC), and Ground Transportation Center (GTC). One route for the LAPM links the CTA with the RAC and terminates at the ITC, the other route transports passengers from the GTC to the CTA. The AAPM is planned as a secure underground system that would connect the western CTA, the Tom Bradley International Terminal (TBIT), and a new West Satellite Concourse (WSC). Please refer to the Automated People Mover sheet for additional information.



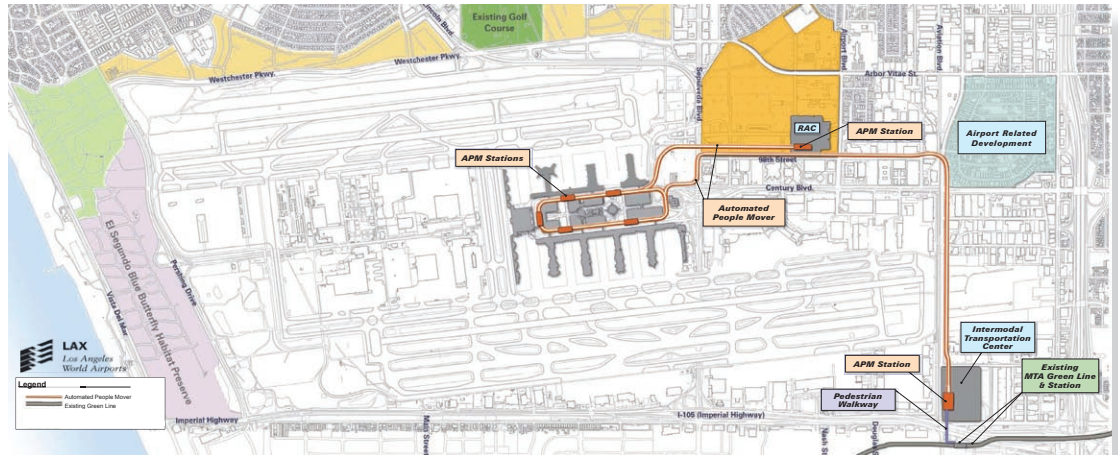
### Potential Transit Service to LAX Alternatives

A number of alternatives to provide direct transit service to LAX are being evaluated. These alternatives fall into three general categories:



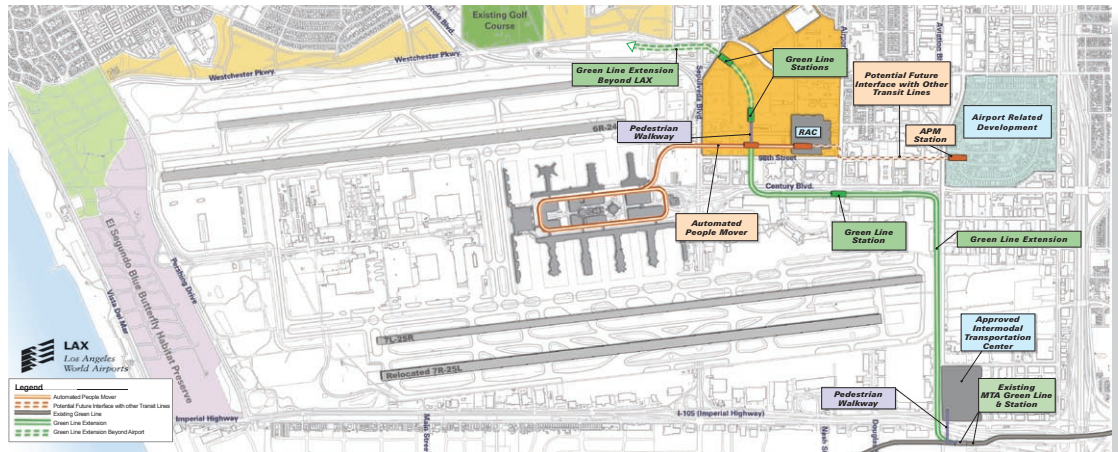
- ▶ Existing Green Line with a transfer to a bus or APM system at or near the Green Line Aviation Station (i.e., type of system currently in the approved Master Plan).

**Master Plan APM1 with Transfer at ITC**



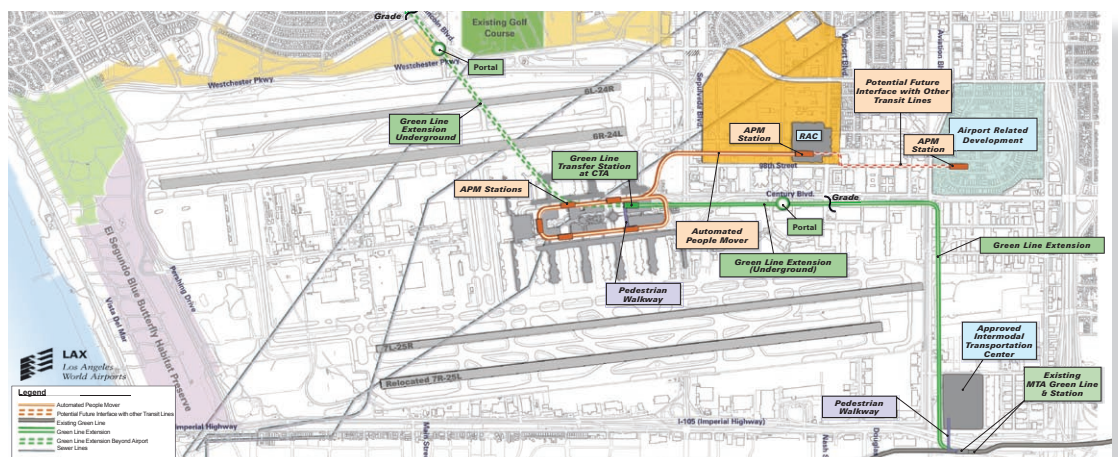
- ▶ Northerly extension of the Green Line to a station outside of the CTA with a transfer to an APM system.

**MTA Green Line North Extension with APM Interface**



- ▶ Extension of the Green Line into the CTA by elevated guideway or tunnel. Some passengers would walk directly to terminals and others would transfer to an APM system station within the CTA.

**Conceptual Illustration of Green Line Extension into CTA**



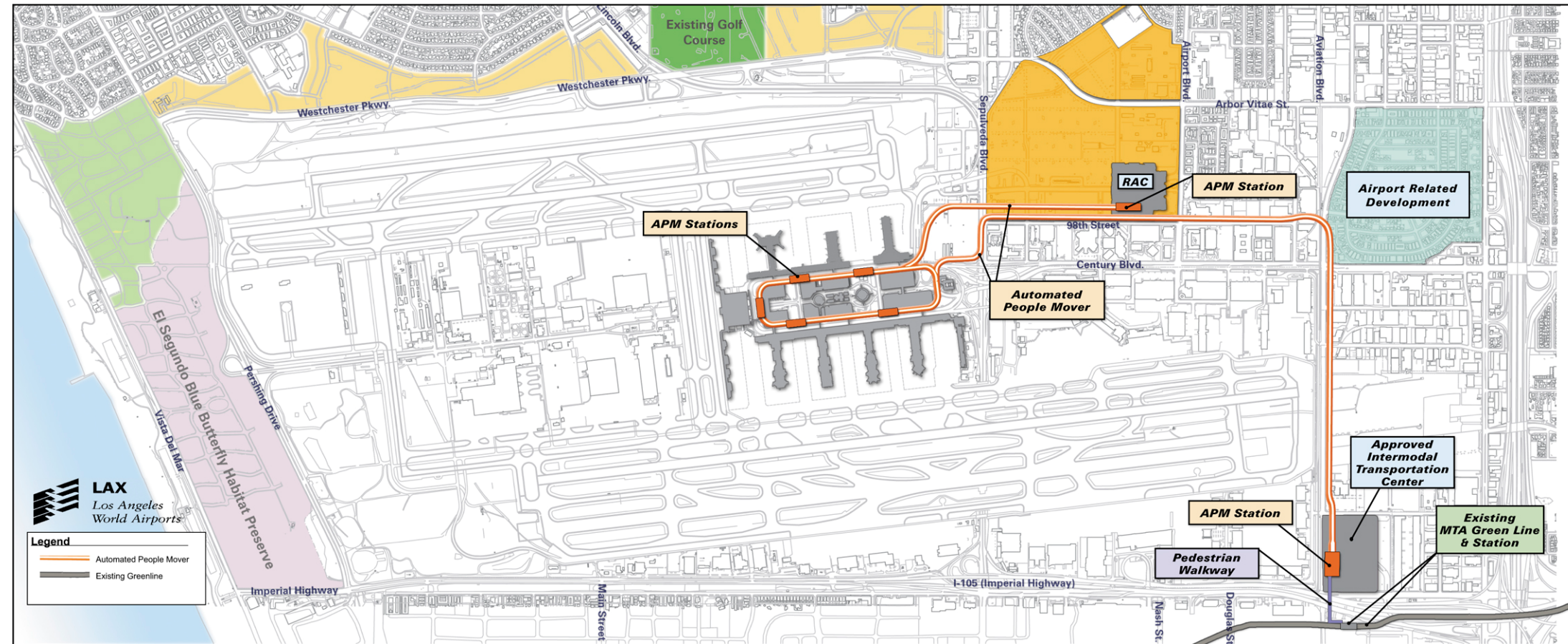
# **Attachment C**

## **Green Line Conceptual Alternatives**





## Alternative A Master Plan APM1



### General Description

Alternative A requires no Green Line extension, but utilizes a pedestrian bridge to connect passengers to the airport's APM station at the ITC as approved in the LAX Master Plan. To minimize the number of pedestrian street crossings, the bridge would begin at the Aviation Station platform and span under the 105 Freeway and over Imperial Highway connecting directly to the ITC. At the ITC, passengers would board the APM to gain access to airport terminals. This alternative does not preclude the future extension of the Green Line to the north.

This alternative provides the opportunity for the airport APM to connect at Manchester Square to future Metro transit lines using the Harbor Subdivision.

### Alignment

- No change to the existing Green Line system.

### Green Line/LAX Interface

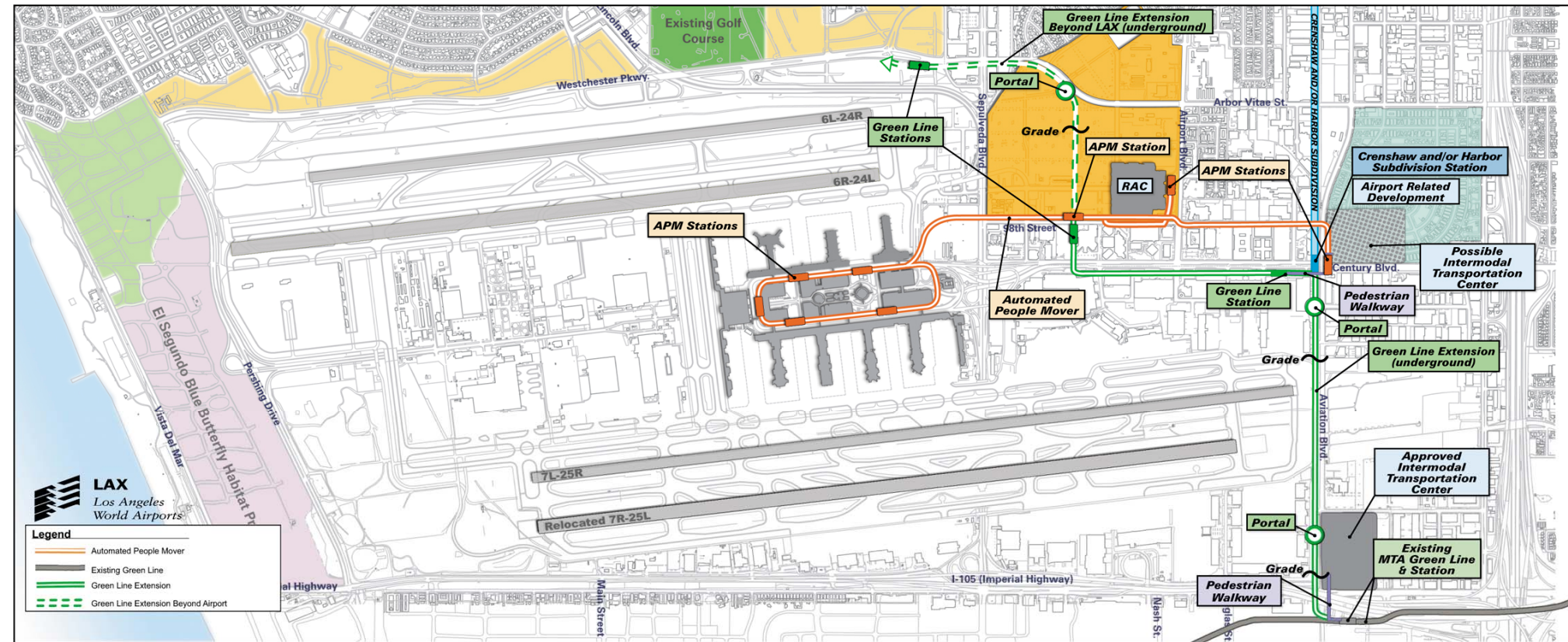
The Green Line/LAX Interface would occur via a pedestrian bridge between the Aviation Station and the APM at the ITC.

To reach the APM station, passengers would have two level changes and a 600-foot assisted walk using a moving sidewalk.

### Connection to LAX Terminals

Five APM stations would be located throughout the CTA. Upon debarking the APM system, passengers would have two level changes and a walking distance ranging from 170 feet to 425 feet, depending on the terminal.

## Alternative B - Modified MTA Green Line North Extension with Modified Stations



### General Description

Alternative B uses the recommended alignment for the Green Line North Extension as proposed in the 1993 SEIR with a modification near the intersection of Century and Aviation Boulevards. In this original design, the Green Line North Extension would branch off the main line at the Aviation Station, and travel north along Aviation Boulevard. It would turn westward and follow Century Boulevard to a location between Avion Drive and Vicksburg Avenue where the alignment would turn north and pass through LAX Parking Lot C. Three stations were originally planned for this extension: one at the intersection of Century Boulevard and Airport Boulevard, one in Lot C, and one near Westchester Parkway. Under this alternative, the planned station in Lot C would be moved south of the planned APM station to better serve as a transfer station to the airport's APM system. The Green Line station would be located south of 98th Street on Metro-owned property and would connect to the APM station in Lot C. The planned station at Airport Boulevard would be moved eastward to Aviation Boulevard where it would 1) connect, via a pedestrian bridge, to a proposed airport APM station at Manchester Square and 2) connect with future Metro transit lines using the Crenshaw Corridor and/or Harbor Subdivision. From the station, the alignment would proceed west on Century Boulevard, where it would continue on the original MTA alignment. The planned station near Westchester Parkway would be moved to the north/northeast to provide greater separation between stations.

This alignment provides the opportunity for a continuation of the Green Line Extension to the north on either Lincoln Boulevard or Sepulveda Boulevard. With this alignment there would be two Metro Green Line train routes: Norwalk to Redondo Beach and Norwalk to LAX.

### Alignment

- Branch at existing turnout just west of the Aviation Station. Proceed north adjacent to the BNSF railroad (RR) tracks.
- Elevation change to approximately 17 feet below grade (in a covered trench) so as not to interfere with 25R/L RPZ and navigational aids. After clearing the RPZ, rise to approximately 25 feet above grade.
- A station would be located at the intersection of Century Boulevard and Aviation Boulevard. Proceed west on the south side of Century Boulevard.
- Turn north between Avion Drive and Vicksburg Avenue, passing through Lot C. A station would be located south of 98th Street and would connect to the APM station in Lot C. This would be a second transfer station to the airport's APM system.
- Continue the alignment through Lot C. Then turn gradually west in the 24R/L RPZ area.
- Portion of alignment located within RPZ of Runways 6R/24L and 6L/24R below grade.
- A third station would be located near Sepulveda Boulevard to serve Westchester.
- Possible extension beyond the airport may use Sepulveda Boulevard or Lincoln Boulevard, to be determined in the future.

### Green Line/LAX Interface

The Green Line/LAX interface would occur at the APM station in Lot C or at the station in Manchester Square.

Green Line passengers may have additional wait time or a transfer due to the two Green Line routes.

Passengers traveling westbound on the main line towards the Aviation Station may have a direct route to the APM transfer stations, if they were on the Norwalk to LAX train. If they were on the Norwalk to Redondo Beach route, they would have to change trains at the Aviation Station. The wait time for this transfer would average 7 to 12 minutes during peak hours, and could be as high as 15 to 20 minutes.

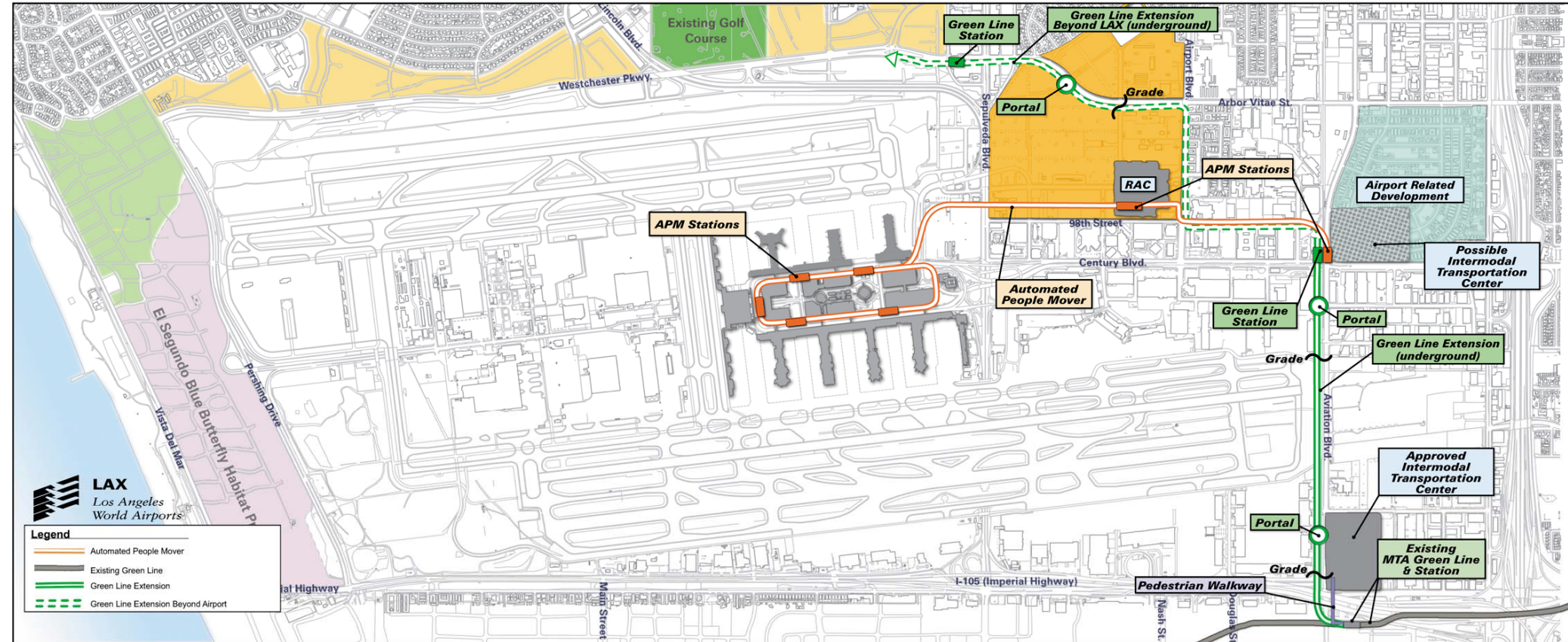
Passengers traveling eastbound on the main line towards the Aviation Station would have to transfer to a train bound for LAX at the Aviation Station. This is an easy cross-platform transfer, with a wait time that would average 7 to 12 minutes during peak hours, and could be as high as 15 to 20 minutes.

Passengers transferring at the Century/Aviation Station to the APM Station would have a 600-foot walk and one level change. Passengers transferring at the Lot C Station would have a 100-foot walk and one or two level changes to transfer to the APM system.

### Connection to LAX Terminals

Five APM stations would be located throughout the CTA. Upon debarking the APM system, passengers would have two level changes and a walking distance ranging from 170 feet to 425 feet, depending on the terminal.

## Alternative C Green Line Extended with Transfer Station at Manchester Square



### General Description

In Alternative C, the Green Line extension would branch off the main line at the Aviation Station and travel north along Aviation Boulevard. A transfer station to the airport's APM system would be located at the intersection of Aviation Boulevard and Century Boulevard. Then the alignment would turn west along 98th Street, turn northward on Airport Boulevard, and turn west on Westchester Parkway. There would be a second station near Sepulveda Boulevard to serve Westchester.

This alignment provides the opportunity for a continuation of the Green Line Extension to the north on either Lincoln Boulevard or Sepulveda Boulevard. With this alignment, there would be two Metro Green Line train routes: Norwalk to Redondo Beach and Norwalk to LAX.

This alternative also provides the opportunity for the airport APM to connect at Manchester Square to future Metro transit lines using the Harbor Subdivision.

### Alignment

- Branch at existing turnout just west of the Aviation Station. Proceed north adjacent to the BNSF RR tracks.
- Elevation change to approximately 17 feet below grade (in a covered trench) so as not to interfere with 25R/L RPZ and navigational aids. After clearing the RPZ, rise to approximately 25 feet above grade.
- A station would be located at the intersection of Aviation Boulevard and Century Boulevard. This would be the transfer station to the airport's APM system.
- Turn west at 98th Street.
- Turn north on Airport Boulevard.
- Turn west on Westchester Parkway.
- Portion of alignment located within RPZ of Runways 6R/24L and 6L/24R below grade.
- A second station would be located near Sepulveda Boulevard to serve Westchester.
- Possible extension beyond the airport may use Sepulveda Boulevard or Lincoln Boulevard, to be determined in the future.

### Green Line/LAX Interface

The Green Line/LAX interface would occur at the station at the intersection of Century Boulevard and Aviation Boulevard.

Green Line passengers may have additional wait time or a transfer due to the two Green Line routes.

Passengers traveling westbound on the main line towards the Aviation Station may have a direct route to the APM transfer station at Century and Aviation boulevards, if they were on the Norwalk to LAX train. If they were on the Norwalk to Redondo Beach route, they would have to change trains at the Aviation Station. The wait time for this transfer would average 7 to 12 minutes during peak hours, and could be as high as 15 to 20 minutes.

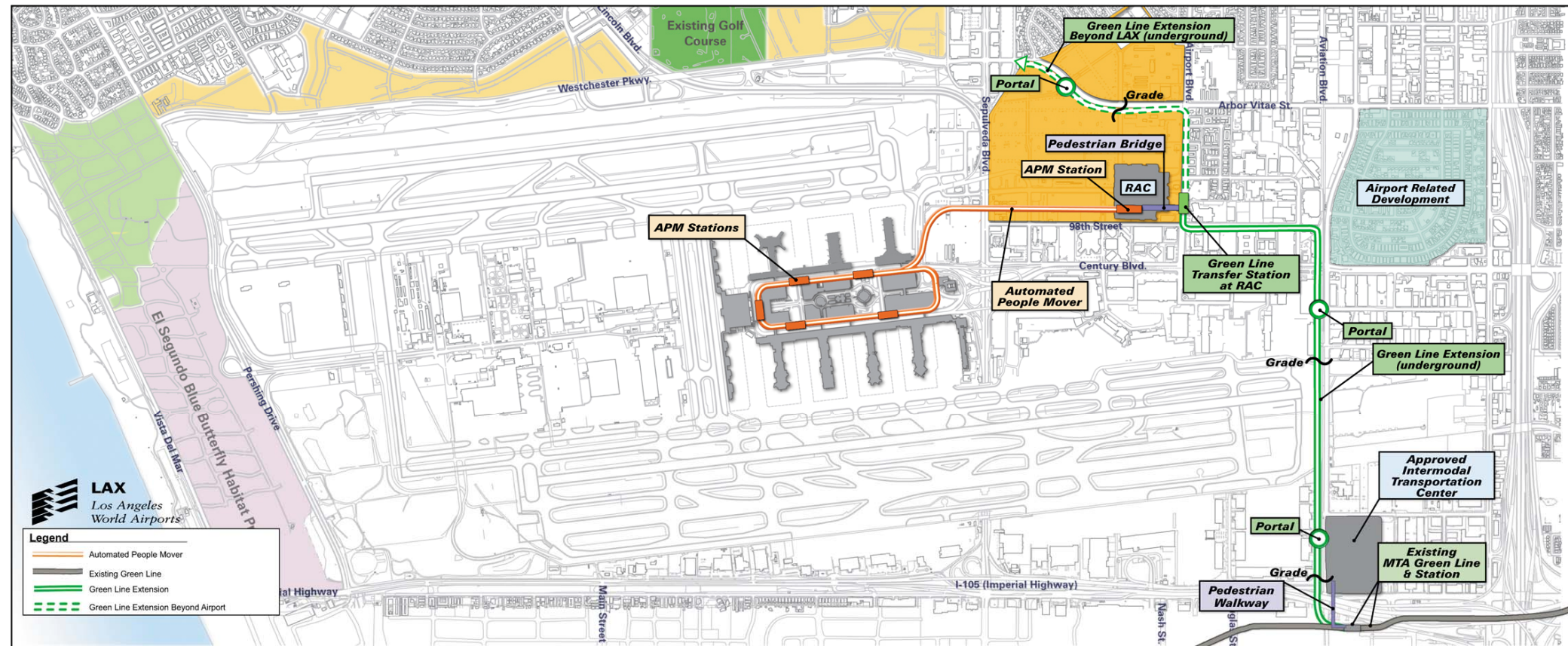
Passengers traveling eastbound on the main line towards the Aviation Station would have to transfer to a train going north towards LAX at the Aviation Station. This is an easy cross-platform transfer, with a wait time that would average 7 to 12 minutes during peak hours, and could be as high as 15 to 20 minutes.

Once at the Century/Aviation Station, passengers would have two level changes to access the APM station.

### Connection to LAX Terminals

Five APM stations would be located throughout the CTA. Upon disembarking the APM system, passengers would have two level changes and a walking distance ranging from 170 feet to 425 feet, depending on the terminal.

## Alternative D Green Line Extended with Transfer Station at RAC



### General Description

In Alternative D, the Green Line would branch off the main line at the Aviation Station and travel north along Aviation Boulevard. It would then turn westward and follow 98th Street to Airport Boulevard where the alignment would turn north. There would be a transfer station to the airport's APM system located east of the RAC, and connected to the RAC APM station by a pedestrian bridge.

This alignment provides the opportunity for a continuation of the Green Line Extension to the north on either Lincoln Boulevard or Sepulveda Boulevard. With this alignment, there would be two Metro Green Line train routes: Norwalk to Redondo Beach and Norwalk to LAX.

### Alignment

- Branch at existing turnout just west of the Aviation Station. Proceed north adjacent to BNSF RR tracks.
- Elevation change to approximately 17 feet below grade (in a covered trench) so as not to interfere with 25R/L RPZ and navigational aids. After clearing the RPZ, rise to approximately 25 feet above grade.
- Turn west at 98th Street.
- Turn north on Airport Boulevard.
- A station would be located adjacent to the RAC and connected by pedestrian bridge to the airport's APM system.
- Turn west on Westchester Parkway.
- Portion of alignment located within RPZ of Runways 6R/24L and 6L/24R below grade.
- Possible extension beyond the airport may use Sepulveda Boulevard or Lincoln Boulevard, to be determined in the future.

### Green Line/LAX Interface

The Green Line/LAX interface would occur at the station near the RAC.

Green Line passengers may have additional wait time or a transfer due to the two Green Line routes.

Passengers traveling westbound on the main line towards the Aviation Station may have a direct route to the APM transfer station at the RAC, if they were on the Norwalk to LAX train. If they were on the Norwalk to Redondo Beach route, they would have to change trains at the Aviation Station. The wait time for this transfer would average 7 to 12 minutes during peak hours, and could be as high as 15 to 20 minutes.

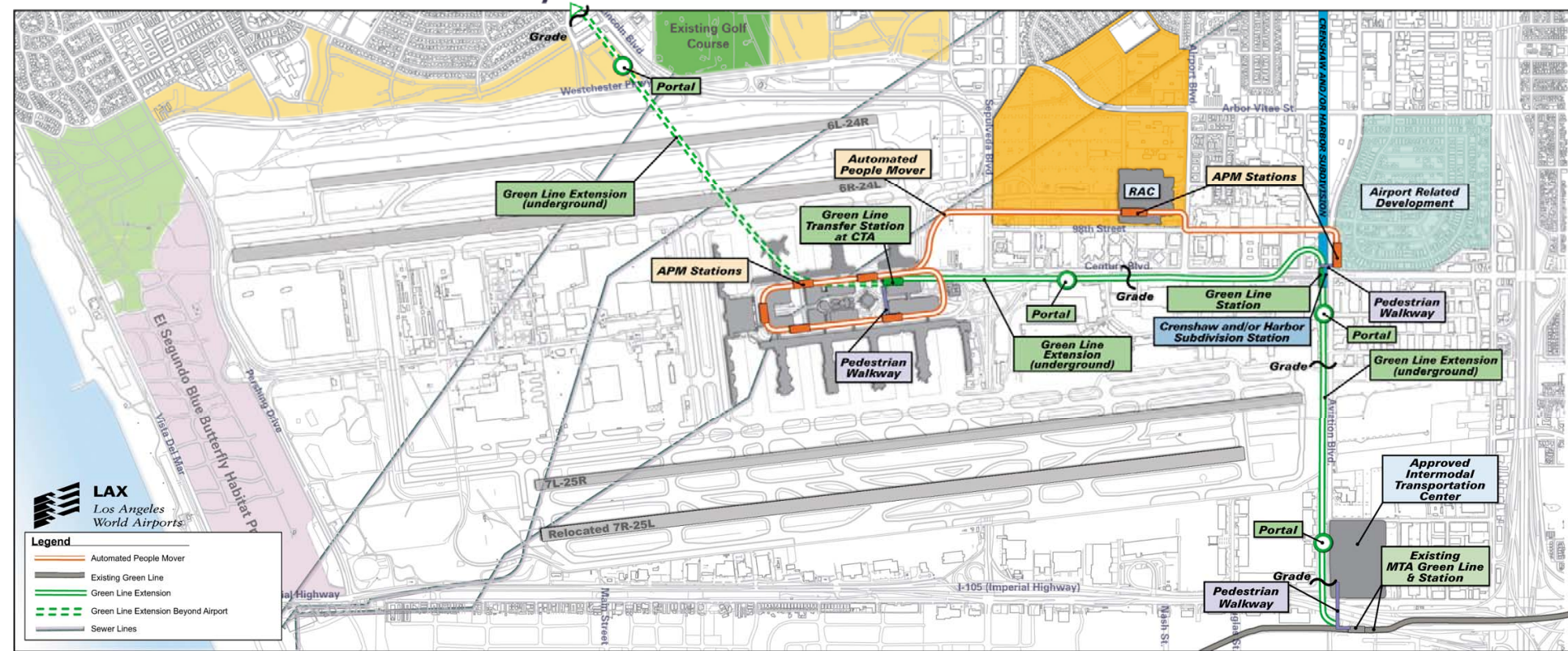
Passengers traveling eastbound on the main line towards the Aviation Station would have to transfer to a train going north towards LAX at the Aviation Station. This is an easy cross-platform transfer, with a wait time that would average 7 to 12 minutes during peak hours, and could be as high as 15 to 20 minutes.

Once at the RAC Station, passengers would have two level changes and a short walk to access the APM station.

### Connection to LAX Terminals

Five APM stations would be located throughout the CTA. Upon deboarding the APM system, passengers would have two level changes and a walking distance ranging from 170 feet to 425 feet, depending on the terminal.

### Alternative E - Modified Green Line Extended into CTA via Century Boulevard



#### General Description

In Alternative E, the Green Line would branch off the main line at the Aviation Station, and travel north along Aviation Boulevard. A station would be located at the intersection of Aviation Boulevard and Century Boulevard where it would 1) connect, via a pedestrian bridge, to a proposed airport APM station at Manchester Square and 2) connect with future Metro transit lines using the Crenshaw Corridor and/or Harbor Subdivision. From the station, the alignment would curve northwesterly and loop back to Century Boulevard continuing westward. West of Airport Boulevard the alignment would transition from an elevated guideway into a tunnel. A station in the CTA would be located across from Terminal 1. Passengers would walk directly to Terminals 1, 2, 6, 7, and 8, and would choose whether to walk to the remaining terminals or transfer to the airport's APM system.

This alignment provides an opportunity for a continuation of the Green Line Extension north on Lincoln Boulevard. With this alignment there would be two Metro Green Line train routes: Norwalk to Redondo Beach and Norwalk to LAX.

#### Alignment

- Branch at existing turnout just west of the Aviation Station. Proceed north adjacent to the BNSF RR tracks.
- Elevation change to approximately 17 feet below grade (in a covered trench) so as not to interfere with 25R/L RPZ and navigational aids. After clearing the RPZ, rise to approximately 25 feet above grade.
- A station would be located at the intersection of Century Boulevard and Aviation Boulevard. Proceed northwesterly and then loop south towards Century Boulevard.
- Turn west on the south side of Century Boulevard. Transition from an elevated guideway to a tunnel just west of Airport Boulevard. Continue into the CTA. A station would be located across from Terminal 1. For some passengers, this would be a transfer station to the airport's APM system.
- Possible extension beyond the airport would require the tunnel to continue under the terminals and north airfield towards Lincoln Boulevard. Once beyond the airport, the alignment would transition from a tunnel to an elevated guideway and proceed along Lincoln Boulevard.

#### Green Line/LAX Interface

The Green Line/LAX interface would occur at the CTA Station or the station in Manchester Square. At the CTA Station, passengers would walk to Terminals 1, 2, 6, 7, and 8, and either walk to the remaining terminals or transfer to the airport's APM system.

Green Line passengers may have additional wait time or a transfer due to the two Green Line routes.

Passengers traveling westbound on the main line towards the Aviation Station may have a direct route to the CTA, if they were on the Norwalk to LAX train. If they were on the Norwalk to Redondo Beach route, they would have to change trains at the Aviation Station. The wait time for this transfer would average 7 to 12 minutes during peak hours, and could be as high as 15 to 20 minutes.

Passengers traveling eastbound on the main line towards the Aviation Station must transfer to a train going north towards LAX at the Aviation Station. This is an easy cross-platform transfer, with a wait time that would average 7 to 12 minutes during peak hours, and could be as high as 15 to 20 minutes.

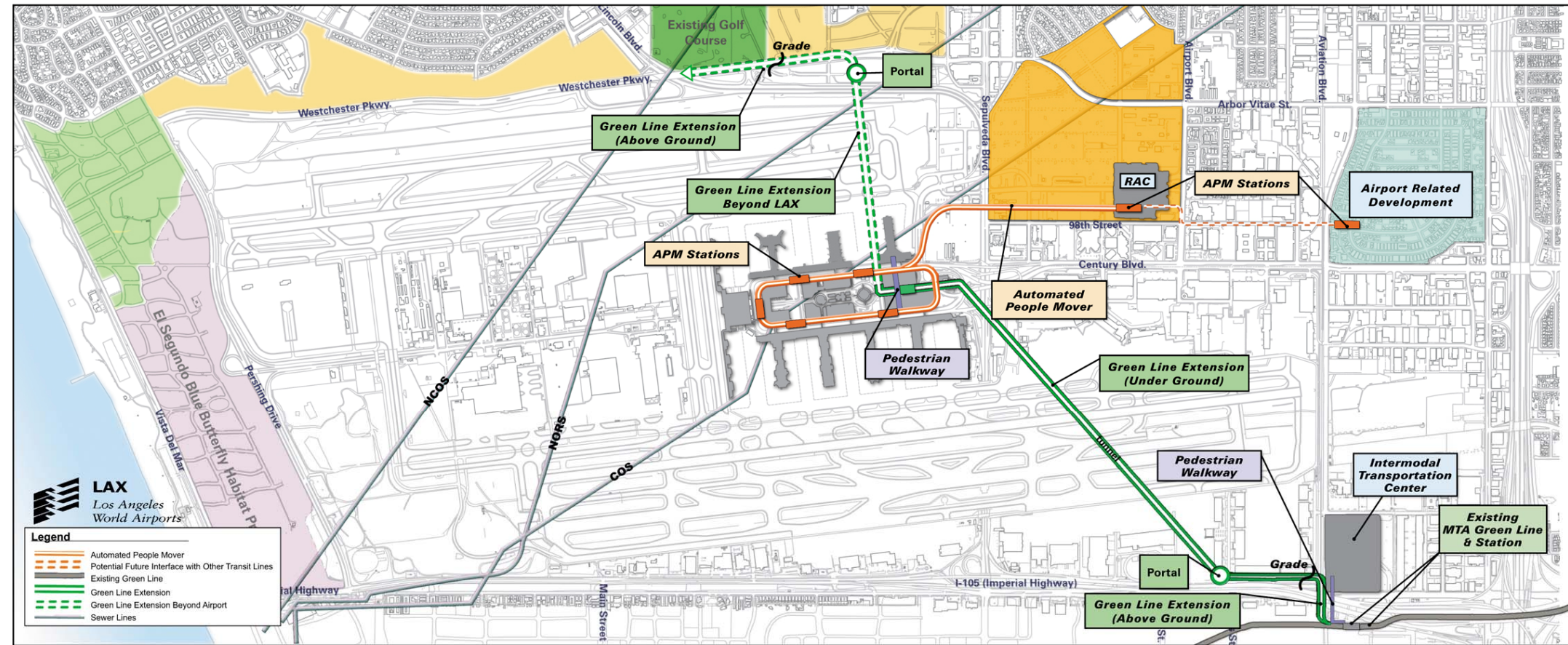
Passengers transferring at the Century/Aviation Station to the APM Station would have a 100-foot walk and one level change. Passengers transferring at the CTA station would have two level changes and an average walk of 1,000 feet to Terminals 1, 2, 6, 7 and 8. If they chose to walk to the remaining terminals, their average walk would be 2,400 feet. Passengers transferring to the APM system would have four level changes and about a 400-foot walk.

#### Connection to LAX Terminals

For passengers choosing to walk directly from the CTA Station to their terminal, the details are provided in the Green Line/LAX Interface discussion above.

For passengers choosing to transfer to the APM system, there would be five APM stations located throughout the CTA. Upon disembarking the APM system, passengers would have two level changes and a walking distance ranging from 170 feet to 425 feet, depending on the terminal.

## Alternative F Green Line Extended into CTA via Tunnel Under South Airfield



### General Description

Alternative F would extend the Green Line to the CTA using a tunnel which would run diagonally from the Aviation Station to the CTA. The Green Line extension would branch off the main line at the Aviation Station, and travel briefly north on Aviation Boulevard. The alignment would then turn west on the north side of Imperial Highway. The alignment would immediately begin a transition from an elevated guideway into a tunnel. Shortly after the portal, the alignment would proceed directly to the CTA. The station in the CTA would be located across from Terminals 1 and 7. Passengers would walk directly to Terminals 1, 2, 6, 7, and 8, and would choose whether to walk to the remaining terminals or transfer to the airport's APM system.

This alignment provides an opportunity for continuation of the Green Line Extension north on either Lincoln Boulevard or Sepulveda Boulevard. With this alignment there would be two Metro Green Line train routes: Norwalk to Redondo Beach and Norwalk to LAX.

This alignment also provides the opportunity to extend the airport APM easterly from the RAC to Manchester Square, where it could connect to future Metro transit lines using the Harbor Subdivision.

### Alignment

- Branch at existing turnout just west of the Aviation Station. Proceed north adjacent to the BNSF RR tracks and then west along the north side of Imperial Highway.
- Transition from an elevated guideway to a tunnel just west of Aviation Boulevard. Proceed diagonally into the CTA. A station would be located across from Terminals 1 and 7. For some passengers, this would be a transfer station to the airport's APM system.
- Possible extension beyond the airport would require the tunnel to continue under the CTA and north airfield towards Lincoln Boulevard. Once beyond the airport, the alignment would transition from a tunnel to an elevated guideway and continue on either Lincoln Boulevard or Sepulveda Boulevard, to be determined in the future.

### Green Line/LAX Interface

The Green Line/LAX interface would occur at the CTA Station. Passengers would walk to Terminals 1, 2, 6, 7, and 8, and either walk to the remaining terminals or transfer to the airport's APM system.

Green Line passengers may have additional wait time or a transfer due to the two Green Line routes.

Passengers traveling westbound on the main line towards the Aviation Station may have a direct route to the CTA, if they were on the Norwalk to LAX train. If they

were on the Norwalk to Redondo Beach route, they would have to change trains at the Aviation Station. The wait time for this transfer would average 7 to 12 minutes during peak hours, and could be as high as 15 to 20 minutes.

Passengers traveling eastbound on the main line towards the Aviation Station would have to transfer to a train going north towards LAX at the Aviation Station. This is an easy cross-platform transfer, with a wait time that would average 7 to 12 minutes during peak hours, and could be as high as 15 to 20 minutes.

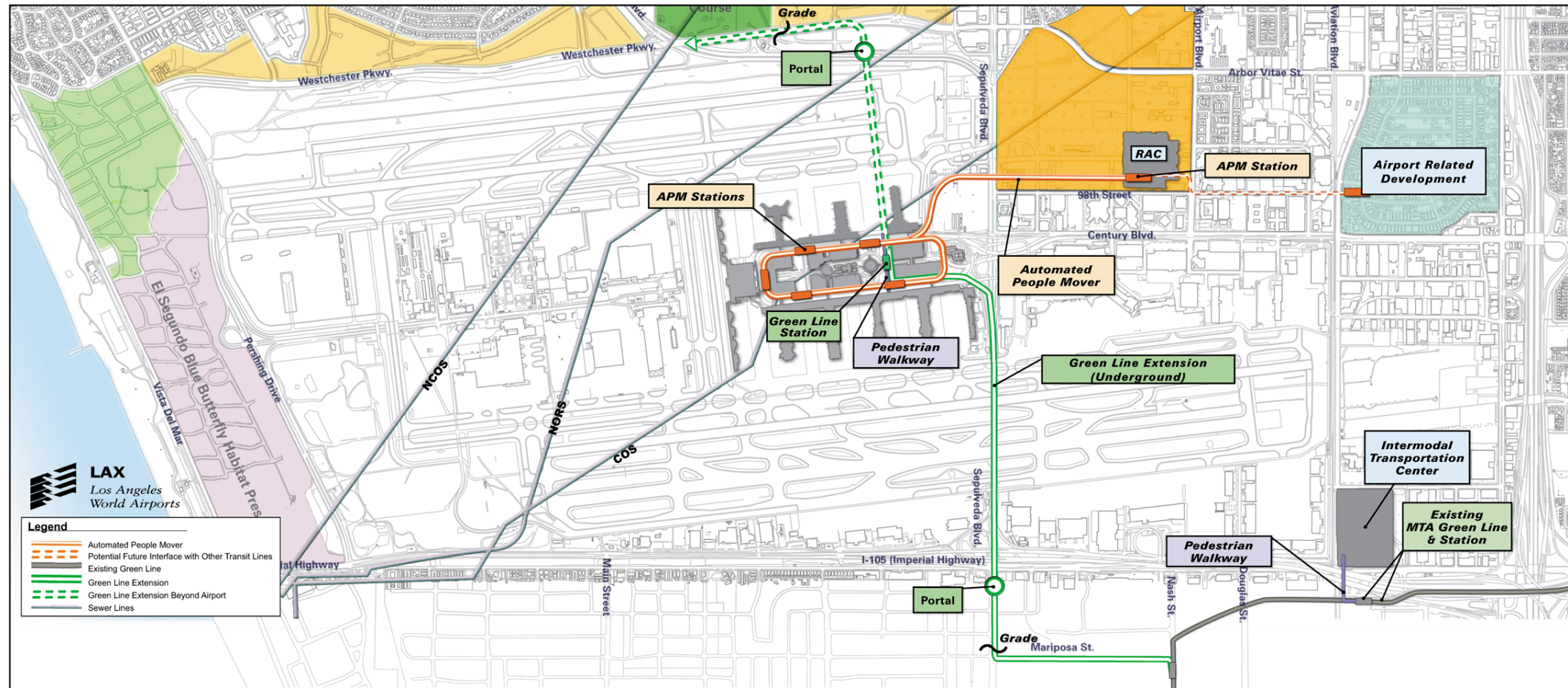
Once at the CTA Station, passengers would have two level changes and an average walk of 1,000 feet to Terminals 1, 2, 6, 7, and 8. If they choose to walk to the remaining terminals, their average walk would be 2,400 feet. Passengers transferring to the APM system would have four level changes and about a 400-foot walk.

### Connection to LAX Terminals

For passengers choosing to walk directly from the CTA Station to their terminal, the details are provided in the Green Line/LAX Interface discussion above.

For passengers choosing to transfer to the APM system, there would be five APM stations located throughout the CTA. Upon disembarking the APM system, passengers would have two level changes and a walking distance ranging from 170 feet to 425 feet, depending on the terminal.

## Alternative G Green Line Extended into CTA via Widened Sepulveda Tunnel



### General Description

The Alternative G alignment would extend the Green Line to the CTA, using Mariposa Street and a tunnel on Sepulveda Boulevard. The Green Line extension would branch off the main line north of the Mariposa Station and travel west on Mariposa Street. The alignment would turn north on Sepulveda Boulevard and immediately begin a transition from an elevated guideway into a tunnel. The underground guideway would continue through a widened Sepulveda Tunnel and then turn west into the CTA. The station in the CTA would be located between Terminals 1 and 7. Passengers would walk directly to Terminals 1, 2, 6, 7, and 8, and would choose whether to walk to the remaining terminals or transfer to the airport's APM system.

This alignment provides an opportunity for continuation of the Green Line Extension north on either Lincoln Boulevard or Sepulveda Boulevard. With this alignment there would be two Metro Green Line train routes: Norwalk to Redondo Beach and Norwalk to LAX.

This alignment also provides the opportunity to extend the airport APM easterly from the RAC to Manchester Square, where it could connect to future Metro transit lines using the Harbor Subdivision.

### Alignment

- Branch at a new turnout north of the Mariposa Station. Proceed west along Mariposa Street.
- Turn north on Sepulveda Boulevard and begin a transition from an elevated guideway to a tunnel. The alignment would continue through a widened Sepulveda Tunnel. Just past Terminal 8, the alignment would turn west into the CTA. A station would be located between Terminals 1 and 7. For some passengers, this would be a transfer station to the airport's APM system.
- Possible extension beyond the airport would require the tunnel to continue under the CTA and north airfield towards Lincoln Boulevard. Once beyond the airport, the alignment would transition from a tunnel to an elevated guideway and continue on either Lincoln Boulevard or Sepulveda Boulevard, to be determined in the future.

### Green Line/LAX Interface

The Green Line/LAX interface would occur at the CTA Station. Passengers would walk to Terminals 1, 2, 6, 7, and 8, and either walk to the remaining terminals or transfer to the airport's APM system.

Green Line passengers may have additional wait time or a transfer due to the two Green Line routes.

Passengers traveling westbound on the main line towards the Mariposa Station may have a direct route to the CTA, if they were on the Norwalk to LAX train. If they were on the Norwalk to Redondo Beach route, they would have to change trains at the Mariposa Station. The wait time for this transfer would average 7 to 12 minutes during peak hours, and could be as high as 15 to 20 minutes.

Passengers traveling eastbound on the main line towards the Mariposa Station would have to transfer to a train going north towards LAX at the Mariposa Station. This is an easy cross-platform transfer, with a wait time that would average 7 to 12 minutes during peak hours, and could be as high as 15 to 20 minutes.

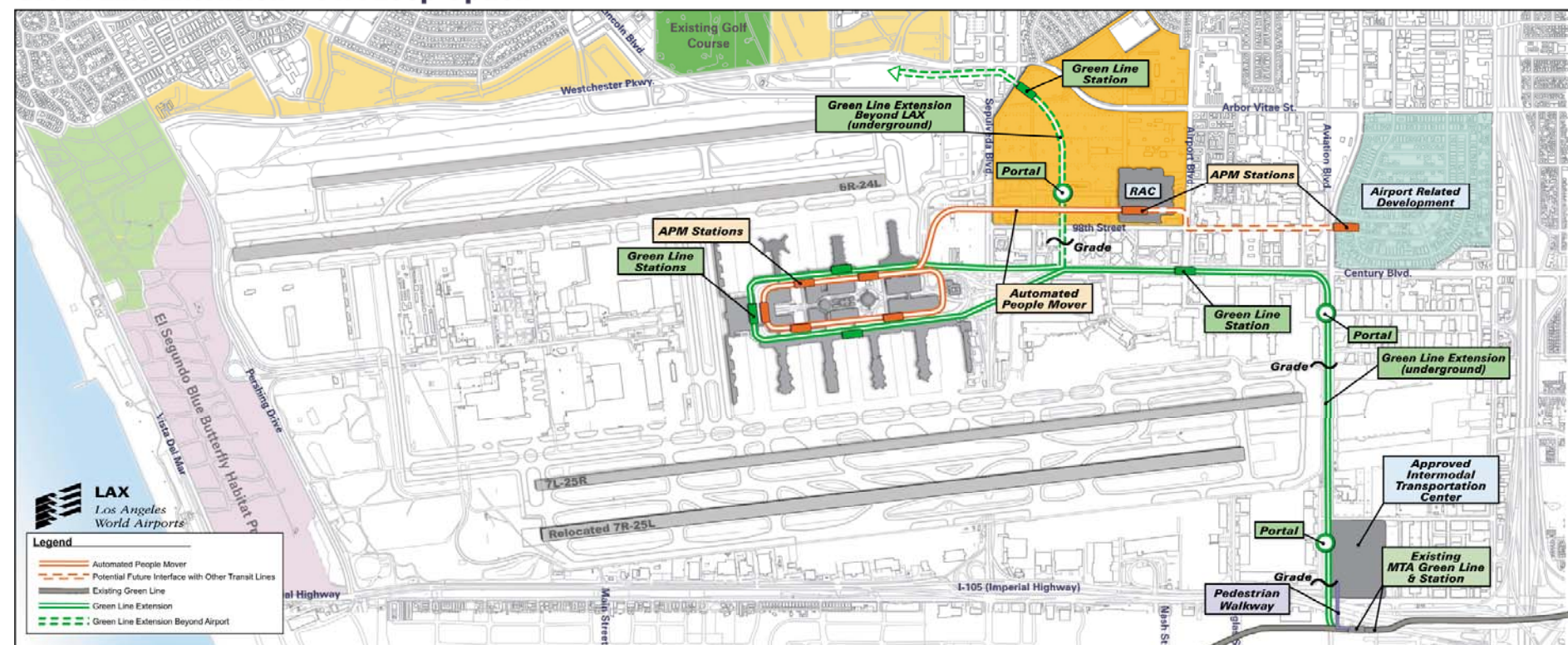
Once at the CTA Station, passengers would have two level changes and an average walk of 900 feet to Terminals 1, 2, 6, 7, and 8. If they chose to walk to the remaining terminals, their average walk would be 1,900 feet. Passengers transferring to the APM system would have four level changes and about a 400-foot walk.

### Connection to LAX Terminals

For passengers choosing to walk directly from the CTA Station to their terminal, the details are provided in the Green Line/LAX Interface discussion above.

For passengers choosing to transfer to the APM system, there would be five APM stations located throughout the CTA. Upon disembarking the APM system, passengers would have two level changes and a walking distance ranging from 170 feet to 425 feet, depending on the terminal.

## Alternative H Green Line Extension - CTA Loop Option



### General Description

Alternative H is a modification of the alignment for the Green Line North Extension as proposed in the 1993 SEIR. In this alternative, the Green Line North Extension would branch off the main line at the Aviation Station, and travel north along Aviation Boulevard. It would turn westward and follow Century Boulevard. Instead of directly proceeding northerly through Lot C, the alignment would first enter the CTA looping over the terminals. After exiting the CTA it would continue on Century Boulevard to a location between Avion Drive and Vicksburg Avenue where the alignment would turn north and pass through LAX Parking Lot C as originally planned. Five stations are proposed for this extension: one at the intersection of Century Boulevard and Airport Boulevard, three in the CTA, and one near Westchester Parkway.

This alignment provides the opportunity for a continuation of the Green Line Extension to the north on either Lincoln Boulevard or Sepulveda Boulevard. With this alignment there would be two Metro Green Line train routes: Norwalk to Redondo Beach and Norwalk to LAX.

This alignment also provides the opportunity to extend the airport APM easterly from the RAC to Manchester Square, where it could connect to future Metro transit lines using the Harbor Subdivision.

### Alignment

- Branch at existing turnout just west of the Aviation Station. Proceed north adjacent to the BNSF railroad tracks.
- Elevation change to approximately 17 feet below grade (in a covered trench) so as not to interfere with 25R/L RPZ and navigational aids. After clearing the RPZ, rise to approximately 25 feet above grade.
- Turn west on the south side of Century Boulevard. A station would be located at the intersection of Century Boulevard and Airport Boulevard.
- Continue west and loop through the CTA over the terminals. Three stations would be located in the CTA.
- After leaving the CTA, follow Century Boulevard east and then turn north between Avion Drive and Vicksburg Avenue, passing through Lot C.
- Continue the alignment through Lot C. Then turn gradually west in the 24R/L RPZ area.
- Portion of alignment located within RPZ of Runways 6R/24L and 6L/24R below grade.
- A fifth station would be located near Sepulveda Boulevard to serve Westchester.
- Possible extension beyond the airport may use Sepulveda Boulevard or Lincoln Boulevard, to be determined in the future.

### Green Line/LAX Interface

The Green Line/LAX interface would occur in the CTA. Three Green Line stations would be located throughout the CTA.

Green Line passengers may have additional wait time or a transfer due to the two Green Line routes.

Passengers traveling westbound on the main line towards the Aviation Station may have a direct route to the APM station in Lot C, if they were on the Norwalk to LAX train. If they were on the Norwalk to Redondo Beach route, they would have to change trains at the Aviation Station. The wait time for this transfer would average 7 to 12 minutes during peak hours, and could be as high as 15 to 20 minutes.

Passengers traveling eastbound on the main line towards the Aviation Station would have to transfer to a train bound for LAX at the Aviation Station. This is an easy cross-platform transfer, with a wait time that would average 7 to 12 minutes during peak hours, and could be as high as 15 to 20 minutes.

Upon disembarking the Green Line system in the CTA, passengers would have one level change and a walking distance ranging from 0 feet to 950 feet, depending on the terminal.

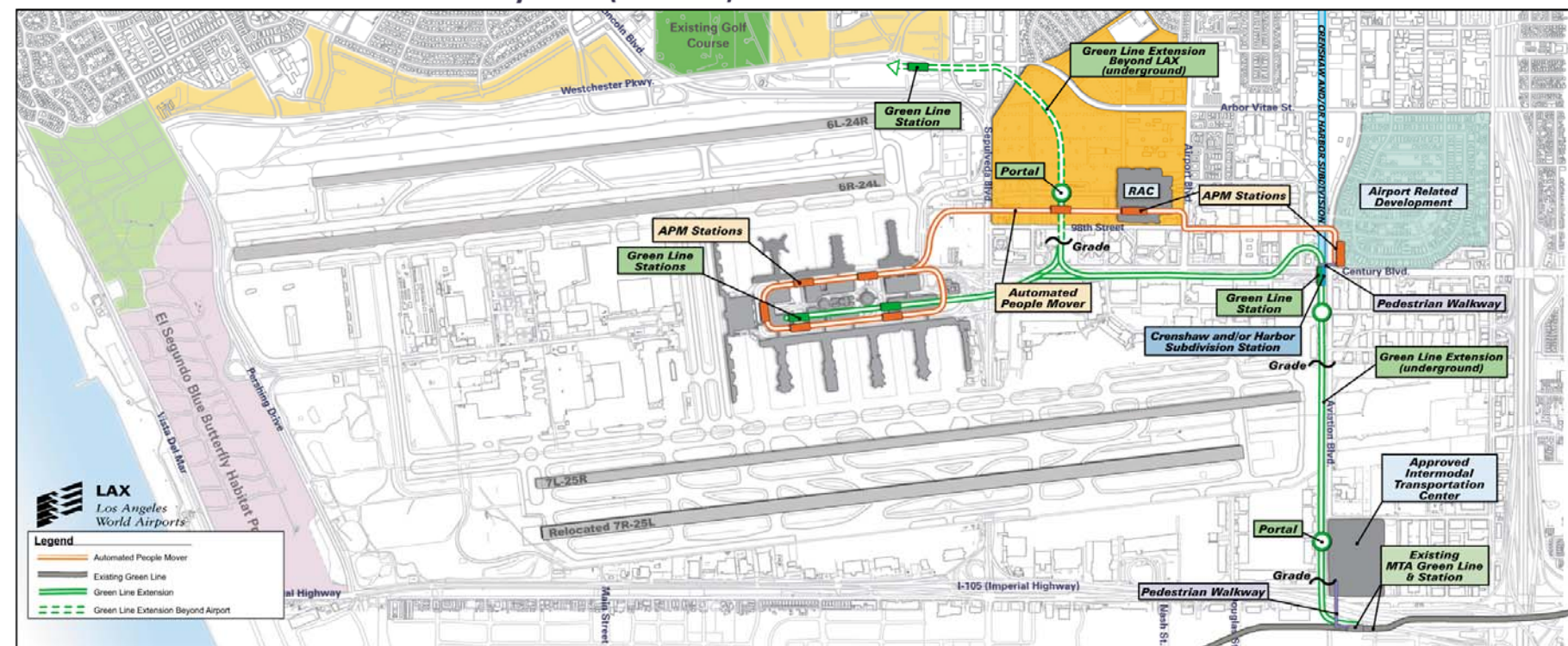
Green Line non-airport passengers would experience delay due to the Green Line loop through the CTA.

### Connection to LAX Terminals

Passengers would walk directly from the CTA Station to their terminal, as detailed in the Green Line/LAX interface discussion above.



### Alternative I Green Line Extended into CTA - Century Blvd. (Elevated)



#### General Description

Alternative I is a modification of the alignment for the Green Line North Extension as proposed in the 1993 SEIR. In this alternative, the Green Line would branch off the main line at the Aviation Station and travel north along Aviation Boulevard. A station would be located at the intersection of Aviation Boulevard and Century Boulevard where it would 1) connect, via a pedestrian bridge, to a proposed airport APM station at Manchester Square and 2) connect with future Metro transit lines using the Crenshaw Corridor and/or Harbor Subdivision. From the station, the alignment would curve northwesterly and loop back to Century Boulevard continuing westward. Instead of directly proceeding northerly through Lot C, the alignment would have the option of first entering the CTA on an elevated guideway. Two stations would be located in the CTA across from Terminals 4 and 7. Passengers would walk directly to Terminals 4, 5, 6, 7, 8 and TBIT, and would choose whether to walk to Terminals 1, 2 and 3 or transfer to the airport's APM system. After exiting the CTA, the route would continue on Century Boulevard to just past Vicksburg Avenue, where it would turn north and pass through parking Lot C as originally planned. Another station would be located along Westchester Parkway.

This alignment provides the opportunity for a continuation of the Green Line Extension to the north on either Lincoln Boulevard or Sepulveda Boulevard. With this alignment there would be two Metro Green Line train routes: Norwalk to Redondo Beach and Norwalk to LAX.

#### Alignment

- Branch at existing turnout just west of the Aviation Station. Proceed north adjacent to the BNSF RR tracks.
- Elevation change to approximately 17 feet below grade (in a covered trench) so as not to interfere with 25R/L RPZ and navigational aids. After clearing the RPZ, rise to approximately 25 feet above grade.

- A station would be located at the intersection of Century Boulevard and Aviation Boulevard. Proceed northwesterly and then loop south towards Century Boulevard.
- Turn west on the south side of Century Boulevard, and continue into the CTA. Stations would be located across from Terminals 4 and 7. For some passengers, these would be transfer stations to the airport's APM system.
- Possible extension beyond the airport directly from the CTA when elevated is not possible, so the route would return eastward back onto Century Boulevard. The alignment would turn north between Avion Drive and Vicksburg Avenue.
- Continue the alignment through Lot C. Then turn gradually west in the 24R/L RPZ area.
- Portion of alignment located within RPZ of Runways 6R/24L and 6L/24R below grade.
- A fourth station would be located along Westchester Parkway to serve Westchester.
- Possible extension beyond the airport may use Sepulveda Boulevard or Lincoln Boulevard, to be determined in the future.

#### Green Line/LAX Interface

The Green Line/LAX interface would occur at the CTA stations or the station in Manchester Square. At the CTA stations, passengers would walk to Terminals 4, 5, 6, 7, 8 and TBIT, and either walk to the remaining terminals (1, 2, or 3) or transfer to the airport's APM system. Pedestrian bridges from the CTA stations to Terminals 1 and 3 are an option.

Green Line passengers may have additional wait time or a transfer due to the two Green Line routes.

Passengers traveling westbound on the main line towards the Aviation Station may have a direct route to the CTA, if they were on the Norwalk to LAX train. If they were on the Norwalk to Redondo Beach route, they would have to change trains at the Aviation Station. The wait time for this transfer would average 7 to 12 minutes during peak hours, and could be as high as 15 to 20 minutes.

Passengers traveling eastbound on the main line towards the Aviation Station would have to transfer to a train going north towards LAX at the Aviation Station. This is an easy cross-platform transfer, with a wait time that would average 7 to 12 minutes during peak hours, and could be as high as 15 to 20 minutes.

Once at the CTA Station, passengers would have two level changes and an average walk of 475 feet to Terminals 4, 5, 6, 7, 8 and TBIT. If they choose to walk to the remaining terminals (1, 2, and 3), their average walk would be 915 feet. Passengers transferring to the APM system would have two level changes and about a 200-foot walk.

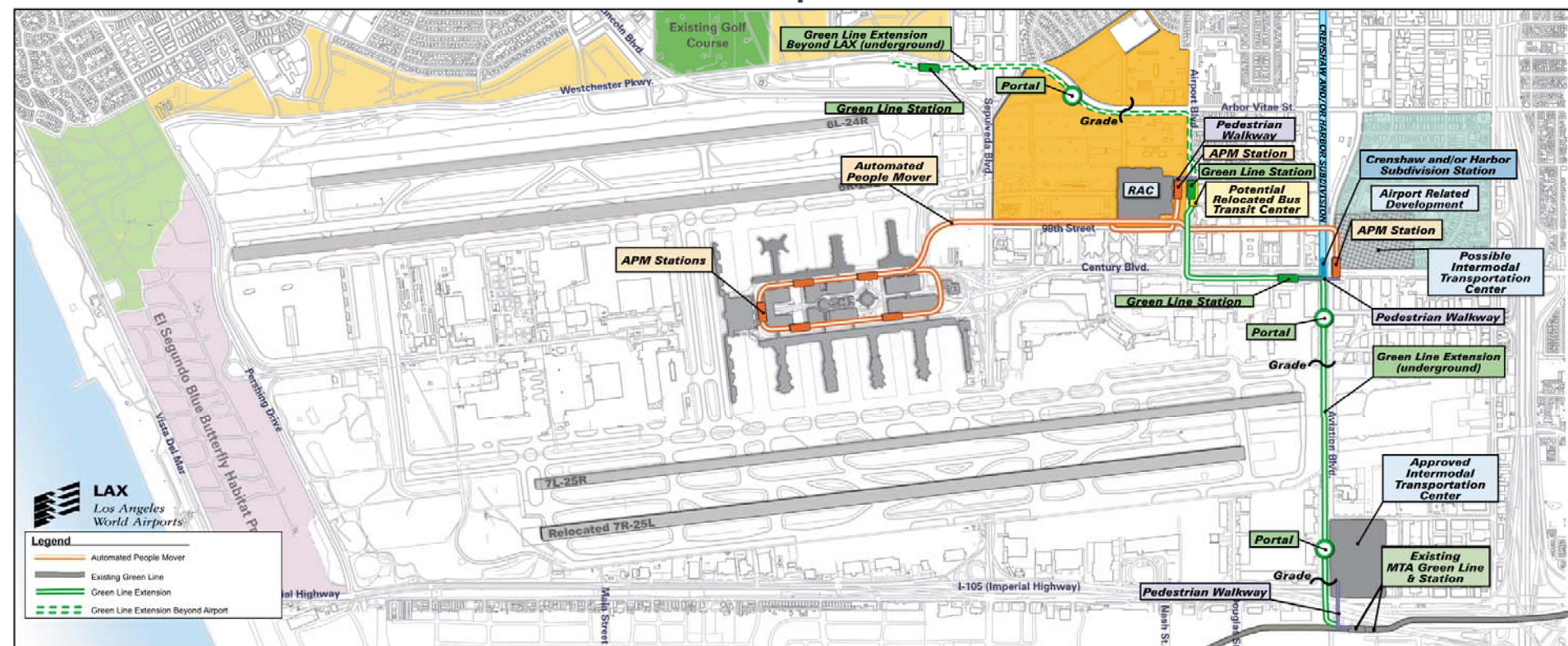
Green Line north-bound non-airport passengers would experience delay due to the Green Line extension into the CTA.

#### Connection to LAX Terminals

For passengers choosing to walk directly from the CTA stations to their terminal, the details are provided in the Green Line/LAX Interface discussion above.

For passengers choosing to transfer to the APM system, there would be five APM stations located throughout the CTA. Upon disembarking the APM system, passengers would have two level changes and a walking distance ranging from 350 feet to 425 feet, depending on the terminal (1, 2, or 3).

## Alternative J Green Line Extended with Transfer Stations at Manchester Square and RAC



### General Description

In Alternative J, the Green Line extension would branch off the main line at the Aviation Station, and travel north along Aviation Boulevard. It would turn westward and follow Century Boulevard, turn northward on Airport Boulevard, and turn west on Westchester Parkway. In Alternative J, there would be three Green Line stations: one at the intersection of Century Boulevard and Aviation Boulevard, one on Airport Boulevard across the street from the RAC APM station, and one near Westchester Parkway. Under this alternative, the proposed station on Airport Boulevard would be connected to the RAC APM station via a pedestrian bridge over Airport Boulevard. The existing LAX City Bus Center, currently located at 96th Street east of Sepulveda Boulevard, would be relocated adjacent to the proposed Green Line station on Airport Boulevard.

The proposed Green Line station at the Century Boulevard/Aviation Boulevard intersection would 1) connect, via a pedestrian bridge, to a proposed airport APM station at Manchester Square and 2) connect with future Metro transit lines using the Crenshaw Corridor and/or Harbor Subdivision. (This alternative shows LRT on these routes, however, alternative modes could also be accommodated.) From the station, the alignment would continue west on Century Boulevard. The alignment would turn north on Airport Boulevard and then west on Westchester Parkway.

This alignment provides the opportunity for a continuation of the Green Line Extension to the north on either Lincoln Boulevard or Sepulveda Boulevard. With this alignment there would be two Metro Green Line train routes: Norwalk to Redondo Beach and Norwalk to LAX.

### Alignment

- Branch at existing turnout just west of the Aviation Station. Proceed north adjacent to the BNSF railroad (RR) tracks.
- Elevation change to approximately 17 feet below grade (in a covered trench) so as not to interfere with 25R/L RPZ and navigational aids. After clearing the RPZ, rise to approximately 25 feet above grade.
- A station would be located at the intersection of Century Boulevard and Aviation Boulevard. Proceed west on the south side of Century Boulevard.
- Turn north on Airport Boulevard. A station would be located on the east side of Airport Boulevard and connect to the RAC APM station via a pedestrian bridge over Airport Boulevard. This would be a second transfer station to the airport's APM system.
- Continue the alignment north on Airport Boulevard. Then turn west on Westchester Parkway.
- Portion of alignment located within RPZ of Runways 6R/24L and 6L/24R below grade.
- A third station would be located near Sepulveda Boulevard to serve Westchester.
- Possible extension beyond the airport may use Sepulveda Boulevard or Lincoln Boulevard, to be determined in the future.

### Green Line/LAX Interface

The Green Line/LAX interface would occur at the APM station at the RAC or at the APM station in Manchester Square.

Green Line passengers may have additional wait time or a transfer due to the two Green Line routes.

Passengers traveling westbound on the main line towards the Aviation Station may have a direct route to the APM transfer stations, if they were on the Norwalk to LAX train. If they were on the Norwalk to Redondo Beach route, they would have to change trains at the Aviation Station. The wait time for this transfer would average 7 to 12 minutes during peak hours, and could be as high as 15 to 20 minutes.

Passengers traveling eastbound on the main line towards the Aviation Station would have to transfer to a train bound for LAX at the Aviation Station. This is an easy cross-platform transfer, with a wait time that would average 7 to 12 minutes during peak hours, and could be as high as 15 to 20 minutes.

Passengers transferring at the Century/Aviation Station to the APM Station would have a 600-foot walk and one level change. Passengers transferring at the Airport Boulevard Station would have a 150-foot walk and two level changes to transfer to the APM system.

### Connection to LAX Terminals

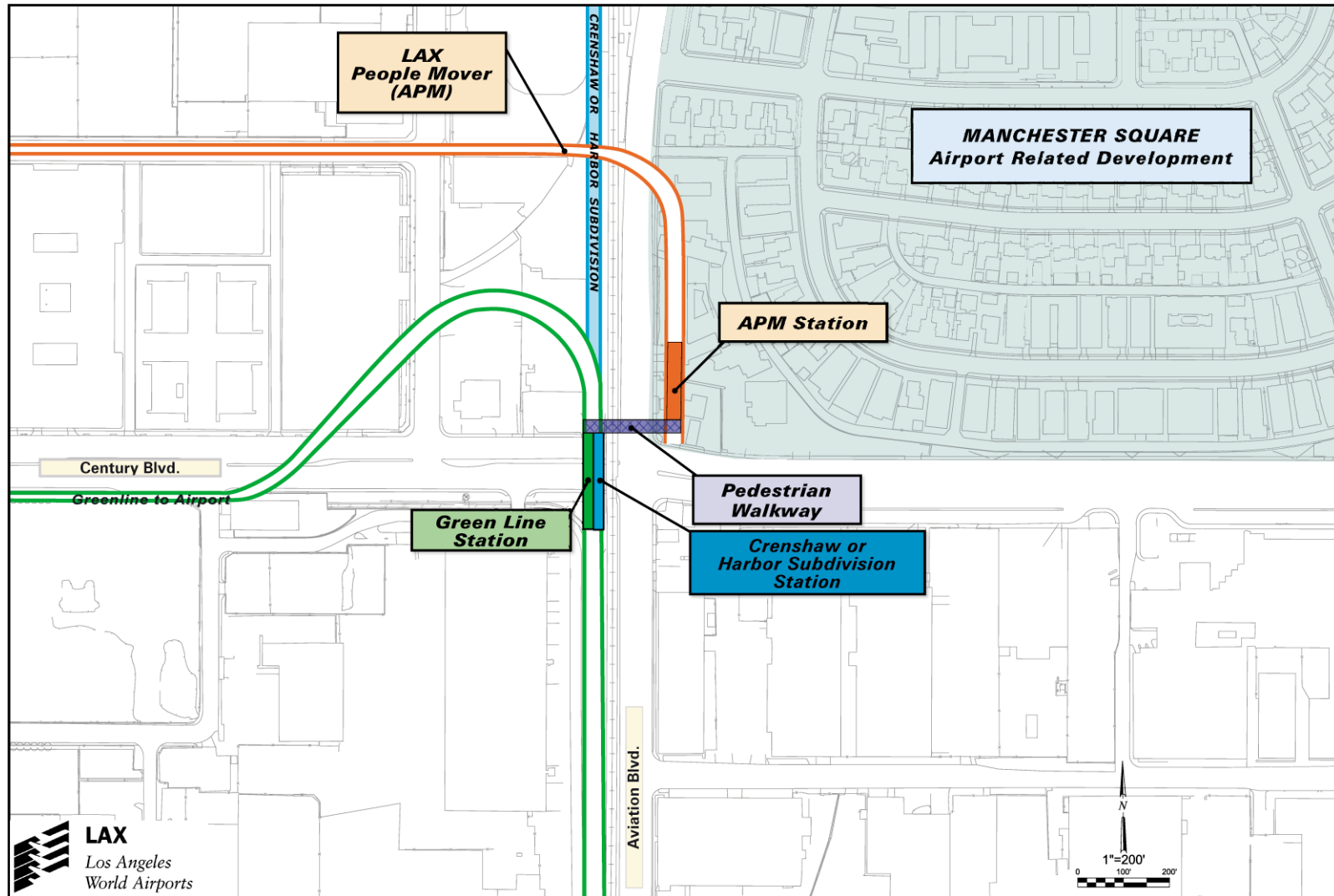
Five APM stations would be located throughout the CTA. Upon disembarking the APM system, passengers would have two level changes and a walking distance ranging from 170 feet to 425 feet, depending on the terminal.

# **Attachment D**

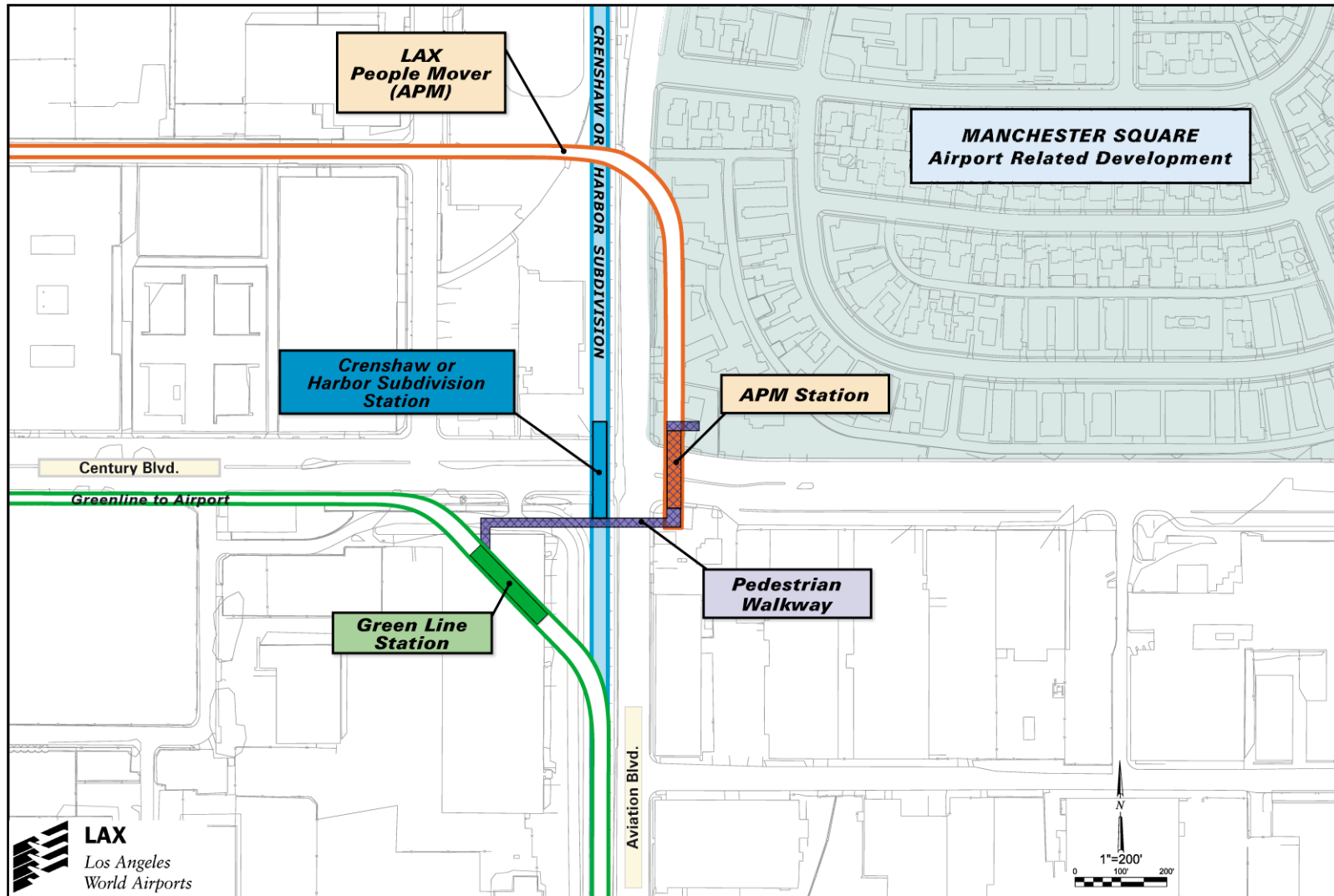
**Transit Interface at  
Century Boulevard/  
Aviation Boulevard  
Options**



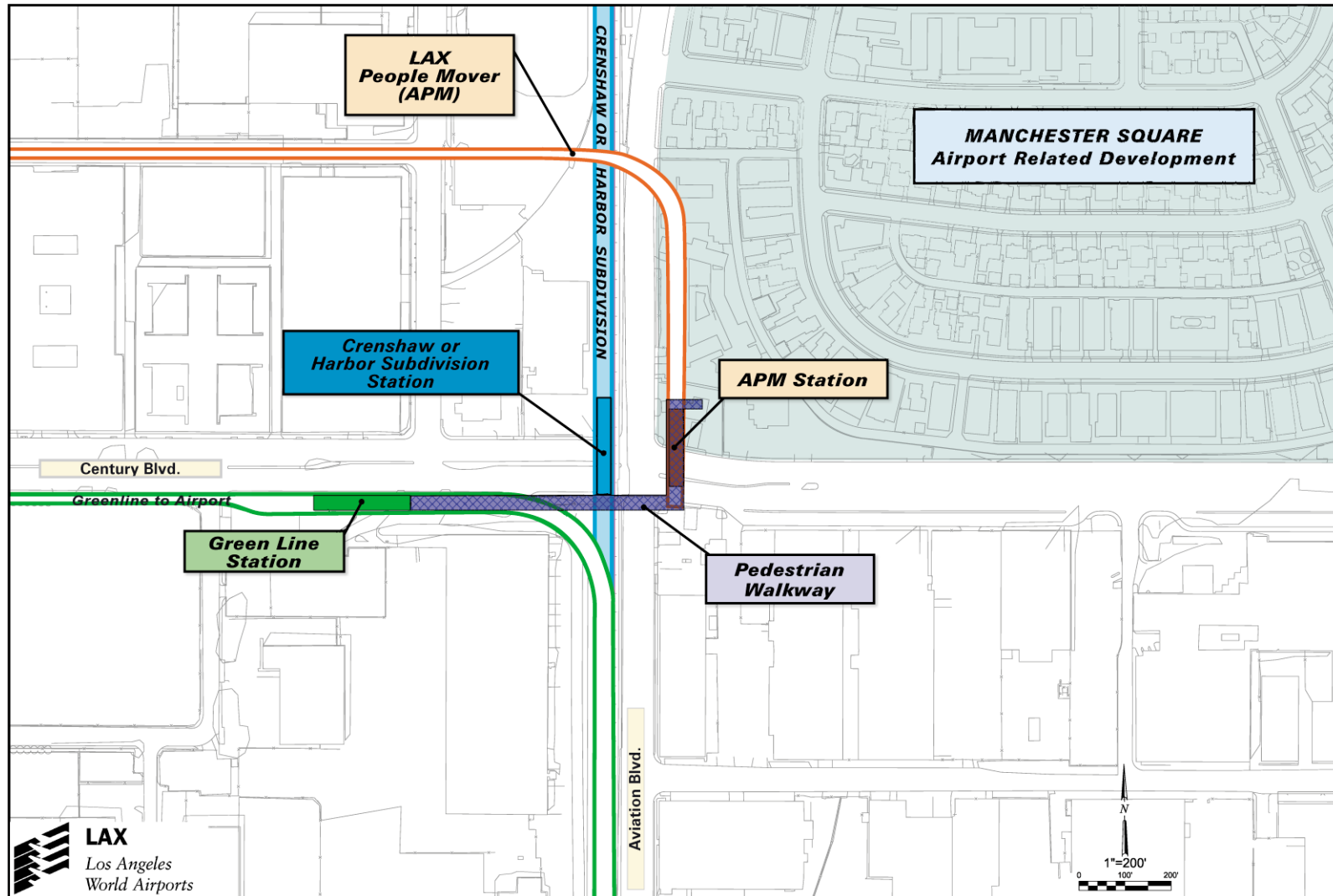
# Option A Transit Interface at Century/Aviation Boulevards



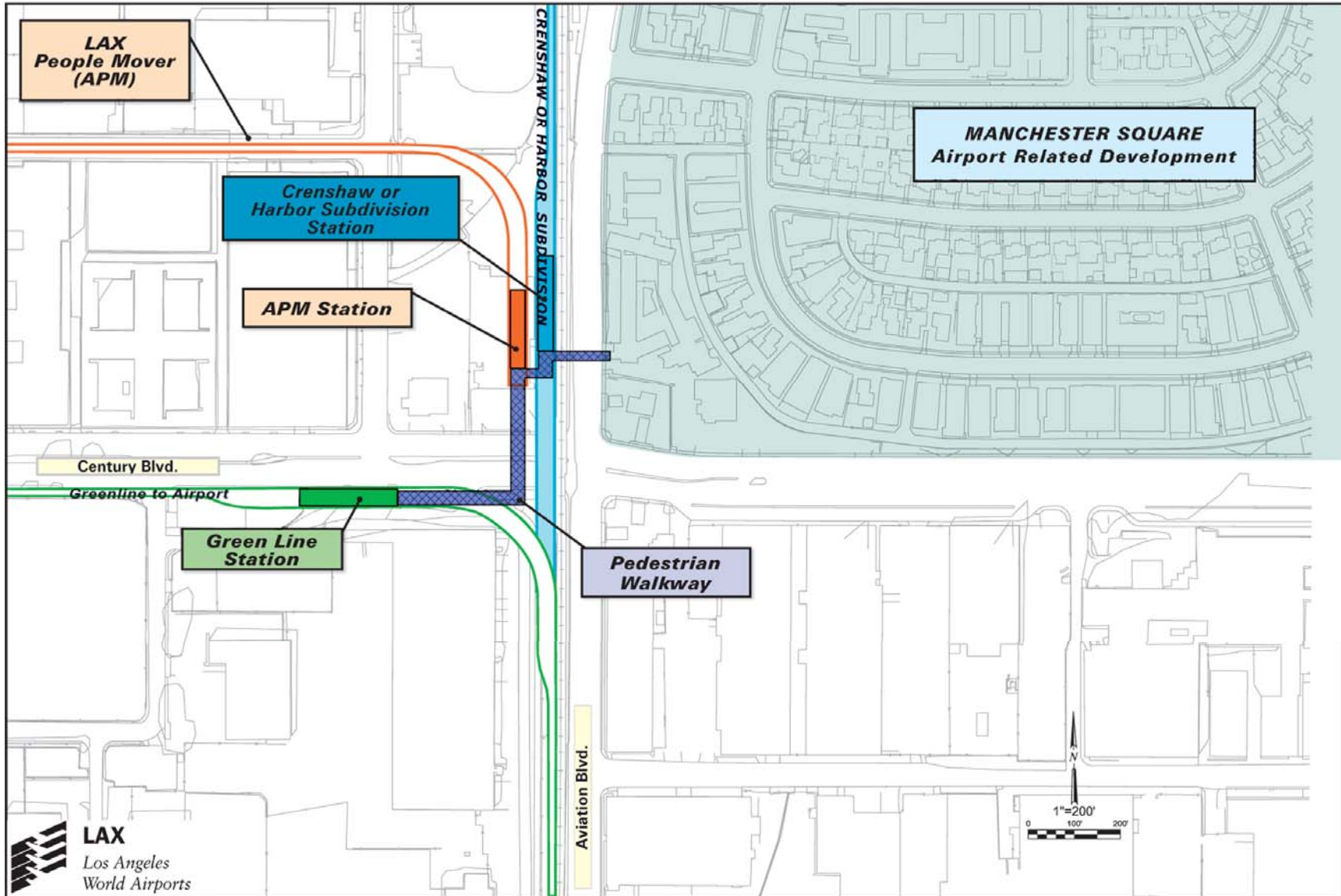
# Option B Transit Interface at Century/Aviation Boulevards



# Option C Transit Interface at Century/Aviation Boulevards

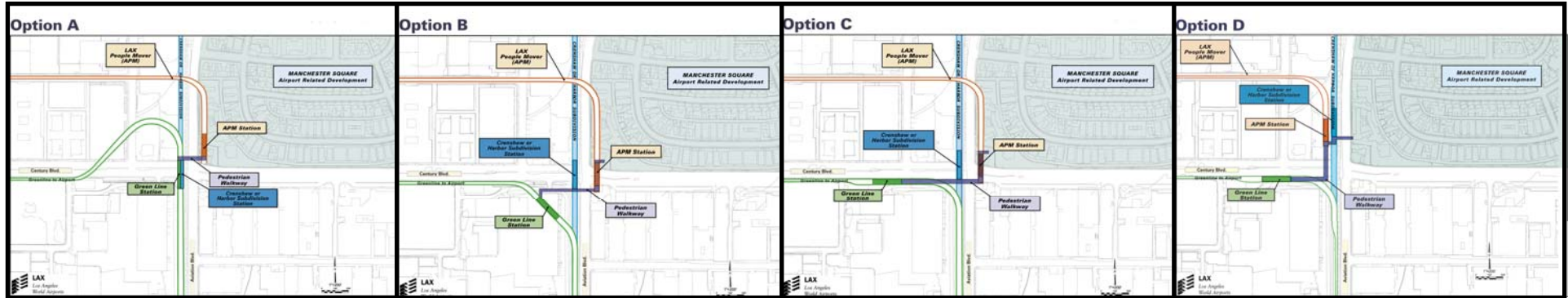


# Option D Transit Interface at Century/Aviation Boulevards





## Century/Aviation Boulevards Intersection Options



**Table 1: Walk Distance Between Stations at Century/Aviation Boulevard Intersection**

Option	Distance Between Ends of Two Stations (feet)			Distance from End of Station to Manchester Square (feet)		
	Green Line/Crenshaw Stations	Green Line/APM Stations	Crenshaw/APM Stations	Green Line Station	Crenshaw Station	APM Station
Option A	0	180	180	180	180	0
Option B	310	490	180	670	180 <sup>1</sup> - 360	0
Option C	420	600	180	780	180 <sup>1</sup> - 360	0
Option D	540	650	110	830	180	290

<sup>1</sup> To have the shorter walk distance another pedestrian bridge would be required at the north end of the Crenshaw and APM stations.

**Table 2: Level Changes Between Stations at Century/Aviation Boulevard Intersection**

Option	Level Changes Between Two Stations (feet)		
	Green Line/Crenshaw Stations	Green Line/APM Stations	Crenshaw/APM Stations
Option A	0	1	1
Option B	2	1	1
Option C	2	1	1
Option D	2	1	1



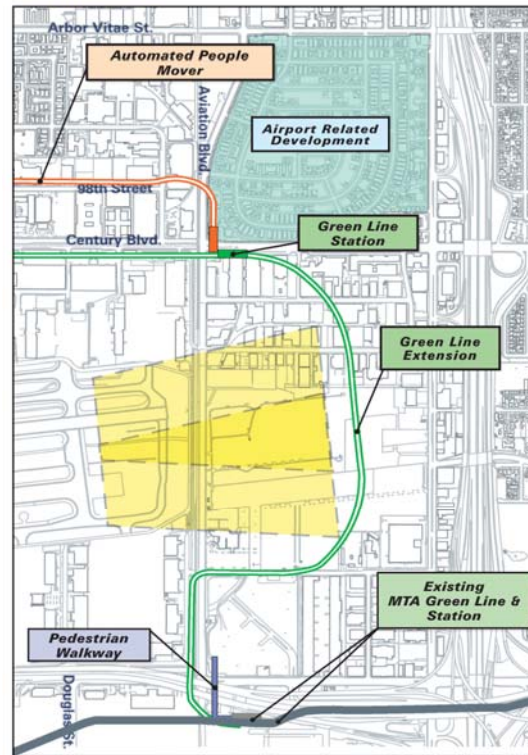
# **Attachment E**

## **Variations at Aviation Boulevard**



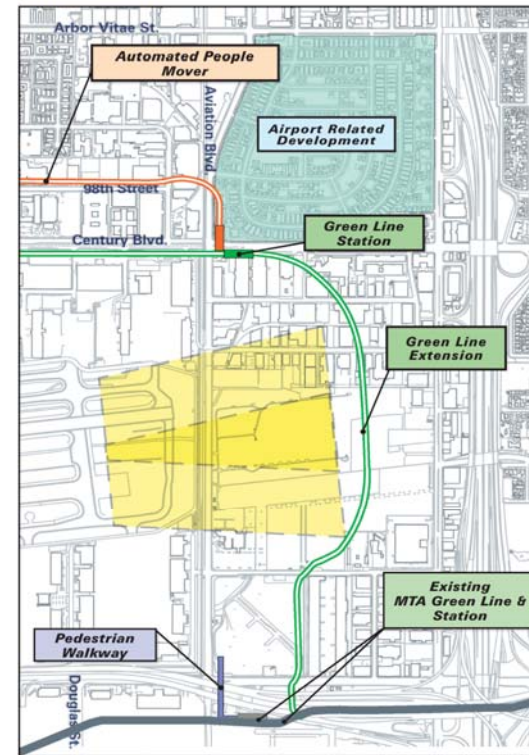
Variations at Aviation Boulevard

Variation A



Green Line East of Navigational Aids

Variation B



Green Line East of Navigational Aids and East of Aviation Station

The above two Green Line extension alignment variations are only applicable to those alternatives that use Aviation Boulevard to travel north from the existing Green Line Aviation Station. These variations were developed to provide an option to Aviation Boulevard, in the event that a covered tunnel alignment on the west side of Aviation Boulevard is not approved by the FAA.

Variation A – Green Line East of Navigational Aids, would use the existing turnout at the Aviation Station and continue north adjacent to the BNSF railroad tracks on the west side of Aviation Boulevard. At 111<sup>th</sup> Street, the alignment would cross Aviation Boulevard and continue to a point east of the navigational aids, then turn north towards Century Boulevard. Once the guideway is beyond the northern tip of the RPZ, it would begin curving towards the west. The

alignment attempts to minimize the amount of new property acquisition that would be required. A station would be located on the southeast corner of the Century/Aviation Boulevard intersection.

Variation B – Green Line East of Navigational Aids and East of Aviation Station, would use a new turnout that would be located east of the Aviation Station, just after it separates from Interstate 105. The extension would proceed north on the east side of the ITC. After passing the ITC, it would veer east to a point east of the navigational aids, then turn north towards Century Boulevard. Once the guideway is beyond the northern tip of the RPZ, it would begin curving towards the west. The alignment attempts to minimize the amount of new property acquisition that would be required. A station would be located on the southeast corner of the

Century/Aviation Boulevard intersection. Operationally, passengers traveling eastbound from Norwalk would transfer at the Hawthorne/I-105 Station, instead of the Aviation Station. This alignment is conceptual. A detailed review of the existing Green Line alignment and surrounding I-105 structures has not been conducted to verify its feasibility.

There would be significant horizontal curves with Variation A, and more gradual curves with Variation B. Both variations would have an elevated alignment, so there would be minimal vertical curves. If these variations are compared to the alignments that use Aviation Boulevard, there are several trade offs which should be studied. The trade offs include: horizontal and vertical curves, guideway length, cost of elevated and tunnel guideway, station location, and Metro operations.



# **Attachment F**

## **Cross Sections and Profiles**





# **Attachment F-1**

## **Aviation Boulevard Cross Sections**



## **Aviation Boulevard Cross Sections and Profiles**

### **Aviation Boulevard Cross Sections**

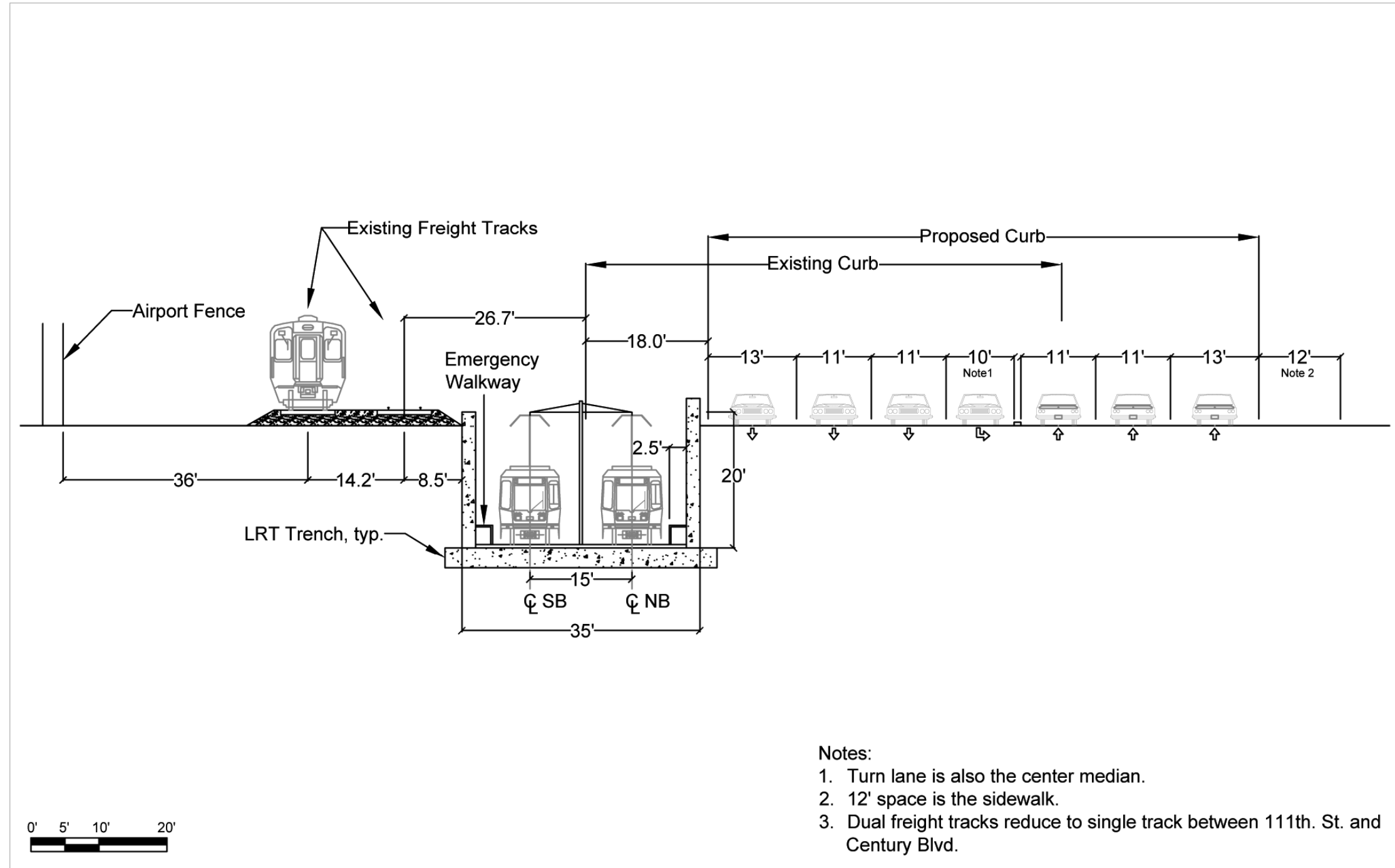
Four cross sections have been developed depicting the northerly extension of the Green Line along Aviation Boulevard. Each cross section depicts the Green Line in a trench and includes a second transit system—potentially the future Crenshaw-Prairie Corridor using the Harbor Subdivision—sharing this corridor, consisting of either a Diesel Multiple Unit (DMU) sharing the existing BNSF freight tracks or Bus Rapid Transit (BRT) in mixed flow on Aviation Boulevard. If the second transit system were to be Light Rail Transit (LRT) instead, it is assumed that the trains would share the Green Line track, thereby eliminating the need for DMU on the freight tracks or BRT in the roadway.

The BNSF freight track currently transitions from two tracks to a single track approximately 0.1 mile north of 111th Street. The drawings show the two track condition.

### **Aviation Boulevard Profiles**

Two conceptual profiles for the Green Line Extension along Aviation Boulevard were developed. On the first profile, the guideway passes over 111th Street; on the second profile, it passes under 111th Street. Both profiles are based on the SEIR 1993 plans and profile. The original profile was revised to reflect the shifting of Runway 25L and its associated Runway Protection Zone (RPZ) approximately 54 feet southward.

## Aviation Blvd. Cross Section - Option A Green Line Extension and DMU on Existing Freight Tracks

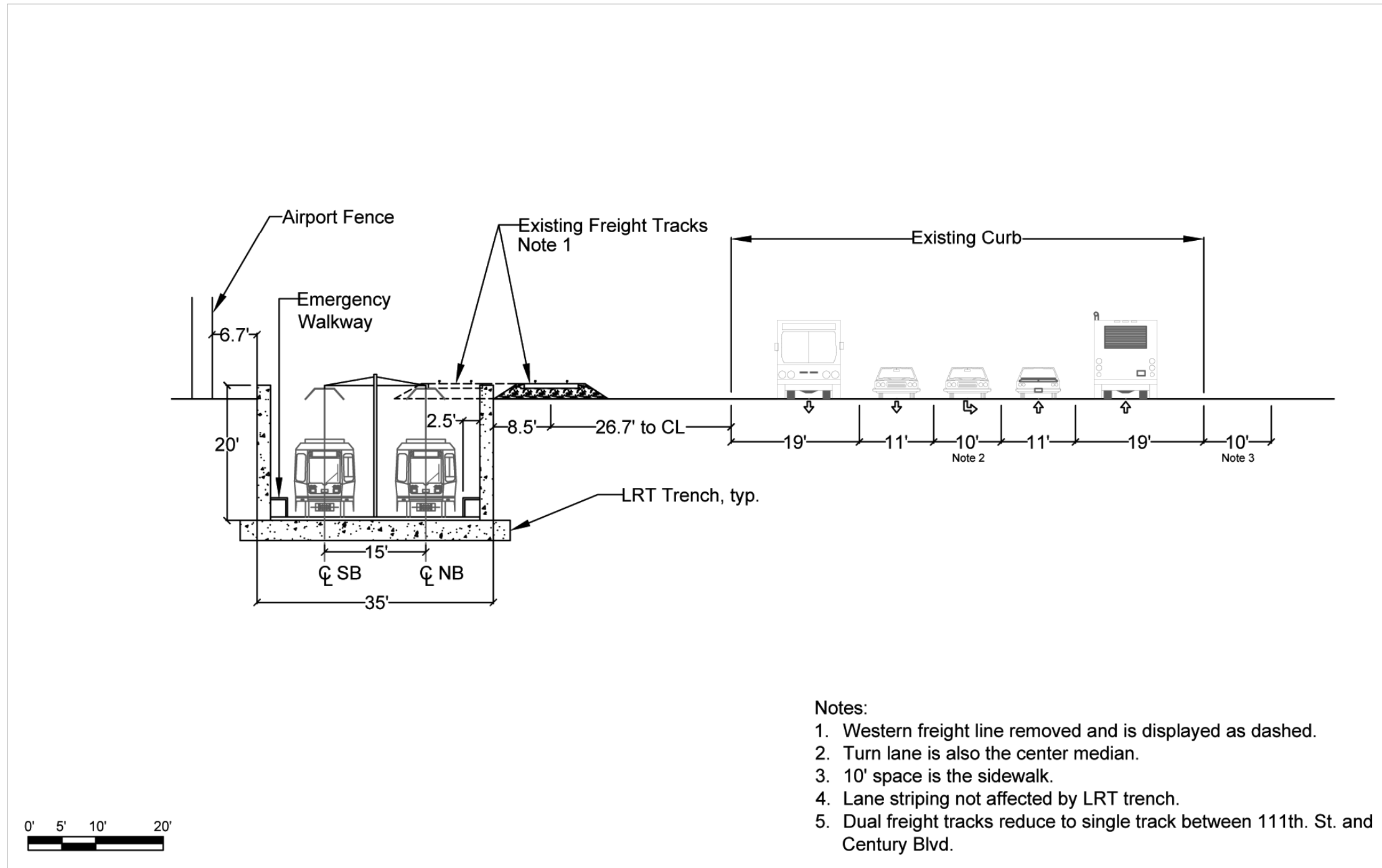


This cross section shows the Green Line Extension (LRT) in a trench to the east of the existing BNSF freight track, with DMUs on the existing freight lines. The section would result in impacts to the current configuration of Aviation Boulevard. Specifically, the LRT trench would encroach into one

southbound through lane. To compensate for this encroachment, the street would be realigned approximately 18 feet east and widened by an additional 10 feet to meet current City standards. Since the LRT would be located next to the roadway, passenger transfers between the LRT and buses could

be accommodated conveniently once the LRT is out of the trench section. Clarification from the FAA is required to determine if DMU could use the freight line in its current "at-grade" location, or if it would have to be in a trench as well.

## Aviation Blvd. Cross Section - Option B Green Line Extension and BRT

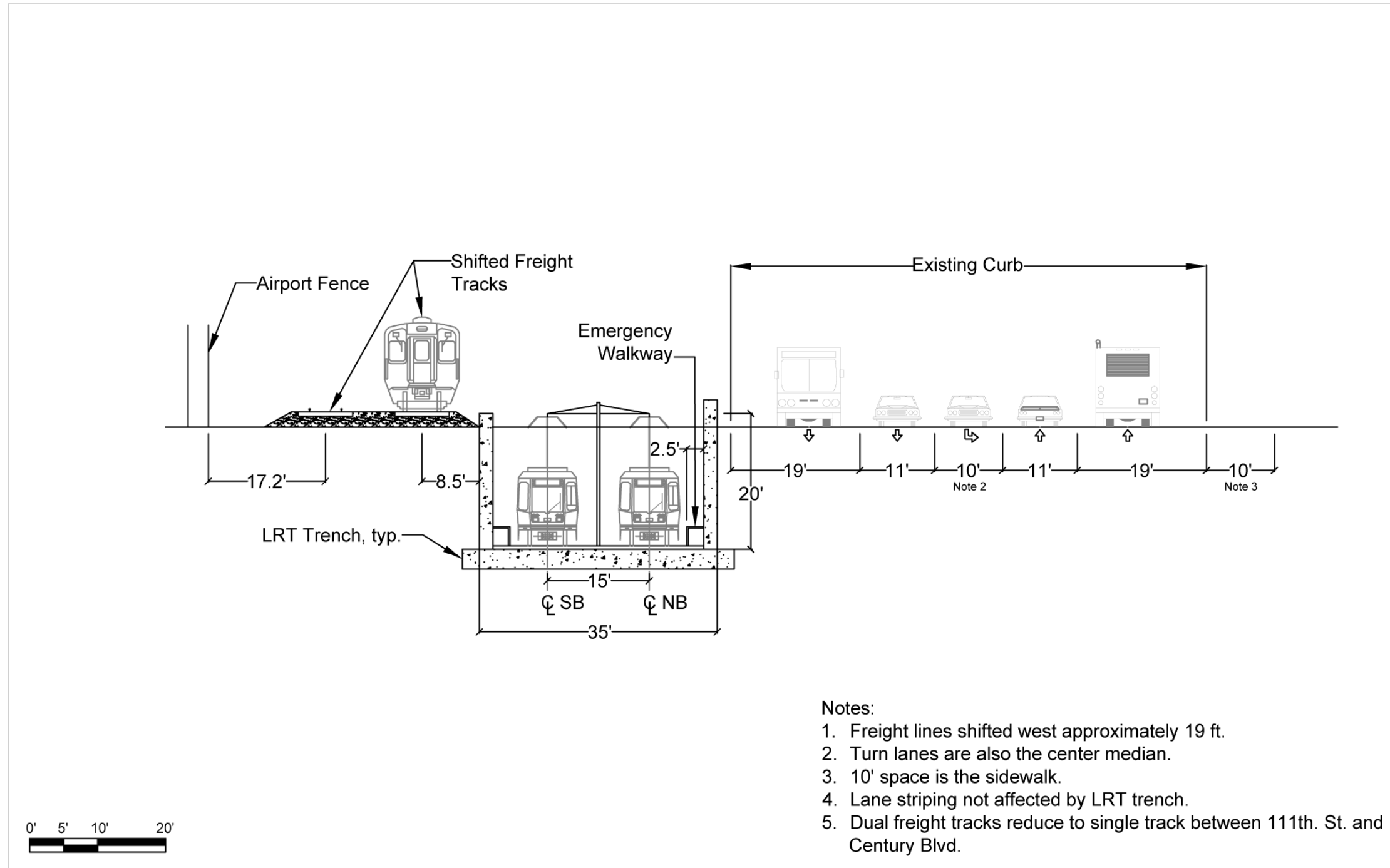


In this option, the Green Line Extension (LRT) would be located in a trench to the west of the existing freight track. A BRT is shown operating in mixed flow in the south bound and north bound right lanes of Aviation Boulevard. Since the LRT would be separated from the roadway by the existing freight track, passenger transfers between the LRT and BRT systems would be

complicated. This alternative would not affect the current configuration of Aviation Boulevard. However, modifications to the existing BNSF track would be required. The BNSF freight track currently transitions from two tracks to a single track slightly north of 111th Street. Under this alternative, the single track configuration would be extended to the south. Specifically,

one inactive freight line would be eliminated between Imperial Highway and just north of 111th Street. Clarification from BNSF is required to determine if the transition to single track can be shifted south of the current location.

## Aviation Blvd. Cross Section - Option C Green Line Extension and DMU on Modified Freight Tracks

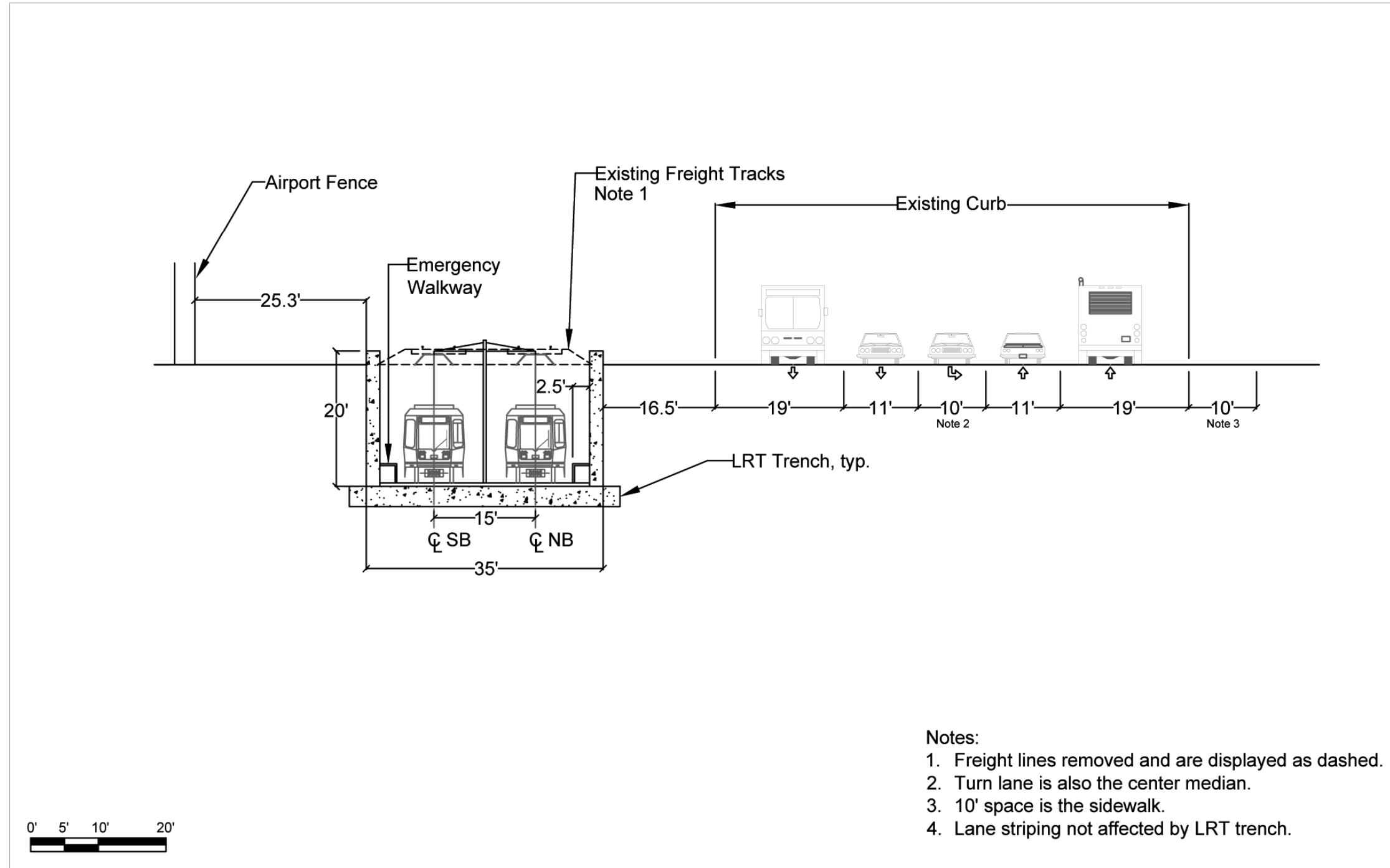


Under this alternative, the existing freight tracks would be shifted 19 feet to the west to accommodate the Green Line Extension (LRT) in a trench to the east of the freight track. DMUs would operate on the existing freight lines.

This alternative would not affect the configuration of Aviation Boulevard. Since the LRT would be located next to the roadway, passenger transfers between the LRT and buses could be accommodated conveniently once the

LRT is out of the trench section. Clarification from the FAA is required to determine if the DMU can use the freight line in its current "at-grade" location, or if it would have to be in a trench as well.

## Aviation Blvd. Cross Section - Option D Green Line Extension and BRT with Freight Lines Eliminated



In this option, freight tracks would be eliminated north of Imperial Highway, and the Green Line Extension (LRT) would be located in a trench centered on the existing freight track location. A BRT is shown operating in mixed flow in the south bound and north bound right lanes of Aviation Boulevard.

This alternative would not affect the current configuration of Aviation Boulevard. Whether the freight lines can be eliminated between Imperial Highway and Century Boulevard would require clarification from BNSF and Metro as removal of this track would preclude any further freight rail

operations by BNSF and would preclude any potential future DMU rail service from Downtown to LAX via the Harbor Subdivision right-of-way.



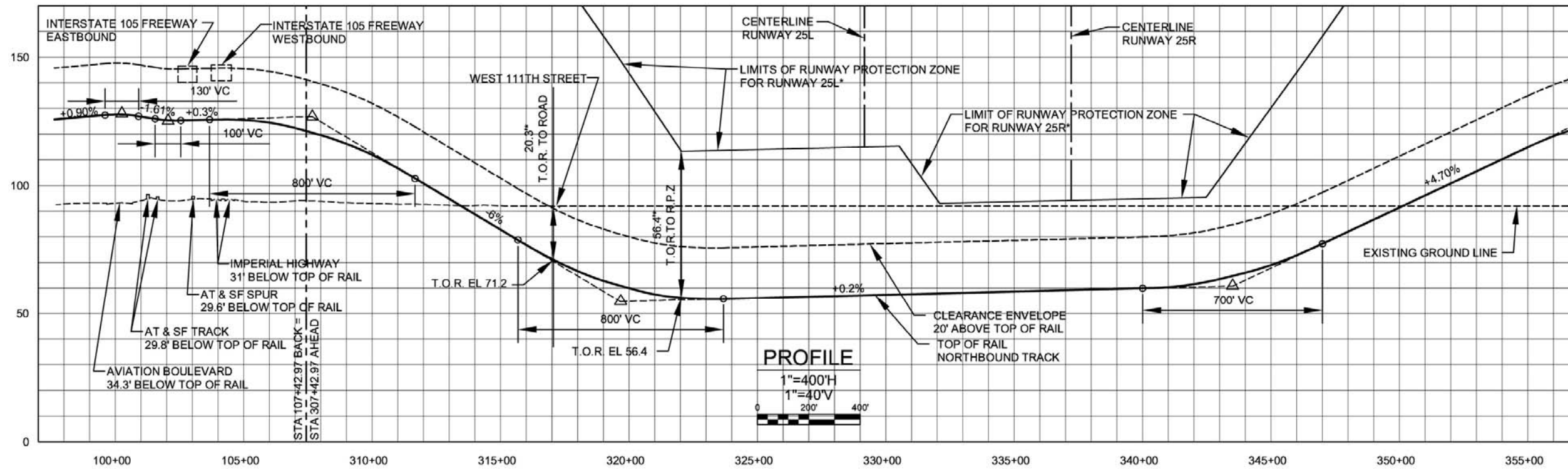


# **Attachment F-2**

## **Aviation Boulevard Profiles**



## GREEN LINE EXTENSION PROFILE ALONG AVIATION BOULEVARD RAIL UNDER 111TH STREET



**NOTES:**

1. THIS PROFILE REFLECTS THE CHANGE OF LOCATION OF RUNWAY 25L AT LOS ANGELES INTERNATIONAL AIRPORT.
2. STATIONING AND ELEVATION DATA BASED ON METRO GREEN LINE NORTHERN EXTENSION AVIATION STATION TO WESTCHESTER STATION PLANS BY GANNET FLEMMING BRAUKIS & ASSOCIATES, MARCH 1, 1993.

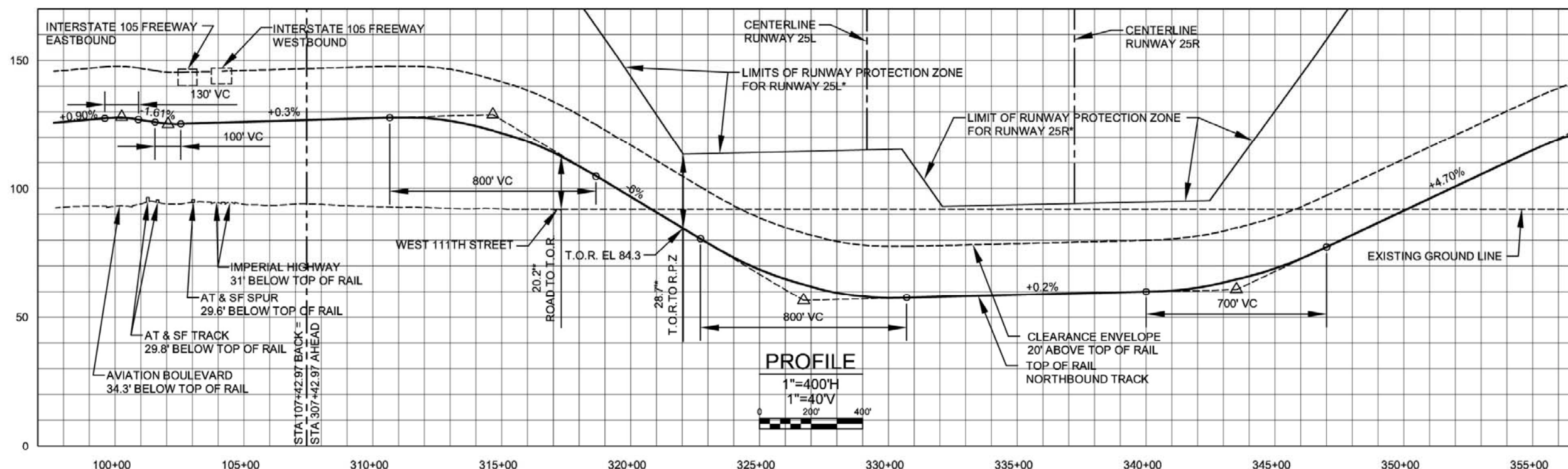


This profile begins at the Aviation Station and proceeds north. In order to be underground prior to 111<sup>th</sup> Street, a slope of -6% was required after crossing over the freight tracks. This is the maximum recommended

guideway slope for light rail. The alignment cannot start descending any sooner, because sufficient clearance over the freight tracks must be provided. The drawing shows this clearance envelope line going through

the I-105 structures, while the OCS would actually be attached to the bottom of the structure.

## GREEN LINE EXTENSION PROFILE ALONG AVIATION BOULEVARD RAIL OVER 111TH STREET



**NOTES:**

1. THIS PROFILE REFLECTS THE CHANGE OF LOCATION OF RUNWAY 25L AT LOS ANGELES INTERNATIONAL AIRPORT.
2. STATIONING AND ELEVATION DATA BASED ON METRO GREEN LINE NORTHERN EXTENSION AVIATION STATION TO WESTCHESTER STATION PLANS BY GANNET FLEMING BRAUKIS & ASSOCIATES, MARCH 1, 1993.



This profile begins approximately 700 feet south of 111<sup>th</sup> Street and proceeds north. The original profile was revised to provide a 20-foot clearance between the roadway surface of 111<sup>th</sup> Street to the top-of-rail, which provides a 14-foot clearance for vehicles and allows for a 5.5- to 6-foot guideway structure. In order to avoid the RPZ as much as possible,

the guideway's slope north of 111<sup>th</sup> street was increased from -4% to -6%. This is the maximum recommended guideway slope for light rail. When the alignment crosses the RPZ, the vehicle and its overhead catenary system (OCS) are below the RPZ's vertical limits, but they are not entirely below grade. If the FAA requires the vehicle and OCS to be covered

within the RPZ, then the portal and its structure may be about 14 feet above grade at its highest point. The tunnel would be completely below grade at a point about 200 feet north of the RPZ. This is an improvement over the 1993 SEIR.

# **Attachment F-3**

## **Alternative B (Modified) Profiles through Lot C**



## **Alternative B (Modified) Profiles through Lot C**

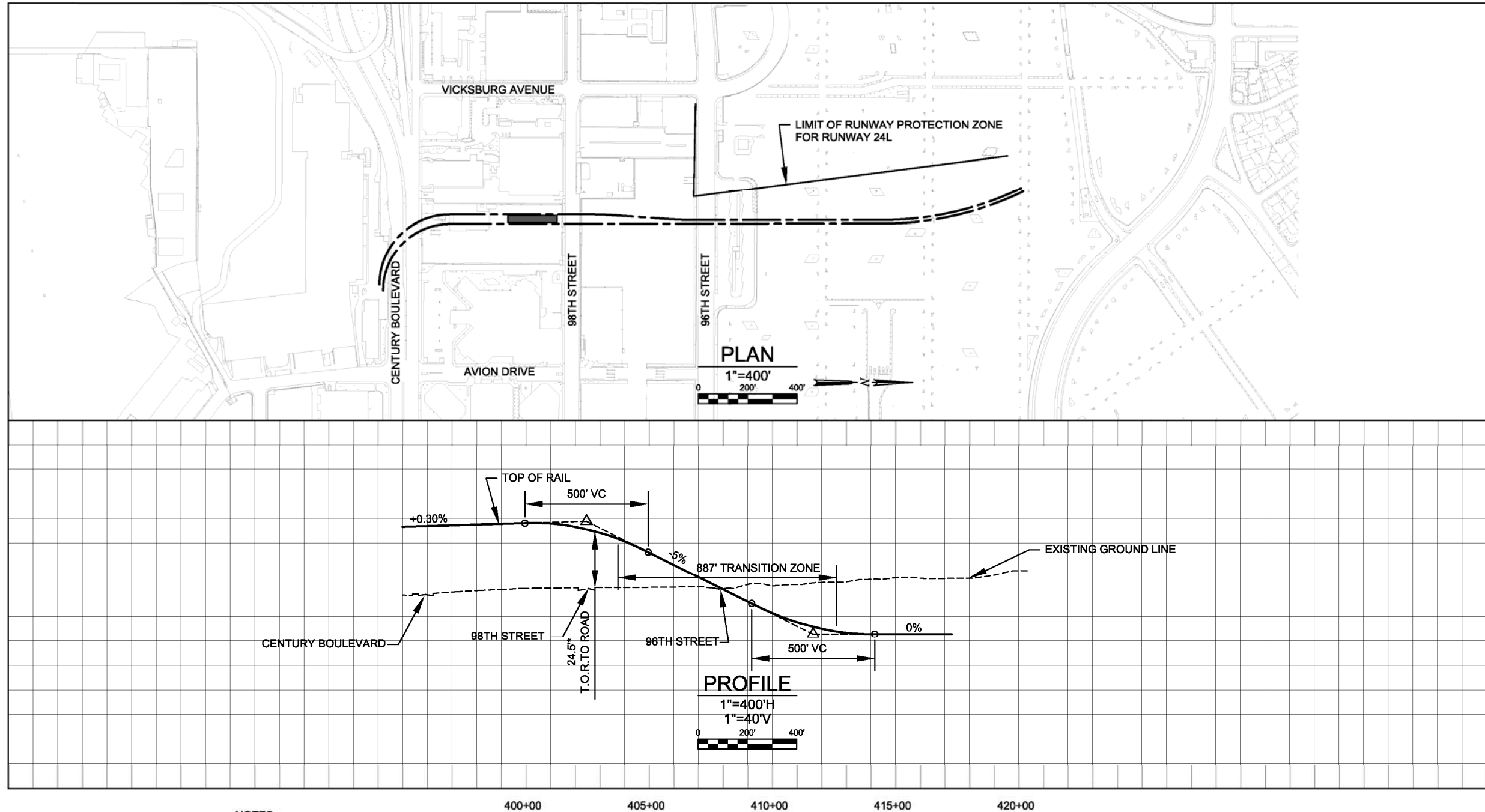
Two conceptual profiles for the Green Line Extension Alternative B Modified were developed for the section north of Century Boulevard through Lot C. Portions of the plan and profile were based on the SEIR 1993 plans and profile.

According to the 1993 SEIR, a portion of the alignment north of 96<sup>th</sup> Street and the Lot C station was outside of the existing 24R/L RPZ. As the guideway proceeded northwest towards Sepulveda Boulevard, it crossed into the existing RPZ. The entire alignment in this area was elevated and the Westchester station appears to be within the existing RPZ.

The first plan and profile uses the 1993 horizontal alignment, but the "Lot C" station is moved south to the Metro property, which is located between Century Boulevard and 98<sup>th</sup> Street. The drawing shows the existing RPZ. In the LAX Master Plan, a runway extension causes the limit of the RPZ to shift eastward. The proposed 98<sup>th</sup> Street station location is outside of the existing and Master Plan RPZs. The alignment crosses into the "Master Plan" RPZ in between 98<sup>th</sup> and 96<sup>th</sup> Streets. In an attempt to reduce the encroachment into the RPZ, the guideway clears 98<sup>th</sup> Street and then begins to transition to below grade. This profile is still elevated when the alignment crosses into the Master Plan RPZ. There is an 887-foot long transition zone as the guideway changes from elevated to tunnel. This results in impact to the RAC operation and obstructs 96<sup>th</sup> Street, which is needed for temporary bus services between the RAC and the CTA.

An alternative plan and profile was developed in an attempt to stay clear of the Master Plan RPZ and minimize the impact on the RAC and its operations. The alignment is shifted towards the eastern edge of Metro's property, proceeds north to Westchester Parkway, then turns west and runs along the south side of Westchester Parkway. The alignment crosses the RAC storage lot elevated, and then transitions from elevated to below grade along the edge of Westchester Parkway. Using a -5% grade, the system is inside a covered tunnel prior to crossing into the RPZ.

## GREEN LINE EXTENSION ALTERNATIVE B MODIFIED PLAN AND PROFILE - TRANSITION TO BELOW GRADE NORTH OF 98TH



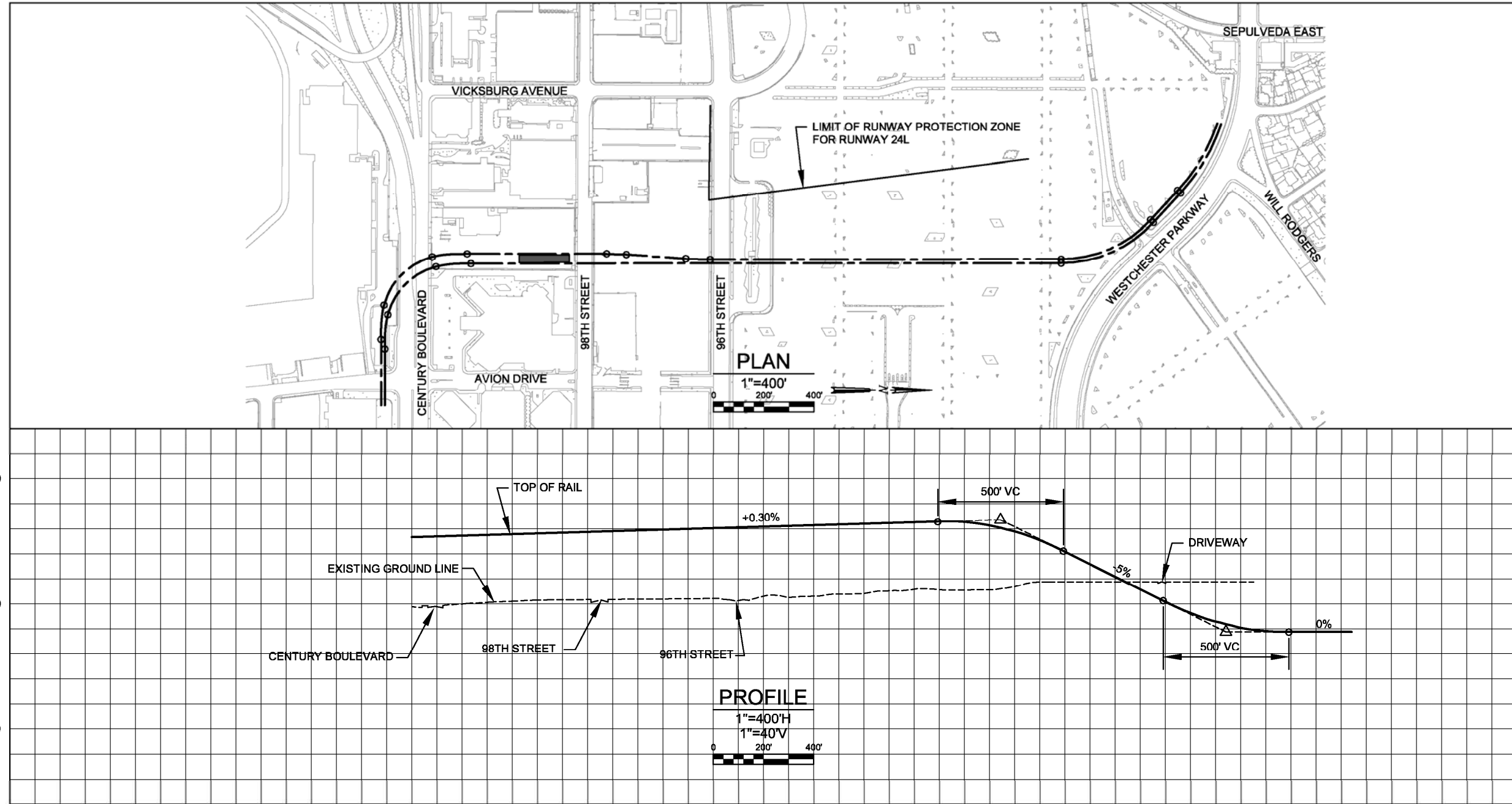
F:\0current\Work\062-LAX\Green Line West\LE-PP-ANB.dwg, Profile 1, 6/18/2007 3:10:18 PM, Ledger



- NOTES:**
1. STATIONING AND ELEVATION DATA BASED ON METRO GREEN LINE NORTHERN EXTENSION AVIATION STATION TO WESTCHESTER STATION PLANS BY GANNETT FLEMING BRAUKIS & ASSOCIATES, MARCH 1, 1993.
  2. EXISTING GROUND ELEVATIONS ARE APPROXIMATE.
  3. RUNWAY PROTECTION ZONE FOR RUNWAY 24L IS APPROXIMATE, BASED ON METRO GREEN LINE DRAWINGS.



## GREEN LINE EXTENSION ALTERNATIVE B MODIFIED PLAN AND PROFILE – TRANSITION TO BELOW GRADE ALONG WESTCHESTER PARKWAY



F:\Current Work\982-LAX\Green Line West\LE-PP-A1B02.dwg, Profile 1, 6/22/2007 10:33:40 AM, Ledger



- NOTES:**
1. STATIONING AND ELEVATION DATA BASED ON METRO GREEN LINE NORTHERN EXTENSION AVIATION STATION TO WESTCHESTER STATION PLANS BY GANNETT FLEMING BRAUKIS & ASSOCIATES, MARCH 1, 1993.
  2. EXISTING GROUND ELEVATIONS ARE APPROXIMATE.
  3. RUNWAY PROTECTION ZONE FOR RUNWAY 24L IS APPROXIMATE, BASED ON METRO GREEN LINE DRAWINGS.

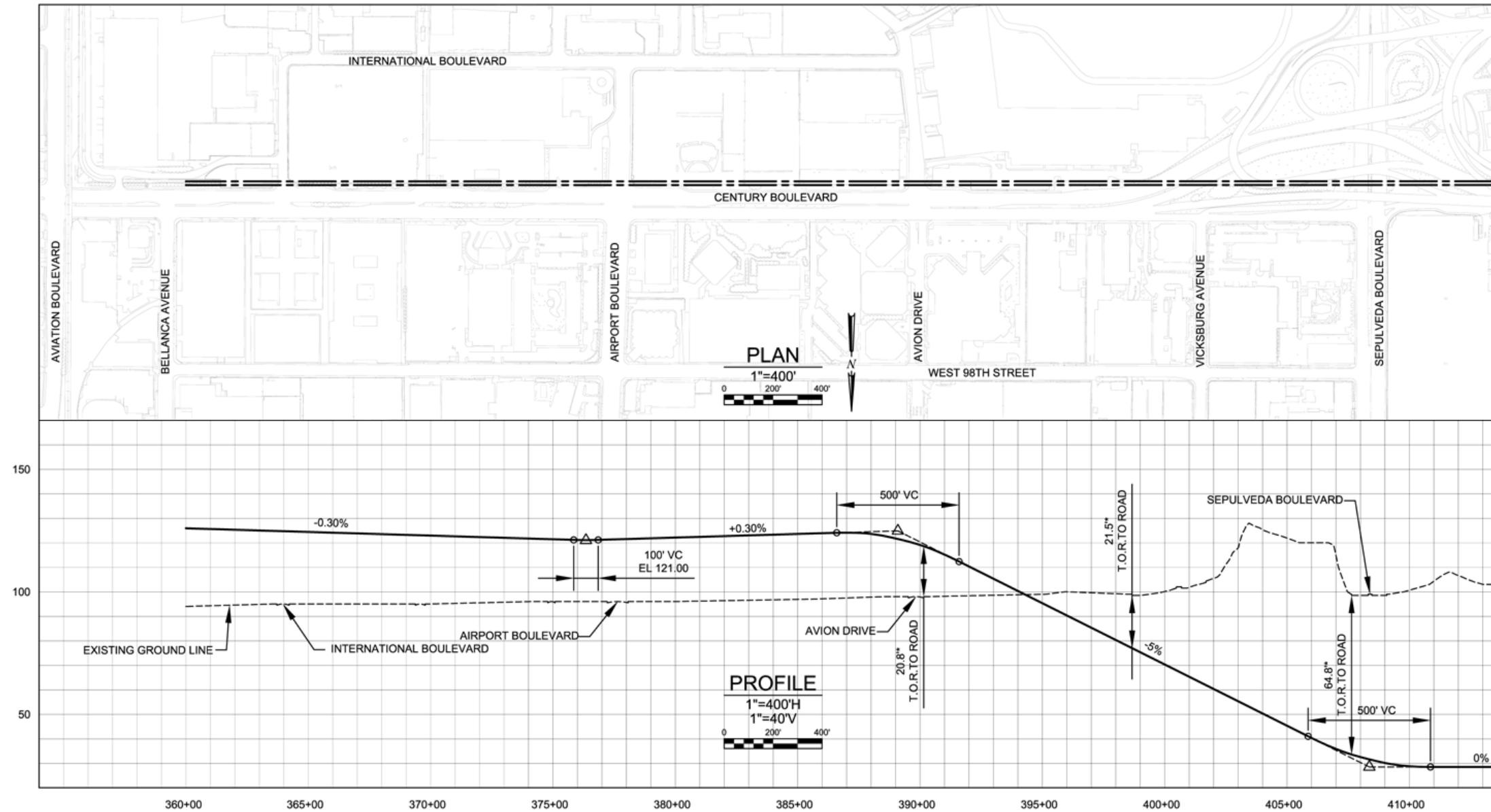


# **Attachment F-4**

## **Alternative E (Modified) Profile along Century Boulevard**



## GREEN LINE EXTENSION ALTERNATIVE E MODIFIED PLAN AND PROFILE ALONG CENTURY BOULEVARD



**NOTES:**

1. STATIONING AND ELEVATION DATA BASED ON METRO GREEN LINE NORTHERN EXTENSION AVIATION STATION TO WESTCHESTER STATION PLANS BY GANNETT FLEMING BRAUKIS & ASSOCIATES, MARCH 1, 1993.
2. EXISTING GROUND ELEVATIONS ARE APPROXIMATE.

A conceptual profile for the Green Line Extension Alternative E Modified was developed along Century Boulevard. The west portion of the plan and profile was based on the SEIR 1993 plans and profile. The profile begins at Bellanca Avenue and proceeds west on Century Boulevard. This profile shows the Green Line Extension clearing both Airport Boulevard and Avion Drive. There is at least 20 feet

between grade level and the Top of Rail (TOR), which provides at least 14-foot clearance for vehicles and allows for a 6-foot guideway structure. The alignment begins descending at 5 percent just east of Avion Drive. This is a significant grade, but less than the maximum allowable for light rail. The TOR is 21.5' below grade as the alignment approaches the Sepulveda ramps/roadways, and the TOR is 64.8'

below grade as it crosses Sepulveda Boulevard. The profile shows the alignment leveling off at this point, but it could continue to descend further if necessary. There are no driveways located in the transition zone where the alignment changes from elevated to below grade. However, impacts to parking and landscaping are expected in this transition zone.



# **Attachment G**

## **Comparative Analysis**





# **Attachment G-1**

## **Comparative Analysis Evaluation Criteria**



## GREEN LINE CONCEPTUAL ALTERNATIVES - COMPARATIVE ANALYSIS

This package presents a comparative analysis of ten conceptual alternatives for providing a direct transit connection from the Metro Green Line to LAX. The following table provides a brief description of each of the ten conceptual alternatives.

**Conceptual Green Line Alternatives**

No.	Alternative Title	Brief Description
A	Approved Master Plan Automated People Mover (APM1)	The APM included in the LAX Master Plan, with a modification to the alignment. The connection between the planned Intermodal Transportation Center (ITC) and the Aviation Station is still via a 600' pedestrian bridge with moving walkway as proposed in the Master Plan.
B <i>Modified</i>	MTA Green Line North Extension with Modified Stations	MTA Plan as recommended in 1994 SEIR with modified station location in Lot C to provide direct interface with APM. Modified alignment and station near intersection of Century and Aviation Boulevards to provide linkage to potential future APM station at this intersection and possible ITC at Manchester Square. <sup>1</sup>
C	Green Line Extended with Transfer Station at Manchester Square	Extends Green Line on Aviation Boulevard with a transfer station to a future APM station at Manchester Square and potentially relocated Intermodal Transportation Center. The extension continues on 98 <sup>th</sup> Street, Airport Boulevard, and Westchester Parkway. <sup>1</sup>
D	Green Line Extended with Transfer Station at RAC	Extends Green Line on Aviation Boulevard, 98 <sup>th</sup> Street, and Airport Boulevard with a transfer station to the APM near the Rent-A-Car (RAC) facility. The extension continues on Westchester Parkway. <sup>1</sup>
E <i>Modified</i>	Green Line Extended into CTA via Century Boulevard (Tunnel)	Extends Green Line into the CTA via Century Boulevard in a partially-tunneled alignment that allows continuation north of LAX. Modified alignment and station near intersection of Century and Aviation Boulevards to provide linkage to potential future APM station at this intersection. <sup>1</sup>
F	Green Line Extended into CTA via Tunnel under South Airfield	Extends Green Line into the CTA using a tunnel which runs diagonally from the Aviation Station to the CTA. <sup>1</sup>
G	Green Line Extended into CTA via Widened Sepulveda Tunnel	Extends Green Line into the CTA from the Mariposa Station via a widened Sepulveda Tunnel.
H	Green Line Extended into CTA (Elevated Loop)	Extends Green Line into the CTA via Century Boulevard on an elevated alignment that circles the CTA over the terminals, back to Century Boulevard, and northerly through Lot C. <sup>1</sup>
I	Green Line Extended into CTA via Century Boulevard (Elevated)	Extends Green Line into the CTA via Century Boulevard on an elevated in-and-out alignment, back to Century Boulevard, and northerly through Lot C. <sup>1</sup>
J	Green Line Extended with Transfer Stations at Manchester Square and RAC	Extends Green Line on Aviation Boulevard, Century Boulevard, and Airport Boulevard with transfer stations at Manchester Square (with possible ITC) and RAC. The extension continues on Westchester Parkway. <sup>1</sup>

<sup>1</sup> Under this alternative, the Green Line would branch at the existing turnout just west of the Aviation Station. The design of this alignment will be determined by Metro in the future. For purposes of this analysis, the branch is assumed to offer an east-west operation only. However, it could be designed to allow a north-south operation as well.

## ***Green Line Conceptual Alternatives - Comparative Analysis***

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### **Evaluation Criteria**

For comparison purposes, each conceptual alternative was evaluated against a number of criteria, identified below.

### **Constructability/Capital Cost**

#### **Constructability**

Constructability at this conceptual level primarily relates to identification of fatal flaws, including items that are either impossible to accomplish using industry and agency approved standards or take an extended time period to construct generating significant impacts to safe operations of the airport. Examples of possible constructability issues include the following:

- slopes greater than 6% for Metro Light Rail train operations
- transition areas that would restrict access to key streets or driveways
- deep tunneling requiring significant escalator and elevators shafts lengths that could pose significant safety issues or significant infrastructure such as vent shafts and pumps, etc.
- alignments that adversely affect terminals, navigation aids, other airport facilities or other major public infrastructure

#### **Capital Cost**

The capital cost of each alternative will vary with guideway type (elevated/at-grade/tunnel), specific site conditions, system length, use of alternative structures, number of stations, fleet size, property acquisition requirements, and many other variables. Normally, elevated systems have a higher capital cost when compared to at-grade systems that have much simpler and less expensive, infrastructure demands. A tunnel system is generally the most expensive. Conceptual cost estimates have not been prepared; this evaluation is based on qualitative, comparative cost assumptions.

### **Quality of Service**

The quality of service associated with each alternative was compared qualitatively. Considerations include walk distance, number of transfers required, and overall transit interface/connectivity.

#### **Walk Distance**

A key evaluation criterion for this comparative analysis is the walking distance to and from the train platform, particularly considering that aviation passengers will be carrying baggage. The length and quantity of pedestrian walkways was evaluated, along with the number of level changes associated with each concept taking into consideration breakdown in elevator and/or escalators. For purposes of this analysis, only walk distances for airport-bound passengers were evaluated.

#### **Required Transfers**

The number of transfers required by a transit system increases trip times or creates a perception of increased trip times, which may deter riders. The convenience of the transfer also affects passenger satisfaction, particularly for those passengers traveling with luggage. Convenient cross platform transfers add less time to the trip and are preferred by passengers over transfers that require one or two level changes and a walk between stations. The number of transfers required for airport passengers to reach their terminal and for non-airport passengers to reach their destination was determined for each alternative. The ease of these transfers was evaluated with regards to the number of level changes and the length of walk required.

#### **Transit Interface/Connectivity**

In the context of this analysis, transit interface refers to both the internal mobility of people within the Central Terminal Area (CTA) as well as to the mobility of people throughout the region who are traveling to the CTA. Transit interface was measured by how well the different concepts provide for a seamless transit trip. A seamless transit trip can be described as one where there are few or no transfers, required transfers are not complicated, the distance from transfer points is relatively short, the wait times (i.e., headways) are relatively short, and the transfer points are not physically challenging, that is, they do not require great effort by the transit

## ***Green Line Conceptual Alternatives - Comparative Analysis***

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user to go from one vehicle to another, and they do not require use of major infrastructure such as bridges, sets of elevators, etc. For purposes of this analysis, transit interface/connectivity was evaluated as a surrogate for ridership, as ridership numbers have not been determined for the various alternatives. Transit interface/connectivity was qualitatively evaluated for three different categories of transit users: airport passengers, airport employees, and non-airport passengers or employees (including hotel employees and employees of surrounding businesses).

Transit interface can also include re-routing bus routes or planned alignments to consolidate stations into a particular area with the intent of providing greater access to a number of locations for a seamless trip. This interface can involve interactions between bus, rail, taxi, hotel shuttle, rental car, or park & ride users of the airport. Transit interface often requires coordination of municipal operators, such as Metro and LAX.

This criterion also encompasses the connectivity of the Green Line and the planned airport APM system to other planned transit routes, including both the future Crenshaw/Prairie line and the extension of the Green Line north of LAX. To evaluate connectivity, the potential for future expandability and the flexibility of future route alignments were considered. Six subcomponents of transit interface were considered. Each subcomponent is defined below.

### ***Green Line – APM Interface***

This criterion evaluates the connection between the proposed Green Line stations and the APM stations, including the walk distances and number of level changes between Green Line and APM stations. In addition, the number of interfaces between the Green Line and the APM was considered.

### ***Interface with Other Transit***

This criterion evaluates how well the APM and/or proposed Green Line extension would connect to other potential future transit opportunities, specifically transit opportunities using the Crenshaw Corridor and/or Harbor Subdivision. Public scoping meetings to evaluate potential alignments and technologies for the Crenshaw/Prairie transit line were conducted in October 2007. The Crenshaw/Prairie transit line is included as a base line project in the funded portion of Metro's Long Range Transportation Plan.

The evaluation for the Comparative Analysis used by the Green Line Task Force is based on the alternative as proposed. However, consideration was made for those alternatives that, as proposed, do not provide connections to future transit, but that could be modified to add such connectivity. This criterion also considers the potential for use of different opportunities to use transit (e.g., future transit along the Crenshaw Corridor) to access LAX.

### ***LAX User Connectivity***

Each alternative was assessed based on how convenient it would be for LAX-bound passengers, including both airport passengers and airport employees. Factors included the number of transfers required to reach the terminal, walk distances between the proposed Green Line stations and the terminal or proposed Green Line stations and the APM, and level changes.

### ***Non-LAX User Connectivity***

Non-LAX User Connectivity evaluates how convenient each alternative would be for non-airport passengers or employees, including hotel employees and employees of surrounding businesses. Under this criterion, alternatives that would provide transit service to the Century Boulevard corridor were rated higher than those that would not provide this service.

### ***Convenient to Non-LAX Green Line Passengers***

Convenience to non-LAX bound Green Line passengers was measured by several factors including: (1) whether or not the Green Line would be split into northern and southern routes, (2) whether the alternative would cause non-LAX bound passengers to detour through the Central Terminal Area (although a single stop in the CTA did not affect the rating as adversely as a detour to the CTA), and (3) the flexibility of the potential future extension of the Green Line north of the airport, specifically, whether or not the alternative would allow for continuation of the Green Line along more than one alignment (i.e., Lincoln and Sepulveda Boulevards).

## ***Green Line Conceptual Alternatives - Comparative Analysis***

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### ***Encourages TOD***

Each alternative was evaluated based on whether or not it would encourage transit-oriented development, particularly within Manchester Square.

### **Safety and Security**

#### **Airport Safety Issues**

Any transit system located in proximity to LAX must conform to FAA regulations regarding aircraft and airport safety. There are several safety issues specifically related to a transit system alignment located in close proximity to the airport. Potential negative impacts include: obstruction or penetration into the Runway Protection Zone<sup>2</sup> (RPZ) envelope, interference with navigational aids, and conflicting visual cues (i.e., whether light and glare emissions from vehicle lights or reflected by the rail cars could impact aircraft operations by confusing or distracting airline pilots on landing approach).

#### **Security**

In conditions of heightened airport security, searches of transit passengers and vehicles may be required prior to entering the CTA. Each alternative was evaluated with regards to the impact these airport security checks may have on the route's operation, including the extent of delay and inconvenience to non-airport bound passengers.

### **Environmental**

Environmental considerations that were evaluated in this comparative process include land use compatibility, visual impacts, and traffic/circulation.

#### **Land Use Compatibility/Synergy**

Transportation is very critical element in land use planning and development. It provides the access between residential and commercial/retail land uses and overall circulation. Public transit systems are becoming a more important element in meeting the mobility needs of growing, dense cities while supporting a more efficient and sustainable urban environment. Public mass transit has also been used to support land use objectives for redevelopment and new development. The City of Los Angeles and Metro have adopted a joint Land Use and Transportation policy that supports the integration of land use objectives with public transportation investments.

For purposes of this analysis, the overall compatibility of the various alternatives with their adjacent land uses was evaluated. Considerations in this analysis include the proximity of commercial uses that can potentially maximize the positive economic impacts of access to a regional transit system, and residential and other sensitive land uses.

#### **Visual Impacts**

Factors that contribute to visual impacts of transit systems include the visual character of the landscape along a proposed alignment, the visual compatibility of transit with surrounding land uses, and the level of intrusiveness to the viewshed. LAX and the surrounding area are heavily urbanized with few existing visual resources. The most notable visual features on the airport are the arched theme building within the CTA and the Airport Traffic Control Tower. Off-airport, the Gateway LAX project along Century Boulevard between Aviation Boulevard and the airport entrance includes a series of 25- to 60-foot-high lighted columns with changing colors, in addition to landscaping and dramatic entrance signs. Visual impacts to these resources are considered in the evaluation.

It should be noted that individuals respond differently to changes in the visual environment and that an adverse visual scene to one person may represent an improved visual condition to another. As a result, the assessment of impacts in this evaluation is necessarily influenced by a degree of subjectivity.

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<sup>2</sup> Runway protection zones are trapezoidal-shaped areas located at ground level beyond each end of a runway. Land uses are limited in runway protection zones to preclude obstruction to aircraft operations proximate to the runway. FAA regulations place limits on height and type of structures that may be built in the RPZ area. The purpose of the runway protection zone is to enhance the protection of people and property on the ground. Runway protection zones vary in size depending upon the type of landing approach available at an airport and the characteristics of the critical aircraft operating at the airport.

## ***Green Line Conceptual Alternatives - Comparative Analysis***

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### **Traffic/Circulation**

While providing additional transit options may have the desired benefit of reducing the number of private vehicles operating on the street network, the installation of transit can also have negative impacts to the flow of traffic on these same streets. Moreover, insufficient parking at transit stations can result in increased demand for surrounding on-street parking. For this analysis, potential impacts to traffic/circulation and parking were evaluated qualitatively.

***Green Line Conceptual Alternatives - Comparative Analysis***

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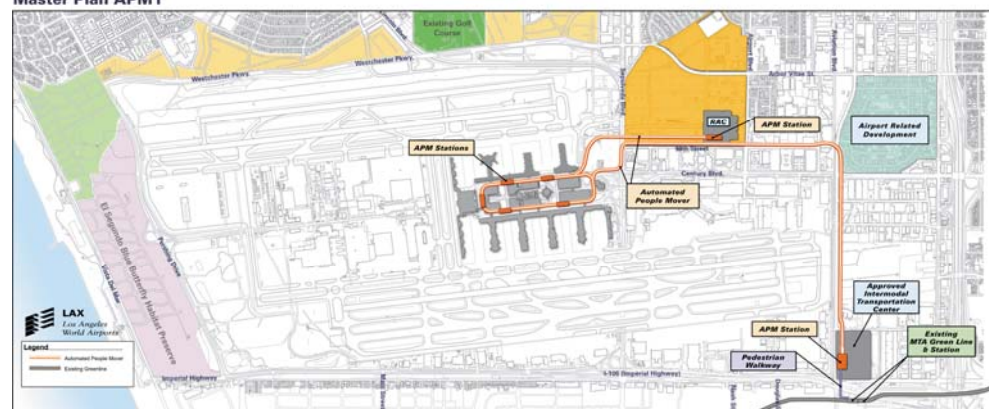
# **Attachment G-2**

## **Green Line Conceptual Alternatives Comparative Analysis**



## Green Line Conceptual Alternatives - Comparative Analysis

Alternative A  
Master Plan APM1



### Constructability/Capital Cost

- Alternative A would have the lowest capital cost of all the alternatives as it would involve the simplest system—a single technology APM instead of an airport APM as well as a Green Line extension—and the fewest number of stations. At a minimum, acquisition of right-of-way would be required between Bellanca Avenue and Aviation Boulevard north of Century Boulevard and along the east side of Aviation Boulevard from Century Boulevard to south of 104<sup>th</sup> Street.
- Alternative A would have fewer constructability issues than concepts involving tunneling. However, there are constructability issues with construction of a transit system along Aviation Boulevard, due to the presence of the alignment within the LAX south airfield Runway Protection Zone (RPZ). FAA has expressed concerns about the potential for both physical and electronic interference of transit along this corridor. Construction of an APM along Aviation Boulevard would pose less of a potential for electronic interference as the APM would use third-rail technology. However, the physical interference issue would have to be addressed. There are also constructability issues associated with construction of a transit system along 98th Street, including the narrowness of the street, minimal set back of commercial buildings from the street on the south side of 98th Street, and the presence of a large stormwater drain in the street.

### Quality of Service

#### Walk Distance

- Passengers would reach the APM from the Green Line Aviation Station via a pedestrian bridge. This transition would require two level changes and a 600-foot assisted walk using a moving sidewalk. This would be a longer walking distance from the Green Line to the APM than the other alternatives.
- Once in the CTA, passengers would choose from five APM stations. Upon disembarking the APM, passengers would have two level changes and a walking distance ranging from 170 to 425 feet, depending upon the terminal.

#### Required Transfers

- Under Alternative A, Green Line passengers would require one transfer to access the APM and have a total of four level changes.

### Transit Interface/Connectivity

- Alternative A would provide a moderately good interface between the Green Line and the APM. As noted above, passengers would access the APM via a pedestrian bridge from the Aviation Station. The walk distance between the Green Line and the APM—600 feet—would be the highest of the alternatives that connect outside the CTA, and the transfer would not be as convenient as those alternatives that would provide co-located APM and Green Line stations. However, the APM would operate with very short headways, resulting in short wait times.

Once on the APM, the five APM stations within the CTA would provide a good level of service to the terminals. This level of service within the CTA would be provided by the APM under all of the alternatives under consideration.

- With the location of the APM station at the approved Intermodal Transportation Center, and within acceptable walking distance of the Green Line Aviation Station, this alternative would provide convenient transit access to LAX for both airport passengers and airport employees. This alternative would not serve non-airport-bound employees of surrounding businesses. However, it would provide a good level of service to Green Line passengers, as it would not split the Green Line into north and south segments. In the event that the Harbor Subdivision were to be used as a future transit corridor for extension of the Green Line or development of the Crenshaw/Prairie Line, Aviation Boulevard would be host to two, separate transit lines, which could introduce unnecessary redundant infrastructure within this corridor. Interface between the APM and future transit along the Harbor Subdivision could be provided at a station at Century and Aviation Boulevards, although this is not a design feature of this alternative at this time.
- This alternative meets the City Council's policy objective of providing a Green Line connection to LAX, but does not meet the objective of providing a northerly extension of the Green Line. Moreover, this alternative would not provide a high level of transit service to the Century Boulevard corridor.

### Safety and Security

#### Airport Safety Issues

- Under Alternative A, the APM would be located on the east side of Aviation Boulevard, within the RPZ of Runways 7R/25L and 7L/25R. The APM cannot penetrate the RPZ envelope, or obstruct or interfere with airport navigational aids. To conform to these requirements, the APM alignment elevation would be designed such that the running surface would be at-grade along part of Aviation Boulevard.
- There is the potential for rail operations along Aviation Boulevard to cause conflicting visual cues to pilots. If this occurs several mitigation measures have been proposed including: tinting of vehicle windows or dimming of interior lights near the runway sections; placement of small metal shields above the side-lights to limit visibility above the horizontal plane; and, painting the tops of the vehicles a dark color, or a brushed-metal finish to reduce glare.

#### Security

- This alternative would provide a relatively high level of airport security. Compared to those alternatives that would extend the Green Line directly into the CTA, Alternative A would provide a stand-alone transit system with fewer overall stations that would provide access to the CTA. This would give LAWA greater control over the security of the system and the CTA. Further,

LAWA would have the option of conducting security screening of passengers prior to boarding the APM without causing delay or inconvenience to non-airport bound passengers. However, with two access points to the APM system, more security facilities/manpower would be required than at Alternative D, which has only one APM access point.

### Environmental

#### Land Use Compatibility/Synergy

- As with all of the alternatives, Alternative A would not be located in close proximity to residential or other sensitive land uses.
- As noted above, Alternative A would essentially serve the airport only and not the surrounding community. It would not serve hotels and other business along the Century Corridor and would not encourage future transit-oriented development along Century Boulevard or within the Manchester Square area.

#### Visual Impacts

- Alternative A would not require an overhead catenary system associated with the Green Line extension alternatives.
- The APM elevated guideway and vehicles would be clearly visible from area roadways and structures. While development of the APM would introduce a new and unique feature in the LAX area, it would not result in the removal of features that contribute to the aesthetic quality of the area (i.e., the Theme Building, Airport Traffic Control Tower and Century Corridor), nor would the APM detract from the area's existing aesthetic character.

#### Traffic/Circulation

- Alternative A is assumed to have adequate parking at the ITC and "kiss and ride" facilities, such that traffic near the station would not be adversely affected. Since the APM would be entirely elevated, it is expected to have minimal impact on traffic or circulation. Its columns would be primarily on existing or future airport property and not in existing roadways, except in a few locations on 98<sup>th</sup> Street.

## Green Line Conceptual Alternatives - Comparative Analysis

Alternative B - Modified  
MTA Green Line North Extension with Modified Stations



### Constructability/Capital Cost

- Capital costs associated with Alternative B would be moderate due to the complexity of the system. Alternative B includes a complex interface at Century and Aviation Boulevards with multiple stations and pedestrian bridges. This alternative includes a comparatively high number of Green Line stations (three) as well as the greatest number of APM stations outside the CTA (three).
- Alternative B would have moderately high constructability issues. This alternative would have constructability issues along Aviation Boulevard within the LAX South Airfield RPZ. In addition, although the APM alignment and stations are not within the RPZ for the North Airfield, the future extension of the Green Line north of the airport would be within the RPZ. Designing these facilities to avoid penetration of the RPZ envelope, or obstruction or interference with airport navigational aids, while also avoiding impacts to future rental car operations, would present a challenge. This alternative would also present constructability issues associated with placement of the APM along 98<sup>th</sup> Street, a narrow street with minimal setback of commercial buildings, and a large stormwater drain in the street.

### Quality of Service

#### Walk Distance

- Green Line passengers could access the APM at the Century/Aviation Boulevard Station or at the 98<sup>th</sup> Street Station. Passengers transferring at the Century/Aviation Station would have a 600-foot walk and one level change; passengers transferring at the 98<sup>th</sup> Street Station would have a 100-foot walk and one or two level changes.
- Once in the CTA, passengers would choose from five APM stations. Upon deboarding the APM, passengers would have two level changes and a walking distance ranging from 170 to 425 feet, depending upon the terminal.

#### Required Transfers

- Under Alternative B, Green Line passengers would require one or two transfers to access the APM, depending on the direction they are traveling, and have a total of three level changes.

#### Transit Interface/Connectivity

- Alternative B would provide a very good interface between the Green Line and the APM. As noted above, Green Line passengers could access the APM at the Century/Aviation Boulevard Station or at the 98<sup>th</sup> Street Station. Passengers transferring at the Century/Aviation Station would have a 600-

foot walk and one level change; passengers transferring at the 98<sup>th</sup> Street Station would have a 100-foot walk and one or two level changes. If the Green Line were to be extended north of the airport in the future, the 98<sup>th</sup> Street Station would be a convenient transfer point for southbound Green Line passengers.

Once on the APM, similar to all of the other alternatives, the five APM stations within the CTA would provide a good level of service to the terminals.

- Alternative B would not provide very good transit connectivity for Green Line passengers. As with all of the alternatives except Alternative A, this alternative would require the Green Line to be split into northern and southern routes. Many Green Line passengers would have to change Green Line trains at the Aviation Station, and then would have to transfer a second time to pick up the APM. Although an easy cross-platform transfer, wait times at the Aviation Station would average 7 to 12 minutes during peak hours, and could be as high as 15 to 20 minutes. These wait times could be improved in the future as Metro service is expanded, but they would never match the 24/7 minimal wait times that could be provided by the APM.
- With two access points to the APM, as well as an interface with future transit using the Crenshaw Corridor and/or Harbor Subdivision, this alternative would provide convenient transit access to LAX for both airport passengers and airport employees. This alternative would also serve non-airport passengers by providing transit to the Century Boulevard corridor as well as connectivity between the Green Line and future transit using the Crenshaw Corridor and/or Harbor Subdivision. Under this alternative, airport-bound passengers on the Crenshaw Corridor and/or Harbor Subdivision would have direct access to the APM.
- With the location of the Green Line/APM interface adjacent to a possible Intermodal Transportation Center in Manchester Square, and the potential for interface with future transit using the Crenshaw Corridor and/or Harbor Subdivision, Alternative B would provide convenient transit access to LAX for both airport passengers and airport employees.
- This alternative would facilitate the City Council's policy objective of providing a northerly extension of the Green Line to the Lincoln/Sepulveda Boulevard intersection as well as provide a connection to LAX. Moreover, it would provide flexibility in a future northerly extension alignment route.

### Safety and Security

#### Airport Safety Issues

- Under Alternative B, a portion of the Green Line would be located on the west side of Aviation Boulevard, within the RPZ of Runways 7R/25L and 7L/25R. The Green Line cannot penetrate the RPZ envelope, or obstruct or interfere with airport navigational aids. To conform to these requirements, the Green Line alignment elevation would be designed to be below-grade in a covered trench along part of Aviation Boulevard.
- Should the Green Line be extended beyond LAX, the portion of the alignment in Lot C would be located within the RPZ of Runways 6R/24L and 6L/24R. This portion of the alignment is proposed to be below-grade within the RPZ.

#### Security

- This alternative would provide a relatively high level of airport security. With Green Line/APM transfer stations outside of the CTA, passengers could be searched at the transfer stations prior to boarding the APM without causing delay or inconvenience to non-airport bound passengers. Compared to Alternative A, which is a stand-alone transit system with fewer stations,

Alternative B would involve interfacing transit systems and more access points (stations) to the CTA; this would give LAWA less control over the security of the system and the CTA. This alternative would require greater coordination efforts and more security facilities/manpower to ensure the security of the transit system and CTA. Since Lot C is proposed as the future Rent-a-Car Facility, the 98<sup>th</sup> Street Station would need to be physically separated from the storage area of the rental vehicles for security purposes.

### Environmental

#### Land Use Compatibility/Synergy

- As with all of the alternatives, Alternative B would not be located in close proximity to residential or other sensitive land uses.
- Unlike Alternative A, Alternative B would serve both the airport and the surrounding community. Alternative B would serve hotels and other business along the Century Corridor, encourage future transit-oriented development along Century Boulevard and within the Manchester Square area, and provide connectivity between the Green Line and future transit using the Crenshaw Corridor and/or Harbor Subdivision.

#### Visual Impacts

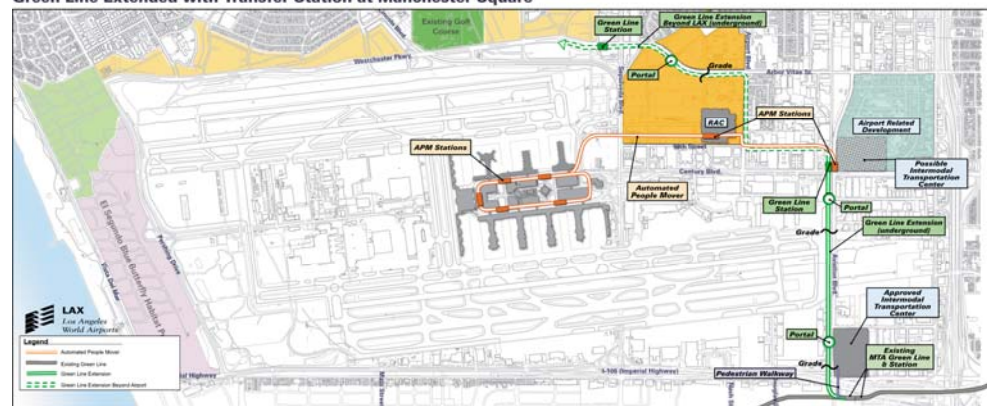
- The Green Line extension and APM elevated guideways and vehicles would be clearly visible from area roadways and structures. While development of the APM, and to a lesser extent the Green Line extension, would introduce a new and unique feature in the area immediately surrounding LAX, it would not result in the removal of features that contribute to the aesthetic quality of the area (i.e., the Theme Building, Airport Traffic Control Tower and Century Corridor).
- The overhead catenary system associated with the Green Line extension, particularly through the Century Corridor, may be considered an adverse visual impact to some individuals. However, Green Line passengers may prefer the views along the Century Corridor to that of 98<sup>th</sup> Street (Alternatives C and D) or an underground tunnel (Alternatives F and G).

#### Traffic/Circulation

- As with the other non-tunnel Green Line extension alternatives, Alternative B would be elevated and/or in its own dedicated ROW, and a portion of the alignment would be on airport property. Consistent with Metro's grade separation policy, the LRT would have grade separation at all roadway crossings and would have minimal adverse impacts to traffic or circulation. However, the elevated track's columns may be located in a median or a parking lane/sidewalk area.

## Green Line Conceptual Alternatives - Comparative Analysis

**Alternative C**  
Green Line Extended with Transfer Station at Manchester Square



### Constructability/Capital Cost

- Capital costs for Alternative C would be relatively low compared to the other alternatives. This alignment would require no tunneling and only includes two Green Line stations. The only alternatives with lower capital costs would be Alternatives A (no Green Line extension) and D (one Green Line station). At a minimum, acquisition of right-of-way would be required between Bellanca Avenue and Aviation Boulevard north of Century. However, since both the LRT and APM are proposed along 98<sup>th</sup> Street between Airport Boulevard and Bellanca Avenue, additional right-of-way along this corridor is expected.
- Alternative C would have moderately high constructability issues. As with almost all of the other alternatives, this alternative would involve construction of the Green Line extension along Aviation Boulevard within the LAX South Airfield RPZ. In addition, a small portion of the future northerly extension of the Green Line, along Westchester Parkway, would be within the RPZ of the North Airfield. Designing this facility to avoid penetration of the RPZ envelope, or obstruction or interference with airport navigational aids, while also avoiding impacts to future rental car operations, would present a challenge. This alternative would involve the adjacent location of both the APM and the Green Line extension along 98<sup>th</sup> Street, a narrow street with minimal setback of commercial buildings, and a large stormwater drain in the street.

### Quality of Service

#### Walk Distance

- Green Line passengers would access the APM at the Century/Aviation Boulevard Station. This transfer would require one or two level changes. The walk distance from the Green Line station to the APM station would be negligible.
- Once in the CTA, passengers would choose from five APM stations. Upon deboarding the APM, passengers would have two level changes and a walking distance ranging from 170 to 425 feet, depending upon the terminal.

#### Required Transfers

- Under Alternative C, Green Line passengers would require one or two transfers to access the APM, depending on the direction they are traveling, and have a total of three or four level changes.

#### Transit Interface/Connectivity

- Alternative C would provide a good interface between the Green Line and the APM. As noted above, Green Line passengers would access the APM at

Century/Aviation Boulevards. This transfer would require one or two level changes.

Once on the APM, similar to all of the other alternatives, the five APM stations within the CTA would provide a good level of service to the terminals.

- Alternative C would not provide very good transit connectivity for the Green Line. As with all of the alternatives except Alternative A, this alternative would require the Green Line to be split into northern and southern routes. Many Green Line passengers would have to change Green Line trains at the Aviation Station, and then would have to transfer a second time to pick up the APM. Although an easy cross-platform transfer, wait times at the Aviation Station would average 7 to 12 minutes during peak hours, and could be as high as 15 to 20 minutes. These wait times could be improved in the future as Metro service is expanded, but they would never match the 24/7 minimal wait times that could be provided by the APM.
- With the location of the Green Line/APM interface adjacent to a possible Intermodal Transportation Center in Manchester Square, and the potential for interface with future transit using the Crenshaw Corridor and/or Harbor Subdivision, Alternative C would provide convenient transit access to LAX for both airport passengers and airport employees. This alternative would not serve non-airport bound passengers as well as alternatives that would use the Century Boulevard corridor, although it would provide connectivity between the Green Line and future transit using the Crenshaw Corridor and/or Harbor Subdivision.
- Alternative C would facilitate the City Council's policy objective of providing a northerly extension of the Green Line to the Lincoln/Sepulveda Boulevard intersection as well as provide a connection to LAX. Moreover, it would provide flexibility in a future northerly extension alignment route. However, this alignment would not provide transit service to the Century Boulevard corridor.

### Safety and Security

#### Airport Safety Issues

- Under Alternative C, a portion of the Green Line would be located on the west side of Aviation Boulevard, within the RPZ of Runways 7R/25L and 7L/25R. The Green Line cannot penetrate the RPZ envelope, or obstruct or interfere with airport navigational aids. To conform to these requirements, the Green Line alignment elevation would be designed to be below-grade in a covered trench along part of Aviation Boulevard.
- Should the Green Line be extended beyond LAX, a small portion of the alignment in Lot C would be located within the RPZ of Runways 6R/24L and 6L/24R. This portion is proposed to be below-grade within the RPZ.

#### Security

- As with Alternative B, Alternative C would provide a moderately high level of airport security. With the Green Line/APM transfer station outside of the CTA, passengers could be searched at the transfer station prior to boarding the APM, without causing delay or inconvenience to non-airport bound passengers. Compared to Alternative A, which is a stand-alone transit system with fewer stations, Alternative C would involve interfacing transit systems and more access points (stations) to the CTA; this would give LAWA less control over the security of the system and the CTA. This alternative would require greater coordination efforts and more security facilities/manpower to ensure the security of the transit system and CTA.

### Environmental

#### Land Use Compatibility/Synergy

- As with all of the alternatives, Alternative C would not be located in close proximity to residential or other sensitive land uses.
- As noted above, Alternative C would not serve non-airport bound passengers as well as alternatives that would use Century Boulevard, although it would provide connectivity between the Green Line and future transit using the Crenshaw Corridor and/or Harbor Subdivision and encourage future transit-oriented development within the Manchester Square area.

#### Visual Impacts

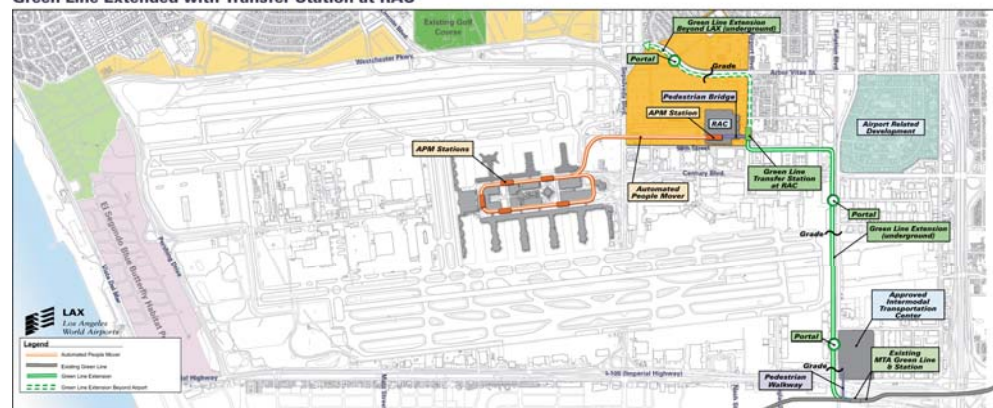
- The Green Line extension and APM elevated guideways and vehicles would be clearly visible from area roadways and structures. While development of the APM, and to a lesser extent the Green Line extension, would introduce a new and unique feature in the area immediately surrounding LAX, it would not result in the removal of features that contribute to the aesthetic quality of the area (i.e., the Theme Building, Airport Traffic Control Tower and Century Corridor).
- The overhead catenary system associated with the Green Line extension may be considered an adverse visual impact to some individuals.

#### Traffic/Circulation

- As with the other non-tunnel Green Line extension alternatives, Alternative C would be elevated and/or in its own dedicated ROW and a portion of the alignment would be on airport property. Consistent with Metro's grade separation policy, the LRT would have grade separation at all roadway crossings and would have minimal adverse impacts to traffic or circulation. However, the elevated track's columns may be located in a median or a parking lane/sidewalk area.

## Green Line Conceptual Alternatives - Comparative Analysis

**Alternative D**  
Green Line Extended with Transfer Station at RAC



### **Constructability/Capital Cost**

- Capital costs associated with Alternative D would be low compared to the other alternatives that include a Green Line extension. This alignment requires no tunneling and has the fewest Green Line stations. This alignment would provide the shortest APM route, stopping at the RAC. The only alternative that would be less costly would be Alternative A (no Green Line Extension). At a minimum, acquisition of right-of-way would be required between Bellanca Avenue and Aviation Boulevard north of Century Boulevard.
- Alternative D would have moderate constructability issues. This alternative would involve construction of the Green Line extension along Aviation Boulevard within the LAX South Airfield RPZ. As with Alternative C, a small portion of the future northerly extension of the Green Line, along Westchester Parkway, would be within the RPZ of the North Airfield. This alternative would place the Green Line within 98<sup>th</sup> Street, a narrow street with minimal setback of commercial buildings, and a large stormwater drain in the street.

### **Quality of Service**

#### **Walk Distance**

- In Alternative D, Green Line passengers would access the APM via a pedestrian bridge linking the Green Line station with an APM station at the planned Consolidated Rent-A-Car facility (RAC). This transfer would require two level changes and a short walk to the APM station.
- Once in the CTA, passengers would choose from five APM stations. Upon deboarding the APM, passengers would have two level changes and a walking distance ranging from 170 to 425 feet, depending upon the terminal.

#### **Required Transfers**

- Under Alternative D, Green Line passengers would require one or two transfers to access the APM, depending on the direction they are traveling, and a total of four level changes.

#### **Transit Interface/Connectivity**

- Alternative D would provide a moderately good interface between the Green Line and the APM. As noted above, Green Line passengers would access the APM via a pedestrian bridge linking the Green Line station with an APM station at the planned Consolidated Rent-A-Car facility (RAC). This transfer

would require two level changes and a short walk to the APM station. This alternative would have the shortest and simplest APM system.

Once on the APM, similar to all of the other alternatives, the five APM stations within the CTA would provide a good level of service to the terminals.

- Alternative D would not provide very good transit connectivity for Green Line passengers. As with all of the alternatives except Alternative A, this alternative would require the Green Line to be split into northern and southern routes. Many Green Line passengers would have to change Green Line trains at the Aviation Station, and then would have to transfer a second time to pick up the APM. Although an easy cross-platform transfer, wait times at the Aviation Station would average 7 to 12 minutes during peak hours, and could be as high as 15 to 20 minutes. These wait times could be improved in the future as Metro service is expanded, but they would never match the 24/7 minimal wait times that could be provided by the APM.
- Alternative D would not provide good transit connectivity for airport passengers parking at the approved Intermodal Transportation Center. These passengers would need to walk to the Green Line Aviation Station via a pedestrian bridge. Upon waiting for and boarding the northbound Green Line train, these passengers would need to transfer to the APM at the RAC Station. Operationally, it would need to be determined whether these ITC patrons would be charged for their short-distance ride on the LRT.
- This alternative would provide the potential for a Green Line interface with future transit using the Crenshaw Corridor and/or Harbor Subdivision. However, to get to LAX, Crenshaw Corridor and/or Harbor Subdivision passengers would be required to transfer to the Green Line, and then make a second transfer to the APM at the RAC Station. This would not provide a very good level of service for southbound airport passengers and airport employees. Moreover, this alternative would not serve non-airport bound passengers as well as alternatives that would use Century Boulevard, although it would provide the potential for connectivity between the Green Line and future transit using the Crenshaw Corridor and/or Harbor Subdivision.
- This alternative would facilitate the City Council's policy objective of providing a northerly extension of the Green Line to the Lincoln/Sepulveda Boulevard intersection as well as provide a connection to LAX. Moreover, it would provide flexibility in a future northerly extension alignment route. However, this alignment would not provide transit service to the Century Boulevard corridor.

### **Safety and Security**

#### **Airport Safety Issues**

- Under Alternative D, a portion of the Green Line would be located on the west side of Aviation Boulevard, within the RPZ of Runways 7R/25L and 7L/25R. The Green Line cannot penetrate the RPZ envelope, or obstruct or interfere with airport navigational aids. To conform to these requirements, the Green Line alignment elevation would be to be below-grade in a covered trench along part of Aviation Boulevard.
- Should the Green Line be extended beyond LAX, a small portion of the alignment in Lot C would be located within the RPZ of Runways 6R/24L and 6L/24R. This portion is proposed to be below-grade within the RPZ.

### **Security**

- This alternative would have a high level of airport security. With a single Green Line/APM transfer station outside of the CTA, passengers could be searched at the RAC Station prior to boarding the APM without causing delay or inconvenience to non-airport bound passengers. Compared to those alternatives that would extend the Green Line directly into the CTA, Alternative D would give LAWA greater control over the security of the APM system and the CTA. Further, LAWA would have the option of conducting security screening of passengers prior to boarding the APM without causing delay or inconvenience to non-airport bound passengers.

### **Environmental**

#### **Land Use Compatibility/Synergy**

- As with all of the alternatives, Alternative D would not be located in close proximity to residential or other sensitive land uses.
- As noted above, Alternative D would not serve non-airport bound passengers as well as alternatives that would use Century Boulevard. It would provide the potential for connectivity between the Green Line and future transit using the Crenshaw Corridor and/or Harbor Subdivision, however, would not provide a direct connection from the Crenshaw Corridor and/or Harbor Subdivision to the CTA.

#### **Visual Impacts**

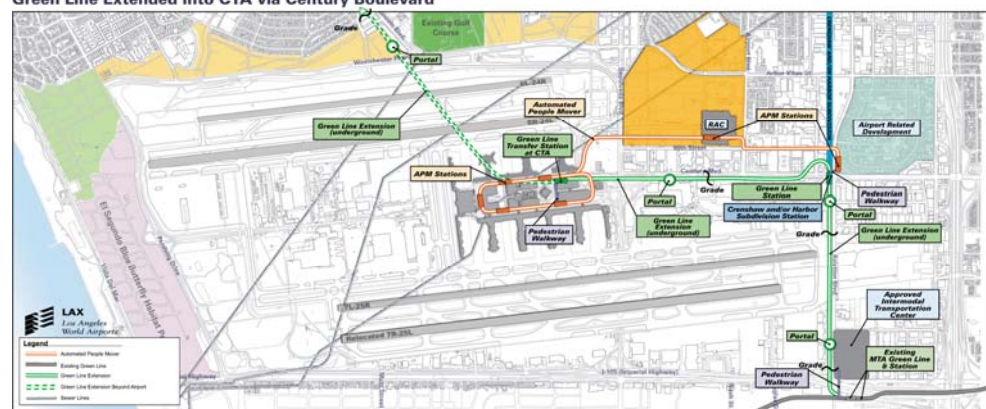
- The Green Line extension and APM elevated guideways and vehicles would be clearly visible from area roadways and structures. While development of the APM, and to a lesser extent the Green Line extension, would introduce a new and unique feature in the area immediately surrounding LAX, it would not result in the removal of features that contribute to the aesthetic quality of the area (i.e., the Theme Building, Airport Traffic Control Tower and Century Corridor).
- The overhead catenary system associated with the Green Line extension may be considered an adverse visual impact to some individuals.

#### **Traffic/Circulation**

- As with the other non-tunnel Green Line extension alternatives, Alternative D would be elevated and/or in its own dedicated ROW, and a portion of the alignment would be on airport property. Consistent with Metro's grade separation policy, the LRT would have grade separation at all roadway crossings and would have minimal adverse impacts to traffic or circulation. However, the elevated track's columns may be located in a median or a parking lane/sidewalk area.

## Green Line Conceptual Alternatives - Comparative Analysis

**Alternative E - Modified**  
Green Line Extended into CTA via Century Boulevard



### **Constructability/Capital Cost**

- Alternative E would have high capital costs primarily due to the tunneled segment of the alignment, although this alternative would have the lowest costs of the three tunneled alternatives. Higher capital costs would also be incurred due to the complexity of the system at the Century/Aviation Boulevard interface, which would include multiple stations and pedestrian bridges. At a minimum, acquisition of right-of-way would be required between Bellanca Avenue and Aviation Boulevard north of Century Boulevard. This alignment may also require the removal of an airport cargo building located in the southwest quadrant of Aviation Boulevard and Century Boulevard, depending upon the configuration of the Green Line alignment at this intersection.
- From a constructability perspective, the issues would be more significant than the non-tunneled alternatives but the lowest of the three tunneled alternatives. This alternative would have constructability issues along Aviation Boulevard within the LAX South Airfield RPZ. In addition, there would be constructability issues associated with placement of the APM along 98<sup>th</sup> Street, a narrow street with minimal setback of commercial buildings, and a large stormwater drain in the street. More significantly, however, would be the constructability issues associated with tunneling the Green Line on Century Boulevard into the CTA. The CTA presents numerous challenges, including a highly congested environment, the potential for encountering subsurface contamination, and the presence of underground utilities, most notably, three major outfall sewers within and outside of the CTA that are located along the trajectory of the Green Line northerly extension.

### **Quality of Service**

#### **Walk Distance**

- Alternative E would provide direct access to the CTA from the Green Line, with the Green Line interface occurring at the CTA Station. However, once in the CTA, the walk time or mode transfer would be less convenient than those associated with alternatives whose interface is outside the CTA. From the CTA Station, Green Line passengers would walk an average of 1,000 feet to Terminals 1, 2, 6, 7 and 8. Passengers would have the option of walking to the remaining terminals (an average walk of 2,400 feet) or transferring to the airport's APM system, which would require four level changes and a 400-foot walk. Upon disembarking the APM, passengers would have two level changes and a walking distance ranging from 170 to 425 feet, depending upon the terminal.
- Passengers would also have the option of transferring to the APM at the Century/Aviation Station, with a 100-foot walk and one level change.

### **Required Transfers**

- Under Alternative E, some Green Line passengers would not require any transfers to reach the CTA. Other passengers may have one transfer to directly access the CTA terminals, depending on the direction they are traveling, and up to two level changes. Green Line passengers choosing to connect to the airport's APM would require an additional transfer and a total of four level changes.

### **Transit Interface/Connectivity**

- Alternative E would provide direct access to the CTA from the Green Line, with the Green Line interface occurring at the CTA Station. This alternative would provide the best service to those terminals that are located close to the proposed Green Line CTA Station. However, the service would be less convenient to those terminals where a long walk or a transfer to the APM would still be required than would alternatives whose interface is outside the CTA. From the CTA Station, Green Line passengers would be very conveniently located to Terminals 1 and 2, but would be required to walk an average of 1,000 feet to Terminals 6, 7 and 8. Passengers would have the option of walking to the remaining terminals (an average walk of 2,400 feet) or transferring to the airport's APM system, which would require four level changes and a 400-foot walk. Passengers transferring to the APM system would have a good level of service to the remaining terminals.
- Alternative E would not provide very good transit connectivity for Green Line passengers. As with all of the alternatives except Alternative A, this alternative would require the Green Line to be split into northern and southern routes. Many Green Line passengers would have to change Green Line trains at the Aviation Station, and then would have to transfer a second time to pick up the APM. Although an easy cross-platform transfer, wait times at the Aviation Station would average 7 to 12 minutes during peak hours, and could be as high as 15 to 20 minutes. These wait times could be improved in the future as Metro service is expanded, but they would never match the 24/7 minimal wait times that could be provided by the APM.
- With direct access to the CTA, and a Green Line interface with future transit using the Crenshaw Corridor and/or Harbor Subdivision, this alternative would provide convenient transit access to LAX for many airport passengers and airport employees. However, as noted above, travelers bound for Terminals 3, 4, 5 and TBIT would have long walk distances or would have to make a mode transfer to the APM once they reached the CTA.
- Alternative E would provide relatively good transit connectivity for airport passengers parking at the Intermodal Transportation Center. These passengers would need to walk to the Green Line Aviation Station via a pedestrian bridge to board the northbound Green Line train to the CTA. However, operationally, it would need to be determined whether these ITC patrons would be charged for their ride on the LRT to the airport.
- This alternative would offer moderate service to non-airport passengers by providing connectivity between the Green Line and future transit using the Crenshaw Corridor and/or Harbor Subdivision. Under this alternative, airport-bound passengers on the Crenshaw Corridor and/or Harbor Subdivision would have direct access to the APM. However, due to the need to tunnel into the CTA, this alternative would not provide a Green Line station along the Century Boulevard corridor. Moreover, Alternative E would not provide flexibility in the alignment route of a future northerly Green Line extension but, rather, would constrain such an alignment to Lincoln Boulevard.
- This alternative would meet the City Council's policy objective of providing a Green Line connection to LAX but would not meet the objective of providing a northerly extension of the Green Line to the Lincoln/Sepulveda Boulevard intersection. This alternative would, however, provide a direct Green Line connection to the CTA that is not provided by the alternatives that require a transfer to the APM outside of the CTA.

### **Safety and Security**

#### **Airport Safety Issues**

- Under Alternative E, a portion of the Green Line would be located on the west side of Aviation Boulevard, within the RPZ of Runways 7R/25L and 7L/25R. The Green Line cannot penetrate the RPZ envelope, or obstruct or interfere with airport navigational aids. To conform to these requirements, the Green Line alignment elevation would be designed to be below-grade in a covered trench along part of Aviation Boulevard.

#### **Security**

- This alternative would present greater security concerns than would alternatives whose interface is outside the CTA because it would provide Green Line passengers direct access to the CTA from ten Green Line stations stretching from Norwalk to the Aviation Station. It would not be practical to provide screening of all Green Line passengers at all of these stations, particularly as many passengers would not be bound for the airport. As an alternative, screening could occur at the below-ground Green Line CTA Station as passengers disembark. Compared to Alternative A, which is a stand-alone transit system with fewer stations, Alternative E would involve interfacing transit systems and more access points (stations) to the CTA; this would give LAWA less control over the security of the system and the CTA. This alternative would require greater coordination efforts and more security facilities/manpower to ensure the security of the transit system and CTA.

### **Environmental**

#### **Land Use Compatibility/Synergy**

- As with all of the alternatives, Alternative E would not be located in close proximity to residential or other sensitive land uses.
- As noted above, Alternative E would offer moderate service to non-airport passengers by providing connectivity between the Green Line and future transit using the Crenshaw Corridor and/or Harbor Subdivision. However, due to the need to tunnel into the CTA, this alternative would not provide a Green Line station on the Century Boulevard corridor. Moreover, Alternative E would not provide flexibility in the alignment route of a future northerly Green Line extension but, rather, would constrain such an alignment to Lincoln Boulevard. However, Alternative E would encourage future transit-oriented development within the Manchester Square area.

#### **Visual Impacts**

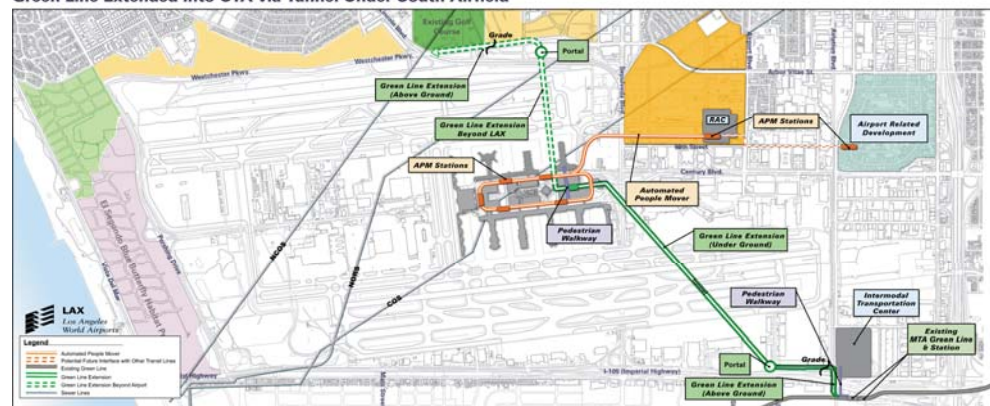
- The Green Line extension and APM elevated guideways and vehicles would be clearly visible from area roadways and structures. While development of the APM, and to a lesser extent the Green Line extension, would introduce a new and unique feature in the area immediately surrounding LAX, it would not result in the removal of features that contribute to the aesthetic quality of the area (i.e., the Theme Building, Airport Traffic Control Tower and Century Corridor). However, the presence of two elevated transit systems within the CTA could affect the aesthetics of the terminal area.
- The overhead catenary system associated with the Green Line extension, particularly through a portion of the Century Corridor, may be considered an adverse visual impact to some individuals. However, Green Line passengers may prefer the views along the Century Corridor to that of 98<sup>th</sup> Street (Alternatives C and D) or a fully underground tunnel (Alternatives F and G).

#### **Traffic/Circulation**

- As with the other tunnel alternatives, Alternative E may result in adverse traffic effects along the transition areas where the alignment changes from elevated to subway; in these areas, some driveways or roads may be adversely affected.

## Green Line Conceptual Alternatives - Comparative Analysis

**Alternative F**  
Green Line Extended into CTA via Tunnel Under South Airfield



### **Constructability/Capital Cost**

- Alternative F would have among the highest capital costs of all the alternatives, due to the length and location of tunneling. At a minimum, acquisition of right-of-way would be required between Bellanca Avenue and Aviation Boulevard north of Century Boulevard.
- This alternative would present significant constructability challenges, including the location of a portal within the Imperial Cargo Complex, which would interfere with cargo operations on an operational level, and would introduce the need for staging and spoil transport, which would interfere with cargo operations during construction; tunneling beneath the South Airfield; tunneling within the CTA, a highly congested environment with the potential for subsurface contamination; and the presence of two major outfall sewer lines along the trajectory of the Green Line northerly extension.

### **Quality of Service**

#### **Walk Distance**

- Alternative F would provide direct access to the CTA from the Green Line, with the Green Line interface occurring at the CTA Station. However, once in the CTA, the walk time or mode transfer would be less convenient than those associated with alternatives whose interface is outside the CTA. From the CTA Station, Green Line passengers would walk an average of 1,000 feet to Terminals 1, 2, 6, 7 and 8. Passengers would have the option of walking to the remaining terminals (an average walk of 2,400 feet) or transferring to the airport's APM system, which would require four level changes and a 400-foot walk. Upon disembarking the APM, passengers would have two level changes and a walking distance ranging from 170 to 425 feet, depending upon the terminal.

#### **Required Transfers**

- Under Alternative F, some Green Line passengers would not require any transfers to reach the CTA. Other passengers may have one transfer to directly access the CTA terminals, depending on the direction they are traveling, and a total of two level changes. Green Line passengers choosing to connect to the airport's APM would require an additional transfer and a total of four level changes.

#### **Transit Interface/Connectivity**

- Alternative F would provide direct access to the CTA from the Green Line, with the Green Line interface occurring at the CTA Station. This alternative would provide the best service to those terminals that are located close to the proposed Green Line CTA Station. However, the service would be less

convenient to those terminals where a long walk or a transfer to the APM would still be required than would alternatives whose interface is outside the CTA. From the CTA Station, Green Line passengers would be very conveniently located to Terminals 1, 6 and 7, but would be required to walk an average of 1,000 feet to Terminals 2, 6 and 8. Passengers would have the option of walking to the remaining terminals (an average walk of 2,400 feet) or transferring to the airport's APM system, which would require four level changes and a 400-foot walk. Passengers transferring to the APM system would have a good level of service to the remaining terminals.

- Alternative F would not provide very good transit connectivity for Green Line passengers. As with all of the alternatives except Alternative A, this alternative would require the Green Line to be split into northern and southern routes. Many Green Line passengers would have to change Green Line trains at the Aviation Station, and then would have to transfer a second time to pick up the APM. Although an easy cross-platform transfer, wait times at the Aviation Station would average 7 to 12 minutes during peak hours, and could be as high as 15 to 20 minutes. These wait times could be improved in the future as Metro service is expanded, but they would never match the 24/7 minimal wait times that could be provided by the APM.
- With direct access to the CTA, Alternative F would provide convenient transit access to LAX for some airport passengers and airport employees. However, as noted above, travelers bound for Terminals 3, 4, 5 and TBIT would have long walk distances or would have to make a mode transfer to the APM once they reached the CTA. This alternative offers no Green Line connection to the Harbor Subdivision at Century and Aviation Boulevards. However, it does allow the opportunity to extend the airport APM easterly to Manchester Square, where it could connect to future transit lines using the Harbor Subdivision.
- Alternative F would provide relatively good transit connectivity for airport passengers parking at the Intermodal Transportation Center. These passengers would need to walk to the Green Line Aviation Station via a pedestrian bridge to board the northbound Green Line train to the CTA. However, operationally, it would need to be determined whether these ITC patrons would be charged for their ride on the LRT to the airport.
- Alternative F would bypass Century Boulevard, offering no access to non-airport-bound employees of airport-area businesses. However, it would facilitate the City Council's policy objective of providing a northerly extension of the Green Line to the Lincoln/Sepulveda Boulevard intersection as well as provide a connection to LAX. Moreover, it would allow for flexibility in a future northerly alignment of the Green Line, although a northerly extension along Sepulveda Boulevard would require the alignment to double-back to Sepulveda. This alternative would also provide a direct Green Line connection to the CTA that is not provided by the alternatives that require a transfer to the APM outside of the CTA.

### **Safety and Security**

#### **Airport Safety Issues**

- Alternative F (as well as Alternative G) would avoid the airport safety issues associated with the other Green Line extension alternatives. The portions of the Alternative F alignment that cross the airport airfield would be underground (within a tunnel); thus, there would be no penetration of the RPZ, interference with navigational aids, or conflicting visual cues.

### **Security**

- This alternative would present greater security concerns than would alternatives whose interface is outside the CTA because it would provide Green Line passengers direct access to the CTA from ten Green Line stations stretching from Norwalk to the Aviation Station. It would not be practical to provide screening of all Green Line passengers at all of these stations, particularly as many passengers would not be bound for the airport. As an alternative, screening could occur at the below-ground Green Line CTA Station as passengers disembark. Compared to Alternative A, which is a stand-alone transit system with fewer stations, Alternative F would involve interfacing transit systems and more access points (stations) to the CTA; this would give LAWA less control over the security of the system and the CTA. This alternative would require greater coordination efforts and more security facilities/manpower to ensure the security of the transit system and CTA.

### **Environmental**

#### **Land Use Compatibility/Synergy**

- As with all of the alternatives, Alternative F would not be located in close proximity to residential or other sensitive land uses.
- Similar to Alternative A, Alternative F would essentially serve the airport only and not the surrounding community. It would not serve hotels and other business along the Century Corridor and would not encourage future transit-oriented development along Century Boulevard or within the Manchester Square area.
- Alternative F would transition from an elevated system to a subway within the Imperial Cargo Complex. Location of a portal in this area could displace or disrupt nearby cargo operations.

#### **Visual Impacts**

- The APM elevated guideway and vehicles would be clearly visible from area roadways and structures. While development of the APM would introduce a new and unique feature in the area surrounding LAX, it would not result in the removal of features that contribute to the aesthetic quality of the area (i.e., the Theme Building, Airport Traffic Control Tower and Century Corridor), nor would the APM detract from the area's existing aesthetic character.
- With the exception of a small portion of the alignment parallel to Aviation Boulevard and Imperial Highway, the Green Line extension guideway, vehicles, and catenary system would be below grade and not visible from surrounding uses.

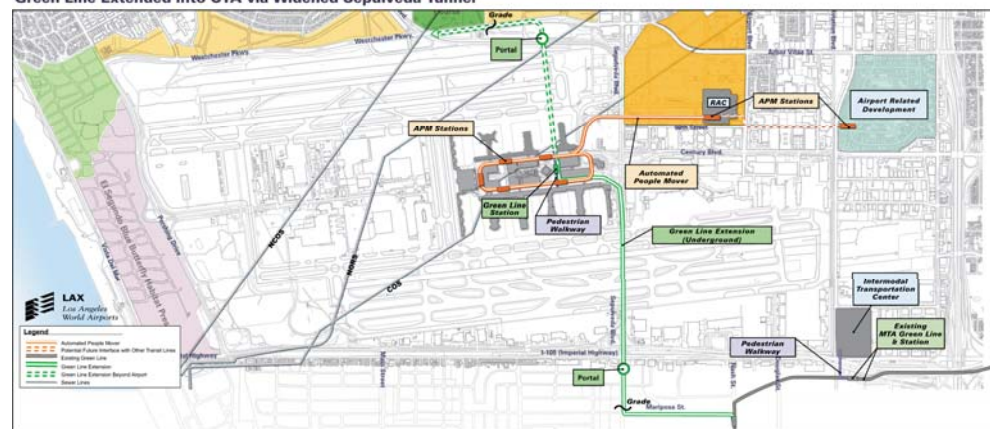
#### **Traffic/Circulation**

- As with the other tunnel alternatives, Alternative F may result in adverse traffic effects along the transition areas where the alignment changes from elevated to subway; in these areas, some driveways or roads may be adversely affected. In the case of Alternative F, these effects would occur within a cargo area on the airport.



## Green Line Conceptual Alternatives - Comparative Analysis

**Alternative G**  
Green Line Extended into CTA via Widened Sepulveda Tunnel



### Constructability/Capital Cost

- Alternative G would have among the highest capital costs of all the alternatives, due to the length and location of tunneling. At a minimum, acquisition of right-of-way would be required between Bellanca Avenue and Aviation Boulevard north of Century Boulevard. In addition, property would likely be required along the Sepulveda Boulevard corridor between Imperial Highway and Mariposa Avenue, in the City of El Segundo.
- This alternative would present significant constructability challenges, including the need to tunnel the Green Line under the South Airfield, adjacent to the highly congested Sepulveda tunnel; tunneling within the CTA, a highly congested environment with the potential for subsurface contamination; and the presence of two major outfall sewer lines along the trajectory of the Green Line northerly extension.

### Quality of Service

#### Walk Distance

- Alternative G would provide direct access to the CTA from the Green Line, with the Green Line interface occurring at the CTA Station. However, once in the CTA, the walk time or mode transfer would be less convenient than those associated with alternatives whose interface is outside the CTA. From the CTA Station, Green Line passengers would walk an average of 900 feet to Terminals 1, 2, 6, 7 and 8. Passengers would have the option of walking to the remaining terminals (an average walk of 1,900 feet) or transferring to the airport's APM system, which would require four level changes and a 400-foot walk. Upon disembarking the APM, passengers would have two level changes and a walking distance ranging from 170 to 425 feet, depending upon the terminal.

#### Required Transfers

- Under Alternative G, some Green Line passengers would not require any transfers to reach the CTA. Other passengers may have one transfer to directly access the CTA terminals, depending on the direction they are traveling, and a total of two level changes. Green Line passengers choosing to connect to the airport's APM would require an additional transfer and a total of four level changes.

#### Transit Interface/Connectivity

- Alternative G would provide direct access to the CTA from the Green Line, with the Green Line interface occurring at the CTA Station. This alternative would provide the best service to those terminals that are located close to the

proposed Green Line CTA Station. However, the service would be less convenient to those terminal where a long walk or a transfer to the APM would still be required than would alternatives whose interface is outside the CTA. From the CTA Station, Green Line passengers would be very conveniently located to Terminals 1 and 6, but would be required to walk an average of 900 feet to Terminals 2, 7 and 8. Passengers would have the option of walking to the remaining terminals (an average walk of 1,900 feet) or transferring to the airport's APM system, which would require four level changes and a 400-foot walk. Passengers transferring to the APM system would have a good level of service to the remaining terminals.

- Alternative G would not provide very good transit connectivity for Green Line passengers. As with all of the alternatives except Alternative A, this alternative would require the Green Line to be split into northern and southern routes. Many Green Line passengers would have to change Green Line trains at the Mariposa Station, and then would have to transfer a second time to pick up the APM. Although an easy cross-platform transfer, wait times at the Mariposa Station would average 7 to 12 minutes during peak hours, and could be as high as 15 to 20 minutes. These wait times could be improved in the future as Metro service is expanded, but they would never match the 24/7 minimal wait times that could be provided by the APM.
- With direct access to the CTA, Alternative G would provide convenient transit access to LAX for some airport passengers and airport employees. However, as noted above, travelers bound for Terminals 3, 4, 5 and TBIT would have long walk distances or would have to make a mode transfer to the APM once they reached the CTA. This alternative offers no Green Line connection to the Harbor Subdivision at Century and Aviation Boulevards. However, it does allow the opportunity to extend the airport APM easterly to Manchester Square, where it could connect to future transit lines using the Harbor Subdivision.
- Alternative G would provide poor transit connectivity for airport passengers parking at the Intermodal Transportation Center. These passengers would need to walk to the Green Line Aviation Station via a pedestrian bridge to board the southbound Green Line train. From there, they would need to transfer to the northbound train at the Mariposa/Nash Station in order to travel to the CTA. Operationally, it would need to be determined whether these ITC patrons would be charged for their ride on the LRT to the airport. A shuttle bus operation between the CTA and the ITC would provide a more efficient service for ITC patrons.
- Alternative G would bypass Century Boulevard, offering no access to non-airport-bound employees of airport-area businesses. However, it would facilitate the City Council's policy objective of providing a northerly extension of the Green Line to the Lincoln/Sepulveda Boulevard intersection and would provide a connection to LAX. Moreover, it would allow for flexibility in a future northerly alignment of the Green Line, although a northerly extension along Sepulveda Boulevard would require the alignment to double-back to Sepulveda. This alternative would also provide a direct Green Line connection to the CTA that is not provided by the alternatives that require a transfer to the APM outside of the CTA.

### Safety and Security

#### Airport Safety Issues

- As with Alternative F, Alternative G would avoid the airport safety issues associated with the other Green Line extension alternatives. The portions of the Alternative G alignment that cross the airport airfield would be

underground (within a tunnel); thus, there would be no penetration of the RPZ, interference with navigational aids, or conflicting visual cues.

#### Security

- This alternative would present greater security concerns than would alternatives whose interface is outside the CTA because it would provide Green Line passengers direct access to the CTA from ten Green Line stations stretching from Norwalk to the Aviation Station. It would not be practical to provide screening of all Green Line passengers at all of these stations, particularly as many passengers would not be bound for the airport. As an alternative, screening could occur at the below-ground Green Line CTA Station as passengers disembark. Compared to Alternative A, which is a stand-alone transit system with fewer stations, Alternative G would involve interfacing transit systems and more access points (stations) to the CTA; this would give LAWA less control over the security of the system and the CTA. This alternative would require greater coordination efforts and more security facilities/manpower to ensure the security of the transit system and CTA.

#### Environmental

#### Land Use Compatibility/Synergy

- As with all of the alternatives, Alternative G would not be located in close proximity to residential or other sensitive land uses.
- Similar to Alternative A, Alternative G would essentially serve the airport only and not the surrounding community. It would not serve hotels and other business along the Century Corridor and would not encourage future transit-oriented development along Century Boulevard or within the Manchester Square area.
- Alternative G would transition from an elevated system to a subway within the City of El Segundo business district. Location of a portal in this area could displace or disrupt nearby businesses.

#### Visual Impacts

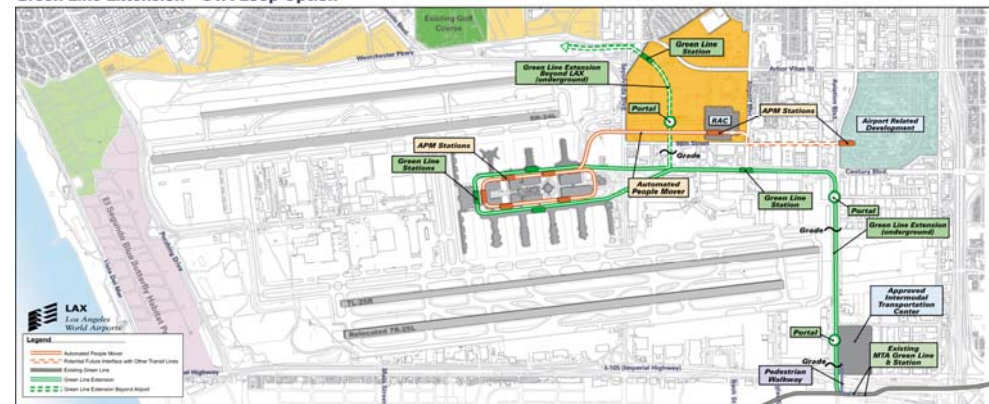
- The APM elevated guideway and vehicles would be clearly visible from area roadways and structures. While development of the APM would introduce a new and unique feature in the area surrounding LAX, it would not result in the removal of features that contribute to the aesthetic quality of the area (i.e., the Theme Building, Airport Traffic Control Tower and Century Corridor), nor would the APM detract from the area's existing aesthetic character.
- With the exception of a small portion of the alignment along Mariposa Street and Sepulveda Boulevard, the Green Line extension guideway, vehicles, and catenary system would be below grade and not visible from surrounding uses.

#### Traffic/Circulation

- As with the other tunnel alternatives, Alternative G may result in adverse traffic effects along the transition areas where the alignment changes from elevated to subway; in these areas, some driveways or roads may be adversely affected. In the case of Alternative G, these effects would occur within the City of El Segundo business district.

## Green Line Conceptual Alternatives - Comparative Analysis

**Alternative H**  
Green Line Extension - CTA Loop Option



### **Constructability/Capital Cost**

- Alternative H would present the highest capital costs of all the alternatives. The location of the Green Line over the terminals within the CTA would require the demolition and reconstruction of all the terminal buildings. This alternative would also include the highest number of Green Line stations (five) of all the alternatives.
- This alternative would present the most significant constructability issues of all the alternatives. The alternative would place two segments of the Green Line within airport RPZs: the portion along Aviation Boulevard within the South Airfield RPZ and a segment of the future northerly Green Line extension within Lot C and the North Airfield RPZ. However, the greatest constructability challenge would be the requirement to demolish and reconstruct all of the terminal buildings within the highly congested CTA, which would likely make this alternative infeasible.

### **Quality of Service**

#### **Walk Distance**

- Alternative H would provide direct access to the CTA from the Green Line, with three stations located in the CTA. Upon disembarking the Green Line system in the CTA, passengers would have one level change and a walking distance ranging from 0 feet to 950 feet, depending on the terminal.

#### **Required Transfers**

- Alternative H would have the fewest number of transfers and level changes for Green Line passengers to access the CTA terminals. Under Alternative H, some Green Line passengers would not require any transfers to reach the CTA. Other passengers may have one transfer to access the CTA terminals, and one level change.

#### **Transit Interface/Connectivity**

- Alternative H would provide direct access to the CTA from the Green Line, with three stations located in the CTA. This alternative would provide the best service to those terminals that are located close to the proposed Green Line CTA Station. However, the service would be less convenient to those terminals where a long walk would still be required. Upon disembarking the Green Line system in the CTA, passengers would be very conveniently located to Terminals 2, 5, 6 and TBIT, but would be required to walk up to 950 feet to the remaining terminals.
- Alternative H would provide moderately good transit connectivity for Green Line passengers. As with all of the alternatives except Alternative A, this alternative would require the Green Line to be split into northern and southern routes. Many Green Line passengers would have to change Green

Line trains at the Aviation Station. Although an easy cross-platform transfer, wait times at the Aviation Station would average 7 to 12 minutes during peak hours, and could be as high as 15 to 20 minutes. These wait times could be improved in the future as Metro service is expanded, but they would never match the 24/7 minimal wait times that could be provided by the APM. Unlike almost all of the other Green Line extension alternatives, Alternative H would not require a second transfer to pick up the airport APM. However, if the Green Line were extended to the north in the future, non-airport bound passengers would be required to make three stops in the airport, and backtrack to Century Boulevard before continuing on their trip.

- With direct access to the CTA, Alternative H would provide convenient transit access to LAX for many airport passengers and airport employees. In addition, this alternative would offer accessibility to the Century Boulevard corridor for non-airport passengers and would allow the opportunity to extend the airport APM easterly to Manchester Square, where it could connect to future transit lines using the Crenshaw Corridor and/or Harbor Subdivision.
- Alternative H would provide relatively good transit connectivity for airport passengers parking at the approved Intermodal Transportation Center. These passengers would need to walk to the Green Line Aviation Station via a pedestrian bridge to board the northbound Green Line train to the CTA. However, operationally, it would need to be determined whether these ITC patrons would be charged for their ride on the LRT to the airport.
- This alternative would facilitate the City Council's policy objective of providing a northerly extension of the Green Line to the Lincoln/Sepulveda Boulevard intersection as well as provide a connection to LAX. Moreover, it would provide flexibility in a future northerly extension alignment route. This alternative would also provide a direct Green Line connection to the CTA that is not provided by the alternatives that require a transfer to the APM outside of the CTA.

### **Safety and Security**

#### **Airport Safety Issues**

- Under Alternative H, a portion of the Green Line would be located on the west side of Aviation Boulevard, within the RPZ of Runways 7R/25L and 7L/25R. The Green Line cannot penetrate the RPZ envelope, or obstruct or interfere with airport navigational aids. To conform to these requirements, the Green Line alignment elevation would be designed to be below-grade in a covered trench along part of Aviation Boulevard.
- Should the Green Line be extended beyond LAX, the portion of the alignment in Lot C would be located within the RPZ of Runways 6R/24L and 6L/24R. This portion of the alignment is proposed to be below-grade within the RPZ.
- If the Green Line is extended beyond LAX, it may have a station in Lot C located within the RPZ. This may conflict with FAA prohibitions against having a "concentration of persons" in the RPZ.

#### **Security**

- This alternative would present security concerns by providing Green Line passengers direct access from ten Green Line stations stretching from Norwalk to the Aviation Station. It would not be practical to provide screening of all Green Line passengers at all of these stations, particularly as many passengers would not be bound for the airport. Moreover, as the Green Line CTA Station would be elevated under this alternative, conducting screening once passengers arrive in the CTA would present security concerns. As an alternative, screening could occur at the Century Boulevard/Aviation Boulevard Station and the first station north of the airport. The search could range from a visual check while passengers remain on

board the train, to a full screen, in which passengers disembark and pass through a metal detector and/or other types of screening devices prior to re-boarding. This would cause delay and inconvenience to all non-airport bound passengers. The extent of the delay would depend on the type of search required. A full screening would require significant space on the station platform. Compared to Alternative A, which is a stand-alone transit system with fewer stations, Alternative H would involve interfacing transit systems and more access points (stations) to the CTA; this would give LAWA less control over the security of the system and the CTA. This alternative would require greater coordination efforts and more security facilities/manpower to ensure the security of the transit system and CTA.

### **Environmental**

#### **Land Use Compatibility/Synergy**

- As with all of the alternatives, Alternative H would not be located in close proximity to residential or other sensitive land uses.
- Alternative H would serve both the airport and the surrounding community. Alternative H would serve hotels and other business along the Century Corridor and would encourage future transit-oriented development along Century Boulevard. It would provide the potential for connectivity between the Green Line and future transit using the Crenshaw Corridor and/or Harbor Subdivision, and would provide Crenshaw Corridor and/or Harbor Subdivision passengers with access to the airport via the APM at Manchester Square.

#### **Visual Impacts**

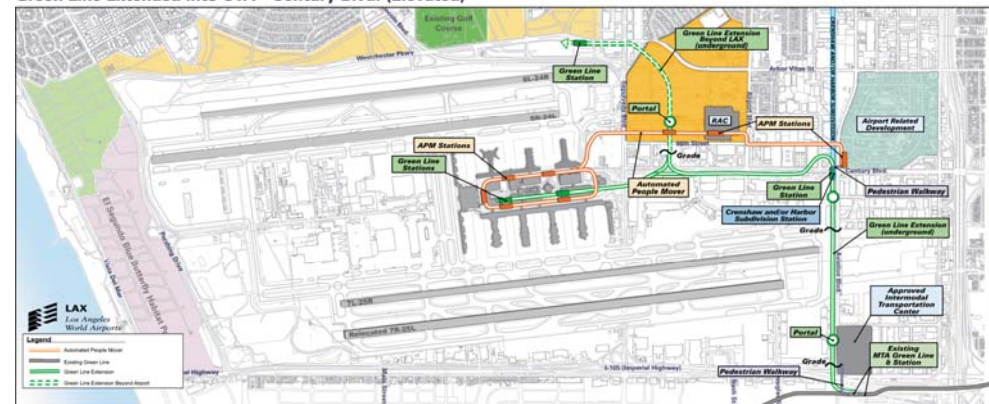
- The Green Line extension and APM elevated guideways and vehicles would be clearly visible from area roadways and structures. While development of the APM, and to a lesser extent the Green Line extension, would introduce a new and unique feature in the area immediately surrounding LAX, it would not result in the removal of features that contribute to the aesthetic quality of the area (i.e., the Theme Building, Airport Traffic Control Tower and Century Corridor).
- The overhead catenary system associated with the Green Line extension through the Century Corridor, and particularly within the CTA, would be considered an adverse visual impact. However, Alternative H would provide Green Line passengers views along the Century Corridor, which may be preferable to that of 98th Street (Alternatives C and D) or an underground tunnel (Alternatives F and G).

#### **Traffic/Circulation**

- As with the other non-tunnel Green Line extension alternatives, Alternative H would be elevated and/or in its own dedicated ROW, and a portion of the alignment would be on airport property. Consistent with Metro's grade separation policy, the LRT would have grade separation at all roadway crossings and would have minimal adverse impacts to traffic or circulation. However, the elevated track's columns may be located in a median or a parking lane/sidewalk area.

## Green Line Conceptual Alternatives - Comparative Analysis

**Alternative I**  
Green Line Extended into CTA - Century Blvd. (Elevated)



### Constructability/Capital Cost

- Capital costs associated with Alternative I would be high due to the complexity of the system and the construction of the Green Line within the CTA. Alternative I includes a complex interface at Century and Aviation Boulevards with multiple stations and pedestrian bridges, as well as a comparatively high total number of Green Line stations (four). Construction of an elevated Green Line in the CTA would also introduce significant costs. At a minimum, acquisition of right-of-way would be required between Bellanca Avenue and Aviation Boulevard north of Century Boulevard. This alignment may also require the removal of an airport cargo building located in the southwest quadrant of Aviation Boulevard and Century Boulevard, depending upon the configuration of the Green Line alignment at this intersection.
- Alternative I would have present significant constructability issues. This alternative would have constructability issues along Aviation Boulevard within the LAX South Airfield RPZ. In addition, although the APM alignment and stations are not within the RPZ for the North Airfield, the future extension of the Green Line north of the airport would be within the RPZ. Designing these facilities to avoid penetration of the RPZ envelope, or obstruction or interference with airport navigational aids, while also avoiding impacts to future rental car operations, would present a challenge. This alternative would also present constructability issues associated with placement of the APM along 98<sup>th</sup> Street, a narrow street with minimal setback of commercial buildings, and a large stormwater drain in the street. Finally, the construction of an elevated Green Line within the CTA, over existing terminal parking structures and adjacent to an elevated airport APM, would present challenges.

### Quality of Service

#### Walk Distance

- Alternative I would provide direct access to the CTA from the Green Line, with two stations in the CTA. However, once in the CTA, the walk time or mode transfer would be less convenient than those associated with alternatives whose interface is outside the CTA. From the CTA stations, Green Line passengers would have two level changes and an average walk of 475 feet to Terminals 4, 5, 6, 7, 8, and TBIT. Passengers would have the option of walking to the remaining terminals (an average walk of 915 feet) or transferring to the airport's APM system, which would require two level changes and a 200-foot walk. Upon disembarking the APM, passengers would have two level changes and a walking distance ranging from 350 to 425 feet, depending upon the terminal.

#### Required Transfers

- Under Alternative I, some Green Line passengers would not require any transfers to reach the CTA. Other passengers may have one transfer to directly access the CTA terminals, depending on the direction they are traveling, and a total of two level changes. Green Line passengers choosing to connect to the airport's APM would require an additional transfer and a total of four level changes.

### Transit Interface/Connectivity

- Alternative I would provide direct access to the CTA from the Green Line, with two stations in the CTA. This alternative would provide the best service to those terminals that are located close to the proposed Green Line CTA Station. However, the service would be less convenient to those terminals where a long walk or a transfer to the APM would still be required. From the CTA stations, Green Line passengers would be very conveniently located to Terminals 4, 5, 6 and 7, but would have two level changes and be required to walk an average of 475 feet to Terminals 8 and TBIT. Passengers would have the option of walking to Terminals 1, 2 and 3 (an average walk of 915 feet) or transferring to the airport's APM system, which would require two level changes and a 200-foot walk.
- Alternative I would provide moderately good transit connectivity for Green Line passengers. As with all of the alternatives except Alternative A, this alternative would require the Green Line to be split into northern and southern routes. Many Green Line passengers would have to change Green Line trains at the Aviation Station. Although an easy cross-platform transfer, wait times at the Aviation Station would average 7 to 12 minutes during peak hours, and could be as high as 15 to 20 minutes. These wait times could be improved in the future as Metro service is expanded, but they would never match the 24/7 minimal wait times that could be provided by the APM. Unlike almost all of the other Green Line extension alternatives, Alternative I would not require a second transfer to pick up the airport APM. However, if the Green Line were extended to the north in the future, non-airport bound passengers would be required to make two stops in the airport, and backtrack to Century Boulevard before continuing on their trip.
- With direct access to the CTA, Alternative I would provide convenient transit access to LAX for many airport passengers and airport employees. However, as noted above, travelers bound for Terminals 1, 2 and 3 would have long walk distances or would have to make a mode transfer to the APM once they reached the CTA. In addition, this alternative would offer the potential for accessibility to the Century Boulevard corridor for non-airport passengers and would provide connectivity between the Green Line and future transit using the Crenshaw Corridor and/or Harbor Subdivision. Under this alternative, airport-bound passengers on the Crenshaw Corridor and/or Harbor Subdivision would have direct access to the APM.
- Alternative I would provide relatively good transit connectivity for airport passengers parking at the approved Intermodal Transportation Center. These passengers would need to walk to the Green Line Aviation Station via a pedestrian bridge to board the northbound Green Line train to the CTA. However, operationally, it would need to be determined whether these ITC patrons would be charged for their ride on the LRT to the airport.
- This alternative would facilitate the City Council's policy objective of providing a northerly extension of the Green Line to the Lincoln/Sepulveda Boulevard intersection as well as provide a connection to LAX. Moreover, it would provide flexibility in a future northerly extension alignment route. This alternative would also provide a direct Green Line connection to the CTA that is not provided by the alternatives that require a transfer to the APM outside of the CTA.

### Safety and Security

#### Airport Safety Issues

- Under Alternative I, a portion of the Green Line would be located on the west side of Aviation Boulevard, within the RPZ of Runways 7R/25L and 7L/25R. The Green Line cannot penetrate the RPZ envelope, or obstruct or interfere with airport navigational aids. To conform to these requirements, the Green Line alignment elevation would be to be below-grade in a covered trench along part of Aviation Boulevard.

- Should the Green Line be extended beyond LAX, the portion of the alignment in Lot C would be located within the RPZ of Runways 6R/24L and 6L/24R. This portion of the alignment is proposed to be below-grade within the RPZ.

### Security

- This alternative would present security concerns by providing Green Line passengers direct access from ten Green Line stations stretching from Norwalk to the Aviation Station. It would not be practical to provide screening of all Green Line passengers at all of these stations, particularly as many passengers would not be bound for the airport. Moreover, as the Green Line CTA Station would be elevated under this alternative, conducting screening once passengers arrive in the CTA would present security concerns. As an alternative, screening could occur at the Century Boulevard/Aviation Boulevard Station and the first station north of the airport. The search could range from a visual check while passengers remain on board the train, to a full screen, in which passengers disembark and pass through a metal detector and/or other types of screening devices prior to re-boarding. This would cause delay and inconvenience to all non-airport bound passengers. The extent of the delay would depend on the type of search required. A full screening would require significant space on the station platform. Compared to Alternative A, which is a stand-alone transit system with fewer stations, Alternative I would involve interfacing transit systems and more access points (stations) to the CTA; this would give LAWA less control over the security of the system and the CTA. This alternative would require greater coordination efforts and more security facilities/manpower to ensure the security of the transit system and CTA.

### Environmental

#### Land Use Compatibility/Synergy

- As with all of the alternatives, Alternative I would not be located in close proximity to residential or other sensitive land uses.
- Alternative I would serve both the airport and the surrounding community. Alternative I would serve hotels and other business along the Century Corridor, encourage future transit-oriented development along Century Boulevard and within the Manchester Square area, and provide connectivity between the Green Line and future transit using the Crenshaw Corridor and/or Harbor Subdivision.

#### Visual Impacts

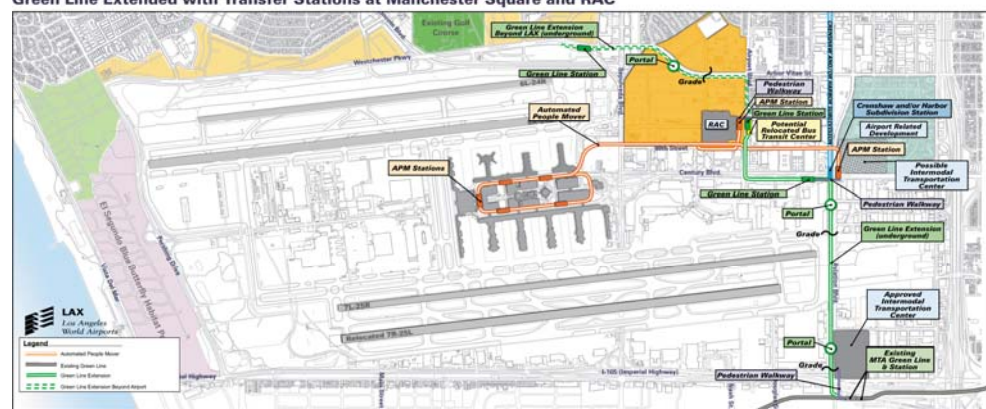
- The Green Line extension and APM elevated guideways and vehicles would be clearly visible from area roadways and structures. While development of the APM, and to a lesser extent the Green Line extension, would introduce a new and unique feature in the area immediately surrounding LAX, it would not result in the removal of features that contribute to the aesthetic quality of the area (i.e., the Theme Building, Airport Traffic Control Tower and Century Corridor).
- The overhead catenary system associated with the Green Line extension through the Century Corridor, and particularly within the CTA, would be considered an adverse visual impact. However, Alternative I would provide Green Line passengers views along the Century Corridor, which may be preferable to that of 98th Street (Alternatives C and D) or an underground tunnel (Alternatives F and G).

#### Traffic/Circulation

- As with the other non-tunnel Green Line extension alternatives, Alternative I would be elevated and/or in its own dedicated ROW, and a portion of the alignment would be on airport property. Consistent with Metro's grade separation policy, the LRT would have grade separation at all roadway crossings and would have minimal adverse impacts to traffic or circulation. However, the elevated track's columns may be located in a median or a parking lane/sidewalk area.

## Green Line Conceptual Alternatives - Comparative Analysis

**Alternative J**  
Green Line Extended with Transfer Stations at Manchester Square and RAC



### Constructability/Capital Cost

- Capital costs associated with Alternative J would be moderate due to the complexity of the system. Alternative J includes a complex interface at Century and Aviation Boulevards with multiple stations and pedestrian bridges, as well as a pedestrian bridge connecting the Airport Boulevard Green Line Station to the RAC APM station. This alternative includes a comparatively high number of Green Line stations (three).
- Alternative J would have moderately high constructability issues. This alternative would have constructability issues along Aviation Boulevard within the LAX South Airfield RPZ. There may also be issues associated with the placement of columns in Airport Boulevard. As with Alternatives C and D, a small portion of the future northerly extension of the Green Line, along Westchester Parkway, would be within the RPZ of the North Airfield. Designing these facilities to avoid penetration of the RPZ envelope, or obstruction or interference with airport navigational aids, while also avoiding impacts to future rental car operations, would present a challenge. This alternative would also present constructability issues associated with placement of the APM along 98<sup>th</sup> Street, a narrow street with minimal setback of commercial buildings, and a large stormwater drain in the street.

### Quality of Service

#### Walk Distance

- Green Line passengers could access the APM at the Century/Aviation Boulevard Station or at the Airport Boulevard Station. Passengers transferring at the Century/Aviation Station would have a 600-foot walk and one level change; passengers transferring at the Airport Boulevard Station would have a 150-foot walk and two level changes.
- Once in the CTA, passengers would choose from five APM stations. Upon deboarding the APM, passengers would have two level changes and a walking distance ranging from 170 to 425 feet, depending upon the terminal.

#### Required Transfers

- Under Alternative J, Green Line passengers would require one or two transfers to access the APM, depending on the direction they are traveling, and have a total of three or four level changes depending on which APM station they used.

#### Transit Interface/Connectivity

- Alternative J would provide a very good interface between the Green Line and the APM. As noted above, Green Line passengers could access the

APM at the Century/Aviation Boulevard Station or at the Airport Boulevard Station. Passengers transferring at the Century/Aviation Station would have a 600-foot walk and one level change; passengers transferring at the Airport Boulevard Station would have a 150-foot walk and two level changes. If the Green Line were to be extended north of the airport in the future, the Airport Boulevard Station would be a convenient transfer point for southbound Green Line passengers.

Once on the APM, similar to all of the other alternatives, the five APM stations within the CTA would provide a good level of service to the terminals.

- Alternative J would not provide very good transit connectivity for Green Line passengers. As with all of the alternatives except Alternative A, this alternative would require the Green Line to be split into northern and southern routes. Many Green Line passengers would have to change Green Line trains at the Aviation Station, and then would have to transfer a second time to pick up the APM. Although an easy cross-platform transfer, wait times at the Aviation Station would average 7 to 12 minutes during peak hours, and could be as high as 15 to 20 minutes. These wait times could be improved in the future as Metro service is expanded, but they would never match the 24/7 minimal wait times that could be provided by the APM.
- With two access points to the APM, as well as an interface with future transit using the Crenshaw Corridor and/or Harbor Subdivision, this alternative would provide convenient transit access to LAX for both airport passengers and airport employees. This alternative would also serve non-airport passengers by providing transit to a portion of the Century Boulevard corridor as well as connectivity between the Green Line and future transit using the Crenshaw Corridor and/or Harbor Subdivision. Under this alternative, airport-bound passengers on the Crenshaw Corridor and/or Harbor Subdivision would have direct access to the APM.
- With the location of the Green Line/APM interface adjacent to a possible Intermodal Transportation Center in Manchester Square, and the potential for interface with future transit using the Crenshaw Corridor and/or Harbor Subdivision, Alternative J would provide convenient transit access to LAX for both airport passengers and airport employees.
- This alternative would facilitate the City Council's policy objective of providing a northerly extension of the Green Line to the Lincoln/Sepulveda Boulevard intersection as well as provide a connection to LAX. Moreover, it would provide flexibility in a future northerly extension alignment route.

### Safety and Security

#### Airport Safety Issues

- Under Alternative J, a portion of the Green Line would be located on the west side of Aviation Boulevard, within the RPZ of Runways 7R/25L and 7L/25R. The Green Line cannot penetrate the RPZ envelope, or obstruct or interfere with airport navigational aids. To conform to these requirements, the Green Line alignment elevation would be designed to be below-grade in a covered trench along part of Aviation Boulevard.
- Should the Green Line be extended beyond LAX, the portion of the alignment in Lot C would be located within the RPZ of Runways 6R/24L and 6L/24R. This portion of the alignment is proposed to be below-grade within the RPZ.

### Security

- This alternative would provide a relatively high level of airport security. With Green Line/APM transfer stations outside of the CTA, passengers could be searched at the transfer stations prior to boarding the APM without causing delay or inconvenience to non-airport bound passengers. Compared to Alternative A, which is a stand-alone transit system with fewer stations, Alternative J would involve interfacing transit systems and more access points (stations) to the CTA; this would give LAWA less control over the security of the system and the CTA. This alternative would require greater coordination efforts and more security facilities/manpower to ensure the security of the transit system and CTA.

### Environmental

#### Land Use Compatibility/Synergy

- As with all of the alternatives, Alternative J would not be located in close proximity to residential or other sensitive land uses.
- Unlike Alternative A, Alternative J would serve both the airport and the surrounding community. Alternative J would serve some hotels and other business along the Century Corridor, encourage future transit-oriented development along a portion of Century Boulevard and within the Manchester Square area, and provide connectivity between the Green Line and future transit using the Crenshaw Corridor and/or Harbor Subdivision.

#### Visual Impacts

- The Green Line extension and APM elevated guideways and vehicles would be clearly visible from area roadways and structures. While development of the APM, and to a lesser extent the Green Line extension, would introduce a new and unique feature in the area immediately surrounding LAX, it would not result in the removal of features that contribute to the aesthetic quality of the area (i.e., the Theme Building, Airport Traffic Control Tower, and Century Corridor).
- The overhead catenary system associated with the Green Line extension, particularly through the Century Corridor, may be considered an adverse visual impact to some individuals. However, Green Line passengers may prefer the views along the Century Corridor to that of 98<sup>th</sup> Street (Alternatives C and D) or an underground tunnel (Alternatives F and G).

#### Traffic/Circulation

- As with the other non-tunnel Green Line extension alternatives, Alternative J would be elevated and/or in its own dedicated ROW, and a portion of the alignment would be on airport property. Consistent with Metro's grade separation policy, the LRT would have grade separation at all roadway crossings and would have minimal adverse impacts to traffic or circulation. However, the elevated track's columns may be located in a median or a parking lane/sidewalk area.

# **Attachment G-3**

## **Alternatives Comparative Analysis Matrix**



Green Line Conceptual Alternatives - Comparative Analysis

Alternatives Comparative Analysis Matrix										
Conceptual Alternative Matrix	Metro Green Line to LAX Connection Alternatives									
	A Master Plan APM1	B MTA Green Line North Extension with Modified Stations	C Green Line Extended with Transfer Station at Manchester Square	D Green Line Extended with Transfer Station at RAC	E Green Line Extended into CTA via Century Boulevard	F Green Line Extended into CTA via Tunnel Under South Airfield	G Green Line Extended into CTA Via Widened Sepulveda Tunnel	H Green Line Extension - CTA Loop Option	I Green Line Extended into CTA via Century Blvd. (Elevated)	J Green Line Extended with Transfer Stations at Manchester Square and RAC
<b>Constructability/Capital Cost</b>										
Capital Cost	Green	Yellow	Yellow	Yellow	Red	Red	Red	Red	Orange	Yellow
Constructability	Yellow	Yellow	Yellow	Yellow	Red	Red	Red	Red	Orange	Yellow
<b>Quality of Service</b>										
Airport Walk Distance	Yellow	Green	Green	Green	Orange	Orange	Orange	Yellow	Yellow	Green
Required Transfers	Yellow	Orange	Orange	Orange	Yellow	Yellow	Yellow	Green	Yellow	Orange
<b>Transit Interface/Connectivity</b>										
<i>Green Line – APM Interface</i>	Yellow	Green	Green	Yellow	Green	Yellow	Yellow	Orange	Green	Green
<i>Interface with Other Transit</i>	Orange	Green	Green	Yellow	Green	Red	Red	Yellow	Green	Green
<i>LAX User Connectivity</i>	Yellow	Green	Yellow	Yellow	Green	Orange	Orange	Yellow	Green	Green
<i>Non-LAX User Connectivity</i>	NA	Green	Yellow	Yellow	Yellow	Orange	Orange	Yellow	Green	Green
<i>Convenient to Non-LAX Green Line Passengers</i>	NA	Yellow	Yellow	Yellow	Orange	Orange	Orange	Red	Red	Yellow
<i>Encourages TOD</i>	Red	Green	Green	Yellow	Green	Red	Red	Yellow	Green	Green
<b>Safety and Security</b>										
Airport Safety Issues	Yellow	Yellow	Yellow	Yellow	Yellow	Green	Green	Yellow	Yellow	Yellow
Security	Green	Green	Green	Green	Yellow	Yellow	Yellow	Orange	Orange	Green
<b>Environmental</b>										
Land Use Compatibility/Synergy	Orange	Green	Green	Yellow	Yellow	Orange	Orange	Green	Green	Green
Visual Impacts	Green	Yellow	Yellow	Yellow	Yellow	Green	Green	Orange	Orange	Yellow
Traffic/Circulation	Green	Green	Green	Green	Yellow	Yellow	Yellow	Green	Green	Green

- - Achieves most criterion objectives; no or comparatively fewest issues.
- - Achieves some criterion objectives; comparatively moderate issues.
- - Achieves few criterion objectives; comparatively serious issues.
- - Conflicts with criterion objectives; substantial issues.



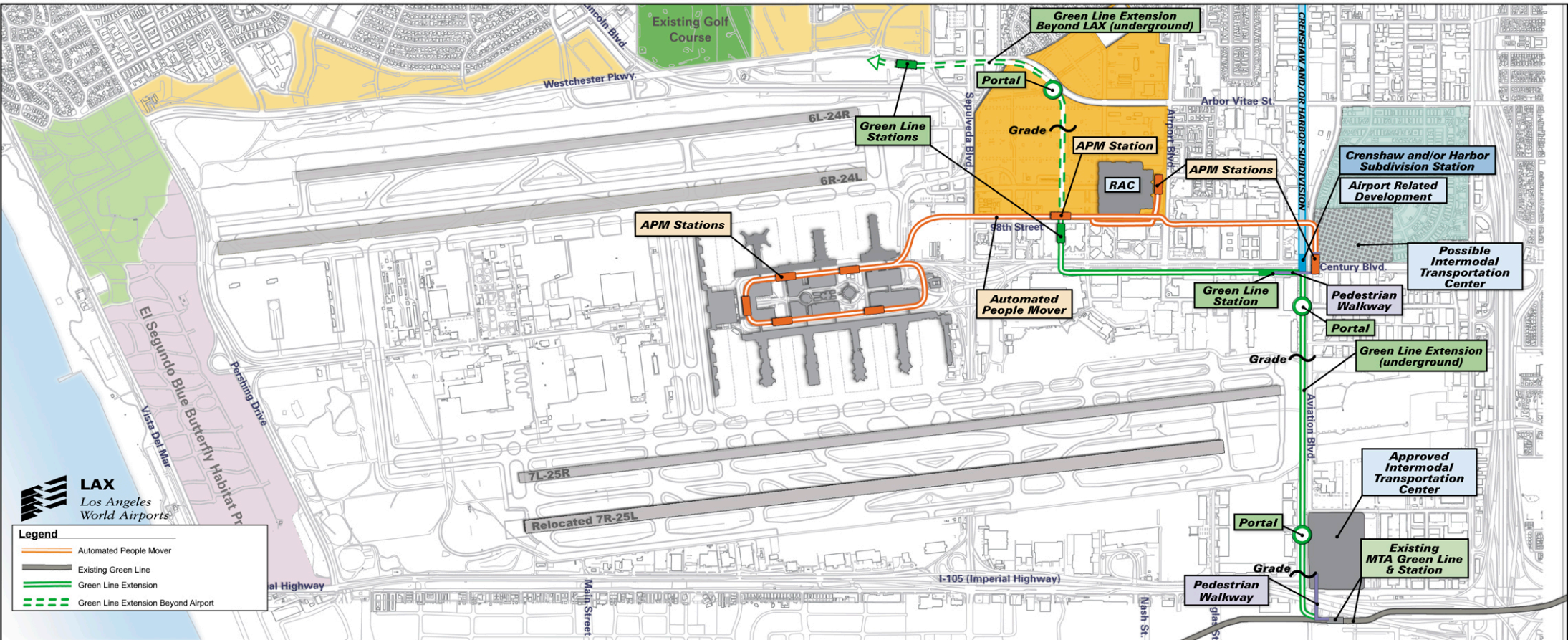


# **Attachment H**

**Alternative B (Modified) and  
Alternative J Conceptual Alternatives**



# Alternative B - Modified MTA Green Line North Extension with Modified Stations

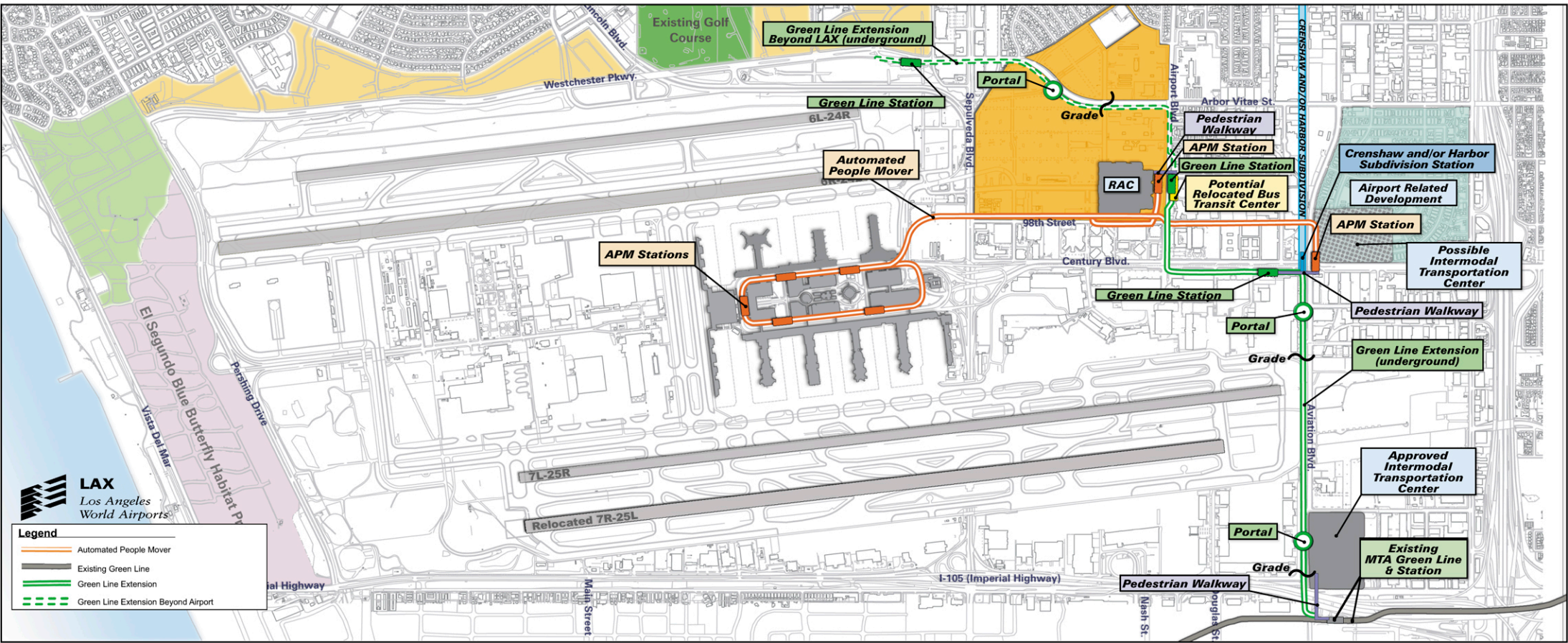


**LAX**  
Los Angeles World Airports

**Legend**

- Automated People Mover
- Existing Green Line
- Green Line Extension
- Green Line Extension Beyond LAX

# Alternative J Green Line Extended with Transfer Stations at Manchester Square and RAC



**LAX**  
Los Angeles  
World Airports

**Legend**

- Automated People Mover
- Existing Green Line
- Green Line Extension
- Green Line Extension Beyond Airport