Expo

Exposition Metro Line Construction Authority

FINAL HAZARD ANALYSIS REPORT for Exposition Corridor Transit Project Phase 2

August 2011

Prepared for:

Exposition Metro Line Construction Authority

By:

AECOM

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1.0 INTRODUCTION

1.1 Overview of the Project

The Expo Phase 2 light rail transit (LRT) project Final Environmental Impact Report (FEIR) was certified by the Exposition Metro Line Construction Authority (Expo Authority) Board on February 4, 2010 under the California Environmental Quality Act (CEQA). As a result of this action, the engineering and construction of this project commenced. Elements of construction may begin in early 2012 followed by completion and opening of the project in late 2015. Note that once the project is completed and accepted, the Expo Authority will hand over the project to the Los Angeles County Metropolitan Transportation Authority (Metro) for operation and maintenance.

Expo Phase 2 is located on the Westside of Los Angeles, extending approximately 6.7 miles from the Expo Phase 1 terminus at the Venice/Robertson Station in Culver City to Santa Monica. The project area is generally bounded by Santa Monica and Pico Boulevards on the north, La Cienega Boulevard on the east, Washington Boulevard on the south and the Pacific Ocean on the west. Major freeways present in the study area include Interstate 10 (I-10) running east to west and Interstate 405 (I-405) crossing north to south through the corridor. Major east/west arterials include Santa Monica, Olympic, Pico, Venice and Washington Boulevards. Overland Avenue, Sepulveda Boulevard, Bundy Drive, Lincoln Boulevard and Ocean Avenue traverse the project area north to south.

The proposed operating plan for Expo Phase 2 provides continuing service from the Expo Phase 1 terminus in Culver City to 4th St/Colorado in Santa Monica. From Culver City, the LRT would run in an exclusive LRT right-of-way for approximately 5.5 miles. The LRT alignment would then diverge from the right-of-way east of 17th Street and Colorado Avenue, where it would then operate within Colorado Avenue for approximately 1.2 miles westerly toward 4th Street. The estimated one-way travel time from the Expo Phase 1 terminus to 4th St/Colorado is 19.5 minutes, which equates to a 20.3 mph average operating speed.

The LRT will operate with Automatic Train Protection (ATP) as now operated on the Metro Blue Line and the Pasadena Gold Line. ATP will be installed and operated from the Expo Phase 1 terminus to just east of 17th Street in Santa Monica, as required. All of the at-grade crossings in this segment will have automated crossing controls and features such as the following: vehicle approach and departure gates, audible sounds, pedestrian approach gates and emergency exit swing gates at the sidewalk crossings, flashing lights, fencing, accessible features for blind pedestrians, and activated electronic no turn symbol signs. From 17th St. to 5th St./Colorado Ave., the LRT will be street-running (CPUC GO 143-B, Section 9.04b4). In this section, trains will operate at a speed no greater than the posted vehicle speed. Each grade crossing will have traffic signals for motorists and pedestrians, appropriate vehicle and pedestrian signage, limited left turn movements, striping and dedicated train signals (lunar white bar indications) for train operators. To further enhance safety, the grade crossings will have train-actuated LED warning signals to alert motorists and pedestrians of approaching trains.

1.2 Purpose

The California Public Utilities Commission (CPUC) requires identification of potential grade crossing hazards and proposed mitigations for new light rail systems and extensions per GO 164-D, Section 3.2.f. The purpose of this report is to fulfill the CPUC's requirements and present the results of analysis for the Expo Phase 2 project. The contents of this report are as follows:

- 1.0 Introduction – Describes the Expo Phase 2 project and the purpose of this report.

- 2.0 Overview of Grade Crossings – Provides a list of proposed at-grade crossings, proposed grade separations and closure of certain streets that currently cross the right of way. The crossing number and milepost for each crossing are included (from east to west).

- 3.0 Grade Crossing Analysis – Analysis of potential hazards for each grade crossing and presentation of proposed mitigations to address these hazards.

- 4.0 Summary and Conclusion – Summarizes the findings of the hazard analysis.

2.0 OVERVIEW OF GRADE CROSSINGS

2.1 Schedule of Grade Crossings

Table 1 provides a schedule of at-grade crossings, grade separations, and crossings to be closed. Many of these crossings were previous at-grade railroad crossings, abandoned when freight service ceased during the 1980's.

Table 1 – Schedule of Grade Crossings

Drawing/ Date	Location	City	Type	Crossing No.	Milepost
GC-001 5/5/10	Venice/Robertson Blvd	Los Angeles	Grade-separated (Aerial)	84S - 107.5	494.27
GC-002 3/11/11	Bagley Ave	Los Angeles	At-Grade (Gated)	84S - 107.9	494.67
GC-003 5/5/10	National/Palms Blvd	Los Angeles	Grade-separated (Existing on embankment)	84S – 108.3	495.04
GC-004 5/5/10	Motor Ave	Los Angeles	Grade-separated (Existing on embankment)	84S – 108.7	495.47
GC-004A & GC-030 7/29/11	I-10 Freeway Box Structure	Los Angeles	Grade-separated (Existing under I-10)	84S - 108.9	495.64
GC-005 2/24/11	Overland Ave	Los Angeles	At-Grade (Gated)	84S - 109.5	496.25
GC-006 2/24/11	Westwood Blvd	Los Angeles	At-Grade (Gated)	84S - 109.8	496.51
GC-007 3/11/11	Military Ave	Los Angeles	At-Grade (Gated)	84S – 110.1	496.83
GC-041 5/5/10	Sepulveda Blvd	Los Angeles	Grade-separated (Aerial)	84S - 110.3	497.01
GC-009 5/5/10	Sawtelle Blvd	Los Angeles	Grade-separated (Aerial)	84S – 110.5	497.24
GC-010 5/5/10	Pico Blvd	Los Angeles	Grade-separated (Aerial)	84S – 110.7	497.41
GC-011 2/28/11	Barrington Ave	Los Angeles	At-Grade (Gated)	84S – 111.0	497.75
GC-012 5/5/10	Bundy Dr	Los Angeles	Grade-separated (Aerial)	84S – 111.4	498.11
GC-013 5/5/10	Centinela Ave	Santa Monica/Los Angeles	Grade-separated (Aerial)	84S – 111.6	498.38
GC-014 2/24/11	Stewart St	Santa Monica	At-Grade (Gated)	84S - 112.1	498.82
GC-015 2/24/11	26th St	Santa Monica	At-Grade (Gated)	84S - 112.4	499.13

Drawing/ Date	Location	City	Type	Crossing No.	Milepost
GC-016 5/5/10	Cloverfield Blvd	Santa Monica	Grade-Separated (Aerial)	84S – 112.5	499.27
GC-016A 5/5/10	Olympic Blvd	Santa Monica	Grade-Separated (Aerial)	84S – 112.6	499.36
GC-017 2/24/11	20th St	Santa Monica	At-Grade (Gated)	84S - 112.8	499.52
GC-017A 2/28/11	19th St	Santa Monica	At-Grade (Gated)	84S - 112.9	499.59
GC-018 1/21/11	17th St	Santa Monica	Street Running and Pedestrian only crossing	84S - 113.0	499.74
N/A	16th St	Santa Monica	Close existing crossing	84S - 113.1	499.82
N/A	15th St	Santa Monica	Close existing crossing	84S - 113.15	499.89
GC-019 1/13/11	14th St	Santa Monica	Street Running	84S - 113.2	500.00
N/A	Euclid St	Santa Monica	Close existing crossing	84S - 113.3	500.08
N/A	12th St	Santa Monica	Close existing crossing	84S - 113.4	500.16
GC-020 1/13/11	11th St	Santa Monica	Street Running	84S - 113.5	500.24
N/A	10th St	Santa Monica	Close existing crossing	84S - 113.8	500.32
N/A	9th St	Santa Monica	Close existing crossing	84S - 113.65	500.40
GC-021 1/13/11	Lincoln Blvd	Santa Monica	Street Running	84S - 113.7	500.48
GC-021A 1/13/11	7th St	Santa Monica	Street Running	84S - 113.8	500.56
GC-022 1/13/11	6th St	Santa Monica	Street Running	84S - 113.85	500.64
GC-022A 2/28/11	5th St	Santa Monica	Street Running and Pedestrian only crossing	84S - 113.9	500.72
GC-025 2/28/11	Details	N/A	N/A	N/A	N/A
GC-026 2/28/11	Details	N/A	N/A	N/A	N/A

3.0 GRADE CROSSING ANALYSIS

3.1 Overview of Light Rail Operation Potential Hazards

Expo Phase 2 will provide maximum peak-service headways of 5 minutes with train operations commencing at about 4 AM and continuing until about 2 AM seven days a week, consistent with hours of operation of the Metro system. Implementation of the proposed project could create the potential for increased safety risks due to the introduction of a new LRT within or adjacent to existing streets. However, the LRT would comply with CPUC and Metro design requirements to ensure controlled access across the tracks. While the risk of collisions between motorists, pedestrians, and LRVs cannot be eliminated, Metro has adopted rules and regulations that are intended to improve the overall safety of LRT operations.

Additional safety requirements include train speed restrictions, emergency braking requirements, and appropriate barriers/signage/gates to discourage pedestrians and motorists from crossing the tracks where not allowed. The installation of warning devices and the design of the crossings along the LRT will be in accordance with the requirements of CPUC General Orders and industry practices. As required by CPUC GO 143-B, Section 7.08, the LRT would be designed to include automatic crossing gates and pedestrian warning signals installed whenever the alignment (exclusive or semi-exclusive) crosses a street at grade. Section 6 of the *Metro Design Criteria* also provides further direction and requirements with respect to crossing gates and signage requirements to ensure the continued safety of local pedestrians.

This report provides the analysis of potential hazards of each grade crossing and develops measures to mitigate those hazards. It should be recognized that while the design will include the appropriate mitigations, it does not guarantee that accidents will not occur. This is because motorists and pedestrians behavior and their obedience to the law is a key factor in preventing accidents. If the motorists or pedestrians do not heed the active and passive warnings provided for their safety, accidents may occur.

The hazard analysis began during the Environmental Impact Report (EIR) process in 2007 whenthe Expo Authority used the Metro Grade Crossing Policy for Light Rail Transit (December 2003) to analyze all potential grade crossings in order to initially determine at-grade and grade separated configurations. See Appendix D for the Conceptual Engineering FEIR drawings issued December 4, 2009. There was extensive coordination with the City of Los Angeles Department of Transportation (LADOT) and in order to reach a consensus, additional studies and discussions with LADOT occurred in response to their DEIR comments. The findings from these studies and discussions are summarized in the October 15, 2009 letter from LADOT; see Appendix E. In the letter, LADOT concurred with the Expo Authority's at-grade and grade separated recommendations and acknowledged that CPUC would ultimately approve the proposed configurations.

On December 4, 2009, the CPUC also issued a letter to the Expo Authority; see Appendix F. This letter acknowledges the extensive coordination and consultation by the Expo Authority with the CPUC, LADOT, and the City of Santa Monica in response to the CPUC and other comments on the DEIR. Further, the CPUC recognizes the additional work and analysis that was conducted on the crossings, which resulted in proposed project revisions and mitigation measures to further reduce impacts identified in the EIR. Accordingly, they state that "the Expo Authority has been responsive to issues raised by the CPUC staff and LADOT concerning the impacts of the proposed crossings." Last, the CPUC also acknowledges that they have not made a final determination regarding compliance with CPUC regulatory requirements, which would be made

after certification of the FEIR and completion of the CPUC Rail Crossing Hazard Analysis process outlined in GO 164-D. This report fulfils this requirement.

3.2 Approach to Identifying Hazards

The analysis evaluated the following areas of potential hazards for each proposed grade crossing and documented the findings in the Hazard Analysis Matrices (Appendix A):

- Train and roadway speed;
- Skewed grade crossing;
- Restricted pedestrian and/or vehicle sight distance;
- Unsafe right or left turn from intersection/driveway onto or across a grade crossing;
- Automobile traffic queue from nearby controlled intersection backs up across at-grade crossing or from the at-grade crossing back to a nearby controlled intersection;
- Vehicle driven around downed crossing gates;
- Parallel roadways and driveways to tracks;
- Pedestrian crosses tracks with train approaching;
- Potential pedestrian surges;

The potential hazard areas were developed from past design and operation experiences from other similar LRT projects; specific site inspections of the potential crossings; and, input from the CPUC, Metro, Cities of Los Angeles and Santa Monica.

3.3 Hazard Analysis Recommendations

The Hazard Analysis Matrices also provide details of proposed methods of controlling the identified hazards. These proposed mitigations were also developed from past experiences along with coordination by the Expo Authority with the CPUC, Metro, Cities of Los Angeles and Santa Monica. Also refer to the Grade Crossing Concept Drawings that include the mitigations to address the identified hazards; see Appendix B.

The following events summarize the development of this Final Hazard Analysis Report:

- June 9, 2010 – Expo Authority Submits the Draft Hazard Analysis Report to CPUC
- July 27, 2010 – Pre-Field Diagnostic meeting with CPUC, Expo Authority, Metro, and Los Angeles Department of Transportation (LADOT)
- July 29, 2010 – Pre-Field Diagnostic meeting with CPUC, Expo Authority, Metro, and City of Santa Monica
- August 2, 2010 – Field Diagnostic meeting with CPUC, Expo Authority, Metro and LADOT
- August 4, 2010 – Field Diagnostic meeting with CPUC, Expo Authority, Metro, and City of Santa Monica

- November 12, 2010 – Expo Authority received CPUC Rail Crossing Engineering Sections (RCES) preliminary disposition on Draft Hazard Analysis Report

- January 7, 2011 – Expo Authority sent letter to CPUC agreeing to implement the 10 grade separated and 14 at-grade crossings as categorized by RECS and to further evaluate three crossings

- January 25, 2011 – Expo Authority submittal to CPUC of updated Hazard Analysis Matrices, Concept Drawings, and Notes as specified in the January 7, 2011 RECS letter

- March 11, 2011 – Expo Authority submittal to CPUC of updated Hazard Analysis Matrices and Concept Drawings of Barrington, 20th Street and 19th Street

- April 1, 2011 – Expo Authority submittal to CPUC conveying the Expo Authority Board direction to change the at-grade crossing of Sepulveda Boulevard to a grade separated crossing

- August 31, 2011 – Expo Authority submittal to CPUC of the updated I-10 Box

4.0 SUMMARY AND CONCLUSION

Through the steps identified in Section 3.3 above, the potential hazards associated with each proposed grade crossing have been assessed and proposed mitigations identified. As shown above in Table 1 and presented in the attached Appendices A and B, the Expo Authority proposes to:

1. Close six vehicular grade crossings
2. Grade separate eleven crossings (of which three are existing)
3. Construct nine at-grade crossings
4. Construct seven street-running crossings (of which two include pedestrian only gated crossings in addition to the adjacent vehicular crossings)

To date, there have been several meetings held with the appropriate parties to discuss these areas in order to reach a consensus. As defined in the GO-164D, Field Diagnostic meetings were held with the CPUC, Metro, and Cities of Los Angeles Santa Monica after the Draft Hazard Analysis Report was submitted to the CPUC in June 2010. The attached updated Hazard Analysis Matrices and Concept Drawings (Appendices A and B) along with the Field and Office Diagnostic Meeting Notes (Appendix C) reflect the input provided to date. Ultimately, after this report is approved by the CPUC, the grade crossing configurations and their mitigations will be incorporated into the project design as such.

Appendix A:

Grade Crossing Hazard Analysis Matrices

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	Prepared by: J. Van Hoff Date: 5/10/10
Grade Crossing: VENICE BLVD & ROBERTSON BLVD **Drawing No. GC-001 and T-008**	**Diagnostic Team** **Initial Review Date: 7/27/10**
Crossing No. 84S – 107.5 USDOT No.	**Final Review Date: 8/2/10**

Train Speed: 55 mph and adjacent to station area **Frequency of Trains (per hr in each direction): 6/hr/dr**	**Type of Train Operation:**	
	Exclusive	☒ Yes ☐ No Grade Separated
	Semi-exclusive	☐ Yes ☒ No At-Grade with fencing/barriers between crossings
	Street Running	☐ Yes ☒ No Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 110 feet **Current No. of Lanes per Direction:** **3-EB, 3-WB**	**Roadway Volumes** **ADT: N/A**	**Peak Hour Volume: (Expo 2007)** **AM: EB – 2,457, WB – 2,626** **PM: EB – 2,266, WB – 2,107**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Train speed	☐ <35 mph ☒ >35 mph – **Posted 55 mph and adjacent to station**	
Roadway speed	35 mph	
Skewed crossing	☐ <30° from perpendicular ☒ >30° from perpendicular	Not applicable since it is grade separated.
Restricted vehicle sight distance	☐ Yes ☐ No	Not applicable since it is grade separated.
Left turn movement onto crossing	☐ Protected ☐ Permissive ☐ Truck/Bus % _____	Not applicable since it is grade separated.
Left turn movement across crossing	☐ Protected ☐ Permissive ☐ Truck/Bus % _____	Not applicable since it is grade separated.
Right turn movement onto tracks	☐ Insufficient Clear Storage Area for design vehicle ☐ Truck Route - %Trucks_____ ☐ School Bus Route	Not applicable since it is grade separated.

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	Prepared by: J. Van Hoff Date: 5/10/10
Grade Crossing: VENICE BLVD & ROBERTSON BLVD **Drawing No. GC-001 and T-008**	**Diagnostic Team** **Initial Review Date: 7/27/10**
Crossing No. 84S – 107.5 USDOT No.	**Final Review Date: 8/2/10**

Train Speed: 55 mph and adjacent to station area **Frequency of Trains (per hr in each direction): 6/hr/dr**	**Type of Train Operation:** **Exclusive** **Semi-exclusive** **Street Running**	 ☒ Yes ☐ No Grade Separated ☐ Yes ☒ No At-Grade with fencing/barriers between crossings ☐ Yes ☒ No Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 110 feet **Current No. of Lanes per Direction:** **3-EB, 3-WB**	**Roadway Volumes** **ADT: N/A**	**Peak Hour Volume: (Expo 2007)** **AM: EB – 2,457, WB – 2,626** **PM: EB – 2,266, WB – 2,107**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Right turn movement across tracks	☐ Insufficient Clear Storage Area for design vehicle ☐ Truck Route - %Trucks_____ ☐ School Bus Route	Not applicable since it is grade separated.
Vehicles queue from intersection onto crossing (Influence zone)	☐ Yes ☐ No	Not applicable since it is grade separated.
Vehicles queue from crossing into intersection (spillback)	☐ Yes ☐ No	Not applicable since it is grade separated.
Vehicle driven around downed crossing gates	☐ Excessive warning activation time ☐ Frequency of Activation - **12/hr (6/hr/direction)** ☐ Meet Point for Trains causing extended gate down time ☐ Number of Tracks - **2** ☐ Non-Mainline Tracks ☐ Station adjacent to crossing	Not applicable since it is grade separated.
Parallel roadways	☐ Yes ☐ No	Not applicable since it is grade separated.
Parallel driveways	☐ Yes ☐ No	Not applicable since it is grade separated.

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	Prepared by: J. Van Hoff Date: 5/10/10
Grade Crossing: VENICE BLVD & ROBERTSON BLVD **Drawing No. GC-001 and T-008**	**Diagnostic Team** **Initial Review Date: 7/27/10**
Crossing No. 84S – 107.5 USDOT No.	**Final Review Date: 8/2/10**

Train Speed: 55 mph and adjacent to station area **Frequency of Trains (per hr in each direction): 6/hr/dr**	**Type of Train Operation:** **Exclusive**	☒ Yes ☐ No Grade Separated
	Semi-exclusive	☐ Yes ☒ No At-Grade with fencing/barriers between crossings
	Street Running	☐ Yes ☒ No Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 110 feet **Current No. of Lanes per Direction:** **3-EB, 3-WB**	**Roadway Volumes** **ADT: N/A**	**Peak Hour Volume: (Expo 2007)** **AM: EB – 2,457, WB – 2,626** **PM: EB – 2,266, WB – 2,107**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Restricted pedestrian sight distance	☐ Yes ☐ No	Not applicable since it is grade separated.
Pedestrian crosses tracks with train(s) approaching	Elementary School near crossing ☐ Yes ☐ No Safe Route to School ☐ Yes ☐ No	Not applicable since it is grade separated.
Pedestrian crosses tracks with train (s) approaching	Middle or High School near crossing ☐ Yes ☐ No Major Pedestrian Route to School ☐ Yes ☐ No	Not applicable since it is grade separated.
Pedestrian crosses tracks with train (s) approaching	Retirement Home near crossing ☐ Yes ☐No Ped Route to Commercial Property ☐ Yes ☐ No Commercial/Industrial property near crossing ☐ Yes ☐No	Not applicable since it is grade separated.

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS		Prepared by: J. Van Hoff Date: 5/10/10
Grade Crossing: VENICE BLVD & ROBERTSON BLVD **Drawing No. GC-001 and T-008**	**Diagnostic Team**	**Initial Review Date: 7/27/10**
Crossing No. 84S – 107.5 USDOT No.		**Final Review Date: 8/2/10**

Train Speed: 55 mph and adjacent to station area **Frequency of Trains (per hr in each direction): 6/hr/dr**	**Type of Train Operation:** **Exclusive** **Semi-exclusive** **Street Running**	 ☒ Yes ☐ No Grade Separated ☐ Yes ☒ No At-Grade with fencing/barriers between crossings ☐ Yes ☒ No Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 110 feet **Current No. of Lanes per Direction:** **3-EB, 3-WB**	**Roadway Volumes** **ADT: N/A**	**Peak Hour Volume: (Expo 2007)** **AM: EB – 2,457, WB – 2,626** **PM: EB – 2,266, WB – 2,107**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Potential pedestrian surges	LRV Station ☐ Yes ☐ No ☐ Event/Entertainment Center ☐ Yes ☐ No	Not applicable since it is grade separated.
Multi-purpose trail crosses tracks	☐ Yes ☒ No	

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	Prepared by: J. Van Hoff Date: 4/15/10
Grade Crossing: BAGLEY AVENUE **Drawing No. GC – 002 and T-008**	**Diagnostic Team** **Initial Review Date: 7/27/10**
Crossing No. 84S – 107.9 USDOT No.	**Final Review Date: 8/4/10**

Train Speed: 55 mph	**Type of Train Operation:**	
	Exclusive	☐ Yes ☒No Grade Separated
Frequency of Trains (per hr in each direction): 6/hr/dr	**Semi-exclusive**	☒ Yes ☐ No At-Grade with fencing/barriers between crossings
	Street Running	☐ Yes ☒No Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 40 feet **Current No. of Lanes per Direction:** **1-NB, 1-SB**	**Roadway Volumes:** LADOT Volumes **ADT 7,000**	**Peak Hour Volume: (Expo 2007)** **AM: NB – 274, SB – 248** **PM: NB – 205, SB – 445**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Train speed	☐ <35 mph ☒ >35 mph – Posted 55 mph	The LRT posted speed for this segment is 55 mph. The mitigation is to install No. 9 railroad gates. Expo will install 4-Quad gate control for additional safety.
Roadway speed	25 mph	Grade crossing controls shall be used. Expo will install 4-Quad gate control for additional safety.
Skewed crossing	☒ <30° from perpendicular ☐ >30° from perpendicular	Grade crossing controls shall be used and tied to the traffic signal controller at Exposition Blvd.
Restricted vehicle sight distance	☒ Yes **due to freeway overcrossing** ☐ No	Grade crossing controls shall be used and tied to the traffic signal controller at Exposition Blvd. Expo will install 4-Quad gate control for additional safety.
Left turn movement onto crossing	☒ Protected **WB and EB** ☐ Permissive ☐ Truck/Bus % _____	The intersection of Bagley Ave. and Exposition Blvd. is currently stop controlled and will receive a new traffic signal. No left turn (R3-2) blank-out signs shall be activated during preemption for EB Exposition Blvd.

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	Prepared by: J. Van Hoff Date: 4/15/10
Grade Crossing: BAGLEY AVENUE **Drawing No. GC – 002 and T-008**	**Diagnostic Team** **Initial Review Date: 7/27/10**
Crossing No. 84S – 107.9 USDOT No.	**Final Review Date: 8/4/10**

Train Speed: 55 mph	**Type of Train Operation:**	
	Exclusive	☐ Yes ☒No Grade Separated
Frequency of Trains (per hr in each direction): 6/hr/dr	**Semi-exclusive**	☒ Yes ☐ No At-Grade with fencing/barriers between crossings
	Street Running	☐ Yes ☒No Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 40 feet **Current No. of Lanes per Direction:** **1-NB, 1-SB**	**Roadway Volumes:** LADOT Volumes **ADT 7,000**	**Peak Hour Volume: (Expo 2007)** **AM: NB – 274, SB – 248** **PM: NB – 205, SB – 445**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Left turn movement across crossing	☐ Protected ☒ Permissive **NB and SB** ☐ Truck/Bus % _____	SB left turns from Bagley Ave. to Exposition Blvd. will be allowed.
Right turn movement onto tracks	☐ Insufficient Clear Storage Area for design vehicle ☐ Truck Route - %Trucks_____ ☐ School Bus Route	For the WB movement from Exposition Blvd. onto NB Bagley Ave., install a no turn on red blank-out sign (R3-1).
Right turn movement across tracks	☐ Insufficient Clear Storage Area for design vehicle ☐ Truck Route - %Trucks_____ ☐ School Bus Route	For the SB movement on Bagley Ave., install a static no turn on red sign (R10-11a) and an LRT icon blank-out sign (W10-7) on the traffic signal mast arm.
Vehicles queue from **Exposition** Blvd. intersection onto crossing (Influence zone)	☐ Yes ☒ No	A pre-signal operation shall be used for the SB movement and preemption shall provide a track clearance with limited service during preempt hold.
Vehicles queue from crossing into **Exposition Blvd**. intersection (Spillback zone)	☐ Yes ☒ No	None

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	Prepared by: J. Van Hoff Date: 4/15/10
Grade Crossing: BAGLEY AVENUE **Drawing No. GC – 002 and T-008**	**Diagnostic Team** **Initial Review Date: 7/27/10**
Crossing No. 84S – 107.9 USDOT No.	**Final Review Date: 8/4/10**

Train Speed: 55 mph	**Type of Train Operation:**	
	Exclusive	☐ Yes ☒No Grade Separated
Frequency of Trains (per hr in each direction): 6/hr/dr	**Semi-exclusive**	☒ Yes ☐ No At-Grade with fencing/barriers between crossings
	Street Running	☐ Yes ☒No Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 40 feet **Current No. of Lanes per Direction:** **1-NB, 1-SB**	**Roadway Volumes:** LADOT Volumes **ADT 7,000**	**Peak Hour Volume: (Expo 2007)** **AM: NB – 274, SB – 248** **PM: NB – 205, SB – 445**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Vehicle driven around downed crossing gates	☐ Excessive warning activation time ☒ Frequency of Activation - **12/hr (6/hr/direction)** ☐ Meet Point for Trains causing extended gate down time ☒ Number of Tracks - **2** ☐ Non-Mainline Tracks ☐ Station adjacent to crossing	Grade crossing controls shall be used and tied to the traffic signal at Exposition Blvd. Expo will install 4-Quad gate control for additional safety.
Parallel roadways	☒ Yes **Exposition Blvd.** ☐ No	Install traffic signal with preemption.
Parallel driveways	☒ Yes **DWP facility** ☐ No	Existing DWP facility access driveway north-east of the tracks will have a 25' storage area between driveway and gate. Driveway will be right-in/right-out.
Restricted pedestrian sight sistance	☐ Yes ☒ No	None
Pedestrian crosses tracks with train(s) approaching	Elementary School near crossing ☐ Yes ☒ No Safe Route to School **on Bagley Ave. between crossing and Venice Blvd.** ☒ Yes ☐ No	A new traffic signal with pedestrian controls will be tied to the crossing warning system for preemption. Crossing controls will include automatic vehicular and pedestrian gates.

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	Prepared by: J. Van Hoff Date: 4/15/10
Grade Crossing: BAGLEY AVENUE **Drawing No. GC – 002 and T-008**	**Diagnostic Team** **Initial Review Date: 7/27/10**
Crossing No. 84S – 107.9 USDOT No.	**Final Review Date: 8/4/10**

Train Speed: 55 mph	**Type of Train Operation:**	
	Exclusive	☐ Yes ☒No Grade Separated
Frequency of Trains (per hr in each direction): 6/hr/dr	**Semi-exclusive**	☒ Yes ☐ No At-Grade with fencing/barriers between crossings
	Street Running	☐ Yes ☒No Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 40 feet **Current No. of Lanes per Direction:** **1-NB, 1-SB**	**Roadway Volumes:** LADOT Volumes **ADT 7,000**	**Peak Hour Volume: (Expo 2007)** **AM: NB – 274, SB – 248** **PM: NB – 205, SB – 445**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Pedestrian crosses tracks with train (s) approaching	Middle or High School near crossing ☐ Yes ☒ No Major Pedestrian Route to School ☐ Yes ☒ No	None
Pedestrian crosses tracks with train (s) approaching	Retirement Home near crossing ☐ Yes ☒ No Ped Route to Commercial Property ☐ Yes ☒ No Commercial/Industrial property near crossing ☐ Yes ☒ No	None
Potential pedestrian surges	LRV Station ☐ Yes ☒ No Event/Entertainment Center ☐ Yes ☒ No	None
Multi-purpose trail crosses tracks	☐ Yes ☒ No	None

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	Prepared by: J. Van Hoff Date: 4/30/10
Grade Crossing: NATIONAL / PALMS BLVD **Existing Grade Separation** **Drawing No. GC-003 and T-007**	**Initial Review Date: 7/27/10** **Diagnostic Team**
Crossing No. 84S – 108.3 USDOT No.	**Final Review Date: 8/3/10**

Train Speed: 55 mph and adjacent to station area

Frequency of Trains (per hr in each direction): 6/hr/dr

Type of Train Operation:

Exclusive	☒ Yes	☐ No	Grade Separated
Semi-exclusive	☐ Yes	☒ No	At-Grade with fencing/barriers between crossings
Street Running	☐ Yes	☒ No	Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 64 feet
Current No. of Lanes per Direction:
2-NB, 2-SB

Roadway Volumes: **ADT N/A**

Peak Hour Volume: (Expo 2007)
AM: NB – 1347, SB – 1142
PM: NB – 1492, SB – 1870

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Train speed	☐ <35 mph ☒ >35 mph – **Posted 55 mph and adjacent to station**	
Roadway speed	35 mph	
Skewed crossing	☒ <30° from perpendicular ☐ >30° from perpendicular	Not applicable since it is grade separated.
Restricted vehicle sight distance	☐ Yes ☐ No	Not applicable since it is grade separated.
Left turn movement onto crossing	☐ Protected ☐ Permissive ☐ Truck/Bus % _____	Not applicable since it is grade separated.
Left turn movement across crossing	☐ Protected ☐ Permissive ☐ Truck/Bus % _____	Not applicable since it is grade separated.
Right turn movement onto tracks	☐ Insufficient Clear Storage Area for design vehicle ☐ Truck Route - %Trucks_____ ☐ School Bus Route	Not applicable since it is grade separated.
Right turn movement across tracks	☐ Insufficient Clear Storage Area for design vehicle ☐ Truck Route - %Trucks_____ ☐ School Bus Route	Not applicable since it is grade separated.
Vehicles queue from intersection onto crossing (Influence zone)	☐ Yes ☐ No	Not applicable since it is grade separated.

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	Prepared by: J. Van Hoff Date: 4/30/10
Grade Crossing: NATIONAL / PALMS BLVD **Existing Grade Separation** **Drawing No. GC-003 and T-007**	**Initial Review Date: 7/27/10** **Diagnostic Team**
Crossing No. 84S – 108.3 USDOT No.	**Final Review Date: 8/3/10**

Train Speed: 55 mph and adjacent to station area **Frequency of Trains (per hr in each direction): 6/hr/dr**	**Type of Train Operation:**	
	Exclusive	☒ Yes ☐ No Grade Separated
	Semi-exclusive	☐ Yes ☒ No At-Grade with fencing/barriers between crossings
	Street Running	☐ Yes ☒ No Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 64 feet **Current No. of Lanes per Direction:** **2-NB, 2-SB**	**Roadway Volumes:** **ADT N/A**	**Peak Hour Volume: (Expo 2007)** **AM: NB – 1347, SB – 1142** **PM: NB – 1492, SB – 1870**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Vehicles queue from intersection onto crossing (spillback)	☐ Yes ☐ No	Not applicable since it is grade separated.
Vehicle driven around downed crossing gates	☐ Excessive warning activation time ☐ Frequency of Activation - **12/hr (6/hr/direction)** ☐ Meet Point for Trains causing extended gate down time ☐ Number of Tracks - **2** ☐ Non-Mainline Tracks ☐ Station adjacent to crossing	Not applicable since it is grade separated.
Parallel roadways	☐ Yes ☐ No	Not applicable since it is grade separated.
Parallel driveways	☐ Yes ☐ No	Not applicable since it is grade separated.
Restricted pedestrian sight distance	☐ Yes ☐ No	Not applicable since it is grade separated.
Pedestrian crosses tracks with train(s) approaching	Elementary School near crossing ☐ Yes ☐ No Safe Route to School ☐ Yes ☐ No	Not applicable since it is grade separated.

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	Prepared by: J. Van Hoff Date: 4/30/10
Grade Crossing: NATIONAL / PALMS BLVD **Existing Grade Separation** **Drawing No. GC-003 and T-007**	**Initial Review Date: 7/27/10** **Diagnostic Team**
Crossing No. 84S – 108.3 USDOT No.	**Final Review Date: 8/3/10**

Train Speed: 55 mph and adjacent to station area **Frequency of Trains (per hr in each direction): 6/hr/dr**	**Type of Train Operation:** **Exclusive** **Semi-exclusive** **Street Running**	 ☒ Yes ☐ No Grade Separated ☐ Yes ☒ No At-Grade with fencing/barriers between crossings ☐ Yes ☒ No Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 64 feet **Current No. of Lanes per Direction:** **2-NB, 2-SB**	**Roadway Volumes:** **ADT N/A**	**Peak Hour Volume: (Expo 2007)** **AM: NB – 1347, SB – 1142** **PM: NB – 1492, SB – 1870**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Pedestrian crosses tracks with train (s) approaching	Middle or High School near crossing ☐ Yes ☐ No Major Pedestrian Route to School ☐ Yes ☐ No	Not applicable since it is grade separated.
Pedestrian crosses tracks with train (s) approaching	Retirement Home near crossing ☐ Yes ☐ No Ped Route to Commercial Property ☐ Yes ☐ No Commercial/Industrial property near crossing ☐ Yes ☐ No	Not applicable since it is grade separated.
Potential pedestrian surges	LRV Station ☐ Yes ☐ No Event/Entertainment Center ☐ Yes ☐ No	Not applicable since it is grade separated.
Multi-purpose trail crosses tracks	☐ Yes ☒ No	

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	Prepared by: J. Van Hoff Date: 5/4/10
Grade Crossing: MOTOR AVENUE **Existing Grade Separation** **Drawing No. GC-004 and T-007**	**Initial Review Date: 7/27/10** **Diagnostic Team**
Crossing No. 84S – 108.7 USDOT No.	**Final Review Date: 8/3/10**

Train Speed: 55 mph **Frequency of Trains (per hr in each direction): 6/hr/dr**	**Type of Train Operation:** **Exclusive** **Semi-exclusive** **Street Running**	☒ Yes ☐ No Grade Separated ☐ Yes ☒ No At-Grade with fencing/barriers between crossings ☐ Yes ☒ No Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 75 feet **Current No. of Lanes per Direction:** **1-NB, 1-SB**	**Roadway Volumes:** **ADT N/A**	**Peak Hour Volume: (Expo 2007)** **AM: NB – 618, SB – 342** **PM: NB – 477, SB – 786**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Train speed	☐ <35 mph ☒ >35 mph – Posted 55 mph	
Roadway speed	30 mph	
Skewed crossing	☒ <30° from perpendicular ☐ >30° from perpendicular	Not applicable since it is grade separated.
Restricted vehicle sight sistance	☐ Yes ☐ No	Not applicable since it is grade separated.
Left turn movement onto crossing	☐ Protected ☐ Permissive ☐ Truck/Bus % _____	Not applicable since it is grade separated.
Left turn movement across crossing	☐ Protected ☐ Permissive ☐ Truck/Bus % _____	Not applicable since it is grade separated.
Right turn movement onto tracks	☐ Insufficient Clear Storage Area for design vehicle ☐ Truck Route - %Trucks_____ ☐ School Bus Route	Not applicable since it is grade separated.
Right turn movement across tracks	☐ Insufficient Clear Storage Area for design vehicle ☐ Truck Route - %Trucks_____ ☐ School Bus Route	Not applicable since it is grade separated.
Vehicles queue from intersection onto crossing (Influence zone)	☐ Yes ☐ No	Not applicable since it is grade separated.

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	Prepared by: J. Van Hoff Date: 5/4/10
Grade Crossing: MOTOR AVENUE **Existing Grade Separation** **Drawing No. GC-004 and T-007**	**Initial Review Date: 7/27/10** **Diagnostic Team**
Crossing No. 84S – 108.7 USDOT No.	**Final Review Date: 8/3/10**

Train Speed: 55 mph **Frequency of Trains (per hr in each direction): 6/hr/dr**	**Type of Train Operation:**	
	Exclusive	☒ Yes ☐ No Grade Separated
	Semi-exclusive	☐ Yes ☒ No At-Grade with fencing/barriers between crossings
	Street Running	☐ Yes ☒ No Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 75 feet **Current No. of Lanes per Direction:** **1-NB, 1-SB**	**Roadway Volumes:** **ADT N/A**	**Peak Hour Volume: (Expo 2007)** **AM: NB – 618, SB – 342** **PM: NB – 477, SB – 786**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Vehicles queue from intersection onto crossing (spillback)	☐ Yes ☐ No	Not applicable since it is grade separated.
Vehicle driven around downed crossing gates	☐ Excessive warning activation time ☐ Frequency of Activation - **12/hr (6/hr/direction)** ☐ Meet Point for Trains causing extended gate down time ☐ Number of Tracks - **2** ☐ Non-Mainline Tracks ☐ Station adjacent to crossing	Not applicable since it is grade separated.
Parallel roadways	☐ Yes ☐ No	Not applicable since it is grade separated.
Parallel driveways	☐ Yes ☐ No	Not applicable since it is grade separated.
Restricted pedestrian sight distance	☐ Yes ☐ No	Not applicable since it is grade separated.

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	Prepared by: J. Van Hoff Date: 5/4/10
Grade Crossing: MOTOR AVENUE **Existing Grade Separation** **Drawing No. GC-004 and T-007**	**Initial Review Date: 7/27/10** **Diagnostic Team**
Crossing No. 84S – 108.7 USDOT No.	**Final Review Date: 8/3/10**

Train Speed: 55 mph **Frequency of Trains (per hr in each direction): 6/hr/dr**	**Type of Train Operation:** **Exclusive** **Semi-exclusive** **Street Running**	☒ Yes ☐ No Grade Separated ☐ Yes ☒ No At-Grade with fencing/barriers between crossings ☐ Yes ☒ No Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 75 feet **Current No. of Lanes per Direction:** **1-NB, 1-SB**	**Roadway Volumes:** **ADT N/A**	**Peak Hour Volume: (Expo 2007)** **AM: NB – 618, SB – 342** **PM: NB – 477, SB – 786**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Pedestrian crosses tracks with train(s) approaching	Elementary School near crossing ☐ Yes ☐ No Safe Route to School ☐ Yes ☐ No	Not applicable since it is grade separated.
Pedestrian Crosses Tracks with Train (s) approaching	Middle or High School near crossing ☐ Yes ☐ No Major Pedestrian Route to School ☐ Yes ☐ No	Not applicable since it is grade separated.
Pedestrian crosses tracks with train (s) approaching	Retirement Home near crossing ☐ Yes ☐ No Ped Route to Commercial Property ☐ Yes ☐ No Commercial/Industrial property near crossing ☐ Yes ☐ No	Not applicable since it is grade separated.
Potential pedestrian surges	LRV Station ☐ Yes ☐ No Event/Entertainment Center ☐ Yes ☐ No	Not applicable since it is grade separated.
Multi-purpose trail crosses tracks	☐ Yes ☒ No	

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	Prepared by: J. Van Hoff Date: 5/10/10
Grade Crossing: I-10 BOX UNDER-PASS **Existing grade separation** **Drawing No. GC-004A, GC-030, T-006A and T-007**	**Initial Review Date: 7/27/10** **Diagnostic Team**
Crossing No. 84S – 108.9 USDOT No.	**Final Review Date: 8/2/10**

Train Speed: 25 mph

Frequency of Trains (per hr in each direction): 6/hr/dr

Type of Train Operation:

Exclusive	☒ Yes ☐ No	Grade Separated
Semi-exclusive	☐ Yes ☒ No	At-Grade with fencing/barriers between crossings
Street Running	☐ Yes ☒ No	Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width:
~250 feet; edge of pavement to edge of pavement
Current No. of Lanes per Direction:
5-EB, 5-WB

Roadway Volumes: (Caltrans 2008) **AADT 256,000**

Peak Hour Volume: (Expo 2008)
AM: NB – n/a, SB – n/a
PM: NB – n/a, SB – n/a

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Train speed	☒ <35 mph ☐ >35 mph	
Roadway speed	65 mph	
Skewed crossing	☐ <30° from perpendicular ☒ >30° from perpendicular	Not applicable since it is grade separated.
Restricted vehicle sight distance	☐ Yes ☐ No	Not applicable since it is grade separated.
Left turn movement onto crossing	☐ Protected ☐ Permissive ☐ Truck/Bus % _____	Not applicable since it is grade separated.
Left turn movement across crossing	☐ Protected ☐ Permissive ☐ Truck/Bus % _____	Not applicable since it is grade separated.
Right turn movement onto tracks	☐ Insufficient Clear Storage Area for design vehicle ☐ Truck Route - %Trucks_____ ☐ School Bus Route	Not applicable since it is grade separated.

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	Prepared by: J. Van Hoff Date: 5/10/10
Grade Crossing: I-10 BOX UNDER-PASS **Existing grade separation** **Drawing No. GC-004A, GC-030, T-006A and T-007**	**Initial Review Date: 7/27/10** **Diagnostic Team**
Crossing No. 84S – 108.9 USDOT No.	**Final Review Date: 8/2/10**

Train Speed: 25 mph	**Type of Train Operation:**	
	Exclusive	☒ Yes ☐ No Grade Separated
Frequency of Trains (per hr in each direction): 6/hr/dr	**Semi-exclusive**	☐ Yes ☒ No At-Grade with fencing/barriers between crossings
	Street Running	☐ Yes ☒ No Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: **~250 feet; edge of pavement to edge of pavement** **Current No. of Lanes per Direction:** **5-EB, 5-WB**	**Roadway Volumes:** (Caltrans 2008) **AADT 256,000**	**Peak Hour Volume: (Expo 2008)** **AM: NB – n/a, SB – n/a** **PM: NB – n/a, SB – n/a**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Right turn movement across tracks	☐ Insufficient Clear Storage Area for design vehicle ☐ Truck Route - %Trucks_____ ☐ School Bus Route	Not applicable since it is grade separated.
Vehicles queue from intersection onto crossing (Influence zone)	☐ Yes ☐ No	Not applicable since it is grade separated.
Vehicles queue from crossing into intersection (spillback)	☐ Yes ☐ No	Not applicable since it is grade separated.
Vehicle driven around downed crossing gates	☐ Excessive warning activation time ☐ Frequency of Activation - **12/hr (6/hr/direction)** ☐ Meet Point for Trains causing extended gate down time ☐ Number of Tracks - **2** ☐ Non-Mainline Tracks ☐ ☐ Station adjacent to crossing	Not applicable since it is grade separated.
Parallel roadways	☐ Yes ☐ No	Not applicable since it is grade separated.
Parallel driveways	☐ Yes ☐ No	Not applicable since it is grade separated.

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	Prepared by: J. Van Hoff Date: 5/10/10
Grade Crossing: I-10 BOX UNDER-PASS **Existing grade separation** **Drawing No. GC-004A, GC-030, T-006A and T-007**	**Initial Review Date: 7/27/10** **Diagnostic Team**
Crossing No. 84S – 108.9 USDOT No.	**Final Review Date: 8/2/10**

Train Speed: 25 mph	**Type of Train Operation:**	
	Exclusive	☒ Yes ☐ No Grade Separated
Frequency of Trains (per hr in each direction): 6/hr/dr	**Semi-exclusive**	☐ Yes ☒ No At-Grade with fencing/barriers between crossings
	Street Running	☐ Yes ☒ No Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: **~250 feet; edge of pavement to edge of pavement** **Current No. of Lanes per Direction:** **5-EB, 5-WB**	**Roadway Volumes:** (Caltrans 2008) **AADT 256,000**	**Peak Hour Volume: (Expo 2008)** **AM: NB – n/a, SB – n/a** **PM: NB – n/a, SB – n/a**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Restricted pedestrian sight distance	☐ Yes ☐ No	Not applicable since it is grade separated.
Pedestrian crosses tracks with train(s) approaching	Elementary School near crossing ☐ Yes ☐ No Safe Route to School ☐ Yes ☐ No	Not applicable since it is grade separated.
Pedestrian crosses tracks with train (s) approaching	Middle or High School near crossing ☐ Yes ☐ No Major Pedestrian Route to School ☐ Yes ☐ No	Not applicable since it is grade separated.
Pedestrian crosses tracks with train (s) approaching	Retirement Home near crossing ☐ Yes ☐ No Ped Route to Commercial Property ☐ Yes ☐ No Commercial/Industrial property near crossing ☐ Yes ☐ No	Not applicable since it is grade separated.

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	Prepared by: J. Van Hoff Date: 5/10/10
Grade Crossing: I-10 BOX UNDER-PASS **Existing grade separation** **Drawing No. GC-004A, GC-030, T-006A and T-007**	**Initial Review Date: 7/27/10** **Diagnostic Team**
Crossing No. 84S – 108.9 USDOT No.	**Final Review Date: 8/2/10**

Train Speed: 25 mph **Frequency of Trains (per hr in each direction): 6/hr/dr**	**Type of Train Operation:** **Exclusive** ☒ Yes ☐ No Grade Separated **Semi-exclusive** ☐ Yes ☒ No At-Grade with fencing/barriers between crossings **Street Running** ☐ Yes ☒ No Mixed flow, LRT/Ped Mall, Separated from traffic by curb	
Roadway Width: **~250 feet; edge of pavement to edge of pavement** **Current No. of Lanes per Direction:** **5-EB, 5-WB**	**Roadway Volumes:** **AADT 256,000** (Caltrans 2008)	**Peak Hour Volume: (Expo 2008)** **AM: NB – n/a, SB – n/a** **PM: NB – n/a, SB – n/a**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Potential pedestrian surges	LRV Station ☐ Yes ☐ No Event/Entertainment Center ☐ Yes ☐ No	Not applicable since it is grade separated.
Multi-purpose trail crosses tracks	☐ Yes ☒ No	

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	Prepared by: J Van Hoff Date: 4/15/10
Grade Crossing: OVERLAND AVENUE **Drawing No. GC-005 and T-006A**	**Diagnostic Team** **Initial Review Date: 7/27/10**
Crossing No. 84S – 109.5 USDOT No.	**Final Review Date: 8/2/10**

Train Speed: 55 mph	**Type of Train Operation:**		
	Exclusive	☐ Yes ☒ No	Grade Separated
Frequency of Trains (per hr in each direction): 6/hr/dr	**Semi-exclusive**	☒ Yes ☐ No	At-Grade with fencing/barriers between crossings
	Street Running	☐ Yes ☒ No	Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 76ft **Current No. of Lanes per Direction:** **2-NB & 2-SB**	**Roadway Volumes:** LADOT Volumes	**ADT: 44,000**	**Peak Hour Volume:** **(Expo 2007)** **AM: NB – 1874, SB - 1326** **PM: NB – 1618, SB - 2010**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Train speed	☐ <35 mph ☒ >35 mph	The LRT posted speed for this segment is 55 mph. The mitigation is to install No. 9 railroad gates. Expo will install 4-Quad gate control for additional safety.
Roadway speed	35 mph	Grade crossing controls shall be used. Expo will install 4-Quad gate control for additional safety.
Skewed crossing	☐ <30° from perpendicular ☒ >30° from perpendicular	The track alignment curves through this crossing; refer to drawing GC-005. Grade crossing controls shall be used.
Restricted vehicle sight distance	☒ Yes **due to skewed crossing** ☐ No	Grade crossing controls shall be used with a queue cutter signal for the NB movement and interconnected with Ashby Avenue. Grade crossing controls shall be tied to the traffic signal controller at Exposition Blvd.

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	Prepared by: J Van Hoff Date: 4/15/10
Grade Crossing: OVERLAND AVENUE **Drawing No. GC-005 and T-006A**	**Diagnostic Team** **Initial Review Date: 7/27/10**
Crossing No. 84S – 109.5 USDOT No.	**Final Review Date: 8/2/10**

Train Speed: 55 mph	**Type of Train Operation:**		
	Exclusive	☐ Yes ☒ No	Grade Separated
Frequency of Trains (per hr in each direction): 6/hr/dr	**Semi-exclusive**	☒ Yes ☐ No	At-Grade with fencing/barriers between crossings
	Street Running	☐ Yes ☒ No	Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 76ft **Current No. of Lanes per Direction:** **2-NB & 2-SB**	**Roadway Volumes:** LADOT Volumes **ADT: 44,000**	**Peak Hour Volume:** **(Expo 2007)** **AM: NB – 1874, SB - 1326** **PM: NB – 1618, SB - 2010**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Left turn movement onto crossing	☐ Protected ☐ Permissive ☐ Truck/Bus % _____	Currently left turns onto crossing are allowed from parallel roadways Northvale Rd. and Exposition Blvd. This will not be allowed. Place raised median in the middle of Overland Ave. both at locations. Also stripe centerline of WB Northvale Rd. and EB Exposition Blvd. with right hand curvature and install a static right turn only (R3-5R) sign to direct vehicles into right turns only movement. Place raised median with Type Q delineators in center of Overland Ave. bike/pedestrian crosswalk to deter WB Northvale Ave. vehicles from using crosswalk gap in median to sneak through the grade crossing.
Left turn movement across crossing	☐ Protected ☐ Permissive ☐ Truck/Bus % _____	None
Right turn movement onto tracks	☐ Insufficient Clear Storage Area for design vehicle ☐ Truck Route - %Trucks_____ ☐ School Bus Route	None

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	Prepared by: J Van Hoff Date: 4/15/10
Grade Crossing: OVERLAND AVENUE **Drawing No. GC-005 and T-006A**	**Diagnostic Team** **Initial Review Date: 7/27/10**
Crossing No. 84S – 109.5 USDOT No.	**Final Review Date: 8/2/10**

Train Speed: 55 mph	**Type of Train Operation:**		
	Exclusive	☐ Yes ☒ No	Grade Separated
Frequency of Trains (per hr in each direction): 6/hr/dr	**Semi-exclusive**	☒ Yes ☐ No	At-Grade with fencing/barriers between crossings
	Street Running	☐ Yes ☒ No	Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 76ft **Current No. of Lanes per Direction:** **2-NB & 2-SB**	**Roadway Volumes:** LADOT Volumes **ADT: 44,000**	**Peak Hour Volume:** **(Expo 2007)** **AM: NB – 1874, SB - 1326** **PM: NB – 1618, SB - 2010**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Right turn movement across tracks	☐ Insufficient Clear Storage Area for design vehicle ☐ Truck Route - %Trucks_____ ☒ School Bus Route	Right turns onto Northvale Rd. and Exposition Blvd. from Overland Ave. will be controlled by the grade crossing controls.
Vehicles queue from **Ashby** Ave. intersection onto crossing (Influence zone)	☒ Yes **both AM and PM** ☐ No	Current 230'storage area with a 2030 projected queue of 355' AM and 379' PM per FEIR. Add third lane in NB direction, queue cutter, and Ashby Ave. shall be tied to the grade crossing controls for preemption per FEIR.
Vehicles queue from **Coventry** Ave. intersection onto crossing (Influence zone)	☐ Yes ☒ No	None - 580' current storage area with a 2030 projected queue of 488' AM and 298' PM per FEIR.
Vehicles queue from crossing into **Ashby Ave.** intersection (Spillback zone)	☒ Yes **both AM and PM** ☐ No	Current 230' storage area with 2030 a projected queue of 356' AM and 567' PM. Add third lane in SB direction and Ashby Ave. shall be tied to the grade crossing controls for preemption per FEIR.

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	Prepared by: J Van Hoff Date: 4/15/10
Grade Crossing: OVERLAND AVENUE **Drawing No. GC-005 and T-006A**	**Diagnostic Team** **Initial Review Date: 7/27/10**
Crossing No. 84S – 109.5 USDOT No.	**Final Review Date: 8/2/10**

Train Speed: 55 mph	**Type of Train Operation:**		
	Exclusive	☐ Yes ☒ No	Grade Separated
Frequency of Trains (per hr in each direction): 6/hr/dr	**Semi-exclusive**	☒ Yes ☐ No	At-Grade with fencing/barriers between crossings
	Street Running	☐ Yes ☒ No	Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 76ft **Current No. of Lanes per Direction:** **2-NB & 2-SB**	**Roadway Volumes:** LADOT Volumes **ADT: 44,000**	**Peak Hour Volume:** **(Expo 2007)** **AM: NB – 1874, SB - 1326** **PM: NB – 1618, SB - 2010**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Vehicles queue from crossing into **Coventry Ave.** intersection (Spillback zone)	☐ Yes ☒ No	None – 580' current storage area with a 2030 projected queue of 537' AM and 468' PM.
Vehicle driven around downed crossing gates	☐ Excessive warning activation time ☒ Frequency of Activation - **12/hr (6/hr/direction)** ☐ Meet Point for Trains causing extensive gate down time ☒ Number of Tracks__**2**__ ☐ Non-Mainline Tracks ☐ Mixed Operations ☐ Station adjacent to crossing	Raised median with 4-Quad gates will control crossing and a queue cutter signal in NB direction controls the traffic. Ashby Ave. shall be tied to the grade crossing control system for preemption.
Parallel roadways	☒ Yes **Northvale Rd. and Exposition Blvd.** ☐ No	Turns restricted to right-in and right-out only on parallel roadways, Northvale Rd. and Exposition Blvd.
Parallel driveways	☒ Yes **Northwest of crossing, residential driveway** ☐ No	Grade crossing controls shall be used. Expo will install 4-Quad gate control for additional safety.

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	Prepared by: J Van Hoff Date: 4/15/10
Grade Crossing: OVERLAND AVENUE **Drawing No. GC-005 and T-006A**	**Diagnostic Team** **Initial Review Date: 7/27/10**
Crossing No. 84S – 109.5 USDOT No.	**Final Review Date: 8/2/10**

Train Speed: 55 mph	**Type of Train Operation:**	
	Exclusive	☐ Yes ☒ No Grade Separated
Frequency of Trains (per hr in each direction): 6/hr/dr	**Semi-exclusive**	☒ Yes ☐ No At-Grade with fencing/barriers between crossings
	Street Running	☐ Yes ☒ No Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 76ft **Current No. of Lanes per Direction:** **2-NB & 2-SB**	**Roadway Volumes:** LADOT Volumes **ADT: 44,000**	**Peak Hour Volume:** **(Expo 2007)** **AM: NB – 1874, SB - 1326** **PM: NB – 1618, SB - 2010**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Restricted pedestrian sight distance	☒ Yes ☐ No	It is Metro's standard practice to install automatic pedestrian gates with emergency swing gates and tactile warning strips for pedestrian paths that cross the tracks.
Pedestrian crosses tracks with train(s) approaching	Elementary School near crossing ☒Yes ☐ No Safe Route to School **on Overland between Pico Blvd. and National/I10 WB ramps** ☒ Yes ☐ No	Observed pedestrian counts taken in 2009 by LADOT were low. However, it is Metro's standard practice to install automatic pedestrian gates with emergency swing gates and tactile warning strips for pedestrian paths that cross the tracks.
Pedestrian crosses tracks with train (s) Approaching	Middle or High School near crossing ☐ Yes ☒ No Major Pedestrian Route to School ☐ Yes ☒ No	None
Pedestrian crosses tracks with train (s) approaching	Retirement Home near crossing ☐ Yes ☒ No Ped Route to Commercial Property ☐ Yes ☒ No Commercial/Industrial property near crossing ☐ Yes ☒ No	None

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS		Prepared by: J Van Hoff Date: 4/15/10
Grade Crossing: OVERLAND AVENUE **Drawing No. GC-005 and T-006A**		**Diagnostic Team** **Initial Review Date: 7/27/10**
Crossing No. 84S – 109.5	**USDOT No.**	**Final Review Date: 8/2/10**

Train Speed: 55 mph	**Type of Train Operation:**	
	Exclusive	☐ Yes ☒ No Grade Separated
Frequency of Trains (per hr in each direction): 6/hr/dr	**Semi-exclusive**	☒ Yes ☐ No At-Grade with fencing/barriers between crossings
	Street Running	☐ Yes ☒ No Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 76ft **Current No. of Lanes per Direction:** **2-NB & 2-SB**	**Roadway Volumes:** LADOT Volumes **ADT: 44,000**	**Peak Hour Volume:** **(Expo 2007)** **AM: NB – 1874, SB - 1326** **PM: NB – 1618, SB - 2010**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Potential pedestrian surges	LRV Station ☐ Yes ☒ No Event/Entertainment Center ☐ Yes ☒ No	None
Multi-purpose trail crosses tracks	☒ Yes ☐ No	Bike/pedestrian trail transitions from north side to south side of the LRT along the west side of Overland Ave. It is Metro's standard practice to install automatic pedestrian gates with emergency swing gates and tactile warning strips for pedestrian paths that cross the tracks. Bicyclists will use these gates to cross the tracks too.

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	**Prepared by:** J Van Hoff **Date: 4/15/10**
Grade Crossing: WESTWOOD BOULEVARD **Drawing No. GC – 006 and T-006A**	**Diagnostic Team** **Initial Review Date: 7/27/10**
Crossing No. 84S – 109.8 USDOT No.	**Final Review Date: 8/2/10**

Train Speed: 30 mph and adjacent to station area

Frequency of Trains (per hr in each direction): 6/hr/dr

Type of Train Operation:

Exclusive	☐ Yes	☒ No	Grade Separated
Semi-exclusive	☒ Yes	☐ No	At-Grade with fencing/barriers between crossings
Street Running	☐ Yes	☒ No	Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 60ft

Current No. of Lanes per Direction:
1-NB Thru, NB Left-turn & 2-SB

Roadway Volumes:
LADOT Volumes

ADT: 21,000

Peak Hour Volume:
(Expo 2007)
AM: NB – 1131, SB - 567
PM: NB – 659, SB - 1353

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Train speed	☒ <35 mph – **Posted 55 mph and adjacent to station** ☐ >35 mph	The LRT posted speed for this segment is 55 mph. However, since the crossing is near a station, the actual speed will be approximately 30 MPH. The mitigation is to install No. 9 railroad gates. Expo will install 4-Quad gate control for additional safety.
Roadway speed	30 mph	Grade crossing controls shall be used. Expo will install 4-Quad gate control for additional safety.
Skewed crossing	☒ <30° from perpendicular ☐ >30° from perpendicular	Grade crossing controls shall be used. Expo will install 4-Quad gate control for additional safety.
Restricted vehicle sight distance	☐ Yes ☒ No	None

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	**Prepared by:** J Van Hoff **Date: 4/15/10**
Grade Crossing: WESTWOOD BOULEVARD **Drawing No. GC – 006 and T-006A**	**Diagnostic Team** **Initial Review Date: 7/27/10**
Crossing No. 84S – 109.8 USDOT No.	**Final Review Date: 8/2/10**

Train Speed: 30 mph and adjacent to station area	**Type of Train Operation:**		
	Exclusive	☐ Yes ☒ No	Grade Separated
	Semi-exclusive	☒ Yes ☐ No	At-Grade with fencing/barriers between crossings
Frequency of Trains (per hr in each direction): 6/hr/dr	**Street Running**	☐ Yes ☒ No	Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 60ft			**Peak Hour Volume:**
Current No. of Lanes per Direction: **1-NB Thru, NB Left-turn & 2-SB**	**Roadway Volumes:** LADOT Volumes	**ADT: 21,000**	**(Expo 2007)** **AM: NB – 1131, SB - 567** **PM: NB – 659, SB - 1353**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Left turn movement onto crossing	☐ Protected ☐ Permissive ☐ Truck/Bus % _____	Currently left turns onto the crossing area are allowed from parallel roadways North and South Exposition Blvd. Propose to not allow these left turns. For South Exposition Blvd., flexible delineators prevent the left turn movement and static right turn only (R3-5R) sign will be installed. For the North Exposition Blvd., install static right turn only (R3-5R) sign.
Left turn movement across crossing	☒ Protected **NB** ☐ Permissive ☐ Truck/Bus % _____	NB Westwood Blvd. left turn movement through the crossing on to North Exposition Blvd. will be protected. Currently North Exposition Blvd. is stop controlled and will be signalized. Will provide pre-signal with overlap for NB left and preemption. There is no SB left turn.

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	**Prepared by:** J Van Hoff **Date: 4/15/10**
Grade Crossing: WESTWOOD BOULEVARD **Drawing No. GC – 006 and T-006A**	**Diagnostic Team** **Initial Review Date: 7/27/10**
Crossing No. 84S – 109.8 USDOT No.	**Final Review Date: 8/2/10**

Train Speed: 30 mph and adjacent to station area **Frequency of Trains (per hr in each direction): 6/hr/dr**	**Type of Train Operation:**	
	Exclusive	☐ Yes ☒ No Grade Separated
	Semi-exclusive	☒ Yes ☐ No At-Grade with fencing/barriers between crossings
	Street Running	☐ Yes ☒ No Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 60ft **Current No. of Lanes per Direction:** **1-NB Thru, NB Left-turn & 2-SB**	**Roadway Volumes:** LADOT Volumes **ADT: 21,000**	**Peak Hour Volume:** **(Expo 2007)** **AM: NB – 1131, SB - 567** **PM: NB – 659, SB - 1353**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Right turn movement onto tracks	☐ Insufficient Clear Storage Area for design vehicle ☐ Truck Route - %Trucks_____ ☐ School Bus Route	EB right turn from North Exposition Blvd. will be controlled by an exclusive phase and shall have a no right turn (R3-1) blank-out sign. The WB right turn from South Exposition Blvd. will be stop controlled and will have a no right turn (R3-1) blank-out sign to be activated during preemption.
Right turn movement across tracks	☐ Insufficient Clear Storage Area for design vehicle ☐ Truck Route - %Trucks_____ ☐ School Bus Route	Currently right turns from Westwood Blvd. are allowed on to parallel roadways North and South Exposition Blvd. Will not allow these right turns by making North and South Exposition Blvd. one-way.
Vehicles queue from **Ashby Ave.** intersection onto crossing (Influence zone)	☐ Yes ☒ No	None – however, due to the complexity of the crossing (two frontage roads immediately adjacent to the crossing), add second lane in NB direction on Westwood, and signalize Ashby Ave. and North Exposition Ave. per FEIR.

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	**Prepared by:** J Van Hoff **Date: 4/15/10**
Grade Crossing: WESTWOOD BOULEVARD **Drawing No. GC – 006 and T-006A**	**Diagnostic Team** **Initial Review Date: 7/27/10**
Crossing No. 84S – 109.8 USDOT No.	**Final Review Date: 8/2/10**

Train Speed: 30 mph and adjacent to station area **Frequency of Trains (per hr in each direction): 6/hr/dr**	**Type of Train Operation:**		
	Exclusive	☐ Yes ☒ No	Grade Separated
	Semi-exclusive	☒ Yes ☐ No	At-Grade with fencing/barriers between crossings
	Street Running	☐ Yes ☒ No	Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 60ft **Current No. of Lanes per Direction:** **1-NB Thru, NB Left-turn & 2-SB**	**Roadway Volumes:** LADOT Volumes **ADT: 21,000**	**Peak Hour Volume:** **(Expo 2007)** **AM: NB – 1131, SB - 567** **PM: NB – 659, SB - 1353**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Vehicles queue from **Coventry Ave.** intersection onto crossing (Influence zone)	☐ Yes ☒ No	None – 1220' current storage area with a 2030 projected queue of 74' AM and 261' PM per FEIR.
Vehicles queue from crossing into **Ashby Ave.** intersection (Spillback zone)	☐ Yes ☒ No	None
Vehicles queue from crossing into **Coventry Ave.** intersection (Spillback zone)	☐ Yes ☒ No	None – 1220' current storage area with a 2030 projected queue of 516' AM and 370' PM per FEIR.
Vehicle driven around downed crossing gates	☐ Excessive warning activation time ☒ Frequency of Activation - **12/hr (6/hr/direction)** ☐ Meet Point for Trains causing extensive gate down time ☒ Number of Tracks__**2**__ ☐ Non-Mainline Tracks ☐ Mixed Operations ☒ Station adjacent to crossing	The need for a NB left turn pocket prohibits the installation of a raised median. Grade crossing controls shall be used and tied to the traffic signals at Ashby Ave., North and South Exposition Blvd. Expo will install 4-Quad gate control for additional safety.

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	**Prepared by:** J Van Hoff **Date: 4/15/10**
Grade Crossing: WESTWOOD BOULEVARD **Drawing No. GC – 006 and T-006A**	**Diagnostic Team** **Initial Review Date: 7/27/10**
Crossing No. 84S – 109.8 USDOT No.	**Final Review Date: 8/2/10**

Train Speed: 30 mph and adjacent to station area **Frequency of Trains (per hr in each direction): 6/hr/dr**	**Type of Train Operation:**	
	Exclusive	☐ Yes ☒ No Grade Separated
	Semi-exclusive	☒ Yes ☐ No At-Grade with fencing/barriers between crossings
	Street Running	☐ Yes ☒ No Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 60ft **Current No. of Lanes per Direction: 1-NB Thru, NB Left-turn & 2-SB**	**Roadway Volumes:** LADOT Volumes **ADT: 21,000**	**Peak Hour Volume: (Expo 2007)** **AM: NB – 1131, SB - 567** **PM: NB – 659, SB - 1353**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Parallel roadways	☒ Yes **North and South Exposition Blvds** ☐ No	South Exposition Blvd. (west side of Westwood Blvd.) shall be one- way EB and South Exposition Blvd. (east of Westwood Blvd.) shall be right-in and right-out. North Exposition Blvd. and Ashby Ave. will be signal controlled and a pre-signal operation will control movements across the tracks.
Parallel driveways	☐ Yes ☒ No	None
Restricted pedestrian sight distance	☐ Yes ☒ No	None
Pedestrian crosses tracks with train(s) approaching	Elementary School near crossing ☐Yes ☒ No Safe Route to School **on Westwood Blvd. between Pico Blvd. and Coventry Pl.** ☒ Yes ☐ No	It is Metro's standard practice to install automatic pedestrian gates with emergency swing gates and tactile warning strips for pedestrian paths that cross the tracks.
Pedestrian crosses tracks with train (s) approaching	Middle or High School near crossing ☐ Yes ☒ No Major Pedestrian Route to School ☐ Yes ☒No	None

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	**Prepared by:** J Van Hoff **Date: 4/15/10**
Grade Crossing: WESTWOOD BOULEVARD **Drawing No. GC – 006 and T-006A**	**Diagnostic Team** **Initial Review Date: 7/27/10**
Crossing No. 84S – 109.8 USDOT No.	**Final Review Date: 8/2/10**

Train Speed: 30 mph and adjacent to station area	**Type of Train Operation:**		
	Exclusive	☐ Yes ☒ No	Grade Separated
	Semi-exclusive	☒ Yes ☐ No	At-Grade with fencing/barriers between crossings
Frequency of Trains (per hr in each direction): 6/hr/dr	**Street Running**	☐ Yes ☒ No	Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 60ft			**Peak Hour Volume:**
Current No. of Lanes per Direction: **1-NB Thru, NB Left-turn & 2-SB**	**Roadway Volumes:** LADOT Volumes	**ADT: 21,000**	**(Expo 2007)** **AM: NB – 1131, SB - 567** **PM: NB – 659, SB - 1353**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Pedestrian crosses tracks with train (s) approaching	Retirement Home near crossing ☐ Yes ☒ No Ped Route to Commercial Property ☐ Yes ☒ No Commercial/Industrial property near crossing ☐ Yes ☒ No	None
Potential pedestrian surges	LRV Station ☒Yes ☐ No Event/Entertainment Center ☐ Yes ☒ No	Westwood Blvd. NB and SB curb lanes will be widened to 20' to accommodate on street bus stops. Provide pedestrian automatic gates for the crossing and No. 8 flashers at station access.
Multi-purpose trail crosses tracks	☐ Yes ☒ No	None

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	**Prepared by:** J Van Hoff **Date: 4/15/10**
Grade Crossing: MILITARY AVENUE **Drawing No. GC – 007 and T-005A**	**Diagnostic Team** **Initial Review Date: 7/27/10**
Crossing No. 84S – 110.1 USDOT No.	**Final Review Date: 8/3/10**

Train Speed: 55 mph	**Type of Train Operation:**	
	Exclusive	☐ Yes ☒ No Grade Separated
Frequency of Trains (per hr in each direction): 6/hr/dr	**Semi-exclusive**	☒ Yes ☐ No At-Grade with fencing/barriers between crossings
	Street Running	☐ Yes ☒ No Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 36ft			**Peak Hour Volume:**
	Roadway Volumes		**(Expo 2007)**
Current No. of Lanes per Direction	LADOT Volumes	**ADT: 4,000**	**AM: NB – 309, SB - 92**
1-NB, 1-SB Thru, 1-SB Lt			**PM: NB – 96, SB - 366**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Train speed	☐ <35 mph ☒ >35 mph	The LRT posted speed for this segment is 55 mph. The mitigation is to install No. 9 railroad gates. Expo will install 4-Quad gate control for additional safety.
Roadway speed	30 mph	Grade crossing controls shall be used. Expo will install 4-Quad gate control for additional safety.
Skewed crossing	☒ <30° from perpendicular ☐ >30° from perpendicular	Grade crossing controls shall be used. Expo will install 4-Quad gate control for additional safety.
Restricted vehicle sight distance	☐ Yes ☒ No	None
Left turn movement onto crossing	☐ Protected ☒ Permissive **EB and WB** ☐ Truck/Bus % _____	WB left turns from North Exposition Blvd. will be signal controlled. EB left turns from South Exposition Blvd. will be restricted during preemption and will have a no left turn (R3- 2) blank-out sign.

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	**Prepared by:** J Van Hoff **Date: 4/15/10**
Grade Crossing: MILITARY AVENUE **Drawing No. GC – 007 and T-005A**	**Diagnostic Team** **Initial Review Date: 7/27/10**
Crossing No. 84S – 110.1 USDOT No.	**Final Review Date: 8/3/10**

Train Speed: 55 mph	**Type of Train Operation:**	
	Exclusive	☐ Yes ☒ No Grade Separated
Frequency of Trains (per hr in each direction): 6/hr/dr	**Semi-exclusive**	☒ Yes ☐ No At-Grade with fencing/barriers between crossings
	Street Running	☐ Yes ☒ No Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 36ft **Current No. of Lanes per Direction** **1-NB, 1-SB Thru, 1-SB Lt**	**Roadway Volumes** LADOT Volumes **ADT: 4,000**	**Peak Hour Volume:** **(Expo 2007)** **AM: NB – 309, SB - 92** **PM: NB – 96, SB - 366**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Left turn movement across crossing	☒ Protected **NB and SB** ☐ Permissive ☐ Truck/Bus % _____	Currently North and South Exposition Blvd. are stop controlled; these will be signalized. A pre-signal operation shall be used to control the grade crossing, North and South Exposition Blvd.
Right turn movement onto tracks	☐ Insufficient Clear Storage Area for design vehicle ☐ Truck Route - %Trucks_____ ☐ School Bus Route	WB right turn from South Exposition Blvd. will have a no right turn (R3-1) blank-out sign.
Right turn movement across tracks	☐ Insufficient Clear Storage Area for design vehicle ☐ Truck Route - %Trucks_____ ☐ School Bus Route	4-Quad gate control and pre-signal operation will be used to control the right turns from Military Ave. to North and South Exposition Blvd.
Vehicles queue from **North Exposition Blvd.** intersection onto crossing (Influence zone)	☐ Yes ☒ No	None
Vehicles queue from **South Exposition** Blvd. intersection onto crossing (Influence zone)	☐ Yes ☒ No	None
Vehicles queue from crossing into **North Exposition Blvd.** intersection (Spillback zone)	☐ Yes ☒ No	None

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	**Prepared by:** J Van Hoff **Date: 4/15/10**
Grade Crossing: MILITARY AVENUE **Drawing No. GC – 007 and T-005A**	**Diagnostic Team** **Initial Review Date: 7/27/10**
Crossing No. 84S – 110.1 USDOT No.	**Final Review Date: 8/3/10**

Train Speed: 55 mph	**Type of Train Operation:**	
	Exclusive	☐ Yes ☒ No Grade Separated
Frequency of Trains (per hr in each direction): 6/hr/dr	**Semi-exclusive**	☒ Yes ☐ No At-Grade with fencing/barriers between crossings
	Street Running	☐ Yes ☒ No Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 36ft **Current No. of Lanes per Direction** **1-NB, 1-SB Thru, 1-SB Lt**	**Roadway Volumes** LADOT Volumes **ADT: 4,000**	**Peak Hour Volume:** **(Expo 2007)** **AM: NB – 309, SB - 92** **PM: NB – 96, SB - 366**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Vehicles queue from crossing into **South Exposition Blvd.** intersection (Spillback zone)	☐ Yes ☒ No	None
Vehicle driven around downed crossing gates	☐ Excessive warning activation time ☒ Frequency of Activation - **12/hr (6/hr/direction)** ☐ Meet Point for Trains causing extensive gate down time ☒ Number of Tracks__**2**__ ☐ Non-Mainline Tracks ☐ Mixed Operations ☐ Station adjacent to crossing	Grade crossing controls shall be used and tied to the traffic signals at North and South Exposition Blvd. Expo will install 4-Quad gate control for additional safety.
Parallel roadways	☒ Yes **North and South Exposition Blvd.** ☐ No	Install traffic signals with preemption.
Parallel driveways	☐ Yes ☒ No	None
Restricted pedestrian sight distance	☐ Yes ☒ No	None
Pedestrian crosses tracks with train (s) approaching	Elementary School near crossing ☐Yes ☒ No Safe Route to School ☐ Yes ☒ No	None

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	**Prepared by:** J Van Hoff **Date: 4/15/10**
Grade Crossing: MILITARY AVENUE **Drawing No. GC – 007 and T-005A**	**Diagnostic Team** **Initial Review Date: 7/27/10**
Crossing No. 84S – 110.1 USDOT No.	**Final Review Date: 8/3/10**

Train Speed: 55 mph	**Type of Train Operation:**	
	Exclusive	☐ Yes ☒ No Grade Separated
Frequency of Trains (per hr in each direction): 6/hr/dr	**Semi-exclusive**	☒ Yes ☐ No At-Grade with fencing/barriers between crossings
	Street Running	☐ Yes ☒ No Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 36ft **Current No. of Lanes per Direction** **1-NB, 1-SB Thru, 1-SB Lt**	**Roadway Volumes** LADOT Volumes **ADT: 4,000**	**Peak Hour Volume:** **(Expo 2007)** **AM: NB – 309, SB - 92** **PM: NB – 96, SB - 366**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Pedestrian crosses tracks with train (s) approaching	Middle or High School near crossing ☐ Yes ☒ No Major Pedestrian Route to School ☐ Yes ☒ No	None
Pedestrian crosses tracks with train (s) approaching	Retirement Home near crossing ☐ Yes ☒ No Ped Route to Commercial Property ☐ Yes ☒ No Commercial/Industrial property near crossing ☐ Yes ☒ No	None
Potential pedestrian surges	LRV Station ☐Yes ☒ No Event/Entertainment Center ☐ Yes ☒ No	None
Multi-purpose trail crosses tracks	☐Yes ☒ No	None

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

GRADE CROSSING HAZARD ANALYSIS	**Prepared by:** J Van Hoff **Date: 3/30/11**
Grade Crossing: SEPULVEDA BOULEVARD **Drawing No. GC – 041 and T-005a**	**Diagnostic Team** **Initial Review Date: 7/29/10**
Crossing No. 84S – 110.3 **USDOT No.**	**Final Review Date: 8/2/10**

Train Speed: 55 mph	**Type of Train Operation:**	
	Exclusive	☒ Yes ☐ No Grade Separated
Frequency of Trains (per hr in each direction): 6/hr/dr	**Semi-exclusive**	☐ Yes ☒ No At-Grade with fencing/barriers between crossings
	Street Running	☐ Yes ☒ No Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 85ft		**Peak Hour Volume:**
	Roadway Volumes:	**(Expo 2007)**
Current No. of Lanes per Direction: 2-NB and 2-SB	LADOT Volumes **ADT: 40,000**	**AM: NB – 1722, SB - 580** **PM: NB –1088, SB - 1048**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Train speed	☐ <35 mph ☒>35 mph – **Posted 55 mph and adjacent to station**	
Roadway speed	30 mph	Not Applicable since it is grade separated.
Skewed crossing	☒ <30° from perpendicular ☐ >30° from perpendicular	Not Applicable since it is grade separated.
Restricted vehicle sight distance	☐ Yes ☐ No	Not Applicable since it is grade separated.
Left turn movement onto crossing	☐ Protected ☐ Permissive ☐ Truck/Bus % _____	Not Applicable since it is grade separated.
Right turn movement onto tracks	☐ Insufficient Clear Storage Area for design vehicle ☐ Truck Route - %Trucks_____ ☐ School Bus Route	Not Applicable since it is grade separated.
Vehicles queue from intersection onto crossing (Influence zone)	☐ Yes ☐ No	Not Applicable since it is grade separated.
Vehicles queue from crossing into intersection (Spillback zone)	☐ Yes ☐ No	Not Applicable since it is grade separated.

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

GRADE CROSSING HAZARD ANALYSIS	**Prepared by:** J Van Hoff **Date: 3/30/11**
Grade Crossing: SEPULVEDA BOULEVARD **Drawing No. GC – 041 and T-005a**	**Diagnostic Team** **Initial Review Date: 7/29/10**
Crossing No. 84S – 110.3 USDOT No.	**Final Review Date: 8/2/10**

Train Speed: 55 mph	**Type of Train Operation:**	
	Exclusive	☒ Yes ☐ No Grade Separated
Frequency of Trains (per hr in each direction): 6/hr/dr	**Semi-exclusive**	☐ Yes ☒ No At-Grade with fencing/barriers between crossings
	Street Running	☐ Yes ☒ No Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 85ft **Current No. of Lanes per Direction: 2-NB and 2-SB**	**Roadway Volumes:** LADOT Volumes **ADT: 40,000**	**Peak Hour Volume: (Expo 2007)** **AM: NB – 1722, SB - 580** **PM: NB –1088, SB - 1048**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Vehicle driven around downed crossing gates	☐ Excessive warning activation time ☐ Frequency of Activation - **12/ hr (6/hr/direction)** ☐ Meet Point for Trains causing extensive gate down time ☐ Number of Tracks__**2**__ ☐ Non-Mainline Tracks ☐ Mixed Operations ☐ Station adjacent to crossing	Not Applicable since it is grade separated.
Parallel roadways	☐ Yes ☐ No	Not Applicable since it is grade separated.
Parallel driveways	☐ Yes ☐ No	Not Applicable since it is grade separated.
Restricted pedestrian sight distance	☐ Yes ☐ No	Not Applicable since it is grade separated.
Pedestrian crosses tracks with train(s) approaching	Elementary School near crossing ☐Yes ☐ No Safe Route to School ☐ Yes ☐ No	Not Applicable since it is grade separated.
Pedestrian crosses tracks with train (s) approaching	Middle or High School near crossing ☐ Yes ☐ No Major Pedestrian Route to School ☐ Yes ☐ No	Not Applicable since it is grade separated.

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

GRADE CROSSING HAZARD ANALYSIS			**Prepared by:** J Van Hoff **Date: 3/30/11**
Grade Crossing: SEPULVEDA BOULEVARD **Drawing No. GC – 041 and T-005a**		**Diagnostic Team**	**Initial Review Date: 7/29/10**
Crossing No. 84S – 110.3	**USDOT No.**		**Final Review Date: 8/2/10**
Train Speed: 55 mph **Frequency of Trains (per hr in each direction): 6/hr/dr**	**Type of Train Operation:** **Exclusive** ☒ Yes ☐ No Grade Separated **Semi-exclusive** ☐ Yes ☒ No At-Grade with fencing/barriers between crossings **Street Running** ☐ Yes ☒ No Mixed flow, LRT/Ped Mall, Separated from traffic by curb		
Roadway Width: 85ft **Current No. of Lanes per Direction: 2-NB and 2-SB**	**Roadway Volumes:** LADOT Volumes	**ADT: 40,000**	**Peak Hour Volume: (Expo 2007)** **AM: NB – 1722, SB - 580** **PM: NB –1088, SB - 1048**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Pedestrian crosses tracks with train (s) approaching	Retirement Home near crossing ☐ Yes ☐ No Ped Route to Commercial Property ☐ Yes ☐ No Commercial/Industrial property near crossing ☐ Yes ☐ No	Not Applicable since it is grade separated.
Potential pedestrian surges	LRV Station ☐Yes ☐ No Event/Entertainment Center ☐ Yes ☐ No	Not Applicable since it is grade separated.
Multi-purpose trail crosses tracks	☐ Yes ☐ No	Not Applicable since it is grade separated.

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	Prepared by: J. Van Hoff Date: 4/30/10
Grade Crossing: SAWTELLE BOULEVARD **Drawing No. GC-009 and T-005A**	**Diagnostic Team** **Initial Review Date: 7/27/10**
Crossing No. 84S – 110.5 USDOT No.	**Final Review Date: 8/2/10**

Train Speed: 55 mph and adjacent to station

Frequency of Trains (per hr in each direction): 6/hr/dr

Type of Train Operation:

Exclusive	☒ Yes	☐ No	Grade Separated
Semi-exclusive	☐ Yes	☒ No	At-Grade with fencing/barriers between crossings
Street Running	☐ Yes	☒ No	Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 60 feet

Current No. of Lanes per Direction: 2-NB, 2-SB

Roadway Volumes: **ADT N/A**

Peak Hour Volume: (Expo 2007)
AM: NB – 930, SB – 581
PM: NB – 857, SB – 1506

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Train speed	☐ <35 mph ☒ >35 mph – **Posted 55 mph and adjacent to station**	
Roadway speed	35 mph	
Skewed crossing	☒ <30° from perpendicular ☐ >30° from perpendicular	Not applicable since it is grade separated.
Restricted vehicle sight distance	☐ Yes ☐ No	Not applicable since it is grade separated.
Left turn movement onto crossing	☐ Protected ☐ Permissive ☐ Truck/Bus % _____	Not applicable since it is grade separated.
Left turn movement across crossing	☐ Protected ☐ Permissive ☐ Truck/Bus % _____	Not applicable since it is grade separated.
Right turn movement onto tracks	☐ Insufficient Clear Storage Area for design vehicle ☐ Truck Route - %Trucks_____ ☐ School Bus Route	Not applicable since it is grade separated.
Right turn movement across tracks	☐ Insufficient Clear Storage Area for design vehicle ☐ Truck Route - %Trucks_____ ☐ School Bus Route	Not applicable since it is grade separated.
Vehicles queue from intersection onto crossing (Influence zone)	☐ Yes ☐ No	Not applicable since it is grade separated.

Potential Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	Prepared by: J. Van Hoff Date: 4/30/10
Grade Crossing: SAWTELLE BOULEVARD **Drawing No. GC-009 and T-005A**	**Diagnostic Team** **Initial Review Date: 7/27/10**
Crossing No. 84S – 110.5 USDOT No.	**Final Review Date: 8/2/10**

Train Speed: 55 mph and adjacent to station **Frequency of Trains (per hr in each direction): 6/hr/dr**	**Type of Train Operation:** **Exclusive**	☒ Yes ☐ No Grade Separated
	Semi-exclusive	☐ Yes ☒ No At-Grade with fencing/barriers between crossings
	Street Running	☐ Yes ☒ No Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 60 feet **Current No. of Lanes per Direction: 2-NB, 2-SB**	**Roadway Volumes:** **ADT N/A**	**Peak Hour Volume: (Expo 2007)** **AM: NB – 930, SB – 581** **PM: NB – 857, SB – 1506**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Vehicles queue from intersection onto crossing (spillback)	☐ Yes ☐ No	Not applicable since it is grade separated.
Vehicle driven around downed crossing gates	☐ Excessive warning activation time ☐ Frequency of Activation - **12/hr (6/hr/direction)** ☐ Meet Point for Trains causing extended gate down time ☐ Number of Tracks - **2** ☐ Non-Mainline Tracks ☐ Station adjacent to crossing	Not applicable since it is grade separated.
Parallel roadways	☐ Yes ☐ No	Not applicable since it is grade separated.
Parallel driveways	☐ Yes ☐ No	Not applicable since it is grade separated.
Restricted pedestrian sight distance	☐ Yes ☐ No	Not applicable since it is grade separated.
Pedestrian crosses tracks with train(s) approaching	Elementary School near crossing ☐ Yes ☐ No Safe Route to School ☐ Yes ☐ No	Not applicable since it is grade separated.

Potential Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	Prepared by: J. Van Hoff Date: 4/30/10
Grade Crossing: SAWTELLE BOULEVARD **Drawing No. GC-009 and T-005A**	**Diagnostic Team** **Initial Review Date: 7/27/10**
Crossing No. 84S – 110.5 USDOT No.	**Final Review Date: 8/2/10**

Train Speed: 55 mph and adjacent to station	**Type of Train Operation:**	
	Exclusive	☒ Yes ☐ No Grade Separated
	Semi-exclusive	☐ Yes ☒ No At-Grade with fencing/barriers between crossings
Frequency of Trains (per hr in each direction): 6/hr/dr	**Street Running**	☐ Yes ☒ No Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 60 feet	**Roadway Volumes:** **ADT N/A**	**Peak Hour Volume: (Expo 2007)** **AM: NB – 930, SB – 581**
Current No. of Lanes per Direction: 2-NB, 2-SB		**PM: NB – 857, SB – 1506**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Pedestrian crosses tracks with train (s) approaching	Middle or High School near crossing ☐ Yes ☐ No Major Pedestrian Route to School ☐ Yes ☐ No	Not applicable since it is grade separated.
Pedestrian crosses tracks with train (s) approaching	Retirement Home near crossing ☐ Yes ☐ No Ped Route to Commercial Property ☐ Yes ☐ No Commercial/Industrial property near crossing ☐ Yes ☐ No	Not applicable since it is grade separated.
Potential pedestrian surges	LRV Station ☐ Yes ☐ No Event/Entertainment Center ☐ Yes ☐ No	Not applicable since it is grade separated.
Multi-purpose trail crosses tracks	☐ Yes ☒ No	

Potential Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	Prepared by: J. Van Hoff Date: 4/30/10
Grade Crossing: PICO BLVD **Drawing No. GC-010 and T-005A**	**Diagnostic Team** **Initial Review Date: 7/27/10**
Crossing No. 84S – 110.7 USDOT No.	**Final Review Date: 8/2/10**

Train Speed: 55 mph	**Type of Train Operation:**	
	Exclusive	☒ Yes ☐ No Grade Separated
Frequency of Trains (per hr in each direction): 6/hr/dr	**Semi-exclusive**	☐ Yes ☒ No At-Grade with fencing/barriers between crossings
	Street Running	☐ Yes ☒ No Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 75 feet **Current No. of Lanes per Direction:** **3-EB, 3-WB**	**Roadway Volumes:** **ADT N/A**	**Peak Hour Volume: (Expo 2007)** **AM: EB – 2294, WB – 1706** **PM: EB – 2551, WB – 2293**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Train speed	☐ <35 mph ☒ >35 mph – Posted 55 mph	
Roadway speed	35 mph	
Skewed crossing	☐ <30° from perpendicular ☒ >30° from perpendicular	Not applicable since it is grade separated.
Restricted vehicle sight distance	☐ Yes ☐ No	Not applicable since it is grade separated.
Left turn movement onto crossing	☐ Protected ☐ Permissive ☐ Truck/Bus % _____	Not applicable since it is grade separated.
Left turn movement across crossing	☐ Protected ☐ Permissive ☐ Truck/Bus % _____	Not applicable since it is grade separated.
Right turn movement onto tracks	☐ Insufficient Clear Storage Area for design vehicle ☐ Truck Route - %Trucks_____ ☐ School Bus Route	Not applicable since it is grade separated.
Right turn movement across tracks	☐ Insufficient Clear Storage Area for design vehicle ☐ Truck Route - %Trucks_____ ☐ School Bus Route	Not applicable since it is grade separated.
Vehicles queue from intersection onto crossing (Influence zone)	☐ Yes ☐ No	Not applicable since it is grade separated.
Vehicles queue from intersection onto crossing (spillback)	☐ Yes ☐ No	Not applicable since it is grade separated.

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	Prepared by: J. Van Hoff Date: 4/30/10
Grade Crossing: PICO BLVD **Drawing No. GC-010 and T-005A**	**Diagnostic Team** **Initial Review Date: 7/27/10**
Crossing No. 84S – 110.7 USDOT No.	**Final Review Date: 8/2/10**

Train Speed: 55 mph	**Type of Train Operation:**	
	Exclusive	☒ Yes ☐ No Grade Separated
Frequency of Trains (per hr in each direction): 6/hr/dr	**Semi-exclusive**	☐ Yes ☒ No At-Grade with fencing/barriers between crossings
	Street Running	☐ Yes ☒ No Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 75 feet **Current No. of Lanes per Direction:** **3-EB, 3-WB**	**Roadway Volumes:** **ADT N/A**	**Peak Hour Volume: (Expo 2007)** **AM: EB – 2294, WB – 1706** **PM: EB – 2551, WB – 2293**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Vehicle driven around downed crossing gates	☐ Excessive warning activation time ☐ Frequency of Activation - **12/hr (6/hr/direction)** ☐ Meet Point for Trains causing extended gate down time ☐ Number of Tracks - **2** ☐ Non-Mainline Tracks ☐ ☐ Station adjacent to crossing	Not applicable since it is grade separated.
Parallel roadways	☐ Yes ☐ No	Not applicable since it is grade separated.
Parallel driveways	☐ Yes ☐ No	Not applicable since it is grade separated.
Restricted pedestrian sight distance	☐ Yes ☐ No	Not applicable since it is grade separated.
Pedestrian crosses tracks with train(s) approaching	Elementary School near crossing ☐ Yes ☐ No Safe Route to School ☐ Yes ☐ No	Not applicable since it is grade separated.
Pedestrian crosses tracks with train (s) approaching	Middle or High School near crossing ☐ Yes ☐ No Major Pedestrian Route to School ☐ Yes ☐ No	Not applicable since it is grade separated.

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	Prepared by: J. Van Hoff Date: 4/30/10
Grade Crossing: PICO BLVD **Drawing No. GC-010 and T-005A**	**Diagnostic Team** **Initial Review Date: 7/27/10**
Crossing No. 84S – 110.7 USDOT No.	**Final Review Date: 8/2/10**

Train Speed: 55 mph	**Type of Train Operation:**	
	Exclusive	☒ Yes ☐ No Grade Separated
Frequency of Trains (per hr in each direction): 6/hr/dr	**Semi-exclusive**	☐ Yes ☒ No At-Grade with fencing/barriers between crossings
	Street Running	☐ Yes ☒ No Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 75 feet **Current No. of Lanes per Direction:** **3-EB, 3-WB**	**Roadway Volumes:** **ADT N/A**	**Peak Hour Volume: (Expo 2007)** **AM: EB – 2294, WB – 1706** **PM: EB – 2551, WB – 2293**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Pedestrian crosses tracks with train (s) approaching	Retirement Home near crossing ☐ Yes ☐ No Ped Route to Commercial Property ☐ Yes ☐ No Commercial/Industrial property near crossing ☐ Yes ☐ No	Not applicable since it is grade separated.
Potential pedestrian surges	LRV Station ☐ Yes ☐ No Event/Entertainment Center ☐ Yes ☐ No	
Multi-purpose trail crosses tracks	☐ Yes ☒ No	

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	**Prepared by:** J Van Hoff **Date: 4/15/10**
Grade Crossing: BARRINGTON AVENUE **Drawing No. GC – 011 and T-004**	**Diagnostic Team** **Initial Review Date: 7/27/10**
Crossing No. 84S – 111.0 USDOT No.	**Final Review Date: 8/2/10**

Train Speed: 55 mph	**Type of Train Operation:**	
	Exclusive	☐ Yes ☒ No Grade Separated
Frequency of Trains (per hr in each direction): 6/hr/dr	**Semi-exclusive**	☒ Yes ☐ No At-Grade with fencing/barriers between crossings
	Street Running	☐ Yes ☒No Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 68 ft **Current No. of Lanes per Direction: 2-NB & 2-SB**	**Roadway Volumes:** LADOT Volumes **ADT: 30,000**	**Peak Hour Volume: (Expo 2007)** **AM: NB – 1893, SB - 806** **PM: NB –781, SB - 1607**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Train speed	☐ <35 mph ☒>35 mph	The LRT posted speed for this segment is 55 mph. The mitigation is to install No. 9 railroad gates. Expo will install 4-Quad gate control for additional safety.
Roadway speed	30 mph	Grade crossing controls shall be used. Expo will install 4-Quad gate control for additional safety.
Skewed crossing	☒ <30° from perpendicular ☐ >30° from perpendicular	Grade crossing controls shall be used. Expo will install 4-Quad gate control for additional safety.
Restricted vehicle sight distance	☐ Yes ☒ No	None
Left turn movement onto crossing	☐ Protected ☐ Permissive ☐ Truck/Bus % _____	Currently left turns are allowed from both South Exposition Blvd. and from a driveway northeast of the crossing onto crossing. These will not be allowed. A center raised median island will be installed to eliminate the left turns.

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	**Prepared by:** J Van Hoff **Date: 4/15/10**
Grade Crossing: BARRINGTON AVENUE **Drawing No. GC – 011 and T-004**	**Diagnostic Team** **Initial Review Date: 7/27/10**
Crossing No. 84S – 111.0 USDOT No.	**Final Review Date: 8/2/10**

Train Speed: 55 mph	**Type of Train Operation:**	
	Exclusive	☐ Yes ☒ No Grade Separated
Frequency of Trains (per hr in each direction): 6/hr/dr	**Semi-exclusive**	☒ Yes ☐ No At-Grade with fencing/barriers between crossings
	Street Running	☐ Yes ☒No Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 68 ft **Current No. of Lanes per Direction:** **2-NB & 2-SB**	**Roadway Volumes:** LADOT Volumes **ADT: 30,000**	**Peak Hour Volume: (Expo 2007)** **AM: NB – 1893, SB - 806** **PM: NB –781, SB - 1607**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Left turn movement across crossing	☐ Protected ☐ Permissive ☐ Truck/Bus % _____	Currently NB and SB Barrington Ave. left turn movements through the crossing to North and South Exposition Blvds are allowed. Both will not be allowed through the use of a center raised median and closure of South Exposition Blvd. east of Barrington Ave.
Right turn movement onto tracks	☐ Insufficient Clear Storage Area for design vehicle ☐ Truck Route - %Trucks_____ ☐ School Bus Route	EB right turn from North Exposition Blvd. will be stop sign controlled and will have a no right turn (R3-1) blank-out sign to be activated during preemption along with a flasher on a center raised median. The WB right turn from South Exposition Blvd. will be eliminated via street closure, per the FEIR.
Right turn movement across tracks	☐ Insufficient Clear Storage Area for design vehicle ☐ Truck Route - %Trucks_____ ☐ School Bus Route	Currently right turns from Barrington Ave. are allowed on to parallel South Exposition Blvd. and a driveway northeast of the crossing. Both will be allowed and controlled by the 4-Quad gate control and pre-signal operation.

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	**Prepared by:** J Van Hoff **Date: 4/15/10**
Grade Crossing: BARRINGTON AVENUE **Drawing No. GC – 011 and T-004**	**Diagnostic Team** **Initial Review Date: 7/27/10**
Crossing No. 84S – 111.0 USDOT No.	**Final Review Date: 8/2/10**

Train Speed: 55 mph	**Type of Train Operation:**	
	Exclusive	☐ Yes ☒ No Grade Separated
Frequency of Trains (per hr in each direction): 6/hr/dr	**Semi-exclusive**	☒ Yes ☐ No At-Grade with fencing/barriers between crossings
	Street Running	☐ Yes ☒No Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 68 ft **Current No. of Lanes per Direction: 2-NB & 2-SB**	**Roadway Volumes:** LADOT Volumes	**ADT: 30,000**	**Peak Hour Volume: (Expo 2007)** **AM: NB – 1893, SB - 806** **PM: NB –781, SB - 1607**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Vehicles queue from **Pico** intersection onto crossing (Influence zone)	☒ Yes **PM** ☐ No	Current 480' storage area with a 2030 projected queue of 134' AM and 463' PM per the FEIR. A queue cutter signal will be installed and Pico Blvd. will be interconnected. Also, add a dedicated SB right turn lane on to Pico Blvd per the FEIR.
Vehicles queue from **Olympic** intersection onto crossing (Influence zone)	☒ Yes **AM** ☐ No	Current 490' storage area with a 2030 projected queue of 619' AM and 351' PM per the FEIR. A queue cutter signal shall be installed and Olympic Ave. will be interconnected. Also, elongate the NB left turn lane at Olympic Bvld. and add a NB dedicated right turn lane at Olympic Blvd. per the FEIR.
Vehicles queue from crossing into **Pico** intersection (Spillback zone)	☐ Yes ☒ No	None - 480' current storage area with a 2030 projected queue of 426' AM and 230' PM per the FEIR.
Vehicles queue from crossing into **Olympic** intersection (Spillback zone)	☐ Yes ☒ No	None - 490' current storage area with a 2030 projected queue of 193' AM and 464' PM per the FEIR.

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	**Prepared by:** J Van Hoff **Date: 4/15/10**
Grade Crossing: BARRINGTON AVENUE **Drawing No. GC – 011 and T-004**	**Diagnostic Team** **Initial Review Date: 7/27/10**
Crossing No. 84S – 111.0 USDOT No.	**Final Review Date: 8/2/10**

Train Speed: 55 mph	**Type of Train Operation:**	
	Exclusive	☐ Yes ☒ No Grade Separated
Frequency of Trains (per hr in each direction): 6/hr/dr	**Semi-exclusive**	☒ Yes ☐ No At-Grade with fencing/barriers between crossings
	Street Running	☐ Yes ☒No Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 68 ft **Current No. of Lanes per Direction:** **2-NB & 2-SB**	**Roadway Volumes:** LADOT Volumes **ADT: 30,000**	**Peak Hour Volume: (Expo 2007)** **AM: NB – 1893, SB - 806** **PM: NB –781, SB - 1607**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Vehicle driven around downed crossing gates	☐ Excessive warning activation time ☒Frequency of Activation **12/hr (6/hr/direction)** ☐ Meet Point for Trains causing extensive gate down time ☒ Number of Tracks__**2**__ ☐ Non-Mainline Tracks ☐ Mixed Operations ☐ Station adjacent to crossing	Provide raised median with 4-Quad gate system and a queue cutter signal.
Parallel roadways	☒ Yes **North and South Exposition Blvd.** ☐ No	South Exposition Blvd. (west of Barrington Ave.) will be signal controlled. South Exposition Blvd. (east of Barrington Ave.) will be closed. North Exposition Blvd. will be limited to right-in and right-out only.
Parallel driveways	☒ Yes **Northeast of crossing, commercial driveway** ☐ No	A driveway northeast of the crossing exists and will remain open as right-in and right-out only.
Restricted pedestrian sight distance	☐ Yes ☒ No	None
Pedestrian crosses tracks with train(s) approaching	Elementary School near crossing ☐Yes ☒ No Safe Route to School **on Barrington Ave. between South Exposition Blvd. and Pico Blvd.** ☒Yes ☐No	It is Metro's standard practice to install automatic pedestrian gates with emergency swing gates and tactile warning strips for pedestrian paths that cross the tracks.

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	**Prepared by:** J Van Hoff **Date: 4/15/10**
Grade Crossing: BARRINGTON AVENUE **Drawing No. GC – 011 and T-004**	**Diagnostic Team** **Initial Review Date: 7/27/10**
Crossing No. 84S – 111.0 USDOT No.	**Final Review Date: 8/2/10**

Train Speed: 55 mph	**Type of Train Operation:**	
	Exclusive	☐ Yes ☒ No Grade Separated
Frequency of Trains (per hr in each direction): 6/hr/dr	**Semi-exclusive**	☒ Yes ☐ No At-Grade with fencing/barriers between crossings
	Street Running	☐ Yes ☒No Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 68 ft **Current No. of Lanes per Direction:** **2-NB & 2-SB**	**Roadway Volumes:** LADOT Volumes	**ADT: 30,000**	**Peak Hour Volume: (Expo 2007)** **AM: NB – 1893, SB - 806** **PM: NB –781, SB - 1607**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Pedestrian crosses tracks with train (s) approaching	Middle or High School near crossing ☐ Yes ☒ No Major Pedestrian Route to School ☐ Yes ☒ No	None
Pedestrian crosses tracks with train (s) approaching	Retirement Home near crossing ☐ Yes ☒ No Ped Route to Commercial Property ☒ Yes ☐ No Commercial/Industrial property near crossing ☒ Yes ☐ No	It is Metro's standard practice to install automatic pedestrian gates with emergency swing gates and tactile warning strips for pedestrian paths that cross the tracks.
Potential pedestrian surges	LRV Station ☐Yes ☒ No Event/Entertainment Center ☐ Yes ☒ No	None
Multi-purpose trail crosses tracks	☐ Yes ☒ No	None

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	Prepared by: J. Van Hoff Date: 4/30/10
Grade Crossing: BUNDY DRIVE **Drawing No. GC-012 and T-004**	**Diagnostic Team** **Initial Review Date: 7/27/10**
Crossing No. 84S – 111.4 USDOT No.	**Final Review Date: 8/2/10**

Train Speed: 55 mph and adjacent to station area	**Type of Train Operation:**	
	Exclusive	☒ Yes ☐ No Grade Separated
	Semi-exclusive	☐ Yes ☒ No At-Grade with fencing/barriers between crossings
Frequency of Trains (per hr in each direction): 6/hr/dr	**Street Running**	☐ Yes ☒ No Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 74 feet **Current No. of Lanes per Direction:** **2-NB, 2-SB**	**Roadway Volumes:** **ADT N/A**	**Peak Hour Volume: (Expo 2007)** **AM: NB – 1601, SB – 1022** **PM: NB – 1513, SB – 1988**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Train speed	☐ <35 mph ☒ >35 mph **– Posted 55 mph and adjacent to station**	
Roadway speed	35 mph	
Skewed crossing	☒ <30° from perpendicular ☐ >30° from perpendicular	Not applicable since it is grade separated.
Restricted vehicle sight distance	☐ Yes ☐ No	Not applicable since it is grade separated.
Left turn movement onto crossing	☐ Protected ☐ Permissive ☐ Truck/Bus % _____	Not applicable since it is grade separated.
Left turn movement across crossing	☐ Protected ☐ Permissive ☐ Truck/Bus % _____	Not applicable since it is grade separated.
Right turn movement onto tracks	☐ Insufficient Clear Storage Area for design vehicle ☐ Truck Route - %Trucks_____ ☐ School Bus Route	Not applicable since it is grade separated.
Right turn movement across tracks	☐ Insufficient Clear Storage Area for design vehicle ☐ Truck Route - %Trucks_____ ☐ School Bus Route	Not applicable since it is grade separated.
Vehicles queue from intersection onto crossing (Influence zone)	☐ Yes ☐ No	Not applicable since it is grade separated.

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	Prepared by: J. Van Hoff Date: 4/30/10
Grade Crossing: BUNDY DRIVE **Drawing No. GC-012 and T-004**	**Diagnostic Team** **Initial Review Date: 7/27/10**
Crossing No. 84S – 111.4 USDOT No.	**Final Review Date: 8/2/10**

Train Speed: 55 mph and adjacent to station area **Frequency of Trains (per hr in each direction): 6/hr/dr**	**Type of Train Operation:** **Exclusive**	☒ Yes ☐ No Grade Separated
	Semi-exclusive	☐ Yes ☒ No At-Grade with fencing/barriers between crossings
	Street Running	☐ Yes ☒ No Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 74 feet **Current No. of Lanes per Direction:** **2-NB, 2-SB**	**Roadway Volumes:** **ADT N/A**	**Peak Hour Volume: (Expo 2007)** **AM: NB – 1601, SB – 1022** **PM: NB – 1513, SB – 1988**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Vehicles queue from intersection onto crossing (spillback)	☐ Yes ☐ No	Not applicable since it is grade separated.
Vehicle driven around downed crossing gates	☐ Excessive warning activation time ☐ Frequency of Activation - **12/hr (6/hr/direction)** ☐ Meet Point for Trains causing extended gate down time ☐ Number of Tracks - **2** ☐ Non-Mainline Tracks ☐ Station adjacent to crossing	Not applicable since it is grade separated.
Parallel roadways	☐ Yes ☐ No	Not applicable since it is grade separated.
Parallel driveways	☐ Yes ☐ No	Not applicable since it is grade separated.
Restricted pedestrian sight distance	☐ Yes ☐ No	Not applicable since it is grade separated.
Pedestrian crosses tracks with train (s) approaching	Elementary School near crossing ☐ Yes ☐ No Safe Route to School ☐ Yes ☐ No	Not applicable since it is grade separated.

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	Prepared by: J. Van Hoff Date: 4/30/10
Grade Crossing: BUNDY DRIVE **Drawing No. GC-012 and T-004**	**Diagnostic Team** **Initial Review Date: 7/27/10**
Crossing No. 84S – 111.4 USDOT No.	**Final Review Date: 8/2/10**

Train Speed: 55 mph and adjacent to station area **Frequency of Trains (per hr in each direction): 6/hr/dr**	**Type of Train Operation:** **Exclusive**	☒ Yes ☐ No Grade Separated
	Semi-exclusive	☐ Yes ☒ No At-Grade with fencing/barriers between crossings
	Street Running	☐ Yes ☒ No Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 74 feet **Current No. of Lanes per Direction:** **2-NB, 2-SB**	**Roadway Volumes:** **ADT N/A**	**Peak Hour Volume: (Expo 2007)** **AM: NB – 1601, SB – 1022** **PM: NB – 1513, SB – 1988**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Pedestrian crosses tracks with train (s) approaching	Middle or High School near crossing ☐ Yes ☐ No Major Pedestrian Route to School ☐ Yes ☐ No	Not applicable since it is grade separated.
Pedestrian crosses tracks with train (s) approaching	Retirement Home near crossing ☐ Yes ☐ No Ped Route to Commercial Property ☐ Yes ☐ No Commercial/Industrial property near crossing ☐ Yes ☐ No	Not applicable since it is grade separated.
Potential pedestrian surges	LRV Station ☐ Yes ☐ No Event/Entertainment Center ☐ Yes ☐ No	Not applicable since it is grade separated.
Multi-purpose trail crosses tracks	☐ Yes ☒ No	

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	Prepared by: J. Van Hoff Date: 4/30/10
Grade Crossing: CENTINELA AVENUE **Drawing No. GC-013 and T-004**	**Diagnostic Team** **Initial Review Date: 7/27/10**
Crossing No. 84S – 111.6 USDOT No.	**Final Review Date: 8/2/10**

Train Speed: 55 mph	**Type of Train Operation:**	
	Exclusive	☒ Yes ☐ No Grade Separated
Frequency of Trains (per hr in each direction): 6/hr/dr	**Semi-exclusive**	☐ Yes ☒ No At-Grade with fencing/barriers between crossings
	Street Running	☐ Yes ☒ No Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 44 feet **Current No. of Lanes per Direction:** **2-NB, 1-SB**	**Roadway Volumes:** **ADT N/A**	**Peak Hour Volume: (Expo 2007)** **AM: NB – 1082, SB – 553** **PM: NB – 545, SB – 820**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Train speed	☐ <35 mph ☒ >35 mph	
Roadway speed	30 mph	
Skewed crossing	☒ <30° from perpendicular ☐ >30° from perpendicular	Not applicable since it is grade separated.
Restricted vehicle sight distance	☐ Yes ☐ No	Not applicable since it is grade separated.
Left turn movement onto crossing	☐ Protected ☐ Permissive ☐ Truck/Bus % _____	Not applicable since it is grade separated.
Left turn movement across crossing	☐ Protected ☐ Permissive ☐ Truck/Bus % _____	Not applicable since it is grade separated.
Right turn movement onto tracks	☐ Insufficient Clear Storage Area for design vehicle ☐ Truck Route - %Trucks_____ ☐ School Bus Route	Not applicable since it is grade separated.
Right turn movement across tracks	☐ Insufficient Clear Storage Area for design vehicle ☐ Truck Route - %Trucks_____ ☐ School Bus Route	Not applicable since it is grade separated.
Vehicles queue from intersection onto crossing (Influence zone)	☐ Yes ☐ No	Not applicable since it is grade separated.
Vehicles queue from intersection onto crossing (spillback)	☐ Yes ☐ No	Not applicable since it is grade separated.

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	Prepared by: J. Van Hoff Date: 4/30/10
Grade Crossing: CENTINELA AVENUE **Drawing No. GC-013 and T-004**	**Diagnostic Team** **Initial Review Date: 7/27/10**
Crossing No. 84S – 111.6 USDOT No.	**Final Review Date: 8/2/10**

Train Speed: 55 mph	**Type of Train Operation:**	
	Exclusive	☒ Yes ☐ No Grade Separated
Frequency of Trains (per hr in each direction): 6/hr/dr	**Semi-exclusive**	☐ Yes ☒ No At-Grade with fencing/barriers between crossings
	Street Running	☐ Yes ☒ No Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 44 feet **Current No. of Lanes per Direction:** **2-NB, 1-SB**	**Roadway Volumes:** **ADT N/A**	**Peak Hour Volume: (Expo 2007)** **AM: NB – 1082, SB – 553** **PM: NB – 545, SB – 820**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Vehicle driven around downed crossing gates	☐ Excessive warning activation time ☐ Frequency of Activation - **12/hr (6/hr/direction)** ☐ Meet Point for Trains causing extended gate down time ☐ Number of Tracks - **2** ☐ Non-Mainline Tracks ☐ Station adjacent to crossing	Not applicable since it is grade separated.
Parallel roadways	☐ Yes ☐ No	Not applicable since it is grade separated.
Parallel driveways	☐ Yes ☐ No	Not applicable since it is grade separated.
Restricted pedestrian sight distance	☐ Yes ☐ No	Not applicable since it is grade separated.
Pedestrian crosses tracks with train(s) approaching	Elementary School near crossing ☐ Yes ☐ No Safe Route to School ☐ Yes ☐ No	Not applicable since it is grade separated.
Pedestrian crosses tracks with train (s) approaching	Middle or High School near crossing ☐ Yes ☐ No Major Pedestrian Route to School ☐ Yes ☐ No	Not applicable since it is grade separated.

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	Prepared by: J. Van Hoff Date: 4/30/10
Grade Crossing: CENTINELA AVENUE **Drawing No. GC-013 and T-004**	**Diagnostic Team** **Initial Review Date: 7/27/10**
Crossing No. 84S – 111.6 USDOT No.	**Final Review Date: 8/2/10**

Train Speed: 55 mph	**Type of Train Operation:**		
	Exclusive	☒ Yes ☐ No	Grade Separated
Frequency of Trains (per hr in each direction): 6/hr/dr	**Semi-exclusive**	☐ Yes ☒ No	At-Grade with fencing/barriers between crossings
	Street Running	☐ Yes ☒ No	Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 44 feet **Current No. of Lanes per Direction:** **2-NB, 1-SB**	**Roadway Volumes:** **ADT N/A**	**Peak Hour Volume: (Expo 2007)** **AM: NB – 1082, SB – 553** **PM: NB – 545, SB – 820**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Pedestrian crosses tracks with train (s) approaching	Retirement Home near crossing ☐ Yes ☐ No Ped Route to Commercial Property ☐ Yes ☐ No Commercial/Industrial property near crossing ☐ Yes ☐ No	Not applicable since it is grade separated.
Potential pedestrian surges	LRV Station ☐ Yes ☐ No Event/Entertainment Center ☐ Yes ☐ No	Not applicable since it is grade separated.
Multi-purpose trail crosses tracks	☐ Yes ☒ No	

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	**Prepared by:** J Van Hoff **Date: 4/15/10**
Grade Crossing: STEWART STREET **Drawing No. GC – 014 and T-003**	**Diagnostic Team** **Initial Review Date: 7/29/10**
Crossing No. 84S – 112.1 USDOT No.	**Final Review Date: 8/4/10**

Train Speed: 55 mph and yard line **Frequency of Trains (per hr in each direction): 6/hr/dr for main line**	**Type of Train Operation:** **Exclusive** ☐ Yes ☒ No Grade Separated **Semi-exclusive** ☒ Yes ☐ No At-Grade with fencing/barriers between crossings **Street Running** ☐ Yes ☒No Mixed flow, LRT/Ped Mall, Separated from traffic by curb	
Roadway Width: 60 ft **Current No. of Lanes per Direction** **2-NB and 1-SB**	**Roadway Volumes:** Santa Monica 2006 Volumes **ADT: 10,000**	**Peak Hour Volume: (Expo 2007)** **AM: NB – 470, SB - 272** **PM: NB – 333, SB - 620**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Train speed	☒ <35 mph Yard Line ☒ >35 mph Main Line	The LRT posted speed for this segment is 55 mph with yard line speeds much less than 35 mph. The mitigation is to install No. 9 railroad gates. Expo will install 4-Quad gate control for additional safety.
Roadway speed	30 mph	Grade crossing controls shall be used. Expo will install 4-Quad gate control for additional safety.
Skewed crossing	☒ <30° from perpendicular ☐ >30° from perpendicular	Grade crossing controls shall be used and tied to the traffic signal controller at Olympic Blvd.
Restricted vehicle sight distance	☒ Yes ☐ No	Grade crossing controls shall be used and tied to the traffic signal controller at Olympic Blvd. Expo will install 4-Quad gate control for additional safety.

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	**Prepared by:** J Van Hoff **Date: 4/15/10**
Grade Crossing: STEWART STREET **Drawing No. GC – 014 and T-003**	**Diagnostic Team** **Initial Review Date: 7/29/10**
Crossing No. 84S – 112.1 **USDOT No.**	**Final Review Date: 8/4/10**

Train Speed: 55 mph and yard line **Frequency of Trains (per hr in each direction): 6/hr/dr for main line**	**Type of Train Operation:** **Exclusive** ☐ Yes ☒ No Grade Separated **Semi-exclusive** ☒ Yes ☐ No At-Grade with fencing/barriers between crossings **Street Running** ☐ Yes ☒No Mixed flow, LRT/Ped Mall, Separated from traffic by curb	
Roadway Width: 60 ft **Current No. of Lanes per Direction** **2-NB and 1-SB**	**Roadway Volumes:** Santa Monica 2006 Volumes **ADT: 10,000**	**Peak Hour Volume: (Expo 2007)** **AM: NB – 470, SB - 272** **PM: NB – 333, SB - 620**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Left turn movement onto crossing	☒ Protected ☐ Permissive ☐ Truck/Bus % _____	WB Olympic Blvd. left turns that cross tracks will be protected via signal. Also, the driveway northeast of the crossing currently cannot make a left turn movement onto the crossing and this will continue to not be allowed via flexible delineators.
Left turn movement across crossing	☒ Protected **NB** ☐ Permissive ☐ Truck/Bus % _____	Currently NB Stewart St. left turn movements across the crossing are allowed. This will continue to be allowed via the signal and grade crossing controls. Also, currently SB Stewart St. left turn movements across the crossing into a park-n-ride are allowed but this will not be allowed via a center raised median due to the proximity to the crossing.
Right turn movement onto tracks	☐ Insufficient Clear Storage Area for design vehicle ☐ Truck Route - %Trucks_____ ☐ School Bus Route	The right turn movements from the northwest and southeast driveways on Stewart St. will continue to be allowed and controlled by the grade crossing control system.

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	**Prepared by:** J Van Hoff **Date: 4/15/10**
Grade Crossing: STEWART STREET **Drawing No. GC – 014 and T-003**	**Diagnostic Team** **Initial Review Date: 7/29/10**
Crossing No. 84S – 112.1 USDOT No.	**Final Review Date: 8/4/10**

Train Speed: 55 mph and yard line **Frequency of Trains (per hr in each direction): 6/hr/dr for main line**	**Type of Train Operation:** **Exclusive**	☐ Yes ☒ No Grade Separated
	Semi-exclusive	☒ Yes ☐ No At-Grade with fencing/barriers between crossings
	Street Running	☐ Yes ☒No Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 60 ft **Current No. of Lanes per Direction** **2-NB and 1-SB**	**Roadway Volumes:** Santa Monica 2006 Volumes **ADT: 10,000**	**Peak Hour Volume: (Expo 2007)** **AM: NB – 470, SB - 272** **PM: NB – 333, SB - 620**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Right turn movement across tracks	☐ Insufficient Clear Storage Area for design vehicle ☐ Truck Route - %Trucks_____ ☐ School Bus Route	The right turn movements into the northeast and southwest driveways from Stewart St. will continue to be allowed and controlled by the grade crossing control system.
Vehicles queue from **Olympic** intersection onto crossing (Influence zone)	☒ Yes **AM** ☐ No	Current 125'storage area with a 2030 projected queue of 190' AM and 125' PM per FEIR. Add dedicated EB right turn lane on to Olympic Blvd. and move existing stop bars south of the crossing per the FEIR. Provide advance preemption to clear track area.
Vehicles queue from crossing into **Olympic** intersection (Spillback zone)	☒ Yes **AM and PM** ☐ No	Current 110'storage area with a 2030 projected queue of 149' AM and 362' PM per FEIR. Add second SB through lane between Olympic Blvd. and Exposition Blvd. per the FEIR. Also, control WB left turns from Olympic Blvd. and EB right turns from Stewart Ave. during preemption.

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	**Prepared by:** J Van Hoff **Date: 4/15/10**
Grade Crossing: STEWART STREET **Drawing No. GC – 014 and T-003**	**Diagnostic Team** **Initial Review Date: 7/29/10**
Crossing No. 84S – 112.1 USDOT No.	**Final Review Date: 8/4/10**

Train Speed: 55 mph and yard line **Frequency of Trains (per hr in each direction): 6/hr/dr for main line**	**Type of Train Operation:** **Exclusive** ☐ Yes ☒ No Grade Separated **Semi-exclusive** ☒ Yes ☐ No At-Grade with fencing/barriers between crossings **Street Running** ☐ Yes ☒No Mixed flow, LRT/Ped Mall, Separated from traffic by curb	
Roadway Width: 60 ft **Current No. of Lanes per Direction** **2-NB and 1-SB**	**Roadway Volumes:** Santa Monica 2006 Volumes **ADT: 10,000**	**Peak Hour Volume: (Expo 2007)** **AM: NB – 470, SB - 272** **PM: NB – 333, SB - 620**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Vehicle driven around downed crossing gates	☒ Excessive warning activation time **due to Yard activity before and after peak hours** ☒ Frequency of Activation - **12/hr (6/hr/direction) for main line** ☐ Meet Point for Trains causing extensive gate down time ☒ Number of Tracks__3__ ☒ Non-Mainline Tracks ☒ Mixed Operations **– main line and yard track** ☐ Station adjacent to crossing	Grade crossing controls shall be used and tied to the traffic signal at Olympic Blvd. Will provide center raised median south of crossing and flexible delineators north of the crossing. Expo will install 4-Quad gate control for additional safety. Also, mixed operations with main line and yard tracks; will use constant warning time detection.
Parallel roadways	☒ Yes **Olympic Blvd.** ☐ No	Install traffic signal with preemption.
Parallel driveways	☒ Yes **adjacent business parking lot access located on the northeast, northwest, and southwest of crossing; Santa Monica College park-in-ride located southeast of crossing** ☐ No	Grade crossing controls shall be used. Also the driveways will be right-in and right-out along with flexible delineators north of the crossing and a raised center median to the south of the crossing. Expo will install 4-Quad gate control for additional safety.

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	**Prepared by:** J Van Hoff **Date: 4/15/10**
Grade Crossing: STEWART STREET **Drawing No. GC – 014 and T-003**	**Diagnostic Team** **Initial Review Date: 7/29/10**
Crossing No. 84S – 112.1 USDOT No.	**Final Review Date: 8/4/10**

Train Speed: 55 mph and yard line **Frequency of Trains (per hr in each direction): 6/hr/dr for main line**	**Type of Train Operation:** **Exclusive** ☐ Yes ☒ No Grade Separated **Semi-exclusive** ☒ Yes ☐ No At-Grade with fencing/barriers between crossings **Street Running** ☐ Yes ☒No Mixed flow, LRT/Ped Mall, Separated from traffic by curb	
Roadway Width: 60 ft **Current No. of Lanes per Direction** **2-NB and 1-SB**	**Roadway Volumes:** Santa Monica 2006 Volumes **ADT: 10,000**	**Peak Hour Volume: (Expo 2007)** **AM: NB – 470, SB - 272** **PM: NB – 333, SB - 620**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Restricted pedestrian sight distance	☒ Yes ☐ No	It is Metro's standard practice to install automatic pedestrian gates with emergency swing gates and tactile warning strips for pedestrian paths that cross the tracks.
Pedestrian crosses tracks with train(s) approaching	Elementary School near crossing ☐Yes ☒ No Safe Route to School **per City of Santa Monica SRTS program** ☒ Yes ☐ No	It is Metro's standard practice to install automatic pedestrian gates with emergency swing gates and tactile warning strips for pedestrian paths that cross the tracks.
Pedestrian crosses tracks with train(s) approaching	Middle or High School near crossing ☐ Yes ☒ No Major Pedestrian Route to School ☐ Yes ☒ No	None
Pedestrian crosses tracks with train(s) approaching	Retirement Home near crossing ☐ Yes ☒ No Ped Route to Commercial Property ☐ Yes ☒ No Commercial/Industrial property near crossing ☒ Yes ☐ No	It is Metro's standard practice to install automatic pedestrian gates with emergency swing gates and tactile warning strips for pedestrian paths that cross the tracks.

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS		**Prepared by:** J Van Hoff **Date: 4/15/10**
Grade Crossing: STEWART STREET **Drawing No. GC – 014 and T-003**		**Diagnostic Team** **Initial Review Date: 7/29/10**
Crossing No. 84S – 112.1	**USDOT No.**	**Final Review Date: 8/4/10**

Train Speed: 55 mph and yard line **Frequency of Trains (per hr in each direction): 6/hr/dr for main line**	**Type of Train Operation:** **Exclusive** ☐ Yes ☒ No Grade Separated **Semi-exclusive** ☒ Yes ☐ No At-Grade with fencing/barriers between crossings **Street Running** ☐ Yes ☒No Mixed flow, LRT/Ped Mall, Separated from traffic by curb	
Roadway Width: 60 ft **Current No. of Lanes per Direction** **2-NB and 1-SB**	**Roadway Volumes:** Santa Monica 2006 Volumes **ADT: 10,000**	**Peak Hour Volume: (Expo 2007)** **AM: NB – 470, SB - 272** **PM: NB – 333, SB - 620**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Potential pedestrian surges	LRV Station ☐Yes ☒ No Event/Entertainment Center ☐ Yes ☒ No	None
Multi-purpose trail crosses tracks	☐ Yes ☒ No	None

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	**Prepared by:** J Van Hoff **Date: 4/15/10**
Grade Crossing: 26th STREET **Drawing No. GC – 015 and T-003**	**Diagnostic Team** **Initial Review Date: 7/29/10**
Crossing No. 84S – 112.4 USDOT No.	**Final Review Date: 8/4/10**

Train Speed: 30 mph and adjacent to station area **Frequency of Trains (per hr in each direction): 6/hr/dr**	**Type of Train Operation:** **Exclusive** ☐ Yes ☒ No Grade Separated **Semi-exclusive** ☒ Yes ☐ No At-Grade with fencing/barriers between crossings **Street Running** ☐ Yes ☒ No Mixed flow, LRT/Ped Mall, Separated from traffic by curb	
Roadway Width: 33 ft **Current No. of Lanes per Direction:** **3-NB; One-Way NB**	**Roadway Volumes:** Santa Monica 2006 Volumes **ADT: 6,000**	**Peak Hour Volume: (Expo 2007)** **AM: NB – 331; SB - 0** **PM: NB –352, SB - 0**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Train speed	☒ <35 mph ☐ >35 mph	The LRT posted speed for this segment is 55 mph. However, since the crossing is near a station, the actual speed will be approximately 30 MPH. The mitigation is to install No. 9 railroad gates. Expo will install 4-Quad gate control for additional safety.
Roadway speed	35 mph	Grade crossing controls shall be used. Expo will install 4-Quad gate control for additional safety.
Skewed crossing	☐ <30° from perpendicular ☒ >30° from perpendicular	The track alignment through this crossing is significantly skewed with the street; refer to drawing GC-015. Grade crossing controls shall be used and tied to the traffic signal controller at Olympic Blvd.
Restricted vehicle sight distance	☒ Yes **due to skewed crossing** ☐ No	Grade crossing controls shall be used and tied to the traffic signal controller at Olympic Blvd. Expo will install 4-Quad gate control for additional safety.

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	**Prepared by:** J Van Hoff **Date: 4/15/10**
Grade Crossing: 26th STREET **Drawing No. GC – 015 and T-003**	**Diagnostic Team** **Initial Review Date: 7/29/10**
Crossing No. 84S – 112.4 USDOT No.	**Final Review Date: 8/4/10**

Train Speed: 30 mph and adjacent to station area **Frequency of Trains (per hr in each direction): 6/hr/dr**	**Type of Train Operation:** **Exclusive**	☐ Yes ☒ No Grade Separated
	Semi-exclusive	☒ Yes ☐ No At-Grade with fencing/barriers between crossings
	Street Running	☐ Yes ☒ No Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 33 ft **Current No. of Lanes per Direction:** **3-NB; One-Way NB**	**Roadway Volumes:** Santa Monica 2006 Volumes **ADT: 6,000**	**Peak Hour Volume: (Expo 2007)** **AM: NB – 331; SB - 0** **PM: NB –352, SB - 0**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Left turn movement onto crossing	☐ Protected ☐ Permissive ☐ Truck/Bus % _____	None
Left turn movement across crossing	☒ Protected ☐ Permissive ☐ Truck/Bus % _____	Currently NB left turn movements crossing the tracks are protected and will continue to be protected. The existing signal and grade crossing controls will control the turns.
Right turn movement onto tracks	☐ Insufficient Clear Storage Area for design vehicle ☐ Truck Route - %Trucks_____ ☐ School Bus Route	The existing driveway on the southeast corner of the crossing will have a No. 8 flasher installed facing the driveway and the access will remain as is existing right-in and right-out only. Grade crossing controls shall be used. Expo will install 4-Quad gate control for additional safety.
Right turn movement across tracks	☒ Insufficient Clear Storage Area for design vehicle ☐ Truck Route - %Trucks_____ ☐ School Bus Route	The NB right turn from 26th Street to Olympic Blvd. shall be restricted during red. Install a static no turn on red sign (R13A).
Vehicles queue from **Olympic** intersection onto crossing (Influence zone)	☐ Yes ☒ No	None

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	**Prepared by:** J Van Hoff **Date: 4/15/10**
Grade Crossing: 26th STREET **Drawing No. GC – 015 and T-003**	**Diagnostic Team** **Initial Review Date: 7/29/10**
Crossing No. 84S – 112.4 USDOT No.	**Final Review Date: 8/4/10**

Train Speed: 30 mph and adjacent to station area **Frequency of Trains (per hr in each direction): 6/hr/dr**	**Type of Train Operation:** **Exclusive** ☐ Yes ☒ No Grade Separated **Semi-exclusive** ☒ Yes ☐ No At-Grade with fencing/barriers between crossings **Street Running** ☐ Yes ☒ No Mixed flow, LRT/Ped Mall, Separated from traffic by curb	
Roadway Width: 33 ft **Current No. of Lanes per Direction:** **3-NB; One-Way NB**	**Roadway Volumes:** Santa Monica 2006 Volumes **ADT: 6,000**	**Peak Hour Volume: (Expo 2007)** **AM: NB – 331; SB - 0** **PM: NB –352, SB - 0**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Vehicles queue from crossing into **Olympic** intersection (Spillback zone)	☐ Yes ☒ No	None
Vehicle driven around downed crossing gates	☐ Excessive warning activation time ☒ Frequency of Activation **_12/hr (6/hr/direction)** ☐ Meet Point for Trains causing extensive gate down time ☒ Number of Tracks__2__ ☐ Non-Mainline Tracks ☐ Mixed Operations ☒ Station adjacent to crossing	Grade crossing controls shall be used and tied to the traffic signal controller at Olympic Blvd. Expo will install 4-Quad gate control for additional safety.
Parallel roadways	☒ Yes **Olympic Blvd.** ☐ No	Install traffic signal with preemption.
Parallel driveways	☒ Yes **adjacent business/parking lot access on southeast corner of crossing** ☐ No	The driveway on the southeast corner of the crossing will have a No. 8 flasher installed facing the driveway and the access will remain as is existing right-in and right-out only. Grade crossing controls shall be used. Expo will install 4-Quad gate control for additional safety.

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	**Prepared by:** J Van Hoff **Date: 4/15/10**
Grade Crossing: 26th STREET **Drawing No. GC – 015 and T-003**	**Diagnostic Team** **Initial Review Date: 7/29/10**
Crossing No. 84S – 112.4 USDOT No.	**Final Review Date: 8/4/10**

Train Speed: 30 mph and adjacent to station area **Frequency of Trains (per hr in each direction): 6/hr/dr**	**Type of Train Operation:** **Exclusive** ☐ Yes ☒ No Grade Separated **Semi-exclusive** ☒ Yes ☐ No At-Grade with fencing/barriers between crossings **Street Running** ☐ Yes ☒ No Mixed flow, LRT/Ped Mall, Separated from traffic by curb	
Roadway Width: 33 ft **Current No. of Lanes per Direction:** **3-NB; One-Way NB**	**Roadway Volumes:** Santa Monica 2006 Volumes **ADT: 6,000**	**Peak Hour Volume: (Expo 2007)** **AM: NB – 331; SB - 0** **PM: NB –352, SB - 0**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Restricted pedestrian sight distance	☒ Yes **due to skewed crossing** ☐ No	It is Metro's standard practice to install automatic pedestrian gates with emergency swing gates and tactile warning strips for pedestrian paths that cross the tracks.
Pedestrian crosses tracks with train(s) approaching	Elementary School near crossing ☐Yes ☒ No Safe Route to School **per City of Santa Monica SRTS program** ☒Yes ☐No	It is Metro's standard practice to install automatic pedestrian gates with emergency swing gates and tactile warning strips for pedestrian paths that cross the tracks.
Pedestrian crosses tracks with train(s) approaching	Middle or High School near crossing ☐ Yes ☒ No Major Pedestrian Route to School ☐ Yes ☒ No	None
Pedestrian crosses tracks with train(s) approaching	Retirement Home near crossing ☐ Yes ☒ No Ped Route to Commercial Property ☐ Yes ☒ No Commercial/Industrial property near crossing ☒ Yes ☐ No	It is Metro's standard practice to install automatic pedestrian gates with emergency swing gates and tactile warning strips for pedestrian paths that cross the tracks.

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS		**Prepared by:** J Van Hoff **Date: 4/15/10**
Grade Crossing: 26th STREET **Drawing No. GC – 015 and T-003**	**Diagnostic Team**	**Initial Review Date: 7/29/10**
Crossing No. 84S – 112.4 USDOT No.		**Final Review Date: 8/4/10**

Train Speed: 30 mph and adjacent to station area **Frequency of Trains (per hr in each direction): 6/hr/dr**	**Type of Train Operation:** **Exclusive** ☐ Yes ☒ No Grade Separated **Semi-exclusive** ☒ Yes ☐ No At-Grade with fencing/barriers between crossings **Street Running** ☐ Yes ☒ No Mixed flow, LRT/Ped Mall, Separated from traffic by curb	
Roadway Width: 33 ft **Current No. of Lanes per Direction:** **3-NB; One-Way NB**	**Roadway Volumes:** Santa Monica 2006 Volumes **ADT: 6,000**	**Peak Hour Volume: (Expo 2007)** **AM: NB – 331; SB - 0** **PM: NB –352, SB - 0**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Potential pedestrian surges	LRV Station ☒Yes ☐ No Event/Entertainment Center ☐ Yes ☒ No	Provide pedestrian automatic gates for the crossing and No. 8 flashers at station access.
Multi-purpose trail crosses tracks	☐ Yes ☒ No	None

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	Prepared by: J. Van Hoff Date: 5/4/10
Grade Crossing: CLOVERFIELD BOULEVARD **Drawing No. GC-016 and T-003**	**Diagnostic Team** **Initial Review Date: 7/29/10**
Crossing No. 84S – 112.5 USDOT No.	**Final Review Date: 8/4/10**

Train Speed: 55 mph and adjacent to station

Type of Train Operation:

Exclusive ☒ Yes ☐ No Grade Separated

Semi-exclusive ☐ Yes ☒ No At-Grade with fencing/barriers between crossings

Street Running ☐ Yes ☒ No Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Frequency of Trains (per hr in each direction): 6/hr/dr

Roadway Width: 90 feet
Current No. of Lanes per Direction:
3-NB, 2-NB LT; 3-SB

Roadway Volumes: **ADT N/A**

Peak Hour Volume: (Expo 2007)
AM: NB – 1755, SB – 1273
PM: NB – 944, SB – 1629

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Train speed	☐ <35 mph ☒ >35 mph – **Posted 55 mph and adjacent to station**	
Roadway speed	30 mph	
Skewed crossing	☒ <30° from perpendicular ☐ >30° from perpendicular	Not applicable since it is grade separated.
Restricted vehicle sight distance	☐ Yes ☐ No	Not applicable since it is grade separated.
Left turn movement onto crossing	☐ Protected ☐ Permissive ☐ Truck/Bus % _____	Not applicable since it is grade separated.
Right turn movement across tracks	☐ Insufficient Clear Storage Area for design vehicle ☐ Truck Route - %Trucks_____ ☐ School Bus Route	Not applicable since it is grade separated.
Vehicles queue from intersection onto crossing (Influence zone)	☐ Yes ☐ No	Not applicable since it is grade separated.
Vehicles queue from intersection onto crossing (spillback)	☐ Yes ☐ No	Not applicable since it is grade separated.

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	Prepared by: J. Van Hoff Date: 5/4/10
Grade Crossing: CLOVERFIELD BOULEVARD **Drawing No. GC-016 and T-003**	**Diagnostic Team** **Initial Review Date: 7/29/10**
Crossing No. 84S – 112.5 USDOT No.	**Final Review Date: 8/4/10**

Train Speed: 55 mph and adjacent to station

Type of Train Operation:

Exclusive	☒ Yes	☐ No	Grade Separated
Semi-exclusive	☐ Yes	☒ No	At-Grade with fencing/barriers between crossings
Street Running	☐ Yes	☒ No	Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Frequency of Trains (per hr in each direction): 6/hr/dr

Roadway Width: 90 feet
Current No. of Lanes per Direction:
3-NB, 2-NB LT; 3-SB

Roadway Volumes: **ADT N/A**

Peak Hour Volume: (Expo 2007)
AM: NB – 1755, SB – 1273
PM: NB – 944, SB – 1629

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Vehicle driven around downed crossing gates	☐ Excessive warning activation time ☐ Frequency of Activation - **12/hr (6/hr/direction)** ☐ Meet Point for Trains causing extended gate down time ☐ Number of Tracks - **2** ☐ Non-Mainline Tracks ☐ Station adjacent to crossing	Not applicable since it is grade separated.
Parallel roadways	☐ Yes ☐ No	Not applicable since it is grade separated.
Parallel driveways	☐ Yes ☐ No	Not applicable since it is grade separated.
Restricted pedestrian sight distance	☐ Yes ☐ No	Not applicable since it is grade separated.
Pedestrian crosses tracks with train (s) approaching	Elementary School near crossing ☐ Yes ☐No Safe Route to School ☐ Yes ☐No	Not applicable since it is grade separated.

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	Prepared by: J. Van Hoff Date: 5/4/10
Grade Crossing: CLOVERFIELD BOULEVARD **Drawing No. GC-016 and T-003**	**Diagnostic Team** **Initial Review Date: 7/29/10**
Crossing No. 84S – 112.5 USDOT No.	**Final Review Date: 8/4/10**

Train Speed: 55 mph and adjacent to station

Type of Train Operation:

Exclusive	☒ Yes	☐ No	Grade Separated
Semi-exclusive	☐ Yes	☒ No	At-Grade with fencing/barriers between crossings
Street Running	☐ Yes	☒ No	Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Frequency of Trains (per hr in each direction): 6/hr/dr

Roadway Width: 90 feet
Current No. of Lanes per Direction:
3-NB, 2-NB LT; 3-SB

Roadway Volumes: **ADT N/A**

Peak Hour Volume: (Expo 2007)
AM: NB – 1755, SB – 1273
PM: NB – 944, SB – 1629

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Pedestrian crosses tracks with train (s) approaching	Middle or High School near crossing ☐ Yes ☐No Major Pedestrian Route to School ☐ Yes ☐No	Not applicable since it is grade separated.
Pedestrian crosses tracks with train (s) approaching	Retirement Home near crossing ☐ Yes ☐ No Ped Route to Commercial Property ☐Yes ☐ No Commercial/Industrial property near crossing ☐Yes ☐ No	Not applicable since it is grade separated.
Potential pedestrian surges	LRV Station ☐ Yes ☐ No Event/Entertainment Center ☐ Yes ☐No	Not applicable since it is grade separated.
Multi-purpose trail crosses tracks	☐ Yes ☒ No	

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	Prepared by: J. Van Hoff Date: 5/4/10
Grade Crossing: OLYMPIC BOULEVARD **Drawing No. GC-016A, T-003, and T-014**	**Diagnostic Team** **Initial Review Date: 7/29/10**
Crossing No. 84S – 112.6 USDOT No.	**Final Review Date: 8/4/10**

Train Speed 55 mph	**Type of Train Operation:**	
	Exclusive	☒ Yes ☐ No Grade Separated
Frequency of Trains (per hr in each direction): 6/hr/dr	**Semi-exclusive**	☐ Yes ☒ No At-Grade with fencing/barriers between crossings
	Street Running	☐ Yes ☒ No Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 110 feet **Current No. of Lanes per Direction:** **2-NB, 2-SB**	**Roadway Volumes** **ADT N/A**	**Peak Hour Volume: (Expo 2007)** **AM: EB – 694, WB – 1042** **PM: EB – 534, WB – 1179**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Train speed	☐ <35 mph ☒ >35 mph – Posted 55 mph	
Roadway speed	45 mph	
Skewed crossing	☐ <30° from perpendicular ☒ >30° from perpendicular	Not applicable since it is grade separated.
Restricted vehicle sight distance	☐ Yes ☐ No	Not applicable since it is grade separated.
Left turn movement onto crossing	☐ Protected ☐ Permissive ☐ Truck/Bus % _____	Not applicable since it is grade separated.
Right turn movement across tracks	☐ Insufficient Clear Storage Area for design vehicle ☐ Truck Route - %Trucks_____ ☐ School Bus Route	Not applicable since it is grade separated.
Vehicles queue from intersection onto crossing (Influence zone)	☐ Yes ☐ No	Not applicable since it is grade separated.
Vehicles queue from intersection onto crossing (spillback)	☐ Yes ☐ No	Not applicable since it is grade separated.

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	Prepared by: J. Van Hoff Date: 5/4/10
Grade Crossing: OLYMPIC BOULEVARD **Drawing No. GC-016A, T-003, and T-014**	**Diagnostic Team** **Initial Review Date: 7/29/10**
Crossing No. 84S – 112.6 USDOT No.	**Final Review Date: 8/4/10**

Train Speed 55 mph **Frequency of Trains (per hr in each direction): 6/hr/dr**	**Type of Train Operation:** **Exclusive** **Semi-exclusive** **Street Running**	 ☒ Yes ☐ No Grade Separated ☐ Yes ☒ No At-Grade with fencing/barriers between crossings ☐ Yes ☒ No Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 110 feet **Current No. of Lanes per Direction:** **2-NB, 2-SB**	**Roadway Volumes** **ADT N/A**	**Peak Hour Volume: (Expo 2007)** **AM: EB – 694, WB – 1042** **PM: EB – 534, WB – 1179**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Vehicle driven around downed crossing gates	☐ Excessive warning activation time ☐ Frequency of Activation - **12/hr (6/hr/direction)** ☐ Meet Point for Trains causing extended gate down time ☐ Number of Tracks - **2** ☐ Non-Mainline Tracks ☐ Station adjacent to crossing	Not applicable since it is grade separated.
Parallel roadways	☐ Yes ☐ No	Not applicable since it is grade separated.
Parallel driveways	☐ Yes ☐ No	Not applicable since it is grade separated.
Restricted pedestrian sight distance	☐ Yes ☐ No	Not applicable since it is grade separated.
Pedestrian crosses tracks with train (s) approaching	Elementary School near crossing ☐ Yes ☐ No Safe Route to School ☐ Yes ☐ No	Not applicable since it is grade separated.

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	Prepared by: J. Van Hoff Date: 5/4/10
Grade Crossing: OLYMPIC BOULEVARD **Drawing No. GC-016A, T-003, and T-014**	**Diagnostic Team** **Initial Review Date: 7/29/10**
Crossing No. 84S – 112.6 USDOT No.	**Final Review Date: 8/4/10**

Train Speed 55 mph **Frequency of Trains (per hr in each direction): 6/hr/dr**	**Type of Train Operation:** **Exclusive** ☒ Yes ☐ No Grade Separated **Semi-exclusive** ☐ Yes ☒ No At-Grade with fencing/barriers between crossings **Street Running** ☐ Yes ☒ No Mixed flow, LRT/Ped Mall, Separated from traffic by curb	
Roadway Width: 110 feet **Current No. of Lanes per Direction:** **2-NB, 2-SB**	**Roadway Volumes** **ADT N/A**	**Peak Hour Volume: (Expo 2007)** **AM: EB – 694, WB – 1042** **PM: EB – 534, WB – 1179**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Pedestrian crosses tracks with train (s) approaching	Middle or High School near crossing ☐ Yes ☐ No Major Pedestrian Route to School ☐ Yes ☐ No	Not applicable since it is grade separated.
Pedestrian crosses tracks with train (s) approaching	Retirement Home near crossing ☐ Yes ☐No Ped Route to Commercial Property ☐ Yes ☐ No Commercial/Industrial property near crossing ☐ Yes ☐No	Not applicable since it is grade separated.
Potential pedestrian surges	LRV Station ☐ Yes ☐ No Event/Entertainment Center ☐ Yes ☐ No	Not applicable since it is grade separated.
Multi-purpose trail crosses tracks	☐ Yes ☒ No	

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	**Prepared by:** J Van Hoff **Date: 4/15/10**
Grade Crossing: 20th STREET **Drawing No. GC – 017 and T-014**	**Diagnostic Team** **Initial Review Date: 7/29/10**
Crossing No. 84s – 112.8 USDOT No.	**Final Review Date: 8/4/10**

Train Speed: 55 mph	**Type of Train Operation:**	
	Exclusive	☐ Yes ☒No Grade Separated
Frequency of Trains (per hr in each direction): 6/hr/dr	**Semi-exclusive**	☒ Yes ☐ No At-Grade with fencing/barriers between crossings
	Street Running	☐ Yes ☒ No Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 60 ft **Current No. of Lanes per Direction:** **2-NB; 2-SB**	**Roadway Volumes** Santa Monica 2006 Volumes **ADT: 25,000**	**Peak Hour Volume: (Expo 2007)** **AM: NB – 1169; SB - 750** **PM: NB – 594, SB - 1063**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Train speed	☐ <35 mph ☒>35 mph	The LRT posted speed for this segment is 55 mph. The mitigation is to install No. 9 railroad gates. Expo will install 4-Quad gate control for additional safety.
Roadway speed	30 mph	Grade crossing controls shall be used. Expo will install 4-Quad gate control for additional safety.
Skewed crossing	☒ <30° from perpendicular ☐ >30° from perpendicular	Grade crossing controls shall be used and tied to the traffic signal controller at Colorado Ave. and Olympic Blvd.
Restricted vehicle sight distance	☐ Yes ☒No	None
Left turn movement onto crossing	☐ Protected ☐ Permissive ☐ Truck/Bus % _____	The driveways northeast and southwest of the crossing currently can make left turn movements onto the crossing. This will not be allowed via a center raised median due to the proximity to the crossing.

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	**Prepared by:** J Van Hoff **Date: 4/15/10**
Grade Crossing: 20th STREET **Drawing No. GC – 017 and T-014**	**Diagnostic Team** **Initial Review Date: 7/29/10**
Crossing No. 84s – 112.8 USDOT No.	**Final Review Date: 8/4/10**

Train Speed: 55 mph	**Type of Train Operation:**	
	Exclusive	☐ Yes ☒No Grade Separated
Frequency of Trains (per hr in each direction): 6/hr/dr	**Semi-exclusive**	☒ Yes ☐ No At-Grade with fencing/barriers between crossings
	Street Running	☐ Yes ☒ No Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 60 ft **Current No. of Lanes per Direction:** **2-NB; 2-SB**	**Roadway Volumes** Santa Monica 2006 Volumes **ADT: 25,000**	**Peak Hour Volume: (Expo 2007)** **AM: NB – 1169; SB - 750** **PM: NB – 594, SB - 1063**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Left turn movement across crossing	☐ Protected ☐ Permissive ☐ Truck/Bus % _____	Currently left turn movements across the tracks are allowed on NB and SB 20th St. to the driveways on the northwest and southeast corners of the crossing. These will not be allowed via a center raised median due to the proximity to the crossing.
Right turn movement onto tracks	☐ Insufficient Clear Storage Area for design vehicle ☐ Truck Route - %Trucks_____ ☐ School Bus Route	The right turn movements from the northwest and southeast driveways on 20th St. will continue to be allowed and controlled by the grade crossing control system.
Right turn movement across tracks	☐ Insufficient Clear Storage Area for design vehicle ☐ Truck Route - %Trucks_____ ☐ School Bus Route	The right turn movements into the northeast and southwest driveways from 20th St. will continue to be allowed and controlled by the grade crossing control system.
Vehicles queue from **Olympic Blvd.** intersection onto crossing (Influence zone)	☐ Yes ☒ No	None – 345' current storage area with a 2030 projected queue of 226' AM and 311' PM per FEIR.

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	**Prepared by:** J Van Hoff **Date: 4/15/10**
Grade Crossing: 20th STREET **Drawing No. GC – 017 and T-014**	**Diagnostic Team** **Initial Review Date: 7/29/10**
Crossing No. 84s – 112.8 USDOT No.	**Final Review Date: 8/4/10**

Train Speed: 55 mph	**Type of Train Operation:**	
	Exclusive	☐ Yes ☒No Grade Separated
Frequency of Trains (per hr in each direction): 6/hr/dr	**Semi-exclusive**	☒ Yes ☐ No At-Grade with fencing/barriers between crossings
	Street Running	☐ Yes ☒ No Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 60 ft **Current No. of Lanes per Direction: 2-NB; 2-SB**	**Roadway Volumes** Santa Monica 2006 Volumes **ADT: 25,000**	**Peak Hour Volume: (Expo 2007)** **AM: NB – 1169; SB - 750** **PM: NB – 594, SB - 1063**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Vehicles queue from **Colorado Ave.** intersection onto crossing (Influence zone)	☒ Yes **AM** ☐ No	Current 295' storage area with a 2030 projected queue of 298' AM and 158' PM per FEIR. Colorado Ave. will be tied to the crossing to improve queuing and a queue cutter signal will be installed.
Vehicles queue from crossing into **Olympic Blvd.** intersection (Spillback zone)	☐ Yes ☒ No	None – 345' current storage area with a 2030 projected queue of 322' AM and 186' PM per FEIR.
Vehicles queue from crossing into **Colorado Ave.** intersection (Spillback zone)	☒ Yes **PM** ☐ No	Current 295' storage area with a 2030 projected queue of 234' AM and 339' PM per FEIR. Colorado Ave. will be tied to the crossing to improve queuing and a queue cutter signal will be installed.

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	**Prepared by:** J Van Hoff **Date: 4/15/10**
Grade Crossing: 20th STREET **Drawing No. GC – 017 and T-014**	**Diagnostic Team** **Initial Review Date: 7/29/10**
Crossing No. 84s – 112.8 USDOT No.	**Final Review Date: 8/4/10**

Train Speed: 55 mph	**Type of Train Operation:**	
	Exclusive	☐ Yes ☒No Grade Separated
Frequency of Trains (per hr in each direction): 6/hr/dr	**Semi-exclusive**	☒ Yes ☐ No At-Grade with fencing/barriers between crossings
	Street Running	☐ Yes ☒ No Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 60 ft **Current No. of Lanes per Direction:** **2-NB; 2-SB**	**Roadway Volumes** Santa Monica 2006 Volumes **ADT: 25,000**	**Peak Hour Volume: (Expo 2007)** **AM: NB – 1169; SB - 750** **PM: NB – 594, SB - 1063**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Vehicle driven around downed crossing gates	☐ Excessive warning activation time ☒ Frequency of Activation **12/hr_(6/hr/direction)** ☐ Meet Point for Trains causing extensive gate down time ☒ Number of Tracks__2__ ☐ Non-Mainline Tracks ☐ Mixed Operations ☐ Station adjacent to crossing	Provide raised median within existing turn lane. Grade crossing controls shall be used and tied to the traffic signal at Colorado Ave. and Olympic Blvd. Expo will install 4-Quad gate control for additional safety.
Parallel roadways	☐ Yes ☒ No	None
Parallel driveways	☒ Yes **adjacent business parking lot access located on all four corners of crossing** ☐ No	The driveways both all four corners of the crossing are extremely close to the grade crossing. Install raised center median and allow right-in and right-out movements.
Restricted pedestrian sight distance	☐ Yes ☒ No	None
Pedestrian crosses tracks with train(s) approaching	Elementary School near crossing ☐Yes ☒ No Safe Route to School **per City of Santa Monica SRTS program** ☒ Yes ☐ No	It is Metro's standard practice to install automatic pedestrian gates with emergency swing gates and tactile warning strips for pedestrian paths that cross the tracks.

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	**Prepared by:** J Van Hoff **Date: 4/15/10**
Grade Crossing: 20th STREET **Drawing No. GC – 017 and T-014**	**Diagnostic Team** **Initial Review Date: 7/29/10**
Crossing No. 84s – 112.8 USDOT No.	**Final Review Date: 8/4/10**

Train Speed: 55 mph	**Type of Train Operation:**	
	Exclusive	☐ Yes ☒No Grade Separated
Frequency of Trains (per hr in each direction): 6/hr/dr	**Semi-exclusive**	☒ Yes ☐ No At-Grade with fencing/barriers between crossings
	Street Running	☐ Yes ☒ No Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 60 ft **Current No. of Lanes per Direction: 2-NB; 2-SB**	**Roadway Volumes** Santa Monica 2006 Volumes **ADT: 25,000**	**Peak Hour Volume: (Expo 2007)** **AM: NB – 1169; SB - 750** **PM: NB – 594, SB - 1063**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Pedestrian crosses tracks with train(s) approaching	Middle or High School near crossing ☐ Yes ☒ No Major Pedestrian Route to School ☐ Yes ☒ No	None
Pedestrian crosses tracks with train(s) approaching	Retirement Home near crossing ☐ Yes ☒ No Ped Route to Commercial Property ☐ Yes ☒ No Commercial/Industrial property near crossing ☒ Yes ☐ No	It is Metro's standard practice to install automatic pedestrian gates with emergency swing gates and tactile warning strips for pedestrian paths that cross the tracks.
Potential pedestrian surges	LRV Station ☐Yes ☒ No Event/Entertainment Center ☐ Yes ☒ No	None
Multi-purpose trail crosses tracks	☐ Yes ☒ No	None

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	**Prepared by:** J Van Hoff **Date: 4/15/10**
Grade Crossing: 19th STREET **Drawing No. GC – 017A and T-014**	**Diagnostic Team** **Initial Review Date: 7/29/10**
Crossing No. 84S – 112.9 USDOT No.	**Final Review Date: 8/4/10**

Train Speed: 55 mph	**Type of Train Operation:**	
	Exclusive	☐ Yes ☒No Grade Separated
Frequency of Trains (per hr in each direction): 6/hr/dr	**Semi-exclusive**	☒ Yes ☐ No At-Grade with fencing/barriers between crossings
	Street Running	☐ Yes ☒ No Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 36 ft **Current No. of Lanes per Direction:** **1-NB; 1-SB**	**Roadway Volumes** Santa Monica 2006 Volumes (½ OF 17TH Street volumes) **ADT: 5,000**	**Peak Hour Volume: (Expo 2007)** **AM: NB – 208; SB - 190** **PM: NB – 192; SB - 250**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Train speed	☐ <35 mph ☒>35 mph	The LRT posted speed for this segment is 55 mph. The mitigation is to install No. 9 railroad gates. Expo will install 4-Quad gate control for additional safety.
Roadway speed	25 mph	Grade crossing controls shall be used. Expo will install 4-Quad gate control for additional safety.
Skewed crossing	☒ <30° from perpendicular ☐ >30° from perpendicular	Grade crossing controls shall be used. Expo will install 4-Quad gate control for additional safety.
Restricted vehicle sight distance	☐ Yes ☒ No	None
Left turn movement onto crossing	☐ Protected ☐ Permissive ☐ Truck/Bus % _____	The driveway northeast of the crossing currently can make left turn movements onto the crossing. This will not be allowed via flexible delineators due to the proximity to the crossing.

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	**Prepared by:** J Van Hoff **Date: 4/15/10**
Grade Crossing: 19th STREET **Drawing No. GC – 017A and T-014**	**Diagnostic Team** **Initial Review Date: 7/29/10**
Crossing No. 84S – 112.9 USDOT No.	**Final Review Date: 8/4/10**

Train Speed: 55 mph	**Type of Train Operation:**	
	Exclusive	☐ Yes ☒No Grade Separated
Frequency of Trains (per hr in each direction): 6/hr/dr	**Semi-exclusive**	☒ Yes ☐ No At-Grade with fencing/barriers between crossings
	Street Running	☐ Yes ☒ No Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 36 ft **Current No. of Lanes per Direction:** **1-NB; 1-SB**	**Roadway Volumes** Santa Monica 2006 Volumes (½ OF 17TH Street volumes) **ADT: 5,000**	**Peak Hour Volume: (Expo 2007)** **AM: NB – 208; SB - 190** **PM: NB – 192; SB - 250**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Left turn movement across crossing	☐ Protected ☐ Permissive ☐ Truck/Bus % _____	Currently left turn movements across the tracks are allowed on NB and SB 19th St. to the driveways on the northwest and southeast corners of the crossing. These will not be allowed via flexible delineators due to the proximity to the crossing.
Right turn movement onto tracks	☐ Insufficient Clear Storage Area for design vehicle ☐ Truck Route - %Trucks_____ ☐ School Bus Route	The right turn movements from the northwest and southeast driveways on 19th St. will continue to be allowed and controlled by the grade crossing control system.
Right turn movement across tracks	☐ Insufficient Clear Storage Area for design vehicle ☐ Truck Route - %Trucks_____ ☐ School Bus Route	The right turn movements into the northeast driveway from 19th St. will continue to be allowed and controlled by the grade crossing control system.
Vehicles queue from **Olympic Blvd.** intersection onto crossing (Influence zone)	☐ Yes ☒ No	None
Vehicles queue from **Colorado Ave.** intersection onto crossing (Influence zone)	☐ Yes ☒ No	None
Vehicles queue from crossing into **Olympic Blvd.** intersection (Spillback zone)	☐ Yes ☒ No	None
Vehicles queue from crossing into **Colorado Ave.** intersection (Spillback zone)	☐ Yes ☒ No	None

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	**Prepared by:** J Van Hoff **Date: 4/15/10**
Grade Crossing: 19th STREET **Drawing No. GC – 017A and T-014**	**Diagnostic Team** **Initial Review Date: 7/29/10**
Crossing No. 84S – 112.9 USDOT No.	**Final Review Date: 8/4/10**

Train Speed: 55 mph	**Type of Train Operation:**	
	Exclusive	☐ Yes ☒No Grade Separated
Frequency of Trains (per hr in each direction): 6/hr/dr	**Semi-exclusive**	☒ Yes ☐ No At-Grade with fencing/barriers between crossings
	Street Running	☐ Yes ☒ No Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 36 ft **Current No. of Lanes per Direction:** **1-NB; 1-SB**	**Roadway Volumes** Santa Monica 2006 Volumes (½ OF 17TH Street volumes) **ADT: 5,000**	**Peak Hour Volume: (Expo 2007)** **AM: NB – 208; SB - 190** **PM: NB – 192; SB - 250**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Vehicle driven around downed crossing gates	☐ Excessive warning activation time ☒ Frequency of Activation **12/hr (6/hr/direction)** ☐ Meet Point for Trains causing extensive gate down time ☒ Number of Tracks__2__ ☐ Non-Mainline Tracks ☐ Mixed Operations ☐ Station adjacent to crossing	Grade crossing controls shall be used and tied to the traffic signal at Colorado Ave. and Olympic Blvd. Include Type Q delineators. Expo will install 4-Quad gate control for additional safety.
Parallel roadways	☐ Yes ☒ No	None
Parallel driveways	☒ Yes **adjacent business and parking lot access located on the northwest, northeast, and southeast corners of crossing** ☐ No	Grade crossing controls shall be used. Also the driveways will be right-in and right-out along with delineators north and south of the crossing. Expo will install 4-Quad gate control for additional safety.
Restricted pedestrian sight distance	☐ Yes ☒ No	None
Pedestrian crosses tracks with train(s) approaching	Elementary School near crossing ☐Yes ☒ No Safe Route to School ☐ Yes ☒ No	None

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	**Prepared by:** J Van Hoff **Date: 4/15/10**
Grade Crossing: 19th STREET **Drawing No. GC – 017A and T-014**	**Diagnostic Team** **Initial Review Date: 7/29/10**
Crossing No. 84S – 112.9 USDOT No.	**Final Review Date: 8/4/10**

Train Speed: 55 mph	**Type of Train Operation:**	
	Exclusive	☐ Yes ☒No Grade Separated
Frequency of Trains (per hr in each direction): 6/hr/dr	**Semi-exclusive**	☒ Yes ☐ No At-Grade with fencing/barriers between crossings
	Street Running	☐ Yes ☒ No Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 36 ft **Current No. of Lanes per Direction: 1-NB; 1-SB**	**Roadway Volumes** Santa Monica 2006 Volumes (½ OF 17TH Street volumes) **ADT: 5,000**	**Peak Hour Volume: (Expo 2007)** **AM: NB – 208; SB - 190** **PM: NB – 192; SB - 250**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Pedestrian crosses tracks with train(s) approaching	Middle or High School near crossing ☐ Yes ☒ No Major Pedestrian Route to School ☐ Yes ☒ No	None
Pedestrian crosses tracks with train(s) approaching	Retirement Home near crossing ☐ Yes ☒ No Ped Route to Commercial Property ☐ Yes ☒ No Commercial/Industrial property near crossing ☒ Yes ☐ No	It is Metro's standard practice to install automatic pedestrian gates with emergency swing gates and tactile warning strips for pedestrian paths that cross the tracks.
Potential pedestrian surges	LRV Station ☐Yes ☒ No Event/Entertainment Center ☐ Yes ☒ No	None
Multi-purpose trail crosses tracks	☐ Yes ☐ ☒ No	None

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	**Prepared by:** J Van Hoff **Date: 4/15/10**
Grade Crossing: 17th STREET **Drawing No. GC – 018 and T-014**	**Diagnostic Team** **Initial Review Date: 7/29/10**
Crossing No. 84S – 113.0 USDOT No.	**Final Review Date: 8/4/10**

Train Speed: Station area 30 mph or posted vehicle speed **Frequency of Trains (per hr in each direction): 6/hr/dr**	**Type of Train Operation:** **Exclusive** **Semi-exclusive** **Street Running**	 ☐ Yes ☒ No Grade Separated ☐ Yes ☒No At-Grade with fencing/barriers between crossings ☒ Yes ☐ No Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 47 Feet **Current No. of Lanes per Direction:** **1-NB and 1-NB Lt** **1-SB, 1-SB Rt and 1-SB Lt**	**Roadway Volumes** Santa Monica 2006 Volumes **ADT: 10,000**	**Peak Hour Volume: (Expo 2007)** **AM: NB – 416; SB - 376** **PM: NB –385; SB - 503**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Train speed	☒ <35 mph ☐>35 mph	LRT will travel no faster than the posted vehicle speed and is controlled by traffic signals with transit signal priority (TSP).
Roadway speed	Colorado 30 mph; 17th Street 25 mph	None
Skewed crossing	☒ <30° from perpendicular ☐ >30° from perpendicular	None
Restricted vehicle sight distance	☒ Yes **due to transitioning from exclusive to street running** ☐ No	Controlled by traffic signal with TSP. A LRT icon blank-out sign (W10-7) shall be placed on the mast arm for the NB and SB movements.
Left turn movement onto crossing	☒ Protected ☐ Permissive ☐ Truck/Bus % _____	Left turn movements from EB and WB Colorado Ave. onto the crossing shall be protected. A LRT icon blank-out sign (W10-7) shall be placed on mast arms next to the EB and WB left turn arrow to be activated with LRT priority.

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	**Prepared by:** J Van Hoff **Date: 4/15/10**
Grade Crossing: 17th STREET **Drawing No. GC – 018 and T-014**	**Diagnostic Team** **Initial Review Date: 7/29/10**
Crossing No. 84S – 113.0 USDOT No.	**Final Review Date: 8/4/10**

Train Speed: Station area 30 mph or posted vehicle speed **Frequency of Trains (per hr in each direction): 6/hr/dr**	**Type of Train Operation:**	
	Exclusive	☐ Yes ☒ No Grade Separated
	Semi-exclusive	☐ Yes ☒No At-Grade with fencing/barriers between crossings
	Street Running	☒ Yes ☐ No Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 47 Feet **Current No. of Lanes per Direction:** **1-NB and 1-NB Lt** **1-SB, 1-SB Rt and 1-SB Lt**	**Roadway Volumes** Santa Monica 2006 Volumes	**ADT: 10,000**	**Peak Hour Volume: (Expo 2007)** **AM: NB – 416; SB - 376** **PM: NB –385; SB - 503**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Left turn movement across tracks	☐ Protected ☒ Permissive ☐ Truck/Bus % _____	Left turn movements from NB and SB 17th St. across the tracks are permissive. A LRT icon blank-out sign (W10-7) shall be placed on mast arms to be activated with LRT priority.
Right turn movement onto crossing	☒ Insufficient Clear Storage Area for design vehicle ☐ Truck Route - %Trucks_____ ☐ School Bus Route	Right turn movement from NB 17th St. will have a no right turn symbol blank-out sign (R3-1) to be activated with LRT priority.
Right turn movement across tracks	☐ Insufficient Clear Storage Area for design vehicle ☐ Truck Route - %Trucks_____ ☐ School Bus Route	None
Vehicles queue from **Olympic** Blvd. intersection onto crossing (Influence zone)	☐ Yes ☒ No	None
Vehicles queue from **Broadway** intersection onto crossing (Influence zone)	☐ Yes ☒ No	None
Vehicles queue from crossing into **Olympic Blvd.** intersection (Spillback zone)	☐ Yes ☒ No	None
Vehicles queue from crossing into **Broadway** intersection (Spillback zone)	☐ Yes ☒ No	None

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	**Prepared by:** J Van Hoff **Date: 4/15/10**
Grade Crossing: 17th STREET **Drawing No. GC – 018 and T-014**	**Diagnostic Team** **Initial Review Date: 7/29/10**
Crossing No. 84S – 113.0 USDOT No.	**Final Review Date: 8/4/10**

Train Speed: Station area 30 mph or posted vehicle speed **Frequency of Trains (per hr in each direction): 6/hr/dr**	**Type of Train Operation:** **Exclusive** ☐ Yes ☒ No Grade Separated **Semi-exclusive** ☐ Yes ☒No At-Grade with fencing/barriers between crossings **Street Running** ☒ Yes ☐ No Mixed flow, LRT/Ped Mall, Separated from traffic by curb	
Roadway Width: 47 Feet **Current No. of Lanes per Direction:** **1-NB and 1-NB Lt** **1-SB, 1-SB Rt and 1-SB Lt**	**Roadway Volumes** Santa Monica 2006 Volumes **ADT: 10,000**	**Peak Hour Volume: (Expo 2007)** **AM: NB – 416; SB - 376** **PM: NB –385; SB - 503**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Vehicle driven around downed crossing gates	☐ Excessive warning activation time ☒ Frequency of Activation - **12/hr (6/hr/direction)** ☐ Meet Point for Trains causing extensive gate down time ☒ Number of Tracks__2__ ☐ Non-Mainline Tracks ☐ Mixed Operations ☒ Station adjacent to crossing	None
Parallel roadways	☒ Yes ☐ No	Traffic signal controlled intersection and left turn protection for EB and WB directions along Colorado Ave.
Parallel driveways	☐ Yes ☒ No	None
Restricted pedestrian sight distance	☒ Yes **due to transitioning from exclusive to street running** ☐ No	Pedestrians will be controlled by the traffic signal pedestrian heads. Audible pedestrian signals will be installed. Provide tactile warning strips on all approaches and curb ramps.

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	**Prepared by:** J Van Hoff **Date: 4/15/10**
Grade Crossing: 17th STREET **Drawing No. GC – 018 and T-014**	**Diagnostic Team** **Initial Review Date: 7/29/10**
Crossing No. 84S – 113.0 USDOT No.	**Final Review Date: 8/4/10**

Train Speed: Station area 30 mph or posted vehicle speed **Frequency of Trains (per hr in each direction): 6/hr/dr**	**Type of Train Operation:** **Exclusive** ☐ Yes ☒ No Grade Separated **Semi-exclusive** ☐ Yes ☒No At-Grade with fencing/barriers between crossings **Street Running** ☒ Yes ☐ No Mixed flow, LRT/Ped Mall, Separated from traffic by curb	
Roadway Width: 47 Feet **Current No. of Lanes per Direction:** **1-NB and 1-NB Lt** **1-SB, 1-SB Rt and 1-SB Lt**	**Roadway Volumes** Santa Monica 2006 Volumes **ADT: 10,000**	**Peak Hour Volume: (Expo 2007)** **AM: NB – 416; SB - 376** **PM: NB –385; SB - 503**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Pedestrian crosses tracks with train(s) approaching	Elementary School near crossing **Crossroads Science and Arts School** ☒Yes ☐ No Safe Route to School **per City of Santa Monica SRTS program** ☒ Yes ☐ No	Traffic signal controlled intersection with pedestrian signal heads and audible pedestrian signals will control pedestrian movements.
Pedestrian crosses tracks with train(s) approaching	Middle or High School near crossing **Crossroads Science and Arts School** ☒Yes ☐ No Major Pedestrian Route to School ☐ Yes ☒ No	Traffic signal controlled intersection with pedestrian signal heads and audible pedestrian signals will control pedestrian movements.
Pedestrian crosses tracks with train(s) approaching	Retirement Home near crossing ☐ Yes ☒ No Ped Route to Commercial Property ☒ Yes ☐ No Commercial/Industrial property near crossing ☒ Yes ☐ No	Traffic signal controlled intersection with pedestrian signal heads and audible pedestrian signals will control pedestrian movements.

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	**Prepared by:** J Van Hoff **Date: 4/15/10**
Grade Crossing: 17th STREET **Drawing No. GC – 018 and T-014**	**Diagnostic Team** **Initial Review Date: 7/29/10**
Crossing No. 84S – 113.0 USDOT No.	**Final Review Date: 8/4/10**

Train Speed: Station area 30 mph or posted vehicle speed **Frequency of Trains (per hr in each direction): 6/hr/dr**	**Type of Train Operation:** **Exclusive** ☐ Yes ☒ No Grade Separated **Semi-exclusive** ☐ Yes ☒No At-Grade with fencing/barriers between crossings **Street Running** ☒ Yes ☐ No Mixed flow, LRT/Ped Mall, Separated from traffic by curb	
Roadway Width: 47 Feet **Current No. of Lanes per Direction:** **1-NB and 1-NB Lt** **1-SB, 1-SB Rt and 1-SB Lt**	**Roadway Volumes** Santa Monica 2006 Volumes	**ADT: 10,000** **Peak Hour Volume: (Expo 2007)** **AM: NB – 416; SB - 376** **PM: NB –385; SB - 503**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Potential pedestrian surges	LRV Station ☒Yes ☐ No Event/Entertainment Center ☐ Yes ☒ No	Traffic signal controlled intersection with pedestrian signal heads and audible pedestrian signals will control pedestrian movements. A pedestrian push button pole will be located at the base of the station ramp between the tracks. An LRT icon blank-out sign (W10-7) with No. 8 flashers will be on the pedestrian pole facing up the station ramp.
Multi-purpose trail crosses tracks	☐ Yes ☒ No	None

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	**Prepared by:** J Van Hoff **Date: 4/15/10**
Grade Crossing: 14th STREET **Drawing No. GC – 019 and T-014**	**Diagnostic Team** **Initial Review Date: 7/29/10**
Crossing No. 84S – 113.2 USDOT No.	**Final Review Date: 8/4/10**

Train Speed: 30 mph or posted vehicle speed **Frequency of Trains (per hr in each direction): 6/hr/dr**	**Type of Train Operation:** **Exclusive** ☐ Yes ☒ No Grade Separated **Semi-exclusive** ☐ Yes ☒No At-Grade with fencing/barriers between crossings **Street Running** ☒ Yes ☐ No Mixed flow, LRT/Ped Mall, Separated from traffic by curb	
Roadway Width: 50 ft **Current No. of Lanes per Direction:** **2-NB Thru, 1-NB Lt** **1-SB Thru, 1-SB Lt**	**Roadway Volumes** Santa Monica 2006 Volumes **ADT: 13,000**	**Peak Hour Volume: (Expo 2007)** **AM: NB – 536; SB - 485** **PM: NB – 437; SB - 655**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Train speed	☒ <35 mph ☐>35 mph	LRT will travel no faster than the posted vehicle speed and is controlled by traffic signals with transit signal priority (TSP).
Roadway speed	Colorado 30 mph; 14th Street 30 mph	None
Skewed crossing	☒ <30° from perpendicular ☐ >30° from perpendicular	None
Restricted vehicle sight distance	☐ Yes ☒ No	None
Left turn movement onto crossing	☐ Protected/Restricted ☐ Permissive ☐ Truck/Bus % _____	Left turn movements from EB and WB Colorado Ave. are not allowed at this intersection per FEIR. A static no left turn sign (R3-2) and an LRT icon blank-out sign (W10-7) will be placed on the EB and WB mast arms to be activated with LRT priority.

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	**Prepared by:** J Van Hoff **Date: 4/15/10**
Grade Crossing: 14th STREET **Drawing No. GC – 019 and T-014**	**Diagnostic Team** **Initial Review Date: 7/29/10**
Crossing No. 84S – 113.2 USDOT No.	**Final Review Date: 8/4/10**

Train Speed: 30 mph or posted vehicle speed **Frequency of Trains (per hr in each direction): 6/hr/dr**	**Type of Train Operation:**	
	Exclusive	☐ Yes ☒ No Grade Separated
	Semi-exclusive	☐ Yes ☒No At-Grade with fencing/barriers between crossings
	Street Running	☒ Yes ☐ No Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 50 ft **Current No. of Lanes per Direction:** **2-NB Thru, 1-NB Lt** **1-SB Thru, 1-SB Lt**	**Roadway Volumes** Santa Monica 2006 Volumes **ADT: 13,000**	**Peak Hour Volume: (Expo 2007)** **AM: NB – 536; SB - 485** **PM: NB – 437; SB - 655**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Left turn movement across tracks	☒ Protected/Restricted ☐ Permissive ☐ Truck/Bus % _____	Left turn movements from NB and SB 14th St. shall be protected with lead-lag operation. Also, an LRT icon blank-out sign (W10-7) will be placed on the NB and SB mast arms to be activated with LRT priority.
Right turn movement onto crossing	☐ Insufficient Clear Storage Area for design vehicle ☐ Truck Route - %Trucks_____ ☐ School Bus Route	None
Right turn movement across tracks	☐ Insufficient Clear Storage Area for design vehicle ☐ Truck Route - %Trucks_____ ☐ School Bus Route	None
Vehicles queue from **Olympic** Blvd. intersection onto crossing (Influence zone)	☐ Yes ☒ No	None
Vehicles queue from **Broadway** intersection onto crossing (Influence zone)	☐ Yes ☒ No	None
Vehicles queue from crossing into **Olympic Blvd.** intersection (Spillback zone)	☐ Yes ☒ No	None
Vehicles queue from crossing into **Broadway** intersection (Spillback zone)	☐ Yes ☒ No	None

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	**Prepared by:** J Van Hoff **Date: 4/15/10**
Grade Crossing: 14th STREET **Drawing No. GC – 019 and T-014**	**Diagnostic Team** **Initial Review Date: 7/29/10**
Crossing No. 84S – 113.2 USDOT No.	**Final Review Date: 8/4/10**

Train Speed: 30 mph or posted vehicle speed **Frequency of Trains (per hr in each direction): 6/hr/dr**	**Type of Train Operation:**	
	Exclusive	☐ Yes ☒ No Grade Separated
	Semi-exclusive	☐ Yes ☒No At-Grade with fencing/barriers between crossings
	Street Running	☒ Yes ☐ No Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 50 ft **Current No. of Lanes per Direction:** **2-NB Thru, 1-NB Lt** **1-SB Thru, 1-SB Lt**	**Roadway Volumes** Santa Monica 2006 Volumes **ADT: 13,000**	**Peak Hour Volume: (Expo 2007)** **AM: NB – 536; SB - 485** **PM: NB – 437; SB - 655**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Vehicle driven around downed crossing gates	☐ Excessive warning activation time ☒ Frequency of Activation - **12/hr (6/hr/direction)** ☐ Meet Point for Trains causing extensive gate down time ☒ Number of Tracks__2__ ☐ Non-Mainline Tracks ☐ Mixed Operations ☐ Station adjacent to crossing	None
Parallel roadways	☒ Yes ☐ No	Traffic signal controlled intersection with up-green arrows for the EB and WB through movements along Colorado Ave., and no left turns are allowed from Colorado Ave.
Parallel driveways	☐ Yes ☒ No	None
Restricted pedestrian sight distance	☐ Yes ☒ No	None
Pedestrian crosses tracks with train(s) approaching	Elementary School near crossing ☐Yes ☒ No Safe Route to School **per City of Santa Monica SRTS program** ☒ Yes ☐No	Traffic signal controlled intersection with pedestrian signal heads and audible pedestrian signals will control pedestrian movements.

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	**Prepared by:** J Van Hoff **Date: 4/15/10**
Grade Crossing: 14th STREET **Drawing No. GC – 019 and T-014**	**Diagnostic Team** **Initial Review Date: 7/29/10**
Crossing No. 84S – 113.2 USDOT No.	**Final Review Date: 8/4/10**

Train Speed: 30 mph or posted vehicle speed **Frequency of Trains (per hr in each direction): 6/hr/dr**	**Type of Train Operation:** **Exclusive** ☐ Yes ☒ No Grade Separated **Semi-exclusive** ☐ Yes ☒No At-Grade with fencing/barriers between crossings **Street Running** ☒ Yes ☐ No Mixed flow, LRT/Ped Mall, Separated from traffic by curb	
Roadway Width: 50 ft **Current No. of Lanes per Direction:** **2-NB Thru, 1-NB Lt** **1-SB Thru, 1-SB Lt**	**Roadway Volumes** Santa Monica 2006 Volumes **ADT: 13,000**	**Peak Hour Volume: (Expo 2007)** **AM: NB – 536; SB - 485** **PM: NB – 437; SB - 655**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Pedestrian crosses tracks with train(s) approaching	Middle or High School near crossing ☐ Yes ☒ No Major Pedestrian Route to School ☐ Yes ☒ No	None
Pedestrian crosses tracks with train(s) approaching	Retirement Home near crossing ☐ Yes ☒ No Ped Route to Commercial Property ☒ Yes ☐ No Commercial/Industrial property near crossing ☒ Yes ☐ No	Traffic signal controlled intersection with pedestrian signal heads and audible pedestrian signals will control pedestrian movements.
Potential pedestrian surges	LRV Station ☐Yes ☒ No Event/Entertainment Center ☐ Yes ☒ No	None
Multi-purpose trail crosses tracks	☐ Yes ☒ No	None

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	**Prepared by:** J Van Hoff **Date: 4/15/10**
Grade Crossing: 11th STREET **Drawing No. GC – 020 and T-013**	**Diagnostic Team** **Initial Review Date: 7/29/10**
Crossing No. 84S – 113.5 USDOT No.	**Final Review Date: 8/4/10**

Train Speed: 30 mph or posted vehicle speed **Frequency of Trains (per hr in each direction): 6/hr/dr**	**Type of Train Operation:**	
	Exclusive	☐ Yes ☒No Grade Separated
	Semi-exclusive	☐ Yes ☒No At-Grade with fencing/barriers between crossings
	Street Running	☒ Yes ☐ No Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 50 ft **Current No. of Lanes per Direction:** **1-NB Thru, 1-NB Lt, 1-NB Rt** **1-SB Thru, 1-SB Lt**	**Roadway Volumes** Santa Monica 2006 Volumes **ADT: 11,000**	**Peak Hour Volume: (Expo 2007)** **AM: NB – 858; SB - 616** **PM: NB –624; SB - 870**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Train speed	☒ <35 mph ☐>35 mph	LRT will travel no faster than the posted vehicle speed and is controlled by traffic signals with transit signal priority (TSP).
Roadway speed	Colorado Ave 30 mph; 11th Street 30 mph	None
Skewed crossing	☒ <30° from perpendicular ☐ >30° from perpendicular	None
Restricted vehicle sight distance	☐ Yes ☒ No	None
Left turn movement onto crossing	☐ Protected/Restricted ☐ Permissive ☐ Truck/Bus % _____	Left turn movements from EB and WB Colorado Ave. are not allowed at this intersection per FEIR. A static no left turn sign (R3-2) and an LRT icon blank-out sign (W10-7) placed on the EB and WB mast arms to be activated with LRT priority.
Left turn movement across tracks	☒ Protected/Restricted ☐ Permissive ☐ Truck/Bus % _____	Left turn movements from NB and SB 11th St. shall be protected with lag-lead operation. Also, an LRT icon blank-out sign (W10-7) will be placed on the NB and SB mast arms to be activated with LRT priority.

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	**Prepared by:** J Van Hoff **Date: 4/15/10**
Grade Crossing: 11th STREET **Drawing No. GC – 020 and T-013**	**Diagnostic Team** **Initial Review Date: 7/29/10**
Crossing No. 84S – 113.5 USDOT No.	**Final Review Date: 8/4/10**

Train Speed: 30 mph or posted vehicle speed **Frequency of Trains (per hr in each direction): 6/hr/dr**	**Type of Train Operation:**	
	Exclusive	☐ Yes ☒No Grade Separated
	Semi-exclusive	☐ Yes ☒No At-Grade with fencing/barriers between crossings
	Street Running	☒ Yes ☐ No Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 50 ft **Current No. of Lanes per Direction:** **1-NB Thru, 1-NB Lt, 1-NB Rt** **1-SB Thru, 1-SB Lt**	**Roadway Volumes** Santa Monica 2006 Volumes **ADT: 11,000**	**Peak Hour Volume: (Expo 2007)** **AM: NB – 858; SB - 616** **PM: NB –624; SB - 870**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Right turn movement onto crossing	☐ Insufficient Clear Storage Area for design vehicle ☐ Truck Route - %Trucks_____ ☐ School Bus Route	None
Right turn movement across tracks	☐ Insufficient Clear Storage Area for design vehicle ☐ Truck Route - %Trucks_____ ☐ School Bus Route	None
Vehicles queue from **Olympic** Blvd. intersection onto crossing (Influence zone)	☐ Yes ☒ No	None
Vehicles queue from **Broadway** intersection onto crossing (Influence zone)	☐ Yes ☒ No	None
Vehicles queue from crossing into **Olympic** Blvd. intersection (Spillback zone)	☐ Yes ☒ No	None
Vehicles queue from crossing into **Broadway** intersection (Spillback zone)	☐ Yes ☒ No	None
Vehicle driven around downed crossing gates	☐ Excessive warning activation time ☒ Frequency of Activation - **12/hr (6/hr/direction)** ☐ Meet Point for Trains causing extensive gate down time ☒ Number of Tracks__2__ ☐ Non-Mainline Tracks ☐ Mixed Operations ☐ Station adjacent to crossing	None

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	**Prepared by:** J Van Hoff **Date: 4/15/10**
Grade Crossing: 11th STREET **Drawing No. GC – 020 and T-013**	**Diagnostic Team** **Initial Review Date: 7/29/10**
Crossing No. 84S – 113.5 USDOT No.	**Final Review Date: 8/4/10**

Train Speed: 30 mph or posted vehicle speed **Frequency of Trains (per hr in each direction): 6/hr/dr**	**Type of Train Operation:**	
	Exclusive	☐ Yes ☒No Grade Separated
	Semi-exclusive	☐ Yes ☒No At-Grade with fencing/barriers between crossings
	Street Running	☒ Yes ☐ No Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 50 ft **Current No. of Lanes per Direction:** **1-NB Thru, 1-NB Lt, 1-NB Rt** **1-SB Thru, 1-SB Lt**	**Roadway Volumes** Santa Monica 2006 Volumes **ADT: 11,000**	**Peak Hour Volume: (Expo 2007)** **AM: NB – 858; SB - 616** **PM: NB –624; SB - 870**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Parallel roadways	☒ Yes ☐ No	Traffic signal controlled intersection with up-green arrows for the EB and WB through movements along Colorado Ave. and no left turns are allowed from Colorado Ave.
Parallel driveways	☐ Yes ☒ No	None
Restricted pedestrian sight distance	☐ Yes ☒ No	None
Pedestrian crosses tracks with train(s) Approaching	Elementary School near crossing ☐Yes ☒ No Safe Route to School **per City of Santa Monica SRTS program** ☒ Yes ☐No	Traffic signal controlled intersection with pedestrian signal heads and audible pedestrian signals will control pedestrian movements.
Pedestrian crosses tracks with train(s) Approaching	Middle or High School near crossing ☐ Yes ☒ No Major Pedestrian Route to School ☐ Yes ☒ No	None

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	**Prepared by:** J Van Hoff **Date: 4/15/10**
Grade Crossing: 11th STREET **Drawing No. GC – 020 and T-013**	**Diagnostic Team** **Initial Review Date: 7/29/10**
Crossing No. 84S – 113.5 USDOT No.	**Final Review Date: 8/4/10**

Train Speed: 30 mph or posted vehicle speed **Frequency of Trains (per hr in each direction): 6/hr/dr**	**Type of Train Operation:**	
	Exclusive	☐ Yes ☒No Grade Separated
	Semi-exclusive	☐ Yes ☒No At-Grade with fencing/barriers between crossings
	Street Running	☒ Yes ☐ No Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 50 ft **Current No. of Lanes per Direction:** **1-NB Thru, 1-NB Lt, 1-NB Rt** **1-SB Thru, 1-SB Lt**	**Roadway Volumes** Santa Monica 2006 Volumes **ADT: 11,000**	**Peak Hour Volume: (Expo 2007)** **AM: NB – 858; SB - 616** **PM: NB –624; SB - 870**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Pedestrian crosses tracks with train(s) Approaching	Retirement Home near crossing ☐ Yes ☒ No Ped Route to Commercial Property ☒ Yes ☐ No Commercial/Industrial property near crossing ☒ Yes ☐ No	Traffic signal controlled intersection with pedestrian signal heads and audible pedestrian signals will control pedestrian movements.
Potential pedestrian surges	LRV Station ☐Yes ☒ No Event/Entertainment Center ☐ Yes ☒ No	None
Multi-purpose trail crosses tracks	☐ Yes ☒ No	None

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	**Prepared by:** J Van Hoff **Date: 4/15/10**
Grade Crossing: LINCOLN BOULEVARD **Drawing No. GC – 021 and T-013** **Crossing No. 84S – 113.7 USDOT No.**	**Diagnostic Team** **Initial Review Date: 7/29/10** **Final Review Date: 8/4/10**

Train Speed: 25 mph or posted vehicle speed

Frequency of Trains (per hr in each direction): 6/hr/dr

Type of Train Operation:

Exclusive	☐ Yes	☒ No	Grade Separated
Semi-exclusive	☐ Yes	☒ No	At-Grade with fencing/barriers between crossings
Street Running	☒ Yes	☐ No	Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 60 ft
Current No. of Lanes per Direction:
2-NB Thru, 1- NB Lt
2-SB Thru, 1-NB Lt

Roadway Volumes
Santa Monica
2006 Volumes

ADT: 24,000

Peak Hour Volume: (Expo 2007)
AM: NB – 1784; SB - 1301
PM: NB –1636; SB - 1471

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Train speed	☒ <35 mph ☐>35 mph	LRT will travel no faster than the posted vehicle speed and is controlled by traffic signals with transit signal priority (TSP).
Roadway speed	Colorado Ave. 25 mph; Lincoln Blvd 30 mph;	None
Skewed crossing	☒ <30° from perpendicular ☐ >30° from perpendicular	None
Restricted vehicle sight distance	☐ Yes ☒ No	None
Left turn movement onto crossing	☐ Protected/Restricted ☐ Permissive ☐ Truck/Bus % _____	Left turn movements from EB and WB Colorado Ave. are not allowed at this intersection per FEIR. A static no left turn sign (R3-2) and an LRT icon blank-out sign (W10-7) placed on the EB and WB mast arms to be activated with LRT priority.

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	**Prepared by:** J Van Hoff **Date: 4/15/10**
Grade Crossing: LINCOLN BOULEVARD **Drawing No. GC – 021 and T-013**	**Diagnostic Team** **Initial Review Date: 7/29/10**
Crossing No. 84S – 113.7 USDOT No.	**Final Review Date: 8/4/10**

Train Speed: 25 mph or posted vehicle speed

Frequency of Trains (per hr in each direction): 6/hr/dr

Type of Train Operation:

Exclusive	☐ Yes	☒ No	Grade Separated
Semi-exclusive	☐ Yes	☒ No	At-Grade with fencing/barriers between crossings
Street Running	☒ Yes	☐ No	Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 60 ft
Current No. of Lanes per Direction:
2-NB Thru, 1- NB Lt
2-SB Thru, 1-NB Lt

Roadway Volumes
Santa Monica
2006 Volumes

ADT: 24,000

Peak Hour Volume: (Expo 2007)
AM: NB – 1784; SB - 1301
PM: NB –1636; SB - 1471

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Left turn movement across tracks	☒ Protected/Restricted ☐ Permissive ☐ Truck/Bus % _____	Left turn movements from NB and SB Lincoln Ave. shall be protected (same as existing) with lead-lag operation. A LRT icon blank-out sign (W10-7) placed on the EB and WB mast arms to be activated with LRT priority
Right turn movement onto crossing	☐ Insufficient Clear Storage Area for design vehicle ☐ Truck Route - %Trucks_____ ☐ School Bus Route	None
Right turn movement across tracks	☐ Insufficient Clear Storage Area for design vehicle ☐ Truck Route - %Trucks_____ ☐ School Bus Route	None
Vehicles queue from **Olympic** Blvd. intersection onto crossing (Influence zone)	☐ Yes ☒No	None - Current 765'storage area with a 2030 projected queue of 383' AM and 471' PM per FEIR.
Vehicles queue from **Broadway** intersection onto crossing (Influence zone)	☐ Yes ☒ No	None - Current 595'storage area with a 2030 projected queue of 427' AM and 283' PM per FEIR.

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	**Prepared by:** J Van Hoff **Date: 4/15/10**
Grade Crossing: LINCOLN BOULEVARD **Drawing No. GC – 021 and T-013**	**Diagnostic Team** **Initial Review Date: 7/29/10**
Crossing No. 84S – 113.7 USDOT No.	**Final Review Date: 8/4/10**

Train Speed: 25 mph or posted vehicle speed **Frequency of Trains (per hr in each direction): 6/hr/dr**	**Type of Train Operation:**		
	Exclusive	☐ Yes ☒ No	Grade Separated
	Semi-exclusive	☐ Yes ☒ No	At-Grade with fencing/barriers between crossings
	Street Running	☒ Yes ☐ No	Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 60 ft **Current No. of Lanes per Direction:** **2-NB Thru, 1- NB Lt** **2-SB Thru, 1-NB Lt**	**Roadway Volumes** Santa Monica 2006 Volumes	**ADT: 24,000**	**Peak Hour Volume: (Expo 2007)** **AM: NB – 1784; SB - 1301** **PM: NB –1636; SB - 1471**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Vehicles queue from crossing into **Olympic Blvd.** intersection (Spillback zone)	☐ Yes ☒ No	None - Current 765'storage area with a 2030 projected queue of 500' AM and 420' PM per FEIR.
Vehicles queue from crossing into **Broadway** intersection (Spillback zone)	☐ Yes ☒ No	None - Current 595'storage area with a 2030 projected queue of 396' AM and 435' PM per FEIR.
Vehicle driven around downed crossing gates	☐ Excessive warning activation time ☒ Frequency of Activation - **12/hr (6/hr/direction)** ☐ Meet Point for Trains causing extensive gate down time ☒ Number of Tracks__2__ ☐ Non-Mainline Tracks ☐ Mixed Operations ☐ Station adjacent to crossing	None
Parallel roadways	☒ Yes ☐ No	Traffic signal controlled intersection with up-green arrows for the EB and WB through movements along Colorado Ave. and no left turns are allowed from Colorado Ave.

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	**Prepared by:** J Van Hoff **Date: 4/15/10**
Grade Crossing: LINCOLN BOULEVARD **Drawing No. GC – 021 and T-013**	**Diagnostic Team** **Initial Review Date: 7/29/10**
Crossing No. 84S – 113.7 USDOT No.	**Final Review Date: 8/4/10**

Train Speed: 25 mph or posted vehicle speed **Frequency of Trains (per hr in each direction): 6/hr/dr**	**Type of Train Operation:**	
	Exclusive	☐ Yes ☒ No Grade Separated
	Semi-exclusive	☐ Yes ☒ No At-Grade with fencing/barriers between crossings
	Street Running	☒ Yes ☐ No Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 60 ft **Current No. of Lanes per Direction:** **2-NB Thru, 1- NB Lt** **2-SB Thru, 1-NB Lt**	**Roadway Volumes** Santa Monica 2006 Volumes **ADT: 24,000**	**Peak Hour Volume: (Expo 2007)** **AM: NB – 1784; SB - 1301** **PM: NB –1636; SB - 1471**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Parallel driveways	☐ Yes ☒ No	None
Restricted pedestrian sight distance	☐ Yes ☒ No	None
Pedestrian crosses tracks with train(s) Approaching	Elementary School near crossing ☐Yes ☒ No Safe Route to School **per City of Santa Monica SRTS program** ☒ Yes ☐No	Traffic signal controlled intersection with pedestrian signal heads and audible pedestrian signals will control pedestrian movements.
Pedestrian crosses tracks with train(s) approaching	Middle or High School near crossing ☐ Yes ☒ No Major Pedestrian Route to School ☐ Yes ☒ No	None
Pedestrian crosses tracks with train(s) approaching	Retirement Home near crossing ☐ Yes ☒ No Ped Route to Commercial Property ☒ Yes ☐ No Commercial/Industrial property near crossing ☒ Yes ☐ No	Traffic signal controlled intersection with pedestrian signal heads and audible pedestrian signals will control pedestrian movements.

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	**Prepared by:** J Van Hoff **Date: 4/15/10**
Grade Crossing: LINCOLN BOULEVARD **Drawing No. GC – 021 and T-013**	**Diagnostic Team** **Initial Review Date: 7/29/10**
Crossing No. 84S – 113.7 USDOT No.	**Final Review Date: 8/4/10**

Train Speed: 25 mph or posted vehicle speed	**Type of Train Operation:**		
	Exclusive	☐ Yes ☒ No	Grade Separated
	Semi-exclusive	☐ Yes ☒ No	At-Grade with fencing/barriers between crossings
Frequency of Trains (per hr in each direction): 6/hr/dr	**Street Running**	☒ Yes ☐ No	Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 60 ft **Current No. of Lanes per Direction:** **2-NB Thru, 1- NB Lt** **2-SB Thru, 1-NB Lt**	**Roadway Volumes** Santa Monica 2006 Volumes	**ADT: 24,000**	**Peak Hour Volume: (Expo 2007)** **AM: NB – 1784; SB - 1301** **PM: NB –1636; SB - 1471**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Potential pedestrian surges	LRV Station ☐Yes ☒ No Event/Entertainment Center ☐ Yes ☒ No	None
Multi-purpose trail crosses tracks	☐ Yes ☒ No	None

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	**Prepared by:** J Van Hoff **Date: 4/15/10** **Reviewed by:** **Date:** **Approved by:** **Date:**
Grade Crossing: 7th STREET **Drawing No. GC – 021A and T-013**	**Diagnostic Team** **Initial Review Date: 7/29/10**
Crossing No. 84S – 113.8 **USDOT No.**	**Final Review Date: 8/4/10**

Train Speed: 25 mph or posted vehicle speed **Frequency of Trains (per hr in each direction): 6/hr/dr**	**Type of Train Operation:** **Exclusive** ☐ Yes ☒ No Grade Separated **Semi-exclusive** ☐ Yes ☒ No At-Grade with fencing/barriers between crossings **Street Running** ☒ Yes ☐ No Mixed flow, LRT/Ped Mall, Separated from traffic by curb	
Roadway Width: 52 ft **Current No. of Lanes per Direction** **1-NB Thru** **1-SB Thru 1-SB Lt**	**Roadway Volumes** Santa Monica 2006 Volumes **ADT: 8,000**	**Peak Hour Volume: (Expo 2007)** **AM: NB – 310; SB – 310** **PM: NB –410; SB – 350**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Train speed	☒ <35 mph ☐>35 mph	LRT will travel no faster than the posted vehicle speed and is controlled by traffic signals with transit signal priority (TSP).
Roadway speed	Colorado Ave 25 mph; 7th Street 30 mph;	None
Skewed crossing	☒ <30° from perpendicular ☐ >30° from perpendicular	None
Restricted vehicle sight distance	☐ Yes ☒ No	None
Left turn movement onto crossing	☐ Protected/Restricted ☐ Permissive ☐ Truck/Bus % _____	Left turn movements from EB and WB Colorado Ave. are not allowed at this intersection per FEIR. A static no left turn sign (R3-2) and an LRT icon blankout sign (W10-7) placed on the EB and WB mast arms to be activated with LRT priority.

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	**Prepared by:** J Van Hoff **Date: 4/15/10** **Reviewed by: Date:** **Approved by: Date:**
Grade Crossing: 7th STREET **Drawing No. GC – 021A and T-013**	**Diagnostic Team** **Initial Review Date: 7/29/10**
Crossing No. 84S – 113.8 USDOT No.	**Final Review Date: 8/4/10**

Train Speed: 25 mph or posted vehicle speed **Frequency of Trains (per hr in each direction): 6/hr/dr**	**Type of Train Operation:**	
	Exclusive	☐ Yes ☒ No Grade Separated
	Semi-exclusive	☐ Yes ☒ No At-Grade with fencing/barriers between crossings
	Street Running	☒ Yes ☐ No Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 52 ft **Current No. of Lanes per Direction** **1-NB Thru** **1-SB Thru 1-SB Lt**	**Roadway Volumes** Santa Monica 2006 Volumes **ADT: 8,000**	**Peak Hour Volume: (Expo 2007)** **AM: NB – 310; SB – 310** **PM: NB –410; SB – 350**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Left turn movement across tracks	☒ Protected/Restricted **SB** ☒ Permissive **NB** ☐ Truck/Bus % _____	Left turn movements from SB 7th St. will be protected and from NB will be permissive. A LRT icon blank-out sign (W10-7) shall be placed on mast arms to be activated with LRT priority.
Right turn movement onto crossing	☐ Insufficient Clear Storage Area for design vehicle ☐ Truck Route - %Trucks_____ ☐ School Bus Route	None
Right turn movement across tracks	☐ Insufficient Clear Storage Area for design vehicle ☐ Truck Route - %Trucks_____ ☐ School Bus Route	None
Vehicles queue from **Olympic Blvd.** intersection onto crossing (Influence zone)	☐ Yes ☒ No	None
Vehicles queue from **Broadway** intersection onto crossing (Influence zone)	☐ Yes ☒ No	None
Vehicles queue from crossing into **Olympic Blvd.** intersection (Spillback zone)	☐ Yes ☒ No	None
Vehicles queue from crossing into **Broadway** intersection (Spillback zone)	☐ Yes ☒ No	None

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	**Prepared by:** J Van Hoff **Date: 4/15/10** **Reviewed by: Date:** **Approved by: Date:**
Grade Crossing: 7th STREET **Drawing No. GC – 021A and T-013**	**Diagnostic Team** **Initial Review Date: 7/29/10**
Crossing No. 84S – 113.8 USDOT No.	**Final Review Date: 8/4/10**

Train Speed: 25 mph or posted vehicle speed **Frequency of Trains (per hr in each direction): 6/hr/dr**	**Type of Train Operation:**	
	Exclusive	☐ Yes ☒ No Grade Separated
	Semi-exclusive	☐ Yes ☒ No At-Grade with fencing/barriers between crossings
	Street Running	☒ Yes ☐ No Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 52 ft **Current No. of Lanes per Direction** **1-NB Thru** **1-SB Thru 1-SB Lt**	**Roadway Volumes** Santa Monica 2006 Volumes **ADT: 8,000**	**Peak Hour Volume: (Expo 2007)** **AM: NB – 310; SB – 310** **PM: NB –410; SB – 350**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Vehicle driven around downed crossing gates	☐ Excessive warning activation time ☒ Frequency of Activation - **12/hr (6/hr/direction)** ☐ Meet Point for Trains causing extensive gate down time ☒ Number of Tracks__2__ ☐ Non-Mainline Tracks ☐ Mixed Operations ☐ Station adjacent to crossing	None
Parallel roadways	☒ Yes ☐ No	Traffic signal controlled intersection with up-green arrows for the EB and WB through movements along Colorado Ave. and no left turns are allowed from Colorado Ave.
Parallel driveways	☐ Yes ☒ No	None
Restricted pedestrian sight distance	☐ Yes ☒ No	None
Pedestrian crosses tracks with train(s) approaching	Elementary School near crossing ☐Yes ☒ No Safe Route to School ☐ Yes ☒ No	None

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	**Prepared by:** J Van Hoff **Date: 4/15/10** **Reviewed by:** **Date:** **Approved by:** **Date:**
Grade Crossing: 7th STREET **Drawing No. GC – 021A and T-013**	**Diagnostic Team** **Initial Review Date: 7/29/10**
Crossing No. 84S – 113.8 USDOT No.	**Final Review Date: 8/4/10**

Train Speed: 25 mph or posted vehicle speed **Frequency of Trains (per hr in each direction): 6/hr/dr**	**Type of Train Operation:**	
	Exclusive	☐ Yes ☒ No Grade Separated
	Semi-exclusive	☐ Yes ☒ No At-Grade with fencing/barriers between crossings
	Street Running	☒ Yes ☐ No Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 52 ft **Current No. of Lanes per Direction** **1-NB Thru** **1-SB Thru 1-SB Lt**	**Roadway Volumes** Santa Monica 2006 Volumes	**ADT: 8,000**	**Peak Hour Volume: (Expo 2007)** **AM: NB – 310; SB – 310** **PM: NB –410; SB – 350**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Pedestrian crosses tracks with train(s) approaching	Middle or High School near crossing ☐ Yes ☒ No Major Pedestrian Route to School ☐ Yes ☒ No	None
Pedestrian crosses tracks with train(s) approaching	Retirement Home near crossing ☐ Yes ☒ No Ped Route to Commercial Property ☒ Yes ☐ No Commercial/Industrial property near crossing ☒ Yes ☐ No	Traffic signal controlled intersection with pedestrian signal heads and audible pedestrian signals will control pedestrian movements.
Potential pedestrian surges	LRV Station ☐Yes ☒ No Event/Entertainment Center ☐ Yes ☒ No	None
Multi-purpose trail crosses tracks	☐ Yes ☒ No	None

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	**Prepared by:** J Van Hoff **Date: 4/15/10**
Grade Crossing: 6th STREET **Drawing No. GC – 022 and T-013** **Crossing No. 84S – 113.85 USDOT No.**	**Diagnostic Team** **Initial Review Date: 7/29/10** **Final Review Date: 8/4/10**

Train Speed: 25mph or posted vehicle speed **Frequency of Trains (per hr in each direction): 6/hr/dr**	**Type of Train Operation:** **Exclusive**	☐ Yes ☒No Grade Separated
	Semi-exclusive	☐ Yes ☒ No At-Grade with fencing/barriers between crossings
	Street Running	☒ Yes ☐ No Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway: Width 52ft **Current No. of Lanes per Direction:** **1-NB Thru, 1NB Lt** **1-SB Thru, 1-SB Lt**	**Roadway Volumes** Santa Monica 2006 Volumes	**ADT: 6,000**	**Peak Hour Volume: (Expo 2007)** **AM: NB – 300; SB – 310** **PM: NB – 100; SB – 310**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Train speed	☒ <35 mph ☐>35 mph	LRT will travel no faster than the posted vehicle speed and is controlled by traffic signals with transit signal priority (TSP).
Roadway speed	Colorado 25 mph; 6th Street 30 mph;	None
Skewed crossing	☒ <30° from perpendicular ☐ >30° from perpendicular	None
Restricted vehicle sight distance	☐ Yes ☒ No	None
Left turn movement onto crossing	☒ Protected/Restricted for Big Blue Bus only ☐ Permissive ☐ Truck/Bus % _____	Left turn movements from EB and WB Colorado Ave. are not allowed at this intersection per FEIR. A static no left turn sign (R3-2) and an LRT icon blank-out sign (W10-7) placed on the EB and WB mast arms to be activated with LRT priority. However, per the FEIR, WB left turns for Big Blue Bus will be allowed.

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	**Prepared by:** J Van Hoff **Date: 4/15/10**
Grade Crossing: 6th STREET **Drawing No. GC – 022 and T-013**	**Diagnostic Team** **Initial Review Date: 7/29/10**
Crossing No. 84S – 113.85 USDOT No.	**Final Review Date: 8/4/10**

Train Speed: 25mph or posted vehicle speed **Frequency of Trains (per hr in each direction): 6/hr/dr**	**Type of Train Operation:**	
	Exclusive	☐ Yes ☒No Grade Separated
	Semi-exclusive	☐ Yes ☒ No At-Grade with fencing/barriers between crossings
	Street Running	☒ Yes ☐ No Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway: Width 52ft **Current No. of Lanes per Direction:** **1-NB Thru, 1NB Lt** **1-SB Thru, 1-SB Lt**	**Roadway Volumes** Santa Monica 2006 Volumes **ADT: 6,000**	**Peak Hour Volume: (Expo 2007)** **AM: NB – 300; SB – 310** **PM: NB – 100; SB – 310**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Left turn movement across tracks	☒ Protected/Restricted **NB and SB** ☐ Permissive ☐ Truck/Bus % _____	Left turn movements from NB and SB 6th St. will be protected with lead-lag. A LRT icon blank-out sign (W10-7) shall be placed on mast arms to be activated with LRT priority.
Right turn movement onto crossing	☐ Insufficient Clear Storage Area for design vehicle ☐ Truck Route - %Trucks_____ ☐ School Bus Route	None
Right turn movement across tracks	☐ Insufficient Clear Storage Area for design vehicle ☐ Truck Route - %Trucks_____ ☐ School Bus Route	None
Vehicles queue from **Big Blue Bus yard** onto crossing (Influence zone)	☐ Yes ☒ No	None
Vehicles queue from **Broadway** intersection onto crossing (Influence zone)	☐ Yes ☒ No	None
Vehicles queue from crossing into **Big Blue Bus yard** (Spillback zone)	☐ Yes ☒ No	None
Vehicles queue from crossing into **Broadway** intersection (Spillback zone)	☐ Yes ☒ No	None

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	**Prepared by:** J Van Hoff **Date: 4/15/10**
Grade Crossing: 6th STREET **Drawing No. GC – 022 and T-013**	**Diagnostic Team** **Initial Review Date: 7/29/10**
Crossing No. 84S – 113.85 USDOT No.	**Final Review Date: 8/4/10**

Train Speed: 25mph or posted vehicle speed **Frequency of Trains (per hr in each direction): 6/hr/dr**	**Type of Train Operation:**	
	Exclusive	☐ Yes ☒No Grade Separated
	Semi-exclusive	☐ Yes ☒ No At-Grade with fencing/barriers between crossings
	Street Running	☒ Yes ☐ No Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway: Width 52ft **Current No. of Lanes per Direction:** **1-NB Thru, 1NB Lt** **1-SB Thru, 1-SB Lt**	**Roadway Volumes** Santa Monica 2006 Volumes	**ADT: 6,000**	**Peak Hour Volume: (Expo 2007)** **AM: NB – 300; SB – 310** **PM: NB – 100; SB – 310**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Vehicle driven around downed crossing gates	☐ Excessive warning activation time ☒ Frequency of Activation - **12/hr (6/hr/direction)** ☐ Meet Point for Trains causing extensive gate down time ☒ Number of Tracks__2__ ☐ Non-Mainline Tracks ☐ Mixed Operations ☐ Station adjacent to crossing	None
Parallel roadways	☒ Yes ☐ No	Traffic signal controlled intersection with up-green arrows for the EB and WB through movements and no left turns are allowed from Colorado Ave., except for WB left turns for Big Blue Bus.
Parallel driveways	☐ Yes ☒ No	None
Restricted pedestrian sight distance	☐ Yes ☒ No	None
Pedestrian crosses tracks with train(s) approaching	Elementary School near crossing ☐Yes ☒ No Safe Route to School ☐ Yes ☒ No	None

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	**Prepared by:** J Van Hoff **Date: 4/15/10**
Grade Crossing: 6th STREET **Drawing No. GC – 022 and T-013**	**Diagnostic Team** **Initial Review Date: 7/29/10**
Crossing No. 84S – 113.85 USDOT No.	**Final Review Date: 8/4/10**

Train Speed: 25mph or posted vehicle speed **Frequency of Trains (per hr in each direction): 6/hr/dr**	**Type of Train Operation:** **Exclusive**	☐ Yes ☒No Grade Separated
	Semi-exclusive	☐ Yes ☒ No At-Grade with fencing/barriers between crossings
	Street Running	☒ Yes ☐ No Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway: Width 52ft **Current No. of Lanes per Direction:** **1-NB Thru, 1NB Lt** **1-SB Thru, 1-SB Lt**	**Roadway Volumes** Santa Monica 2006 Volumes **ADT: 6,000**	**Peak Hour Volume: (Expo 2007)** **AM: NB – 300; SB – 310** **PM: NB – 100; SB – 310**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Pedestrian crosses tracks with train(s) approaching	Middle or High School near crossing ☐ Yes ☒ No Major Pedestrian Route to School ☐ Yes ☒ No	None
Pedestrian crosses tracks with train(s) approaching	Retirement Home near crossing ☐ Yes ☒ No Ped Route to Commercial Property ☒ Yes ☐ No Commercial/Industrial property near crossing ☒ Yes ☐ No	Traffic signal controlled intersection with pedestrian signal heads and audible pedestrian signals will control pedestrian movements.
Potential pedestrian surges	LRV Station ☐Yes ☒ No Event/Entertainment Center ☐ Yes ☒ No	None
Multi-purpose trail crosses tracks	☐ Yes ☒ No	None

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	**Prepared by:** J Van Hoff **Date: 4/15/10**
Grade Crossing: 5th STREET **Drawing No. GC – 022A and T-013** **Crossing No. 84S – 113.9 USDOT No.**	**Diagnostic Team** **Initial Review Date: 7/29/10** **Final Review Date: 8/4/10**

Train Speed: Station area 25 mph or posted vehicle speed

Frequency of Trains (per hr in each direction): 6/hr/dr

Type of Train Operation:

Exclusive	☐ Yes ☒ No	Grade Separated
Semi-exclusive	☐ Yes ☒ No	At-Grade with fencing/barriers between crossings
Street Running	☒ Yes ☐ No	Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 70ft
Current No. of Lanes per Direction:
1-NB Thru, 1 NB Thru Lt, 1 NB Rt
1-SB Thru, 1 SB Lt

Roadway Volumes
Santa Monica
2006 Volumes

ADT: 20,000

Peak Hour Volume: (Expo 2007)
AM: NB – 110; SB – 510
PM: NB –510; SB – 310

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Train speed	☒ <35 mph **and adjacent to station** ☐>35 mph	LRT will travel no faster than the posted vehicle speed and is controlled by traffic signals with transit signal priority (TSP).
Roadway speed	Colorado Ave 25 mph; 5th Street 30 mph	None
Skewed crossing	☒ <30° from perpendicular ☐ >30° from perpendicular	None
Restricted vehicle sight distance	☐ Yes ☒ No	None
Left turn movement onto crossing	☐ Protected/Restricted ☐ Permissive ☐ Truck/Bus % _____	Left turn movements from EB and WB Colorado Ave. are not allowed at this intersection per FEIR. A static no left turn sign (R3-2) and an LRT icon blank-out sign (W10-7) placed on the EB and WB mast arms to be activated with the LRT priority.
Left turn movement across tracks	☒ Protected/Restricted **NB and SB** ☐ Permissive ☐ Truck/Bus % _____	Left turn movements from NB and SB 5th St. shall be protected.

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	**Prepared by:** J Van Hoff **Date: 4/15/10**
Grade Crossing: 5th STREET **Drawing No. GC – 022A and T-013**	**Diagnostic Team** **Initial Review Date: 7/29/10**
Crossing No. 84S – 113.9 USDOT No.	**Final Review Date: 8/4/10**

Train Speed: Station area 25 mph or posted vehicle speed **Frequency of Trains (per hr in each direction): 6/hr/dr**	**Type of Train Operation:** **Exclusive** **Semi-exclusive** **Street Running**	 ☐ Yes ☒ No Grade Separated ☐ Yes ☒ No At-Grade with fencing/barriers between crossings ☒ Yes ☐ No Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 70ft **Current No. of Lanes per Direction:** **1-NB Thru, 1 NB Thru Lt, 1 NB Rt** **1-SB Thru, 1 SB Lt**	**Roadway Volumes** Santa Monica 2006 Volumes	**ADT: 20,000**	**Peak Hour Volume: (Expo 2007)** **AM: NB – 110; SB – 510** **PM: NB –510; SB – 310**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Right turn movement onto crossing	☐ Insufficient Clear Storage Area for design vehicle ☐ Truck Route - %Trucks_____ ☐ School Bus Route	NB right turn movement from 5th St. will be fully controlled during an approaching LRT. Will install a no right turn blank-out sign (R3-1) with 4-section signal head.
Right turn movement across tracks	☐ Insufficient Clear Storage Area for design vehicle ☐ Truck Route - %Trucks_____ ☐ School Bus Route	The EB right turn movement from Colorado Ave. onto SB 5th St. will be held at the 4th St. traffic signal west of the crossing. The transit signal priority will provide an all-red phase to allow EB right turns to clear the trackway.
Vehicles queue from **Olympic Blvd.** onto crossing (Influence zone)	☐ Yes ☒ No	None
Vehicles queue from **Broadway** intersection onto crossing (Influence zone)	☐ Yes ☒ No	None
Vehicles queue from crossing into **Olympic Blvd** (Spillback zone)	☐ Yes ☒ No	None
Vehicles queue from crossing into **Broadway** intersection (Spillback zone)	☐ Yes ☒ No	None

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	**Prepared by:** J Van Hoff **Date: 4/15/10**
Grade Crossing: 5th STREET **Drawing No. GC – 022A and T-013**	**Diagnostic Team** **Initial Review Date: 7/29/10**
Crossing No. 84S – 113.9 USDOT No.	**Final Review Date: 8/4/10**

Train Speed: Station area 25 mph or posted vehicle speed **Frequency of Trains (per hr in each direction): 6/hr/dr**	**Type of Train Operation:** **Exclusive** **Semi-exclusive** **Street Running**	 ☐ Yes ☒ No Grade Separated ☐ Yes ☒ No At-Grade with fencing/barriers between crossings ☒ Yes ☐ No Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 70ft **Current No. of Lanes per Direction:** **1-NB Thru, 1 NB Thru Lt, 1 NB Rt** **1-SB Thru, 1 SB Lt**	**Roadway Volumes** Santa Monica 2006 Volumes	**ADT: 20,000**	**Peak Hour Volume: (Expo 2007)** **AM: NB – 110; SB – 510** **PM: NB –510; SB – 310**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Vehicle driven around downed crossing gates	☐ Excessive warning activation time ☒ Frequency of Activation - **12/hr (6/hr/direction)** ☐ Meet Point for Trains causing extensive gate down time ☒ Number of Tracks__2__ ☐ Non-Mainline Tracks ☐ Mixed Operations ☒ Station adjacent to crossing	None
Parallel roadways	☒ Yes ☐ No	Traffic signal controlled intersection with up-green arrows for the EB and WB through movements and no left turns are allowed from Colorado Ave.
Parallel driveways	☐ Yes ☒ No	None

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	**Prepared by:** J Van Hoff **Date: 4/15/10**
Grade Crossing: 5th STREET **Drawing No. GC – 022A and T-013**	**Diagnostic Team** **Initial Review Date: 7/29/10**
Crossing No. 84S – 113.9 USDOT No.	**Final Review Date: 8/4/10**

Train Speed: Station area 25 mph or posted vehicle speed **Frequency of Trains (per hr in each direction): 6/hr/dr**	**Type of Train Operation:**	
	Exclusive	☐ Yes ☒ No Grade Separated
	Semi-exclusive	☐ Yes ☒ No At-Grade with fencing/barriers between crossings
	Street Running	☒ Yes ☐ No Mixed flow, LRT/Ped Mall, Separated from traffic by curb

Roadway Width: 70ft **Current No. of Lanes per Direction:** **1-NB Thru, 1 NB Thru Lt, 1 NB Rt** **1-SB Thru, 1 SB Lt**	**Roadway Volumes** Santa Monica 2006 Volumes	**ADT: 20,000**	**Peak Hour Volume: (Expo 2007)** **AM: NB – 110; SB – 510** **PM: NB –510; SB – 310**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Restricted pedestrian sight distance	☐ Yes ☒ No	Pedestrians will be controlled by the traffic signal pedestrian heads. Audible pedestrian signals will be installed. Provide tactile warning strips on all approaches and curb ramps. The sidewalk on the south side of Colorado west of the crossing will cross perpendicular to the tracks just north of the station. The pedestrian crossing will have swings gates with No. 8 flashers for all approach directions including each approach from the station.
Pedestrian crosses tracks with train(s) approaching	Elementary School near crossing ☐Yes ☒ No Safe Route to School ☐ Yes ☒ No	None
Pedestrian crosses tracks with train(s) approaching	Middle or High School near crossing ☐ Yes ☒ No Major Pedestrian Route to School ☐ Yes ☒ No	None

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

EXPOSITION PHASE 2 GRADE CROSSING HAZARD ANALYSIS	**Prepared by:** J Van Hoff **Date: 4/15/10**
Grade Crossing: 5th STREET **Drawing No. GC – 022A and T-013**	**Diagnostic Team** **Initial Review Date: 7/29/10**
Crossing No. 84S – 113.9 USDOT No.	**Final Review Date: 8/4/10**

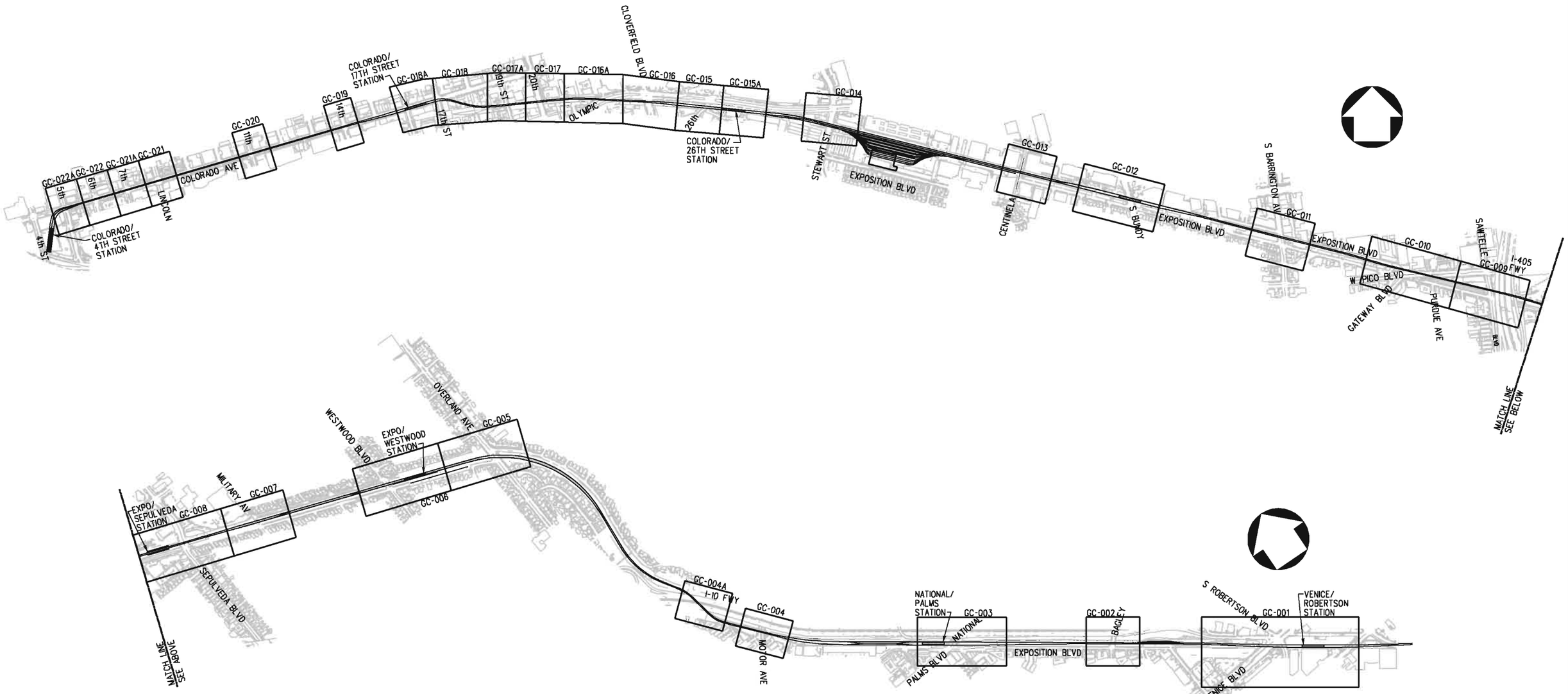
Train Speed: Station area 25 mph or posted vehicle speed **Frequency of Trains (per hr in each direction): 6/hr/dr**	**Type of Train Operation:** **Exclusive** ☐ Yes ☒ No Grade Separated **Semi-exclusive** ☐ Yes ☒ No At-Grade with fencing/barriers between crossings **Street Running** ☒ Yes ☐ No Mixed flow, LRT/Ped Mall, Separated from traffic by curb	
Roadway Width: 70ft **Current No. of Lanes per Direction:** **1-NB Thru, 1 NB Thru Lt, 1 NB Rt** **1-SB Thru, 1 SB Lt**	**Roadway Volumes** Santa Monica 2006 Volumes **ADT: 20,000**	**Peak Hour Volume: (Expo 2007)** **AM: NB – 110; SB – 510** **PM: NB –510; SB – 310**

POTENTIAL HAZARD	HAZARD IDENTIFIER	PROPOSED MITIGATIONS
Pedestrian crosses tracks with train(s) approaching	Retirement Home near crossing ☐ Yes ☒ No Ped Route to Commercial Property ☒ Yes ☐ No Commercial/Industrial property near crossing ☒ Yes ☐ No	Traffic signal controlled intersection with pedestrian signal heads and audible pedestrian signals will control pedestrian movements
Potential pedestrian surges	LRV Station ☒Yes ☐ No Event/Entertainment Center ☐ Yes ☒ No	Provide barriers along all approaches to pedestrian grade crossing.
Multi-purpose trail crosses tracks	☐ Yes ☒ No	None

Proposed Mitigations: This column is all inclusive and should be reduced to those which are recommended during the hazard evaluation and modified as determined by the initial and final Diagnostic Team Review.

Appendix B:

Grade Crossing Concept Plans



CONCEPTUAL ENGINEERING

PRELIMINARY

THE PREPARATION OF THIS DRAWING HAS BEEN FINANCED BY THE TAXES OF THE CITIZENS OF LOS ANGELES COUNTY AND OF THE STATE OF CALIFORNIA.

REV	DATE	BY	APP	REG NO	EXPIRES	SEAL HOLDER	DESCRIPTION
	-	-	-	-	-		-

DESIGNED BY J. SUSILO
DRAWN BY M. AL-MASHAT
CHECKED BY L. MOHR
IN CHARGE J. PRIZNER
DATE 5/05/10

Exposition Metro Line Construction Authority
Expo

DMJM HARRIS | AECOM
300 S. GRAND AVENUE, SECOND FLOOR
LOS ANGELES, CALIFORNIA 90071
TEL (213) 330-7200 FAX (213) 330-7201

SUBMITTED
APPROVED

EXPOSITION TRANSIT PROJECT-PHASE 2

GRADE CROSSINGS KEY MAP

CONTRACT NO EXXXX
DRAWING NO GC-000
REV 0
SCALE NONE
SHEET NO

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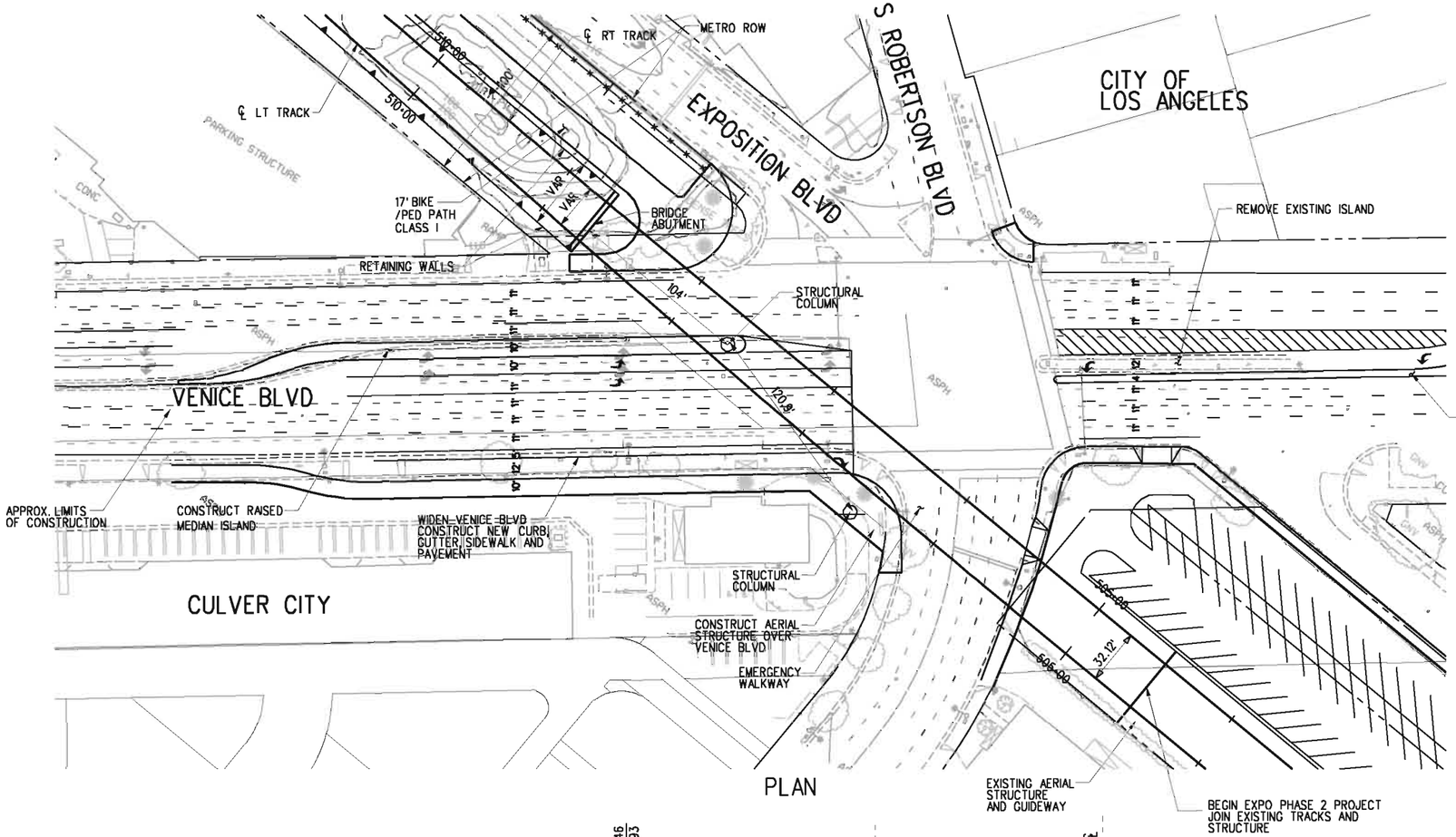
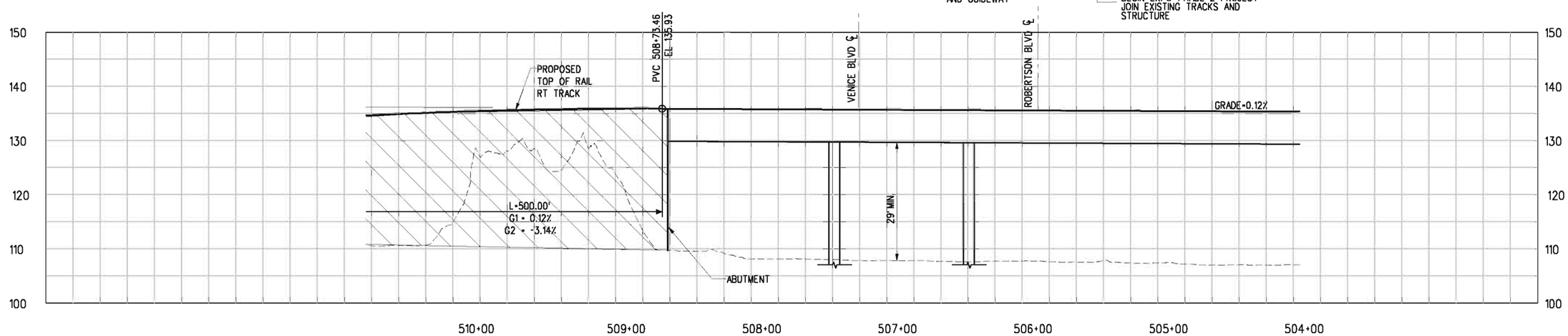


PLAN

NOTES:

VENICE AND ROBERTSON BLVD TO BE RECONSTRUCTED PER CONCEPT PLAN. LANE CONFIGURATION, SIGNAGE, AND PEDESTRIAN TREATMENTS TO BE FURTHER DESIGNED DURING PRELIMINARY ENGINEERING.



40' 20' 0 40' 80'
HORIZ: 1"=40'

10' 0 10' 20'
VERT: 1"=10'

CONCEPTUAL ENGINEERING

RT TRACK PROFILE

PRELIMINARY

THE PREPARATION OF THIS DRAWING HAS BEEN FINANCED BY THE TAXES OF THE CITIZENS OF LOS ANGELES COUNTY AND OF THE STATE OF CALIFORNIA.

REV	DATE	BY	APP	REG NO	EXPIRES	SEAL HOLDER	DESCRIPTION
	-	-	-	-	-		-

DESIGNED BY J. SUSILO
DRAWN BY M. AL-MASHAT
CHECKED BY L. MOHR
IN CHARGE J. PRIZNER
DATE 5/05/10

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Expo

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LOS ANGELES, CALIFORNIA 90071
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SUBMITTED
APPROVED

EXPOSITION TRANSIT PROJECT-PHASE 2
VENICE/ROBERTSON BLVD
GRADE SEPARATION
CONCEPT PLAN
PROPOSED CPUC NO.84S - 107.9

CONTRACT NO EXXXX
DRAWING NO GC-001 REV 0
SCALE HORIZ: 1"=40' VERT: 1"=10'
SHEET NO

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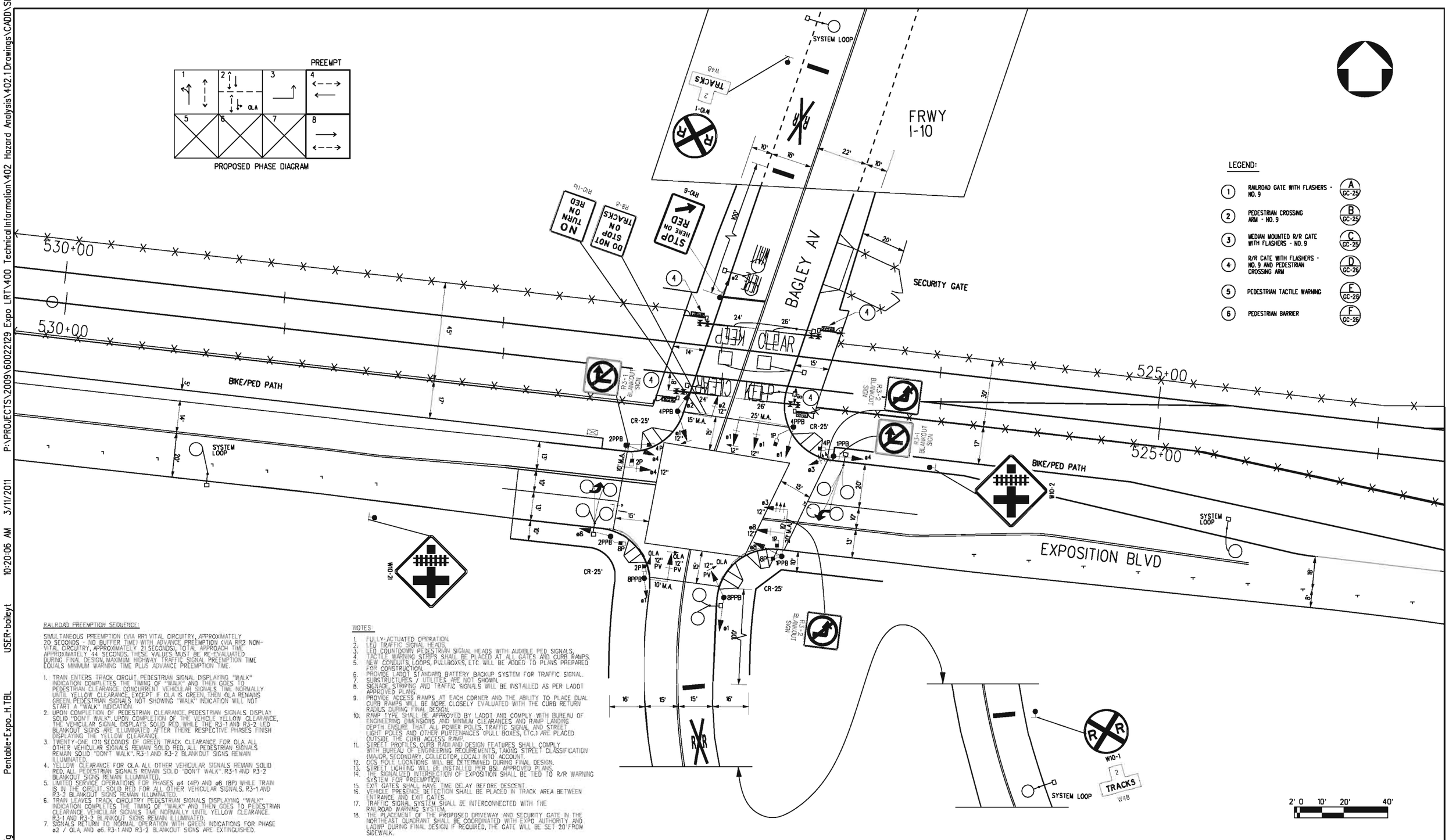
PROPOSED PHASE DIAGRAM



LEGEND:

1	RAILROAD GATE WITH FLASHERS - NO. 9	A GC-25
2	PEDESTRIAN CROSSING ARM - NO. 9	B GC-25
3	MEDIAN MOUNTED R/R GATE WITH FLASHERS - NO. 9	C GC-25
4	R/R GATE WITH FLASHERS - NO. 9 AND PEDESTRIAN CROSSING ARM	D GC-26
5	PEDESTRIAN TACTILE WARNING	F GC-26
6	PEDESTRIAN BARRIER	F GC-26

RAILROAD PREEMPTION SEQUENCE:

SIMULTANEOUS PREEMPTION (VIA RR1 VITAL CIRCUITRY, APPROXIMATELY 20 SECONDS - NO BUFFER TIME) WITH ADVANCE PREEMPTION (VIA RR2 NON-VITAL CIRCUITRY, APPROXIMATELY 21 SECONDS), TOTAL APPROACH TIME APPROXIMATELY 44 SECONDS. THESE VALUES MUST BE RE-EVALUATED DURING FINAL DESIGN. MAXIMUM HIGHWAY TRAFFIC SIGNAL PREEMPTION TIME EQUALS MINIMUM WARNING TIME PLUS ADVANCE PREEMPTION TIME.

1. TRAIN ENTERS TRACK CIRCUIT. PEDESTRIAN SIGNAL DISPLAYING "WALK" INDICATION COMPLETES THE TIMING OF "WALK" AND THEN GOES TO PEDESTRIAN CLEARANCE. CONCURRENT VEHICULAR SIGNALS TIME NORMALLY UNTIL YELLOW CLEARANCE, EXCEPT IF OLA IS GREEN, THEN OLA REMAINS GREEN. PEDESTRIAN SIGNALS NOT SHOWING "WALK" INDICATION WILL NOT START A "WALK" INDICATION.
2. UPON COMPLETION OF PEDESTRIAN CLEARANCE, PEDESTRIAN SIGNALS DISPLAY SOLID "DONT WALK". UPON COMPLETION OF THE VEHICLE YELLOW CLEARANCE, THE VEHICULAR SIGNAL DISPLAYS SOLID RED, WHILE THE R3-1 AND R3-2 LED BLANKOUT SIGNS ARE ILLUMINATED AFTER THERE RESPECTIVE PHASES FINISH DISPLAYING THE YELLOW CLEARANCE.
3. TWENTY-ONE (21) SECONDS OF GREEN. TRACK CLEARANCE FOR OLA. ALL OTHER VEHICULAR SIGNALS REMAIN SOLID RED. ALL PEDESTRIAN SIGNALS REMAIN SOLID "DON'T WALK". R3-1 AND R3-2 BLANKOUT SIGNS REMAIN ILLUMINATED.
4. YELLOW CLEARANCE FOR OLA. ALL OTHER VEHICULAR SIGNALS REMAIN SOLID RED. ALL PEDESTRIAN SIGNALS REMAIN SOLID "DON'T WALK". R3-1 AND R3-2 BLANKOUT SIGNS REMAIN ILLUMINATED.
5. LIMITED SERVICE OPERATIONS FOR PHASES ø4 (4P) AND ø8 (8P) WHILE TRAIN IS IN THE CIRCUIT. SOLID RED FOR ALL OTHER VEHICULAR SIGNALS. R3-1 AND R3-2 BLANKOUT SIGNS REMAIN ILLUMINATED.
6. TRAIN LEAVES TRACK CIRCUITRY. PEDESTRIAN SIGNALS DISPLAYING "WALK" INDICATION COMPLETES THE TIMING OF "WALK" AND THEN GOES TO PEDESTRIAN CLEARANCE. VEHICULAR SIGNALS TIME NORMALLY UNTIL YELLOW CLEARANCE. R3-1 AND R3-2 BLANKOUT SIGNS REMAIN ILLUMINATED.
7. SIGNALS RETURN TO NORMAL OPERATION WITH GREEN INDICATIONS FOR PHASE ø2 / OLA, AND ø6. R3-1 AND R3-2 BLANKOUT SIGNS ARE EXTINGUISHED.

NOTES:

1. FULLY-ACTUATED OPERATION.
2. LED TRAFFIC SIGNAL HEADS.
3. LED COUNTDOWN PEDESTRIAN SIGNAL HEADS WITH AUDIBLE PED SIGNALS.
4. TACTILE WARNING STRIPS SHALL BE PLACED AT ALL GATES AND CURB RAMPS.
5. NEW CONDUITS, LOOPS, PULLBOXES, ETC WILL BE ADDED TO PLANS PREPARED FOR CONSTRUCTION.
6. PROVIDE LADOT STANDARD BATTERY BACKUP SYSTEM FOR TRAFFIC SIGNAL.
7. SUBSTRUCTURES / UTILITIES ARE NOT SHOWN.
8. SIGNAGE, STRIPING AND TRAFFIC SIGNALS WILL BE INSTALLED AS PER LADOT APPROVED PLANS.
9. PROVIDE ACCESS RAMPS AT EACH CORNER AND THE ABILITY TO PLACE DUAL CURB RAMPS WILL BE MORE CLOSELY EVALUATED WITH THE CURB RETURN RADIUS DURING FINAL DESIGN.
10. RAMP TYPE SHALL BE APPROVED BY LADOT AND COMPLY WITH BUREAU OF ENGINEERING DIMENSIONS AND MINIMUM CLEARANCES AND RAMP LANDING DEPTH. ENSURE THAT ALL POWER POLES, TRAFFIC SIGNAL AND STREET LIGHT POLES AND OTHER PURTENANCES (PULL BOXES, ETC.) ARE PLACED OUTSIDE THE CURB ACCESS RAMP.
11. STREET PROFILES, CURB RADII AND DESIGN FEATURES SHALL COMPLY WITH BUREAU OF ENGINEERING REQUIREMENTS, TAKING STREET CLASSIFICATION (MAJOR, SECONDARY, COLLECTOR, LOCAL) INTO ACCOUNT.
12. OCS POLE LOCATIONS WILL BE DETERMINED DURING FINAL DESIGN.
13. STREET LIGHTING WILL BE INSTALLED PER BSL APPROVED PLANS.
14. THE SIGNALIZED INTERSECTION OF EXPOSITION SHALL BE TIED TO R/R WARNING SYSTEM FOR PREEMPTION.
15. EXIT GATES SHALL HAVE TIME DELAY BEFORE DESCENT.
16. VEHICLE PRESENCE DETECTION SHALL BE PLACED IN TRACK AREA BETWEEN ENTRANCE AND EXIT GATES.
17. TRAFFIC SIGNAL SYSTEM SHALL BE INTERCONNECTED WITH THE RAILROAD WARNING SYSTEM.
18. THE PLACEMENT OF THE PROPOSED DRIVEWAY AND SECURITY GATE IN THE NORTHEAST QUADRANT SHALL BE COORDINATED WITH EXPO AUTHORITY AND LADWP DURING FINAL DESIGN. IF REQUIRED, THE GATE WILL BE SET 20' FROM SIDEWALK.

THE PREPARATION OF THIS DRAWING HAS BEEN FINANCED BY THE TAXES OF THE CITIZENS OF LOS ANGELES COUNTY AND OF THE STATE OF CALIFORNIA.

REV	DATE	BY	APP	REG NO	EXPIRES	SEAL HOLDER	DESCRIPTION

DESIGNED BY J. VAN HOFF
DRAWN BY T. BAILEY
CHECKED BY R. SORENSON
IN CHARGE
DATE 03/11/11

Exposition Metro Line Construction Authority
Expo

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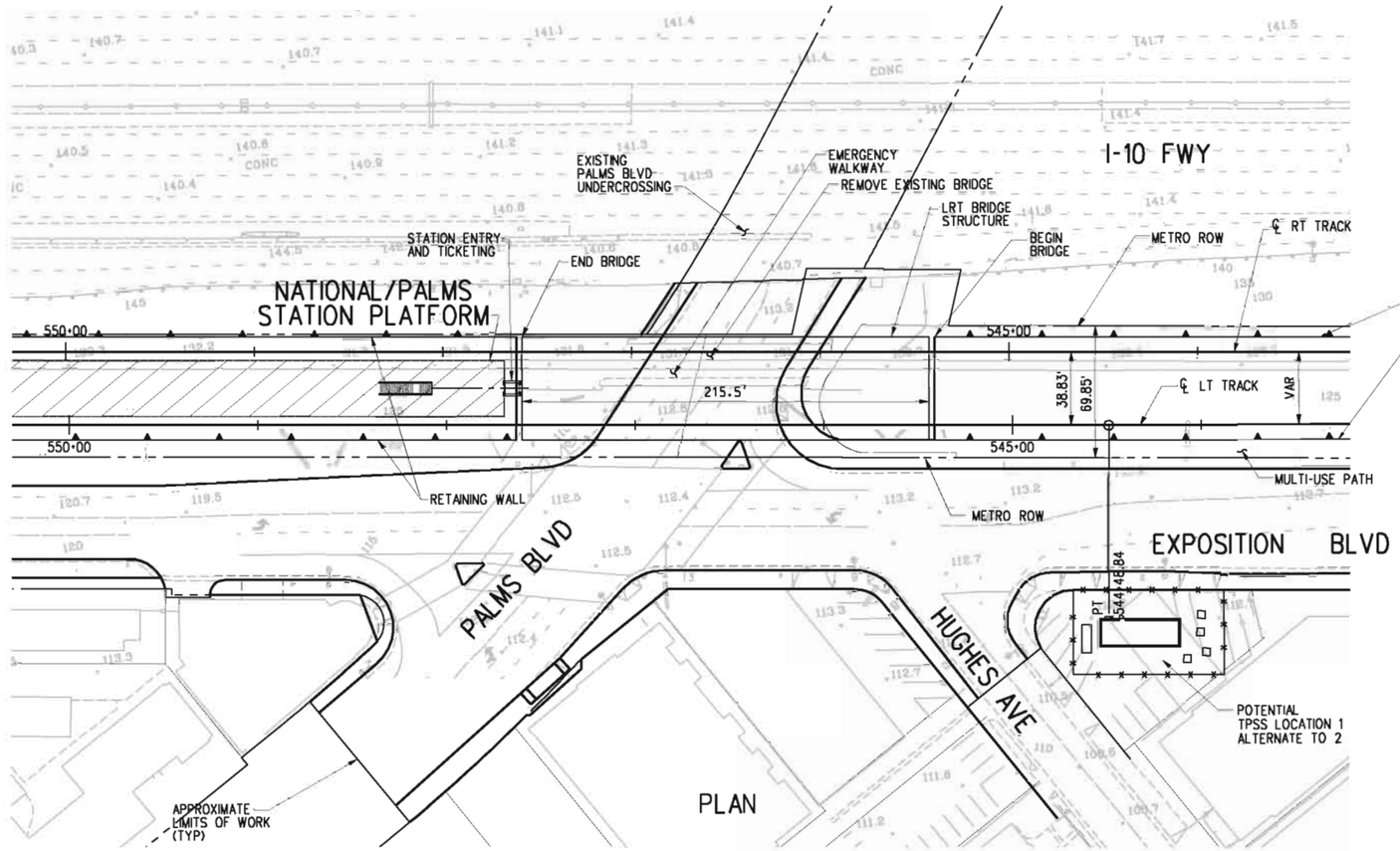
707 WILSHIRE BLVD, SUITE 3300
LOS ANGELES, CALIFORNIA 90017
TEL (213) 243-3500 FAX (213) 243-3552

SUBMITTED
APPROVED

EXPOSITION TRANSIT PROJECT-PHASE 2
BAGLEY AVENUE & EXPOSITION BLVD.
AT-GRADE CROSSING CONCEPT PLAN
PROPOSED CPUC NO. 84S - 107.9

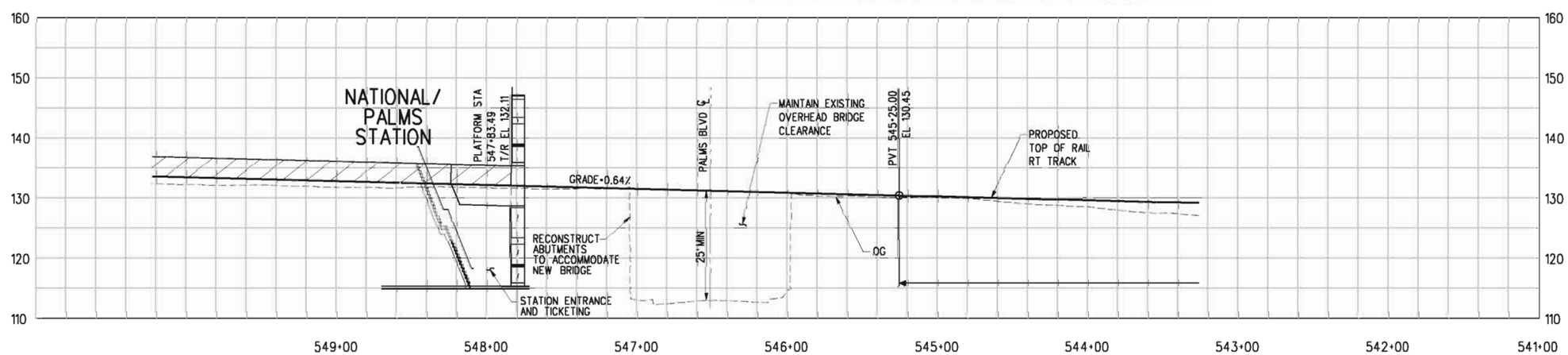
CONTRACT NO
DRAWING NO GC-002
REV
SCALE AS SHOWN
SHEET NO



PLAN

NOTES:

NATIONAL AND EXPOSITION BLVD TO BE RECONSTRUCTED PER CONCEPT PLAN. LANE CONFIGURATION TO REMAINED AS EXISTING. TRAFFIC SIGNAL AND SIGNAGE TO BE FURTHER DESIGNED DURING PRELIMINARY ENGINEERING.



40' 20' 0 40' 80' HORIZ: 1"=40'

10' 0 10' 20' VERT: 1"=10'

CONCEPTUAL ENGINEERING

RT TRACK PROFILE

PRELIMINARY

THE PREPARATION OF THIS DRAWING HAS BEEN FINANCED BY THE TAXES OF THE CITIZENS OF LOS ANGELES COUNTY AND OF THE STATE OF CALIFORNIA.

REV	DATE	BY	APP	REG NO	EXPIRES	SEAL HOLDER	DESCRIPTION
	-	-	-	-	-		-

DESIGNED BY J. SUSILO
DRAWN BY M. AL-MASHAT
CHECKED BY L. MOHR
IN CHARGE J. PRIZNER
DATE 5/05/10

Exposition Metro Line Construction Authority
Expo

DMJM HARRIS | AECOM
300 S. GRAND AVENUE, SECOND FLOOR
LOS ANGELES, CALIFORNIA 90071
TEL (213) 330-7200 FAX (213) 330-7201

SUBMITTED
APPROVED

EXPOSITION TRANSIT PROJECT-PHASE 2
NATIONAL/PALMS BLVD
GRADE SEPARATION
CONCEPT PLAN
PROPOSED CPUC NO.84S - 108.3

CONTRACT NO EXXXX
DRAWING NO GC-003
REV 0
SCALE HORIZ: 1"=40' VERT: 1"=10'
SHEET NO

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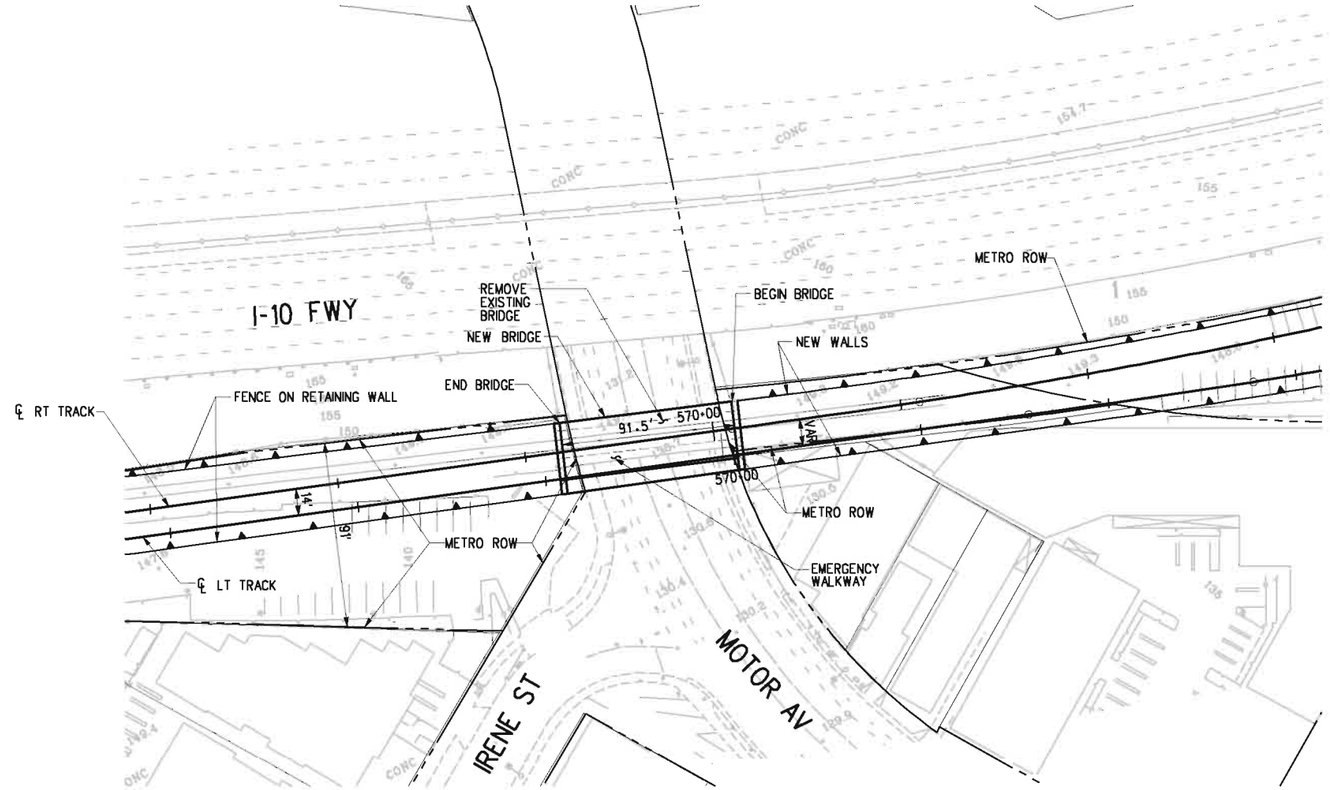
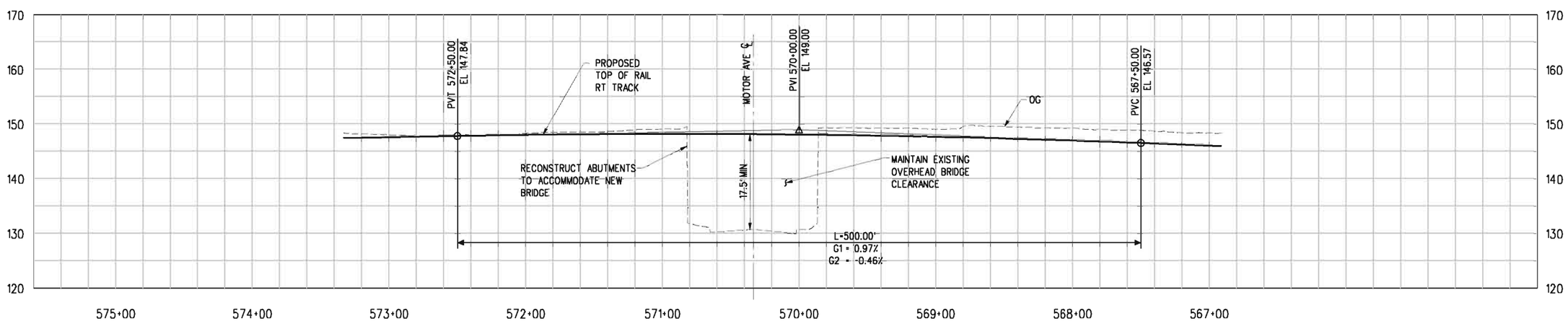


PLAN

NOTE:

EXISTING ROADWAY WIDTH, STRIPING, AND SIGNAGE TO REMAIN AS EXISTING.



CONCEPTUAL ENGINEERING

RT TRACK PROFILE

40' 20' 0 40' 80' HORIZ: 1"=40'

10' 0 10' 20' VERT: 1"=10'

PRELIMINARY

THE PREPARATION OF THIS DRAWING HAS BEEN FINANCED BY THE TAXES OF THE CITIZENS OF LOS ANGELES COUNTY AND OF THE STATE OF CALIFORNIA.

REV	DATE	BY	APP	REG NO	EXPIRES	SEAL HOLDER	DESCRIPTION
	-	-	-	-	-		-

DESIGNED BY J. SUSILO
DRAWN BY M. AL-MASHAT
CHECKED BY L. MOHR
IN CHARGE J. PRIZNER
DATE 5/05/10

Exposition Metro Line Construction Authority
Expo

DMJM HARRIS | AECOM
300 S. GRAND AVENUE, SECOND FLOOR
LOS ANGELES, CALIFORNIA 90071
TEL (213) 330-7200 FAX (213) 330-7201

SUBMITTED
APPROVED

EXPOSITION TRANSIT PROJECT-PHASE 2
MOTOR AVE
GRADE SEPARATION
CONCEPT PLAN
PROPOSED CPUC NO.84S - 108.7

CONTRACT NO EXXXX
DRAWING NO GC-004
REV 0
SCALE HORIZ: 1"=40' VERT: 1"=10'
SHEET NO

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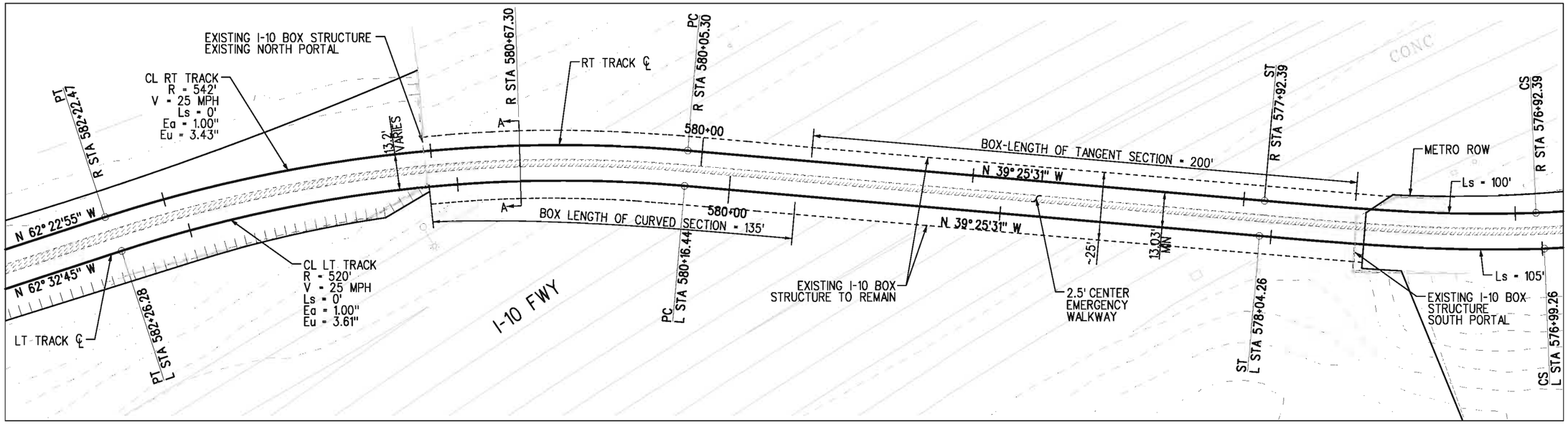
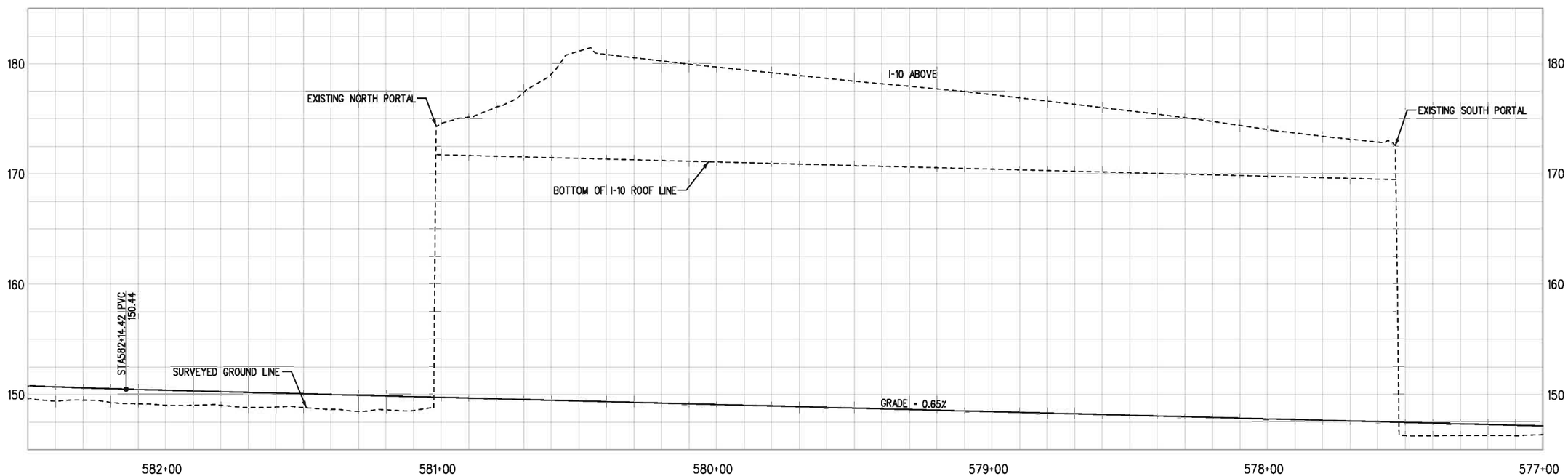


PLAN

NOTE:

REFER TO DRAWING GC-030 FOR CROSS SECTION A-A OF I-10 BOX STRUCTURE



PROFILE

THE PREPARATION OF THIS DRAWING HAS BEEN FINANCED BY THE TAXES OF THE CITIZENS OF LOS ANGELES COUNTY AND OF THE STATE OF CALIFORNIA.

REV	DATE	BY	APP	REG NO	EXPIRES	SEAL HOLDER	DESCRIPTION

DESIGNED BY Y. MAGNIER
DRAWN BY J. GONZALES
CHECKED BY J. VALENCIA
IN CHARGE B. JONES
DATE 07/29/2011

Exposition Metro Line Construction Authority
Expo

EXPO SKANSKA RADOS PARSONS BRINCKERHOFF

444 South Flower Street
Suite 2200
Los Angeles, CA 90071
TEL (213) 443-7463
FAX (213) 362-9481

EXPOSITION TRANSIT PROJECT-PHASE 2
I-10 FWY BOX STRUCTURE
GRADE SEPARATION
CONCEPT PLAN
PROPOSED CPUC NO. 84S - 108.9

CONTRACT NO XP8902-002
DRAWING NO GC-004A
REV
SCALE HORIZ: 1"=20' VERT: 1"=5'
SHEET NO

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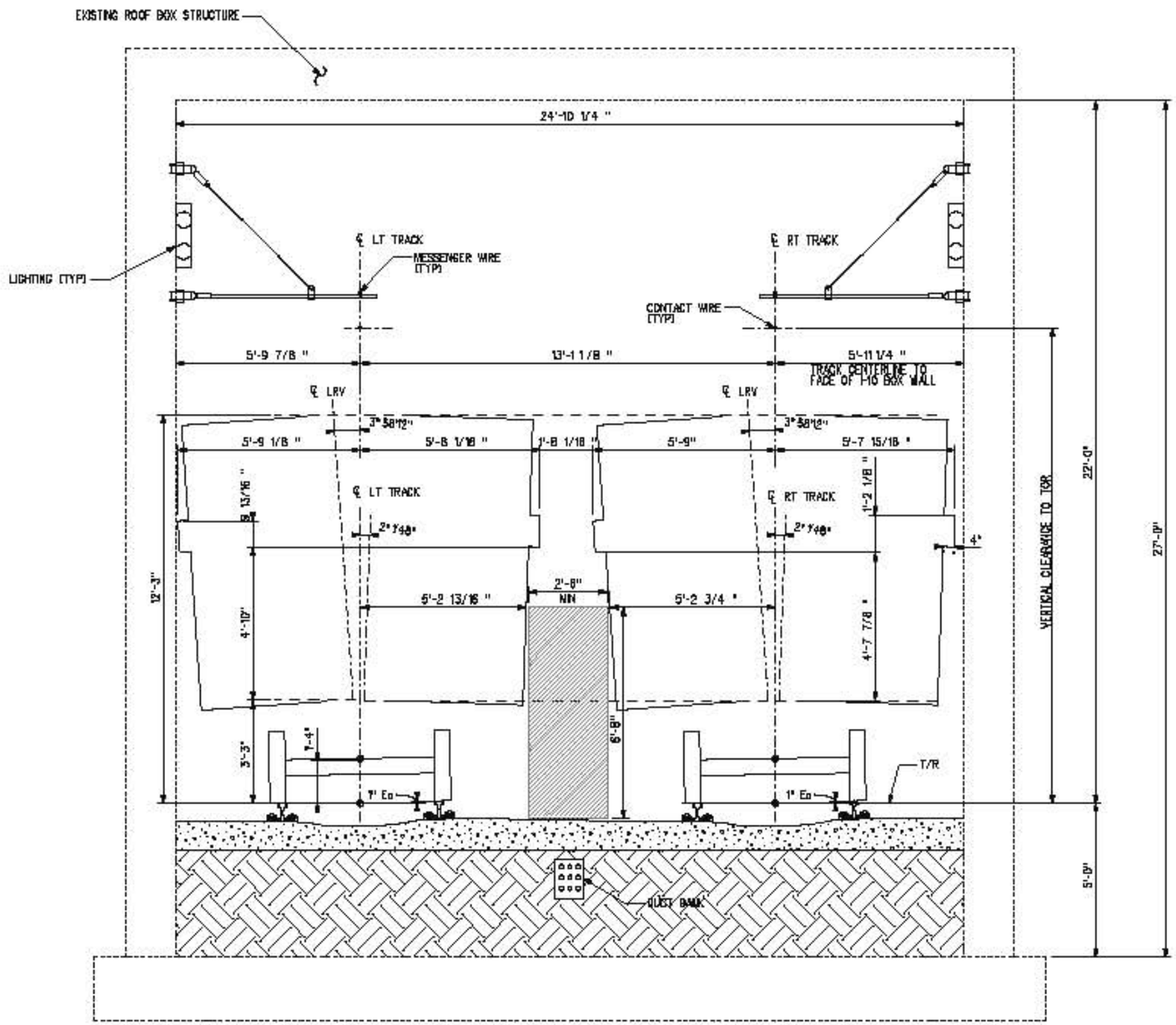

SECTION A-A

R STA. 580+67.30

TRACK ALIGNMENT DATA:

13' - 1 1/8" TRACK CENTER AT SECTION A-A
V = 25 MPH
RT TRK (TRK 4) Eq = 1.00"
LT TRK (TRK 3) Eq = 1.00"

NOTES:

1. CURVE RADIUS IS 542' AND 520' FOR RT (TRK 4) AND LT (TRK 3) TRACK CENTERLINE, RESPECTIVELY. CROSS SECTION A-A SHOWN IS AT MOST RESTRICTIVE SECTION WITHIN I-10 BOX GIVEN PROPOSED ALIGNMENT.
2. DIMENSIONS SHOWN VARY SLIGHTLY THROUGHOUT THE EXISTING STRUCTURE.
3. THIS DRAWING IS BASED ON FIELD SURVEY AND AS-BUILT DRAWINGS.
4. REFER TO SHEET GC-004A FOR LOCATION OF SECTION A-A ALONG WITH ADDITIONAL TRACK ALIGNMENT INFORMATION.
5. VOE AND CLEARANCE CALCULATION VALUES ARE DERIVED FROM THE MTA DESIGN CRITERIA: REBASELINE 01/19/2010 FIGURES FOR LIGHT RAIL VEHICLE DYNAMIC ENVELOPE.
6. VOE SHOWN BASED ON MTA DESIGN CRITERIA AND ENCOMPASSES THE WORST CASE FOR ALL VEHICLES.
7. INTRUSION DETECTION SYSTEM SHALL BE INSTALLED FOR THE BOX STRUCTURE UNDER I-10.

NOT FOR CONSTRUCTION

THE PREPARATION OF THIS DRAWING HAS BEEN FINANCED BY THE TAXES OF THE CITIZENS OF LOS ANGELES COUNTY AND OF THE STATE OF CALIFORNIA.

REV	DATE	BY	APP	ECO NO	EXPIRES	SEAL HOLDER	DESCRIPTION

DESIGNED BY Y. WAGNIER
DRAWN BY N. MONARCO
CHECKED BY J. VALENCIA
IN CHARGE B. JONES
DATE 07/29/2011

Exposition Metro Line Construction Authority
Expo
444 South Flower Street
Suite 2200
Los Angeles, CA 90071
TEL (213) 443-7463
FAX (213) 942-8411

EXPOSITION LRT PROJECT- PHASE 2

CROSS SECTION
1-10 BOX STRUCTURE
AT STATION 580+67.30

CONTRACT NO XP8902-002
DRAWING NO GC-030
REV
SCALE NO SCALE
SHEET NO

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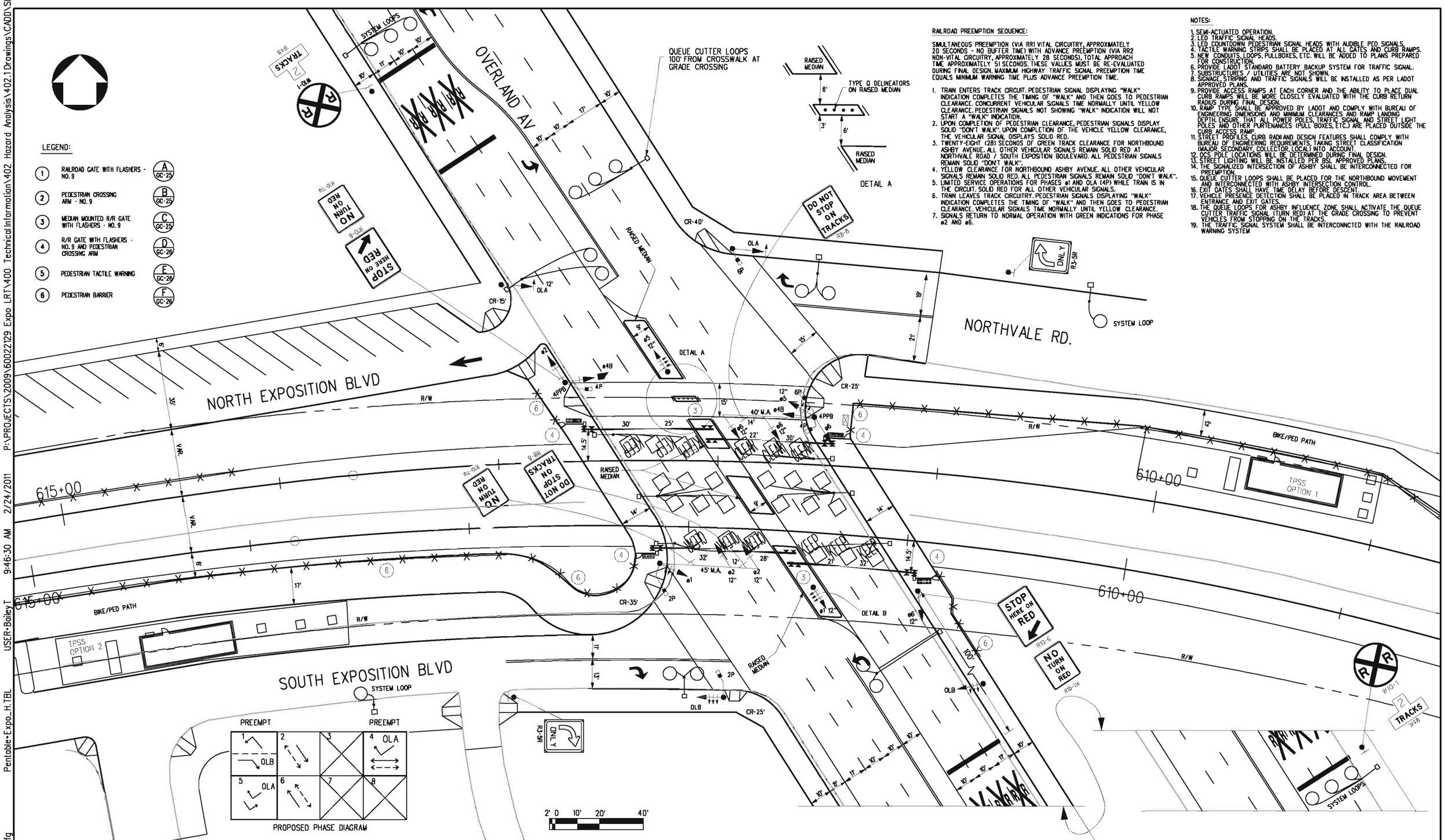


RAILROAD PREEMPTION SEQUENCE:

SIMULTANEOUS PREEMPTION (VIA RR1 VITAL CIRCUITRY, APPROXIMATELY 20 SECONDS - NO BUFFER TIME) WITH ADVANCE PREEMPTION (VIA RR2 NON-VITAL CIRCUITRY, APPROXIMATELY 28 SECONDS), TOTAL APPROACH TIME APPROXIMATELY 51 SECONDS. THESE VALUES MUST BE RE-EVALUATED DURING FINAL DESIGN. MAXIMUM HIGHWAY TRAFFIC SIGNAL PREEMPTION TIME EQUALS MINIMUM WARNING TIME PLUS ADVANCE PREEMPTION TIME.

1. TRAIN ENTERS TRACK CIRCUIT. PEDESTRIAN SIGNAL DISPLAYING "WALK" INDICATION COMPLETES THE TIMING OF "WALK" AND THEN GOES TO PEDESTRIAN CLEARANCE. CONCURRENT VEHICULAR SIGNALS TIME NORMALLY UNTIL YELLOW CLEARANCE. PEDESTRIAN SIGNALS NOT SHOWING "WALK" INDICATION WILL NOT START A "WALK" INDICATION.
2. UPON COMPLETION OF PEDESTRIAN CLEARANCE, PEDESTRIAN SIGNALS DISPLAY SOLID "DON'T WALK". UPON COMPLETION OF THE VEHICLE YELLOW CLEARANCE, THE VEHICULAR SIGNAL DISPLAYS SOLID RED.
3. TWENTY-EIGHT (28) SECONDS OF GREEN TRACK CLEARANCE FOR NORTHBOUND ASHBY AVENUE. ALL OTHER VEHICULAR SIGNALS REMAIN SOLID RED AT NORTHVALE ROAD / SOUTH EXPOSITION BOULEVARD. ALL PEDESTRIAN SIGNALS REMAIN SOLID "DON'T WALK".
4. YELLOW CLEARANCE FOR NORTHBOUND ASHBY AVENUE. ALL OTHER VEHICULAR SIGNALS REMAIN SOLID RED. ALL PEDESTRIAN SIGNALS REMAIN SOLID "DON'T WALK".
5. LIMITED SERVICE OPERATIONS FOR PHASES ø1 AND OLA (4P) WHILE TRAIN IS IN THE CIRCUIT. SOLID RED FOR ALL OTHER VEHICULAR SIGNALS.
6. TRAIN LEAVES TRACK CIRCUITRY. PEDESTRIAN SIGNALS DISPLAYING "WALK" INDICATION COMPLETES THE TIMING OF "WALK" AND THEN GOES TO PEDESTRIAN CLEARANCE. VEHICULAR SIGNALS TIME NORMALLY UNTIL YELLOW CLEARANCE.
7. SIGNALS RETURN TO NORMAL OPERATION WITH GREEN INDICATIONS FOR PHASE ø2 AND ø6.

NOTES:

1. SEMI-ACTUATED OPERATION.
2. LED TRAFFIC SIGNAL HEADS.
3. LED COUNTDOWN PEDESTRIAN SIGNAL HEADS WITH AUDIBLE PED SIGNALS.
4. TACTILE WARNING STRIPS SHALL BE PLACED AT ALL GATES AND CURB RAMPS.
5. NEW CONDUITS, LOOPS, PULLBOXES, ETC. WILL BE ADDED TO PLANS PREPARED FOR CONSTRUCTION.
6. PROVIDE LADOT STANDARD BATTERY BACKUP SYSTEM FOR TRAFFIC SIGNAL.
7. SUBSTRUCTURES / UTILITIES ARE NOT SHOWN.
8. SIGNAGE, STRIPING AND TRAFFIC SIGNALS WILL BE INSTALLED AS PER LADOT APPROVED PLANS.
9. PROVIDE ACCESS RAMPS AT EACH CORNER AND THE ABILITY TO PLACE DUAL CURB RAMPS WILL BE MORE CLOSELY EVALUATED WITH THE CURB RETURN RADIUS DURING FINAL DESIGN.
10. RAMP TYPE SHALL BE APPROVED BY LADOT AND COMPLY WITH BUREAU OF ENGINEERING DIMENSIONS AND MINIMUM CLEARANCES AND RAMP LANDING DEPTH. ENSURE THAT ALL POWER POLES, TRAFFIC SIGNAL AND STREET LIGHT POLES AND OTHER PURTENANCES (PULL BOXES, ETC.) ARE PLACED OUTSIDE THE CURB ACCESS RAMP.
11. STREET PROFILES, CURB RADII AND DESIGN FEATURES SHALL COMPLY WITH BUREAU OF ENGINEERING REQUIREMENTS, TAKING STREET CLASSIFICATION (MAJOR, SECONDARY, COLLECTOR, LOCAL) INTO ACCOUNT.
12. OCS POLE LOCATIONS WILL BE DETERMINED DURING FINAL DESIGN.
13. STREET LIGHTING WILL BE INSTALLED PER BSL APPROVED PLANS.
14. THE SIGNALIZED INTERSECTION OF ASHBY SHALL BE INTERCONNECTED FOR PREEMPTION.
15. QUEUE CUTTER LOOPS SHALL BE PLACED FOR THE NORTHBOUND MOVEMENT AND INTERCONNECTED WITH ASHBY INTERSECTION CONTROL.
16. EXIT GATES SHALL HAVE TIME DELAY BEFORE DESCENT.
17. VEHICLE PRESENCE DETECTION SHALL BE PLACED IN TRACK AREA BETWEEN ENTRANCE AND EXIT GATES.
18. THE QUEUE LOOPS FOR ASHBY INFLUENCE ZONE SHALL ACTIVATE THE QUEUE CUTTER TRAFFIC SIGNAL (TURN RED) AT THE GRADE CROSSING TO PREVENT VEHICLES FROM STOPPING ON THE TRACKS.
19. THE TRAFFIC SIGNAL SYSTEM SHALL BE INTERCONNCTED WITH THE RAILROAD WARNING SYSTEM

THE PREPARATION OF THIS DRAWING HAS BEEN FINANCED BY THE TAXES OF THE CITIZENS OF LOS ANGELES COUNTY AND OF THE STATE OF CALIFORNIA.

REV	DATE	BY	APP	REG NO	EXPIRES	SEAL HOLDER	DESCRIPTION

DESIGNED BY J. VAN HOFF
DRAWN BY T. BAILEY
CHECKED BY R. SORENSON
IN CHARGE
DATE 02/24/11

Exposition Metro Line Construction Authority
Expo

DMJM HARRIS | AECOM
707 WILSHIRE BLVD, SUITE 3300
LOS ANGELES, CALIFORNIA 90017
TEL (213) 243-3500 FAX (213) 243-3552

SUBMITTED
APPROVED

EXPOSITION TRANSIT PROJECT-PHASE 2
NORTHVALE ROAD & OVERLAND AVENUE
AT-GRADE CROSSING CONCEPT PLAN
PROPOSED CPUC NO. 84S - 109.5

CONTRACT NO
DRAWING NO GC-005
REV
SCALE AS SHOWN
SHEET NO

NOTES:

1. SEMI-ACTUATED OPERATION.
2. LED TRAFFIC SIGNAL HEADS.
3. LED COUNTDOWN PEDESTRIAN SIGNAL HEADS WITH AUDIBLE PED SIGNALS.
4. TACTILE WARNING STRIPS SHALL BE PLACED AT ALL GATES AND CURB RAMPS.
5. NEW CONDUITS, LOOPS, PULLBOXES, ETC. WILL BE ADDED TO PLANS PREPARED FOR CONSTRUCTION.
6. PROVIDE LADOT STANDARD BATTERY BACKUP SYSTEM FOR TRAFFIC SIGNAL.
7. SUBSTRUCTURES / UTILITIES ARE NOT SHOWN.
8. SIGNAGE, STRIPING AND TRAFFIC SIGNALS WILL BE INSTALLED AS PER LADOT APPROVED PLANS.
9. PROVIDE ACCESS RAMPS AT EACH CORNER AND THE ABILITY TO PLACE DUAL. CURB RAMPS WILL BE MORE CLOSELY EVALUATED WITH THE CURB RETURN RADIUS DURING FINAL DESIGN.
10. RAMP TYPE SHALL BE APPROVED BY LADOT AND COMPLY WITH BUREAU OF ENGINEERING DIMENSIONS AND MINIMUM CLEARANCES AND RAMP LANDING DEPTH. ENSURE THAT ALL POWER POLES, TRAFFIC SIGNAL AND STREET LIGHT POLES AND OTHER PURTENANCES (PULL BOXES, ETC.) ARE PLACED OUTSIDE THE CURB ACCESS RAMP.
11. STREET PROFILES, CURB RADII AND DESIGN FEATURES SHALL COMPLY WITH BUREAU OF ENGINEERING REQUIREMENTS, TAKING STREET CLASSIFICATION (MAJOR, SECONDARY, COLLECTOR, LOCAL) INTO ACCOUNT.
12. OCS POLE LOCATIONS WILL BE DETERMINED DURING FINAL DESIGN.
13. STREET LIGHTING WILL BE INSTALLED PER BSL APPROVED PLANS.
14. THE SIGNALIZED INTERSECTION OF ASHBY AVENUE SHALL BE INTERCONNECTED FOR PREEMPTION.
15. EXIT GATES SHALL HAVE TIME DELAY BEFORE DESCENT.
16. VEHICLE PRESENCE DETECTION SHALL BE PLACED IN TRACK AREA BETWEEN ENTRANCE AND EXIT GATES.
17. TRAFFIC SIGNAL SYSTEM SHALL BE INTERCONNECTED WITH THE R/R WARNING SYSTEM.

RAILROAD PREEMPTION (with 19 second advance preemption)

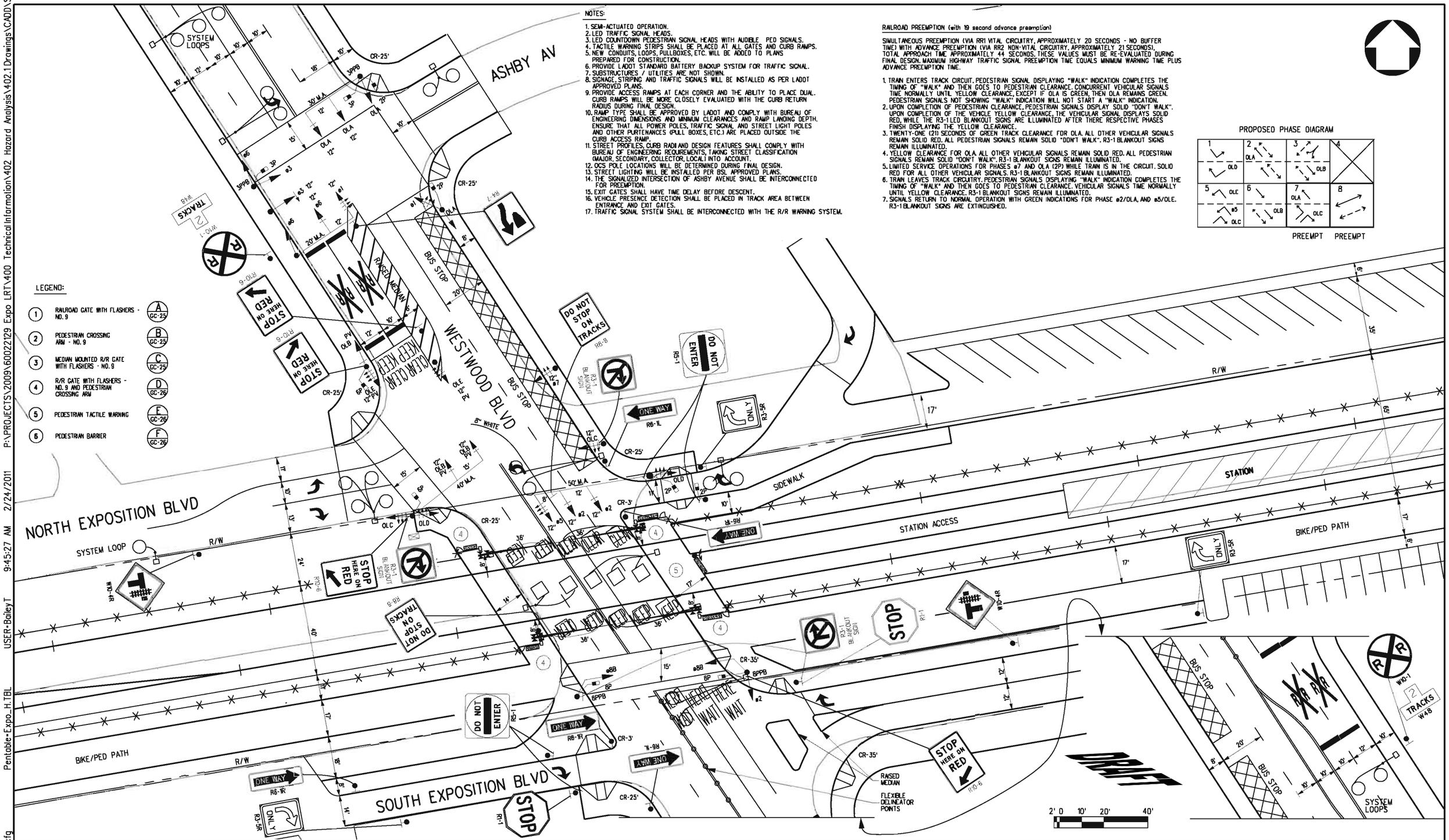
SIMULTANEOUS PREEMPTION (VIA RR1 VITAL CIRCUITRY, APPROXIMATELY 20 SECONDS - NO BUFFER TIME) WITH ADVANCE PREEMPTION (VIA RR2 NON-VITAL CIRCUITRY, APPROXIMATELY 21 SECONDS). TOTAL APPROACH TIME APPROXIMATELY 44 SECONDS. THESE VALUES MUST BE RE-EVALUATED DURING FINAL DESIGN. MAXIMUM HIGHWAY TRAFFIC SIGNAL PREEMPTION TIME EQUALS MINIMUM WARNING TIME PLUS ADVANCE PREEMPTION TIME.

1. TRAIN ENTERS TRACK CIRCUIT. PEDESTRIAN SIGNAL DISPLAYING "WALK" INDICATION COMPLETES THE TIMING OF "WALK" AND THEN GOES TO PEDESTRIAN CLEARANCE. CONCURRENT VEHICULAR SIGNALS TIME NORMALLY UNTIL YELLOW CLEARANCE, EXCEPT IF OLA IS GREEN, THEN OLA REMAINS GREEN. PEDESTRIAN SIGNALS NOT SHOWING "WALK" INDICATION WILL NOT START A "WALK" INDICATION.
2. UPON COMPLETION OF PEDESTRIAN CLEARANCE, PEDESTRIAN SIGNALS DISPLAY SOLID "DON'T WALK". UPON COMPLETION OF THE VEHICLE YELLOW CLEARANCE, THE VEHICULAR SIGNAL DISPLAYS SOLID RED, WHILE THE R3-1 LED BLANKOUT SIGNS ARE ILLUMINATED AFTER THERE RESPECTIVE PHASES FINISH DISPLAYING THE YELLOW CLEARANCE.
3. TWENTY-ONE (21) SECONDS OF GREEN TRACK CLEARANCE FOR OLA. ALL OTHER VEHICULAR SIGNALS REMAIN SOLID RED. ALL PEDESTRIAN SIGNALS REMAIN SOLID "DON'T WALK". R3-1 BLANKOUT SIGNS REMAIN ILLUMINATED.
4. YELLOW CLEARANCE FOR OLA. ALL OTHER VEHICULAR SIGNALS REMAIN SOLID RED. ALL PEDESTRIAN SIGNALS REMAIN SOLID "DON'T WALK". R3-1 BLANKOUT SIGNS REMAIN ILLUMINATED.
5. LIMITED SERVICE OPERATIONS FOR PHASES ø7 AND OLA (2P) WHILE TRAIN IS IN THE CIRCUIT. SOLID RED FOR ALL OTHER VEHICULAR SIGNALS. R3-1 BLANKOUT SIGNS REMAIN ILLUMINATED.
6. TRAIN LEAVES TRACK CIRCUITRY. PEDESTRIAN SIGNALS DISPLAYING "WALK" INDICATION COMPLETES THE TIMING OF "WALK" AND THEN GOES TO PEDESTRIAN CLEARANCE. VEHICULAR SIGNALS TIME NORMALLY UNTIL YELLOW CLEARANCE. R3-1 BLANKOUT SIGNS REMAIN ILLUMINATED.
7. SIGNALS RETURN TO NORMAL OPERATION WITH GREEN INDICATIONS FOR PHASE ø2/OLA, AND ø5/OLE. R3-1 BLANKOUT SIGNS ARE EXTINGUISHED.

PROPOSED PHASE DIAGRAM

LEGEND:

1	RAILROAD GATE WITH FLASHERS - NO. 9	A GC-25
2	PEDESTRIAN CROSSING ARM - NO. 9	B GC-25
3	MEDIAN MOUNTED R/R GATE WITH FLASHERS - NO. 9	C GC-25
4	R/R GATE WITH FLASHERS - NO. 9 AND PEDESTRIAN CROSSING ARM	D GC-26
5	PEDESTRIAN TACTILE WARNING	E GC-26
6	PEDESTRIAN BARRIER	F GC-26



THE PREPARATION OF THIS DRAWING HAS BEEN FINANCED BY THE TAXES OF THE CITIZENS OF LOS ANGELES COUNTY AND OF THE STATE OF CALIFORNIA.

REV	DATE	BY	APP	REG NO	EXPIRES	SEAL HOLDER	DESCRIPTION

DESIGNED BY J. VAN HOFF
DRAWN BY T. BAILEY
CHECKED BY R. SORENSON
IN CHARGE
DATE 02/24/11

Exposition Metro Line Construction Authority
Expo

DMJM HARRIS | AECOM
707 WILSHIRE BLVD, SUITE 3300
LOS ANGELES, CALIFORNIA 90017
TEL (213) 243-5500 FAX (213) 243-5552

SUBMITTED
APPROVED

EXPOSITION TRANSIT PROJECT-PHASE 2
ASHBY AVE./EXPOSITION BLVD.& WESTWOOD BOULEVARD
AT-GRADE CROSSING CONCEPT PLAN
PROPOSED CPUC NO. 84S - 109.8

CONTRACT NO
DRAWING NO GC-006
REV
SCALE AS SHOWN
SHEET NO

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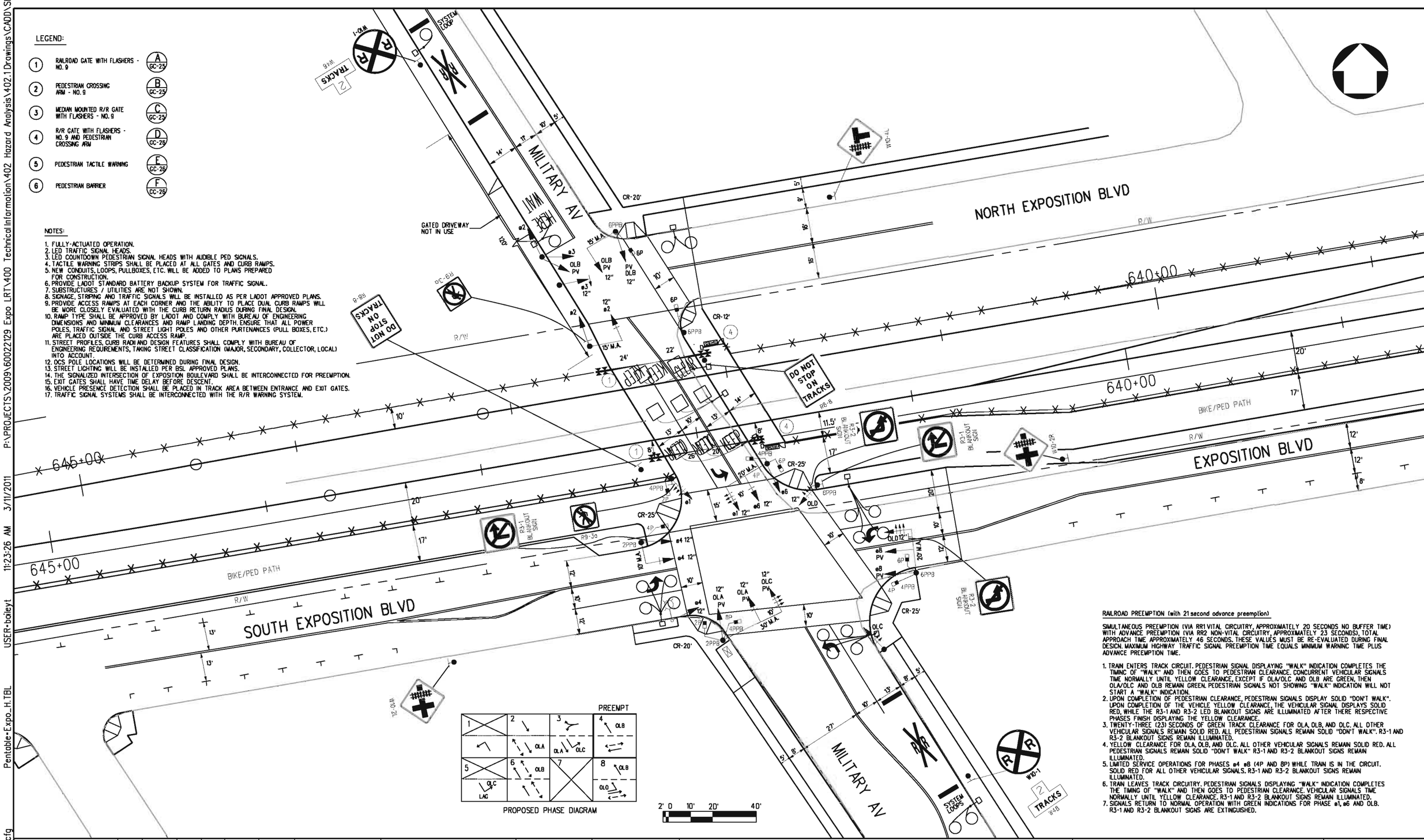
LEGEND:

1	RAILROAD GATE WITH FLASHERS - NO. 9	A GC-25
2	PEDESTRIAN CROSSING ARM - NO. 9	B GC-25
3	MEDIAN MOUNTED R/R GATE WITH FLASHERS - NO. 9	C GC-25
4	R/R GATE WITH FLASHERS - NO. 9 AND PEDESTRIAN CROSSING ARM	D GC-26
5	PEDESTRIAN TACTILE WARNING	E GC-26
6	PEDESTRIAN BARRIER	F GC-26

NOTES:

1. FULLY-ACTUATED OPERATION.
2. LED TRAFFIC SIGNAL HEADS.
3. LED COUNTDOWN PEDESTRIAN SIGNAL HEADS WITH AUDIBLE PED SIGNALS.
4. TACTILE WARNING STRIPS SHALL BE PLACED AT ALL GATES AND CURB RAMPS.
5. NEW CONDUITS, LOOPS, PULLBOXES, ETC. WILL BE ADDED TO PLANS PREPARED FOR CONSTRUCTION.
6. PROVIDE LADOT STANDARD BATTERY BACKUP SYSTEM FOR TRAFFIC SIGNAL.
7. SUBSTRUCTURES / UTILITIES ARE NOT SHOWN.
8. SIGNAGE, STRIPING AND TRAFFIC SIGNALS WILL BE INSTALLED AS PER LADOT APPROVED PLANS.
9. PROVIDE ACCESS RAMPS AT EACH CORNER AND THE ABILITY TO PLACE DUAL CURB RAMPS WILL BE MORE CLOSELY EVALUATED WITH THE CURB RETURN RADIUS DURING FINAL DESIGN.
10. RAMP TYPE SHALL BE APPROVED BY LADOT AND COMPLY WITH BUREAU OF ENGINEERING DIMENSIONS AND MINIMUM CLEARANCES AND RAMP LANDING DEPTH. ENSURE THAT ALL POWER POLES, TRAFFIC SIGNAL AND STREET LIGHT POLES AND OTHER PURTENANCES (PULL BOXES, ETC.) ARE PLACED OUTSIDE THE CURB ACCESS RAMP.
11. STREET PROFILES, CURB RADI AND DESIGN FEATURES SHALL COMPLY WITH BUREAU OF ENGINEERING REQUIREMENTS, TAKING STREET CLASSIFICATION (MAJOR, SECONDARY, COLLECTOR, LOCAL) INTO ACCOUNT.
12. OCS POLE LOCATIONS WILL BE DETERMINED DURING FINAL DESIGN.
13. STREET LIGHTING WILL BE INSTALLED PER BSL APPROVED PLANS.
14. THE SIGNALIZED INTERSECTION OF EXPOSITION BOULEVARD SHALL BE INTERCONNECTED FOR PREEMPTION.
15. EXIT GATES SHALL HAVE TIME DELAY BEFORE DESCENT.
16. VEHICLE PRESENCE DETECTION SHALL BE PLACED IN TRACK AREA BETWEEN ENTRANCE AND EXIT GATES.
17. TRAFFIC SIGNAL SYSTEMS SHALL BE INTERCONNECTED WITH THE R/R WARNING SYSTEM.



RAILROAD PREEMPTION (with 21 second advance preemption)

SIMULTANEOUS PREEMPTION (VIA RR1 VITAL CIRCUITRY, APPROXIMATELY 20 SECONDS NO BUFFER TIME) WITH ADVANCE PREEMPTION (VIA RR2 NON-VITAL CIRCUITRY, APPROXIMATELY 23 SECONDS). TOTAL APPROACH TIME APPROXIMATELY 46 SECONDS. THESE VALUES MUST BE RE-EVALUATED DURING FINAL DESIGN. MAXIMUM HIGHWAY TRAFFIC SIGNAL PREEMPTION TIME EQUALS MINIMUM WARNING TIME PLUS ADVANCE PREEMPTION TIME.

1. TRAIN ENTERS TRACK CIRCUIT. PEDESTRIAN SIGNAL DISPLAYING "WALK" INDICATION COMPLETES THE TIMING OF "WALK" AND THEN GOES TO PEDESTRIAN CLEARANCE. CONCURRENT VEHICULAR SIGNALS TIME NORMALLY UNTIL YELLOW CLEARANCE, EXCEPT IF OLA/OLC AND OLB ARE GREEN, THEN OLA/OLC AND OLB REMAIN GREEN. PEDESTRIAN SIGNALS NOT SHOWING "WALK" INDICATION WILL NOT START A "WALK" INDICATION.
2. UPON COMPLETION OF PEDESTRIAN CLEARANCE, PEDESTRIAN SIGNALS DISPLAY SOLID "DON'T WALK". UPON COMPLETION OF THE VEHICLE YELLOW CLEARANCE, THE VEHICULAR SIGNAL DISPLAYS SOLID RED, WHILE THE R3-1 AND R3-2 LED BLANKOUT SIGNS ARE ILLUMINATED AFTER THERE RESPECTIVE PHASES FINISH DISPLAYING THE YELLOW CLEARANCE.
3. TWENTY-THREE (23) SECONDS OF GREEN TRACK CLEARANCE FOR OLA, OLB, AND OLC. ALL OTHER VEHICULAR SIGNALS REMAIN SOLID RED. ALL PEDESTRIAN SIGNALS REMAIN SOLID "DON'T WALK". R3-1 AND R3-2 BLANKOUT SIGNS REMAIN ILLUMINATED.
4. YELLOW CLEARANCE FOR OLA, OLB, AND OLC. ALL OTHER VEHICULAR SIGNALS REMAIN SOLID RED. ALL PEDESTRIAN SIGNALS REMAIN SOLID "DON'T WALK" R3-1 AND R3-2 BLANKOUT SIGNS REMAIN ILLUMINATED.
5. LIMITED SERVICE OPERATIONS FOR PHASES ø4 ø8 (4P AND 8P) WHILE TRAIN IS IN THE CIRCUIT. SOLID RED FOR ALL OTHER VEHICULAR SIGNALS. R3-1 AND R3-2 BLANKOUT SIGNS REMAIN ILLUMINATED.
6. TRAIN LEAVES TRACK CIRCUITRY. PEDESTRIAN SIGNALS DISPLAYING "WALK" INDICATION COMPLETES THE TIMING OF "WALK" AND THEN GOES TO PEDESTRIAN CLEARANCE. VEHICULAR SIGNALS TIME NORMALLY UNTIL YELLOW CLEARANCE. R3-1 AND R3-2 BLANKOUT SIGNS REMAIN ILLUMINATED.
7. SIGNALS RETURN TO NORMAL OPERATION WITH GREEN INDICATIONS FOR PHASE ø1, ø6 AND OLB. R3-1 AND R3-2 BLANKOUT SIGNS ARE EXTINGUISHED.

THE PREPARATION OF THIS DRAWING HAS BEEN FINANCED BY THE TAXES OF THE CITIZENS OF LOS ANGELES COUNTY AND OF THE STATE OF CALIFORNIA.

REV	DATE	BY	APP	REG NO	EXPIRES	SEAL HOLDER	DESCRIPTION

DESIGNED BY J. VAN HOFF
DRAWN BY T. BAILEY
CHECKED BY R. SORENSON
IN CHARGE
DATE 03/11/11

Exposition Metro Line Construction Authority
Expo

DMJM HARRIS | AECOM
707 WILSHIRE BLVD, SUITE 3300
LOS ANGELES, CALIFORNIA 90017
TEL (213) 243-3500 FAX (213) 243-3552

SUBMITTED
APPROVED

EXPOSITION TRANSIT PROJECT-PHASE 2
EXPOSITION BOULEVARD & MILITARY AVENUE
AT-GRADE CROSSING CONCEPT PLAN
PROPOSED CPUC NO. 84S - 110.1

CONTRACT NO
DRAWING NO GC-007
REV
SCALE AS SHOWN
SHEET NO

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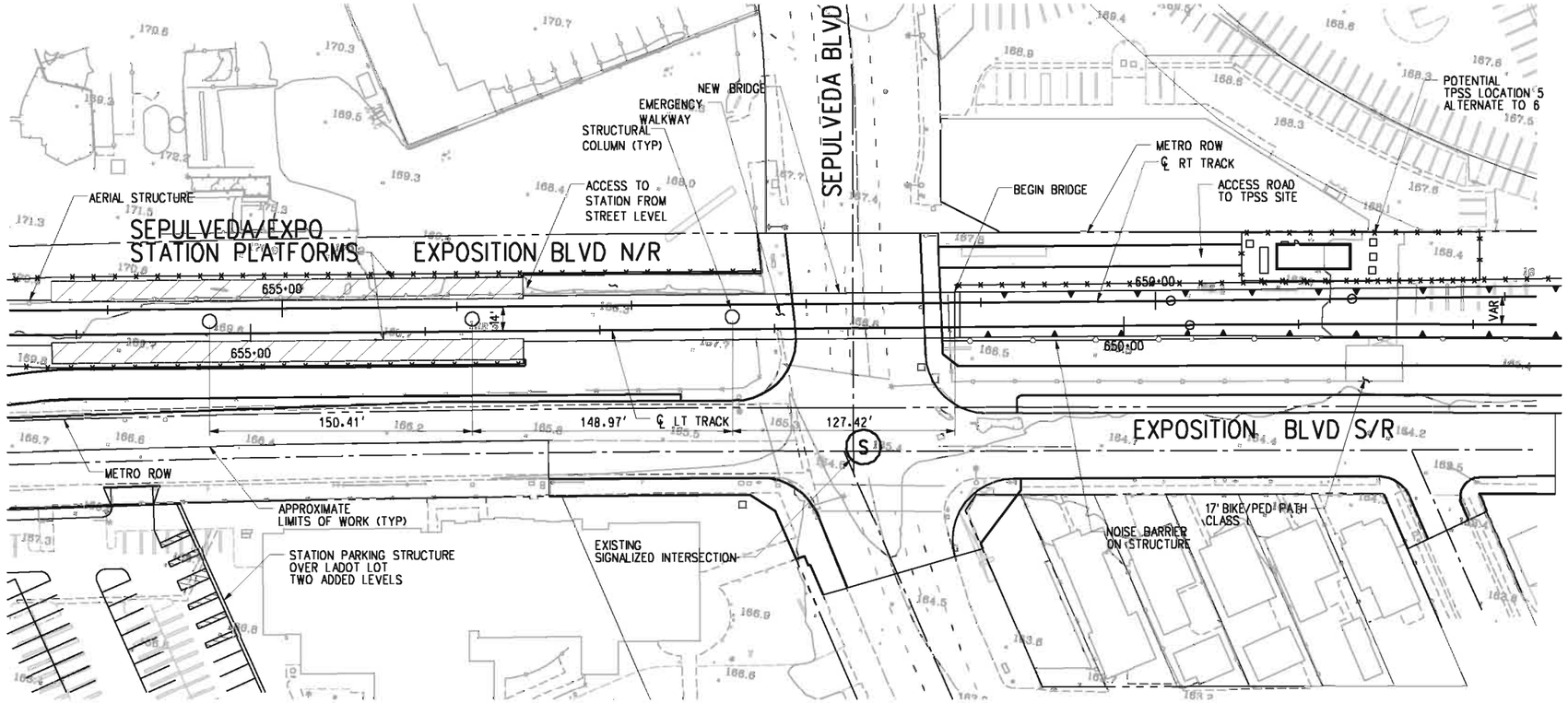
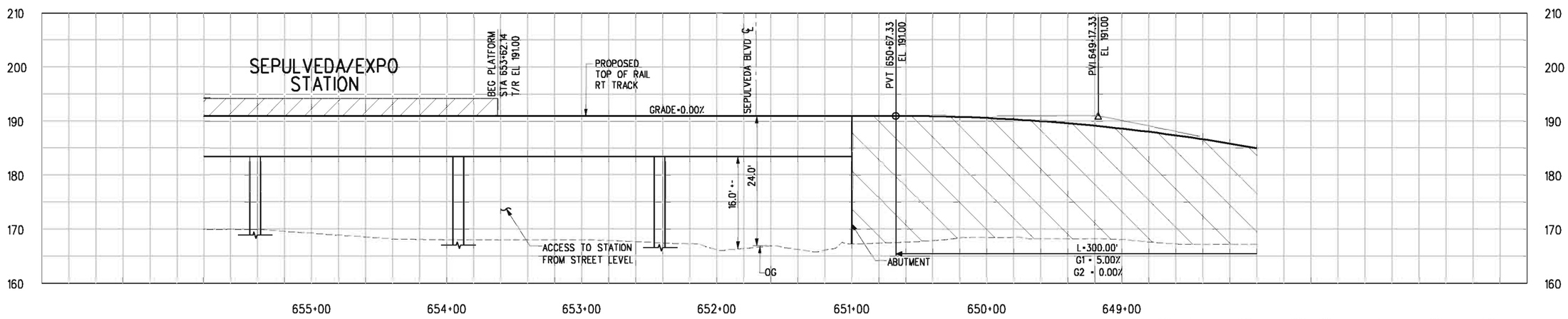


PLAN



40' 20' 0 40' 80' HORIZ: 1"=40'

10' 0 10' 20' VERT: 1"=10'

CONCEPTUAL ENGINEERING

RT TRACK PROFILE

PRELIMINARY

THE PREPARATION OF THIS DRAWING HAS BEEN FINANCED BY THE TAXES OF THE CITIZENS OF LOS ANGELES COUNTY AND OF THE STATE OF CALIFORNIA.

REV	DATE	BY	APP	REG NO	EXPIRES	SEAL HOLDER	DESCRIPTION
	-	-	-	-	-		-

DESIGNED BY J. SUSILO
DRAWN BY M. AL-MASHAT
CHECKED BY L. MOHR
IN CHARGE J. PRIZNER
DATE 5/05/10

Exposition Metro Line Construction Authority
Expo

DMJM HARRIS | AECOM
300 S. GRAND AVENUE, SECOND FLOOR
LOS ANGELES, CALIFORNIA 90071
TEL (213) 330-7200 FAX (213) 330-7201

SUBMITTED
APPROVED

EXPOSITION TRANSIT PROJECT-PHASE 2
SEPULVEDA BLVD
GRADE SEPARATION
CONCEPT PLAN
PROPOSED CPUC NO.84S - 110.3

CONTRACT NO EXXXX
DRAWING NO GC-041
REV 0
SCALE HORIZ: 1"=40' VERT: 1"=10'
SHEET NO

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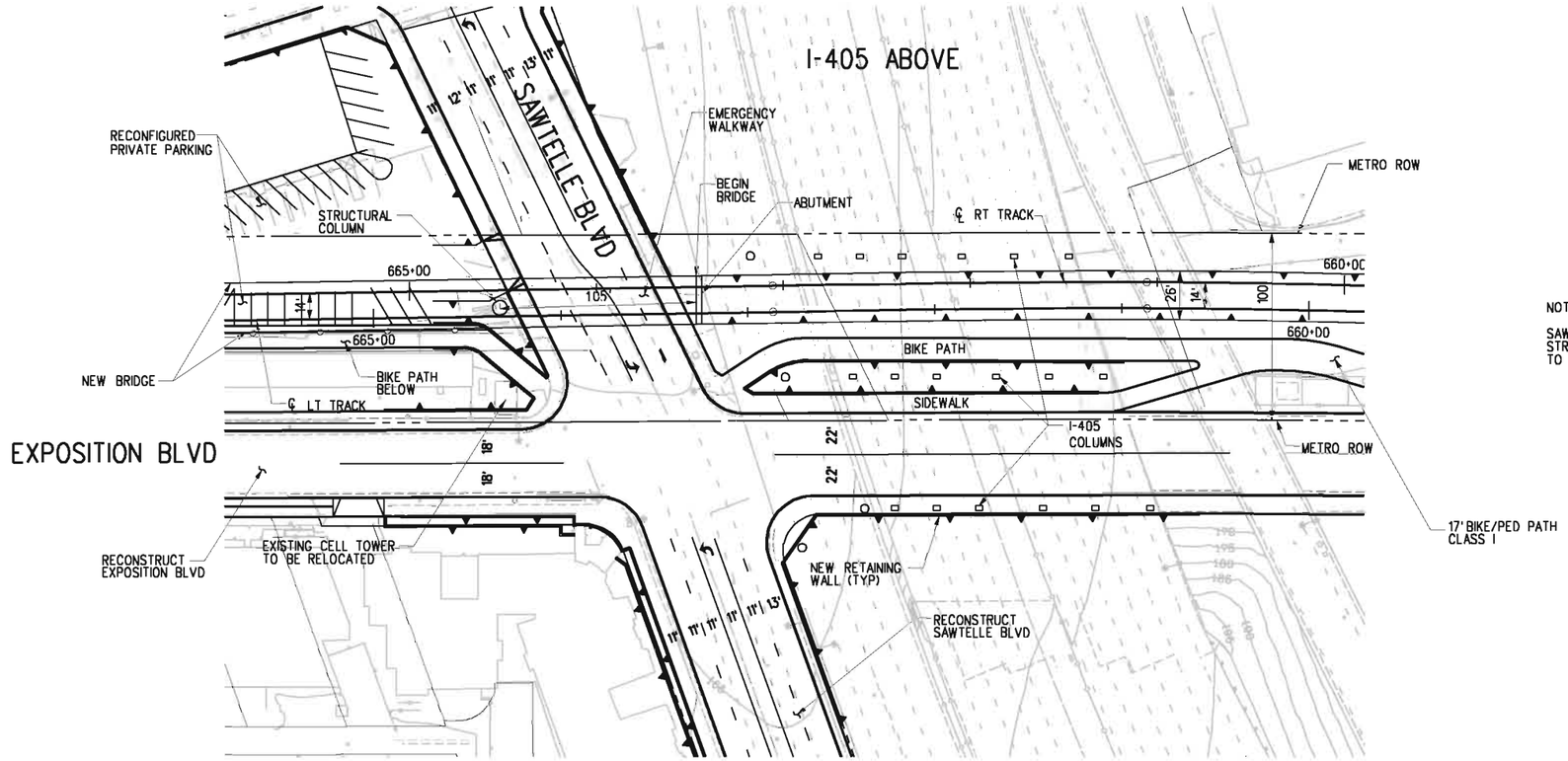
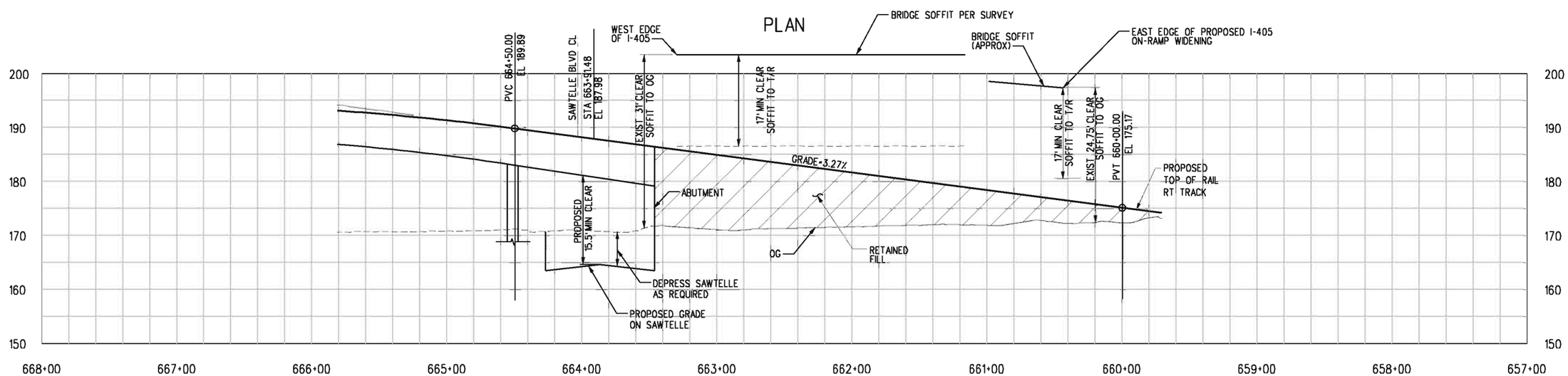


NOTE:

SAWTELLE BLVD ROADWAY TO BE RECONSTRUCTED PER CONCEPT PLAN. STRIPING, SIGNAGE, TRAFFIC SIGNALS, AND PEDESTRIAN TREATMENTS TO BE FURTHER DEVELOPED DURING PRELIMINARY ENGINEERING.

PLAN



40' 20' 0 40' 80' HORIZ: 1"=40'

10' 0 10' 20' VERT: 1"=10'

CONCEPTUAL ENGINEERING

RT TRACK PROFILE

PRELIMINARY

THE PREPARATION OF THIS DRAWING HAS BEEN FINANCED BY THE TAXES OF THE CITIZENS OF LOS ANGELES COUNTY AND OF THE STATE OF CALIFORNIA.

REV	DATE	BY	APP	REG NO	EXPIRES	SEAL HOLDER	DESCRIPTION
	-	-	-	-	-		-

DESIGNED BY J. SUSILO
DRAWN BY M. AL-MASHAT
CHECKED BY L. MOHR
IN CHARGE J. PRIZNER
DATE 5/05/10

Exposition Metro Line Construction Authority
Expo

DMJM HARRIS | AECOM
300 S. GRAND AVENUE, SECOND FLOOR
LOS ANGELES, CALIFORNIA 90071
TEL (213) 330-7200 FAX (213) 330-7201

SUBMITTED
APPROVED

EXPOSITION TRANSIT PROJECT-PHASE 2
SAWTELLE BLVD
GRADE SEPARATION
CONCEPT PLAN
PROPOSED CPUC NO.84S - 110.5

CONTRACT NO EXXXX
DRAWING NO GC-009
REV 0
SCALE HORIZ: 1"=40' VERT: 1"=10'
SHEET NO

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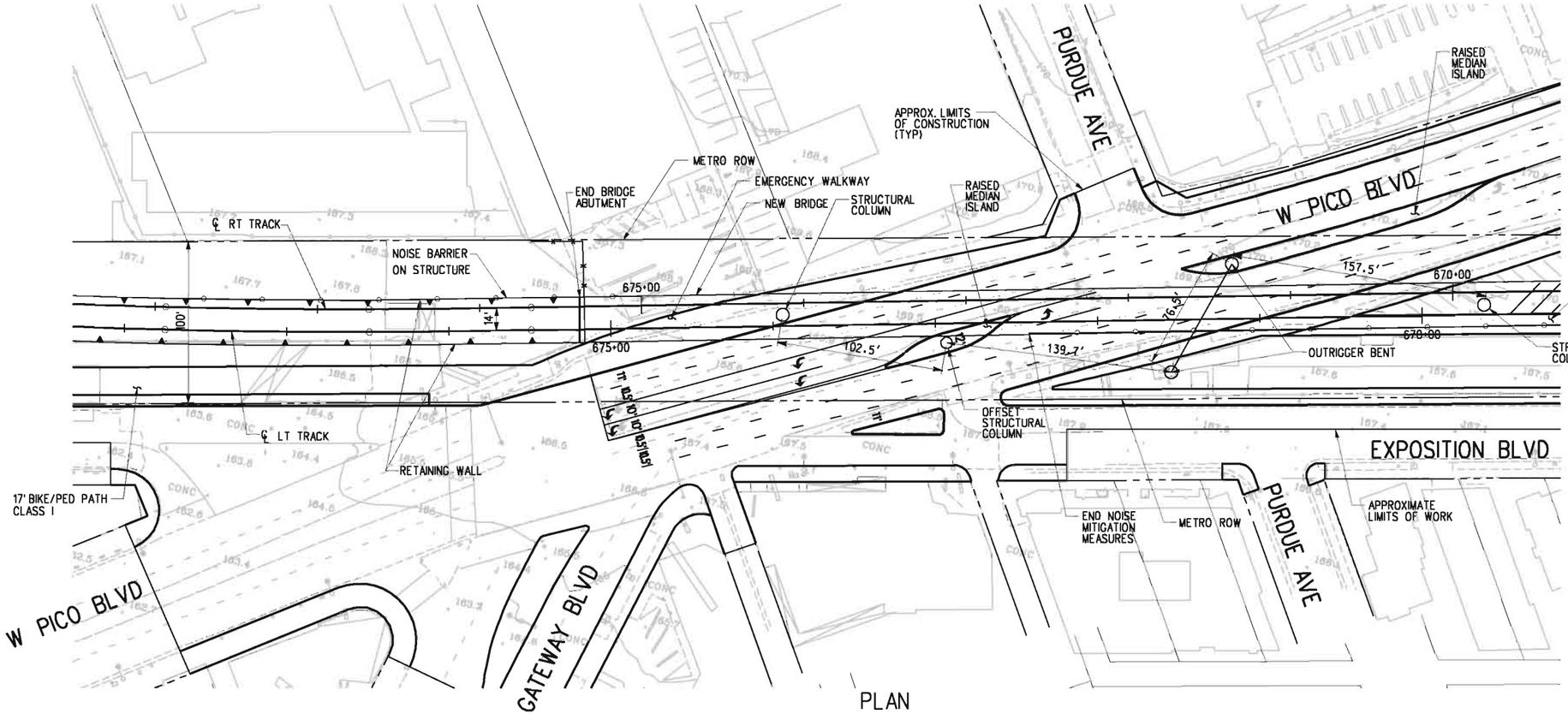
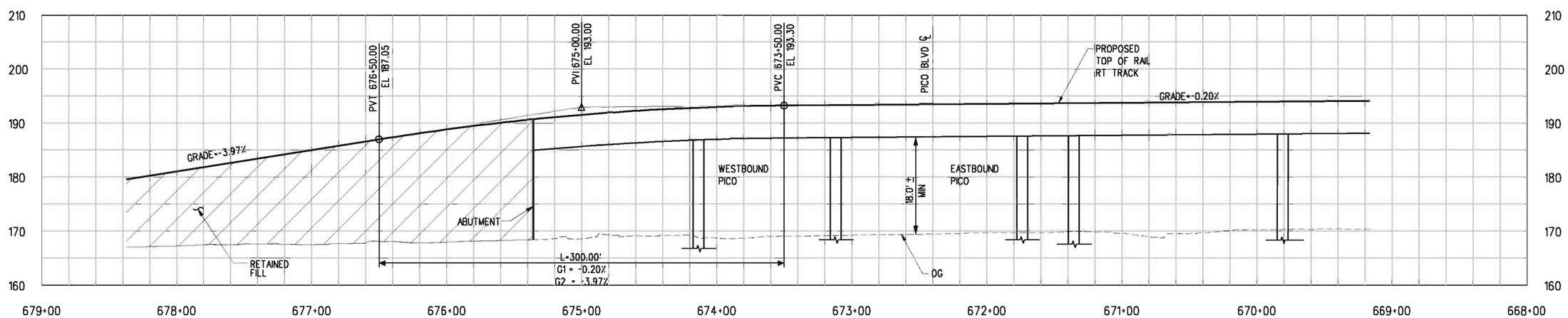


PLAN

NOTE:

W PICO BLVD AND GATEWAY BLVD TO BE RECONSTRUCTED PER CONCEPT PLAN.SIGNAGE, STRIPING, TRAFFIC SIGNALS, AND PEDESTRIAN TREATMENTS TO BE FURTHER DEVELOPED DURING PRELIMINARY ENGINEERING.



40' 20' 0 40' 80' HORIZ: 1"=40'

10' 0 10' 20' VERT: 1"=10'

CONCEPTUAL ENGINEERING

RT TRACK PROFILE

PRELIMINARY

THE PREPARATION OF THIS DRAWING HAS BEEN FINANCED BY THE TAXES OF THE CITIZENS OF LOS ANGELES COUNTY AND OF THE STATE OF CALIFORNIA.

REV	DATE	BY	APP	REG NO	EXPIRES	SEAL HOLDER	DESCRIPTION
	-	-	-	-	-		-

DESIGNED BY J. SUSILO
DRAWN BY M. AL-MASHAT
CHECKED BY L. MOHR
IN CHARGE J. PRIZNER
DATE 5/05/10

Exposition Metro Line Construction Authority
Expo

DMJM HARRIS | AECOM
300 S. GRAND AVENUE, SECOND FLOOR
LOS ANGELES, CALIFORNIA 90071
TEL (213) 330-7200 FAX (213) 330-7201

SUBMITTED
APPROVED

EXPOSITION TRANSIT PROJECT-PHASE 2
W PICO/GATEWAY BLVD
GRADE SEPARATION
CONCEPT PLAN
PROPOSED CPUC NO.84S - 110.7

CONTRACT NO EXXXX
DRAWING NO GC-010
REV 0
SCALE HORIZ: 1"=40' VERT: 1"=10'
SHEET NO

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NOTES:

1. QUEUE CUTTER SIGNAL, SEMI-ACTUATED OPERATION.
2. LED TRAFFIC SIGNAL HEADS.
3. LED COUNTDOWN PEDESTRIAN SIGNAL HEADS WITH AUDIBLE PED SIGNALS.
4. TACTILE WARNING STRIPS SHALL BE PLACED AT ALL GATES AND CURB RAMPS.
5. NEW CONDUITS, LOOPS, PULLBOXES, ETC. WILL BE ADDED TO PLANS PREPARED FOR CONSTRUCTION.
6. PROVIDE LADOT STANDARD BATTERY BACKUP SYSTEM FOR TRAFFIC SIGNAL.
7. SUBSTRUCTURES / UTILITIES ARE NOT SHOWN.
8. SIGNAGE, STRIPING AND TRAFFIC SIGNALS WILL BE INSTALLED AS PER LADOT APPROVED PLANS.
9. PROVIDE ACCESS RAMPS AT EACH CORNER AND THE ABILITY TO PLACE DUAL CURB RAMPS WILL BE MORE CLOSELY EVALUATED WITH THE CURB RETURN RADIUS DURING FINAL DESIGN.
10. RAMP TYPE SHALL BE APPROVED BY LADOT AND COMPLY WITH BUREAU OF ENGINEERING DIMENSIONS AND MINIMUM CLEARANCES AND RAMP LANDING DEPTH. ENSURE THAT ALL POWER POLES, TRAFFIC SIGNAL AND STREET LIGHT POLES AND OTHER PURTENANCES (PULL BOXES, ETC.) ARE PLACED OUTSIDE THE CURB ACCESS RAMP.
11. STREET PROFILES, CURB RADII AND DESIGN FEATURES SHALL COMPLY WITH BUREAU OF ENGINEERING REQUIREMENTS, TAKING STREET CLASSIFICATION (MAJOR, SECONDARY, COLLECTOR, LOCAL) INTO ACCOUNT.
12. OCS POLE LOCATIONS WILL BE DETERMINED DURING FINAL DESIGN.
13. STREET LIGHTING WILL BE INSTALLED PER BSL APPROVED PLANS.
14. QUEUE CUTTER LOOPS SHALL BE PLACED FOR THE NORTHBOUND MOVEMENT AND INTERCONNECTED WITH OLYMPIC AVENUE INTERSECTION CONTROL.
15. QUEUE CUTTER LOOPS SHALL BE PLACED FOR THE SOUTHBOUND MOVEMENT AND INTERCONNECTED WITH PICO BOULEVARD INTERSECTION CONTROL.
16. EXIT GATES SHALL HAVE TIME DELAY BEFORE DESCENT.
17. VEHICLE PRESENCE DETECTION SHALL BE PLACED IN TRACK AREA BETWEEN ENTRANCE AND EXIT GATES.
18. THE QUEUE LOOPS FOR ASHBY INFLUENCE ZONE SHALL ACTIVATE THE QUEUE CUTTER TRAFFIC SIGNAL (TURN RED) AT THE GRADE CROSSING TO PREVENT VEHICLES FROM STOPPING ON THE TRACKS.
19. TRAFFIC SIGNAL SYSTEM SHALL BE INTERCONNECTED WITH THE R/R WARNING SYSTEM.
20. THE EXPO AUTHORITY WILL FINALIZE THE RELOCATION OF THE EXISTING PRIVATE BUSINESS GATE THAT IS LOCATED IN THE NORTHEAST QUADRANT DURING FINAL DESIGN. THE GATE WILL BE SET 20' BACK FROM THE SIDEWALK.

LEGEND:

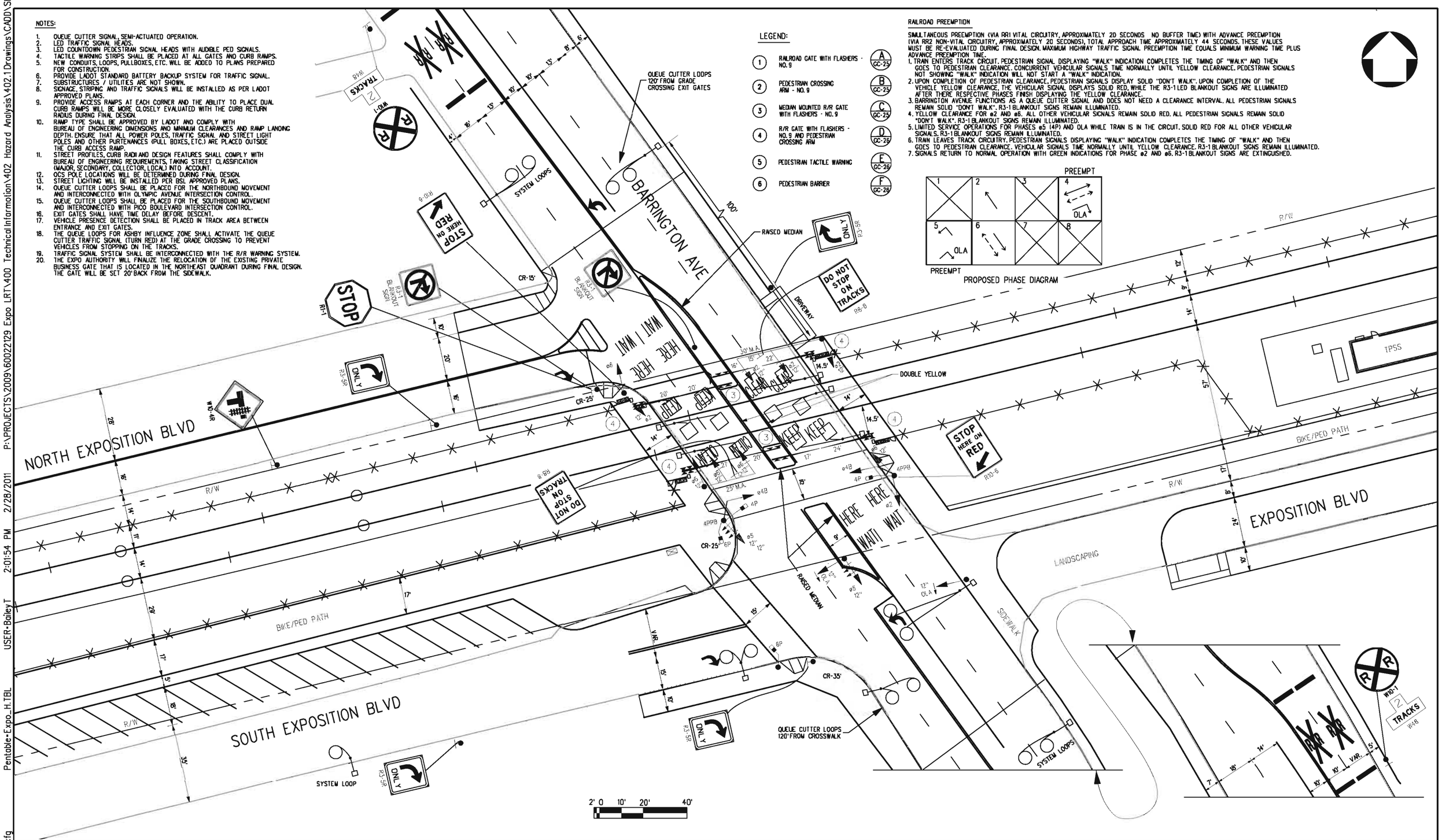
1	RAILROAD GATE WITH FLASHERS - NO. 9	A GC-25
2	PEDESTRIAN CROSSING ARM - NO. 9	B GC-25
3	MEDIAN MOUNTED R/R GATE WITH FLASHERS - NO. 9	C GC-25
4	R/R GATE WITH FLASHERS - NO. 9 AND PEDESTRIAN CROSSING ARM	D GC-25
5	PEDESTRIAN TACTILE WARNING	E GC-26
6	PEDESTRIAN BARRIER	F GC-26

RAILROAD PREEMPTION

SIMULTANEOUS PREEMPTION (VIA RR1 VITAL CIRCUITRY, APPROXIMATELY 20 SECONDS NO BUFFER TIME) WITH ADVANCE PREEMPTION (VIA RR2 NON-VITAL CIRCUITRY, APPROXIMATELY 20 SECONDS), TOTAL APPROACH TIME APPROXIMATELY 44 SECONDS. THESE VALUES MUST BE RE-EVALUATED DURING FINAL DESIGN. MAXIMUM HIGHWAY TRAFFIC SIGNAL PREEMPTION TIME EQUALS MINIMUM WARNING TIME PLUS ADVANCE PREEMPTION TIME.

1. TRAIN ENTERS TRACK CIRCUIT. PEDESTRIAN SIGNAL DISPLAYING "WALK" INDICATION COMPLETES THE TIMING OF "WALK" AND THEN GOES TO PEDESTRIAN CLEARANCE. CONCURRENT VEHICULAR SIGNALS TIME NORMALLY UNTIL YELLOW CLEARANCE. PEDESTRIAN SIGNALS NOT SHOWING "WALK" INDICATION WILL NOT START A "WALK" INDICATION.
2. UPON COMPLETION OF PEDESTRIAN CLEARANCE, PEDESTRIAN SIGNALS DISPLAY SOLID "DON'T WALK". UPON COMPLETION OF THE VEHICLE YELLOW CLEARANCE, THE VEHICULAR SIGNAL DISPLAYS SOLID RED. WHILE THE R3-1 LED BLANKOUT SIGNS ARE ILLUMINATED AFTER THERE RESPECTIVE PHASES FINISH DISPLAYING THE YELLOW CLEARANCE.
3. BARRINGTON AVENUE FUNCTIONS AS A QUEUE CUTTER SIGNAL AND DOES NOT NEED A CLEARANCE INTERVAL. ALL PEDESTRIAN SIGNALS REMAIN SOLID "DON'T WALK". R3-1 BLANKOUT SIGNS REMAIN ILLUMINATED.
4. YELLOW CLEARANCE FOR ø2 AND ø6. ALL OTHER VEHICULAR SIGNALS REMAIN SOLID RED. ALL PEDESTRIAN SIGNALS REMAIN SOLID "DON'T WALK". R3-1 BLANKOUT SIGNS REMAIN ILLUMINATED.
5. LIMITED SERVICE OPERATIONS FOR PHASES ø5 (4P) AND OLA WHILE TRAIN IS IN THE CIRCUIT. SOLID RED FOR ALL OTHER VEHICULAR SIGNALS. R3-1 BLANKOUT SIGNS REMAIN ILLUMINATED.
6. TRAIN LEAVES TRACK CIRCUITRY. PEDESTRIAN SIGNALS DISPLAYING "WALK" INDICATION COMPLETES THE TIMING OF "WALK" AND THEN GOES TO PEDESTRIAN CLEARANCE. VEHICULAR SIGNALS TIME NORMALLY UNTIL YELLOW CLEARANCE. R3-1 BLANKOUT SIGNS REMAIN ILLUMINATED.
7. SIGNALS RETURN TO NORMAL OPERATION WITH GREEN INDICATIONS FOR PHASE ø2 AND ø6. R3-1 BLANKOUT SIGNS ARE EXTINGUISHED.

PROPOSED PHASE DIAGRAM



THE PREPARATION OF THIS DRAWING HAS BEEN FINANCED BY THE TAXES OF THE CITIZENS OF LOS ANGELES COUNTY AND OF THE STATE OF CALIFORNIA.

REV	DATE	BY	APP	REG NO	EXPIRES	SEAL HOLDER	DESCRIPTION

DESIGNED BY J. VAN HOFF
DRAWN BY T. BAILEY
CHECKED BY R. SORENSON
IN CHARGE
DATE 02/28/11

Exposition Metro Line Construction Authority
Expo

DMJM HARRIS | AECOM
707 WILSHIRE BLVD, SUITE 3300
LOS ANGELES, CALIFORNIA 90017
TEL (213) 243-5500 FAX (213) 243-5552

SUBMITTED
APPROVED

EXPOSITION TRANSIT PROJECT-PHASE 2
BARRINGTON AVENUE &
EXPOSITION BOULEVARD
AT-GRADE CROSSING CONCEPT PLAN
PROPOSED CPUC NO. 84S - 111.0

CONTRACT NO
DRAWING NO GC-011
REV
SCALE AS SHOWN
SHEET NO

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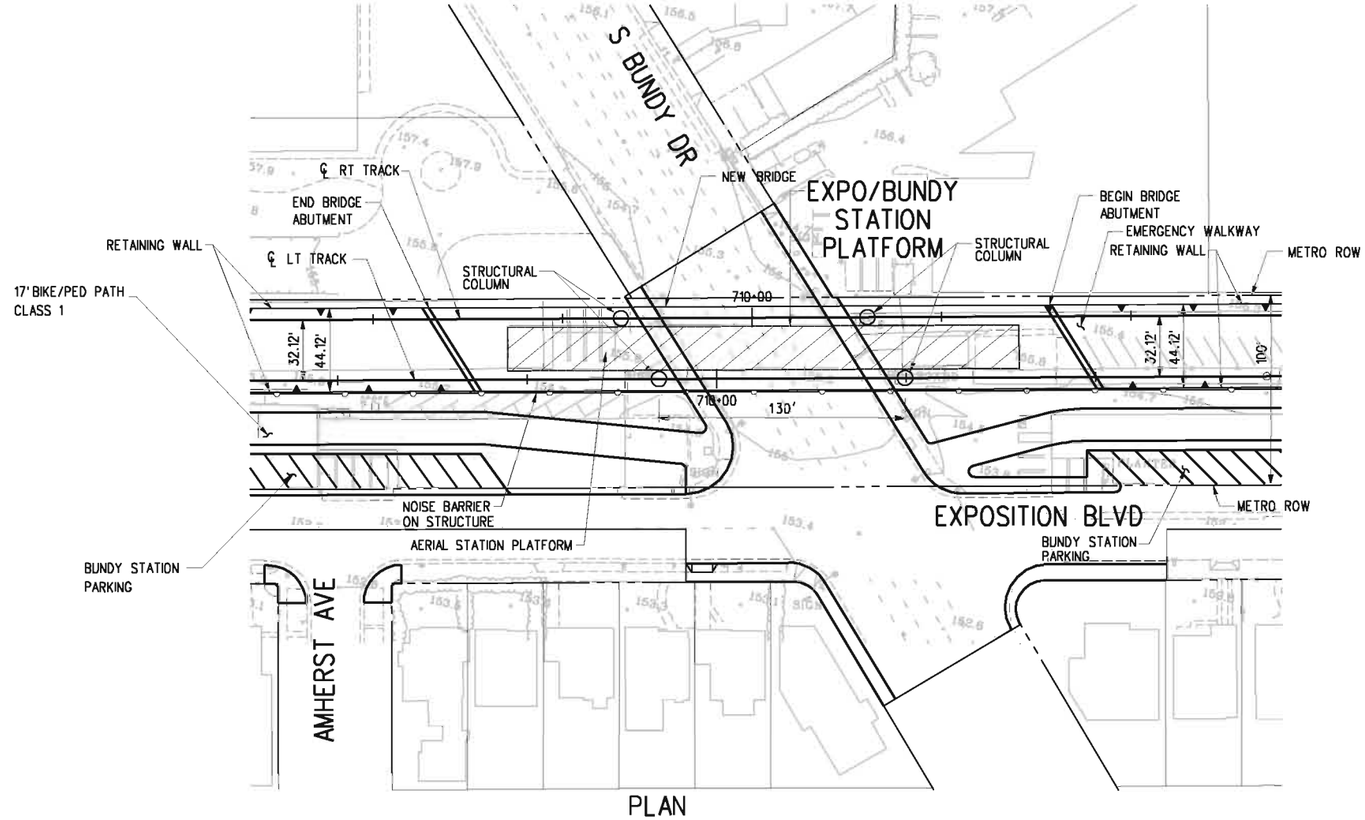
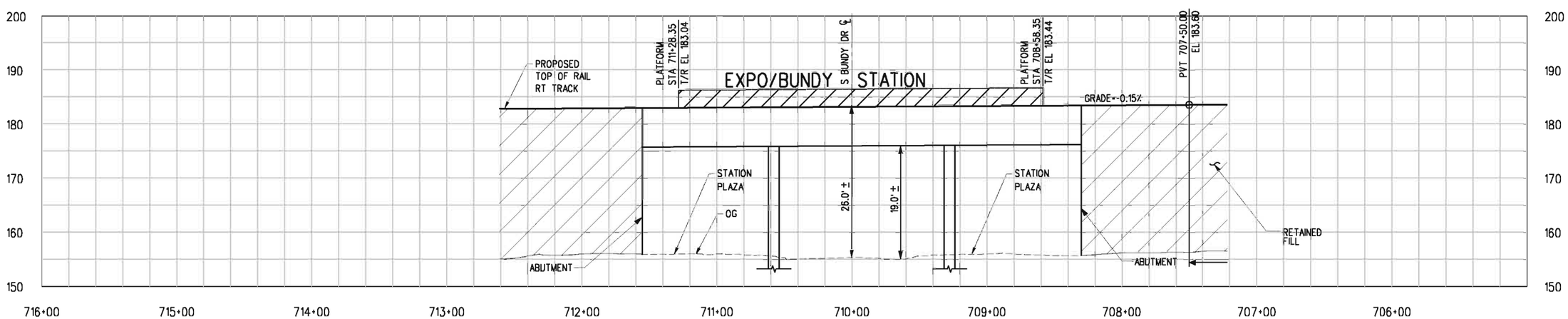


PLAN



40' 20' 0 40' 80'
HORIZ: 1"=40'

10' 0 10' 20'
VERT: 1"=10'

CONCEPTUAL ENGINEERING

RT TRACK PROFILE

PRELIMINARY

NOTES:

BUNDY DR TO BE RECONSTRUCTED PER CONCEPT PLAN. LANE CONFIGURATION AND WIDTH TO REMAIN AS EXISTING. PEDESTRIAN TREATMENTS TO BE FURTHER DESIGNED DURING PRELIMINARY ENGINEERING.

THE PREPARATION OF THIS DRAWING HAS BEEN FINANCED BY THE TAXES OF THE CITIZENS OF LOS ANGELES COUNTY AND OF THE STATE OF CALIFORNIA.

REV	DATE	BY	APP	REG NO	EXPIRES	SEAL HOLDER	DESCRIPTION
	-	-	-	-	-		-

DESIGNED BY J. SUSILO
DRAWN BY M. AL-MASHAT
CHECKED BY L. MOHR
IN CHARGE J. PRIZNER
DATE 5/05/10

Exposition Metro Line Construction Authority
Expo

DMJM HARRIS | AECOM
300 S. GRAND AVENUE, SECOND FLOOR
LOS ANGELES, CALIFORNIA 90071
TEL (213) 330-7200 FAX (213) 330-7201

SUBMITTED
APPROVED

EXPOSITION TRANSIT PROJECT-PHASE 2
S BUNDY DR
GRADE SEPARATION
CONCEPT PLAN
PRPOPSED CPUC NO.84S - 11.4

CONTRACT NO EXXXX
DRAWING NO GC-012
REV 0
SCALE HORIZ: 1"=40' VERT: 1"=10'
SHEET NO

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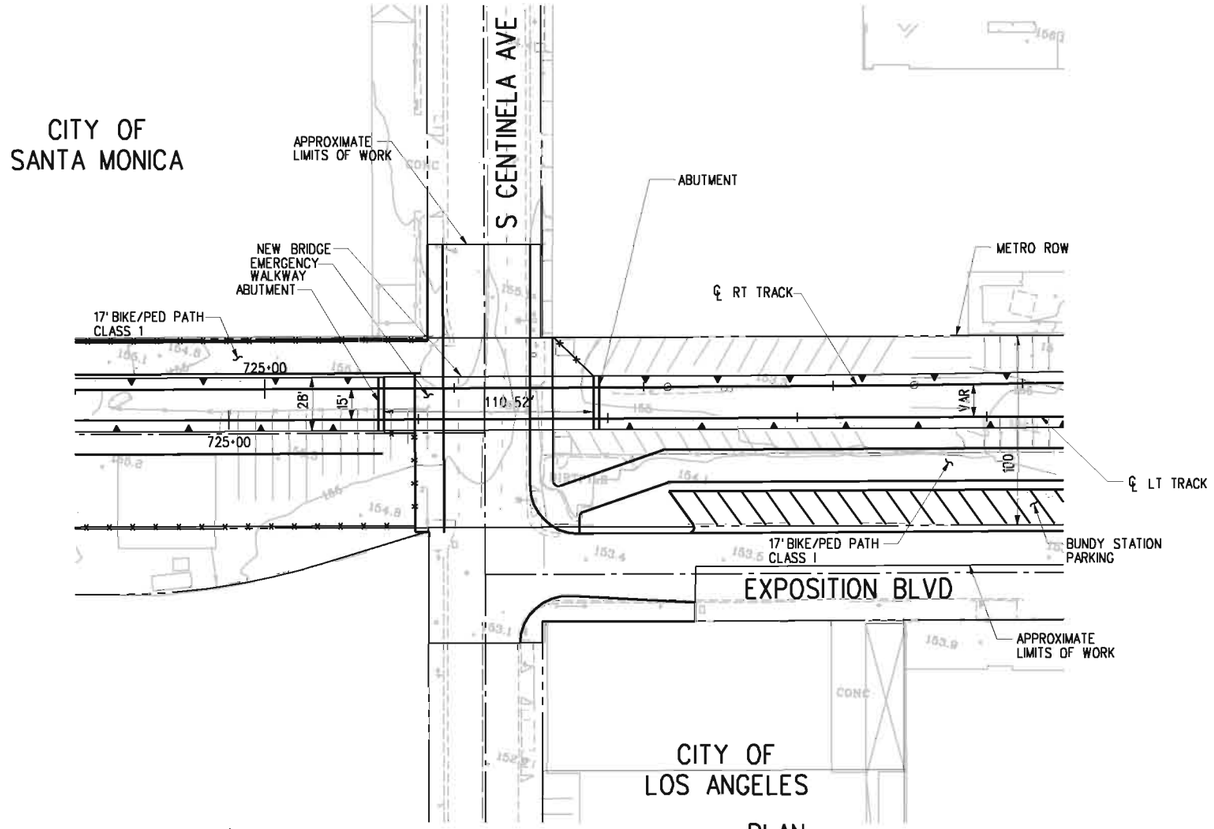
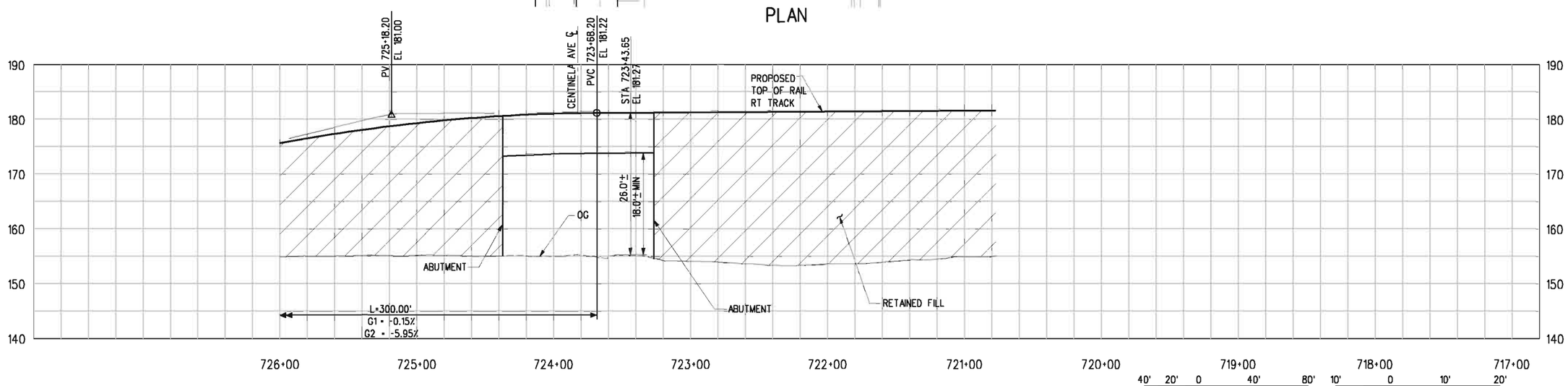


PLAN

NOTES:

S CENTINELA AVE TO BE RECONSTRUCTED PER CONCEPT PLAN. LANE CONFIGURATION TO REMAIN AS EXISTING. PEDESTRIAN TREATMENTS AND TRAFFIC SIGNAL TO BE FURTHER DEVELOPED DURING PRELIMINARY ENGINEERING.



40' 20' 0 40' 80' HORIZ: 1"=40'

10' 0 10' 20' VERT: 1"=10'

CONCEPTUAL ENGINEERING

RT TRACK PROFILE

PRELIMINARY

THE PREPARATION OF THIS DRAWING HAS BEEN FINANCED BY THE TAXES OF THE CITIZENS OF LOS ANGELES COUNTY AND OF THE STATE OF CALIFORNIA.

REV	DATE	BY	APP	REG NO	EXPIRES	SEAL HOLDER	DESCRIPTION
	-	-	-	-	-		-

DESIGNED BY J. SUSILO
DRAWN BY M. AL-MASHAT
CHECKED BY L. MOHR
IN CHARGE J. PRIZNER
DATE 5/05/10

Exposition Metro Line Construction Authority
Expo

DMJM HARRIS | AECOM
300 S. GRAND AVENUE, SECOND FLOOR
LOS ANGELES, CALIFORNIA 90071
TEL (213) 330-7200 FAX (213) 330-7201

SUBMITTED
APPROVED

EXPOSITION TRANSIT PROJECT-PHASE 2
S CENTINELA AVE
GRADE SEPARTION
CONCEPT PLAN
PROPOSED CPUC NO.84S - 111.6

CONTRACT NO EXXXX
DRAWING NO GC-013
REV 0
SCALE HORIZ: 1"=40' VERT: 1"=10'
SHEET NO

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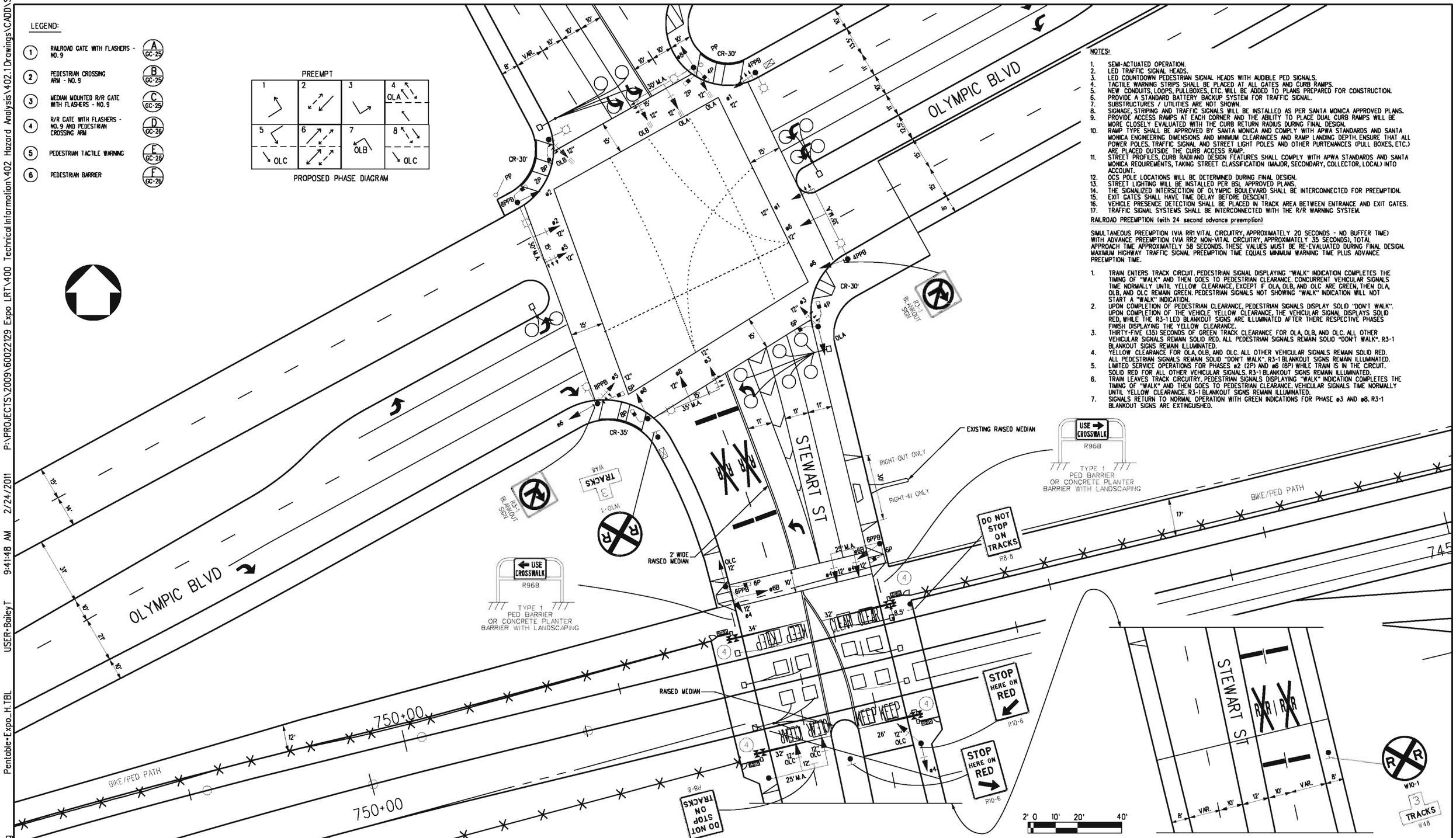
LEGEND:

1. RAILROAD GATE WITH FLASHERS - NO. 9 (A GC-25)
2. PEDESTRIAN CROSSING ARM - NO. 9 (B GC-25)
3. MEDIAN MOUNTED R/R GATE WITH FLASHERS - NO. 9 (C GC-25)
4. R/R GATE WITH FLASHERS - NO. 9 AND PEDESTRIAN CROSSING ARM (D GC-26)
5. PEDESTRIAN TACTILE WARNING (E GC-26)
6. PEDESTRIAN BARRIER (F GC-26)

PREEMPT

PROPOSED PHASE DIAGRAM



NOTES:

1. SEMI-ACTUATED OPERATION.
2. LED TRAFFIC SIGNAL HEADS.
3. LED COUNTDOWN PEDESTRIAN SIGNAL HEADS WITH AUDIBLE PED SIGNALS.
4. TACTILE WARNING STRIPS SHALL BE PLACED AT ALL GATES AND CURB RAMPS.
5. NEW CONDUITS, LOOPS, PULLBOXES, ETC. WILL BE ADDED TO PLANS PREPARED FOR CONSTRUCTION.
6. PROVIDE A STANDARD BATTERY BACKUP SYSTEM FOR TRAFFIC SIGNAL.
7. SUBSTRUCTURES / UTILITIES ARE NOT SHOWN.
8. SIGNAGE, STRIPING AND TRAFFIC SIGNALS WILL BE INSTALLED AS PER SANTA MONICA APPROVED PLANS.
9. PROVIDE ACCESS RAMPS AT EACH CORNER AND THE ABILITY TO PLACE DUAL CURB RAMPS WILL BE MORE CLOSELY EVALUATED WITH THE CURB RETURN RADIUS DURING FINAL DESIGN.
10. RAMP TYPE SHALL BE APPROVED BY SANTA MONICA AND COMPLY WITH APWA STANDARDS AND SANTA MONICA ENGINEERING DIMENSIONS AND MINIMUM CLEARANCES AND RAMP LANDING DEPTH. ENSURE THAT ALL POWER POLES, TRAFFIC SIGNAL AND STREET LIGHT POLES AND OTHER PURTENANCES (PULL BOXES, ETC.) ARE PLACED OUTSIDE THE CURB ACCESS RAMP.
11. STREET PROFILES, CURB RADII AND DESIGN FEATURES SHALL COMPLY WITH APWA STANDARDS AND SANTA MONICA REQUIREMENTS, TAKING STREET CLASSIFICATION (MAJOR, SECONDARY, COLLECTOR, LOCAL) INTO ACCOUNT.
12. OCS POLE LOCATIONS WILL BE DETERMINED DURING FINAL DESIGN.
13. STREET LIGHTING WILL BE INSTALLED PER BSL APPROVED PLANS.
14. THE SIGNALIZED INTERSECTION OF OLYMPIC BOULEVARD SHALL BE INTERCONNECTED FOR PREEMPTION.
15. EXIT GATES SHALL HAVE TIME DELAY BEFORE DESCENT.
16. VEHICLE PRESENCE DETECTION SHALL BE PLACED IN TRACK AREA BETWEEN ENTRANCE AND EXIT GATES.
17. TRAFFIC SIGNAL SYSTEMS SHALL BE INTERCONNECTED WITH THE R/R WARNING SYSTEM.

RAILROAD PREEMPTION (with 24 second advance preemption)

SIMULTANEOUS PREEMPTION (VIA RR1 VITAL CIRCUITRY, APPROXIMATELY 20 SECONDS - NO BUFFER TIME) WITH ADVANCE PREEMPTION (VIA RR2 NON-VITAL CIRCUITRY, APPROXIMATELY 35 SECONDS), TOTAL APPROACH TIME APPROXIMATELY 58 SECONDS. THESE VALUES MUST BE RE-EVALUATED DURING FINAL DESIGN. MAXIMUM HIGHWAY TRAFFIC SIGNAL PREEMPTION TIME EQUALS MINIMUM WARNING TIME PLUS ADVANCE PREEMPTION TIME.

1. TRAIN ENTERS TRACK CIRCUIT. PEDESTRIAN SIGNAL DISPLAYING "WALK" INDICATION COMPLETES THE TIMING OF "WALK" AND THEN GOES TO PEDESTRIAN CLEARANCE. CONCURRENT VEHICULAR SIGNALS TIME NORMALLY UNTIL YELLOW CLEARANCE, EXCEPT IF OLA, OLB, AND OLC ARE GREEN, THEN OLA, OLB, AND OLC REMAIN GREEN. PEDESTRIAN SIGNALS NOT SHOWING "WALK" INDICATION WILL NOT START A "WALK" INDICATION.
2. UPON COMPLETION OF PEDESTRIAN CLEARANCE, PEDESTRIAN SIGNALS DISPLAY SOLID "DON'T WALK". UPON COMPLETION OF THE VEHICLE YELLOW CLEARANCE, THE VEHICULAR SIGNAL DISPLAYS SOLID RED, WHILE THE R3-1 LED BLANKOUT SIGNS ARE ILLUMINATED AFTER THERE RESPECTIVE PHASES FINISH DISPLAYING THE YELLOW CLEARANCE.
3. THIRTY-FIVE (35) SECONDS OF GREEN TRACK CLEARANCE FOR OLA, OLB, AND OLC. ALL OTHER VEHICULAR SIGNALS REMAIN SOLID RED. ALL PEDESTRIAN SIGNALS REMAIN SOLID "DON'T WALK". R3-1 BLANKOUT SIGNS REMAIN ILLUMINATED.
4. YELLOW CLEARANCE FOR OLA, OLB, AND OLC. ALL OTHER VEHICULAR SIGNALS REMAIN SOLID RED. ALL PEDESTRIAN SIGNALS REMAIN SOLID "DON'T WALK". R3-1 BLANKOUT SIGNS REMAIN ILLUMINATED.
5. LIMITED SERVICE OPERATIONS FOR PHASES ø2 (2P) AND ø6 (6P) WHILE TRAIN IS IN THE CIRCUIT. SOLID RED FOR ALL OTHER VEHICULAR SIGNALS. R3-1 BLANKOUT SIGNS REMAIN ILLUMINATED.
6. TRAIN LEAVES TRACK CIRCUITRY. PEDESTRIAN SIGNALS DISPLAYING "WALK" INDICATION COMPLETES THE TIMING OF "WALK" AND THEN GOES TO PEDESTRIAN CLEARANCE. VEHICULAR SIGNALS TIME NORMALLY UNTIL YELLOW CLEARANCE. R3-1 BLANKOUT SIGNS REMAIN ILLUMINATED.
7. SIGNALS RETURN TO NORMAL OPERATION WITH GREEN INDICATIONS FOR PHASE ø3 AND ø8. R3-1 BLANKOUT SIGNS ARE EXTINGUISHED.

THE PREPARATION OF THIS DRAWING HAS BEEN FINANCED BY THE TAXES OF THE CITIZENS OF LOS ANGELES COUNTY AND OF THE STATE OF CALIFORNIA.

REV	DATE	BY	APP	REG NO	EXPIRES	SEAL HOLDER	DESCRIPTION

DESIGNED BY J. VAN HOFF
DRAWN BY T. BAILEY
CHECKED BY R. SORENSON
IN CHARGE
DATE 02/24/11

Exposition Metro Line Construction Authority
Expo

DMJM HARRIS | AECOM
707 WILSHIRE BLVD, SUITE 3300
LOS ANGELES, CALIFORNIA 90017
TEL (213) 243-3500 FAX (213) 243-3552

SUBMITTED
APPROVED

EXPOSITION TRANSIT PROJECT-PHASE 2
OLYMPIC BOULEVARD & STEWART STREET
AT-GRADE CROSSING CONCEPT PLAN
PROPOSED CPUC NO. 84S - 112.1

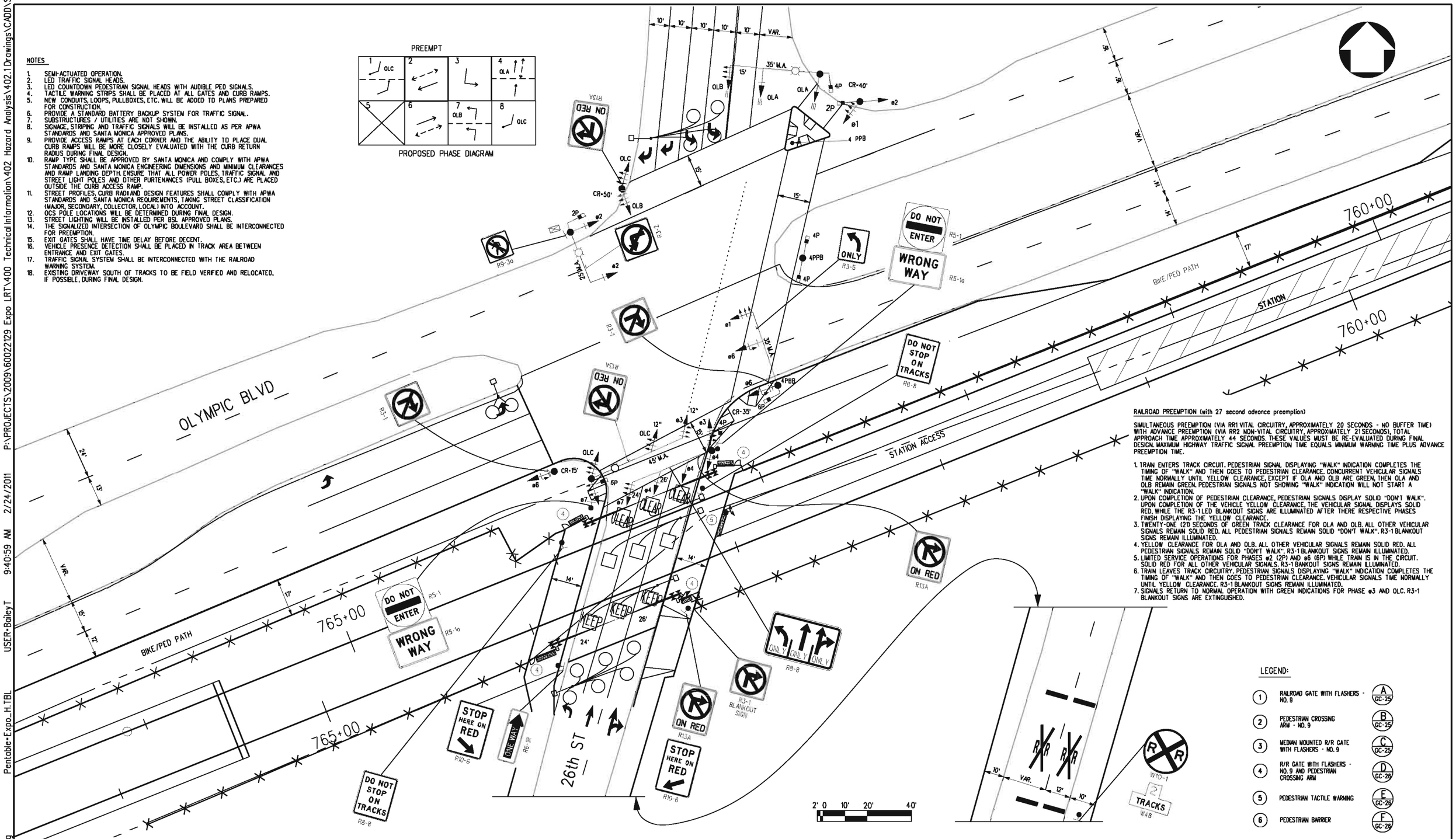
CONTRACT NO
DRAWING NO GC-014
REV
SCALE AS SHOWN
SHEET NO

Plot Driver=printer.pltcfg Pentable=Expo_H.TBL USER=BaileyT 9:41:48 AM 2/24/2011 P:\PROJECTS\2009\60022129 Expo LRT\400 Technical Information\402 Hazard Analysis\402.1 Drawings\CADD\Sheet

NOTES

1. SEMI-ACTUATED OPERATION.
2. LED TRAFFIC SIGNAL HEADS.
3. LED COUNTDOWN PEDESTRIAN SIGNAL HEADS WITH AUDIBLE PED SIGNALS.
4. TACTILE WARNING STRIPS SHALL BE PLACED AT ALL GATES AND CURB RAMPS.
5. NEW CONDUITS, LOOPS, PULLBOXES, ETC. WILL BE ADDED TO PLANS PREPARED FOR CONSTRUCTION.
6. PROVIDE A STANDARD BATTERY BACKUP SYSTEM FOR TRAFFIC SIGNAL.
7. SUBSTRUCTURES / UTILITIES ARE NOT SHOWN.
8. SIGNAGE, STRIPING AND TRAFFIC SIGNALS WILL BE INSTALLED AS PER APWA STANDARDS AND SANTA MONICA APPROVED PLANS.
9. PROVIDE ACCESS RAMPS AT EACH CORNER AND THE ABILITY TO PLACE DUAL CURB RAMPS WILL BE MORE CLOSELY EVALUATED WITH THE CURB RETURN RADIUS DURING FINAL DESIGN.
10. RAMP TYPE SHALL BE APPROVED BY SANTA MONICA AND COMPLY WITH APWA STANDARDS AND SANTA MONICA ENGINEERING DIMENSIONS AND MINIMUM CLEARANCES AND RAMP LANDING DEPTH. ENSURE THAT ALL POWER POLES, TRAFFIC SIGNAL AND STREET LIGHT POLES AND OTHER PURTENANCES (PULL BOXES, ETC.) ARE PLACED OUTSIDE THE CURB ACCESS RAMP.
11. STREET PROFILES, CURB RADII AND DESIGN FEATURES SHALL COMPLY WITH APWA STANDARDS AND SANTA MONICA REQUIREMENTS, TAKING STREET CLASSIFICATION (MAJOR, SECONDARY, COLLECTOR, LOCAL) INTO ACCOUNT.
12. OCS POLE LOCATIONS WILL BE DETERMINED DURING FINAL DESIGN.
13. STREET LIGHTING WILL BE INSTALLED PER BSL APPROVED PLANS.
14. THE SIGNALIZED INTERSECTION OF OLYMPIC BOULEVARD SHALL BE INTERCONNECTED FOR PREEMPTION.
15. EXIT GATES SHALL HAVE TIME DELAY BEFORE DECENT.
16. VEHICLE PRESENCE DETECTION SHALL BE PLACED IN TRACK AREA BETWEEN ENTRANCE AND EXIT GATES.
17. TRAFFIC SIGNAL SYSTEM SHALL BE INTERCONNECTED WITH THE RAILROAD WARNING SYSTEM.
18. EXISTING DRIVEWAY SOUTH OF TRACKS TO BE FIELD VERIFIED AND RELOCATED, IF POSSIBLE, DURING FINAL DESIGN.

PROPOSED PHASE DIAGRAM



RAILROAD PREEMPTION (with 27 second advance preemption)

SIMULTANEOUS PREEMPTION (VIA RR1 VITAL CIRCUITRY, APPROXIMATELY 20 SECONDS - NO BUFFER TIME) WITH ADVANCE PREEMPTION (VIA RR2 NON-VITAL CIRCUITRY, APPROXIMATELY 21 SECONDS), TOTAL APPROACH TIME APPROXIMATELY 44 SECONDS. THESE VALUES MUST BE RE-EVALUATED DURING FINAL DESIGN. MAXIMUM HIGHWAY TRAFFIC SIGNAL PREEMPTION TIME EQUALS MINIMUM WARNING TIME PLUS ADVANCE PREEMPTION TIME.

1. TRAIN ENTERS TRACK CIRCUIT. PEDESTRIAN SIGNAL DISPLAYING "WALK" INDICATION COMPLETES THE TIMING OF "WALK" AND THEN GOES TO PEDESTRIAN CLEARANCE. CONCURRENT VEHICULAR SIGNALS TIME NORMALLY UNTIL YELLOW CLEARANCE, EXCEPT IF OLA AND OLB ARE GREEN, THEN OLA AND OLB REMAIN GREEN. PEDESTRIAN SIGNALS NOT SHOWING "WALK" INDICATION WILL NOT START A "WALK" INDICATION.
2. UPON COMPLETION OF PEDESTRIAN CLEARANCE, PEDESTRIAN SIGNALS DISPLAY SOLID "DON'T WALK". UPON COMPLETION OF THE VEHICLE YELLOW CLEARANCE, THE VEHICULAR SIGNAL DISPLAYS SOLID RED, WHILE THE R3-1 LED BLANKOUT SIGNS ARE ILLUMINATED AFTER THERE RESPECTIVE PHASES FINISH DISPLAYING THE YELLOW CLEARANCE.
3. TWENTY-ONE (21) SECONDS OF GREEN TRACK CLEARANCE FOR OLA AND OLB. ALL OTHER VEHICULAR SIGNALS REMAIN SOLID RED. ALL PEDESTRIAN SIGNALS REMAIN SOLID "DON'T WALK". R3-1 BLANKOUT SIGNS REMAIN ILLUMINATED.
4. YELLOW CLEARANCE FOR OLA AND OLB. ALL OTHER VEHICULAR SIGNALS REMAIN SOLID RED. ALL PEDESTRIAN SIGNALS REMAIN SOLID "DON'T WALK". R3-1 BLANKOUT SIGNS REMAIN ILLUMINATED.
5. LIMITED SERVICE OPERATIONS FOR PHASES ø2 (2P) AND ø6 (6P) WHILE TRAIN IS IN THE CIRCUIT. SOLID RED FOR ALL OTHER VEHICULAR SIGNALS. R3-1 BANKOUT SIGNS REMAIN ILLUMINATED.
6. TRAIN LEAVES TRACK CIRCUITRY. PEDESTRIAN SIGNALS DISPLAYING "WALK" INDICATION COMPLETES THE TIMING OF "WALK" AND THEN GOES TO PEDESTRIAN CLEARANCE. VEHICULAR SIGNALS TIME NORMALLY UNTIL YELLOW CLEARANCE. R3-1 BLANKOUT SIGNS REMAIN ILLUMINATED.
7. SIGNALS RETURN TO NORMAL OPERATION WITH GREEN INDICATIONS FOR PHASE ø3 AND OLC. R3-1 BLANKOUT SIGNS ARE EXTINGUISHED.

LEGEND:

1	RAILROAD GATE WITH FLASHERS - NO. 9	A GC-25
2	PEDESTRIAN CROSSING ARM - NO. 9	B GC-25
3	MEDIAN MOUNTED R/R GATE WITH FLASHERS - NO. 9	C GC-25
4	R/R GATE WITH FLASHERS - NO. 9 AND PEDESTRIAN CROSSING ARM	D GC-26
5	PEDESTRIAN TACTILE WARNING	E GC-26
6	PEDESTRIAN BARRIER	F GC-26

THE PREPARATION OF THIS DRAWING HAS BEEN FINANCED BY THE TAXES OF THE CITIZENS OF LOS ANGELES COUNTY AND OF THE STATE OF CALIFORNIA.

REV	DATE	BY	APP	REG NO	EXPIRES	SEAL HOLDER	DESCRIPTION

DESIGNED BY J. VAN HOFF
DRAWN BY T. BAILEY
CHECKED BY R. SORENSON
IN CHARGE
DATE 02/24/11

Exposition Metro Line Construction Authority
Expo

DMJM HARRIS | AECOM
707 WILSHIRE BLVD, SUITE 3300
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TEL (213) 243-5500 FAX (213) 243-5552

SUBMITTED
APPROVED

EXPOSITION TRANSIT PROJECT-PHASE 2
26TH STREET & OLYMPIC BOULEVARD
AT-GRADE CROSSING CONCEPT PLAN
PROPOSED CPUC NO. 84S - 112.4

CONTRACT NO
DRAWING NO GC-015
REV
SCALE AS SHOWN
SHEET NO

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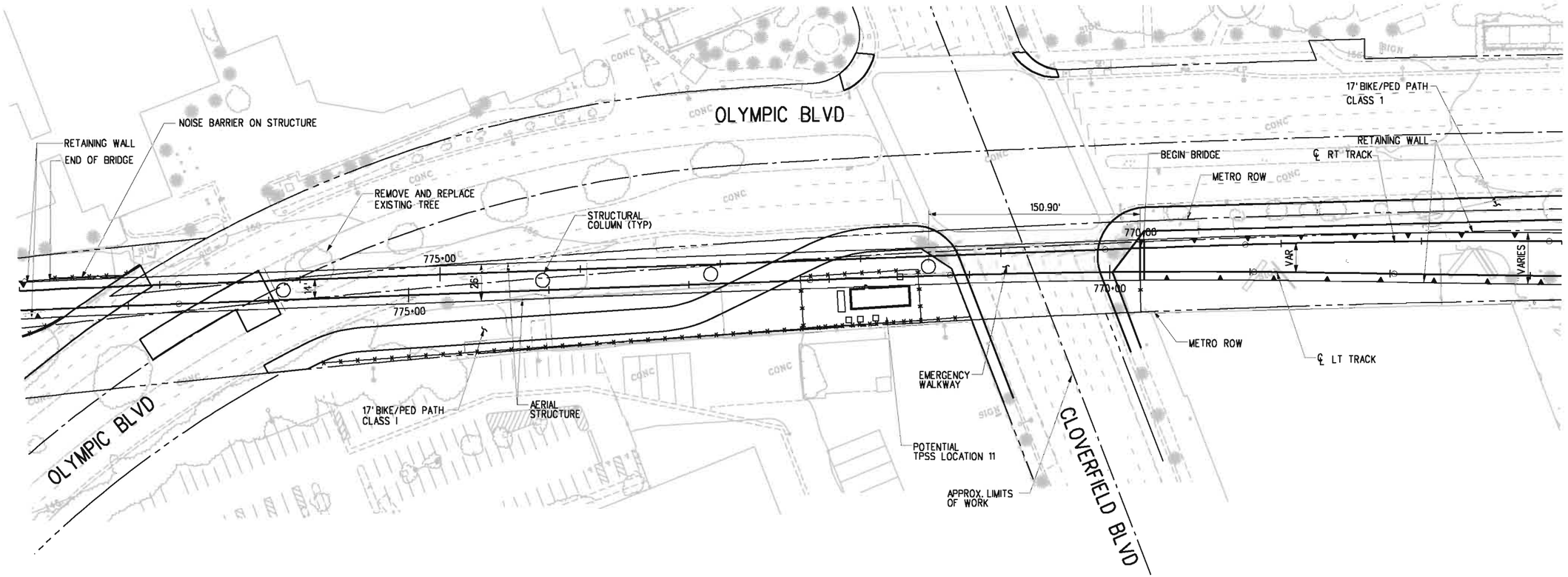
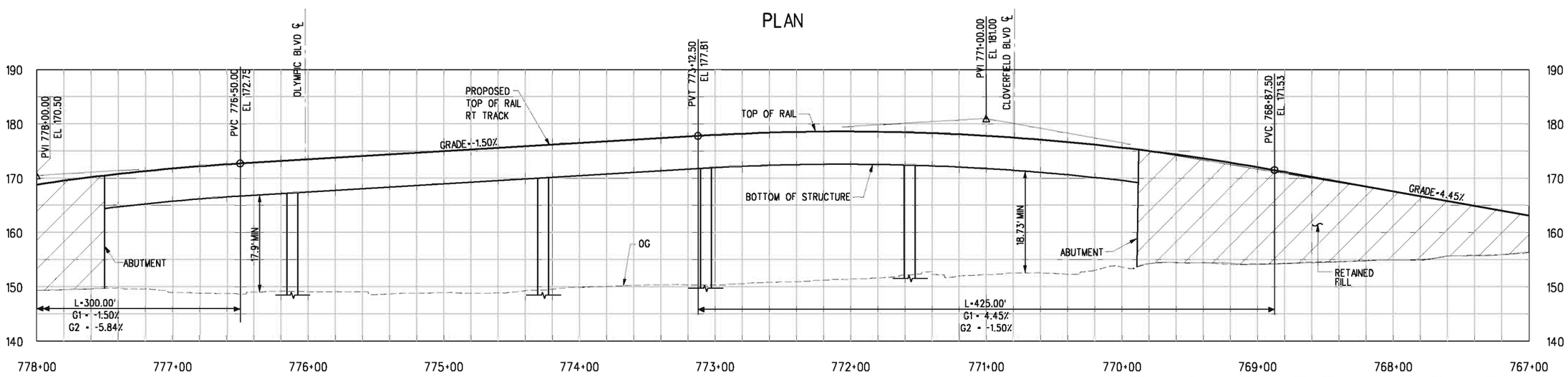


PLAN



CONCEPTUAL ENGINEERING

RT TRACK PROFILE

PRELIMINARY

THE PREPARATION OF THIS DRAWING HAS BEEN FINANCED BY THE TAXES OF THE CITIZENS OF LOS ANGELES COUNTY AND OF THE STATE OF CALIFORNIA.

REV	DATE	BY	APP	REG NO	EXPIRES	SEAL HOLDER	DESCRIPTION
	-	-	-	-	-		-

DESIGNED BY J. SUSILO
DRAWN BY M. AL-MASHAT
CHECKED BY L. MOHR
IN CHARGE J. PRIZNER
DATE 5/05/10

Exposition Metro Line Construction Authority
Expo

DMJM HARRIS | AECOM
300 S. GRAND AVENUE, SECOND FLOOR
LOS ANGELES, CALIFORNIA 90071
TEL (213) 330-7300 FAX (213) 330-7301

SUBMITTED
APPROVED

EXPOSITION TRANSIT PROJECT-PHASE 2
CLOVERFIELD BLVD
GRADE SEPARATION
CONCEPT PLAN
PROPOSED CPUC NO.84S - 112.5

CONTRACT NO EXXXX
DRAWING NO GC-016
REV 0
SCALE HORIZ: 1"=40' VERT: 1"=10'
SHEET NO

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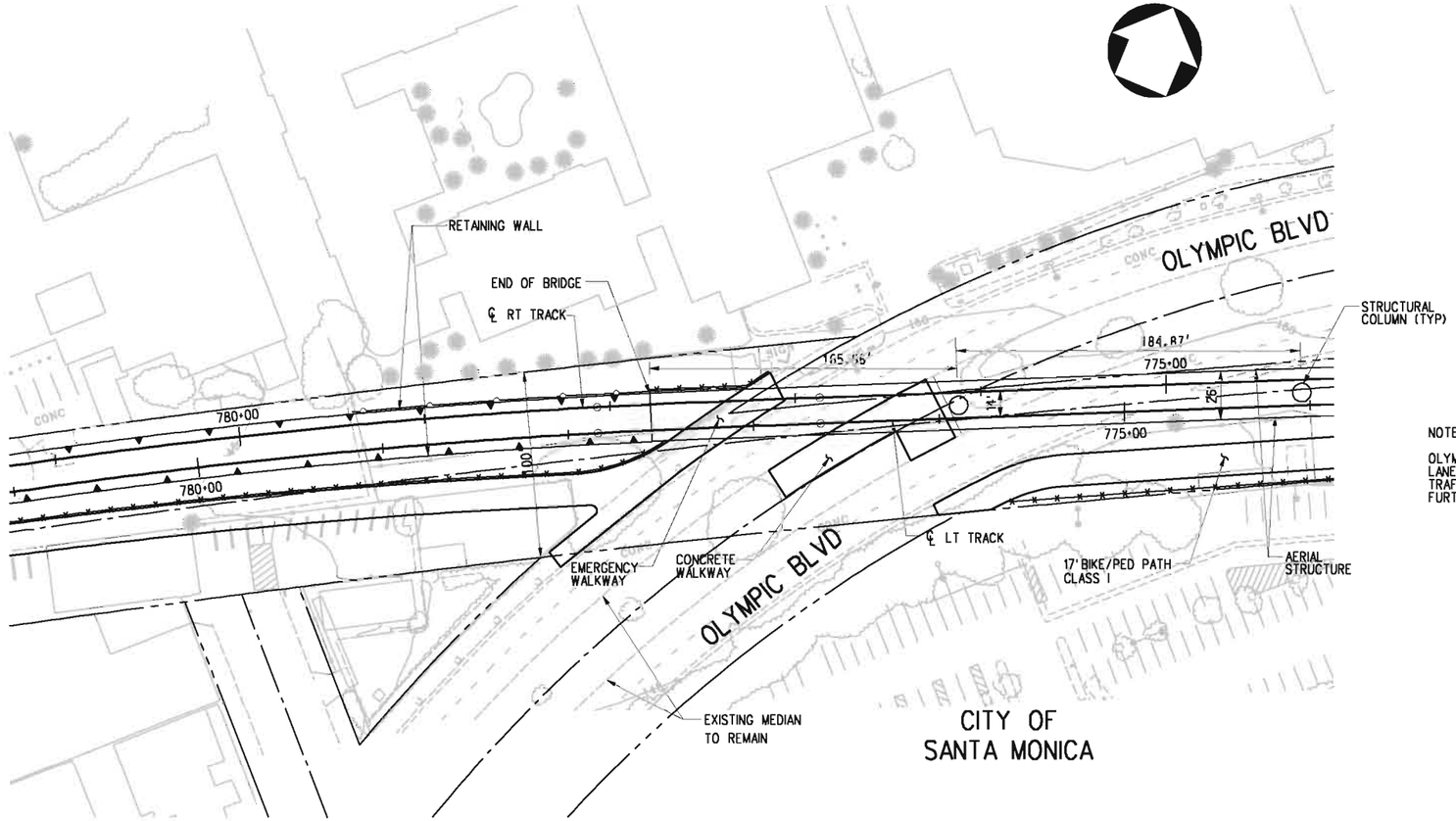
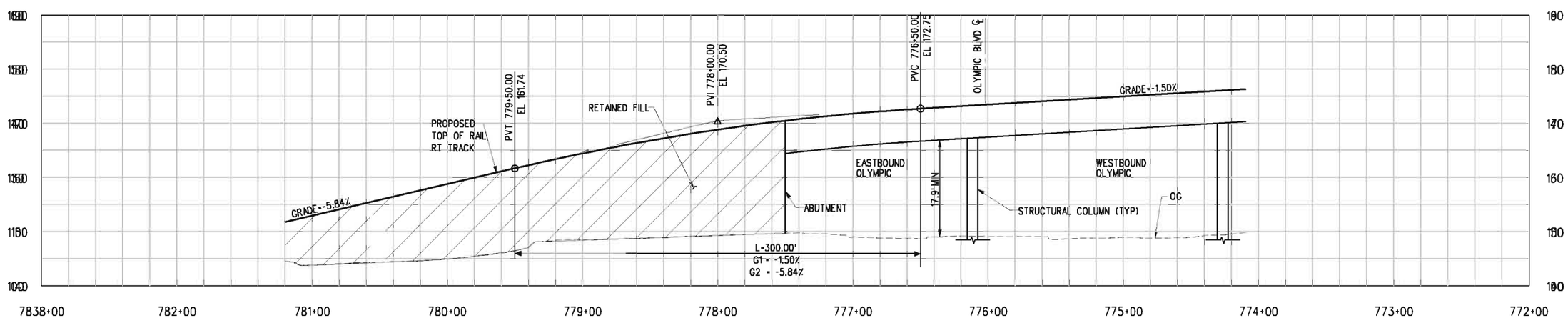


PLAN

NOTES:

OLYMPIC BLVD TO BE RECONSTRUCTED PER CONCEPT PLAN.
LANE CONFIGURATION TO BE REMAINED AS EXISTING.
TRAFFIC SIGNALS AND PEDESTRIAN TREATMENTS TO BE FURTHER DESIGNED DURING PRELIMINARY ENGINEERING.



CONCEPTUAL ENGINEERING

RT TRACK PROFILE

HORIZ: 1"=40' VERT: 1"=10'

PRELIMINARY

THE PREPARATION OF THIS DRAWING HAS BEEN FINANCED BY THE TAXES OF THE CITIZENS OF LOS ANGELES COUNTY AND OF THE STATE OF CALIFORNIA.

REV	DATE	BY	APP	REG NO	EXPIRES	SEAL HOLDER	DESCRIPTION
	-	-	-	-	-		-

DESIGNED BY J. SUSILO
DRAWN BY M. AL-MASHAT
CHECKED BY L. MOHR
IN CHARGE J. PRIZNER
DATE 5/05/10

Exposition Metro Line Construction Authority
Expo

DMJM HARRIS | AECOM
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LOS ANGELES, CALIFORNIA 90071
TEL (213) 330-7300 FAX (213) 330-7301

SUBMITTED
APPROVED

EXPOSITION TRANSIT PROJECT-PHASE 2
OLYMPIC BLVD
GRADE SEPARATION
CONCEPT PLAN
PROPOSED CPUC NO. 84S - 112.6

CONTRACT NO EXXXX
DRAWING NO GC-016A
REV 0
SCALE HORIZ: 1"=40' VERT: 1"=10'
SHEET NO

Plot Driver=Expo_H_pdf.plt Pentable=Expo_H.TBL USER=almashatm 1:25:09 PM 5/5/2010 W:\60022129 Expo 2_LA\cadd\Rail\Sheet\PCHARS\gc016A.plg

LEGEND:

1	RAILROAD GATE WITH FLASHERS - NO. 9	A GC-25
2	PEDESTRIAN CROSSING ARM - NO. 9	B GC-25
3	MEDIAN MOUNTED R/R GATE WITH FLASHERS - NO. 9	C GC-25
4	R/R GATE WITH FLASHERS - NO. 9 AND PEDESTRIAN CROSSING ARM	D GC-26
5	PEDESTRIAN TACTILE WARNING	E GC-26
6	PEDESTRIAN BARRIER	F GC-26

NOTES:

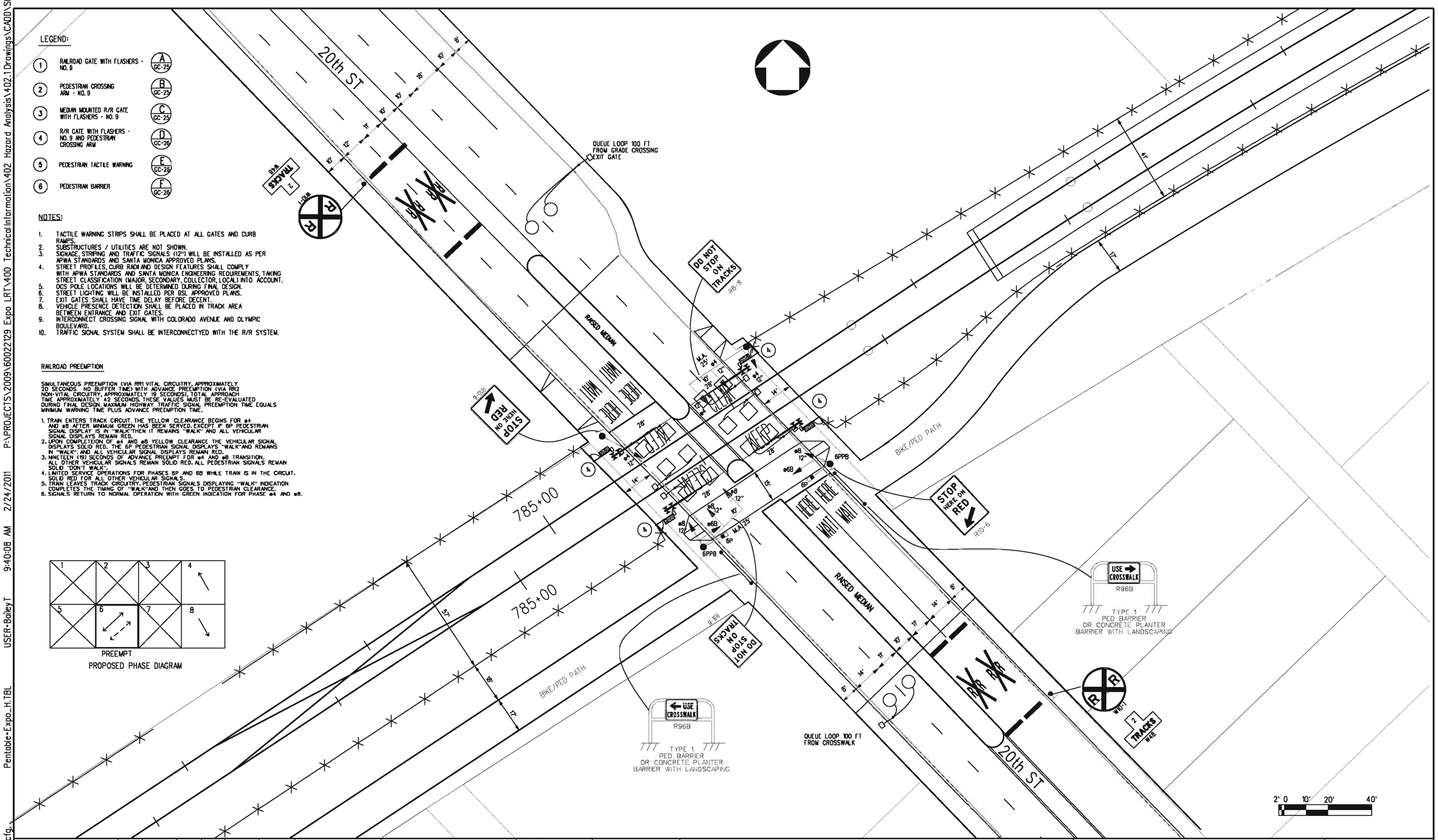
1. TACTILE WARNING STRIPS SHALL BE PLACED AT ALL GATES AND CURB RAMPS.
2. SUBSTRUCTURES / UTILITIES ARE NOT SHOWN.
3. SIGNAGE, STRIPING AND TRAFFIC SIGNALS (12") WILL BE INSTALLED AS PER APWA STANDARDS AND SANTA MONICA APPROVED PLANS.
4. STREET PROFILES, CURB RADI AND DESIGN FEATURES SHALL COMPLY WITH APWA STANDARDS AND SANTA MONICA ENGINEERING REQUIREMENTS, TAKING STREET CLASSIFICATION (MAJOR, SECONDARY, COLLECTOR, LOCAL) INTO ACCOUNT.
5. OCS POLE LOCATIONS WILL BE DETERMINED DURING FINAL DESIGN.
6. STREET LIGHTING WILL BE INSTALLED PER BSL APPROVED PLANS.
7. EXIT GATES SHALL HAVE TIME DELAY BEFORE DECENT.
8. VEHICLE PRESENCE DETECTION SHALL BE PLACED IN TRACK AREA BETWEEN ENTRANCE AND EXIT GATES.
9. INTERCONNECT CROSSING SIGNAL WITH COLORADO AVENUE AND OLYMPIC BOULEVARD.
10. TRAFFIC SIGNAL SYSTEM SHALL BE INTERCONNECTYED WITH THE R/R SYSTEM.

RAILROAD PREEMPTION

SIMULTANEOUS PREEMPTION (VIA RR1 VITAL CIRCUITRY, APPROXIMATELY 20 SECONDS NO BUFFER TIME) WITH ADVANCE PREEMPTION (VIA RR2 NON-VITAL CIRCUITRY, APPROXIMATELY 19 SECONDS), TOTAL APPROACH TIME APPROXIMATELY 42 SECONDS. THESE VALUES MUST BE RE-EVALUATED DURING FINAL DESIGN. MAXIMUM HIGHWAY TRAFFIC SIGNAL PREEMPTION TIME EQUALS MINIMUM WARNING TIME PLUS ADVANCE PREEMPTION TIME.

1. TRAIN ENTERS TRACK CIRCUIT. THE YELLOW CLEARANCE BEGINS FOR ø4 AND ø8 AFTER MINIMUM GREEN HAS BEEN SERVED. EXCEPT IF 6P PEDESTRIAN SIGNAL DISPLAY IS IN "WALK" THEN IT REMAINS "WALK" AND ALL VEHICULAR SIGNAL DISPLAYS REMAIN RED.
2. UPON COMPLETEIOIN OF ø4 AND ø8 YELLOW CLEARANCE THE VEHICULAR SIGNAL DISPLAYS SOLID RED. THE 6P PEDESTRIAN SIGNAL DISPLAYS "WALK" AND REMAINS IN "WALK", AND ALL VEHICULAR SIGNAL DISPLAYS REMAIN RED.
3. NINETEEN (19) SECONDS OF ADVANCE PREEMPT FOR ø4 AND ø8 TRANSITION. ALL OTHER VEHICULAR SIGNALS REMAIN SOLID RED. ALL PEDESTRIAN SIGNALS REMAIN SOLID "DON'T WALK".
4. LIMITED SERVICE OPERATIONS FOR PHASES 6P AND 6B WHILE TRAIN IS IN THE CIRCUIT. SOLID RED FOR ALL OTHER VEHICULAR SIGNALS.
5. TRAIN LEAVES TRACK CIRCUITRY. PEDESTRIAN SIGNALS DISPLAYING "WALK" INDICATION COMPLETES THE TIMING OF "WALK" AND THEN GOES TO PEDESTRIAN CLEARANCE.
6. SIGNALS RETURN TO NORMAL OPERATION WITH GREEN INDICATION FOR PHASE ø4 AND ø8.

PREEMPT
PROPOSED PHASE DIAGRAM



THE PREPARATION OF THIS DRAWING HAS BEEN FINANCED BY THE TAXES OF THE CITIZENS OF LOS ANGELES COUNTY AND OF THE STATE OF CALIFORNIA.

REV	DATE	BY	APP	REG NO	EXPIRES	SEAL HOLDER	DESCRIPTION

DESIGNED BY J. VAN HOFF
DRAWN BY T. BAILEY
CHECKED BY R. SORENSON
IN CHARGE
DATE 02/24/11

Exposition Metro Line Construction Authority
Expo

DMJM HARRIS | AECOM
707 WILSHIRE BLVD, SUITE 3300
LOS ANGELES, CALIFORNIA 90017
TEL (213) 243-3500 FAX (213) 243-3552

SUBMITTED
APPROVED

EXPOSITION TRANSIT PROJECT-PHASE 2
20TH STREET &
EXPOSITION BIKE PATH
AT-GRADE CROSSING CONCEPT PLAN
PROPOSED CPUC NO. 84S-112.8

CONTRACT NO
DRAWING NO GC-017
REV
SCALE AS SHOWN
SHEET NO

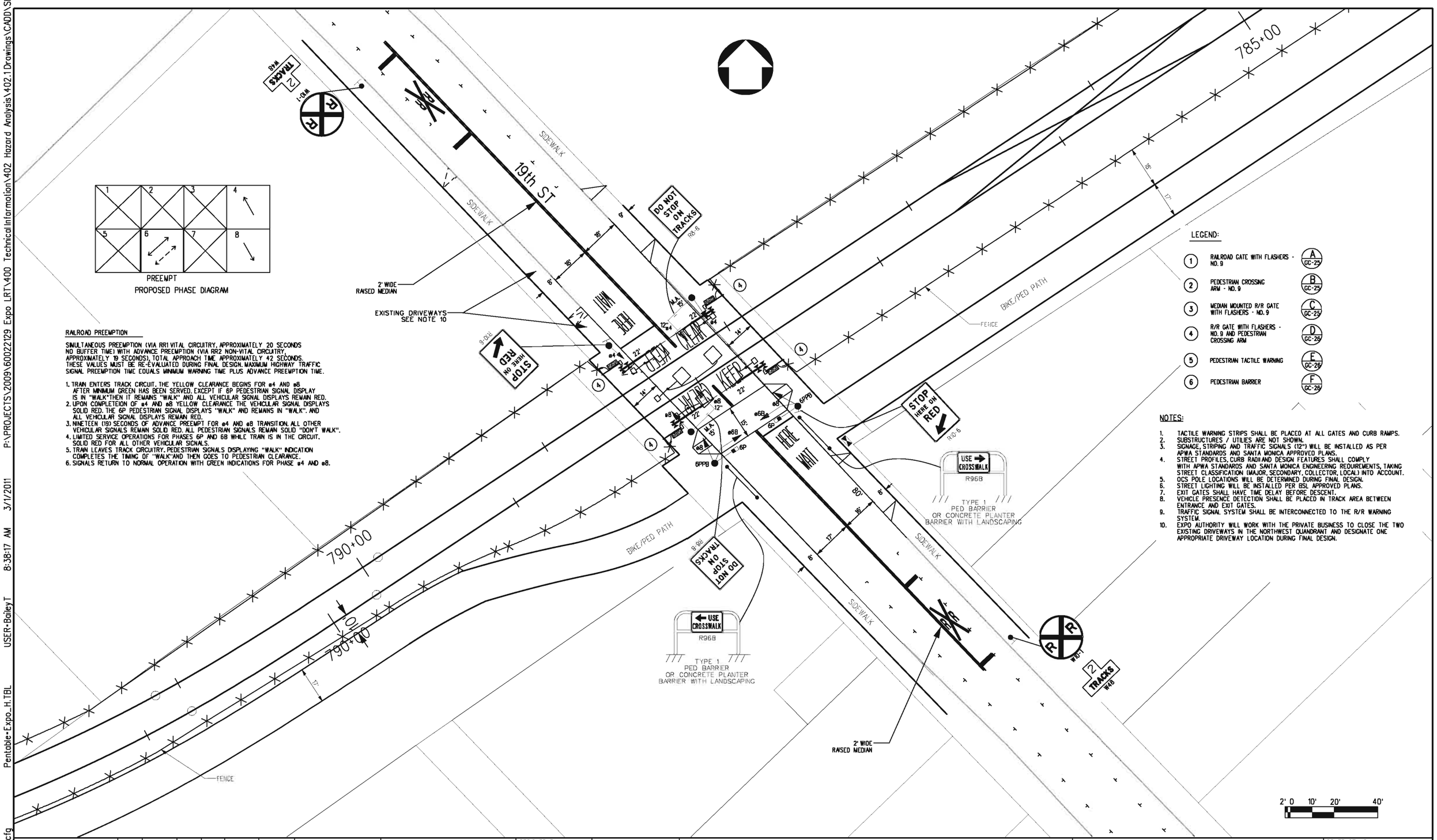
Plot Driver=printer.pltcfg, Pentable=Expo_H.TBL USER=BaileyT 9:40:08 AM 2/24/2011 P:\PROJECTS\2009\60022129 Expo LRT\400 Technical Information\402 Hazard Analysis\402.1 Drawings\CADD\Shee

PREEMPT
PROPOSED PHASE DIAGRAM

RAILROAD PREEMPTION

SIMULTANEOUS PREEMPTION (VIA RR1 VITAL CIRCUITRY, APPROXIMATELY 20 SECONDS NO BUFFER TIME) WITH ADVANCE PREEMPTION (VIA RR2 NON-VITAL CIRCUITRY, APPROXIMATELY 19 SECONDS), TOTAL APPROACH TIME APPROXIMATELY 42 SECONDS. THESE VALUES MUST BE RE-EVALUATED DURING FINAL DESIGN. MAXIMUM HIGHWAY TRAFFIC SIGNAL PREEMPTION TIME EQUALS MINIMUM WARNING TIME PLUS ADVANCE PREEMPTION TIME.

1. TRAIN ENTERS TRACK CIRCUIT. THE YELLOW CLEARANCE BEGINS FOR ø4 AND ø8 AFTER MINIMUM GREEN HAS BEEN SERVED. EXCEPT IF 6P PEDESTRIAN SIGNAL DISPLAY IS IN "WALK" THEN IT REMAINS "WALK" AND ALL VEHICULAR SIGNAL DISPLAYS REMAIN RED.
2. UPON COMPLETEION OF ø4 AND ø8 YELLOW CLEARANCE THE VEHICULAR SIGNAL DISPLAYS SOLID RED. THE 6P PEDESTRIAN SIGNAL DISPLAYS "WALK" AND REMAINS IN "WALK". AND ALL VEHICULAR SIGNAL DISPLAYS REMAIN RED.
3. NINETEEN (19) SECONDS OF ADVANCE PREEMPT FOR ø4 AND ø8 TRANSITION, ALL OTHER VEHICULAR SIGNALS REMAIN SOLID RED. ALL PEDESTRIAN SIGNALS REMAIN SOLID "DON'T WALK".
4. LIMITED SERVICE OPERATIONS FOR PHASES 6P AND 6B WHILE TRAIN IS IN THE CIRCUIT. SOLID RED FOR ALL OTHER VEHICULAR SIGNALS.
5. TRAIN LEAVES TRACK CIRCUITRY. PEDESTRIAN SIGNALS DISPLAYING "WALK" INDICATION COMPLETES THE TIMING OF "WALK" AND THEN GOES TO PEDESTRIAN CLEARANCE.
6. SIGNALS RETURN TO NORMAL OPERATION WITH GREEN INDICATIONS FOR PHASE ø4 AND ø8.



LEGEND:

1	RAILROAD GATE WITH FLASHERS - NO. 9	A GC-25
2	PEDESTRIAN CROSSING ARM - NO. 9	B GC-25
3	MEDIAN MOUNTED R/R GATE WITH FLASHERS - NO. 9	C GC-25
4	R/R GATE WITH FLASHERS - NO. 9 AND PEDESTRIAN CROSSING ARM	D GC-25
5	PEDESTRIAN TACTILE WARNING	E GC-25
6	PEDESTRIAN BARRIER	F GC-25

NOTES:

1. TACTILE WARNING STRIPS SHALL BE PLACED AT ALL GATES AND CURB RAMPS.
2. SUBSTRUCTURES / UTILIES ARE NOT SHOWN.
3. SIGNAGE, STRIPING AND TRAFFIC SIGNALS (12") WILL BE INSTALLED AS PER APWA STANDARDS AND SANTA MONICA APPROVED PLANS.
4. STREET PROFILES, CURB RADII AND DESIGN FEATURES SHALL COMPLY WITH APWA STANDARDS AND SANTA MONICA ENGINEERING REQUIREMENTS, TAKING STREET CLASSIFICATION (MAJOR, SECONDARY, COLLECTOR, LOCAL) INTO ACCOUNT.
5. OCS POLE LOCATIONS WILL BE DETERMINED DURING FINAL DESIGN.
6. STREET LIGHTING WILL BE INSTALLED PER BSL APPROVED PLANS.
7. EXIT GATES SHALL HAVE TIME DELAY BEFORE DESCENT.
8. VEHICLE PRESENCE DETECTION SHALL BE PLACED IN TRACK AREA BETWEEN ENTRANCE AND EXIT GATES.
9. TRAFFIC SIGNAL SYSTEM SHALL BE INTERCONNECTED TO THE R/R WARNING SYSTEM.
10. EXPO AUTHORITY WILL WORK WITH THE PRIVATE BUSINESS TO CLOSE THE TWO EXISTING DRIVEWAYS IN THE NORTHWEST QUADRANT AND DESIGNATE ONE APPROPRIATE DRIVEWAY LOCATION DURING FINAL DESIGN.

THE PREPARATION OF THIS DRAWING HAS BEEN FINANCED BY THE TAXES OF THE CITIZENS OF LOS ANGELES COUNTY AND OF THE STATE OF CALIFORNIA.

REV	DATE	BY	APP	REG NO	EXPIRES	SEAL HOLDER	DESCRIPTION

DESIGNED BY J. VAN HOFF
DRAWN BY T. BAILEY
CHECKED BY R. SORENSON
IN CHARGE
DATE 02/28/11

Exposition Metro Line Construction Authority
Expo

DMJM HARRIS | AECOM
707 WILSHIRE BLVD, SUITE 3300
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TEL (213) 243-5500 FAX (213) 243-5552

SUBMITTED
APPROVED

EXPOSITION TRANSIT PROJECT-PHASE 2
19TH STREET & EXPOSITION BLVD BIKE PATH AT-GRADE CROSSING CONCEPT PLAN PROPOSED CPUC NO. 84S-112.9

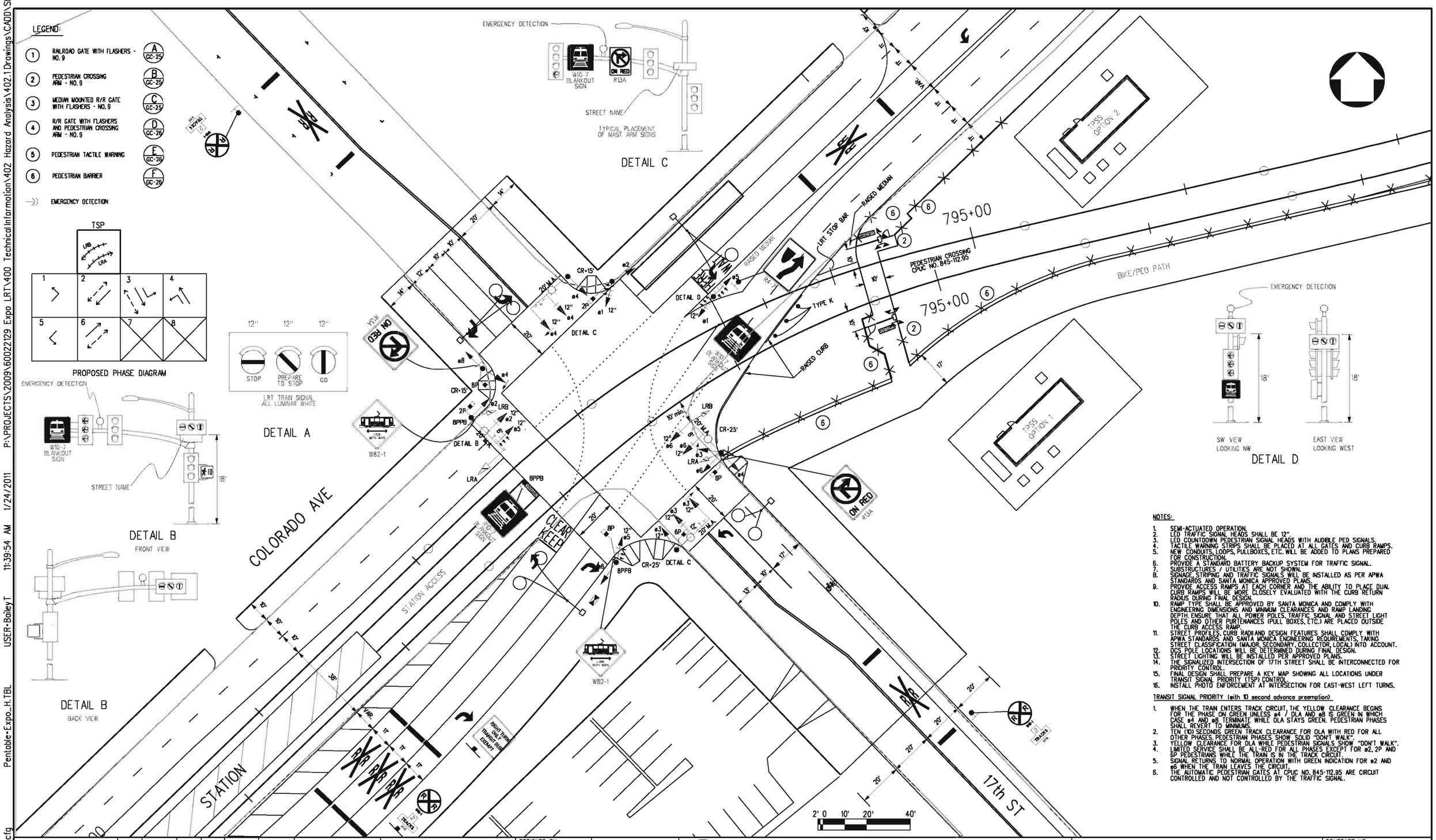
CONTRACT NO
DRAWING NO GC-017A
REV
SCALE AS SHOWN
SHEET NO

Plot Driver=printer.pltcfg Pentable=Expo_H.TBL USER=BaileyT 8:38:17 AM 3/1/2011 P:\PROJECTS\2009\60022129 Expo LRT\400 Technical Information\402 Hazard Analysis\402.1 Drawings\CADD\Shee

LEGEND:

1. RAILROAD GATE WITH FLASHERS - NO. 9 (A / GC-25)
2. PEDESTRIAN CROSSING ARM - NO. 9 (B / GC-25)
3. MEDIAN MOUNTED R/R GATE WITH FLASHERS - NO. 9 (C / GC-25)
4. R/R GATE WITH FLASHERS AND PEDESTRIAN CROSSING ARM - NO. 9 (D / GC-26)
5. PEDESTRIAN TACTILE WARNING (E / GC-26)
6. PEDESTRIAN BARRIER (F / GC-26)

EMERGENCY DETECTION



NOTES:

1. SEMI-ACTUATED OPERATION.
2. LED TRAFFIC SIGNAL HEADS SHALL BE 12".
3. LED COUNTDOWN PEDESTRIAN SIGNAL HEADS WITH AUDIBLE PED SIGNALS.
4. TACTILE WARNING STRIPS SHALL BE PLACED AT ALL GATES AND CURB RAMPS.
5. NEW CONDUITS, LOOPS, PULLBOXES, ETC. WILL BE ADDED TO PLANS PREPARED FOR CONSTRUCTION.
6. PROVIDE A STANDARD BATTERY BACKUP SYSTEM FOR TRAFFIC SIGNAL.
7. SUBSTRUCTURES / UTILITIES ARE NOT SHOWN.
8. SIGNAGE, STRIPING AND TRAFFIC SIGNALS WILL BE INSTALLED AS PER APWA STANDARDS AND SANTA MONICA APPROVED PLANS.
9. PROVIDE ACCESS RAMPS AT EACH CORNER AND THE ABILITY TO PLACE DUAL CURB RAMPS WILL BE MORE CLOSELY EVALUATED WITH THE CURB RETURN RADIUS DURING FINAL DESIGN.
10. RAMP TYPE SHALL BE APPROVED BY SANTA MONICA AND COMPLY WITH ENGINEERING DIMENSIONS AND MINIMUM CLEARANCES AND RAMP LANDING DEPTH. ENSURE THAT ALL POWER POLES, TRAFFIC SIGNAL AND STREET LIGHT POLES AND OTHER PURTENANCES (PULL BOXES, ETC.) ARE PLACED OUTSIDE THE CURB ACCESS RAMP.
11. STREET PROFILES, CURB RADII AND DESIGN FEATURES SHALL COMPLY WITH APWA STANDARDS AND SANTA MONICA ENGINEERING REQUIREMENTS, TAKING STREET CLASSIFICATION (MAJOR, SECONDARY, COLLECTOR, LOCAL) INTO ACCOUNT.
12. OCS POLE LOCATIONS WILL BE DETERMINED DURING FINAL DESIGN.
13. STREET LIGHTING WILL BE INSTALLED PER APPROVED PLANS.
14. THE SIGNALIZED INTERSECTION OF 17TH STREET SHALL BE INTERCONNECTED FOR PRIORITY CONTROL.
15. FINAL DESIGN SHALL PREPARE A KEY MAP SHOWING ALL LOCATIONS UNDER TRANSIT SIGNAL PRIORITY (TSP) CONTROL.
16. INSTALL PHOTO ENFORCEMENT AT INTERSECTION FOR EAST-WEST LEFT TURNS.

TRANSIT SIGNAL PRIORITY (with 10 second advance preemption)

1. WHEN THE TRAIN ENTERS TRACK CIRCUIT, THE YELLOW CLEARANCE BEGINS FOR THE PHASE ON GREEN UNLESS ø4 / OLA AND ø8 IS GREEN IN WHICH CASE ø4 AND ø8 TERMINATE WHILE OLA STAYS GREEN. PEDESTRIAN PHASES SHALL REVERT TO MINIMUMS.
2. TEN (10) SECONDS GREEN TRACK CLEARANCE FOR OLA WITH RED FOR ALL OTHER PHASES. PEDESTRIAN PHASES SHOW SOLID "DON'T WALK".
3. YELLOW CLEARANCE FOR OLA WHILE PEDESTRIAN SIGNALS SHOW "DON'T WALK".
4. LIMITED SERVICE SHALL BE ALL-RED FOR ALL PHASES EXCEPT FOR ø2, 2P AND 6P PEDESTRIANS WHILE THE TRAIN IS IN THE TRACK CIRCUIT.
5. SIGNAL RETURNS TO NORMAL OPERATION WITH GREEN INDICATION FOR ø2 AND ø6 WHEN THE TRAIN LEAVES THE CIRCUIT.
6. THE AUTOMATIC PEDESTRIAN GATES AT CPUC NO. 845-112.95 ARE CIRCUIT CONTROLLED AND NOT CONTROLLED BY THE TRAFFIC SIGNAL.

THE PREPARATION OF THIS DRAWING HAS BEEN FINANCED BY THE TAXES OF THE CITIZENS OF LOS ANGELES COUNTY AND OF THE STATE OF CALIFORNIA.

REV	DATE	BY	APP	REG NO	EXPIRES	SEAL HOLDER	DESCRIPTION

DESIGNED BY J. VAN HOFF
DRAWN BY T. BAILEY
CHECKED BY R. SORENSON
IN CHARGE
DATE 01/21/11

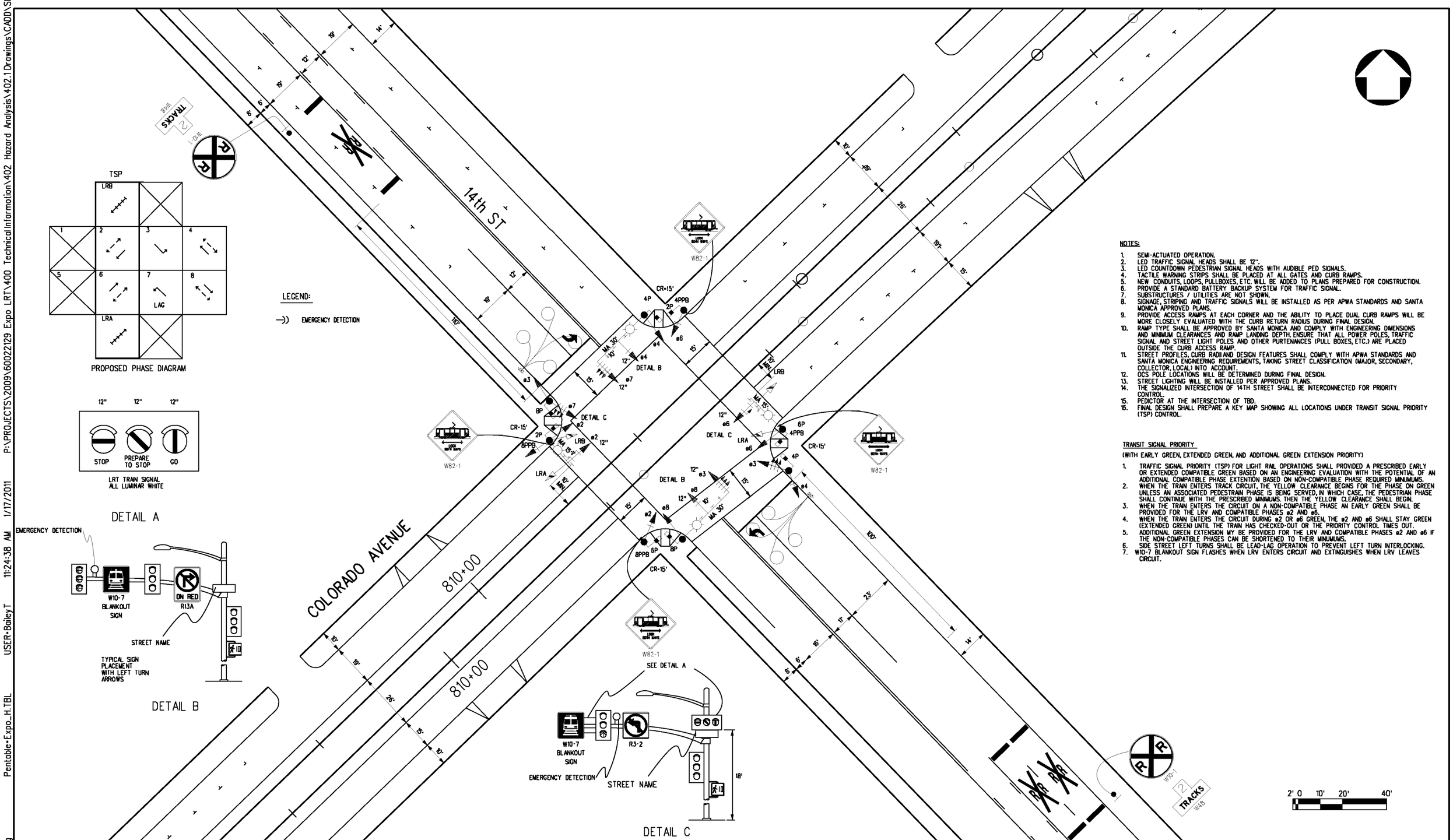
Exposition Metro Line Construction Authority
Expo
DMJM HARRIS | AECOM
707 WILSHIRE BLVD, SUITE 3300
LOS ANGELES, CALIFORNIA 90017
TEL (213) 243-5500 FAX (213) 243-5552

SUBMITTED
APPROVED

EXPOSITION TRANSIT PROJECT-PHASE 2
17TH STREET & COLORADO AVENUE
STREET RUNNING CONCEPT PLAN
PROPOSED CPUC NO. 84S - 113.0

CONTRACT NO
DRAWING NO GC-018
REV
SCALE AS SHOWN
SHEET NO

Plot Driver•printer.pltcfg Pentable•Expo_H.TBL USER•BaileyT 11:39:54 AM 1/24/2011 P:\PROJECTS\2009\60022129 Expo LRT\400 Technical Information\402 Hazard Analysis\402.1 Drawings\CADD\Shee



NOTES:

1. SEMI-ACTUATED OPERATION.
2. LED TRAFFIC SIGNAL HEADS SHALL BE 12".
3. LED COUNTDOWN PEDESTRIAN SIGNAL HEADS WITH AUDIBLE PED SIGNALS.
4. TACTILE WARNING STRIPS SHALL BE PLACED AT ALL GATES AND CURB RAMPS.
5. NEW CONDUITS, LOOPS, PULLBOXES, ETC. WILL BE ADDED TO PLANS PREPARED FOR CONSTRUCTION.
6. PROVIDE A STANDARD BATTERY BACKUP SYSTEM FOR TRAFFIC SIGNAL.
7. SUBSTRUCTURES / UTILITIES ARE NOT SHOWN.
8. SIGNAGE, STRIPING AND TRAFFIC SIGNALS WILL BE INSTALLED AS PER APWA STANDARDS AND SANTA MONICA APPROVED PLANS.
9. PROVIDE ACCESS RAMPS AT EACH CORNER AND THE ABILITY TO PLACE DUAL CURB RAMPS WILL BE MORE CLOSELY EVALUATED WITH THE CURB RETURN RADIUS DURING FINAL DESIGN.
10. RAMP TYPE SHALL BE APPROVED BY SANTA MONICA AND COMPLY WITH ENGINEERING DIMENSIONS AND MINIMUM CLEARANCES AND RAMP LANDING DEPTH. ENSURE THAT ALL POWER POLES, TRAFFIC SIGNAL AND STREET LIGHT POLES AND OTHER PURTENANCES (PULL BOXES, ETC.) ARE PLACED OUTSIDE THE CURB ACCESS RAMP.
11. STREET PROFILES, CURB RADII AND DESIGN FEATURES SHALL COMPLY WITH APWA STANDARDS AND SANTA MONICA ENGINEERING REQUIREMENTS, TAKING STREET CLASSIFICATION (MAJOR, SECONDARY, COLLECTOR, LOCAL) INTO ACCOUNT.
12. OCS POLE LOCATIONS WILL BE DETERMINED DURING FINAL DESIGN.
13. STREET LIGHTING WILL BE INSTALLED PER APPROVED PLANS.
14. THE SIGNALIZED INTERSECTION OF 14TH STREET SHALL BE INTERCONNECTED FOR PRIORITY CONTROL.
15. PEDICTOR AT THE INTERSECTION OF TBD.
16. FINAL DESIGN SHALL PREPARE A KEY MAP SHOWING ALL LOCATIONS UNDER TRANSIT SIGNAL PRIORITY (TSP) CONTROL.

TRANSIT SIGNAL PRIORITY

(WITH EARLY GREEN, EXTENDED GREEN, AND ADDITIONAL GREEN EXTENSION PRIORITY)

1. TRAFFIC SIGNAL PRIORITY (TSP) FOR LIGHT RAIL OPERATIONS SHALL PROVIDED A PRESCRIBED EARLY OR EXTENDED COMPATIBLE GREEN BASED ON AN ENGINEERING EVALUATION WITH THE POTENTIAL OF AN ADDITIONAL COMPATIBLE PHASE EXTENTION BASED ON NON-COMPATIBLE PHASE REQUIRED MINUMUMS.
2. WHEN THE TRAIN ENTERS TRACK CIRCUIT, THE YELLOW CLEARANCE BEGINS FOR THE PHASE ON GREEN UNLESS AN ASSOCIATED PEDESTRAIN PHASE IS BEING SERVED, IN WHICH CASE, THE PEDESTRIAN PHASE SHALL CONTINUE WITH THE PRESCRIBED MINIMUMS. THEN THE YELLOW CLEARANCE SHALL BEGIN.
3. WHEN THE TRAIN ENTERS THE CIRCUIT ON A NON-COMPATIBLE PHASE AN EARLY GREEN SHALL BE PROVIDED FOR THE LRV AND COMPATIBLE PHASES ø2 AND ø6.
4. WHEN THE TRAIN ENTERS THE CIRCUIT DURING ø2 OR ø6 GREEN, THE ø2 AND ø6 SHALL STAY GREEN (EXTENDED GREEN) UNTIL THE TRAIN HAS CHECKED-OUT OR THE PRIORITY CONTROL TIMES OUT.
5. ADDITIONAL GREEN EXTENSION MY BE PROVIDED FOR THE LRV AND COMPATIBLE PHASES ø2 AND ø6 IF THE NON-COMPATIBLE PHASES CAN BE SHORTENED TO THEIR MINUMUMS.
6. SIDE STREET LEFT TURNS SHALL BE LEAD-LAG OPERATION TO PREVENT LEFT TURN INTERLOCKING.
7. W10-7 BLANKOUT SIGN FLASHES WHEN LRV ENTERS CIRCUIT AND EXTINGUISHES WHEN LRV LEAVES CIRCUIT.

THE PREPARATION OF THIS DRAWING HAS BEEN FINANCED BY THE TAXES OF THE CITIZENS OF LOS ANGELES COUNTY AND OF THE STATE OF CALIFORNIA.

REV	DATE	BY	APP	REG NO	EXPIRES	SEAL HOLDER	DESCRIPTION

DESIGNED BY J. VAN HOFF
DRAWN BY T. BAILEY
CHECKED BY R. SORENSON
IN CHARGE
DATE 01/13/11

Exposition Metro Line Construction Authority
Expo

DMJM HARRIS | AECOM
707 WILSHIRE BLVD, SUITE 3300
LOS ANGELES, CALIFORNIA 90017
TEL (213) 243-5500 FAX (213) 243-5552

SUBMITTED
APPROVED

EXPOSITION TRANSIT PROJECT-PHASE 2
14TH STREET & COLORADO AVENUE
STREET RUNNING CONCEPT PLAN
PROPOSED CPUC NO. 84S - 113.2

CONTRACT NO
DRAWING NO GC-019
REV
SCALE AS SHOWN
SHEET NO

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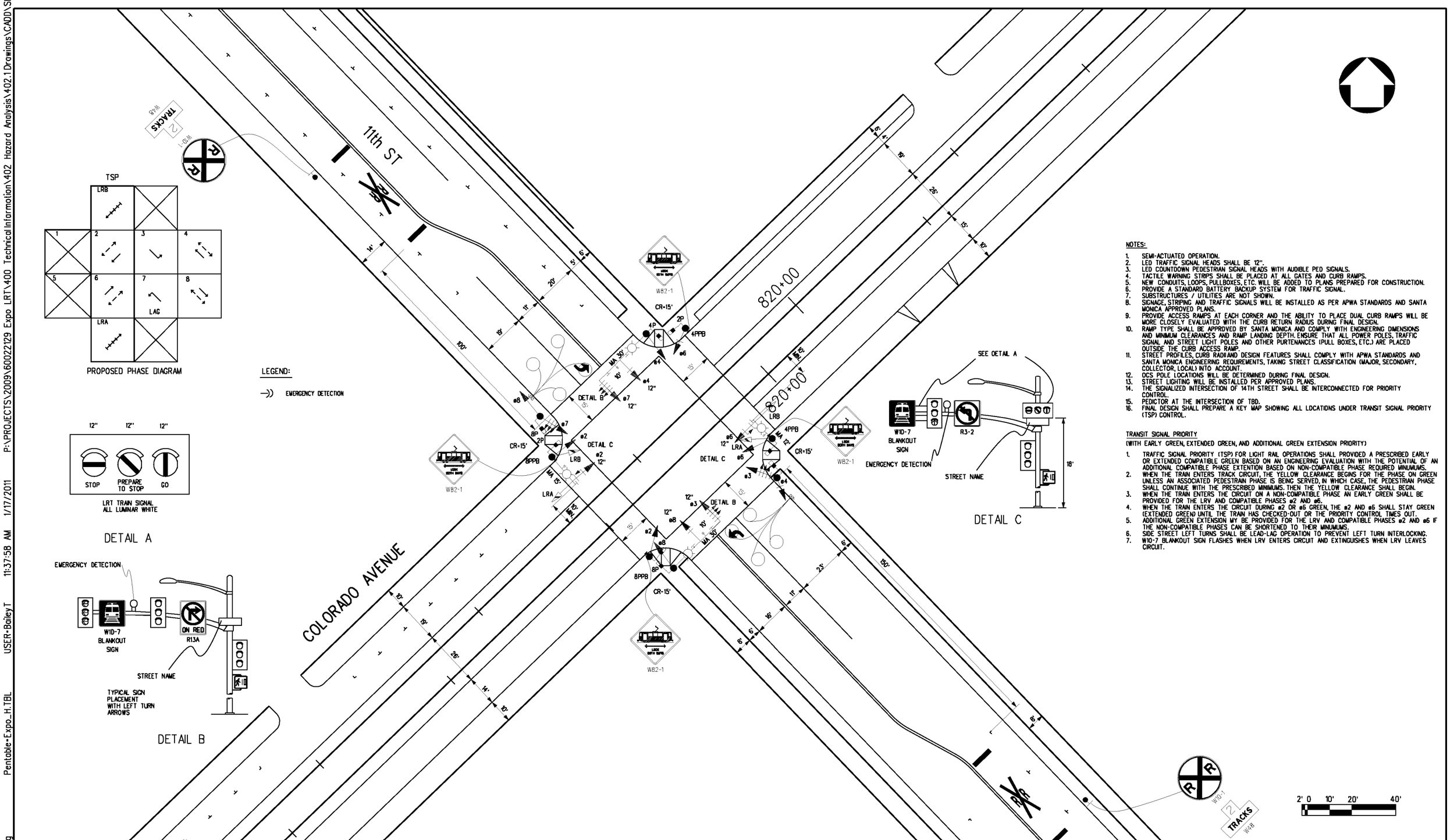

NOTES:

1. SEMI-ACTUATED OPERATION.
2. LED TRAFFIC SIGNAL HEADS SHALL BE 12".
3. LED COUNTDOWN PEDESTRIAN SIGNAL HEADS WITH AUDIBLE PED SIGNALS.
4. TACTILE WARNING STRIPS SHALL BE PLACED AT ALL GATES AND CURB RAMPS.
5. NEW CONDUITS, LOOPS, PULLBOXES, ETC. WILL BE ADDED TO PLANS PREPARED FOR CONSTRUCTION.
6. PROVIDE A STANDARD BATTERY BACKUP SYSTEM FOR TRAFFIC SIGNAL.
7. SUBSTRUCTURES / UTILITIES ARE NOT SHOWN.
8. SIGNAGE, STRIPING AND TRAFFIC SIGNALS WILL BE INSTALLED AS PER APWA STANDARDS AND SANTA MONICA APPROVED PLANS.
9. PROVIDE ACCESS RAMPS AT EACH CORNER AND THE ABILITY TO PLACE DUAL CURB RAMPS WILL BE MORE CLOSELY EVALUATED WITH THE CURB RETURN RADIUS DURING FINAL DESIGN.
10. RAMP TYPE SHALL BE APPROVED BY SANTA MONICA AND COMPLY WITH ENGINEERING DIMENSIONS AND MINIMUM CLEARANCES AND RAMP LANDING DEPTH. ENSURE THAT ALL POWER POLES, TRAFFIC SIGNAL AND STREET LIGHT POLES AND OTHER PURTENANCES (PULL BOXES, ETC.) ARE PLACED OUTSIDE THE CURB ACCESS RAMP.
11. STREET PROFILES, CURB RADII AND DESIGN FEATURES SHALL COMPLY WITH APWA STANDARDS AND SANTA MONICA ENGINEERING REQUIREMENTS, TAKING STREET CLASSIFICATION (MAJOR, SECONDARY, COLLECTOR, LOCAL) INTO ACCOUNT.
12. OCS POLE LOCATIONS WILL BE DETERMINED DURING FINAL DESIGN.
13. STREET LIGHTING WILL BE INSTALLED PER APPROVED PLANS.
14. THE SIGNALIZED INTERSECTION OF 14TH STREET SHALL BE INTERCONNECTED FOR PRIORITY CONTROL.
15. PEDICTOR AT THE INTERSECTION OF TBD.
16. FINAL DESIGN SHALL PREPARE A KEY MAP SHOWING ALL LOCATIONS UNDER TRANSIT SIGNAL PRIORITY (TSP) CONTROL.

TRANSIT SIGNAL PRIORITY

(WITH EARLY GREEN, EXTENDED GREEN, AND ADDITIONAL GREEN EXTENSION PRIORITY)

1. TRAFFIC SIGNAL PRIORITY (TSP) FOR LIGHT RAIL OPERATIONS SHALL PROVIDED A PRESCRIBED EARLY OR EXTENDED COMPATIBLE GREEN BASED ON AN ENGINEERING EVALUATION WITH THE POTENTIAL OF AN ADDITIONAL COMPATIBLE PHASE EXTENTION BASED ON NON-COMPATIBLE PHASE REQUIRED MINIMUMS.
2. WHEN THE TRAIN ENTERS TRACK CIRCUIT, THE YELLOW CLEARANCE BEGINS FOR THE PHASE ON GREEN UNLESS AN ASSOCIATED PEDESTRAIN PHASE IS BEING SERVED, IN WHICH CASE, THE PEDESTRIAN PHASE SHALL CONTINUE WITH THE PRESCRIBED MINIMUMS. THEN THE YELLOW CLEARANCE SHALL BEGIN.
3. WHEN THE TRAIN ENTERS THE CIRCUIT ON A NON-COMPATIBLE PHASE AN EARLY GREEN SHALL BE PROVIDED FOR THE LRV AND COMPATIBLE PHASES ø2 AND ø6.
4. WHEN THE TRAIN ENTERS THE CIRCUIT DURING ø2 OR ø6 GREEN, THE ø2 AND ø6 SHALL STAY GREEN (EXTENDED GREEN) UNTIL THE TRAIN HAS CHECKED-OUT OR THE PRIORITY CONTROL TIMES OUT.
5. ADDITIONAL GREEN EXTENSION MY BE PROVIDED FOR THE LRV AND COMPATIBLE PHASES ø2 AND ø6 IF THE NON-COMPATIBLE PHASES CAN BE SHORTENED TO THEIR MINIMUMS.
6. SIDE STREET LEFT TURNS SHALL BE LEAD-LAG OPERATION TO PREVENT LEFT TURN INTERLOCKING.
7. W10-7 BLANKOUT SIGN FLASHES WHEN LRV ENTERS CIRCUIT AND EXTINGUISHES WHEN LRV LEAVES CIRCUIT.

THE PREPARATION OF THIS DRAWING HAS BEEN FINANCED BY THE TAXES OF THE CITIZENS OF LOS ANGELES COUNTY AND OF THE STATE OF CALIFORNIA.

REV	DATE	BY	APP	REG NO	EXPIRES	SEAL HOLDER	DESCRIPTION

DESIGNED BY J. VAN HOFF
DRAWN BY T. BAILEY
CHECKED BY R. SORENSON
IN CHARGE
DATE 01/13/11

Exposition Metro Line Construction Authority
Expo
DMJM HARRIS | AECOM
707 WILSHIRE BLVD, SUITE 3300
LOS ANGELES, CALIFORNIA 90017
TEL (213) 243-5500 FAX (213) 243-5552

SUBMITTED
APPROVED

EXPOSITION TRANSIT PROJECT-PHASE 2
11TH STREET & COLORADO AVENUE
STREET RUNNING CONCEPT PLAN
PROPOSED CPUC NO. 84S - 113.5

CONTRACT NO
DRAWING NO GC-020
REV
SCALE AS SHOWN
SHEET NO

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NOTES:

1. FULLY-ACTUATED OPERATION.
2. LED TRAFFIC SIGNAL HEADS SHALL BE 12".
3. LED COUNTDOWN PEDESTRIAN SIGNAL HEADS WITH AUDIBLE PED SIGNALS.
4. TACTILE WARNING STRIPS SHALL BE PLACED AT ALL GATES AND CURB RAMPS.
5. NEW CONDUITS, LOOPS, PULLBOXES, ETC. WILL BE ADDED TO PLANS PREPARED FOR CONSTRUCTION.
6. PROVIDE A STANDARD BATTERY BACKUP SYSTEM FOR TRAFFIC SIGNAL.
7. SUBSTRUCTURES / UTILITIES ARE NOT SHOWN.
8. SIGNAGE, STRIPING AND TRAFFIC SIGNALS WILL BE INSTALLED AS PER APWA STANDARDS AND SANTA MONICA APPROVED PLANS.
9. PROVIDE ACCESS RAMPS AT EACH CORNER AND THE ABILITY TO PLACE DUAL CURB RAMPS WILL BE MORE CLOSELY EVALUATED WITH THE CURB RETURN RADIUS DURING FINAL DESIGN.
10. RAMP TYPE SHALL BE APPROVED BY SANTA MONICA AND COMPLY WITH ENGINEERING DIMENSIONS AND MINIMUM CLEARANCES AND RAMP LANDING DEPTH. ENSURE THAT ALL POWER POLES, TRAFFIC SIGNAL AND STREET LIGHT POLES AND OTHER PURTENANCES (PULL BOXES, ETC.) ARE PLACED OUTSIDE THE CURB ACCESS RAMP.
11. STREET PROFILES, CURB RADIAND DESIGN FEATURES SHALL COMPLY APWA STANDARDS AND SANTA MONICA ENGINEERING REQUIREMENTS, TAKING STREET CLASSIFICATION (MAJOR, SECONDARY, COLLECTOR, LOCAL) INTO ACCOUNT.
12. OCS POLE LOCATIONS WILL BE DETERMINED DURING FINAL DESIGN.
13. STREET LIGHTING WILL BE INSTALLED PER APPROVED PLANS.
14. THE SIGNALIZED INTERSECTION OF LINCOLN BOULEVARD SHALL BE INTERCONNECTED FOR PRIORITY CONTROL.
15. PREDICTOR AT THE INTERSECTION OF TBD.
16. FINAL DESIGN SHALL PREPARE A KEY MAP SHOWING ALL LOCATIONS UNDER TRANSIT SIGNAL PRIORITY (TSP) CONTROL.

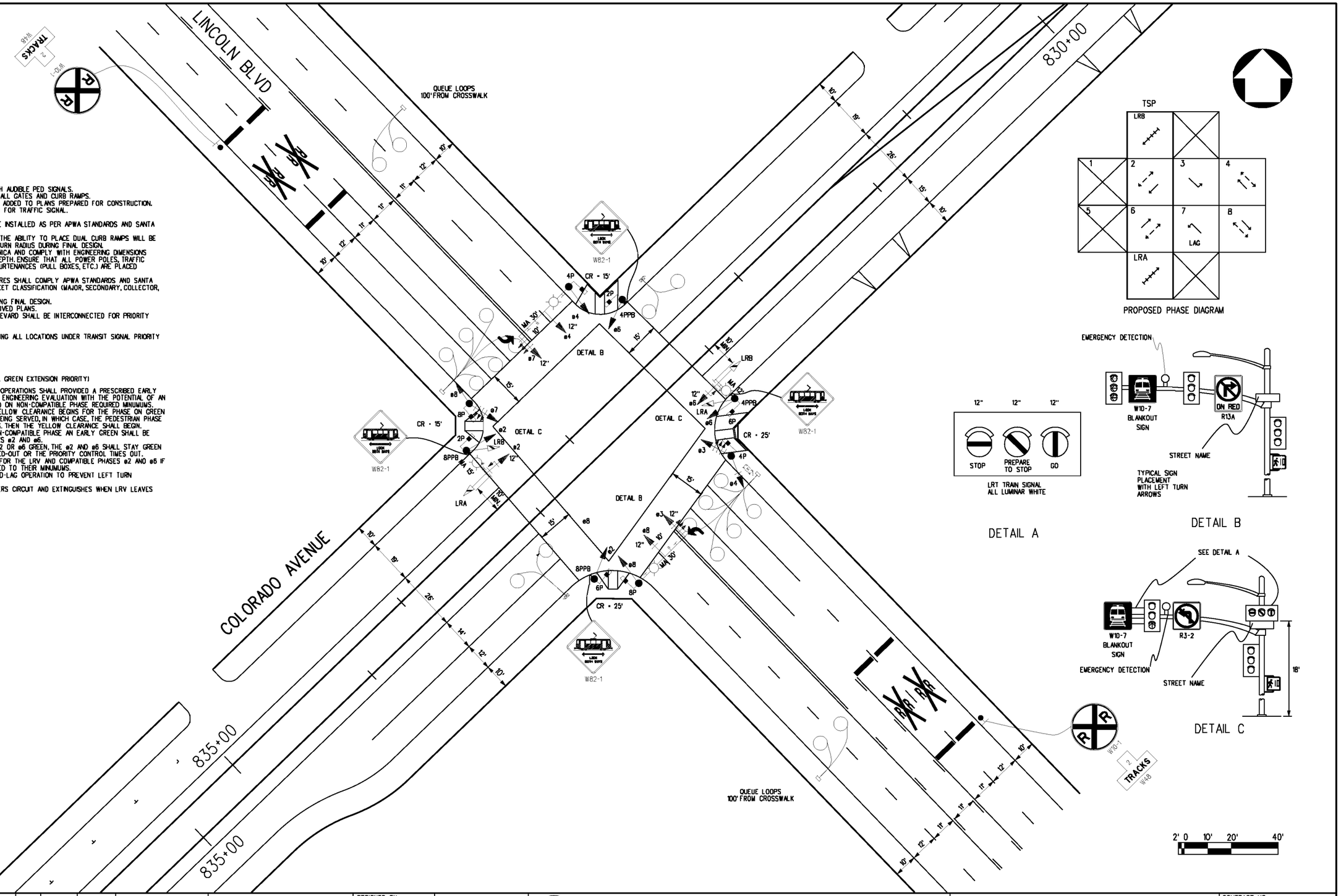
TRANSIT SIGNAL PRIORITY

(WITH EARLY GREEN, EXTENDED GREEN, AND ADDITIONAL GREEN EXTENSION PRIORITY)

1. TRAFFIC SIGNAL PRIORITY (TSP) FOR LIGHT RAIL OPERATIONS SHALL PROVIDED A PRESCRIBED EARLY OR EXTENDED COMPATIBLE GREEN BASED ON AN ENGINEERING EVALUATION WITH THE POTENTIAL OF AN ADDITIONAL COMPATIBLE PHASE EXTENTION BASED ON NON-COMPATIBLE PHASE REQUIRED MINUMUMS.
2. WHEN THE TRAIN ENTERS TRACK CIRCUIT, THE YELLOW CLEARANCE BEGINS FOR THE PHASE ON GREEN UNLESS AN ASSOCIATED PEDESTRAIN PHASE IS BEING SERVED, IN WHICH CASE, THE PEDESTRIAN PHASE SHALL CONTINUE WITH THE PRESCRIBEO MINIMUMS. THEN THE YELLOW CLEARANCE SHALL BEGIN.
3. WHEN THE TRAIN ENTERS THE CIRCUIT ON A NON-COMPATIBLE PHASE AN EARLY GREEN SHALL BE PROVIDEO FOR THE LRV AND COMPATIBLE PHASES ø2 AND ø6.
4. WHEN THE TRAIN ENTERS THE CIRCUIT DURING ø2 OR ø6 GREEN, THE ø2 AND ø6 SHALL STAY GREEN (EXTENDED GREEN) UNTIL THE TRAIN HAS CHECKED-OUT OR THE PRIORITY CONTROL TIMES OUT.
5. ADDITIONAL GREEN EXTENSION MY BE PROVIDED FOR THE LRV AND COMPATIBLE PHASES ø2 AND ø6 IF THE NON-COMPATIBLE PHASES CAN BE SHORTENED TO THEIR MINUMUMS.
6. LINCOLN BOULEVARD LEFT TURNS SHALL BE LEAD-LAG OPERATION TO PREVENT LEFT TURN INTERLOCKING.
7. W10-7 BLANKOUT SIGN FLASHES WHEN LRV ENTERS CIRCUIT AND EXTINGUISHES WHEN LRV LEAVES CIRCUIT.

LEGEND:

EMERGENCY DETECTION



THE PREPARATION OF THIS DRAWING HAS BEEN FINANCED BY THE TAXES OF THE CITIZENS OF LOS ANGELES COUNTY AND OF THE STATE OF CALIFORNIA.

REV	DATE	BY	APP	REG NO	EXPIRES	SEAL HOLDER	DESCRIPTION

DESIGNED BY J. VAN HOFF
DRAWN BY T. BAILEY
CHECKED BY R. SORENSON
IN CHARGE
DATE 01/13/11

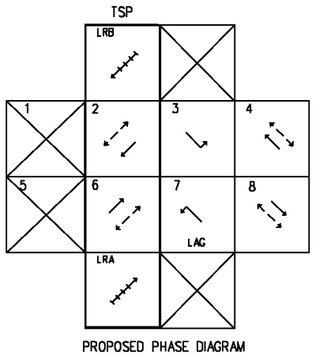
Exposition Metro Line Construction Authority
Expo

DMJM HARRIS | AECOM
707 WILSHIRE BLVD, SUITE 3300
LOS ANGELES, CALIFORNIA 90017
TEL (213) 243-5500 FAX (213) 243-5552

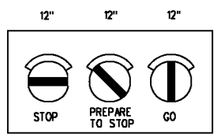
SUBMITTED
APPROVED

EXPOSITION TRANSIT PROJECT-PHASE 2
COLORADO AVENUE & LINCOLN BLVD
STREET RUNNING CONCEPT PLAN
PROPOSED CPUC NO. 84S - 113.7

CONTRACT NO
DRAWING NO GC-021
REV
SCALE AS SHOWN
SHEET NO



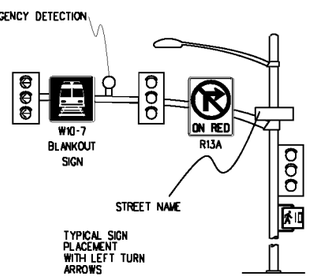
PROPOSED PHASE DIAGRAM



LRT TRAIN SIGNAL
ALL LUMINAR WHITE

DETAIL A

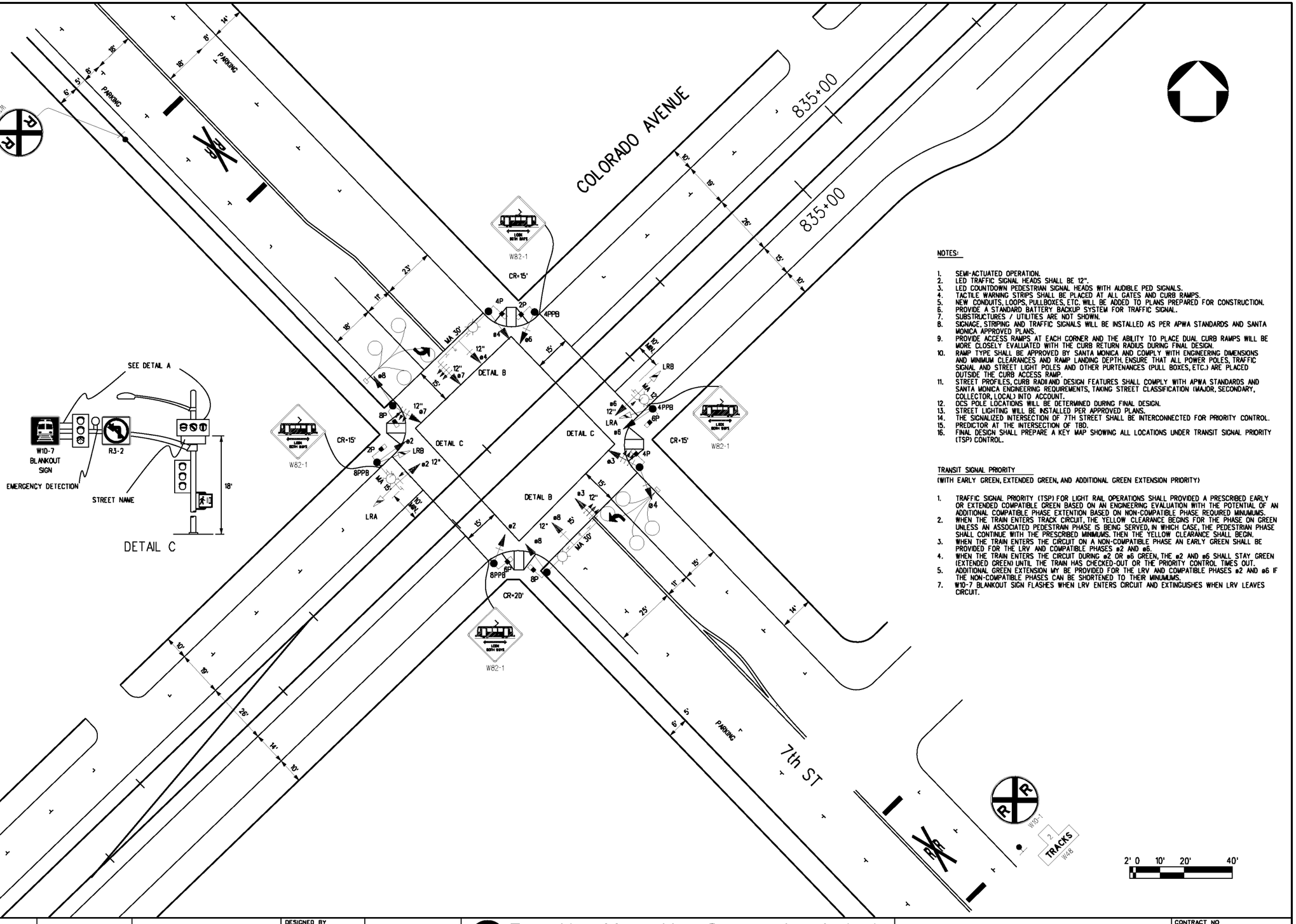
DETAIL C



DETAIL B

LEGEND:

EMERGENCY DETECTION



NOTES:

1. SEMI-ACTUATED OPERATION.
2. LED TRAFFIC SIGNAL HEADS SHALL BE 12".
3. LED COUNTDOWN PEDESTRIAN SIGNAL HEADS WITH AUDIBLE PED SIGNALS.
4. TACTILE WARNING STRIPS SHALL BE PLACED AT ALL GATES AND CURB RAMPS.
5. NEW CONDUITS, LOOPS, PULLBOXES, ETC. WILL BE ADDED TO PLANS PREPARED FOR CONSTRUCTION.
6. PROVIDE A STANDARD BATTERY BACKUP SYSTEM FOR TRAFFIC SIGNAL.
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8. SIGNAGE, STRIPING AND TRAFFIC SIGNALS WILL BE INSTALLED AS PER APWA STANDARDS AND SANTA MONICA APPROVED PLANS.
9. PROVIDE ACCESS RAMPS AT EACH CORNER AND THE ABILITY TO PLACE DUAL CURB RAMPS WILL BE MORE CLOSELY EVALUATED WITH THE CURB RETURN RADIUS DURING FINAL DESIGN.
10. RAMP TYPE SHALL BE APPROVED BY SANTA MONICA AND COMPLY WITH ENGINEERING DIMENSIONS AND MINIMUM CLEARANCES AND RAMP LANDING DEPTH. ENSURE THAT ALL POWER POLES, TRAFFIC SIGNAL AND STREET LIGHT POLES AND OTHER PURTENANCES (PULL BOXES, ETC.) ARE PLACED OUTSIDE THE CURB ACCESS RAMP.
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12. OCS POLE LOCATIONS WILL BE DETERMINED DURING FINAL DESIGN.
13. STREET LIGHTING WILL BE INSTALLED PER APPROVED PLANS.
14. THE SIGNALIZED INTERSECTION OF 7TH STREET SHALL BE INTERCONNECTED FOR PRIORITY CONTROL.
15. PREDICTOR AT THE INTERSECTION OF TBD.
16. FINAL DESIGN SHALL PREPARE A KEY MAP SHOWING ALL LOCATIONS UNDER TRANSIT SIGNAL PRIORITY (TSP) CONTROL.

TRANSIT SIGNAL PRIORITY

(WITH EARLY GREEN, EXTENDED GREEN, AND ADDITIONAL GREEN EXTENSION PRIORITY)

1. TRAFFIC SIGNAL PRIORITY (TSP) FOR LIGHT RAIL OPERATIONS SHALL PROVIDED A PRESCRIBED EARLY OR EXTENDED COMPATIBLE GREEN BASED ON AN ENGINEERING EVALUATION WITH THE POTENTIAL OF AN ADDITIONAL COMPATIBLE PHASE EXTENTION BASED ON NON-COMPATIBLE PHASE REQUIRED MINUMUMS.
2. WHEN THE TRAIN ENTERS TRACK CIRCUIT, THE YELLOW CLEARANCE BEGINS FOR THE PHASE ON GREEN UNLESS AN ASSOCIATED PEDESTRAIN PHASE IS BEING SERVED, IN WHICH CASE, THE PEDESTRIAN PHASE SHALL CONTINUE WITH THE PRESCRIBED MINIMUMS. THEN THE YELLOW CLEARANCE SHALL BEGIN.
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THE PREPARATION OF THIS DRAWING HAS BEEN FINANCED BY THE TAXES OF THE CITIZENS OF LOS ANGELES COUNTY AND OF THE STATE OF CALFORNIA.

REV	DATE	BY	APP	REG NO	EXPIRES	SEAL HOLDER	DESCRIPTION

DESIGNED BY J. VAN HOFF
DRAWN BY T. BAILEY
CHECKED BY R. SORENSON
IN CHARGE
DATE 01/13/11

Exposition Metro Line Construction Authority
Expo

DMJM HARRIS | AECOM
707 WILSHIRE BLVD, SUITE 3300
LOS ANGELES, CALIFORNIA 90017
TEL (213) 243-3500 FAX (213) 243-3552

SUBMITTED
APPROVED

EXPOSITION TRANSIT PROJECT-PHASE 2
7TH STREET & COLORADO AVENUE
STREET RUNNING CONCEPT PLAN
PROPOSED CPUC NO. 84S - 113.8

CONTRACT NO
DRAWING NO GC-021A
REV
SCALE AS SHOWN
SHEET NO

P:\PROJECTS\2009\60022129 Expo LRT\400 Technical Information\402 Hazard Analysis\402.1 Drawings\CADD\Sheet
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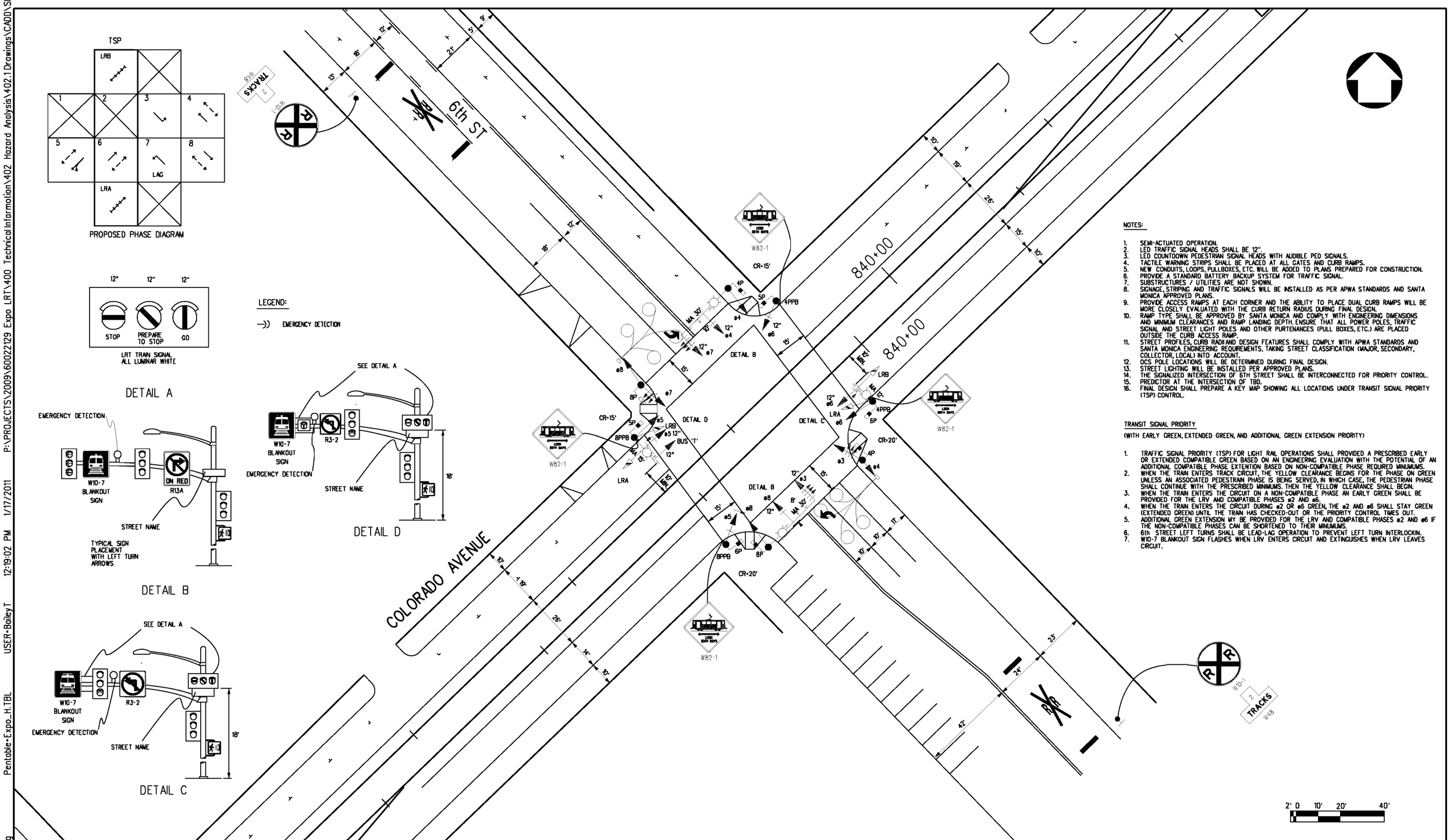
Pentable=Expo_H.TBL
Plot Driver=printer.pltcfg

Plot Driver•printer.pltcfg Pentable•Expo_H.TBL USER•BaileyT 12:19:02 PM 1/17/2011 P:\PROJECTS\2009\60022129 Expo LRT\400 Technical Information\402 Hazard Analysis\402.1Drawings\CADD\Shee



NOTES:

1. SEMI-ACTUATED OPERATION.
2. LED TRAFFIC SIGNAL HEADS SHALL BE 12".
3. LED COUNTDOWN PEDESTRIAN SIGNAL HEADS WITH AUDIBLE PED SIGNALS.
4. TACTILE WARNING STRIPS SHALL BE PLACED AT ALL GATES AND CURB RAMPS.
5. NEW CONDUITS, LOOPS, PULLBOXES, ETC. WILL BE ADDED TO PLANS PREPARED FOR CONSTRUCTION.
6. PROVIDE A STANDARD BATTERY BACKUP SYSTEM FOR TRAFFIC SIGNAL.
7. SUBSTRUCTURES / UTILITIES ARE NOT SHOWN.
8. SIGNAGE, STRIPING AND TRAFFIC SIGNALS WILL BE INSTALLED AS PER APWA STANDARDS AND SANTA MONICA APPROVED PLANS.
9. PROVIDE ACCESS RAMPS AT EACH CORNER AND THE ABILITY TO PLACE DUAL CURB RAMPS WILL BE MORE CLOSELY EVALUATED WITH THE CURB RETURN RADIUS DURING FINAL DESIGN.
10. RAMP TYPE SHALL BE APPROVED BY SANTA MONICA AND COMPLY WITH ENGINEERING DIMENSIONS AND MINIMUM CLEARANCES AND RAMP LANDING DEPTH. ENSURE THAT ALL POWER POLES, TRAFFIC SIGNAL AND STREET LIGHT POLES AND OTHER PURTENANCES (PULL BOXES, ETC.) ARE PLACED OUTSIDE THE CURB ACCESS RAMP.
11. STREET PROFILES, CURB RADII AND DESIGN FEATURES SHALL COMPLY WITH APWA STANDARDS AND SANTA MONICA ENGINEERING REQUIREMENTS, TAKING STREET CLASSIFICATION (MAJOR, SECONDARY, COLLECTOR, LOCAL) INTO ACCOUNT.
12. OCS POLE LOCATIONS WILL BE DETERMINED DURING FINAL DESIGN.
13. STREET LIGHTING WILL BE INSTALLED PER APPROVED PLANS.
14. THE SIGNALIZED INTERSECTION OF 6TH STREET SHALL BE INTERCONNECTED FOR PRIORITY CONTROL.
15. PREDICTOR AT THE INTERSECTION OF TBD.
16. FINAL DESIGN SHALL PREPARE A KEY MAP SHOWING ALL LOCATIONS UNDER TRANSIT SIGNAL PRIORITY (TSP) CONTROL.

TRANSIT SIGNAL PRIORITY

(WITH EARLY GREEN, EXTENDED GREEN, AND ADDITIONAL GREEN EXTENSION PRIORITY)

1. TRAFFIC SIGNAL PRIORITY (TSP) FOR LIGHT RAIL OPERATIONS SHALL PROVIDED A PRESCRIBED EARLY OR EXTENDED COMPATIBLE GREEN BASED ON AN ENGINEERING EVALUATION WITH THE POTENTIAL OF AN ADDITIONAL COMPATIBLE PHASE EXTENTION BASED ON NON-COMPATIBLE PHASE REQUIRED MINIMUMS.
2. WHEN THE TRAIN ENTERS TRACK CIRCUIT, THE YELLOW CLEARANCE BEGINS FOR THE PHASE ON GREEN UNLESS AN ASSOCIATED PEDESTRAIN PHASE IS BEING SERVED, IN WHICH CASE, THE PEDESTRIAN PHASE SHALL CONTINUE WITH THE PRESCRIBED MINIMUMS. THEN THE YELLOW CLEARANCE SHALL BEGIN.
3. WHEN THE TRAIN ENTERS THE CIRCUIT ON A NON-COMPATIBLE PHASE AN EARLY GREEN SHALL BE PROVIDED FOR THE LRV AND COMPATIBLE PHASES ø2 AND ø6.
4. WHEN THE TRAIN ENTERS THE CIRCUIT DURING ø2 OR ø6 GREEN, THE ø2 AND ø6 SHALL STAY GREEN (EXTENDED GREEN) UNTIL THE TRAIN HAS CHECKED-OUT OR THE PRIORITY CONTROL TIMES OUT.
5. ADDITIONAL GREEN EXTENSION MY BE PROVIDED FOR THE LRV AND COMPATIBLE PHASES ø2 AND ø6 IF THE NON-COMPATIBLE PHASES CAN BE SHORTENED TO THEIR MINIMUMS.
6. 6th STREET LEFT TURNS SHALL BE LEAD-LAG OPERATION TO PREVENT LEFT TURN INTERLOCKIN.
7. W10-7 BLANKOUT SIGN FLASHES WHEN LRV ENTERS CIRCUIT AND EXTINGUISHES WHEN LRV LEAVES CIRCUIT.

2' 0 10' 20' 40'

THE PREPARATION OF THIS DRAWING HAS BEEN FINANCED BY THE TAXES OF THE CITIZENS OF LOS ANGELES COUNTY AND OF THE STATE OF CALIFORNIA.

REV	DATE	BY	APP	REG NO	EXPIRES	SEAL HOLDER	DESCRIPTION

DESIGNED BY J. VAN HOFF
DRAWN BY T. BAILEY
CHECKED BY R. SORENSON
IN CHARGE
DATE 01/13/11

Exposition Metro Line Construction Authority
Expo

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LOS ANGELES, CALIFORNIA 90017
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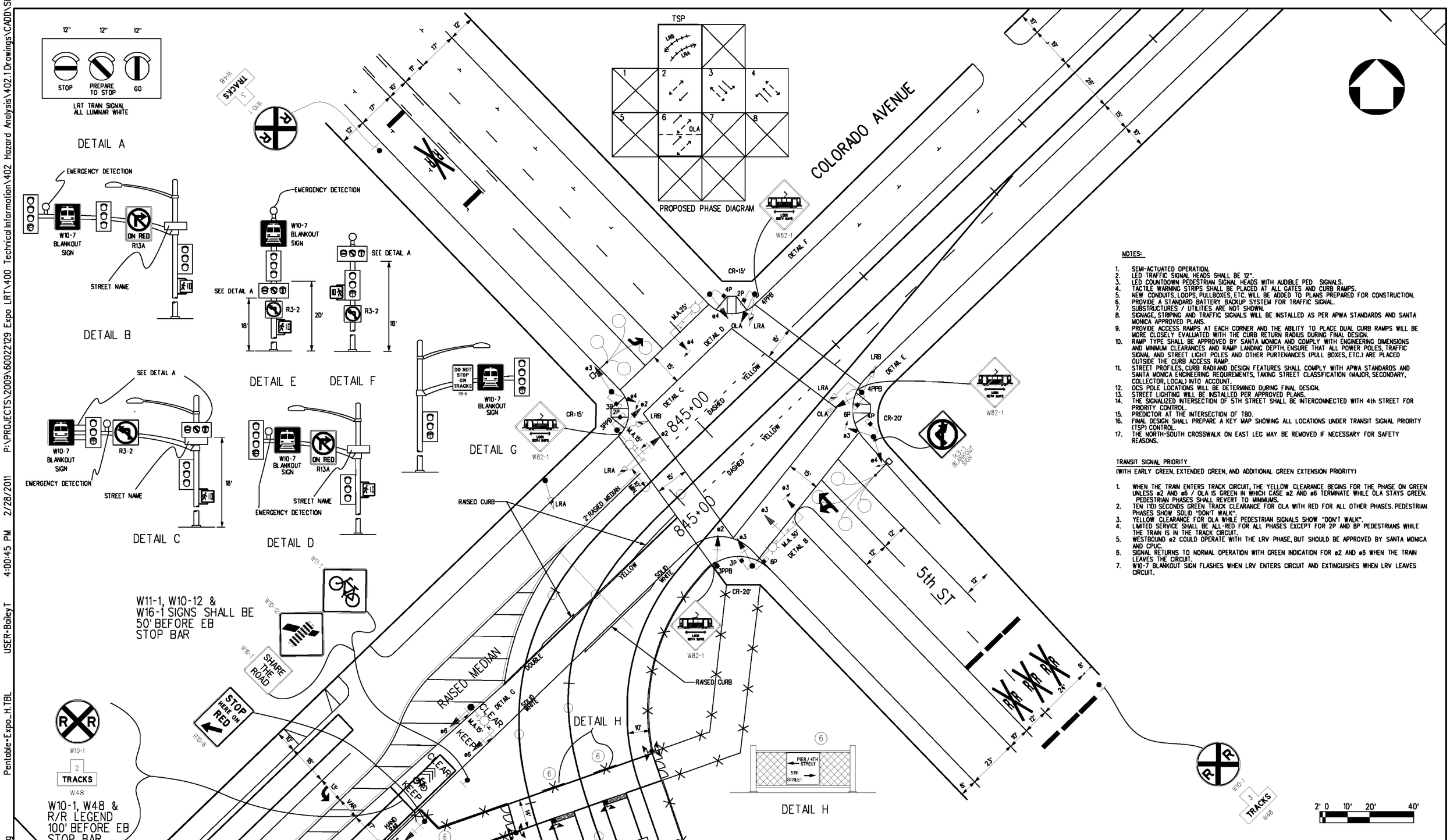
SUBMITTED
APPROVED

EXPOSITION TRANSIT PROJECT-PHASE 2
6TH STREET & COLORADO AVENUE
STREET RUNNING CONCEPT PLAN
PROPOSED CPUC NO. 84S - 113.85

CONTRACT NO
DRAWING NO GC-022
REV
SCALE AS SHOWN
SHEET NO



NOTES:

1. SEMI-ACTUATED OPERATION.
2. LED TRAFFIC SIGNAL HEADS SHALL BE 12".
3. LED COUNTDOWN PEDESTRIAN SIGNAL HEADS WITH AUDIBLE PED SIGNALS.
4. TACTILE WARNING STRIPS SHALL BE PLACED AT ALL GATES AND CURB RAMPS.
5. NEW CONDUITS, LOOPS, PULLBOXES, ETC. WILL BE ADDED TO PLANS PREPARED FOR CONSTRUCTION.
6. PROVIDE A STANDARD BATTERY BACKUP SYSTEM FOR TRAFFIC SIGNAL..
7. SUBSTRUCTURES / UTILITIES ARE NOT SHOWN.
8. SIGNAGE, STRIPING AND TRAFFIC SIGNALS WILL BE INSTALLED AS PER APWA STANDARDS AND SANTA MONICA APPROVED PLANS.
9. PROVIDE ACCESS RAMPS AT EACH CORNER AND THE ABILITY TO PLACE DUAL CURB RAMPS WILL BE MORE CLOSELY EVALUATED WITH THE CURB RETURN RADIUS DURING FINAL DESIGN.
10. RAMP TYPE SHALL BE APPROVED BY SANTA MONICA AND COMPLY WITH ENGINEERING DIMENSIONS AND MINIMUM CLEARANCES AND RAMP LANDING DEPTH. ENSURE THAT ALL POWER POLES, TRAFFIC SIGNAL AND STREET LIGHT POLES AND OTHER PURTENANCES (PULL BOXES, ETC.) ARE PLACED OUTSIDE THE CURB ACCESS RAMP.
11. STREET PROFILES, CURB RADIAND DESIGN FEATURES SHALL COMPLY WITH APWA STANDARDS AND SANTA MONICA ENGINEERING REQUIREMENTS, TAKING STREET CLASSIFICATION (MAJOR, SECONDARY, COLLECTOR, LOCAL) INTO ACCOUNT.
12. OCS POLE LOCATIONS WILL BE DETERMINED DURING FINAL DESIGN.
13. STREET LIGHTING WILL BE INSTALLED PER APPROVED PLANS.
14. THE SIGNALIZED INTERSECTION OF 5TH STREET SHALL BE INTERCONNECTED WITH 4th STREET FOR PRIORITY CONTROL.
15. PREDICTOR AT THE INTERSECTION OF TBD.
16. FINAL DESIGN SHALL PREPARE A KEY MAP SHOWING ALL LOCATIONS UNDER TRANSIT SIGNAL PRIORITY (TSP) CONTROL.
17. THE NORTH-SOUTH CROSSWALK ON EAST LEG MAY BE REMOVED IF NECESSARY FOR SAFETY REASONS.

TRANSIT SIGNAL PRIORITY

(WITH EARLY GREEN, EXTENDED GREEN, AND ADDITIONAL GREEN EXTENSION PRIORITY)

1. WHEN THE TRAIN ENTERS TRACK CIRCUIT, THE YELLOW CLEARANCE BEGINS FOR THE PHASE ON GREEN UNLESS ø2 AND ø6 / OLA IS GREEN IN WHICH CASE ø2 AND ø6 TERMINATE WHILE OLA STAYS GREEN. PEDESTRIAN PHASES SHALL REVERT TO MINIMUMS.
2. TEN (10) SECONDS GREEN TRACK CLEARANCE FOR OLA WITH RED FOR ALL OTHER PHASES. PEDESTRIAN PHASES SHOW SOLID "DON'T WALK".
3. YELLOW CLEARANCE FOR OLA WHILE PEDESTRIAN SIGNALS SHOW "DON'T WALK".
4. LIMITED SERVICE SHALL BE ALL-RED FOR ALL PHASES EXCEPT FOR 2P AND 8P PEDESTRIANS WHILE THE TRAIN IS IN THE TRACK CIRCUIT.
5. WESTBOUND ø2 COULD OPERATE WITH THE LRV PHASE, BUT SHOULD BE APPROVED BY SANTA MONICA AND CPUC.
6. SIGNAL RETURNS TO NORMAL OPERATION WITH GREEN INDICATION FOR ø2 AND ø6 WHEN THE TRAIN LEAVES THE CIRCUIT.
7. W10-7 BLANKOUT SIGN FLASHES WHEN LRV ENTERS CIRCUIT AND EXTINGUISHES WHEN LRV LEAVES CIRCUIT.

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REV	DATE	BY	APP	REG NO	EXPIRES	SEAL HOLDER	DESCRIPTION

DESIGNED BY J. VAN HOFF
DRAWN BY T. BAILEY
CHECKED BY R. SORENSON
IN CHARGE
DATE 02/28/11

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SUBMITTED
APPROVED

EXPOSITION TRANSIT PROJECT-PHASE 2
5TH STREET AND COLORADO AVENUE STREET RUNNING CONCEPT PLAN PROPOSED CPUC NO. 84S - 113.9

CONTRACT NO
DRAWING NO GC-022A
REV
SCALE AS SHOWN
SHEET NO

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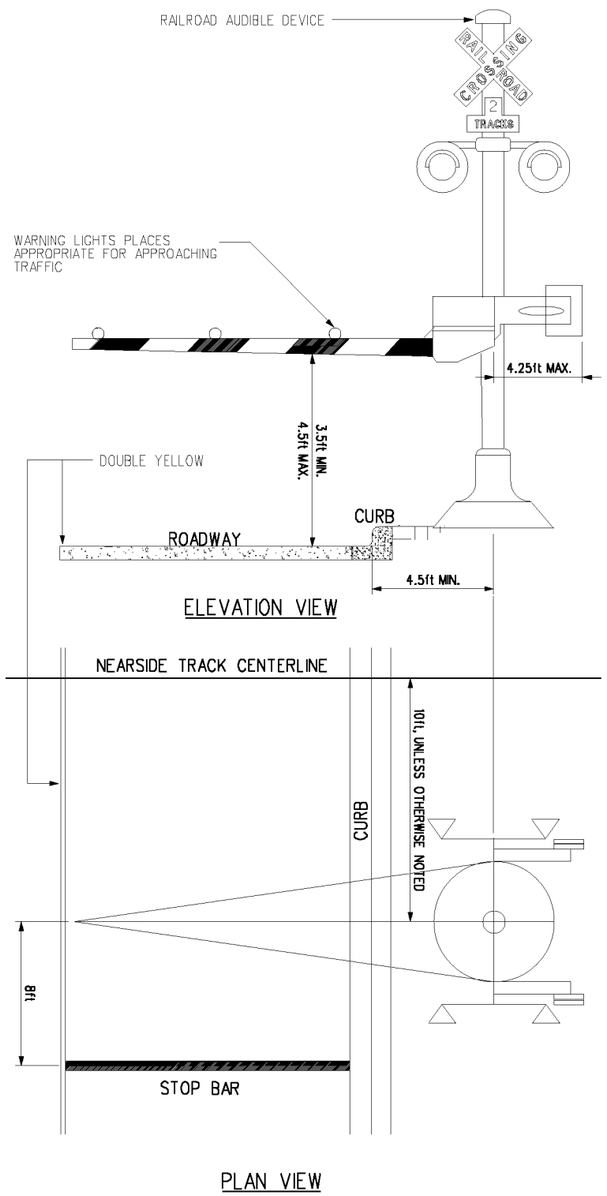
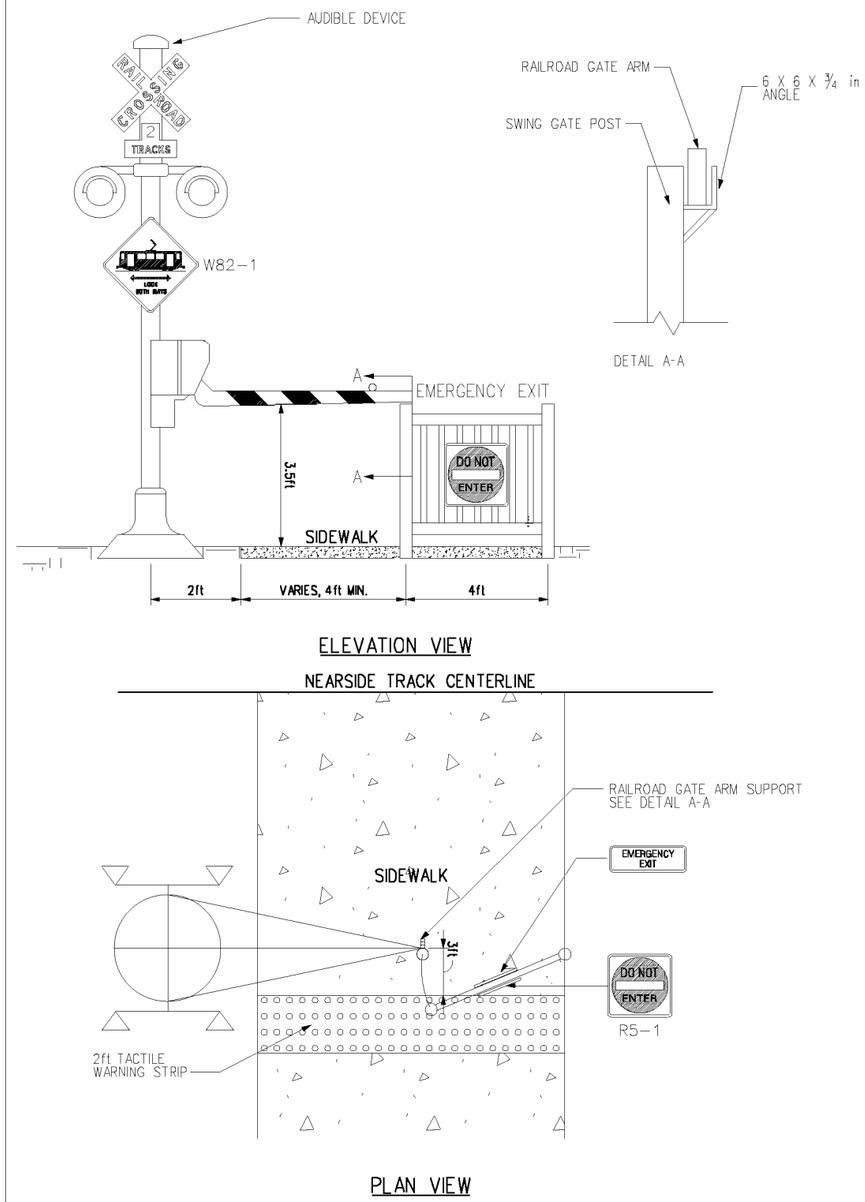
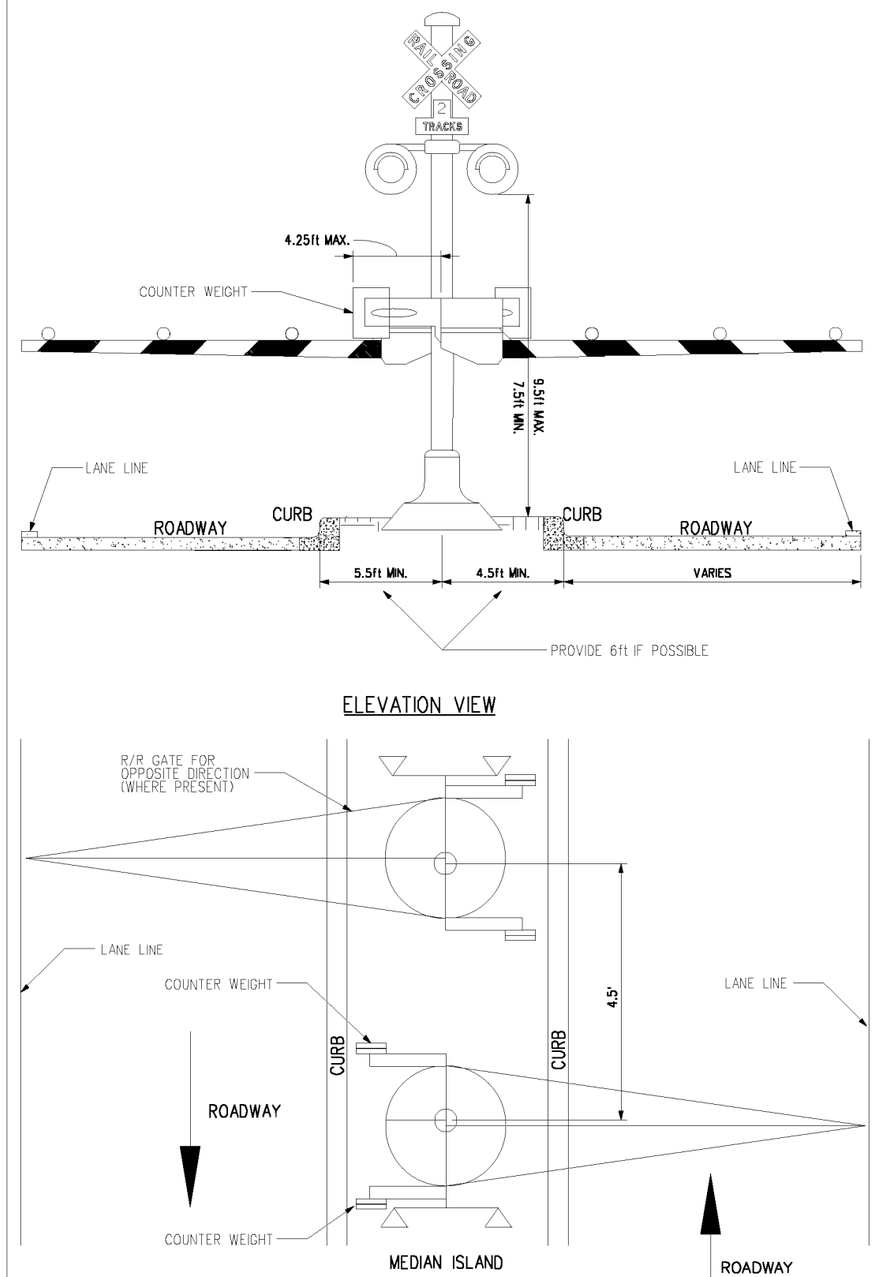


A 25 R/R GATE WITH FLASHERS NO.9



B 25 PEDESTRIAN CROSSING ARM NO.9 WITH EMERGENCY EXIT GATE



C 25 MEDIAN MOUNTED R/R GATE WITH FLASHERS NO.9

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DESIGNED BY J. VAN HOFF
DRAWN BY T. BAILEY
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IN CHARGE
DATE 02/28/11

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SUBMITTED
APPROVED

EXPOSITION TRANSIT PROJECT-PHASE 2 DETAILS

CONTRACT NO
DRAWING NO GC-025
REV
SCALE NOT TO SCALE
SHEET NO

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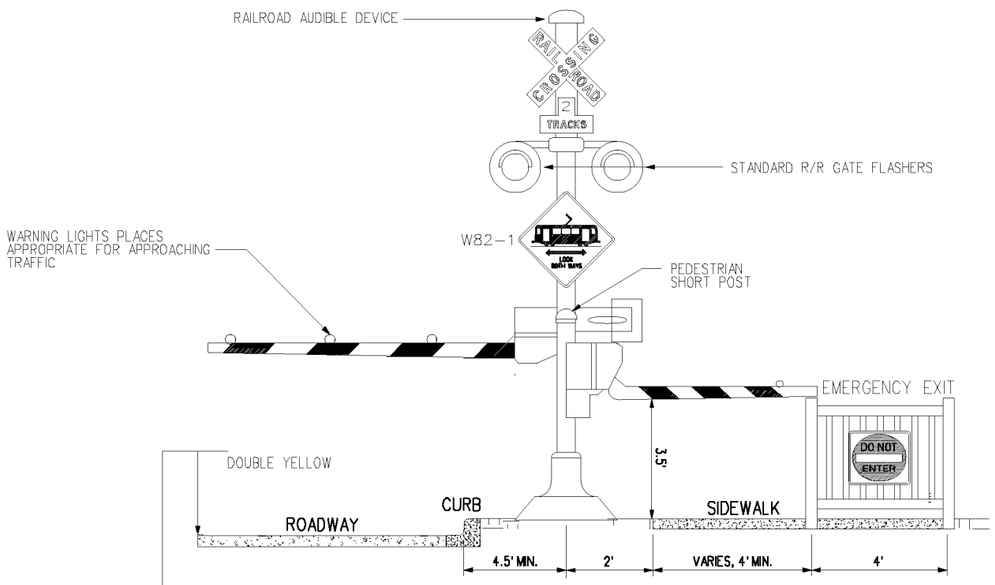
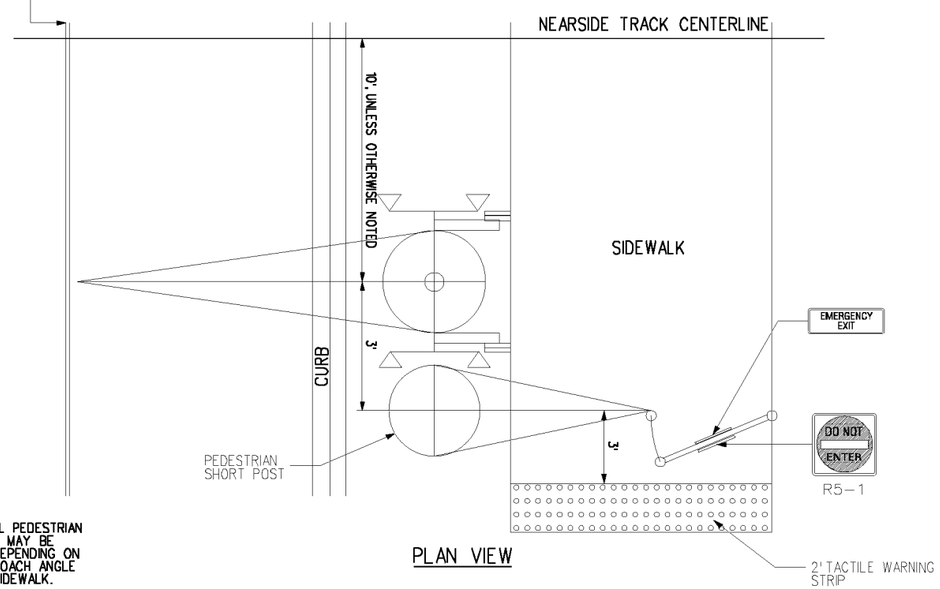


ELEVATION VIEW

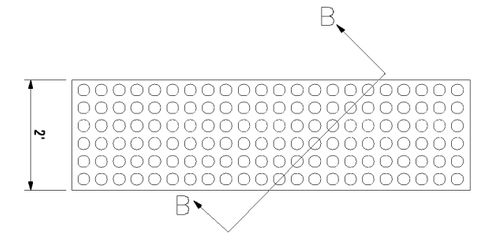


PLAN VIEW

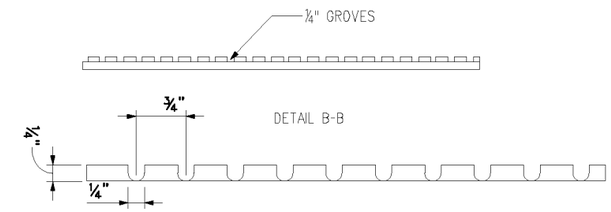
NOTE:

1. ADDITIONAL PEDESTRIAN FLASHERS MAY BE NEEDED DEPENDING ON THE APPROACH ANGLE OF THE SIDEWALK.

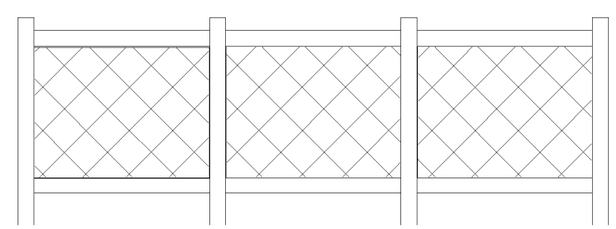
D / 26 — R/R GATE WITH FLASHERS NO. 9 AND PEDESTRIAN CROSSING ARM WITH EMERGENCY EXIT GATE



TOP VIEW - TACTILE STRIP



E / 26 — PEDESTRIAN TACTILE WARNING



F / 26 — PEDESTRIAN BARRIER

THE PREPARATION OF THIS DRAWING HAS BEEN FINANCED BY THE TAXES OF THE CITIZENS OF LOS ANGELES COUNTY AND OF THE STATE OF CALIFORNIA.

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DRAWN BY T. BAILEY
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DATE 02/28/11

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SUBMITTED
APPROVED

EXPOSITION TRANSIT PROJECT-PHASE 2
DETAILS

CONTRACT NO
DRAWING NO GC-026
REV
SCALE NOT TO SCALE
SHEET NO

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Appendix C:

Field and Office Diagnostic Meeting Notes – Updated 1/24/11 and 3/11/11

FINAL – UPDATED 1-24-11 and 3-11-11

Office and Field Diagnostic Meeting Notes for Expo Phase 2

The following are a consolidation of the office and field notes taken during the Office Pre-meetings and the Field Diagnostic Team's field review of the Expo Phase 2 (Phase 2) grade crossings. The Office Pre-meeting to discuss the City of Los Angeles grade crossings was held on July 27, 2010 followed by the Field Diagnostic meeting on August 2, 2010. The Office Pre-meeting to discuss the City of Santa Monica grade crossings was held on July 29, 2010 followed by the Field Diagnostic meeting on August 4, 2010. See attached sign-in sheets for attendees. The following notes document the recommended changes and items that need further review to the Hazard Analysis Report submitted on May 10, 2010. Next steps will be per General Order (G.O.) #164D, the CPUC will provide their comments within 90 days of the Field Diagnostic meetings and then the Exposition Metro Line Construction Authority (Authority) must decide to incorporate the comments or discuss further with the CPUC.

The drawings and matrices were updated based upon the information specified below. The following track changes show the latest changes made since the last update on January 24, 2011.

General Notes

1. The individual grade crossing identification needs to be corrected to include "a" for a street above the tracks and "b" for a street below the tracks. ACTION: AECOM - *Completed*
2. CPUC allows railroad gates to be placed 18" from dynamic envelope, which is 5.36' feet from center of track. Therefore gates may be placed as close as 6.86' (nominal distance of 7') from center of track. ACTION: Authority verify within compliance with Metro Design Criteria and AECOM incorporate into drawings - *Completed*
3. All pre-signal conditions shall comply with CA MUTCD, Section 8D.07: Traffic Control Signals at or Near Highway-Rail Grade Crossings, which states **"If a pre-signal is installed at an interconnected highway-rail grade crossing near a signalized intersection, a STOP HERE ON RED (R10-6) sign shall be installed near the pre-signal or at the stop line if used. If there is a nearby signalized intersection with insufficient clear storage distance for a design vehicle, or the highway-rail crossing does not have gates, a NO TURN ON RED (R10-11) sign shall be installed for the approach that crosses the railroad track."**. Furthermore, the City of Santa Monica does want nearside static "No Right Turn on Red" signs at all north-south crossings along Colorado that the LRT crosses. ACTION: AECOM – *Completed;* Note that per the updated CAMUTCD, the R10-11 was replaced with R13A
4. Metro would like to install active "Look Both Ways" signs at all gated station ramp entrances to mitigate accidents associated with second train approaching a station. However, CPUC staff at the field diagnostic meetings does not support the use of this non-standard active sign and this is not consistent with Expo Phase 1. Therefore Phase 2 does not plan to incorporate it. However, Metro will discuss further with the CPUC. ACTION: *None*
5. The Authority will submit a letter to CPUC requesting silencing of bells and shrouds for grade crossings adjacent to sensitive receptors per G.O. #75D. ACTION: *Authority*
6. Both LADOT and City of Santa Monica will review and provide comments on the proposed signal phasing and equipments shown on the drawings within the Hazard Analysis Report. Also, LADOT has requested that as part of their review, the railroad preemption spreadsheet be submitted for their review. The Authority will schedule meetings with both cities. ACTION: Authority and AECOM – *Completed*; incorporated comments received from Cities, sent RR preemption spreadsheets to LADOT, and held meetings with both Cities and the Design-Build Teams
7. Include at each grade crossing "Keep Clear" pavement markings within the track area. ACTION: AECOM - *Completed*
8. Include "Do Not Stop on Tracks" signs (type R8-8) at each approach to a grade crossing. ACTION: AECOM - *Completed*

9. At street-running crossings, include static "Look Both Ways" signs (W82-1) for each pedestrian approach that crosses the tracks. ACTION: AECOM - *Completed*
10. Add active "Train Coming" LED pedestrian signs at base of each street running station entrance ramp facing towards the station. ACTION: AECOM – *Completed*
11. Verify the placement of the vehicular gates does not preclude the ultimate widening of the streets. ACTION: Authority and AECOM - *Completed*
12. Based upon past discussions with LADOT Bikeway Department representatives, the preference is for a single ramp in lieu of the LABOE's preferred dual ramps at the grade crossings with pedestrian/bicyclist crossings. However, LADOT Bikeway Department representatives after the Diagnostics Meetings have revised their preference to dual ramps. ACTION: *None*
13. The City of Santa Monica requested the details referenced on the drawings within the Hazard Analysis report and asked that a detail be added that showed vehicular and pedestrian gate side-by-side, since the City of Santa Monica is concerned with conflicts with other warning devices and impeding the circulation of pedestrians and bikes. The City of Santa Monica encourages a single unit to minimize pedestrian conflicts and avoid ADA issues. However, the new MUTCD standard specifically requires that the vehicular and pedestrian gates be split. Details will be given to the City of Santa Monica in order to address their concerns. ACTION: AECOM - *Completed*
14. The City of Santa Monica representatives stated that the City's standard practice is the use of video detection rather than detection loops. The Authority requested the City standard that supports this preference. The City of Santa Monica will provide design plans showing the use of video detection as standard practice. Furthermore, the City of Santa Monica reiterated their position that Caltrans Traffic Operations Policy Directive (TOPD 09-06) requires bicycle detection and that the City has made a policy decision to utilize video detection for the bicycle detection at intersections that utilize video detection for vehicles. ACTION: City of Santa Monica and Authority – *Completed*; detection system incorporated into the drawings as applicable
15. The City of Santa Monica representatives agreed that the existing OPTICOM system timing will be adjusted to coordinate with the light rail transit (LRT) transit system priority (TSP) system. ACTION: City of Santa Monica and Authority – *Completed*
16. The City of Santa Monica believes additional hardware will be required to link traffic signals currently not interconnected in order to accommodate modifications to traffic signal operations to accommodate LRT operations. ACTION: City of Santa Monica and Authority – *Completed*; incorporated into the Design-Build teams' drawings
17. The City of Santa Monica representatives stated that all Phase 2 provided signal heads are to be 12". The Authority requested the City standard that supports this preference, and the City of Santa Monica will provide design plans showing the use of 12" heads as standard practice. ACTION: AECOM - *Completed*
18. The City of Santa Monica needs to decide if near side and secondary side traffic signals are to be included at each crossing. The City of Santa Monica after the Diagnostic Meetings followed-up with: City only wants near-side signals where there's an existing Protected Left-Turn phasing and City wants far-side signals at all locations. ACTION: AECOM - *Completed*
19. The City of Santa Monica representatives stated that on the drawings remove lane legends (arrows) from through and right turn lanes along with the "ONLY" pavement marking within the left turn lanes. The left turn arrows are to remain. ACTION: AECOM - *Completed*
20. Right turn abilities in City of Santa Monica were discussed along Colorado Ave. It was decided that turning templates should be used to assure trucks can make the turns but also that City of Santa Monica needs to identify what design vehicle (type of truck) should be used for this

analysis, and the City followed-up with the request to use a SU-30 panel truck. ACTION: City of Santa Monica and Authority; *Completed by Design-Build teams*

21. The City of Santa Monica representatives requested that the drawing notes include a reference to the APWA Standards for the curb ramps and tactile strips as these are used in Santa Monica. ACTION: AECOM - *Completed*
22. The City of Santa Monica representatives stated that the City standard is to not to use PV heads, so Expo's suggestion was to use louvers or hoods in lieu of PV heads. ACTION: AECOM - *Completed*
23. City of Santa Monica wanted all the drawings to show that the overhead street names signs are placed on the traffic signal pole just above the mast arm connection. ACTION: AECOM - *Completed*
24. The drawings for Colorado Avenue intersections in Santa Monica show a solid line designating parking, but another method of showing parking (such as "T" marks) should be used to reduce confusion and clutter. ACTION: AECOM - *Completed*

Drawing GC -002 Bagley Avenue & Exposition Blvd

1. Verify existing lane configurations are accurately shown on the drawings as there appears to be no on-street parking. If some of the on-street parking needs to be relocated due to the additional left turn pockets, the relocation needs to be shown on the drawings, like at Military Ave. ACTION: AECOM - *Completed*
2. Remove southbound (SB) W10-7 blankout sign on mast arm. ACTION: AECOM - *Completed*
3. LADOT needed to decide if the WB left turn should be protected or permissive. LADOT followed-up after the Diagnostic Meetings with their preference for a permissive WB left-turn phase. ACTION: AECOM - *Completed*
4. LADOT representatives discussed a preference for a right turn pocket in the westbound (WB) direction. The Authority noted that there is not sufficient width without reducing the adjacent bikeway nor is there a demand for such a change. However, LADOT followed-up after the meeting that the right turn pocket is needed to provide a safe signal operation during pre-emption. They are also willing to accept a 10-foot multi-purpose path in order to obtain the right turn lane. After the Diagnostic Meetings, the Authority discussed with the City of LA that since the right turn pocket was not a requirement per the FEIR, which studied the need for such improvements based upon the demand, the right turn pocket is considered a Betterment. However, the Authority has decided to implement a wider curb lane since the northeast curb will require relocation due to the incorporated left turn pockets. This was incorporated into the drawings. ACTION: *Completed*
5. As a follow-up to the meeting, LADOT has asked not to remove the northbound (NB) Ø1, 3-section head on mast arm for visibility reasons. ACTION: AECOM – *Completed*
6. Install additional near side (SW corner of intersection) Ø1 signal head. ACTION: AECOM - *Completed*
7. Label DWP maintenance driveway located at the northeast (NE) quadrant of the tracks and indicate an access gate located at least 20' into the property from the sidewalk. ACTION: AECOM – *Completed*

Drawing GC-005 Northvale Road & Overland

1. CPUC requested that "No Right Turn on Red" signs (type R10-11a) be placed on the nearside poles located on the NW and SE quadrant of the tracks, as specified by CA MUTCD, Section 8D.07 as indicated in the General Notes above. ACTION: AECOM - *Completed*
2. Metro representatives requested a gate-down indicator (yellow light) facing the train operators per the Metro Design Criteria. Metro will provide the specific location for incorporation into the drawings. ACTION: Metro and Design-Build Team – *Completed*; Design-Build teams incorporated into the drawings
3. LADOT representatives requested camera surveillance (CCTV) at this grade crossing. LADOT also needs to identify other locations along the alignment for inclusion into the contract documents. As a follow-up after the meeting, LADOT provided the following locations: National/Palms, Overland, Westwood, Sepulveda, Sawtelle, Pico, and Centinela.
   ACTION: Authority – *Completed*; Authority incorporated into Design-Build General Requirements

Drawing GC-006 Ashby Ave/Exposition Blvd & Westwood Blvd

1. Add a bell to the flasher shown at the bottom of the station entrance ramp. However, it was noted after the meeting that both bells and flashers are standard unless noted otherwise. ACTION: *None*
2. Verify that we can narrow roadway width within the track area in order to shorten the vehicular gate arm lengths from 36' to 34'. ACTION: AECOM – *Completed* reduction in curb lane width to standard 12' but the vehicular gate arm was not reduced due to the CPUC required 90% lane coverage
3. A 5-section signal head was discussed for the EB left and right turn movements. However, right turns on red are not allowed. As a follow-up to the Diagnostic Meetings, LADOT has stated that the 5-section signal head is not needed and instead use a 3-section arrow head as shown for both right and left turns. ACTION: AECOM - *Completed*
4. LADOT agrees to removing the 3-section arrow head on the Type I pole located on the NE quadrant of the tracks. ACTION: AECOM - *Completed*
5. Adjust vehicular gate in NE quadrant of the tracks to be as close as possible to the tracks (see General Notes above) in order to adjust the adjacent automatic pedestrian gate and swing gate to provide more pedestrian storage area. ACTION: AECOM - *Completed*
6. For the NB left turn pocket, remove the limit line and "L" shaped pavement marking and keep only the 8" white curved pavement marking. ACTION: AECOM - *Completed*
7. Place a far-side blankout (active) "No Right Turn" sign (R3-1) on the Type I pole located on the SW quadrant of the tracks facing towards WB traffic on S. Exposition Blvd. ACTION: AECOM - *Completed*
8. Place "Wait Here" pavement markings in NB left turn lane for pre-signal south of tracks. ACTION: AECOM - *Completed*
9. Verify SB lane width within track area and add striping within the same area. Also, verify the location of the SB curb south of the grade crossing. ACTION: AECOM - *Completed*
10. At the pre-meeting, it was discussed adding a slot clearance within the track area in addition to the slot clearance from the track area north to Ashby Ave. The Authority wants to discuss with LADOT and Metro the difference between the use of the near-side signal versus the use of the pre-signal in determining the need for a slot clearance. ACTION: - *None*

Drawing GC-007 Military Ave & Exposition Blvd

1. Modify the EB left turns on S. Exposition Blvd. to fully protected. LADOT followed-up after the Diagnostic Meetings with their request to provide a permissive WB left turn. ACTION: Authority and AECOM - *Completed*
2. LADOT representatives discussed a preference for a right turn pocket in the westbound (WB) direction. The Authority noted that there may not be sufficient room without reducing the adjacent bikeway. However, LADOT followed-up after the Diagnostic Meetings that the right turn pocket is needed to provide a safe signal operation during pre-emption. The Authority discussed with the City of LA that since the right turn pocket was not a requirement per the FEIR, which studied the need for such improvements based upon the demand, the right turn pocket is considered a Betterment. However, the Authority has decided to implement a wider curb lane since the northeast curb will require relocation due to the incorporated left turn pockets. This was incorporated into the drawings. ACTION: *Completed*
3. It was discussed widening Military Ave. on the west side within the track area in order to align with the existing curb line south of Exposition Blvd. However, the Authority pointed out that then in doing so the warning devices would then potentially not be in the line of slight from the SB direction. As a follow-up to the Diagnostic Meetings, LADOT has agreed not to widen the street. ACTION: *None*
4. After the Diagnostic Meetings, LADOT agreed to overlapping Ø5 with Ø3 so that WB left turns on N. Exposition Blvd. do not stop at the S. Exposition Blvd. intersection. ACTION: Authority and AECOM – *Completed*; Ø5 could not be overlapped with Ø3 therefore Ø5 was changed to an OLC
5. Include the existing driveway and gate on the NW quadrant of the tracks. Label as “Not in Use”. ACTION: AECOM - *Completed*
6. Verify if the track profile can be lowered to the street profile. ACTION: Authority discuss with DB teams – *Completed*; discussed with Design-Build Teams and will be incorporated into the Final Design drawings
7. Verify existing lane width conditions are accurately shown on the drawings as there appears to be no on-street parking, such as S. Exposition Blvd. east of intersection. ACTION: AECOM - *Completed*

Drawing GC-008 Sepulveda & Exposition Blvd

1. Remove SB LRT blankout sign (type W10-7) on mast arm. ACTION: AECOM - *Completed*
2. Add flasher to the Type 9 at the bottom of each station entrance ramp. ACTION: AECOM - *Completed*
3. Add NB queue cutter loops north of the track area. ACTION: AECOM - *Completed*
4. Add low profile fence along raised median island north of track area prevent illegal pedestrian crossing from east of Sepulveda to the west in order to access the station. ACTION: AECOM - *Completed*
5. LADOT after the Diagnostic Meetings decided that the WB left turns should be permissive. ACTION: Authority and AECOM - *Completed*
6. Include driveway to TPSS alternative on the NE quadrant of tracks and indicate an access gate located at least 20’ into the property from the sidewalk. ACTION: AECOM - *Completed*
7. Add Ø2 far side signal head on pole located in the NE corner of intersection and face towards SB traffic due to line of sight. ACTION: AECOM - *Completed*
8. LADOT representatives discussed a preference for a right turn pocket in the westbound (WB) direction. The Authority noted that there may not be sufficient room without reducing the adjacent bikeway. However, LADOT followed-up after the Diagnostic Meetings that the right turn pocket is needed to provide a safe signal operation during pre-emption. The Authority discussed with the

City of LA that since the right turn pocket was not a requirement per the FEIR, which studied the need for such improvements based upon the demand, the right turn pocket is considered a Betterment. However, the Authority has decided to implement a wider curb lane since the northeast curb will require relocation due to the incorporated left turn pockets. This was incorporated into the drawings. ACTION: *Completed*

9. Remove concrete median on the drawings within the guideway. ACTION: AECOM - *Completed*

Drawing GC-011 Barrington Ave & Exposition Blvd

1. Adjust vehicular gates north of crossing so that the NE quadrant gates are closer to crossing (see General Notes above for details) and the pedestrian gates are further away to provide additional pedestrian storage area between the existing driveway and gates. ACTION: AECOM - *Completed*
2. There was discussion about talking to the property owner on the NE quadrant of the tracks about limiting truck access or possibly moving the existing gate further into the property in order to prevent vehicles from stopping on the tracks. LADOT agrees that the City of LA and Authority should both send letter to property owner. As a follow-up to the meeting, the CPUC believes that a more substantive mitigation measure needs to be taken to prevent trucks from fouling the tracks. ACTION: Authority, Metro Real Estate and the property owner have discussed relocating the existing private gate; Metro Real Estate has sent a Right-of-Entry and Construction Permit (attached) to the property owner for signature; drawing GC-011 was updated to include a note specifying the relocation of this private gate - *Completed*
3. Consider moving fencing SE of the tracks closer to the tracks and tying back at the adjacent TPSS. ACTION: Authority and AECOM - *Completed*
4. Remove solid line on east side of Barrington, north of tracks. Only need to verify lane widths and show on drawings. ACTION: AECOM - *Completed*

Drawing GC-014 Olympic Blvd & Stewart St

1. Remove the flexible delineators (type Q) and chevron striping north of the tracks and replace with a 2'-wide raised median. ACTION: AECOM - *Completed*
2. Correct NB and SB W48 signs (2 tracks) with 3 track crossing signs. ACTION: AECOM - *Completed*
3. Adjust accessible ramps to be in line with crosswalk located at the tracks. ACTION: AECOM - *Completed*
4. Remove extra line across Stewart just north of north vehicular gates. ACTION: AECOM - *Completed*
5. Place barrier (such as planter) at back of curb with appropriate guide signs directing bicyclists and pedestrians to the crosswalk located at the tracks. ACTION: AECOM - *Completed*
6. Adjust length of vehicular gates shown on drawings so that the gates do not overlap with the median. ACTION: AECOM - *Completed*
7. Metro and CPUC discussed their concern about the close proximity of an existing driveway SW of the tracks. It is close enough that a truck turning into the property may foul the tracks. The City of Santa Monica is to discuss with their lessee about their truck access; note the City owns the property in question. After the Diagnostic Meetings, the City confirmed that it is requiring that north driveway be right-turn in and right-turn out only and that trucks will utilize the main driveway further south. ACTION: City of Santa Monica and AECOM - *Completed*
8. The City of Santa Monica representatives do not agree with the second WB left turn from Olympic Blvd. on to Stewart St. SB. The Authority reminded the City that this was included in the FEIR as a result of the traffic analysis that showed a demand for it. If it were to be removed, traffic could potentially cause problems on Olympic Blvd. ACTION: *None*

9. The City of Santa Monica representatives questioned the removal of the on-street parking from Olympic Blvd. to Exposition Blvd. along both sides of Stewart St. The Authority will verify with the FEIR and let the City know. ACTION: Authority – *Completed*; per the FEIR, on-street parking along both sides of Stewart is to be removed and based upon the demand, will not require new parking spaces beyond the existing. This information was shared with the City of Santa Monica.

Drawing GC-015 26th Street & Olympic Blvd

1. Replace "No Right Turn" blankout sign (type R3-1) with a static "No Right Turn" sign (type R3-1) on the SW and SE corner of the intersection. ACTION: AECOM - *Completed*
2. Remove the static "No Right Turn on Red" sign (type R13-A) located on the SE corner of the intersection north of the tracks. Install a "No Turn on Red" sign (type R13) south of the tracks adjacent to the limit line as per CA MUTCD Section 8D.07 as indicated in the General Notes above. ACTION: AECOM - *Completed*
3. Remove W10-7 blankout sign on NB mast arm. ACTION: AECOM – *Completed*
4. Include with the flasher a "No Right Turn" blankout sign (type R3-1) facing the driveway located on the SE quadrant of the track area. ACTION: AECOM - *Completed*
5. Install "One-Way" sign (type R6-1) on the sign post opposite the driveway located on the SE quadrant of the track area. ACTION: AECOM - *Completed*
6. Verify location of driveway located on the SE quadrant of the track area and possibly move it closer to the southerly property line of the development. However, the City of Santa Monica believes that it may not be feasible to relocate the driveway due to the existing buildings within the adjacent property and the existing culvert. The City does not want the driveway closed. ACTION: Authority and Design-Build Team – *Completed*; driveway location shown on Design-Build Team drawings
7. Verify existing curb layout south of tracks on west side of 26th Street. ACTION: AECOM - *Completed*

Drawing GC-017 20th Street and Exposition ROW

1. Adjust striping on drawing for NB right turn lane at Colorado Ave. ACTION: AECOM - *Completed*
2. Adjust leader for SB "Stop Here On Red" sign to reference the pole. ACTION: AECOM - *Completed*
3. Show proper R/R gate arm lengths on drawings as the gates do not need to be overlapping with the median. ACTION: AECOM - *Completed*
4. Install "Wait Here" pavement markings for NB lanes. ACTION: AECOM - *Completed*
5. There is a need for further evaluation of the existing driveway and its usage for the property in the NE quadrant of the crossing. It appears the existing driveway is wide enough for one vehicle but the CPUC is concerned about the close proximity to the crossing and a potential fouling of the tracks. It was discussed to look at extending the 21st St (which currently ends south of the Metro right-of-way) under the guideway (which is on an embankment) and connecting to the existing driveway. The City of Santa Monica is also concerned that the extension of 21st St. would cross the bikeway and recommend that appropriate traffic control devices be installed not to impede travel on the bicyclists/pedestrians. ACTION: Authority has discussed with the private property owner and the City of Santa Monica; the City of Santa Monica Fire Department does not consider this to be a fire lane but garbage trucks utilize the driveway and therefore must be able to turnaround; the Design-Build team completed a turning template study (attached) and was able to show that a garbage truck can make the turnaround within the existing private property - *Completed*

6. The bikeway east of 20th St. will need to not impact the existing buildings within the Metro right-of-way, south of the guideway. There appears to be sufficient width within the Metro right-of-way to accommodate both the bikeway and existing buildings. ACTION: Bikeway Designer – *Completed*; incorporated into the Design-Build Team drawings
7. Move the crosswalks as close at possible to the gates to minimize potential for vehicles storing in that space. ACTION: AECOM - *Completed*
8. Relocate the proposed mast arm pole away from the driveway on the NE side of the crossing. ACTION: AECOM - *Completed*
9. Add barrier (such as a planter) at the ends of the bikeway to direct pedestrians/bicyclists to use the crosswalk. ACTION: AECOM - *Completed*

Drawing GC-017A 19th Street and Exposition ROW

1. Remove the proposed Type Q flexible delineators, and install raised center median islands (approximately 2' wide) both south and north of the crossing. The width of the remaining roadway will be checked for sufficient width in order to have the existing on-street parking to remain. ACTION: AECOM - *Completed*
2. Show proper vehicular gate arm lengths on drawing after revising the delineators to a median. ACTION: AECOM - *Completed*
3. Move the crosswalks as close at possible to the gates to minimize potential for vehicles storing in that space. ACTION: AECOM - *Completed*
4. Identify and locate the driveways on both sides of roadway and clarify the back of sidewalks. ACTION: AECOM – the drawing was revised to include a note that the existing driveways on the northwest quadrant of the crossing will need to be consolidated - *Completed* -
5. Install "Wait Here" pavement markings for NB lanes. ACTION: AECOM - *Completed*
6. Install barrier (such as a planter) at curb to direct pedestrians/bicyclists s to use the crosswalk. ACTION: AECOM - *Completed*
7. Place fencing north of the tracks on both west and east of the crossing. ACTION: AECOM – *Completed*
8. CPUC wants the Authority and the City of Santa Monica to consider closing 19th Street. The City and the Authority will talk to the adjacent businesses while the Authority investigates if cul-de-sacs are feasible. Also, it appears the existing concrete plant on the NW corner of the crossing may utilize property on the SE corner of the crossing thus crossing the tracks each time this movement is made; the City and the Authority will verify in their talks. ACTION: City of Santa Monica and the Authority discussed closure of the street; the City believes there are significant safety concerns with a hard closure (see attached City letter dated November 1, 2010) - *Completed*

Drawing GC-018 17th Street and Colorado Ave

1. Add photo enforcement note and that left turns are protected on to the drawing and the PCHAR matrix. ACTION: AECOM – *Completed*
2. Show split phase for NB and SB movements and add 4 Section heads on the drawing. ACTION: AECOM - *Completed*
3. Keep the existing NB and SB left turn pockets and the existing dedicated right turn pocket in the SB direction. ACTION: AECOM - *Completed*
4. Label "17th Street" on the drawing. ACTION: AECOM - *Completed*
5. Indicate the existing conditions, including existing parking north of Colorado Ave. and not south of Colorado Ave. ACTION: AECOM - *Completed*
6. Show bike lane on 17th Street south of Colorado Ave. ACTION: AECOM - *Completed*

7. Show R/R crossing pavement markings with appropriate signs (W10-1 and W48) for EB movement, and for NB and SB movements. ACTION: AECOM - *Completed*
8. Place "Right Turn Only, Transit Bus Exempt" sign for EB curb lane. ACTION: AECOM - *Completed*
9. Make all crosswalks 20' wide at stations. ACTION: AECOM – *Completed*
10. Place LRB signal on back side of mast arm on pole in SE corner of intersection. ACTION: AECOM - *Completed*
11. Place LRA signal on traffic signal standard in SE corner of intersection. ACTION: AECOM - *Completed*
12. Remove LRA & LRB signals on pole in raised median next to WB left turn pocket, east of 17th Street. ACTION: AECOM - *Completed*
13. Remove Type 8 flashers from pole at end of station ramp. ACTION: AECOM - *Completed*
14. Detail C – place W10-7 blankout sign next to traffic signal head, and show a 4-section head. ACTION: AECOM - *Completed*
15. Identify and locate the LRT Stop Bar for WB LRT just before Colorado Avenue such that the LRV will block the pedestrian crossing when stopped. ACTION: AECOM - *Completed*

Drawing GC-019 14th Street and Colorado Ave

1. Verify existing striping and parking conditions on 14th Street. ACTION: AECOM - *Completed*
2. Remove NB dedicated right turn lane south of Colorado Ave. and leave a wide NB through lane per City of Santa Monica's direction. Adjust NB R/R pavement markings to reflect this change. ACTION: AECOM - *Completed*

Drawing GC-020 11th Street and Colorado Ave

1. Verify existing striping and parking conditions on 11th Street. ACTION: AECOM - *Completed*
2. Remove NB dedicated right turn lane south of Colorado Ave. and leave a wide NB through lane per City of Santa Monica's direction. Adjust NB R/R pavement markings to reflect this change. ACTION: AECOM - *Completed*

Drawing GC-021 Lincoln Blvd. and Colorado Ave.

1. Bay Cities Deli, located northeast of the crossing, currently causes a NB queue that blocks the intersection during lunch hour. The City of Santa Monica currently mitigates this queue by deploying a traffic officer direct traffic through the intersection. This current condition was not identified by the City of Santa Monica before and therefore not included in the FEIR. In order to mitigate this impact, it was discussed to install a queue detector north of the crossing. This will situation will also be included in the PCHAR matrix as an existing issue and the proposed mitigation. ACTION: Santa Monica and AECOM – *Completed* by adding queue loops
2. NB left turn pocket stripe should be solid line and not a double line. ACTION: AECOM - *Completed*
3. City of Santa Monica representatives indicated that there is also a queuing problem in the SB direction that is caused by back-up from the Santa Monica Freeway (I10) on-ramp south of the crossing. The City of Santa Monica will work with Caltrans to improve the existing signing in order to let motorists know of the double left turn pocket at the on-ramp, which could potentially eliminate or minimize the long queue. If this is not feasible, a queue detector may also be needed here to mitigate this impact. This current condition was not identified by the City of Santa Monica before and therefore not included in the FEIR. This will situation will also be included in the PCHAR matrix as an existing issue and the proposed mitigation. ACTION: City of Santa Monica, Caltrans, and AECOM – *Completed* by adding queue loops

Drawing GC-021A 7th Street and Colorado Ave.

1. Verify existing striping and parking conditions on 7th Street. ACTION: AECOM - *Completed*
2. Install NB a lagged, protected left turn and adjust phase diagram to reflect this change. ACTION: AECOM - *Completed*
3. Detail D should be eliminated. Both NB and SB directions should reference Detail B. ACTION: AECOM - *Completed*

Drawing GC-022 6th Street and Colorado Ave.

1. SE corner of intersection has been fully improved. The City of Santa Monica recently forwarded the CADD files for inclusion into the revised PCHAR drawings. ACTION: City of Santa Monica and AECOM – *Completed*
2. A new Detail D should have a yellow "T" indication in lieu of a left-turn arrow for the WB bus turning movement along with the 3-section up-arrow heads. Adjust the phase diagram to reflect the change. ACTION: AECOM - *Completed*
3. Correct Detail C to reference EB only. ACTION: AECOM - *Completed*

Drawing GC-022A 5th Street and Colorado Ave.

1. Install 2'wide raised median on west leg of intersection between trackway and WB traffic lane. ACTION: AECOM - *Completed*
2. Include the proposed dashed yellow paint from the east leg to the west leg north of the tracks to indicate the LRV out-swing. ACTION: AECOM - *Completed*
3. Show pedestrian walkway from station crossing to SW corner of intersection with swing gates and flashers east of trackway. ACTION: AECOM – *Completed*
4. Place NB R/R pavement markings for the NB dedicated right turn lane south of the tracks. ACTION: AECOM - *Completed*
5. Change both NB and SB W48 sign to reflect 3 tracks. ACTION: AECOM - *Completed*
6. Install advance R/R warning signs W10-1 and W48 (3) signs for the EB movement near the pedestrian access. ACTION: AECOM - *Completed*
7. Install the W10-12 "Skewed Crossing" sign, the W11-1 bike symbol sign, the W16-1 "Share the Road" sign and the "Share the Road" pavement markings (Fig 9c-104 CAMUTCD) for the EB direction. ACTION: AECOM - *Completed*
8. Detail E should be redrawn to show LRA at 18' high, and the OLA signal head to be at least 20' high, while the LRB signal on the back side must be 18' high. ACTION: AECOM - *Completed*
9. Show a dimension of 18' for the height of LRT signal display on Detail F. ACTION: AECOM - *Completed*
10. Detail G should have 3-section with a green up-arrow. ACTION: AECOM - *Completed*
11. Detail H should have directional signs (such as "Pier" left arrow and "5th Street" right arrow) attached to the pedestrian barrier at the end of the station ramp. ACTION: AECOM - *Completed*
12. Place an LRA signal head (high mount) on the north side of Colorado Ave. in line with the outbound departure sight line for LRV's at the station (about 80 feet to the west of 5th Street). ACTION: AECOM - *Completed*
13. City of Santa Monica representatives agreed to allow the eastern N/S crosswalks on Colorado Avenue and 5th St. to be removed if it was necessary for safety reasons. ACTION: AECOM - *Completed*
14. After the Diagnostic Meetings, the City of Santa Monica requested that the traffic signal plans and any additional grade crossing warning devices for 4th St. and Colorado Ave. be included in the PCHAR since the LRT operations will affect this intersection. Currently, there are no plans to

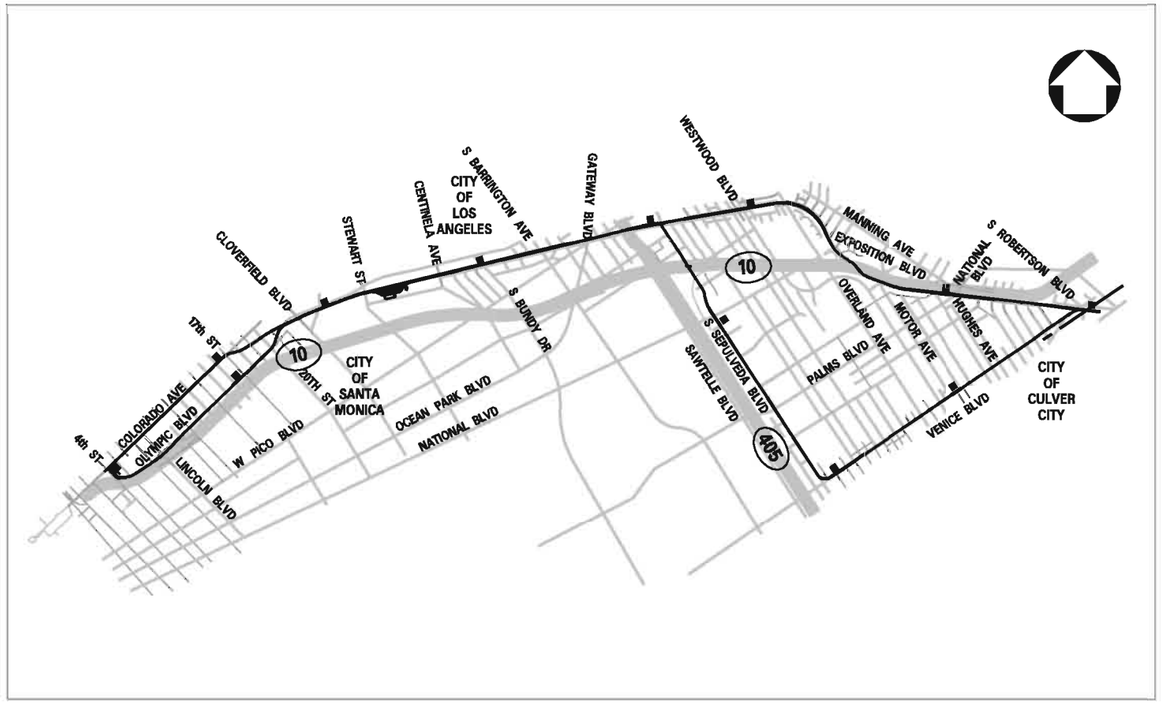
include any additional grade crossing warning devices on 4th St and Colorado Ave. and since there is no LRT crossing on 4th St., it should not be added to the PCHAR since this report concerns LRT crossings. ACTION: *None*

Appendix D:

Exposition Project Phase 2 Conceptual Engineering

FEIR Drawings Issued December 4, 2009

(FEIR Appendix E)



EXPOSITION PROJECT PHASE 2
CONCEPTUAL ENGINEERING
FINAL EIR

ISSUED: DECEMBER 4, 2009

APPENDIX E

EXPOSITION BOULEVARD LIGHT RAIL TRANSIT PROJECT

DMJM HARRIS | AECOM
300 S. GRAND AVENUE, SECOND FLOOR
LOS ANGELES, CALIFORNIA 90071
TEL (213) 330-7200 FAX (213) 330-7201

ACCEPTED _____ DATE _____
PROJECT MANAGER

LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY
Expo

ACCEPTED _____ DATE _____
PROJECT MANAGER

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INDEX OF DRAWINGS

SHEET NO	DWG NO	DRAWING TITLE
		GENERAL
	G-001	TITLE SHEET
	G-002	APPENDIX E INDEX OF DRAWINGS
	G-003	KEY MAP
	G-004	LIST OF ABBREVIATIONS

SHEET NO	DWG NO	DRAWING TITLE
		TRACK
	T-001	PLAN & PROFILE, STA 830+00 TO STA 852+26.08
	T-002	PLAN & PROFILE, STA 780+00 TO STA 830+00
	T-003	PLAN & PROFILE, STA 730+00 TO STA 780+00
	T-004	PLAN & PROFILE, STA 680+00 TO STA 730+00
	T-005	SEPULVEDA AT-GRADE ALTERNATIVE PLAN & PROFILE, STA 630+00 TO STA 680+00
	T-005A	SEPULVEDA GRADE SEPARATED ALTERNATIVE PLAN & PROFILE, STA 630+00 TO STA 680+00
	T-006	PLAN & PROFILE, STA 580+00 TO STA 630+00
	T-006A	WESTWOOD NO STATION PARKING ALTERNATIVE PLAN & PROFILE, STA 580+00 TO STA 630+00
	T-007	PLAN & PROFILE, STA 530+00 TO STA 580+00
	T-008	PLAN & PROFILE, STA 500+19 TO STA 530+00
	T-009	PLAN & PROFILE, STA 650+19 TO STA 710+00
	T-010	PLAN & PROFILE, STA 600+00 TO STA 650+00
	T-011	PLAN & PROFILE, STA 550+00 TO STA 600+00
	T-012	PLAN & PROFILE, STA 500+19 TO STA 550+00
	T-013	COLORADO BLVD PLAN & PROFILE, STA 810+00 TO STA 850+81.71
	T-013A	COLORADO BLVD ALTERNATE ALIGNMENT PLAN & PROFILE, STA 810+00 TO STA 850+81.71
	T-014	PLAN & PROFILE, STA 760+00 TO STA 810+00
	TX-001	TYPICAL SECTION TYPICAL TRACK SECTIONS SHEET 1 OF 6
	TX-002	TYPICAL SECTION TYPICAL TRACK SECTIONS SHEET 2 OF 6
	TX-003	TYPICAL SECTION TYPICAL TRACK SECTIONS SHEET 3 OF 6
	TX-004	TYPICAL SECTION TYPICAL TRACK SECTIONS SHEET 4 OF 6
	TX-005	TYPICAL SECTION TYPICAL TRACK SECTIONS SHEET 5 OF 6
	TX-006	TYPICAL SECTION TYPICAL TRACK SECTIONS SHEET 6 OF 6

SHEET NO	DWG NO	DRAWING TITLE
		CIVIL
	CP-100	STREET PLAN AND PROFILE SAWTELLE BLVD
	CP-200	STREET PLAN PICO/GATEWAY BLVD
	CI-100	GRADE CROSSING PLAN STEWART STREET
	CI-300	GRADE CROSSING PLAN BARRINGTON AVENUE
	CI-400	GRADE CROSSING PLAN RIGHT-OF-WAY ALIGNMENT SEPULVEDA BLVD SHEET 1 OF 2
	CI-401	GRADE CROSSING PLAN RIGHT-OF-WAY ALIGNMENT SEPULVEDA BLVD SHEET 2 OF 2
	CI-500	GRADE CROSSING PLAN WESTWOOD AVENUE
	CI-600	GRADE CROSSING PLAN OVERLAND AVENUE
	CI-700	GRADE CROSSING PLAN VENICE SEPULVEDA ALIGNMENT SEPULVEDA BLVD AT-GRADE

GENERAL NOTES:

1. ADDITIONAL DISCUSSION OF TPSS LOCATIONS MAY BE FOUND IN CHAPTER 3: ALTERNATIVES CONSIDERED OF THE FEIR.

2. PARKING LOT LAYOUTS ARE CONCEPTUAL IN NATURE. ACTUAL LAYOUT AND NUMBER OF SPACES TO BE PROVIDED WILL BE DETERMINED IN FINAL DESIGN. THE NUMBERS INCLUDED IN THE FEIR ARE MAXIMUM SPACE COUNTS FOR ENVIRONMENTAL CLEARANCE PURPOSES.

3. REMOVAL OF ON-STREET PARKING IS DESCRIBED IN THE SECTION 4.2 TRAFFIC AND CIRCULATION OF THE FEIR.

4. NOISE MITIGATION OPTIONS SUCH AS SOUND WALLS OR BERMS ARE CONCEPTUAL IN NATURE. ACTUAL NOISE MITIGATIONS TO BE DETERMINED IN FINAL DESIGN. FURTHER ANALYSIS IS DESCRIBED IN SECTION 5.6 NOISE AND VIBRATION OF THE FEIR.

CONCEPTUAL ENGINEERING

PRELIMINARY

THE PREPARATION OF THIS DRAWING HAS BEEN FINANCED BY THE TAXES OF THE CITIZENS OF LOS ANGELES COUNTY AND OF THE STATE OF CALIFORNIA.

REV	DATE	BY	APP	REG NO	EXPIRES	SEAL HOLDER	DESCRIPTION
	-	-	-	-	-		-

DESIGNED BY J. SUSILO
DRAWN BY M. AL-MASHAT
CHECKED BY L. MOHR
IN CHARGE J. PRIZNER
DATE 12/4/09

Exposition Metro Line Construction Authority
Expo

DMJM HARRIS | AECOM

300 S. GRAND AVENUE, SECOND FLOOR
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SUBMITTED

APPROVED

EXPOSITION TRANSIT PROJECT-PHASE 2
APPENDIX E
INDEX OF DRAWINGS

CONTRACT NO

DRAWING NO G-002 REV 0

SCALE NO SCALE

SHEET NO

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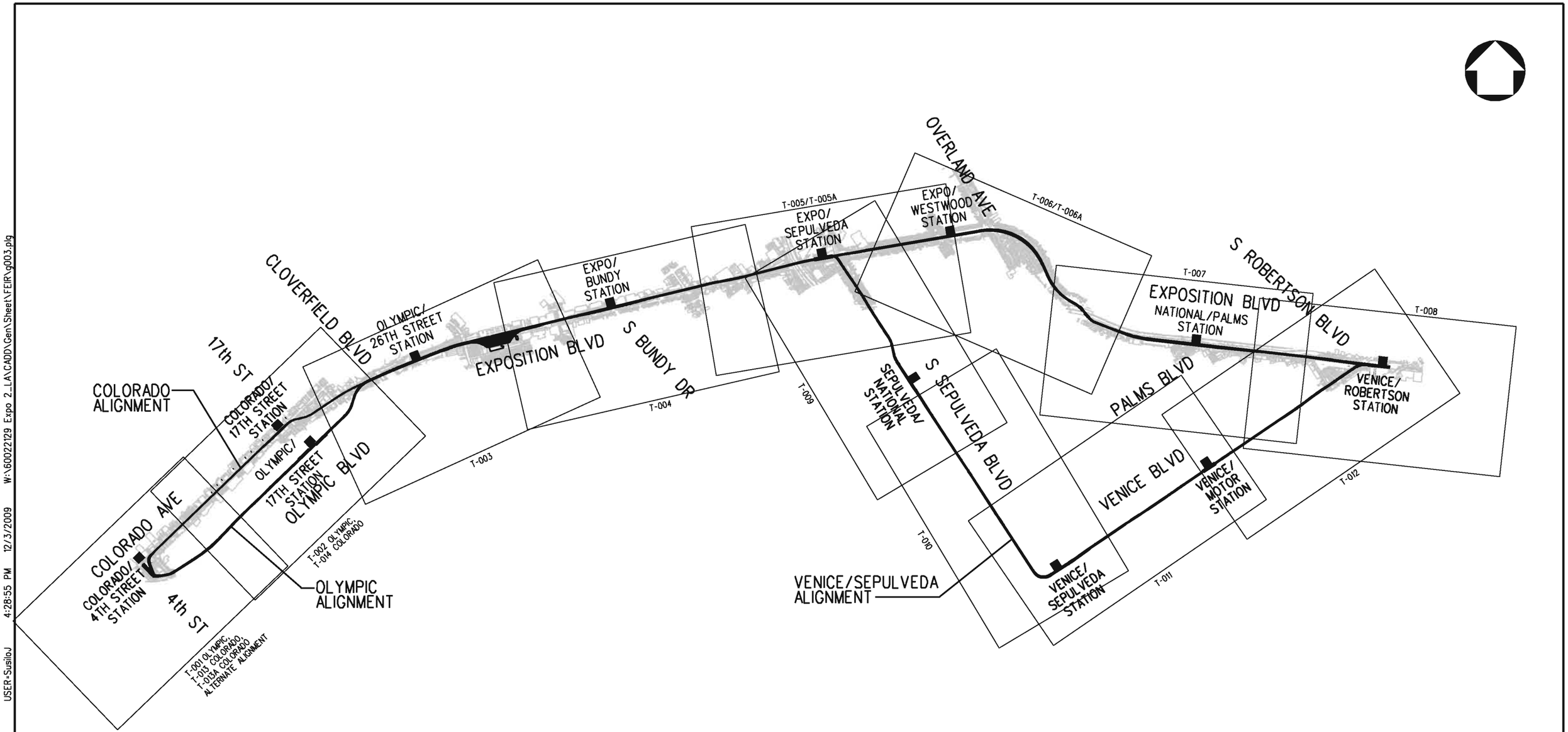

CONCEPTUAL ENGINEERING

PRELIMINARY

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REV	DATE	BY	APP	REG NO	EXPIRES	SEAL HOLDER	DESCRIPTION
	-	-	-	-	-		-

DESIGNED BY J. SUSILO
DRAWN BY M. AL-MASHAT
CHECKED BY L. MOHR
IN CHARGE J. PRIZNER
DATE 12/4/09

Exposition Metro Line Construction Authority
Expo

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SUBMITTED
APPROVED

EXPOSITION TRANSIT PROJECT-PHASE 2

KEY MAP

CONTRACT NO
DRAWING NO G-003
REV 0
SCALE NONE
SHEET NO

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LIST OF ABBREVIATIONS

ABAN	Abandon
ABAND	Abandoned
ABUT	Abutment
ABS	Acrylonitrile - butadiene - styrene
AC	Asphalt concrete
ACP	Asbestos cement pipe
ACWS	Asphalt concrete wearing surface
AD	Area Drain
ADA	Americans with Disabilities Act
ADAAG	Americans with Disabilities Act Accessibility Guidelines
AGB	Alley grating basin
ALT	Alternate
AMER STD	American Standard
APPROX	Approximate
APWA	American Public Works Association
ATSAC	Automated Traffic Surveillance and Control System
AWG	American Wire Gage (nonferrous wire)
BB	Beginning of Bridge
BC	Beginning of curve
BCR	Beginning of curb return
BDRY	Boundary
BEG	Begin
BF	Bottom of footing
BLDG	Building
BM	Bench mark
BOW	Back of Sidewalk
BPW	Board of Public Works
BSJ	Bell and spigot joint
BSL	Bureau of Street Lighting
BVC	Beginning of vertical curve
B/W	Back of wall
C/C	Center to center
CAB	Crushed aggregate base
CAP	Corrugated aluminum pipe
CB	Catch Basin, Construction Baseline
Cb	Curb
CBP	Catch Basin Connection Pipe
CBR	California Bearing Ratio
CCR	California Code of Regulations
CCTV	Closed Circuit TV
CEFB	City Engineer Field Book
CF	Curb face or Cubic foot
C&G	Curb and gutter
CGB	Curbside grating basin
CFR	Code of Federal Regulations
CI	Cast Iron
CIDH	Cast-in-drilled-hole
CIP	Cast iron pipe or Cast-in-place
CIPP	Cast-in place pipe
CL	Clearance, center line
CLF	Chain link fence
CLSM	Controlled Low Strength Material
CMB	Crushed miscellaneous base
CMC	Cement mortar-coated
CML	Cement mortar-lined
CO	Cleanout (sewer)
COL	Column
CONC	Concrete
CONN	Connection
CONST	Construct, Construction
COORD	Coordinate
C/S	Communications/Signaling
CSP	Corrugated steel pipe
CTB	Cement treated base
CV	Check valve
CY	Cubic yard
D	Load of pipe
DB	Design Builder
dB	Decibels
DBE	Disadvantaged Business Enterprise
DBL	Double
DF	Douglas fir
DG	Decomposed Granite
DIA	Diameter
DIP	Ductile Iron Pipe
DL	Dead load
DMBB	Double metal beam barrier
DT	Drain Tile
DU	Duct
DWG	Drawing
DWPPS	Los Angeles Department of Water & Power, Power System
DWPWS	Los Angeles Department of Water & Power, Water System
DWY	Driveway
DWY APR	Driveway approach
E	East
EA	Each
EB	Eastbound
EB	End of bridge
EC	End of curve
ECR	End of curb return
EF	Each face
EG	Edge of gutter
EGL	Energy grade line
EI	Elevation
ELC	Electrolier lighting conduit
ELT	Extra long ton
ENGR	Engineer, Engineering
EP	Edge of pavement
ESMT	Easement
ETB	Emulsion-treated base
EVC	End of vertical curb
EXC	Excavation
EXP JT	Expansion joint
EXST, EXIST	Existing
F	Fahrenheit
F&C	Frame and cover
F&I	Furnish and install
FAB	Fabricate
FAS	Flashing arrow sign
FD	Floor drain
FDN	Foundation
FED SPEC	Federal Specification
FG	Finished grade
FH	Fire hydrant
FL	Flow line
FS	Finished surface
FTA	Fully traffic actuated
FT-LB	Foot-pound
FTG	Footing
FW	Face of wall
FWY	Freeway
GA	Gauge
GALV	Galvanized
G	Gas
GB	Grade Break
GC	Grade change
GIP	Galvanized iron pipe
GL	Ground line or grade line
GM	Gas meter
GP	Guy pole
GR	Grade
GRTG	Grating
GSP	Galvanized steel pipe
GTE	General Telephone Company
H	High or height
HB	Hose bib
HC	House connection
HDPE	High Density Polyethylene
HDWL	Headwall
HGL	Hydraulic grade line
HORIZ	Horizontal
HP	High Point
HPG	High pressure gas
HPS	High pressure sodium (Light)
HS	High strength
HYDR	Hydraulic
ID	Inside diameter
INCL	Including
INSP	Inspection
INV	Invert
IP	Iron pipe
IPW	Inspector of Public Works
JC	Junction chamber
JCT	Junction
JS	Junction structure
JT	Joint
KV	Kilovolt
L	Length
LA	Los Angeles
LAB	Laboratory
LADGS	Los Angeles Department of General Services
LADOT	Los Angeles Department of Transportation
LACDPW	Los Angeles County Department of Public Works
LAT	Lateral
LB	Pound
LD	Local depression
LF	Linear foot
LH	Lamp hole, Left-Hand
LL	Live load
LOL	Layout line
LONG	Longitudinal
LP	Lamp post/Low Point
LPS	Low pressure sodium (Light)
LRT	Light Rail Transit
LS	Lump sum
LT	Left
LTS	Lime treated soil
M	Medium
MA	Mast Arm
MAINT	Maintenance
MAX	Maximum
MB	Metal beam
MBB	Metal beam barrier
MBGR	Metal beam guard railing
MBE	Minority Business Enterprise
MCR	Middle of curb return
MEAS	Measure
MED	Median
MH	Maintenance hole
MIL SPEC	Military Specification
MIN	Minimum
MISC	Miscellaneous
MOD	Modified, modify
MON	Monument
MSM	Mandatory subcontracting minimum
METRO	Metropolitan Transportation Authority (of LA County)
MTH	Month
MTL	Material
MULT	Multiple
MVL	Mercury vapor light
MWD	Metropolitan Water district
N	North
NRCP	Nonreinforced concrete pipe
OBE	Other Business Enterprise
OBS	Obsolete
OC	On center
OCS	Overhead Catenary System
OG	Original Ground/Grade
OD	Outside diameter
OE	Outer edge
OH	Overhead
OPP	Opposite
ORIG	Original
PACBELL	Pacific Bell (SBC)
PB	Pull box
PC	Point of curvature
PCC	Portland cement concrete or Point of compound curvature
PCVC	Point of compound vertical curve
PE	Polyethylene
PED	Pedestrian
PG	Profile Grade
PI	Point of intersection
PL	Property line
PMB	Processed miscellaneous base
POC	Point on curve
POT	Point on tangent
PP	Power pole
PRC	Point of reverse curve
PRVC	Point of reverse vertical curve
PS	Point of Switch
PSI	Pounds per square inch
PT	Point of tangency
PVC	Polyvinyl chloride / Point of vertical curve
PVI	Point of Vertical Intersection
PVMT	Pavement
PVT R/W	Private right-of-way / Point of vertical tangency
Q	Rate of flow in cubic feet per second
QUAD	Quadrangle, Quadrant
R	Radius, Right
R&O	Rock and oil
R/W	Right-of-way
RA	Recycling agent
RAC	Recycled asphalt concrete
RAP	Reclaimed asphalt pavement
RBAC	Rubberized asphalt concrete
RC	Reinforced concrete
RCB	Reinforced concrete box
RCC	Rail Construction Corporation
RCE	Registered civil engineer
RCP	Reinforced concrete pipe
RCV	Remote control valve
REF	Reference
REINF	Reinforced or reinforcement
RES	Reservoir
RH	Right-Hand
RGE	Registered geotechnical engineer
ROW	Right of Way
RR	Railroad
RT	Right
RSE	Registered structural engineer
RTE	Registered traffic engineer
RW	Retaining Wall
S	Slope, South
SBC	SBC TELEPHONE (NOW AT&T)
SCCP	Steel cylinder concrete pipe
SCG	Southern California Gas Company
SCHED	Schedule
SCRRA	Southern California Regional Rail Authority
SD	Storm drain
SDR	Standard thermoplastic pipe dimension ratio (ratio of pipe O.D. to minimum wall thickness)
SEC	Section
SF	Square foot
SI	International System of Units (Metric)
SOCB	Side opening catch basin
SPEC	Specifications
SPPWC	Standard Plans for Public Works Construction
SR	Standard ratio
SRJ	Steel ring joint (for RCP)
SS	Sanitary sewer
SSB	Select sub-base
SSM	Standard Survey Monument
SSPK	Survey Spike
SSPWC	Standard Specifications for Public Works Construction
ST HWY	State highway
STA	Station, Stationing
STD	Standard
STR	Straight
STR GR	Straight grade
STRUC	Structural/Structure
SW	Sidewalk
SWD	Sidewalk drain
SY	Square yard
TAN	Tangent
TC	Top of curb/Track Center
TCP	Traffic control plan
TEL	Telephone
TF or T/F	Top of footing
TG	Top of Grate
TH	Test hole
TOPO	Topography
TP	Traction Power
TPSS	Traction Power Substation
TOR	Top of Rail
TR	Tract
TRANS	Transition
TS	Traffic signal or transition structure
TSC	Traffic signal conduit
TSS	Traffic signal standard
TV	Television
TW	Top of wall
TYP	Typical
USA	Underground Service Alert
VAR	Varies, Variable
VB	Valve box
VC	vertical curve
VCP	Vitrified clay pipe
VERT	Vertical
VOL	Volume
VT	Variable thickness
W	Wider, width, water, west
WATCH	Work Area Traffic Control Handbook
WB	Westbound
WBE	Women Business Enterprise
WI	Wrought iron
WM	Water meter
WPJ	Weakened plane joint
WUT	Western Union Telegraph
XCONN	Cross connection
XO	Crossover
XSEC	Cross section

CONCEPTUAL ENGINEERING

PRELIMINARY

REV	DATE	BY	APP	REG NO	EXPIRES	SEAL HOLDER	DESCRIPTION
	-	-	-	-	-		-

DESIGNED BY J. SUSILO
DRAWN BY M. AL-MASHAT
CHECKED BY L. MOHR
IN CHARGE J. PRIZNER
DATE 12/4/09

Exposition Metro Line Construction Authority
Expo

DMJM HARRIS | AECOM

300 S. GRAND AVENUE, SECOND FLOOR
LOS ANGELES, CALIFORNIA 90071
TEL (213) 330-7200 FAX (213) 330-7201

SUBMITTED
APPROVED

EXPOSITION TRANSIT PROJECT-PHASE 2

LIST OF ABBREVIATIONS

CONTRACT NO
DRAWING NO G-004
REV 0
SCALE NTS
SHEET NO

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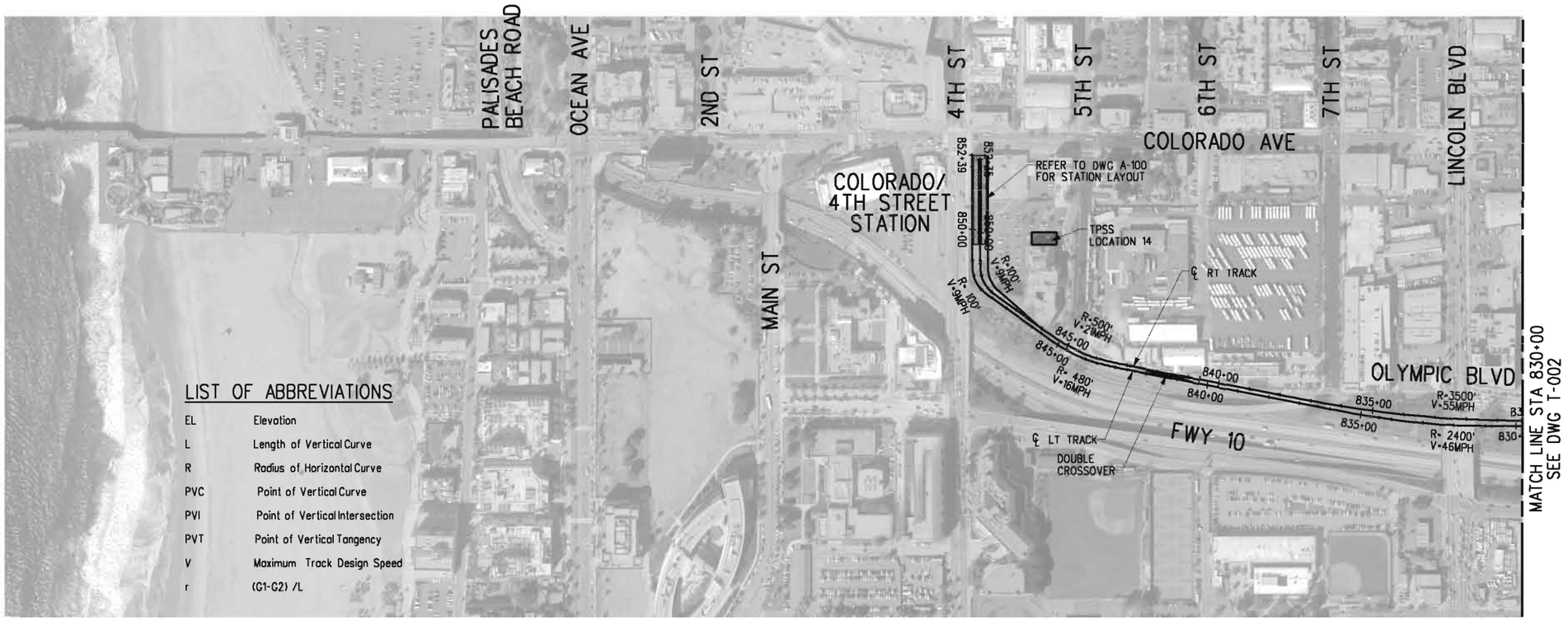
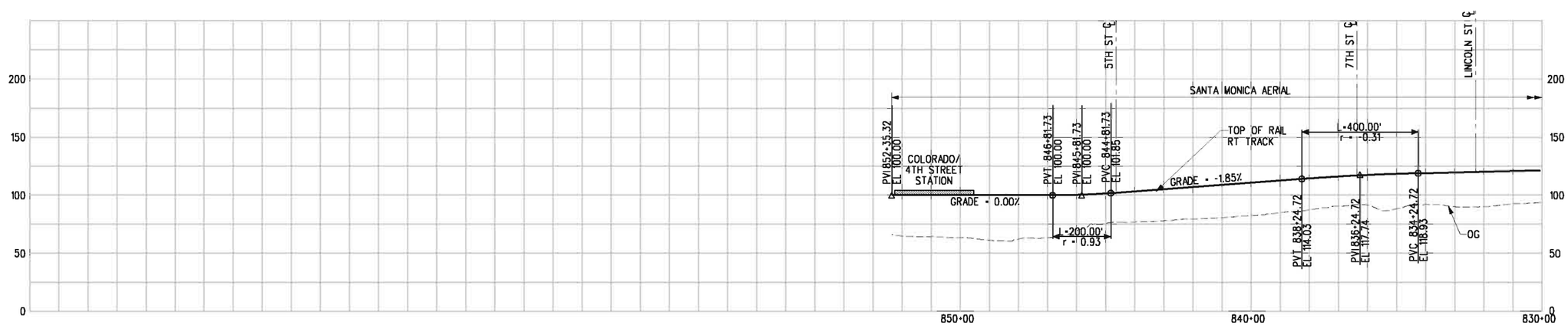


LIST OF ABBREVIATIONS

EL	Elevation
L	Length of Vertical Curve
R	Radius of Horizontal Curve
PVC	Point of Vertical Curve
PVI	Point of Vertical Intersection
PVT	Point of Vertical Tangency
V	Maximum Track Design Speed
r	(G1-G2) /L

PLAN



50' 0 50' 100' 100' 0 200' 400'

CONCEPTUAL ENGINEERING

RT TRACK PROFILE

PRELIMINARY

THE PREPARATION OF THIS DRAWING HAS BEEN FINANCED BY THE TAXES OF THE CITIZENS OF LOS ANGELES COUNTY AND OF THE STATE OF CALIFORNIA.

REV	DATE	BY	APP	REG NO	EXPIRES	SEAL HOLDER	DESCRIPTION
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DESIGNED BY J. SUSILO
DRAWN BY M. AL-MASHAT
CHECKED BY L. MOHR
IN CHARGE J. PRIZNER
DATE 12/4/09

Exposition Metro Line Construction Authority
Expo

DMJM HARRIS | AECOM
300 S. GRAND AVENUE, SECOND FLOOR
LOS ANGELES, CALIFORNIA 90071
TEL (213) 330-7200 FAX (213) 330-7201

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APPROVED

EXPOSITION TRANSIT PROJECT-PHASE 2

PLAN AND PROFILE
STA 830+00 TO STA 852+35.32

CONTRACT NO
DRAWING NO T-001
REV 0
SCALE 1"=200'-0" 1"=50'-0"
SHEET NO

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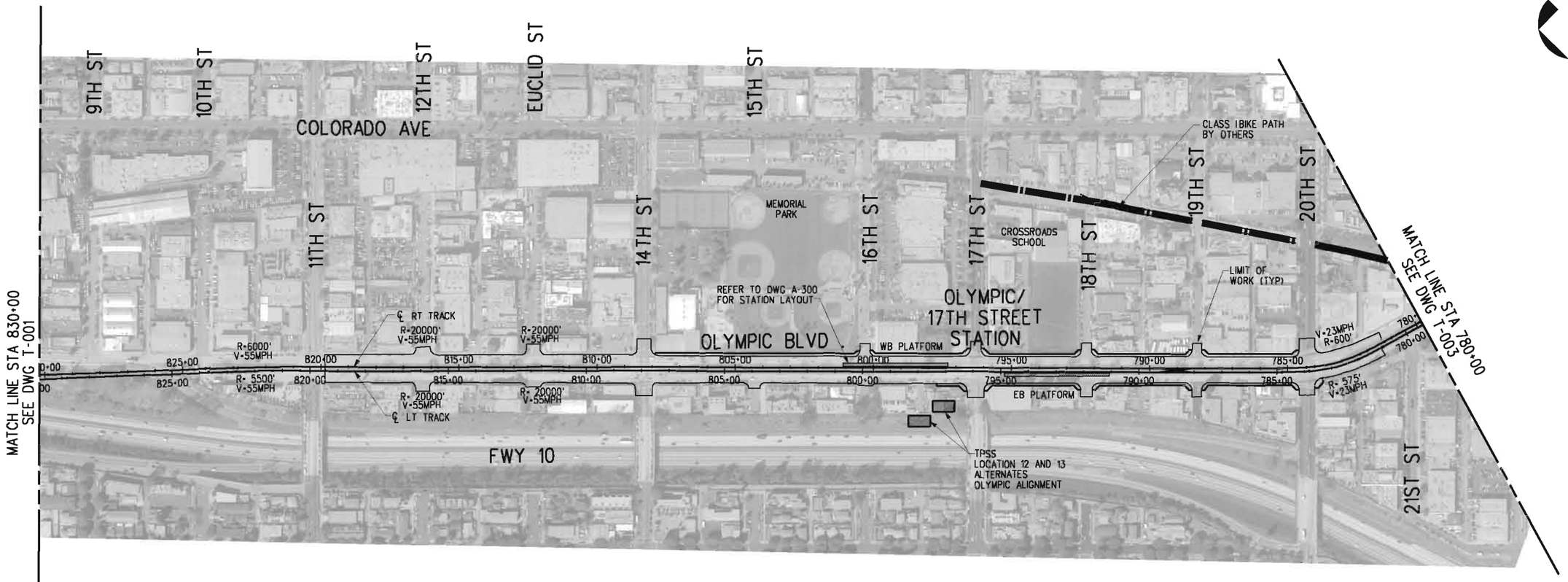

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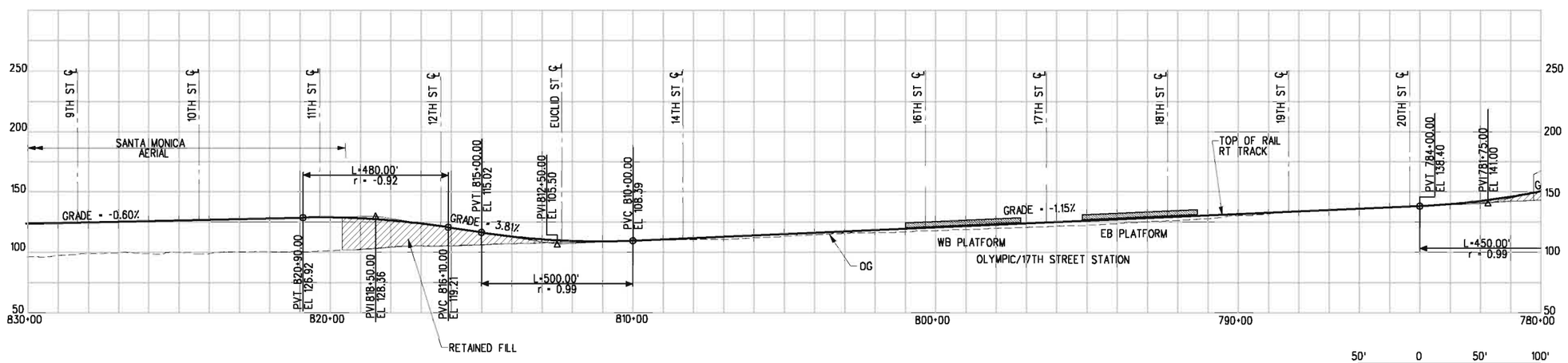

50' 0 50' 100' 100' 0 200' 400'

CONCEPTUAL ENGINEERING

RT TRACK PROFILE

PRELIMINARY

THE PREPARATION OF THIS DRAWING HAS BEEN FINANCED BY THE TAXES OF THE CITIZENS OF LOS ANGELES COUNTY AND OF THE STATE OF CALIFORNIA.

REV	DATE	BY	APP	REG NO	EXPIRES	SEAL HOLDER	DESCRIPTION
	-	-	-	-	-		-

DESIGNED BY J. SUSILO
DRAWN BY M. AL-MASHAT
CHECKED BY L. MOHR
IN CHARGE J. PRIZNER
DATE 12/4/09

Exposition Metro Line Construction Authority
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LOS ANGELES, CALIFORNIA 90071
TEL (213) 330-7200 FAX (213) 330-7201

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EXPOSITION TRANSIT PROJECT-PHASE 2

PLAN AND PROFILE
STA 780+00 TO STA 830+00

CONTRACT NO
DRAWING NO T-002
REV 0
SCALE 1" =200'-0" 1" =50'-0"
SHEET NO

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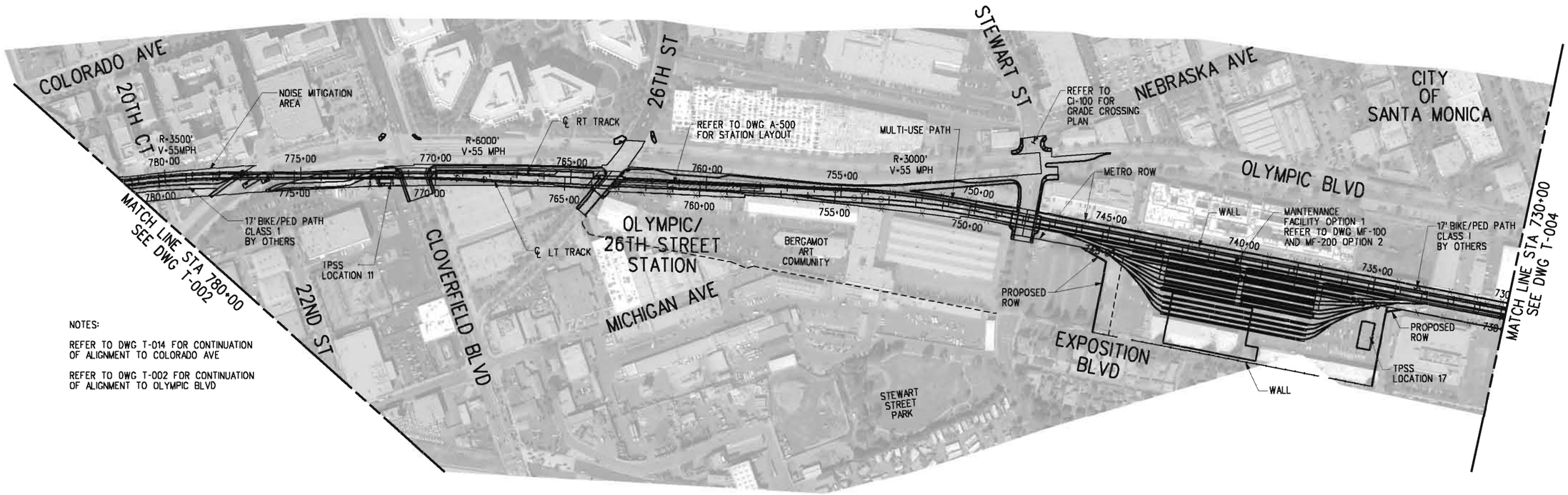
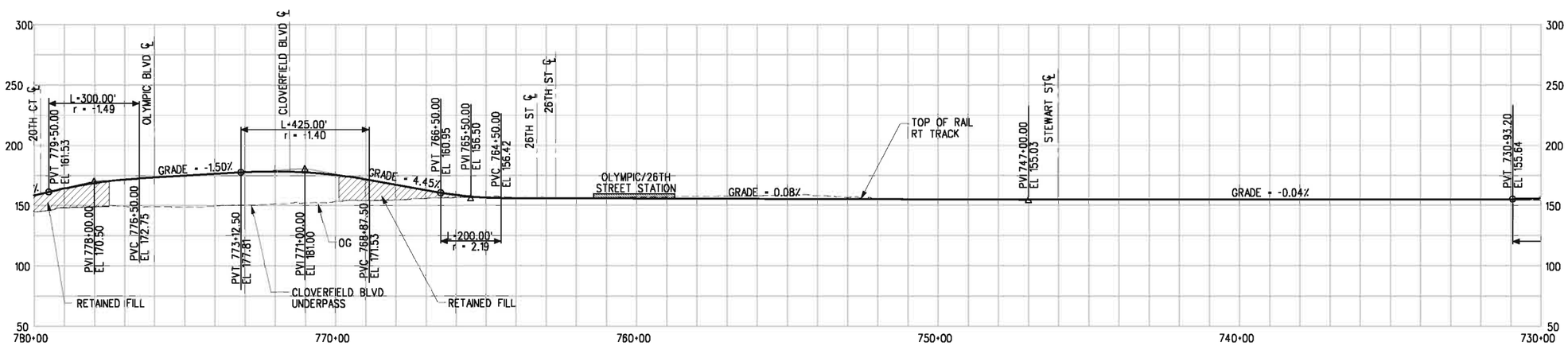


NOTES:

REFER TO DWG T-014 FOR CONTINUATION OF ALIGNMENT TO COLORADO AVE

REFER TO DWG T-002 FOR CONTINUATION OF ALIGNMENT TO OLYMPIC BLVD

PLAN



50' 0 50' 100'

100' 0 200' 400'

CONCEPTUAL ENGINEERING

RT TRACK PROFILE

PRELIMINARY

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REV	DATE	BY	APP	REG NO	EXPIRES	SEAL HOLDER	DESCRIPTION
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DESIGNED BY J. SUSILO
DRAWN BY M. AL-MASHAT
CHECKED BY L. MOHR
IN CHARGE J. PRIZNER
DATE 12/4/09

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EXPOSITION TRANSIT PROJECT-PHASE 2

PLAN AND PROFILE
STA 730+00 TO STA 780+00

CONTRACT NO
DRAWING NO T-003
REV 0
SCALE 1"=200'-0" 1"=50'-0"
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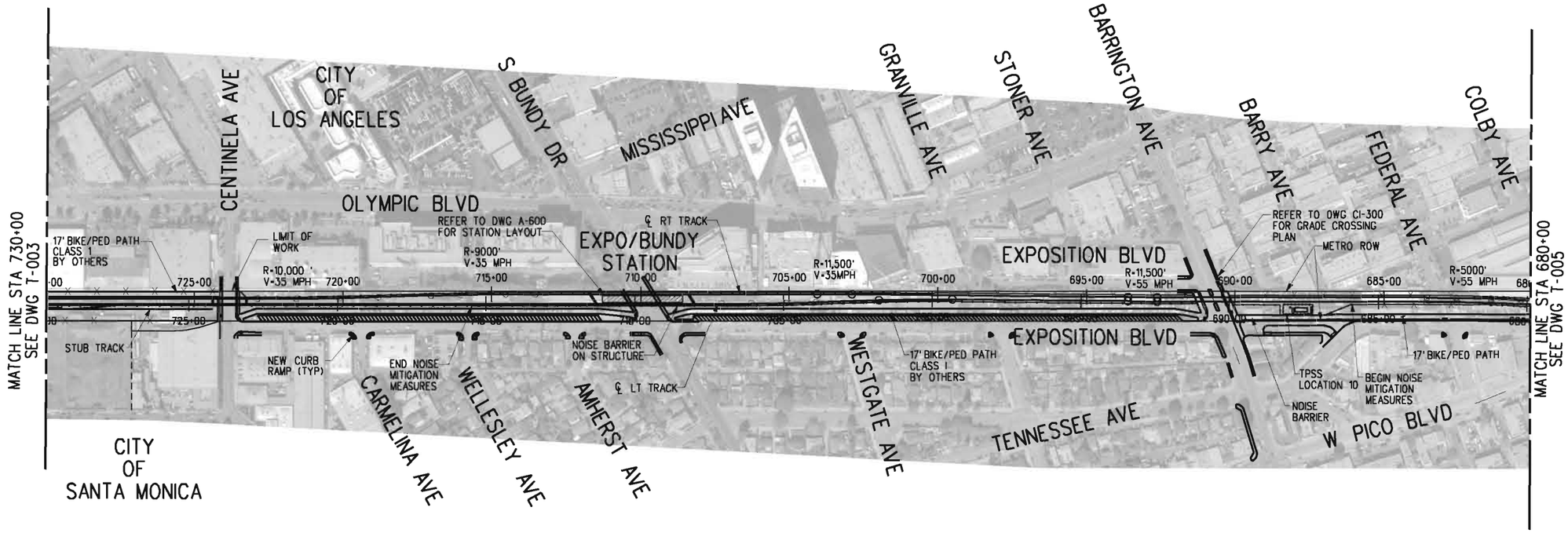

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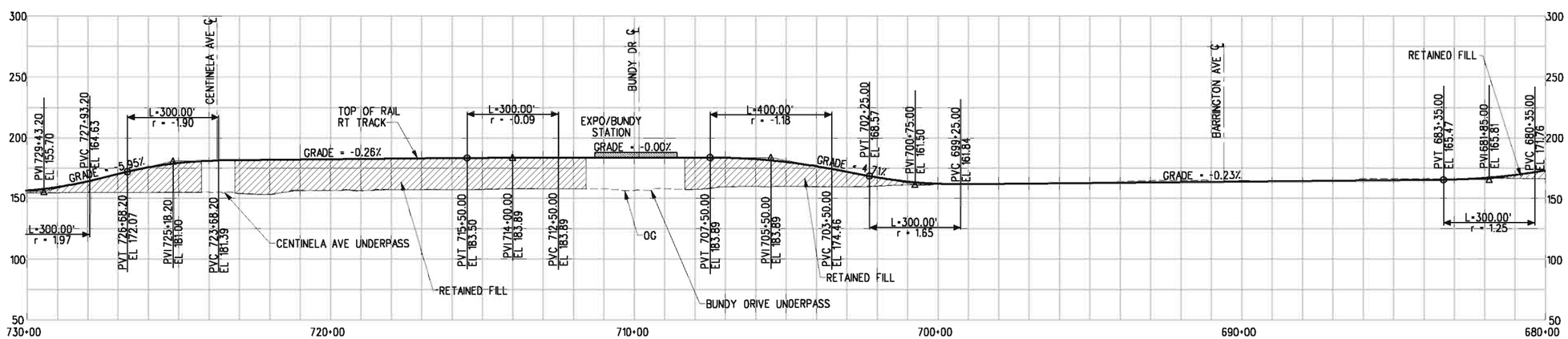

CONCEPTUAL ENGINEERING

RT TRACK PROFILE

50' 0 50' 100'

100' 0 200' 400'

PRELIMINARY

THE PREPARATION OF THIS DRAWING HAS BEEN FINANCED BY THE TAXES OF THE CITIZENS OF LOS ANGELES COUNTY AND OF THE STATE OF CALIFORNIA.

REV	DATE	BY	APP	REG NO	EXPIRES	SEAL HOLDER	DESCRIPTION
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DESIGNED BY J. SUSILO
DRAWN BY M. AL-MASHAT
CHECKED BY L. MOHR
IN CHARGE J. PRIZNER
DATE 12/4/09

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LOS ANGELES, CALIFORNIA 90071
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EXPOSITION TRANSIT PROJECT-PHASE 2

PLAN AND PROFILE
STA 680+00 TO STA 730+00

CONTRACT NO
DRAWING NO T-004
REV 0
SCALE 1"=200'-0" 1"=50'-0"
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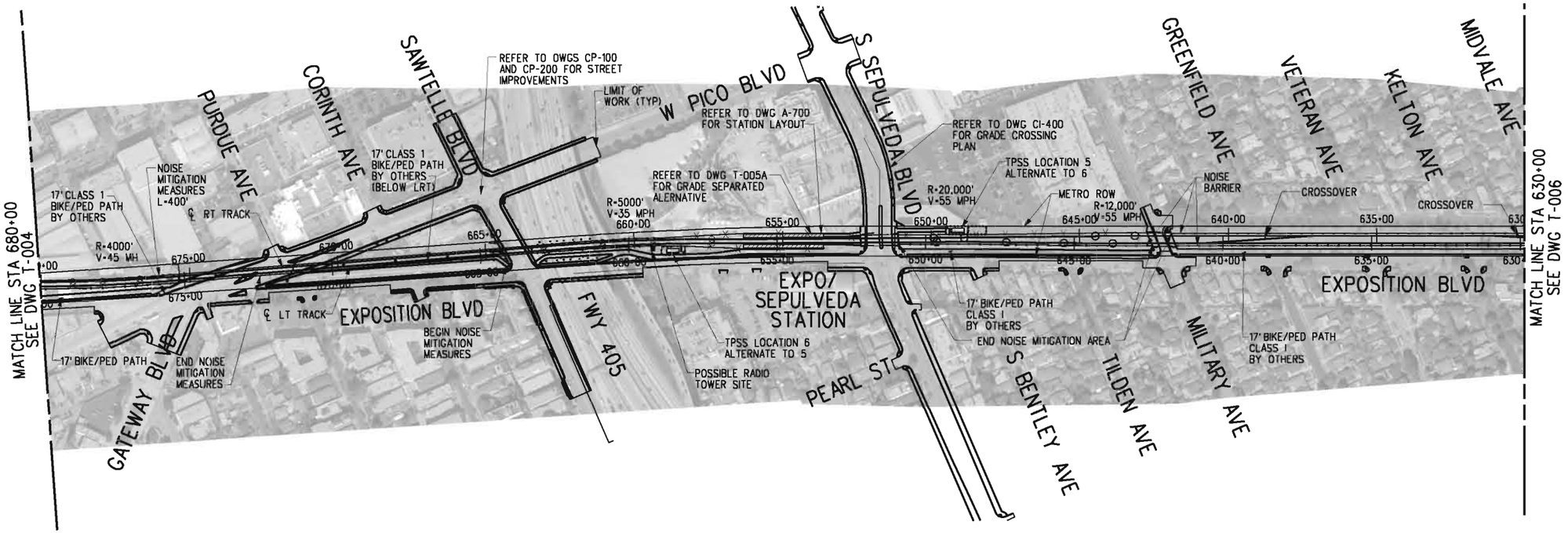

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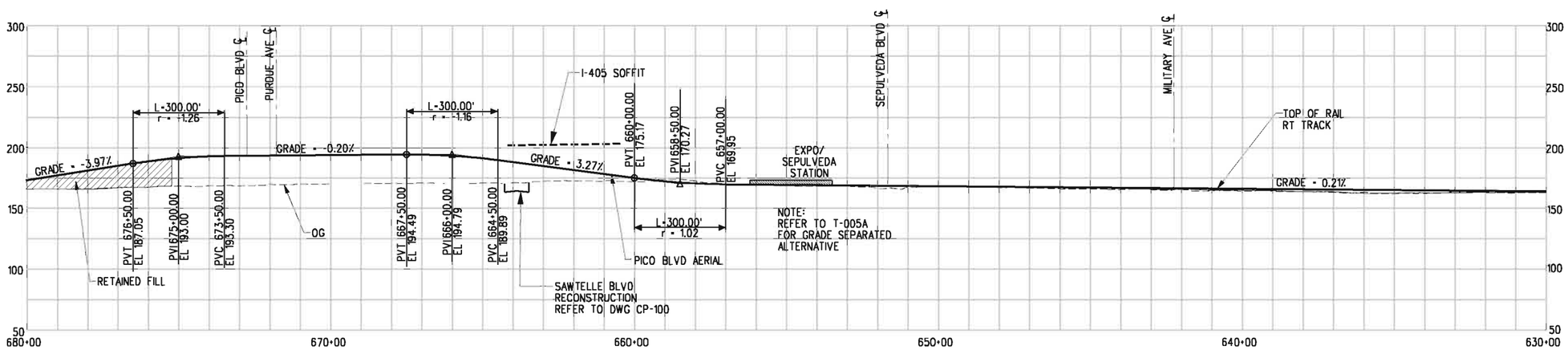

CONCEPTUAL ENGINEERING

RT TRACK PROFILE

50' 0 50' 100' 100' 0 200' 400'

PRELIMINARY

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REV	DATE	BY	APP	REG NO	EXPIRES	SEAL HOLDER	DESCRIPTION
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DESIGNED BY J. SUSILO
DRAWN BY M. AL-MASHAT
CHECKED BY L. MOHR
IN CHARGE J. PRIZNER
DATE 12/4/09

Exposition Metro Line Construction Authority
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LOS ANGELES, CALIFORNIA 90071
TEL (213) 330-7200 FAX (213) 330-7201

SUBMITTED
APPROVED

EXPOSITION TRANSIT PROJECT-PHASE 2
SEPULVEDA AT-GRADE ALTERNATIVE
PLAN AND PROFILE
STA 630+00 TO STA 680+00

CONTRACT NO
DRAWING NO T-005
REV 0
SCALE 1" =200' -0" 1" =50' -0"
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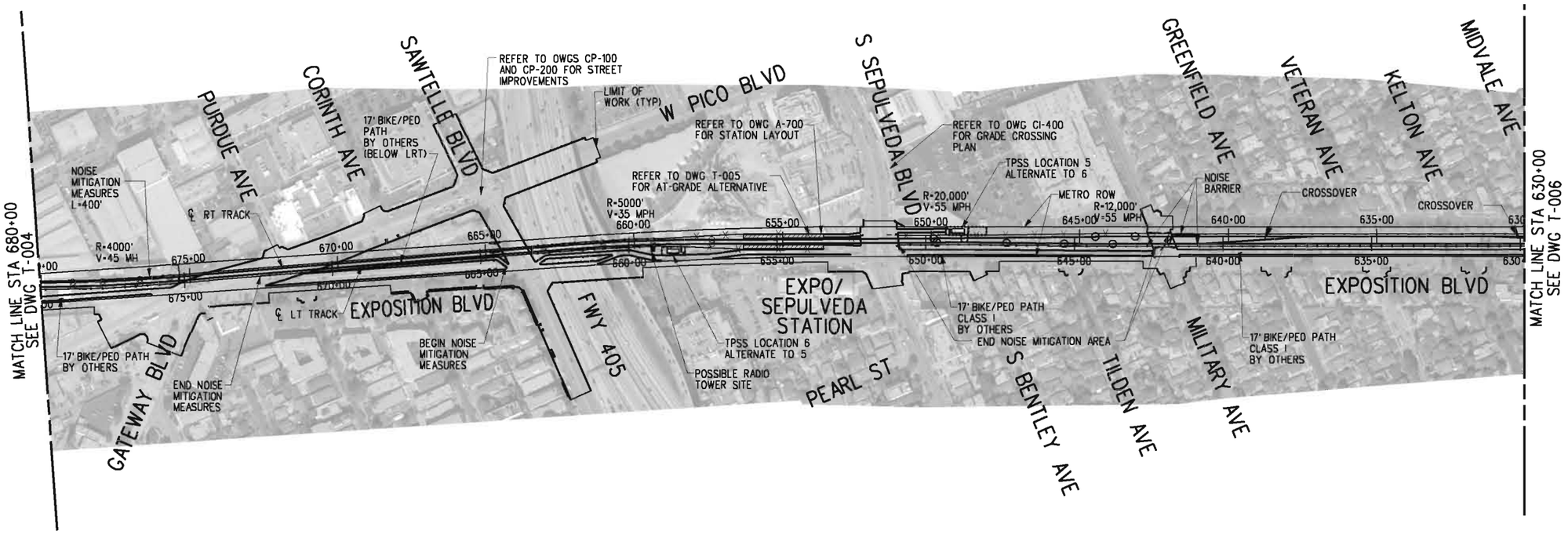

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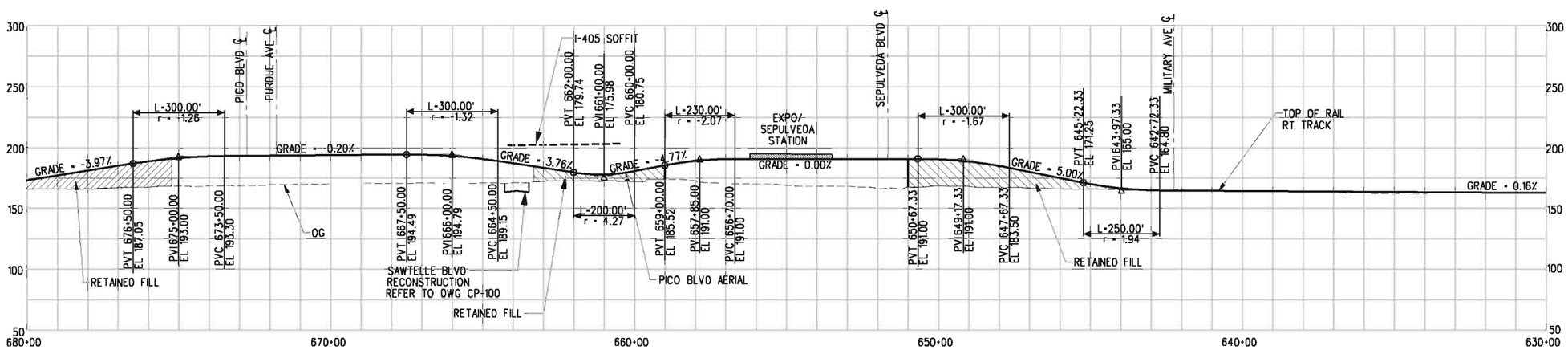

CONCEPTUAL ENGINEERING

RT TRACK PROFILE

50' 0 50' 100' 100' 0 200' 400'

PRELIMINARY

THE PREPARATION OF THIS DRAWING HAS BEEN FINANCED BY THE TAXES OF THE CITIZENS OF LOS ANGELES COUNTY AND OF THE STATE OF CALIFORNIA.

REV	DATE	BY	APP	REG NO	EXPIRES	SEAL HOLDER	DESCRIPTION
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DESIGNED BY J. SUSILO
DRAWN BY M. AL-MASHAT
CHECKED BY L. MOHR
IN CHARGE J. PRIZNER
DATE 12/4/09

Exposition Metro Line Construction Authority
Expo

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LOS ANGELES, CALIFORNIA 90071
TEL (213) 330-7200 FAX (213) 330-7201

SUBMITTED
APPROVED

EXPOSITION TRANSIT PROJECT-PHASE 2
SEPULVEDA GRADE SEPARATED ALTERNATIVE
PLAN AND PROFILE
STA 630+00 TO STA 680+00

CONTRACT NO
DRAWING NO T-005A
REV 0
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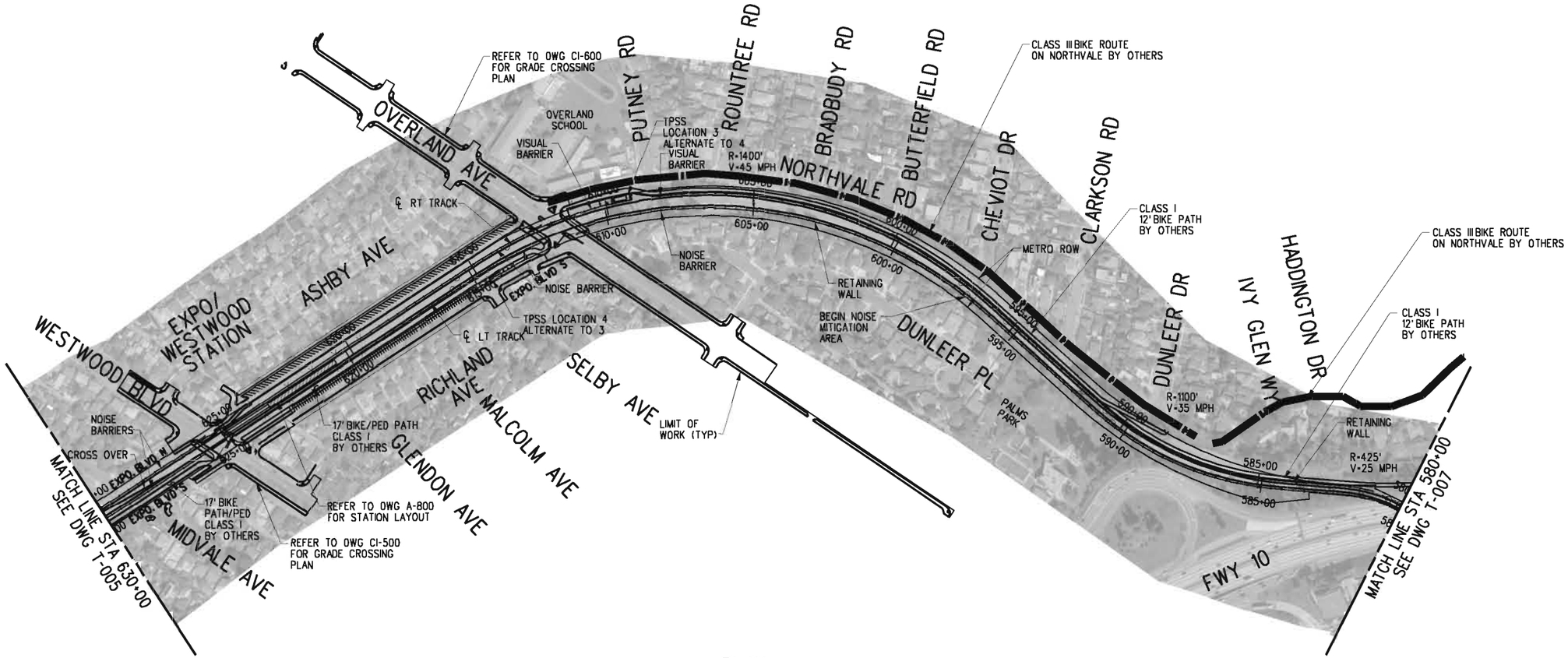

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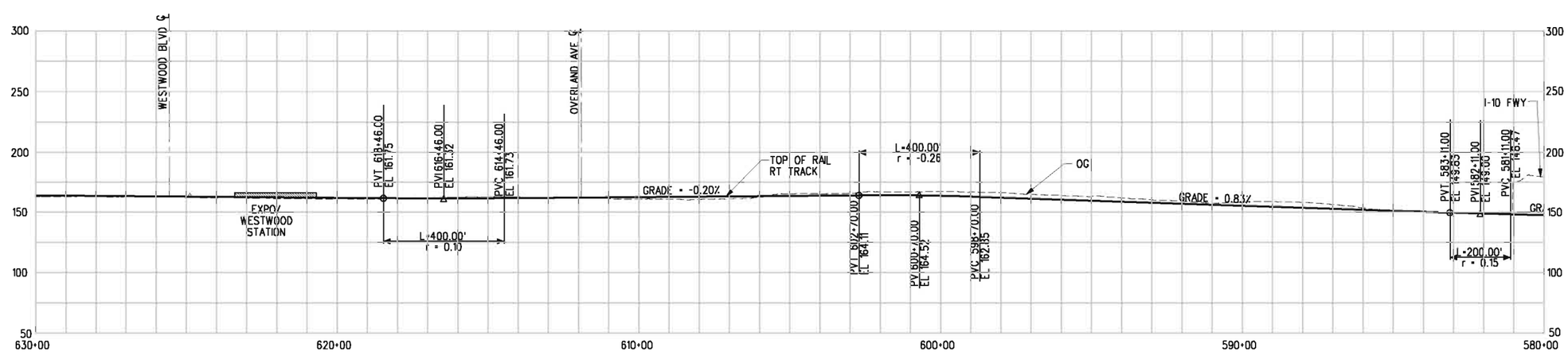

50' 0 50' 100'

100' 0 200' 400'

CONCEPTUAL ENGINEERING

RT TRACK PROFILE

PRELIMINARY

THE PREPARATION OF THIS DRAWING HAS BEEN FINANCED BY THE TAXES OF THE CITIZENS OF LOS ANGELES COUNTY AND OF THE STATE OF CALIFORNIA.

REV	DATE	BY	APP	REG NO	EXPIRES	SEAL HOLDER	DESCRIPTION
	-	-	-	-	-		-

DESIGNED BY J. SUSILO
DRAWN BY M. AL-MASHAT
CHECKED BY L. MOHR
IN CHARGE J. PRIZNER
DATE 12/4/09

Exposition Metro Line Construction Authority
Expo

DMJM HARRIS | AECOM
300 S. GRAND AVENUE, SECOND FLOOR
LOS ANGELES, CALIFORNIA 90071
TEL (213) 330-7200 FAX (213) 330-7201

SUBMITTED
APPROVED

EXPOSITION TRANSIT PROJECT-PHASE 2

PLAN AND PROFILE
STA 580+00 TO STA 630+00

CONTRACT NO
DRAWING NO T-006
REV 0
SCALE 1" =200'-0" 1" =50'-0"
SHEET NO

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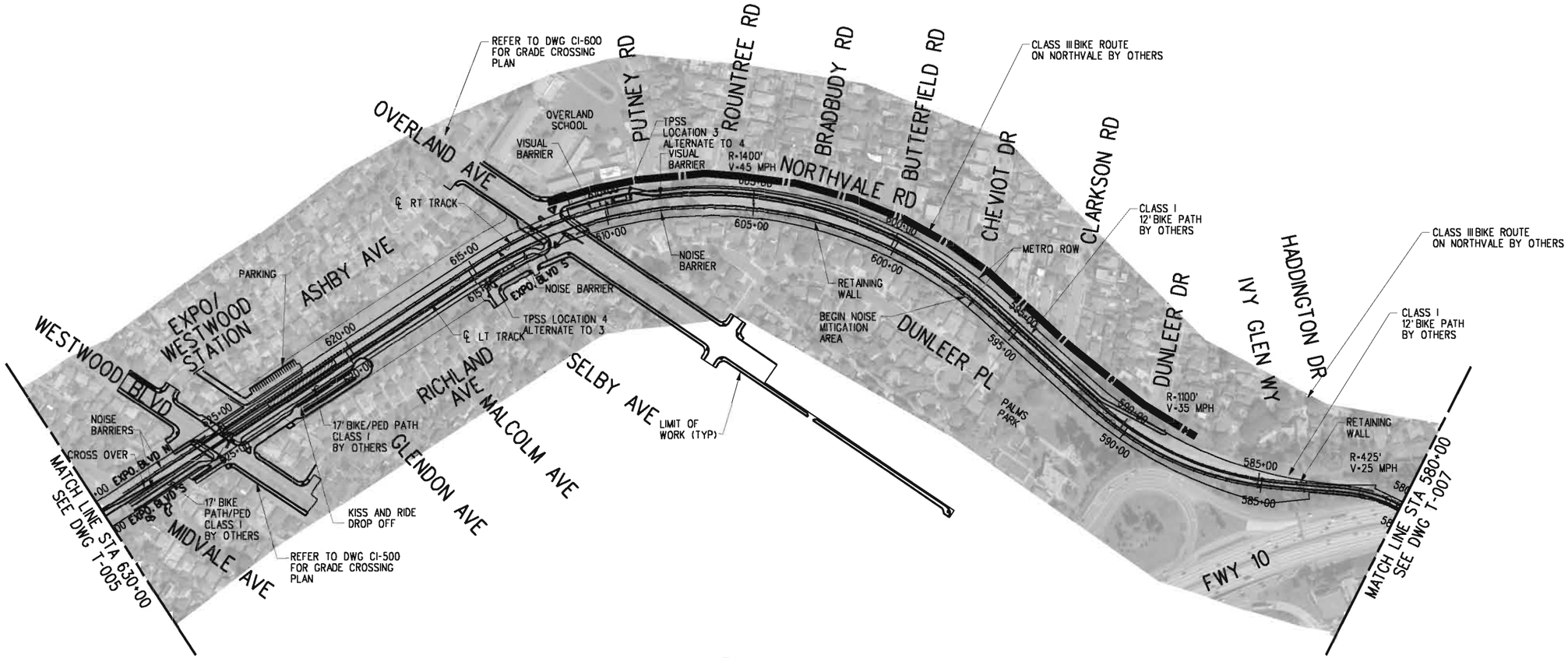

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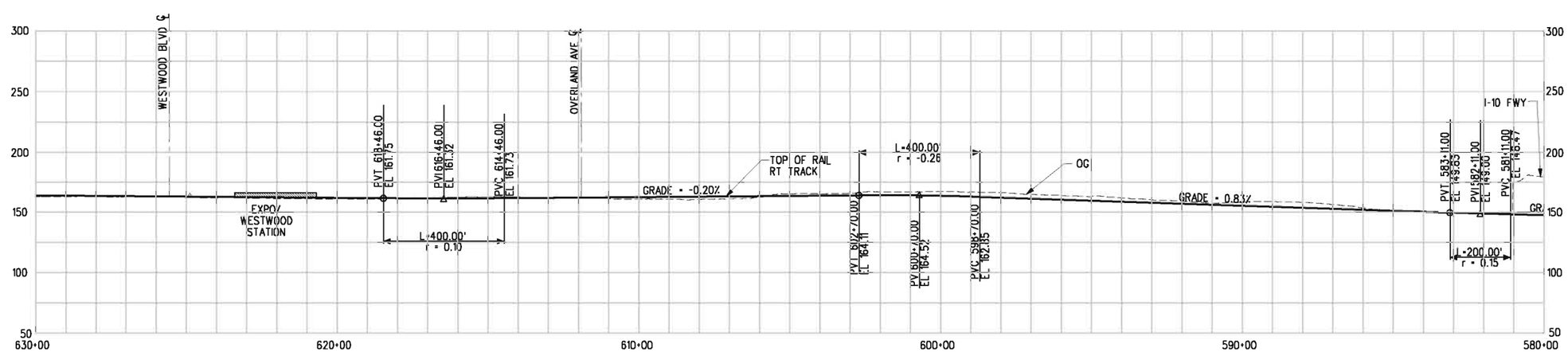

CONCEPTUAL ENGINEERING

RT TRACK PROFILE

50' 0 50' 100'

100' 0 200' 400'

PRELIMINARY

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REV	DATE	BY	APP	REG NO	EXPIRES	SEAL HOLDER	DESCRIPTION
	-	-	-	-	-		-

DESIGNED BY J. SUSILO
DRAWN BY M. AL-MASHAT
CHECKED BY L. MOHR
IN CHARGE J. PRIZNER
DATE 12/4/09

Exposition Metro Line Construction Authority
Expo

DMJM HARRIS | AECOM

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LOS ANGELES, CALIFORNIA 90071
TEL (213) 330-7200 FAX (213) 330-7201

SUBMITTED
APPROVED

EXPOSITION TRANSIT PROJECT-PHASE 2
WESTWOOD NO STATION PARKING ALTERNATIVE
PLAN AND PROFILE
STA 580+00 TO STA 630+00

CONTRACT NO
DRAWING NO T-006A
REV 0
SCALE 1" =200'-0" 1" =50'-0"
SHEET NO

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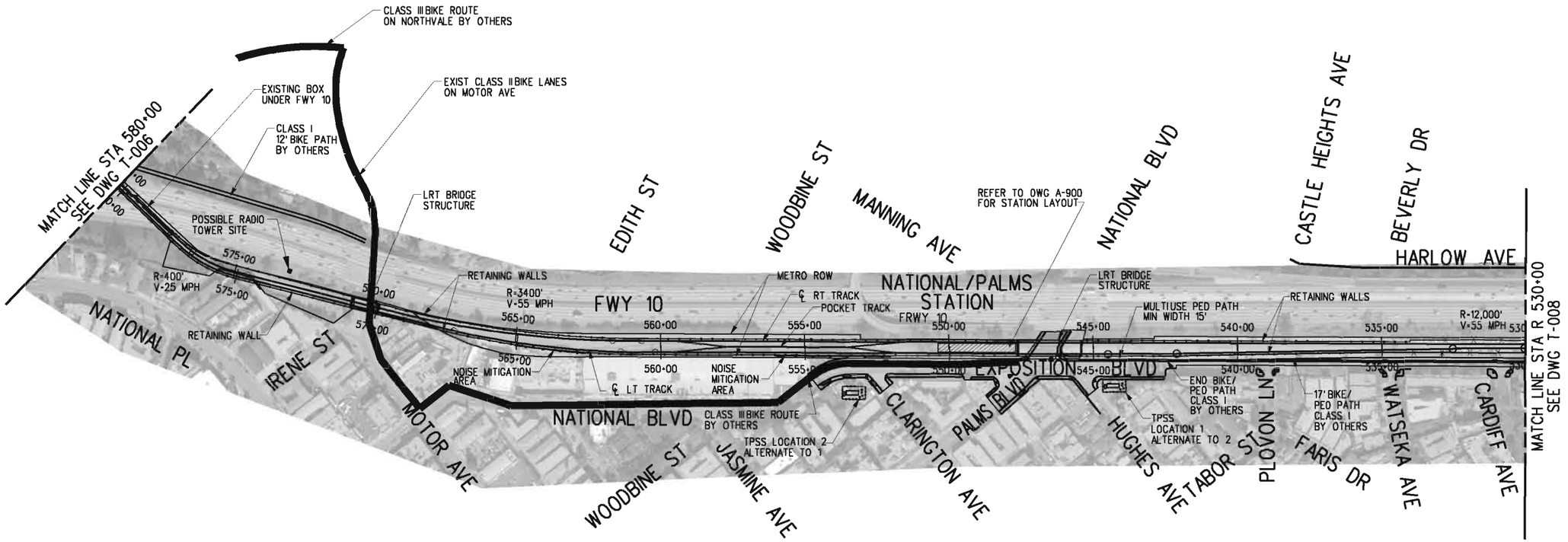
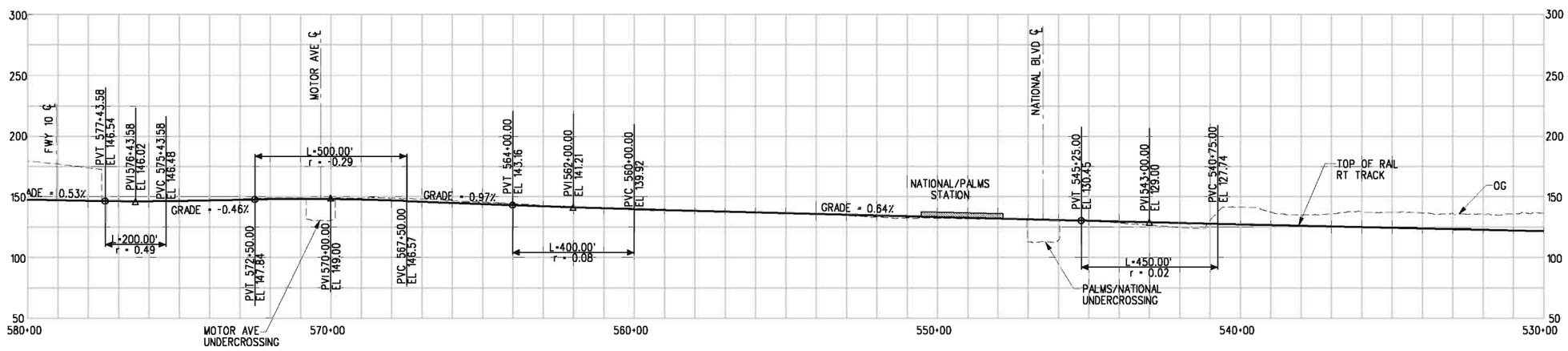


PLAN



CONCEPTUAL ENGINEERING

RT TRACK PROFILE

50' 0 50' 100'

100' 0 200' 400'

PRELIMINARY

THE PREPARATION OF THIS DRAWING HAS BEEN FINANCED BY THE TAXES OF THE CITIZENS OF LOS ANGELES COUNTY AND OF THE STATE OF CALIFORNIA.

REV	DATE	BY	APP	REG NO	EXPIRES	SEAL HOLDER	DESCRIPTION
	-	-	-	-	-		-

DESIGNED BY J. SUSILO
DRAWN BY M. AL-MASHAT
CHECKED BY L. MOHR
IN CHARGE J. PRIZNER
DATE 12/4/09

Exposition Metro Line Construction Authority
Expo

DMJM HARRIS | AECOM

300 S. GRAND AVENUE, SECOND FLOOR
LOS ANGELES, CALIFORNIA 90071
TEL (213) 330-7200 FAX (213) 330-7201

SUBMITTED
APPROVED

EXPOSITION TRANSIT PROJECT-PHASE 2

PLAN AND PROFILE
STA 530+00 TO STA 580+00

CONTRACT NO
DRAWING NO T-007
REV 0
SCALE 1" =200' -0" 1" =50' -0"
SHEET NO

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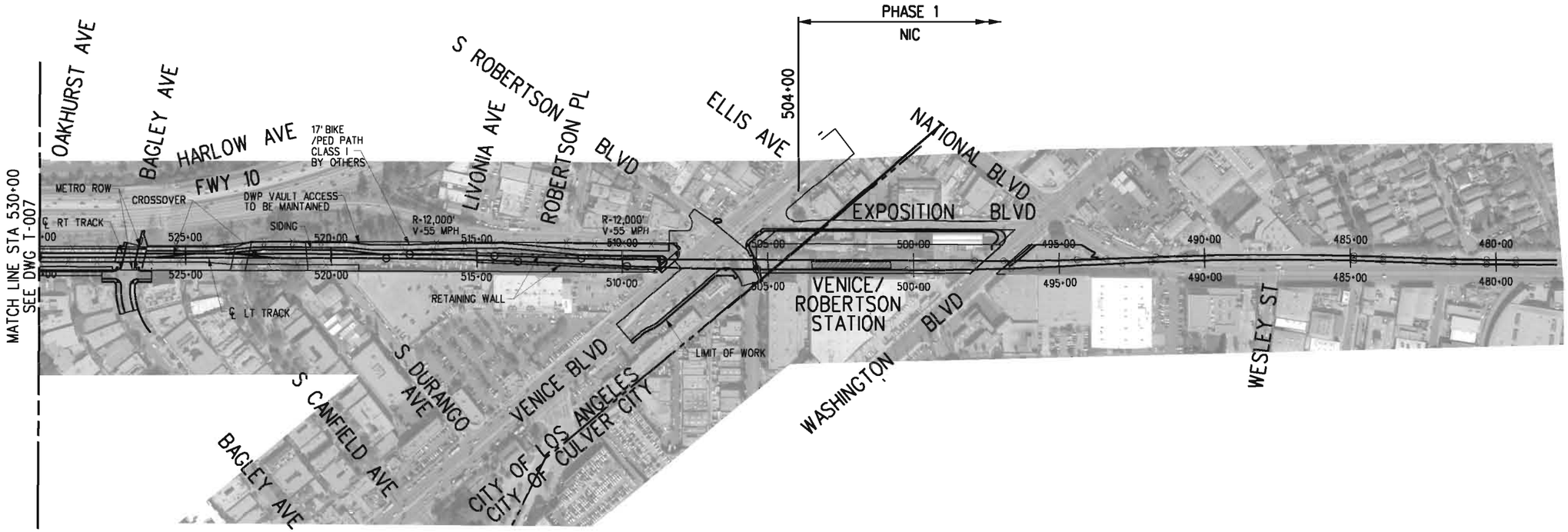
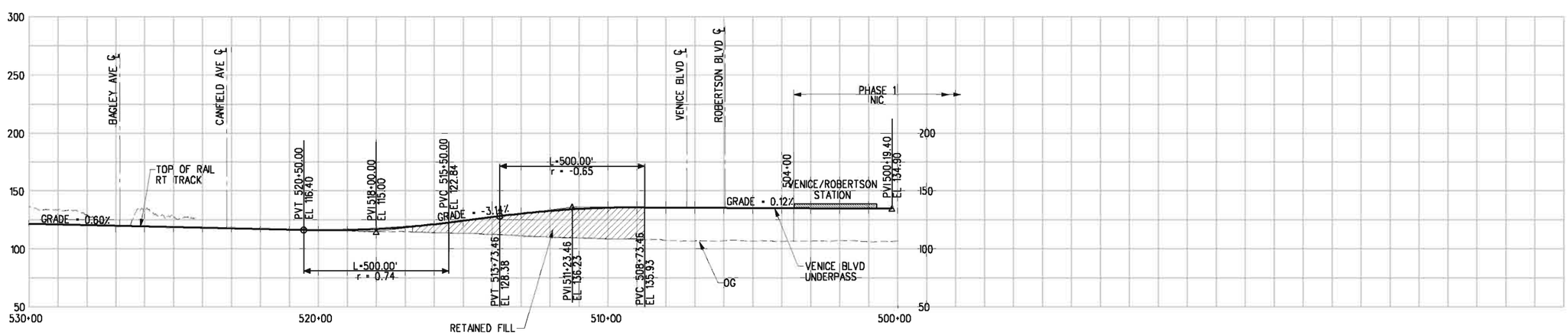


PLAN



CONCEPTUAL ENGINEERING

RT TRACK PROFILE

50' 0 50' 100'

100' 0 200' 400'

PRELIMINARY

REV	DATE	BY	APP	REG NO	EXPIRES	SEAL HOLDER	DESCRIPTION
	-	-	-	-	-		-

DESIGNED BY J. SUSILO
DRAWN BY M. AL-MASHAT
CHECKED BY L. MOHR
IN CHARGE J. PRIZNER
DATE 12/4/09

Exposition Metro Line Construction Authority
Expo

DMJM HARRIS | AECOM
300 S. GRAND AVENUE, SECOND FLOOR
LOS ANGELES, CALIFORNIA 90071
TEL (213) 330-7200 FAX (213) 330-7201

SUBMITTED
APPROVED

EXPOSITION TRANSIT PROJECT-PHASE 2

PLAN AND PROFILE
STA 504+00 TO STA 530+00

CONTRACT NO
DRAWING NO T-008
REV 0
SCALE 1"=200'-0" 1"=50'-0"
SHEET NO

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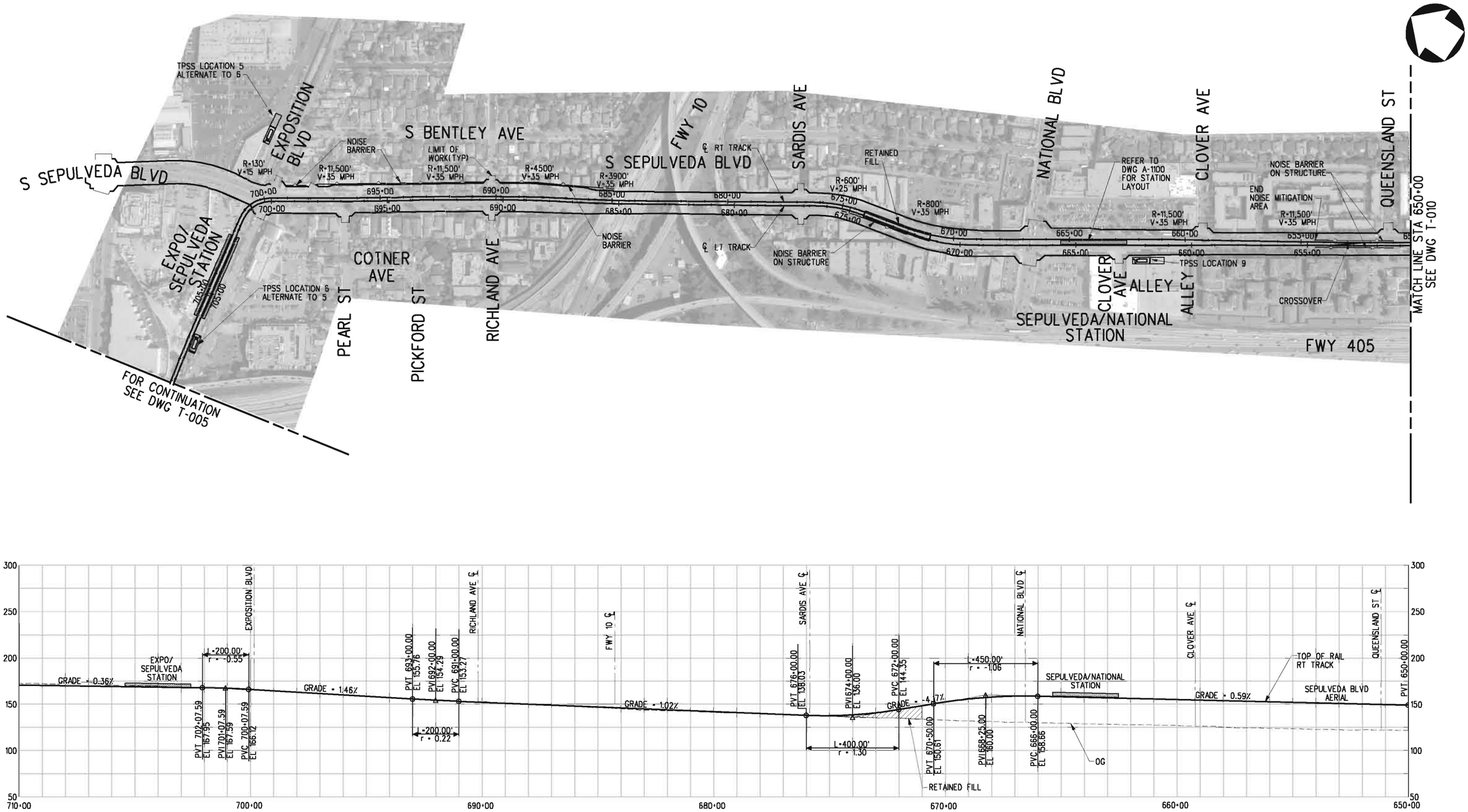

CONCEPTUAL ENGINEERING

PRELIMINARY

THE PREPARATION OF THIS DRAWING HAS BEEN FINANCED BY THE TAXES OF THE CITIZENS OF LOS ANGELES COUNTY AND OF THE STATE OF CALIFORNIA.

REV	DATE	BY	APP	REG NO	EXPIRES	SEAL HOLDER	DESCRIPTION
	-	-	-	-	-		-

DESIGNED BY J. SUSILO
DRAWN BY M. AL-MASHAT
CHECKED BY L. MOHR
IN CHARGE J. PRIZNER
DATE 12/4/09

Exposition Metro Line Construction Authority
Expo

DMJM HARRIS | AECOM

300 S. GRAND AVENUE, SECOND FLOOR
LOS ANGELES, CALIFORNIA 90071
TEL (213) 330-7200 FAX (213) 330-7201

SUBMITTED
APPROVED

EXPOSITION TRANSIT PROJECT-PHASE 2

PLAN AND PROFILE
STA 650+00 TO STA 710+00

CONTRACT NO
DRAWING NO T-009
REV 0
SCALE 1" =200' -0" / 1" =50' -0"
SHEET NO

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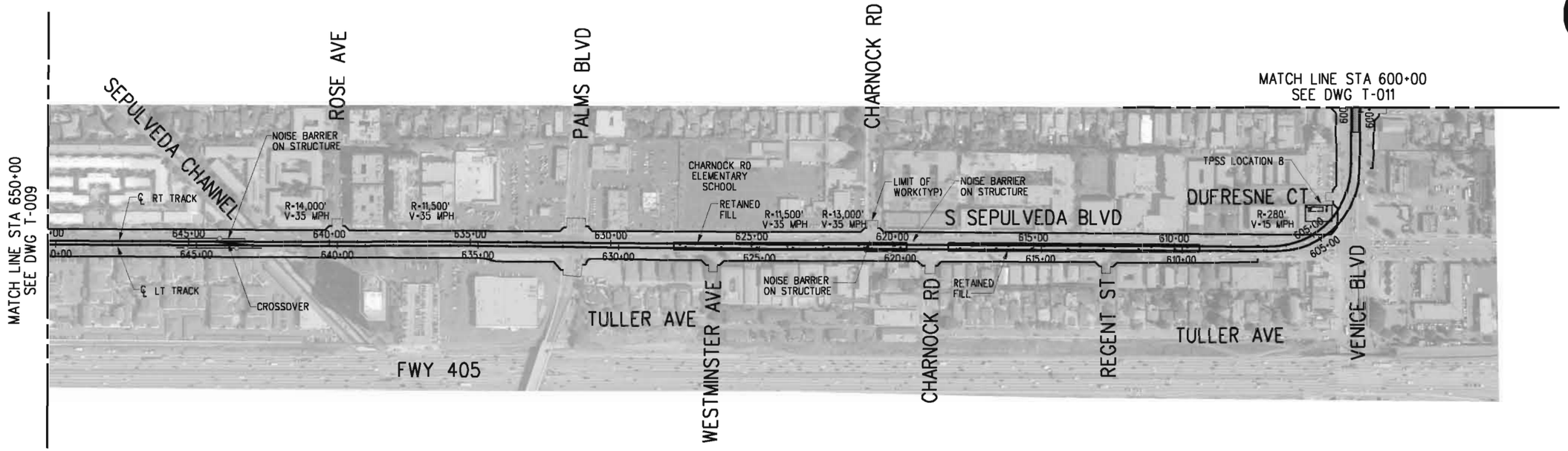
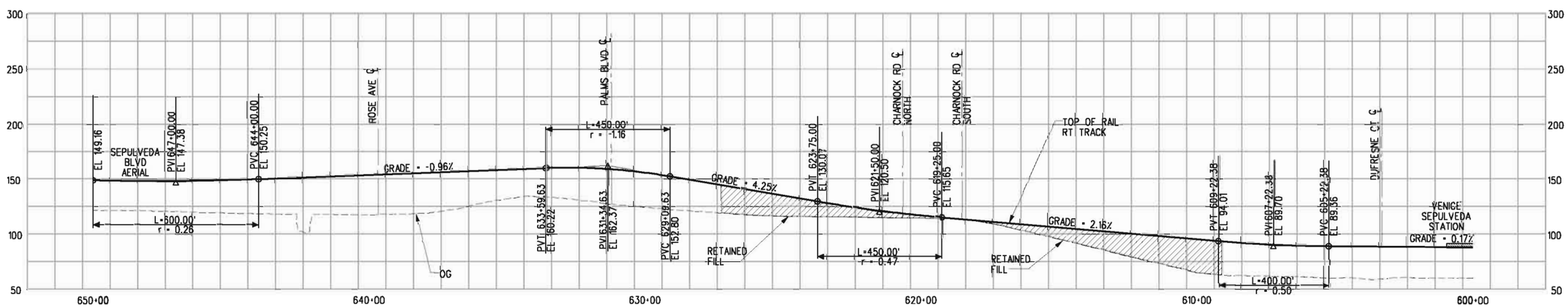


PLAN



50' 0 50' 100' 100' 0 200' 400'

CONCEPTUAL ENGINEERING

RT TRACK PROFILE

PRELIMINARY

THE PREPARATION OF THIS DRAWING HAS BEEN FINANCED BY THE TAXES OF THE CITIZENS OF LOS ANGELES COUNTY AND OF THE STATE OF CALIFORNIA.

REV	DATE	BY	APP	REG NO	EXPIRES	SEAL HOLDER	DESCRIPTION
	-	-	-	-	-		-

DESIGNED BY J. SUSILO
DRAWN BY M. AL-MASHAT
CHECKED BY L. MOHR
IN CHARGE J. PRIZNER
DATE 12/4/09

Exposition Metro Line Construction Authority
Expo

DMJM HARRIS | AECOM
300 S. GRAND AVENUE, SECOND FLOOR
LOS ANGELES, CALIFORNIA 90071
TEL (213) 330-7200 FAX (213) 330-7201

SUBMITTED
APPROVED

EXPOSITION TRANSIT PROJECT-PHASE 2

PLAN AND PROFILE
STA 600+00 TO STA 650+00

CONTRACT NO
DRAWING NO T-010 REV 0
SCALE 1" =200' -0" 1" =50' -0"
SHEET NO

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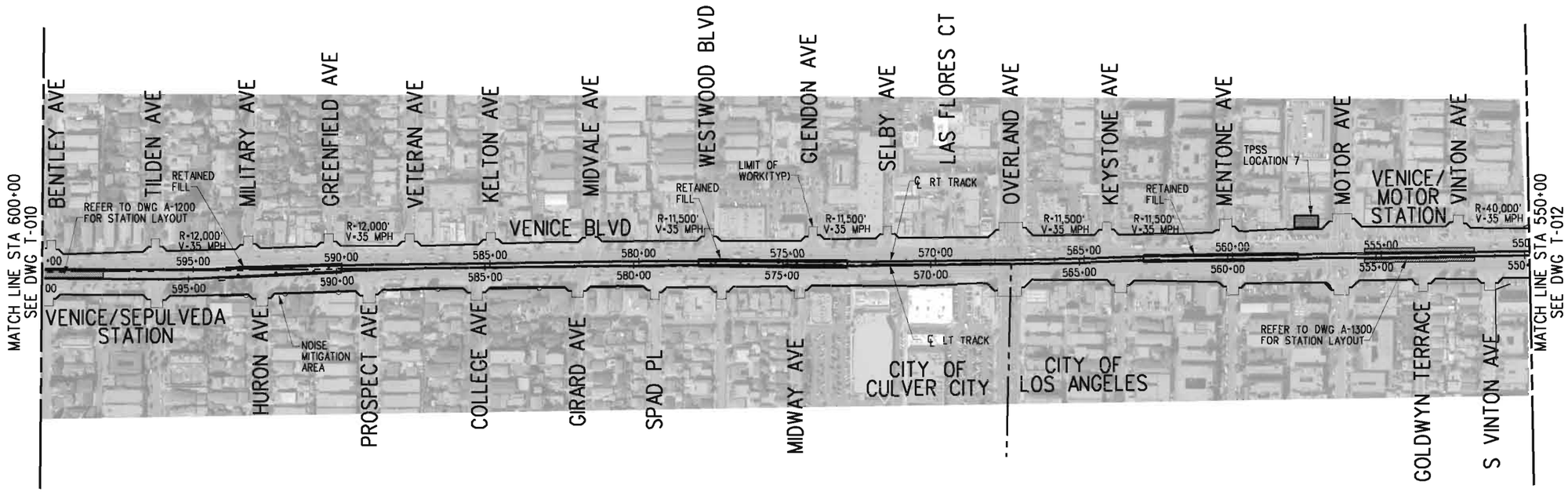
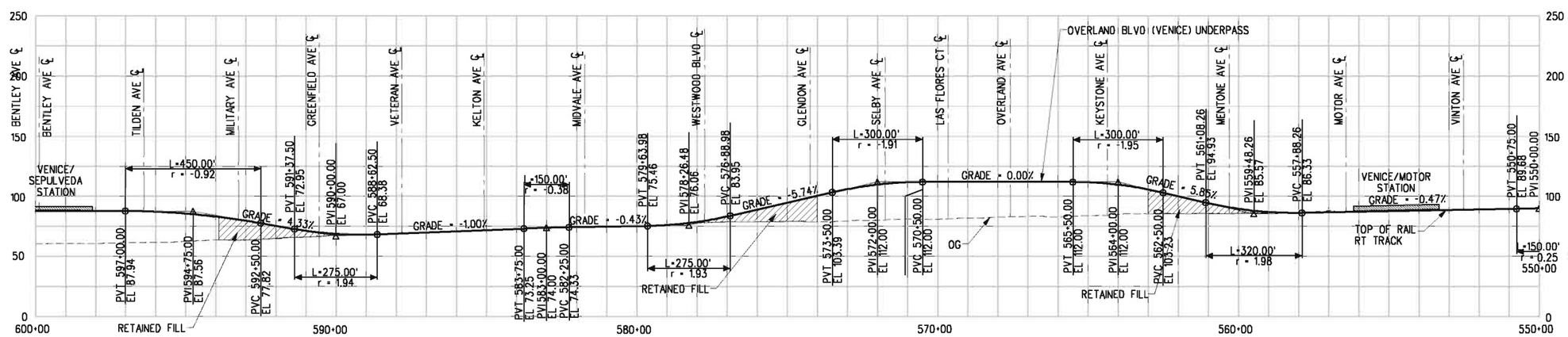


PLAN



CONCEPTUAL ENGINEERING

RT TRACK PROFILE

PRELIMINARY

THE PREPARATION OF THIS DRAWING HAS BEEN FINANCED BY THE TAXES OF THE CITIZENS OF LOS ANGELES COUNTY AND OF THE STATE OF CALIFORNIA.

REV	DATE	BY	APP	REG NO	EXPIRES	SEAL HOLDER	DESCRIPTION
	-	-	-	-	-		-

DESIGNED BY J. SUSILO
DRAWN BY M. AL-MASHAT
CHECKED BY L. MOHR
IN CHARGE J. PRIZNER
DATE 12/4/09

Exposition Metro Line Construction Authority
Expo

DMJM HARRIS | AECOM
300 S. GRAND AVENUE, SECOND FLOOR
LOS ANGELES, CALIFORNIA 90071
TEL (213) 330-7200 FAX (213) 330-7201

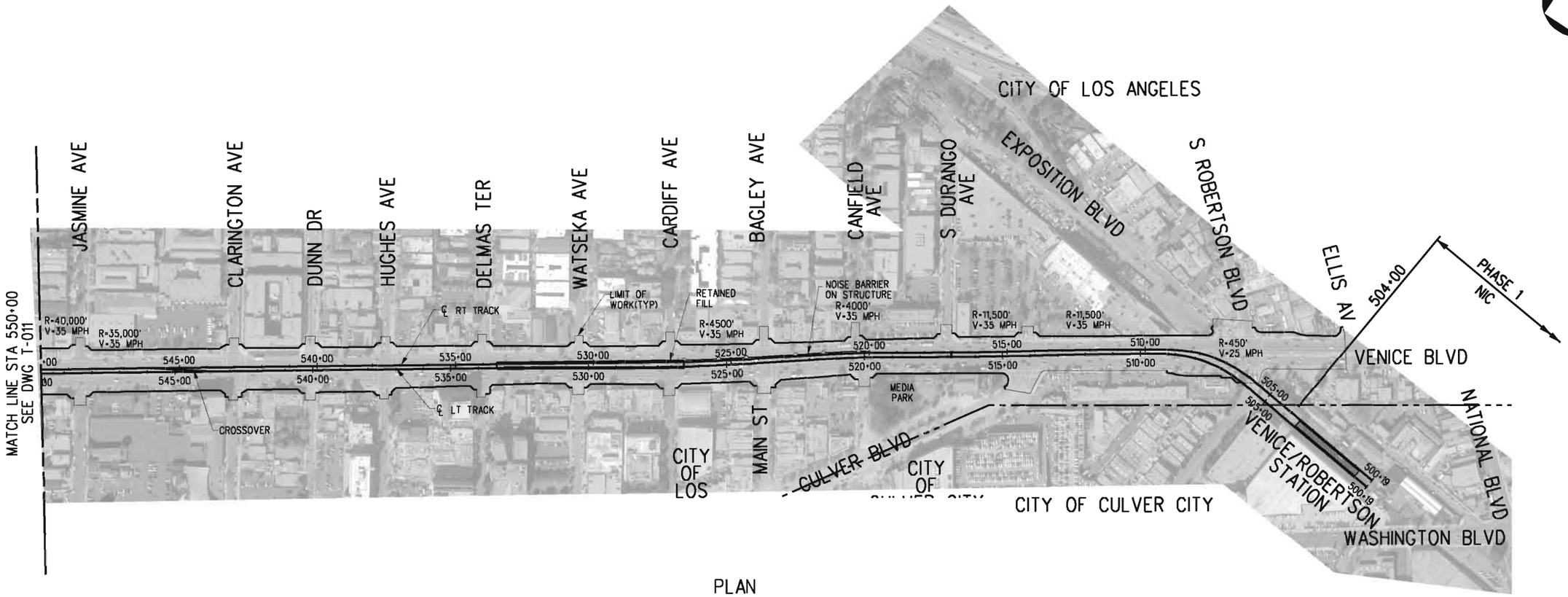
SUBMITTED
APPROVED

EXPOSITION TRANSIT PROJECT-PHASE 2

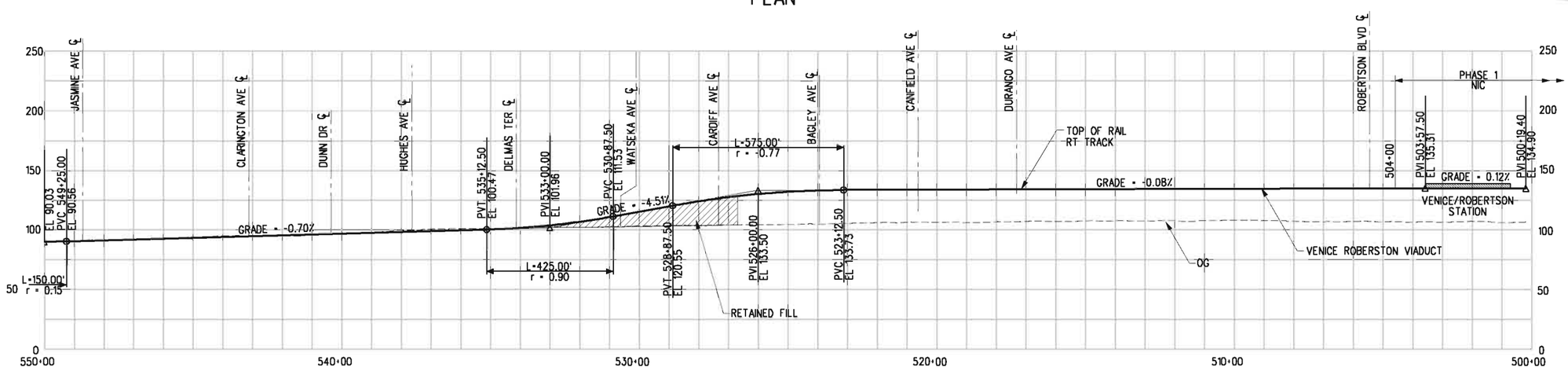
PLAN AND PROFILE
STA 550+00 TO STA 600+00

CONTRACT NO
DRAWING NO T-011
REV 0
SCALE 1" =200' -0" 1" =50' -0"
SHEET NO

Plot Driver=MTA_H_pdf.plt Pentable=Expo_H.TBL USER=SusiloJ 5:00:12 PM 12/3/2009 W:\60022129 Expo 2_LA\CADD\Rail\Sheet\FEIR\t011.plg



PLAN



CONCEPTUAL ENGINEERING

RT TRACK PROFILE

50' 0 50' 100'

100' 0 200' 400'

PRELIMINARY

THE PREPARATION OF THIS DRAWING HAS BEEN FINANCED BY THE TAXES OF THE CITIZENS OF LOS ANGELES COUNTY AND OF THE STATE OF CALIFORNIA.

REV	DATE	BY	APP	REG NO	EXPIRES	SEAL HOLDER	DESCRIPTION
	-	-	-	-	-		-

DESIGNED BY J. SUSILO
DRAWN BY M. AL-MASHAT
CHECKED BY L. MOHR
IN CHARGE J. PRIZNER
DATE 12/4/09

Exposition Metro Line Construction Authority
Expo

DMJM HARRIS | AECOM

300 S. GRAND AVENUE, SECOND FLOOR
LOS ANGELES, CALIFORNIA 90071
TEL (213) 330-7200 FAX (213) 330-7201

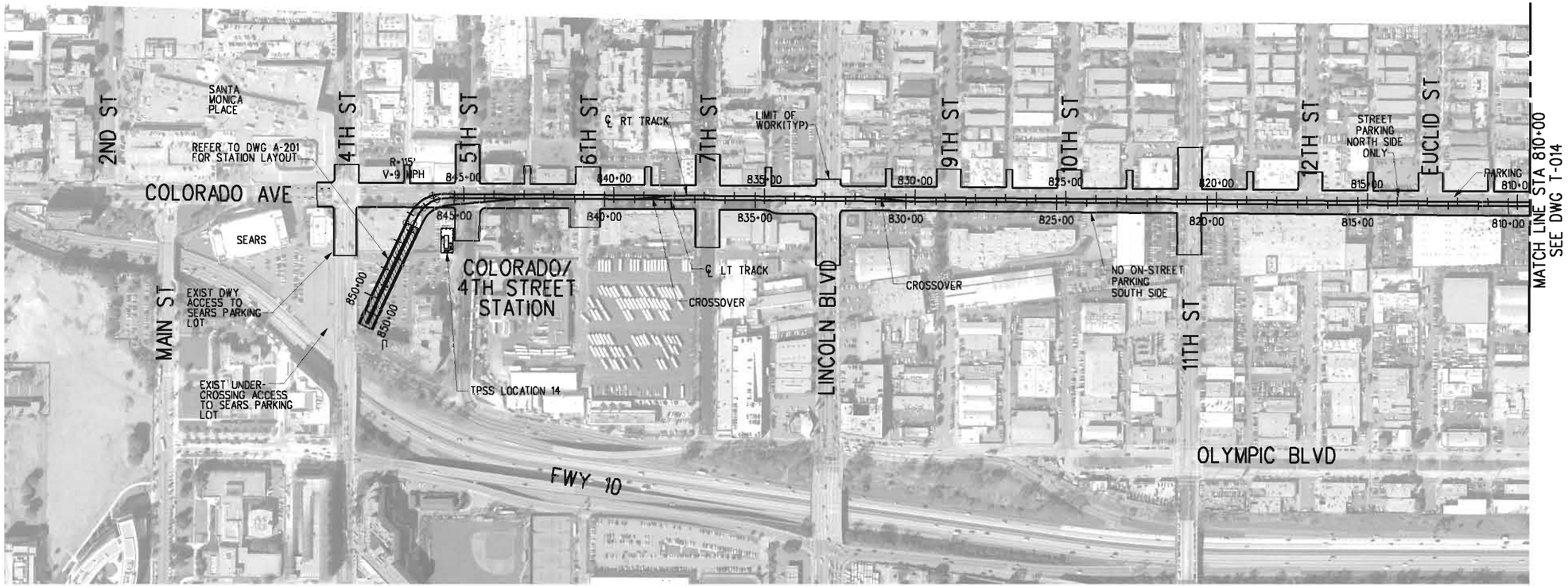
SUBMITTED
APPROVED

EXPOSITION TRANSIT PROJECT-PHASE 2

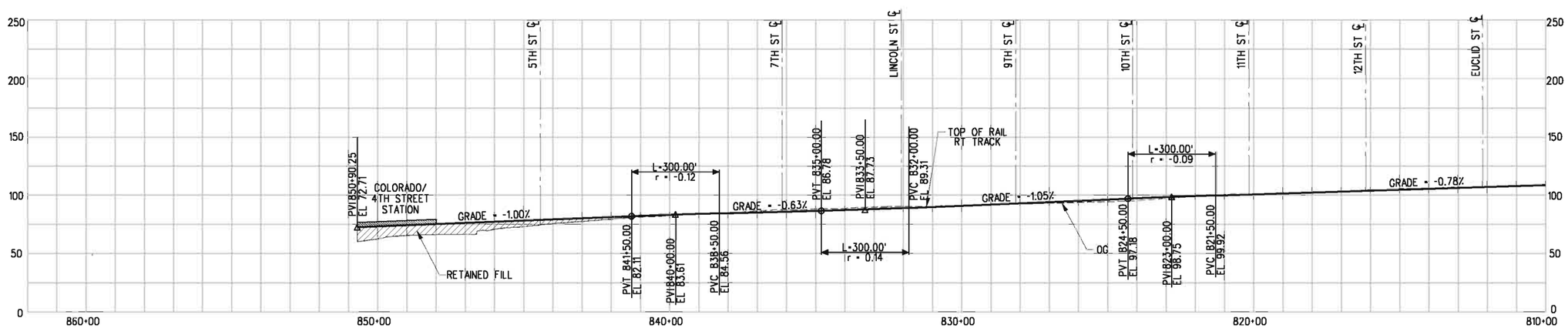
PLAN AND PROFILE
STA 504+00 TO STA 550+00

CONTRACT NO
DRAWING NO T-012
REV 0
SCALE 1" =200'-0" 1" =50'-0"
SHEET NO

Plot Driver=MTA_H_pdf.plt Pentable=Expo_H.TBL USER=SusiloJ 5:00:38 PM 12/3/2009 W:\60022129 Expo 2_LA\CADD\Rail\Sheet\FEIR\t012.plg



PLAN



50' 0 50' 100'

100' 0 200' 400'

CONCEPTUAL ENGINEERING

RT TRACK PROFILE

PRELIMINARY

THE PREPARATION OF THIS DRAWING HAS BEEN FINANCED BY THE TAXES OF THE CITIZENS OF LOS ANGELES COUNTY AND OF THE STATE OF CALIFORNIA.

REV	DATE	BY	APP	REG NO	EXPIRES	SEAL HOLDER	DESCRIPTION
	-	-	-	-	-		-

DESIGNED BY J. SUSILO
DRAWN BY M. AL-MASHAT
CHECKED BY L. MOHR
IN CHARGE J. PRIZNER
DATE 12/4/09

Exposition Metro Line Construction Authority
Expo

DMJM HARRIS | AECOM
300 S. GRAND AVENUE, SECOND FLOOR
LOS ANGELES, CALIFORNIA 90071
TEL (213) 330-7200 FAX (213) 330-7201

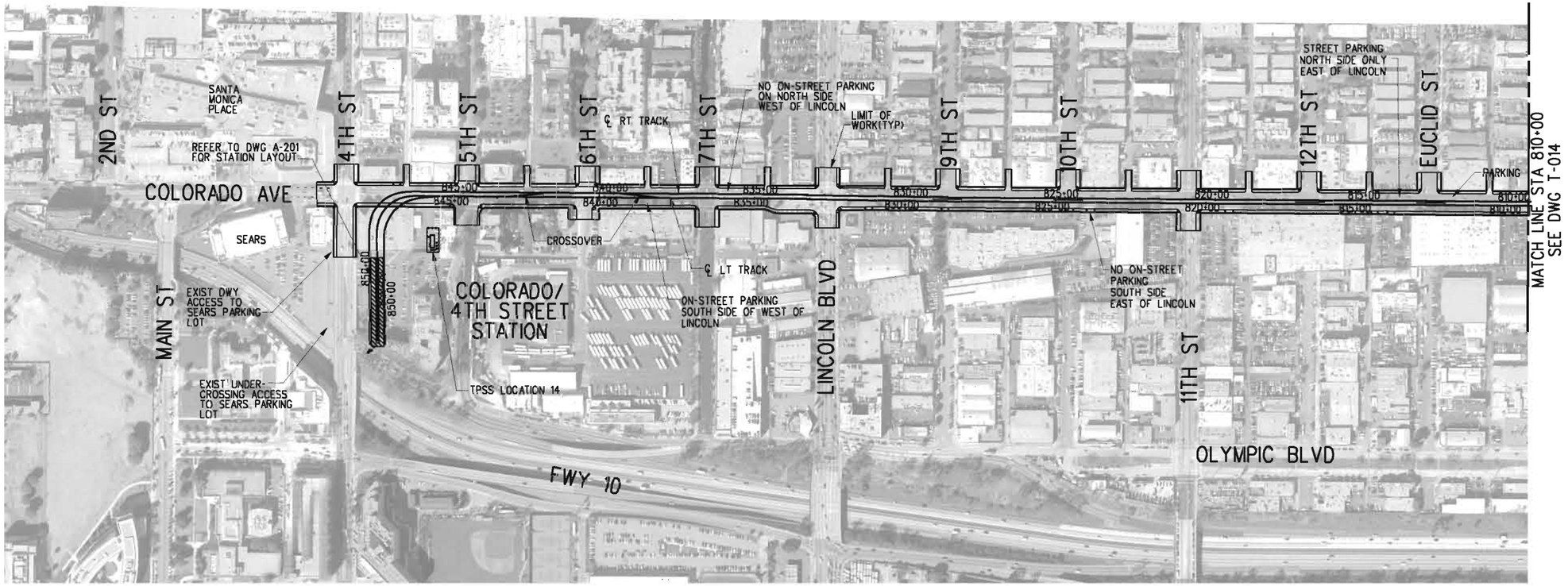
SUBMITTED
APPROVED

EXPOSITION TRANSIT PROJECT-PHASE 2
COLORADO BLVD

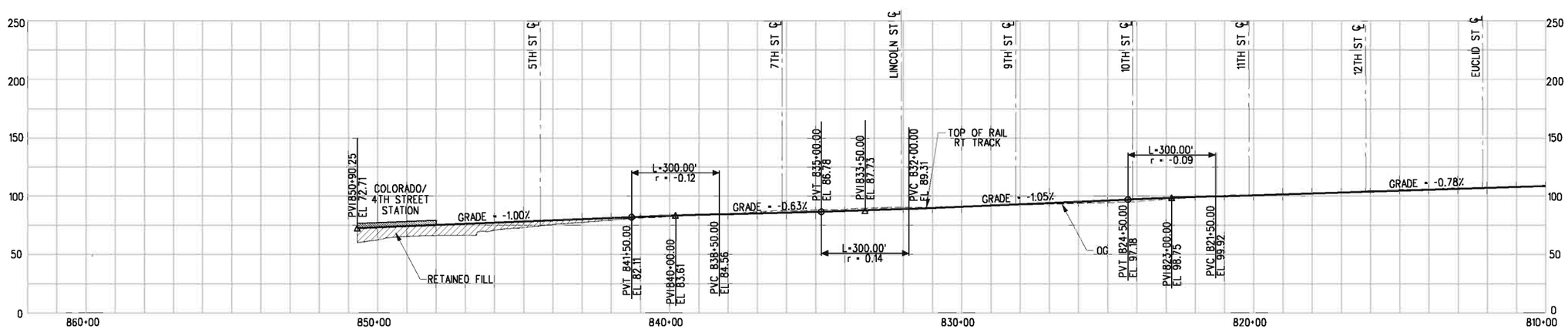
PLAN AND PROFILE
STA 810+00 TO STA 850+81.71

CONTRACT NO
DRAWING NO T-013
REV 0
SCALE 1" =200' -0"
SHEET NO

Plot Driver=Expo_H_pdf.plt Pentable=Expo_H.TBL USER=almashatm 5:07:32 PM 12/9/2009 W:\60022129 Expo 2_LA\cadd\Rail\Sheet\FEIR\1013.plg



PLAN



50' 0 50' 100'

100' 0 200' 400'

CONCEPTUAL ENGINEERING

RT TRACK PROFILE

PRELIMINARY

THE PREPARATION OF THIS DRAWING HAS BEEN FINANCED BY THE TAXES OF THE CITIZENS OF LOS ANGELES COUNTY AND OF THE STATE OF CALIFORNIA.

REV	DATE	BY	APP	REG NO	EXPIRES	SEAL HOLDER	DESCRIPTION
	-	-	-	-	-		-

DESIGNED BY J. SUSILO
DRAWN BY M. AL-MASHAT
CHECKED BY L. MOHR
IN CHARGE J. PRIZNER
DATE 12/4/09

Exposition Metro Line Construction Authority
Expo

DMJM HARRIS | AECOM
300 S. GRAND AVENUE, SECOND FLOOR
LOS ANGELES, CALIFORNIA 90071
TEL (213) 330-7200 FAX (213) 330-7201

SUBMITTED
APPROVED

EXPOSITION TRANSIT PROJECT-PHASE 2
COLORADO BLVD
ALTERNATE ALIGNMENT
PLAN AND PROFILE
STA 810+00 TO STA 850+81.71

CONTRACT NO
DRAWING NO T-013A
REV 0
SCALE 1" =200' -0"
SHEET NO

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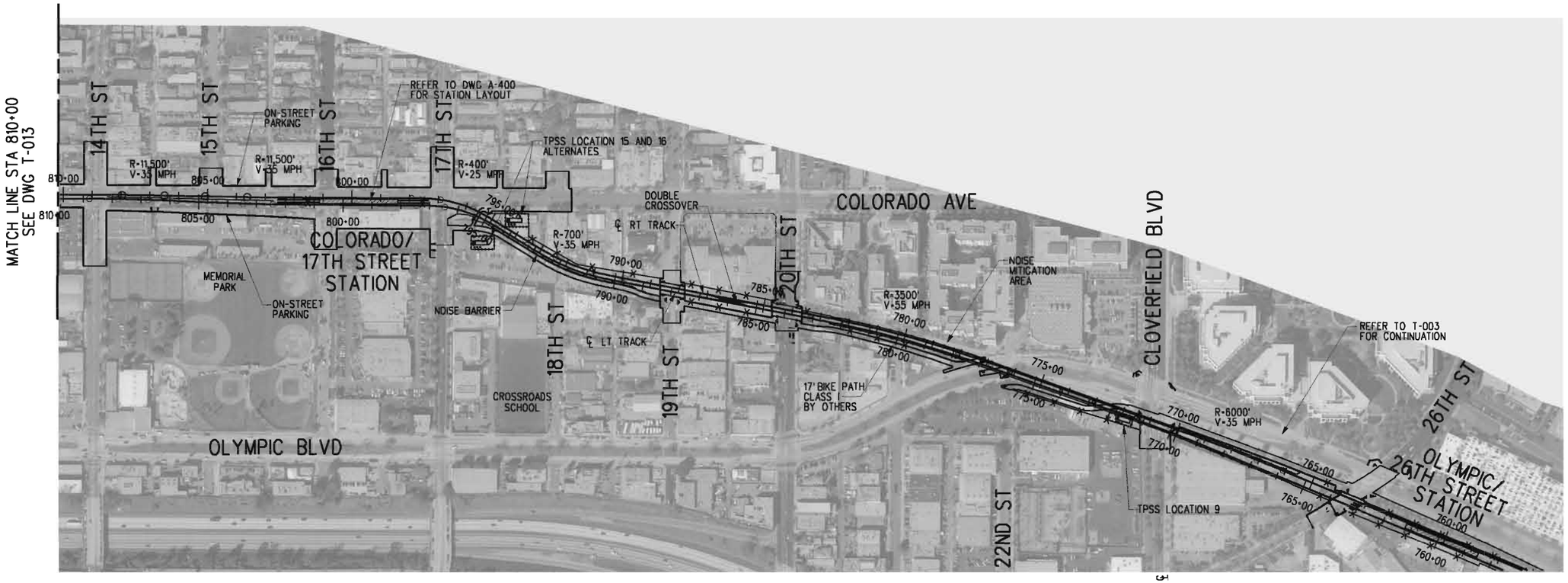
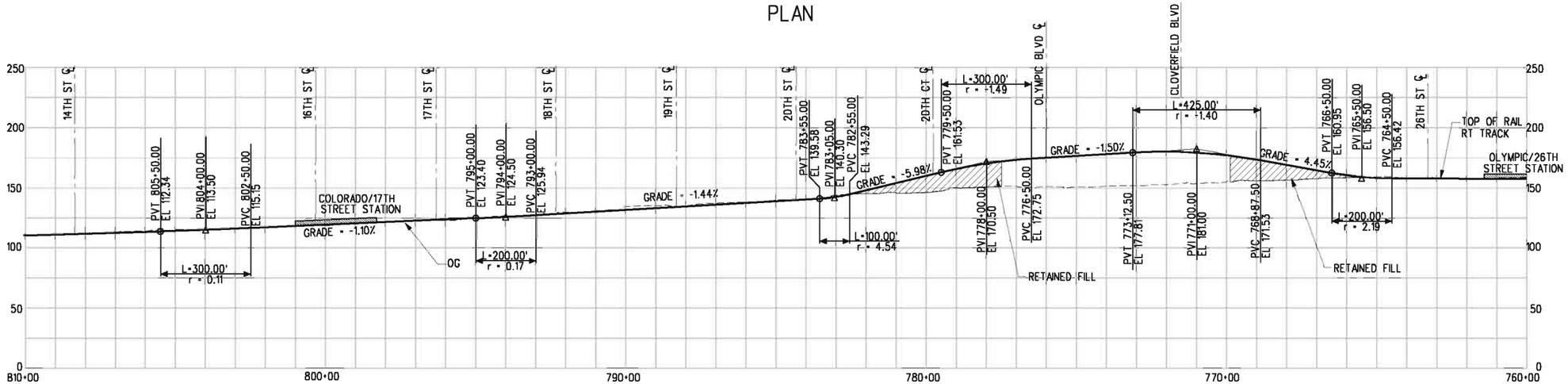


PLAN



50' 0 50' 100'

100' 0 200' 400'

CONCEPTUAL ENGINEERING

RT TRACK PROFILE

PRELIMINARY

THE PREPARATION OF THIS DRAWING HAS BEEN FINANCED BY THE TAXES OF THE CITIZENS OF LOS ANGELES COUNTY AND OF THE STATE OF CALIFORNIA.

REV	DATE	BY	APP	REG NO	EXPIRES	SEAL HOLDER	DESCRIPTION
	-	-	-	-	-		-

DESIGNED BY J. SUSILO
DRAWN BY M. AL-MASHAT
CHECKED BY L. MOHR
IN CHARGE J. PRIZNER
DATE 12/4/09

Exposition Metro Line Construction Authority
Expo

DMJM HARRIS | AECOM
300 S. GRAND AVENUE, SECOND FLOOR
LOS ANGELES, CALIFORNIA 90071
TEL (213) 330-7200 FAX (213) 330-7201

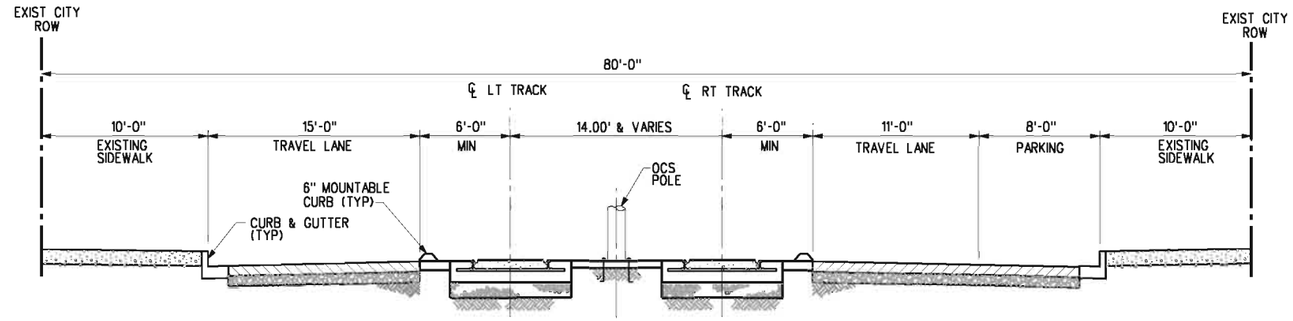
SUBMITTED
APPROVED

EXPOSITION TRANSIT PROJECT-PHASE 2

PLAN AND PROFILE
STA 760+00 TO STA 810+00

CONTRACT NO
DRAWING NO T-014
REV 0
SCALE 1" =200'-0"
SHEET NO

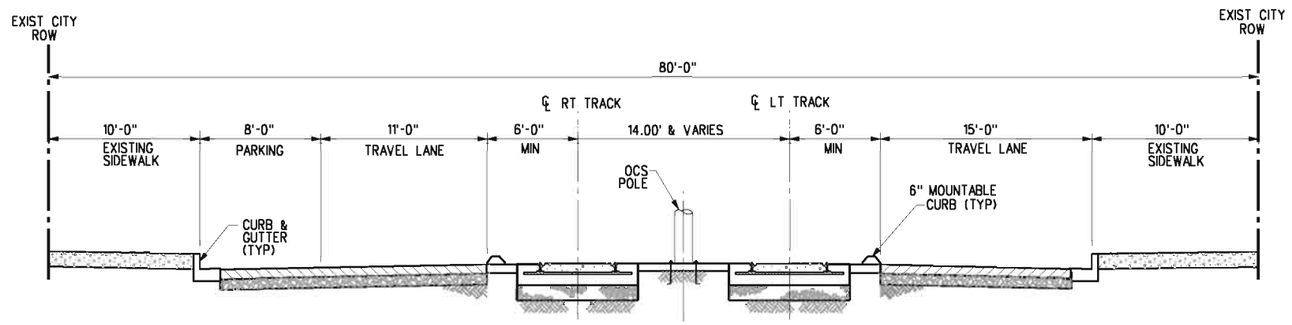
Plot Driver=Expo_H_pdf.plt Pentable=Expo_H.TBL USER=almashatm 5:22:32 PM 12/9/2009 W:\60022129 Expo 2_LA\cadd\Rail\Sheet\FEIR\1014.plg



TYPICAL STREET RUNNING ON COLORADO AVENUE WITH PARKING ON SOUTH SIDE

SCALE: NTS

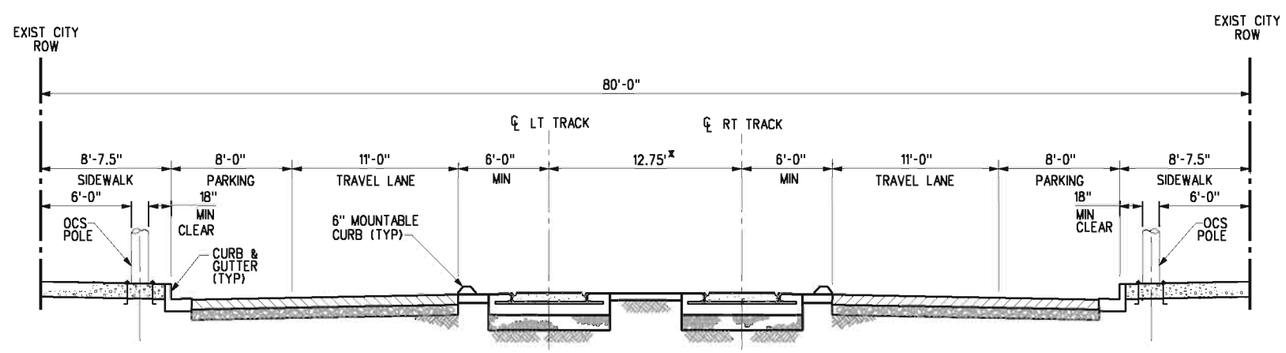
A / TX-001



TYPICAL STREET RUNNING ON COLORADO AVENUE WITH PARKING ON NORTH SIDE

SCALE: NTS

B / TX-001



* NOTE: THE 12.75' CLEARANCE WOULD ONLY BE IN SELECT AREAS AND NOT FROM 17TH STREET TO 4TH STREET CONTINUOUSLY

TYPICAL STREET RUNNING ON COLORADO AVENUE WITH PARKING ON BOTH SIDES

SCALE: NTS

C / TX-001

CONCEPTUAL ENGINEERING

PRELIMINARY

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REV	DATE	BY	APP	REG NO	EXPIRES	SEAL HOLDER	DESCRIPTION
	-	-	-	-	-		-

DESIGNED BY J. SUSILO
DRAWN BY M. AL-MASHAT
CHECKED BY L. MOHR
IN CHARGE J. PRIZNER
DATE 12/4/09

Exposition Metro Line Construction Authority
Expo

DMJM HARRIS | AECOM
300 S. GRAND AVENUE, SECOND FLOOR
LOS ANGELES, CALIFORNIA 90071
TEL (213) 330-7200 FAX (213) 330-7201

SUBMITTED
APPROVED

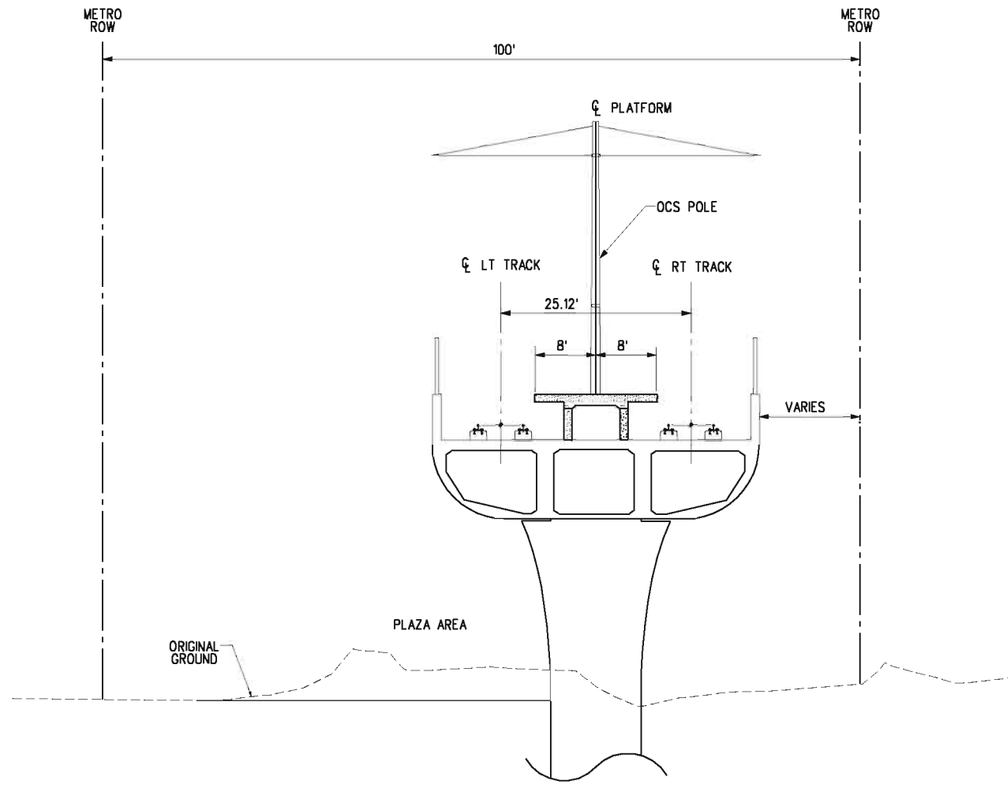
EXPOSITION TRANSIT PROJECT-PHASE 2

TYPICAL SECTIONS

SHEET 1 OF 6

CONTRACT NO EXXXX
DRAWING NO TX-001
REV 0
SCALE AS SHOWN
SHEET NO

Plot Driver=MTA_H_pdf.plt Pentable=Expo_H.TBL USER=SusiloJ 2:14:30 PM 12/9/2009 W:\60022129 Expo 2_LA\cadd\Rail\Sheet\FEIR\tx001.plg

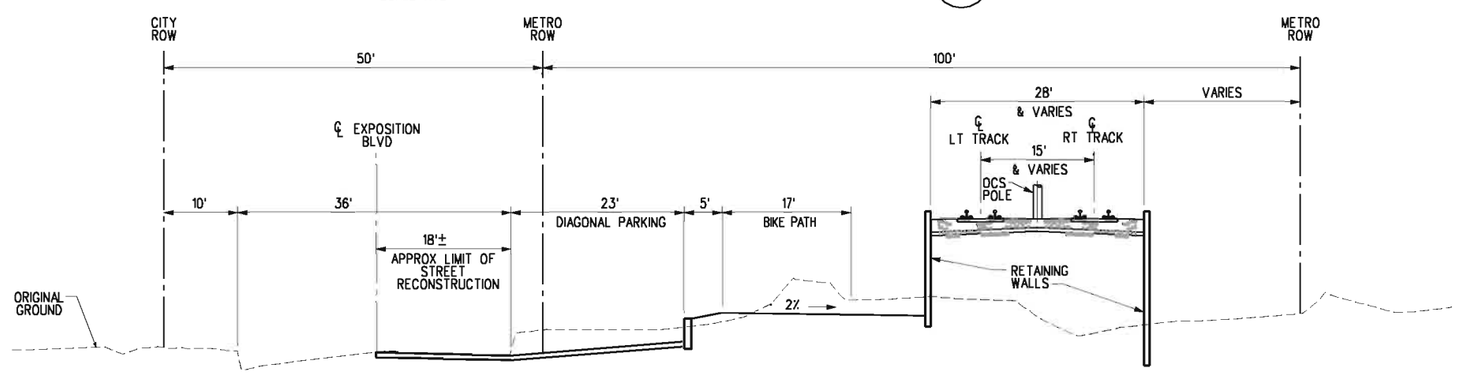


TYPICAL AERIAL STATION AT BUNDY STREET (D / TX-002)

SCALE: NTS

NOTES:

1. LT TRACK IS TRACK 3; RT TRACK IS TRACK 4
2. SEE CONTRACT PERFORMANCE SPECS REGARDING BIKE/PED PATH



EXPOSITION BLVD STA 720+00 (E / TX-002)

SCALE: NTS

CONCEPTUAL ENGINEERING

PRELIMINARY

THE PREPARATION OF THIS DRAWING HAS BEEN FINANCED BY THE TAXES OF THE CITIZENS OF LOS ANGELES COUNTY AND OF THE STATE OF CALIFORNIA.

REV	DATE	BY	APP	REG NO	EXPIRES	SEAL HOLDER	DESCRIPTION
	-	-	-	-	-		-

DESIGNED BY J. SUSILO
DRAWN BY M. AL-MASHAT
CHECKED BY L. MOHR
IN CHARGE J. PRIZNER
DATE 12/4/09

Exposition Metro Line Construction Authority
Expo

DMJM HARRIS | AECOM

300 S. GRAND AVENUE, SECOND FLOOR
LOS ANGELES, CALIFORNIA 90071
TEL (213) 330-7300 FAX (213) 330-7301

SUBMITTED
APPROVED

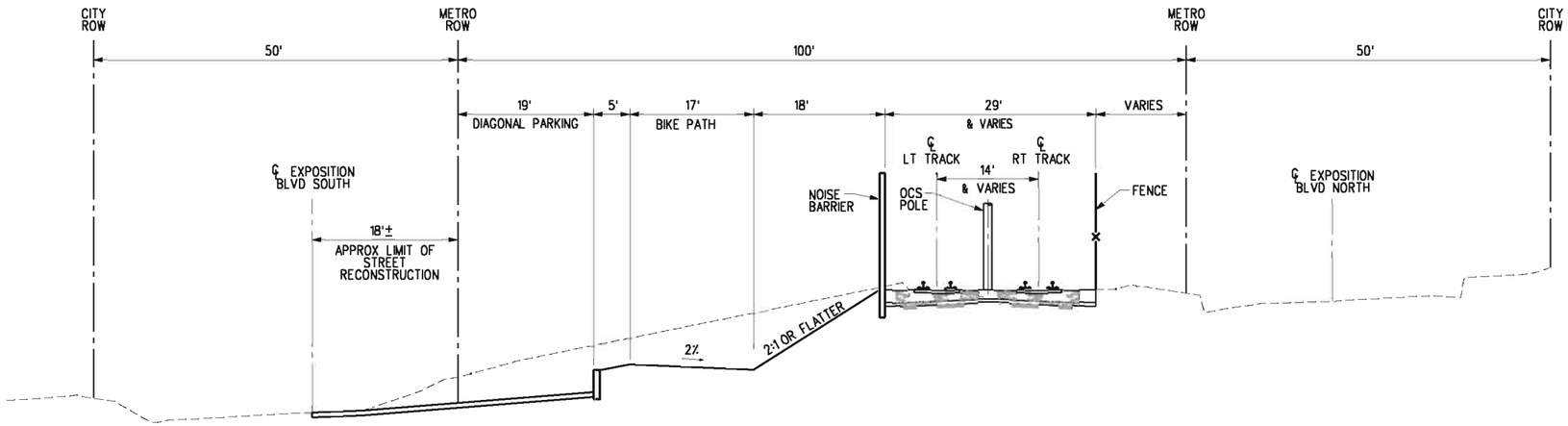
EXPOSITION TRANSIT PROJECT-PHASE 2

TYPICAL SECTIONS

SHEET 2 OF 6

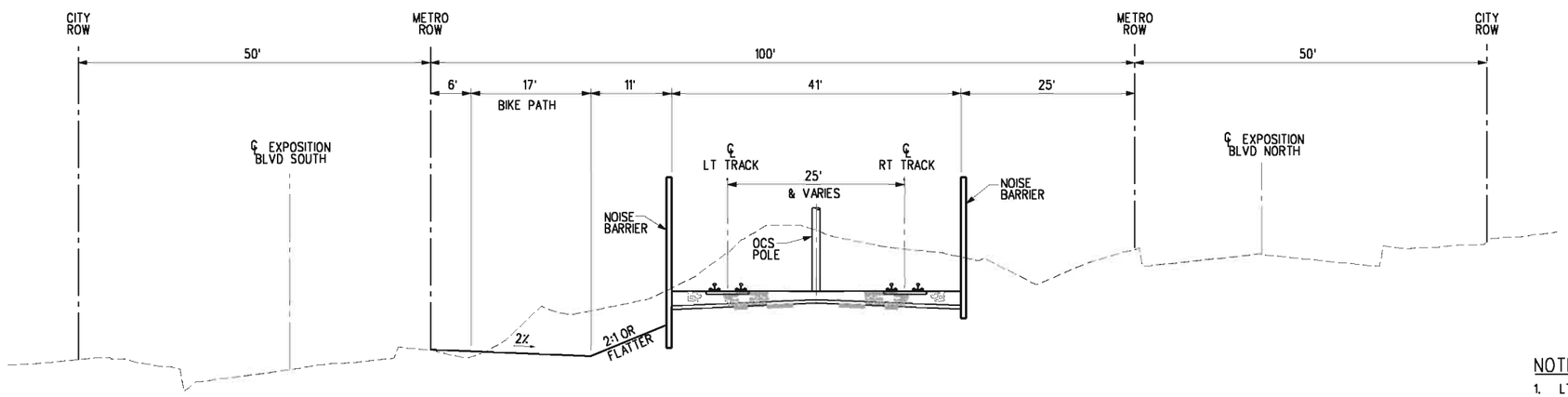
CONTRACT NO EXXXX
DRAWING NO TX-002
REV 0
SCALE AS SHOWN
SHEET NO

Plot Driver=MTA_H_pdf.plt Pentable=Expo_H.TBL USER=SusiloJ 2:16:03 PM 12/9/2009 W:\60022129 Expo 2_LA\cadd\Rail\Sheet\FEIR\tx002.plg



EXPOSITION BLVD STA 695+00 (F / TX-003)

SCALE: NTS



EXPOSITION BLVD STA 635+00 (G / TX-003)

SCALE: NTS

NOTES:

1. LT TRACK IS TRACK 3; RT TRACK IS TRACK 4
2. SEE CONTRACT PERFORMANCE SPECS REGARDING BIKE/PED PATH

CONCEPTUAL ENGINEERING

PRELIMINARY

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REV	DATE	BY	APP	REG NO	EXPIRES	SEAL HOLDER	DESCRIPTION
	-	-	-	-	-		-

DESIGNED BY J. SUSILO
DRAWN BY M. AL-MASHAT
CHECKED BY L. MOHR
IN CHARGE J. PRIZNER
DATE 12/4/09

Exposition Metro Line Construction Authority
Expo

DMJM HARRIS | AECOM

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LOS ANGELES, CALIFORNIA 90071
TEL (213) 330-7200 FAX (213) 330-7201

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EXPOSITION TRANSIT PROJECT-PHASE 2

TYPICAL SECTIONS

SHEET 3 OF 6

CONTRACT NO EXXXX
DRAWING NO TX-003
REV 0
SCALE AS SHOWN
SHEET NO

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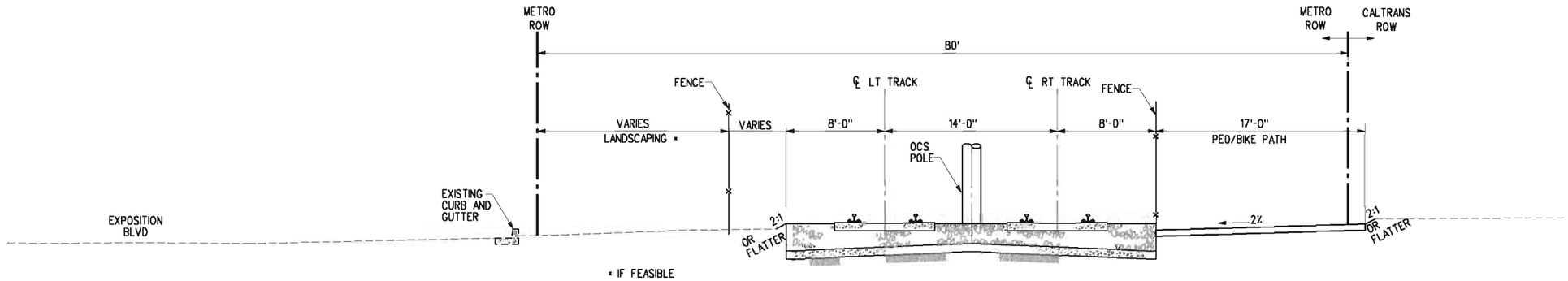
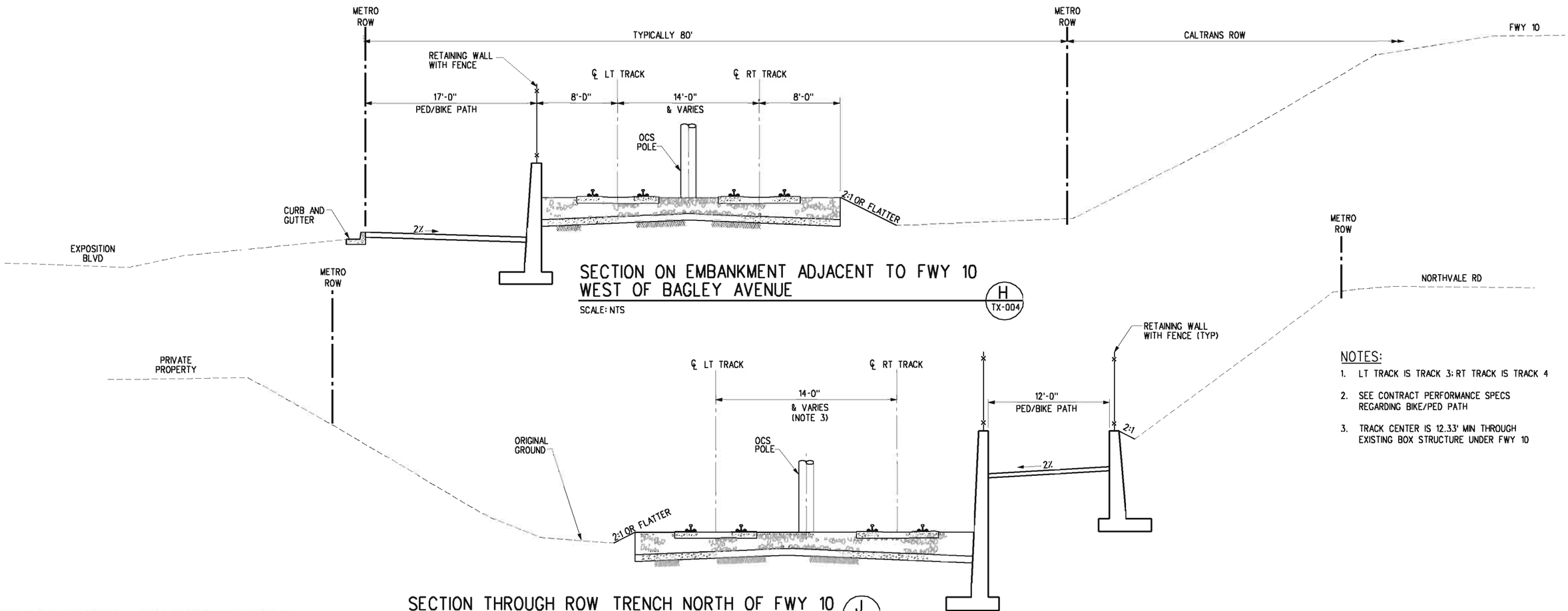


SECTION ON EMBANKMENT ADJACENT TO FWY 10
EAST OF BAGLEY AVENUE

I
TX-004

SCALE: NTS

NOTE: SECTION OMITS POSSIBLE SIDING TRACK



SECTION ON EMBANKMENT ADJACENT TO FWY 10
WEST OF BAGLEY AVENUE

H
TX-004

SCALE: NTS

NOTES:

1. LT TRACK IS TRACK 3; RT TRACK IS TRACK 4
2. SEE CONTRACT PERFORMANCE SPECS REGARDING BIKE/PED PATH
3. TRACK CENTER IS 12.33' MIN THROUGH EXISTING BOX STRUCTURE UNDER FWY 10

SECTION THROUGH ROW TRENCH NORTH OF FWY 10

J
TX-004

SCALE: NTS

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EXPOSITION TRANSIT PROJECT-PHASE 2
TYPICAL SECTIONS
SHEET 4 OF 6

CONTRACT NO EXXXX
DRAWING NO TX-004
REV 0
SCALE AS SHOWN
SHEET NO

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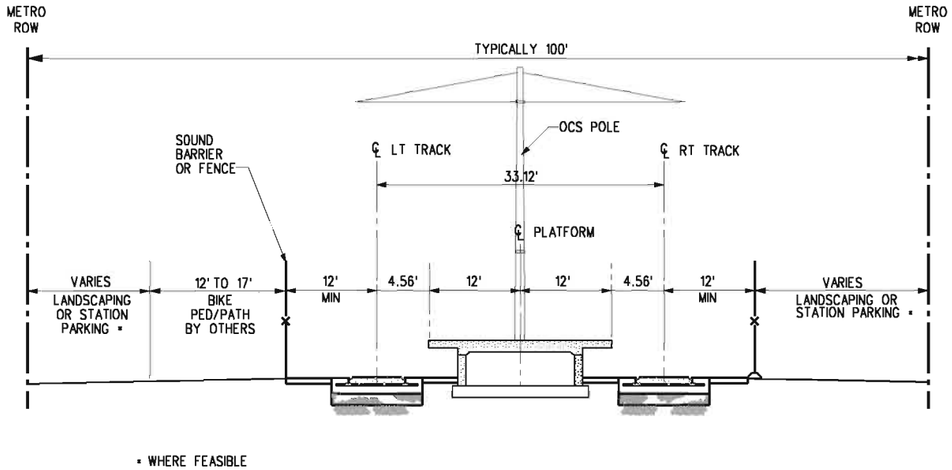
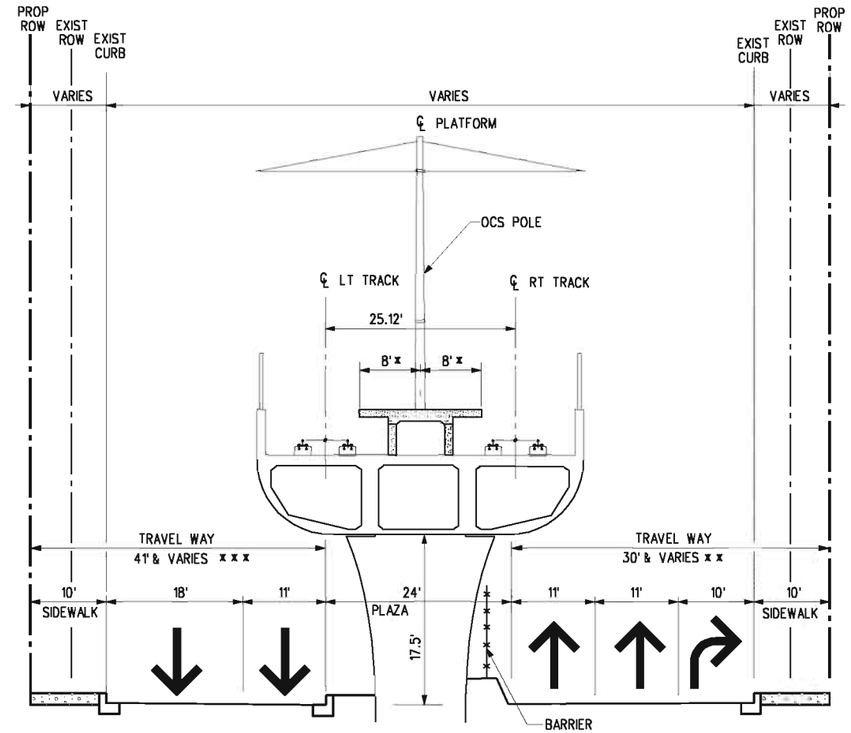


* WHERE FEASIBLE

TYPICAL CENTERED AT-GRADE STATION ON ROW (K / TX-005)

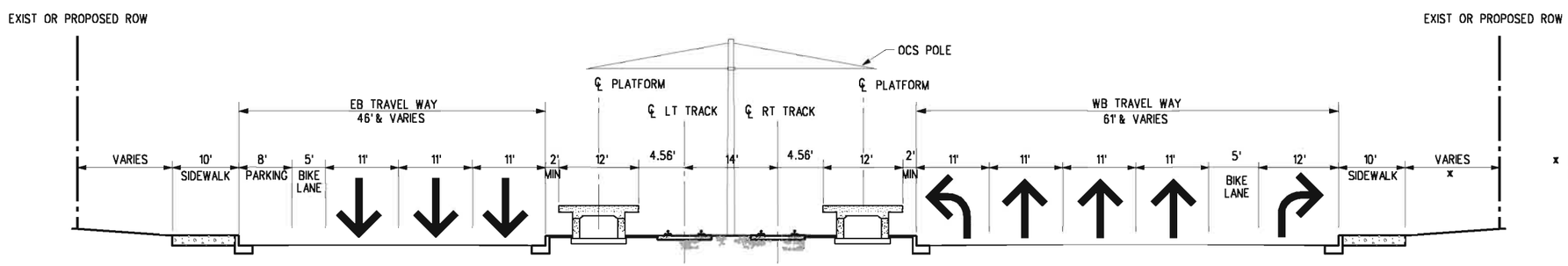
SCALE: NTS



x FOR VENICE/SEPULVEDA STATION PLATFORM WIDTH = 23'
x x FOR VENICE/SEPULVEDA STATION TRAVEL WAY WIDTH = 39'
x x x FOR VENICE/SEPULVEDA STATION TRAVEL WAY WIDTH = 50'

AERIAL STATION AT SEPULVEDA BLVD/NATIONAL BLVD (M / TX-005)

SCALE: NTS



x DIMENSION VARIES BASED ON EXISTING RIGHT-OF-WAY WIDTH

VENICE/MOTOR STATION (L / TX-005)

SCALE: NTS

CONCEPTUAL ENGINEERING

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LOS ANGELES, CALIFORNIA 90071
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TYPICAL SECTIONS

SHEET 5 OF 6

CONTRACT NO
DRAWING NO TX-005
REV 0
SCALE AS SHOWN
SHEET NO

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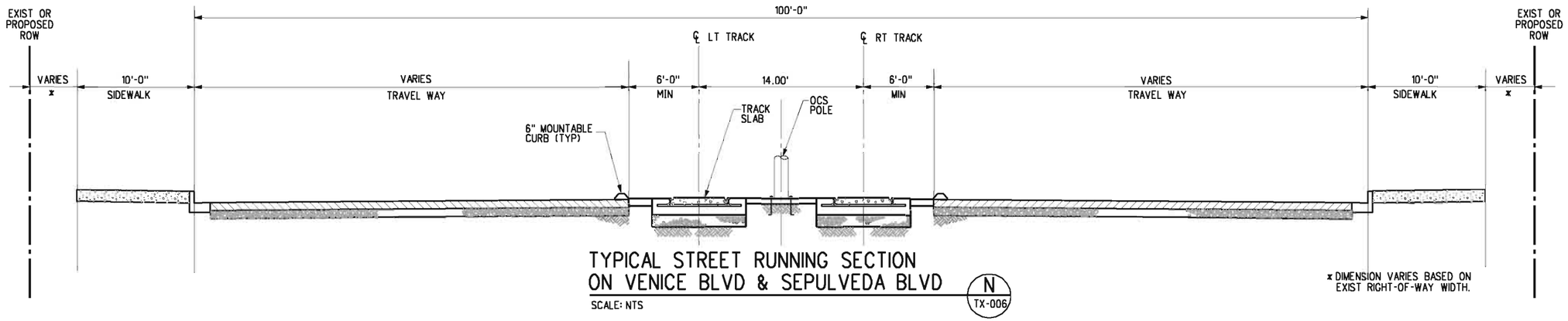
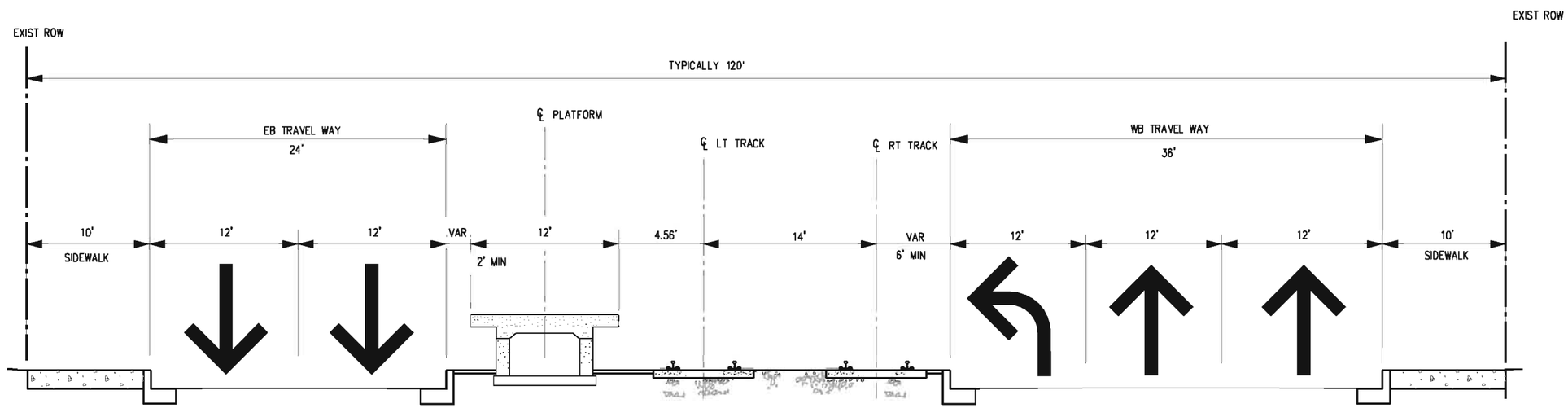


TYPICAL STREET RUNNING SECTION
ON VENICE BLVD & SEPULVEDA BLVD

N
TX-006

SCALE: NTS



OLYMPIC/17TH STATION

0
TX-006

SCALE: NTS

CONCEPTUAL ENGINEERING

PRELIMINARY

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EXPOSITION TRANSIT PROJECT-PHASE 2

TYPICAL SECTIONS

SHEET 6 OF 6

CONTRACT NO
DRAWING NO TX-006
REV 0
SCALE AS SHOWN
SHEET NO

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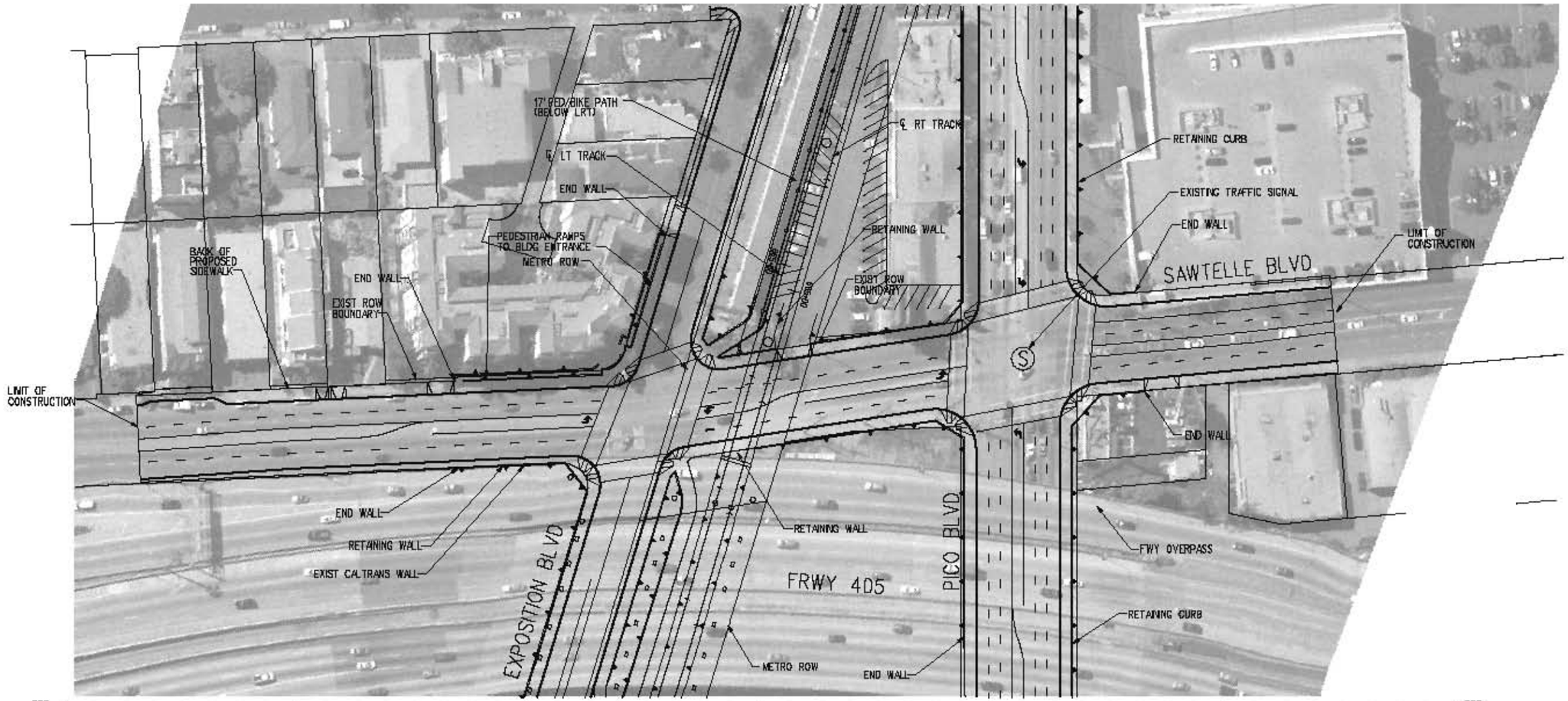

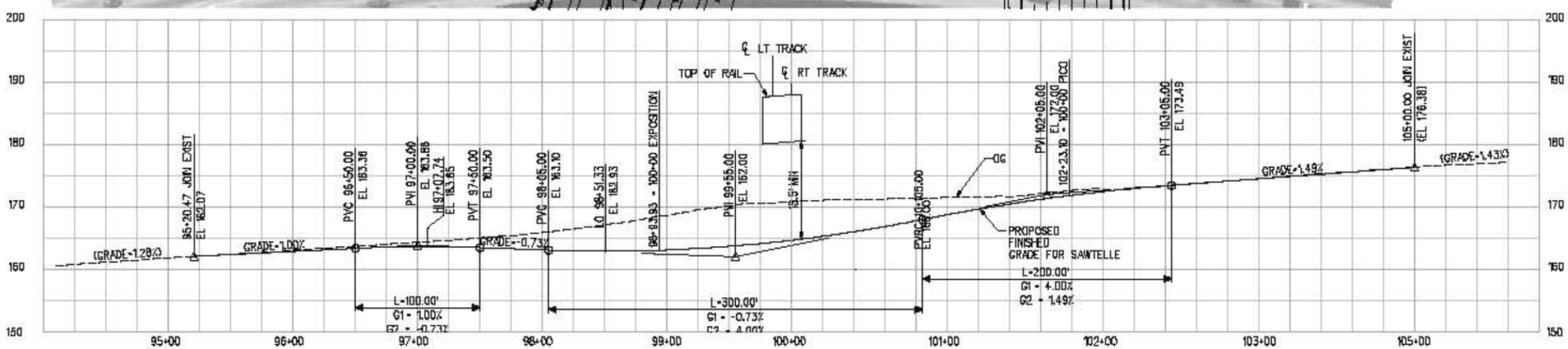

50' 0 50' 100'

CONCEPTUAL ENGINEERING

RT TRACK PROFILE

PRELIMINARY

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DESIGNED BY J. SUSILO
DRAWN BY M. AL-MASHAT
CHECKED BY L. MOHR
IN CHARGE J. PRIZNER
DATE 12/4/09

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Expo

DMJM HARRIS | AECOM

333 S. GRAND AVENUE, SECOND FLOOR
LOS ANGELES, CALIFORNIA 90071
TEL (213) 922-7200 FAX (213) 922-7201

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EXPOSITION TRANSIT PROJECT-PHASE 2

STREET PLAN AND PROFILE
SAWTELLE BLVD

CONTRACT NO

DRAWING NO CP-100 REV 0

SCALE 1"=50'-0"

SHEET NO

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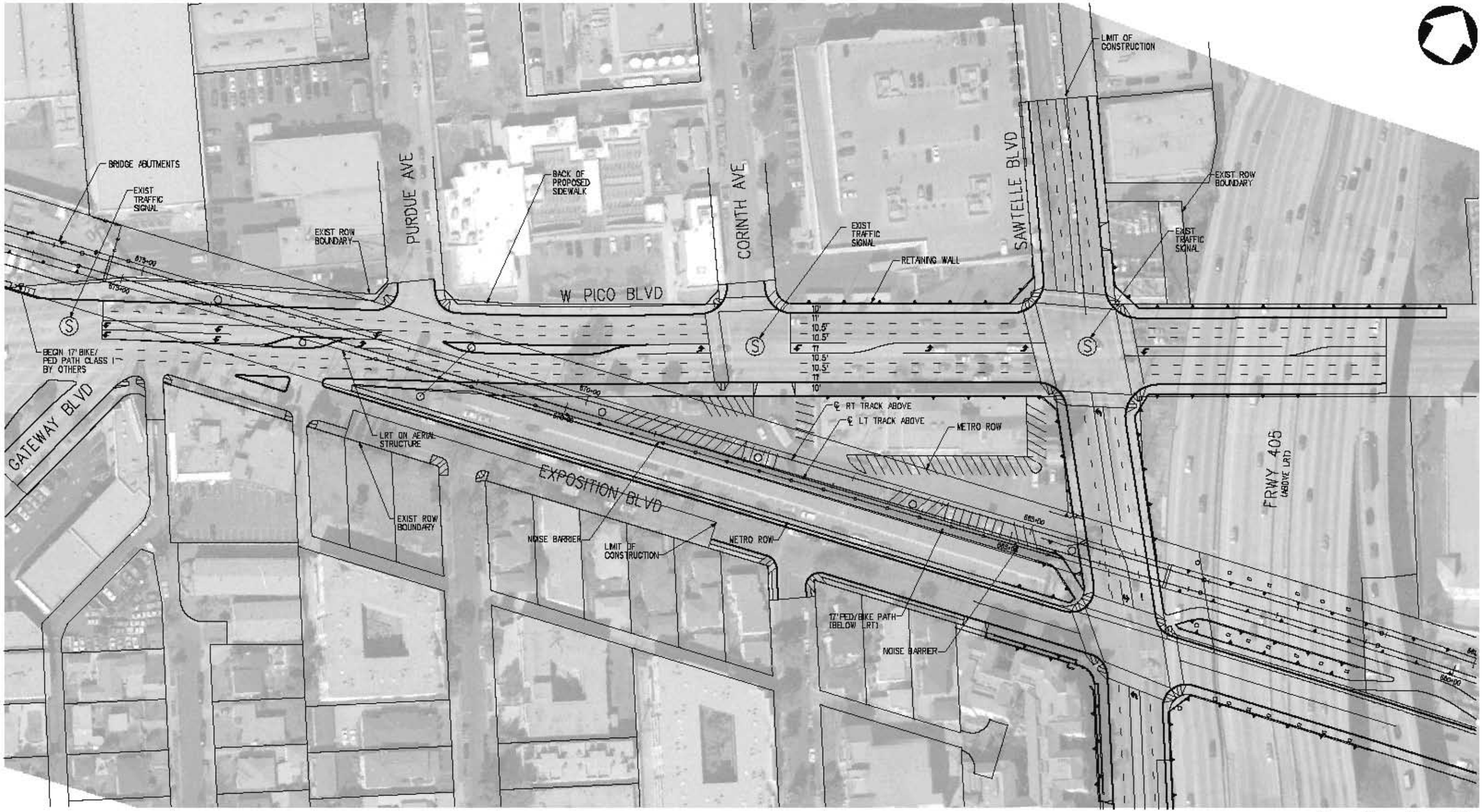

CONCEPTUAL ENGINEERING

PRELIMINARY

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IN CHARGE J. PRIZNER
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EXPOSITION TRANSIT PROJECT-PHASE 2

STREET PLAN
PICO/GATEWAY BLVD

CONTRACT NO
DRAWING NO CP-200
REV 0
SCALE 1"=50'-0"
SHEET NO

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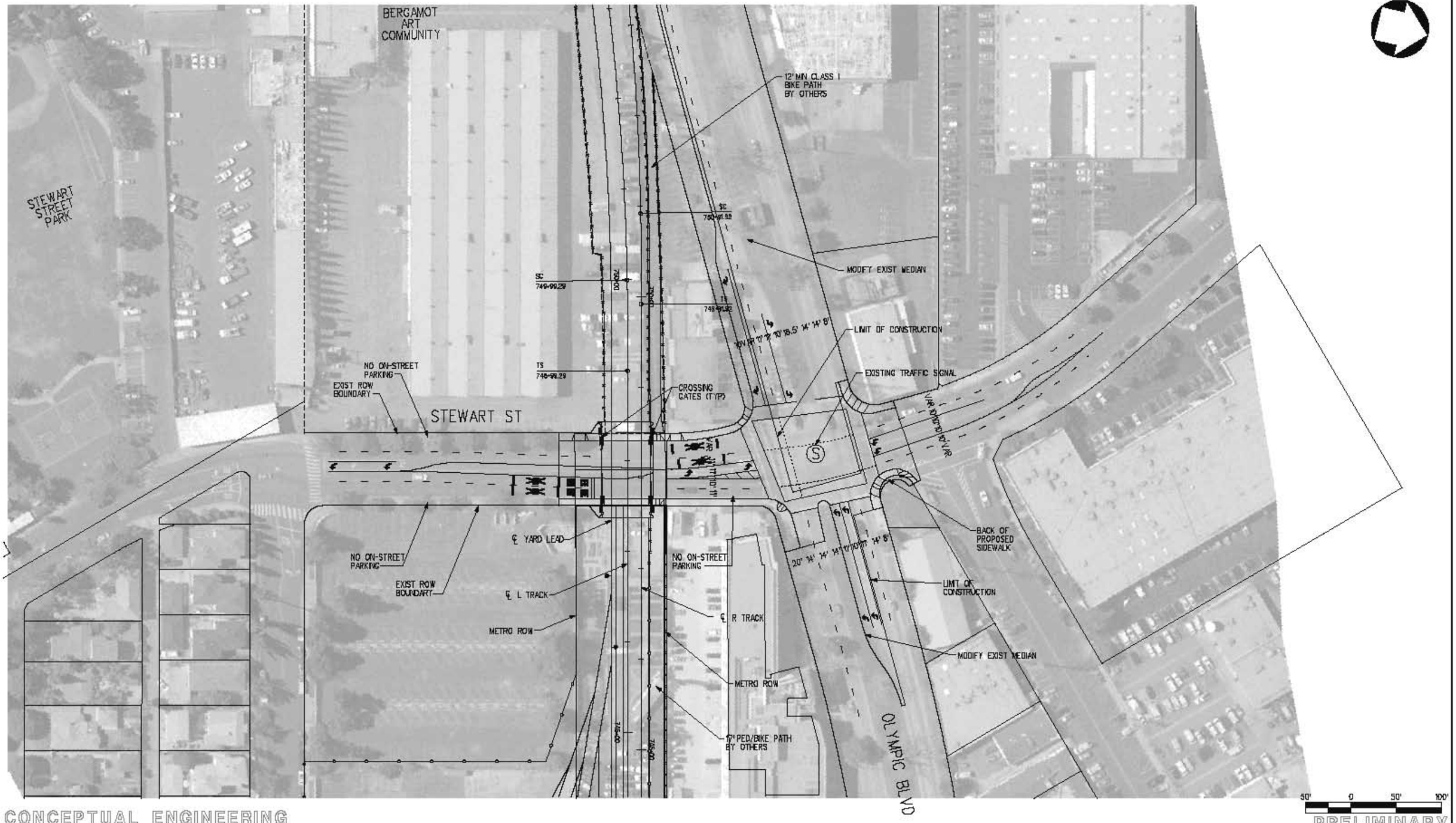

CONCEPTUAL ENGINEERING

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LOS ANGELES, CALIFORNIA 90071
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EXPOSITION TRANSIT PROJECT-PHASE 2

GRADE CROSSING PLAN
STEWART STREET

CONTRACT NO
DRAWING NO CI-100
REV 0
SCALE 1"=50'-0"
SHEET NO

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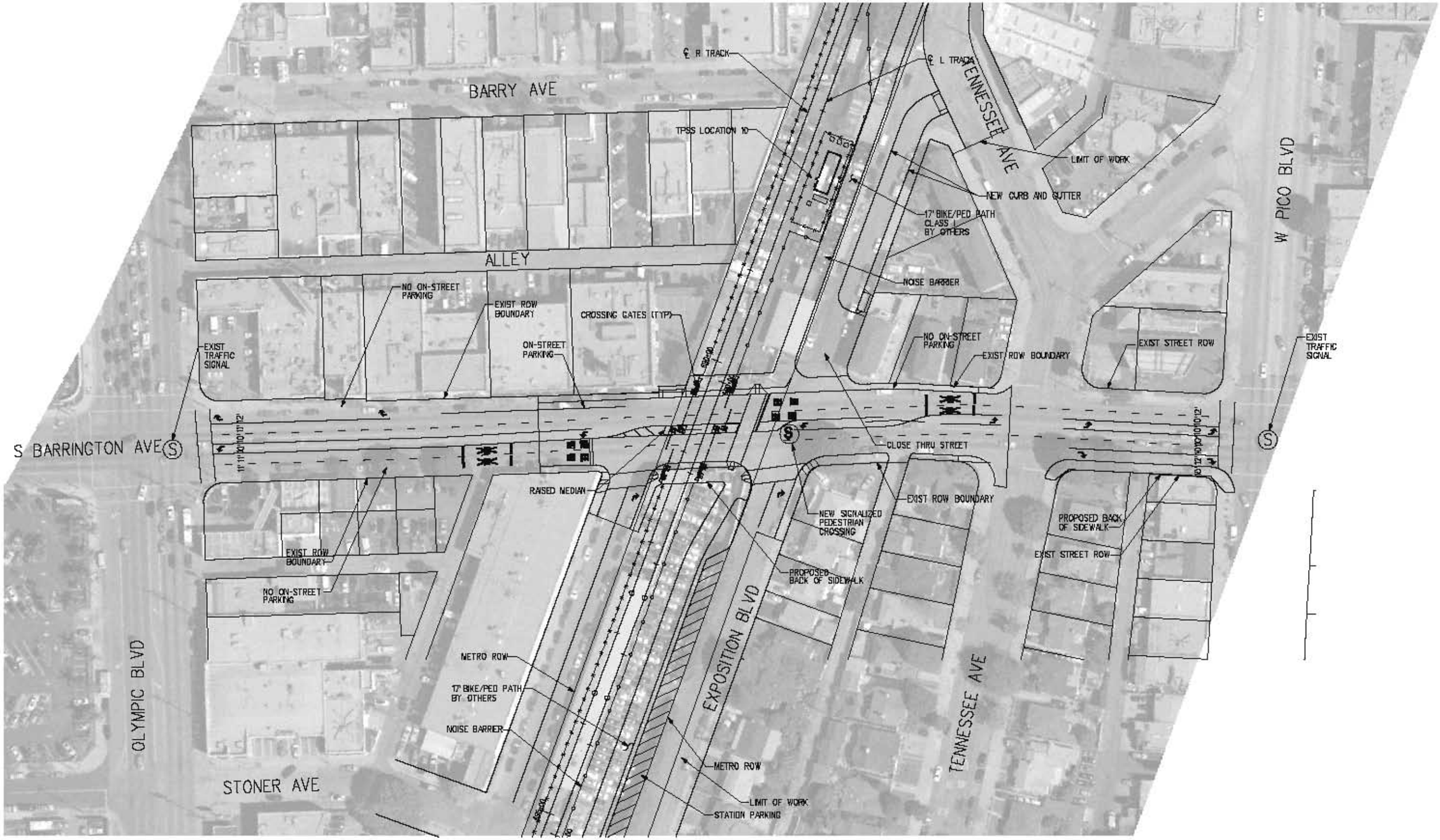

CONCEPTUAL ENGINEERING

50' 0 50' 100'

PRELIMINARY

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REV	DATE	BY	APP	REG NO	EXPIRES	SEAL HOLDER	DESCRIPTION
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DESIGNED BY J. SUSILO
DRAWN BY M. AL-MASHAT
CHECKED BY L. MOHR
IN CHARGE J. PRIZNER
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EXPOSITION TRANSIT PROJECT-PHASE 2

GRADE CROSSING PLAN
BARRINGTON AVENUE

CONTRACT NO
DRAWING NO C1-300
REV 0
SCALE 1"=50'-0"
SHEET NO

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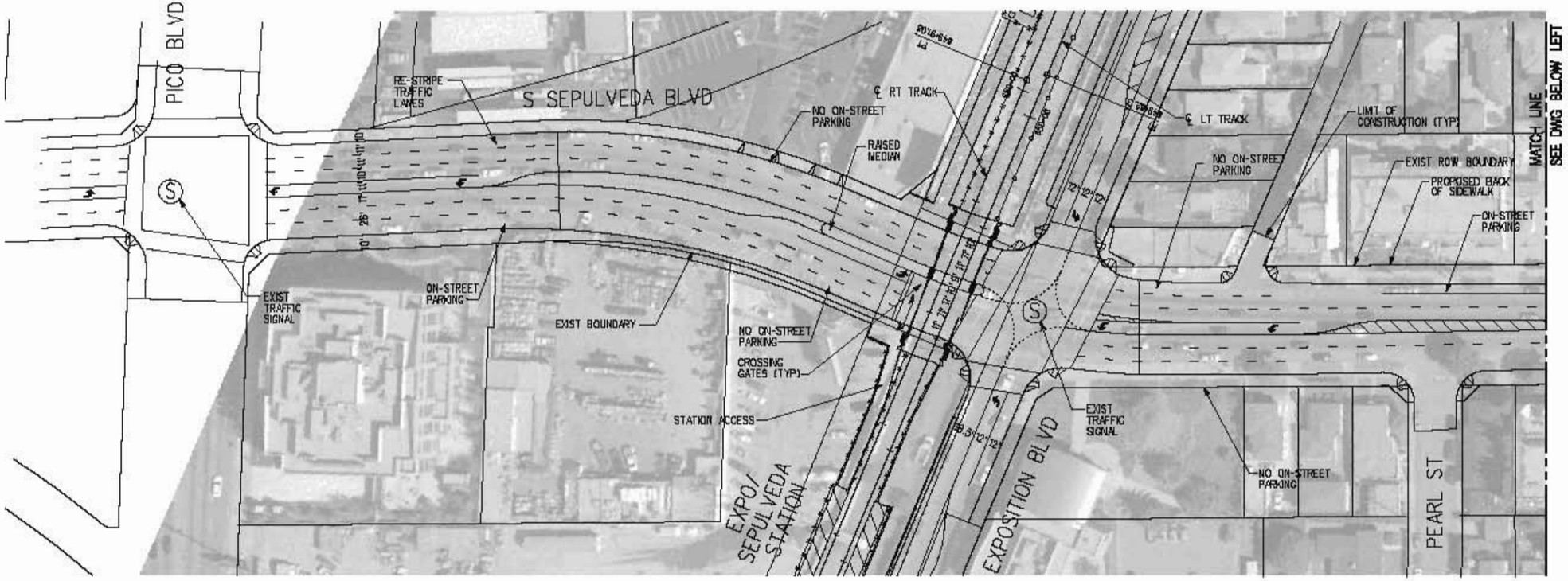

CONCEPTUAL ENGINEERING

50' 0 50' 100'

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EXPOSITION TRANSIT PROJECT-PHASE 2
GRADE CROSSING PLAN
RIGHT-OF-WAY ALIGNMENT
SEPULVEDA BOULEVARD
SHEET 1 OF 2

CONTRACT NO
DRAWING NO CI-400 REV 0
SCALE 1"=50'-0"
SHEET NO

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50' 0 50' 100'

CONCEPTUAL ENGINEERING

PRELIMINARY

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EXPOSITION TRANSIT PROJECT-PHASE 2
GRADE CROSSING PLAN
RIGHT-OF-WAY ALIGNMENT
SEPULVEDA BOULEVARD
SHEET 2 OF 2

CONTRACT NO
DRAWING NO CI-401 REV 0
SCALE 1"=50'-0"
SHEET NO

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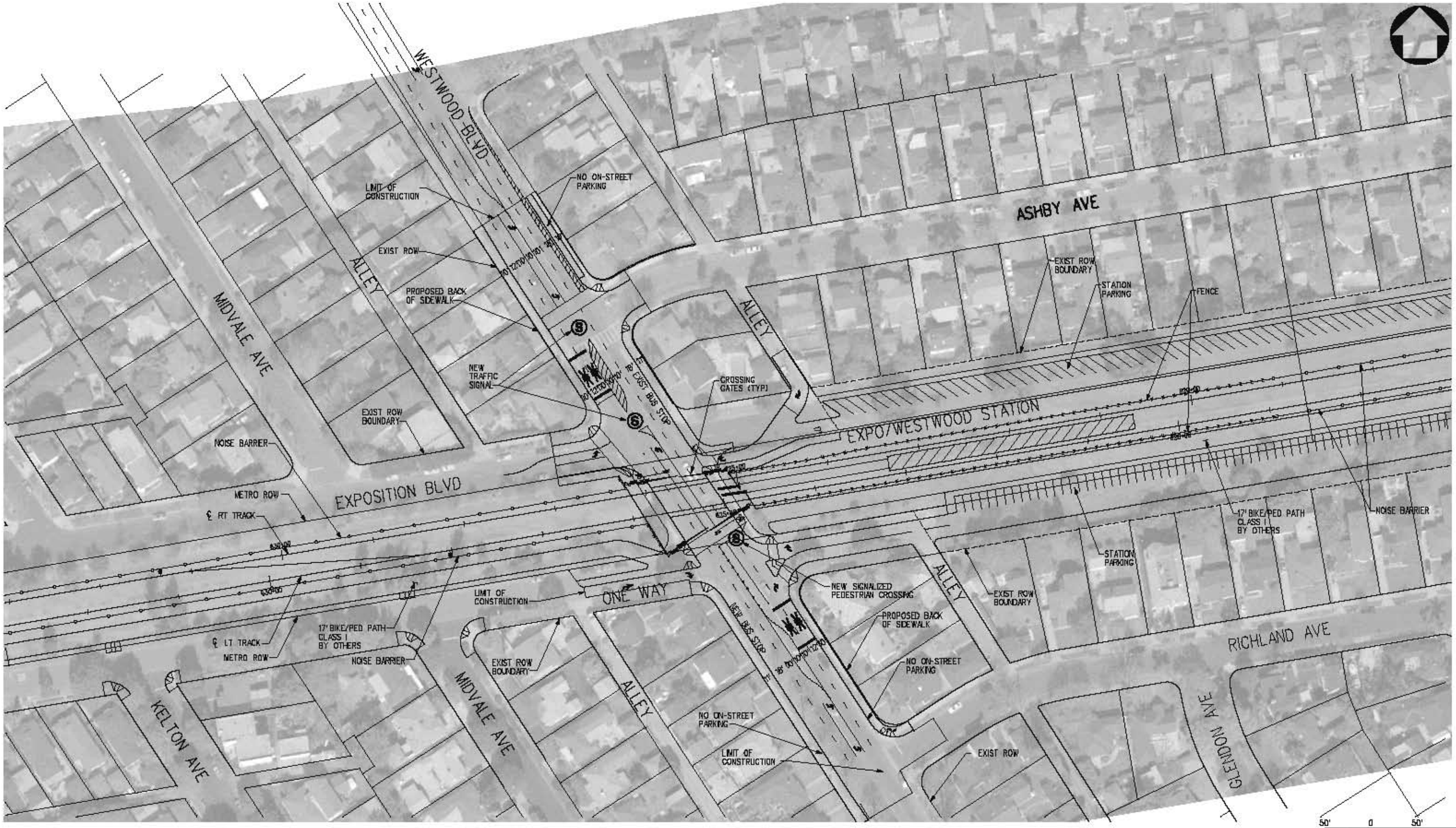

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CHECKED BY L. MOHR
IN CHARGE J. PRIZNER
DATE 12/4/09

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EXPOSITION TRANSIT PROJECT-PHASE 2

GRADE CROSSING PLAN
WESTWOOD BOULEVARD

CONTRACT NO
DRAWING NO CI-500
REV 0
SCALE 1"=50'-0"
SHEET NO

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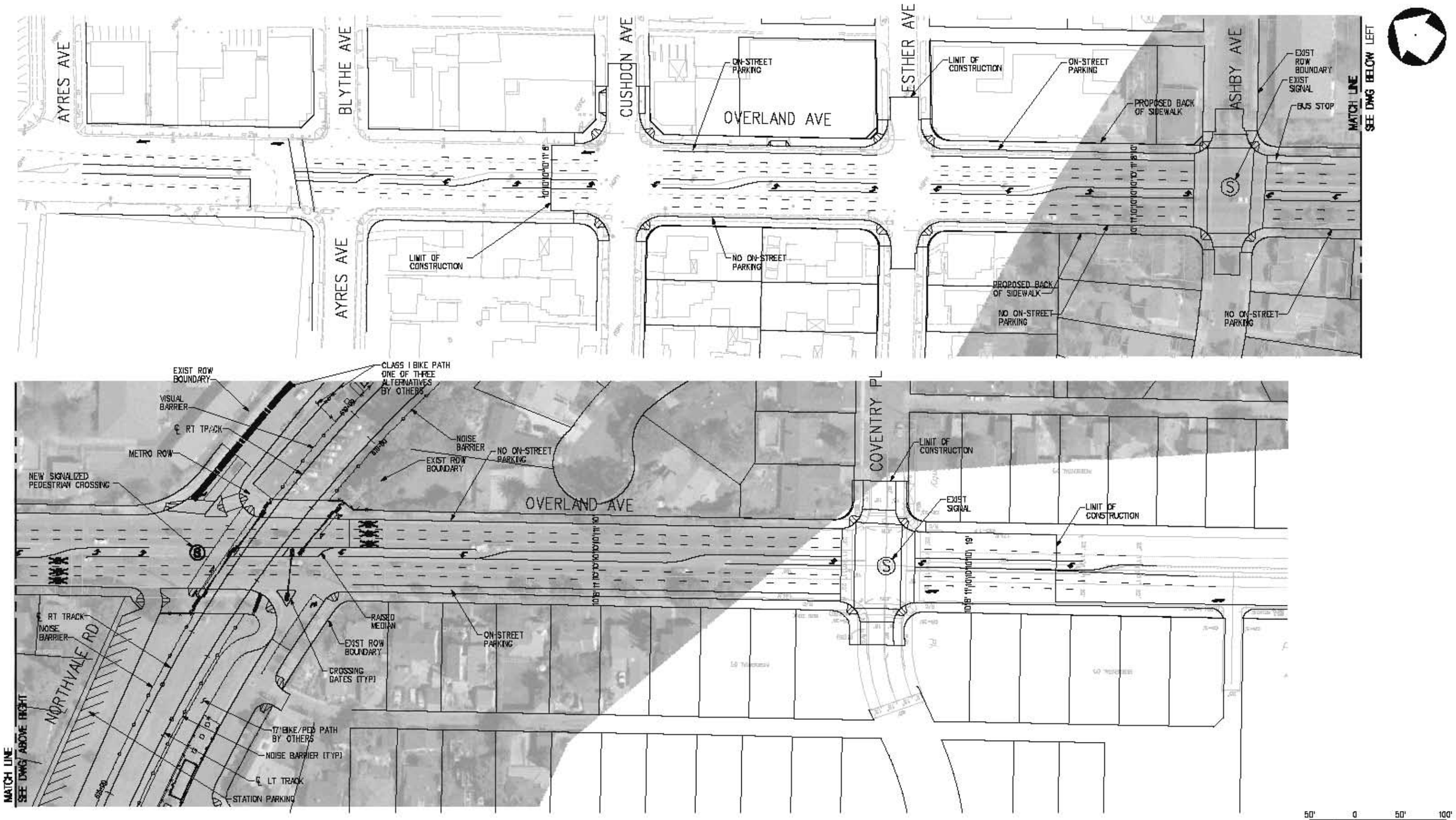

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CHECKED BY L. MOHR
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DATE 12/4/09

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EXPOSITION TRANSIT PROJECT-PHASE 2

GRADE CROSSING PLAN
OVERLAND AVENUE

CONTRACT NO
DRAWING NO CI-600
REV 0
SCALE 1" =50' -0"
SHEET NO

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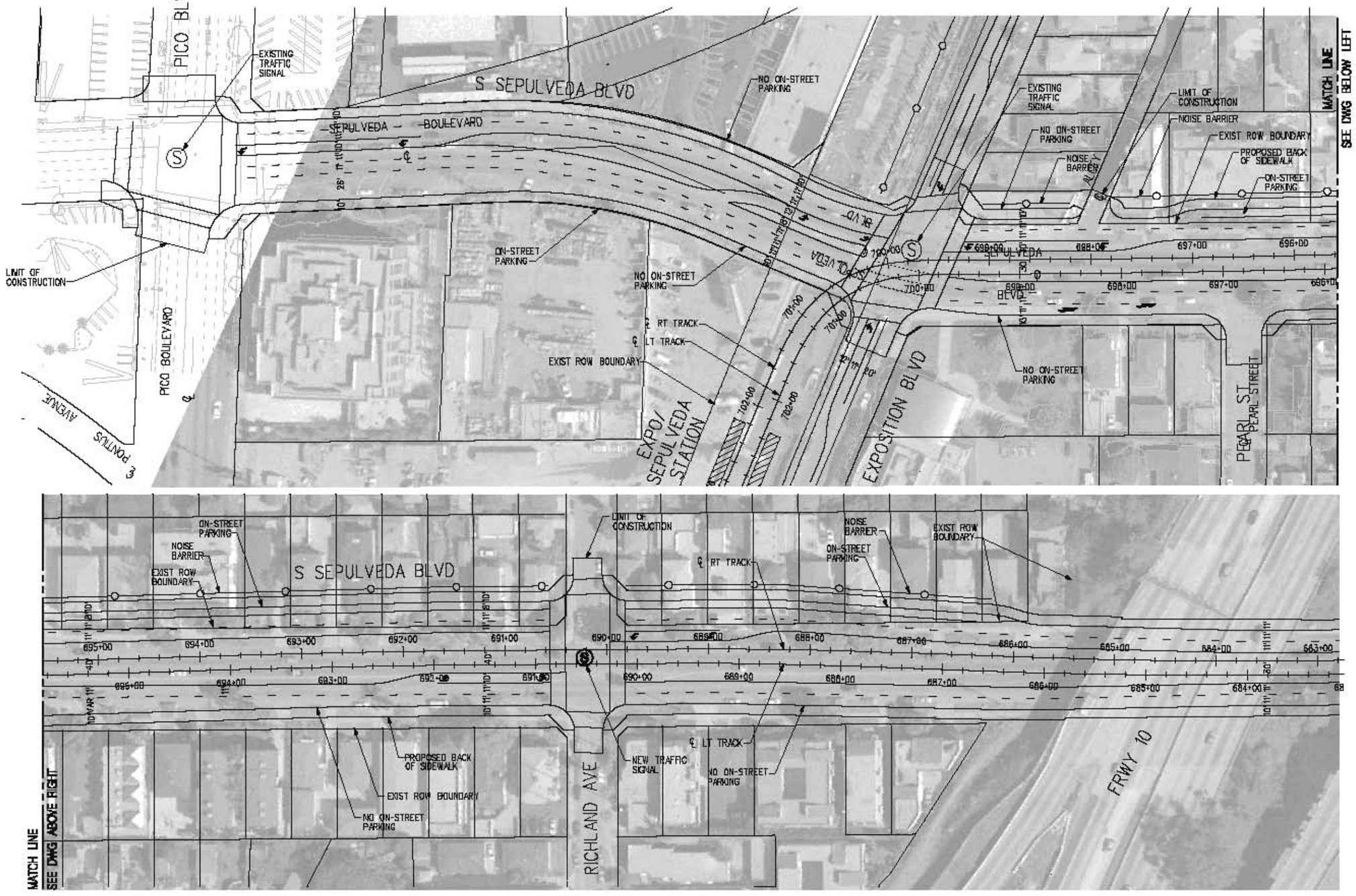

CONCEPTUAL ENGINEERING

50' 0 50' 100'

PRELIMINARY

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DATE 12/4/09

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TEL (213) 330-7000 FAX (213) 330-7001

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EXPOSITION TRANSIT PROJECT-PHASE 2

GRADE CROSSING PLAN
VENICE SEPULVEDA ALIGNMENT
SEPULVEDA BLVD AT-GRADE

CONTRACT NO
DRAWING NO CI-700
REV 0
SCALE 1"=50'-0"
SHEET NO

Plot Driver=MTA_H_pdf.plt Pentable=Expo_H.TBL USER=Susilo J 3:25:37 PM 12/9/2009 W:\60022129 Expo 2...LA\cadd\Civil\Sheet\FEIR\ci700.plg

Appendix E:

Letter from LADOT to Expo Dated October 15, 2009

CITY OF LOS ANGELES

CALIFORNIA

INEX2 - 00623

RITA L. ROBINSON
GENERAL MANAGER

DEPARTMENT OF
TRANSPORTATION
100 S. Main St., 10th Floor
Los Angeles, CA 90012
(213) 972-8470
FAX (213) 972-8410

ANTONIO R. VILLARAIGOSA
MAYOR

October 15, 2009

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Construction Authority
Executive Office

Mr. Richard D. Thorpe
Chief Executive Officer
Exposition Construction Authority
707 Wilshire Boulevard, 34th Floor
Los Angeles, CA 90017

RE: GRADE CROSSINGS FOR EXPOSITION LIGHT RAIL TRANSIT PROJECT, PHASE 2

Dear Mr. Thorpe:

LADOT continues to be committed to working with the Exposition Construction Authority (Authority) and the offices of elected officials to design a safe and effective extension of the Exposition Light Rail Transit Project (Phase 2) through the West Los Angeles area. In this regard, the Authority proposes at-grade crossings at six locations, with aerial grade separation at four other locations. In addition, special measures have been developed in consultation with LADOT where at-grade operation had been proposed by the Authority. This letter summarizes these measures and identifies the related parking and traffic impacts.

It is our understanding that these measures will be presented and discussed in the Final EIR. The California Public Utilities Commission (CPUC) will ultimately determine if the at-grade crossings recommended by the Authority are to be approved.

We recognize that interested elected officials and community groups may wish to have a better understanding of the rationale for grade separation versus at-grade operation. Further, we believe that stakeholders may wish to understand the projected impacts of at-grade operation. Accordingly, we are using the opportunity of this correspondence to objectively report on the impacts.

<u>Grade Separation Versus At-Grade Operation</u>

The Authority has three general criteria for grade separation when planning a light rail project: alignment practicality; traffic disruption; and close proximity to a major intersection. An example of the "alignment practicality" criterion is the decision to have grade separation at the Pico Boulevard crossing, as a result of the nearby crossing at Sawtelle Boulevard also being grade separated. At this location it would not be possible to descend to an at-grade alignment before reaching Pico Boulevard.

"Traffic disruption" describes the condition where the volume of traffic on the street being crossed is so great and the light rail crossings are so frequent that significant disruption and delay would result, which would also increase traffic safety risk. An example of the traffic disruption criterion is the decision to have grade separation at the Bundy Drive crossing. For this criterion, the Authority uses guidelines developed by the Institute of Transportation Engineers and adopted by Metropolitan Transportation Authority (MTA).

"Close proximity to a major intersection" describes the condition where the light rail crossing is so close to a major signalized intersection that the intersection would be in a recurrent state of interlock which would also increase traffic safety risk. An example of this criterion is the recent proposal by the Authority to provide grade separation at the Centinela Avenue crossing.

If a crossing doesn't meet any of these three general criteria the Authority and the MTA conclude that traffic safety risk would be minimal and that at-grade operation would be an acceptable and cost effective means to expand the County's light rail system.

Based on these criteria, grade separations are proposed by the Authority at the Centinela Avenue, Bundy Drive, Pico Boulevard and Sawtelle Boulevard crossings. In each case, the light rail line would travel above the existing street grades. At-grade operation is proposed by the Authority at the Barrington Avenue, Sepulveda Boulevard, Military Avenue, Westwood Boulevard, Overland Avenue and Bagley Avenue crossings.

Description of At-Grade Operation

Exposition light rail trains are proposed to operate on five-minute headways in each direction during peak periods. Thus, on the average, light rail trains will arrive once every two and one-half minutes during peak periods when both directions are considered.

Each at-grade crossing will have automated state-of-the-art crossing controls and features, including:

- Fencing
- Audible Sounds
- Flashing lights
- Vehicle approach gates
- Vehicle departure gates (to prevent vehicles from going around approach gates)
- Pedestrian approach gates
- Pedestrian emergency exit swing gates
- Emergency battery back-up power
- Activated electronic No Turn symbol signs
- Activated electronic Train Coming symbol signs at selected locations
- Pedestrian countdown signals
- Accessible features for blind pedestrians
- "Queue-cutter" features to prevent vehicles from stopping on the tracks

Traffic signal displays facing the north-south cross streets will show red under three conditions: when the gates are down for a crossing light rail train; to serve vehicular and pedestrian traffic on Exposition Boulevard; and to prevent vehicles from stopping across the light rail tracks. In fulfilling this third objective, red signals will be displayed to north-south cross streets when downstream traffic comes close to extending across the tracks, even in the absence of an approaching light rail train. Stopped vehicles downstream from and near the light rail crossing would be sensed by detectors embedded in the roadway pavement. When stopped vehicles are detected near the light rail crossing, the traffic signal at the crossing would display a red to prevent further vehicles from passing across the tracks. When downstream stopped vehicles no longer are detected, no light rail trains are approaching and there is no signal call from traffic on Exposition Boulevard, the traffic signal at the crossing will return to green. This safety feature is known as a "queue-cutter".

General Impacts of At-Grade Operation

Each at-grade crossing will result in incremental delays to vehicular traffic. This is due to the frequency and duration of the light rail pre-emptions and the random arrivals associated with light-rail pre-emption. By its very nature, pre-emption would generally be out-of-step with the patterns prescribed for the interconnected and synchronized traffic signal network. The pre-emption period and calculated delays to motorists are summarized below:

- The minimum pre-emption period will be 46 seconds – 12 seconds for the gates to descent, 20 seconds for the gates to remain down prior to arrival of a light rail train, six seconds for the gates to remain down while the light rail train crosses and eight seconds for the gates to rise.
- The average pre-emption period will be 56 seconds, or approximately 10 seconds longer, since the traffic signal would go to red in advance of gate activation, due to insufficient time to serve the next signal phase, such as for pedestrian crossing time.
- The maximum pre-emption period will be 112 seconds when back-to-back pre-emptions occur.
- Based on the 2.5 minute frequency of light rail pre-emptions during the peak period and the probability of motorists arriving during a light rail pre-emption, the average delay to motorists at each at-grade crossing is estimated by LADOT to be approximately 22 seconds.
- The Authority modeled the pre-emption delay at many of the at-grade crossings. The modeled delay ranged from 10.4 to 55.0 seconds, and the differences are due to a variety of site-specific factors. The average delay as calculated by LADOT is in general agreement with the delays modeled by the Authority.

The modeled delay at each at-grade crossing was compared to the various threshold values shown in the Highway Capacity Manual for identifying if delay is within acceptable limits.

Each at-grade crossing signal will cause some degree of queuing (a line of waiting vehicles) upstream of the tracks. If the upstream queuing were to extend into an adjacent signalized intersection then a gridlock situation could result. Accordingly, the modeled upstream queuing was evaluated for proposed at-grade crossings. The

modeled 95th percentile queue (meaning that the length is exceeded only 5% of the time) was used as a reasonable conservative threshold for identifying a potential gridlock situation.

Finally, each at-grade crossing could result in the new signalized rail crossing being so close to a downstream traffic signal that waiting traffic at the downstream signal might extend across the tracks. Without special controls such a situation could entrap a stopped vehicle and could present a safety risk when light rail trains approach. Accordingly, the downstream queues were examined. Where the value for the modeled 95th percentile queues for downstream traffic came close to the distance between the light rail crossing and the downstream signalized intersection, LADOT requires that a "queue-cutter" feature be provided.

Centinela Avenue

We concur with the Authority's new recommendation to provide an aerial grade separation at this crossing. Grade separation is justified based on the light rail crossing's close proximity to Olympic Boulevard.

Barrington Avenue

The Authority, in consultation with LADOT, has revised the operational plan on Barrington Avenue by providing a southbound right turn lane at Pico Boulevard and an extended northbound left turn lane at Olympic Boulevard.

Nineteen on-street parking spaces would be lost in order to operate Barrington Avenue with two lanes in each direction and turn lanes. We note that businesses and residents have access to side street parking and off-street parking lots.

The average delay due to the at-grade crossing signal (northbound and southbound combined) is identified by the Authority as 10.4 seconds during the AM peak period and 12.5 seconds during the PM peak. This corresponds to Level of Service B (reasonably free flow), as specified in the Highway Capacity Manual. This level of service is acceptable to LADOT.

With the currently proposed measures, the queue lengths that would extend upstream of the light rail crossing up to 5% of the time, as modeled by the Authority, are as follows:

Northbound, AM peak: 426 feet
Northbound, PM peak: 230 feet
Southbound, AM peak: 193 feet
Southbound, PM peak: 464 feet

These queue lengths marginally would not impact the operation of adjacent signalized intersections which are immediately upstream – 480 feet for northbound and 490 feet for southbound.

Further evaluation by LADOT indicates that traffic stopped at a signalized intersection downstream from the light rail crossing might infrequently extend to the light rail tracks.

In order to ensure that traffic would not extend across the tracks when light rail trains are approaching, a queue-cutter feature would be provided. This feature would activate a red signal display for traffic approaching the light rail crossing, when downstream queues come close to extending across the light rail crossing, even in the absence of an approaching light rail train.

We note that the adjacent crossings at Pico Boulevard and at Bundy Drive would have aerial grade separations. This could result in a "roller-coaster" alignment if the crossing at Barrington Avenue were to remain at-grade. The Authority should re-examine the feasibility of an aerial grade separation at Barrington Avenue, primarily from an alignment practicality perspective.

In summary, the on-street parking loss can be accommodated by available side street and off-street parking. Delay would be within acceptable limits and vehicles queuing upstream of the crossing marginally would be within manageable limits. A queue-cutter would be provided to ensure that vehicles queuing downstream of the light rail crossing would not extend across the tracks. Finally, the feasibility of an aerial grade separation should be re-examined, for the purpose of maintaining a smoother vertical alignment.

Sepulveda Boulevard

The Draft EIR describes an at-grade crossing with widening of Sepulveda Boulevard, for the purpose of providing an additional southbound travel lane through the crossing. The Authority now proposes to revise this description of the proposed at-grade crossing to include widening of Sepulveda Boulevard to create an additional travel lane in each direction between Tennessee Avenue and Pearl Street. The additional lane would avoid excessive queuing upstream of the light rail crossing. The Authority also proposes to add a Design Option for an aerial grade separation which would be implemented if additional funding can be identified. If the grade separation option is implemented, it would be undertaken in place of the widening. However, the structure would have to accommodate future widening of Sepulveda Boulevard to ultimate Major Highway standards.

With at-grade operation, 49 on-street parking spaces would be lost, in order to operate Sepulveda Boulevard with three lanes in each direction plus left turn lanes. We note that off-street spaces are available.

The average delay due to the at-grade crossing signal (northbound and southbound combined) is identified by the Authority as 55.0 seconds during the AM peak period. This corresponds to a Level of Service D (approaching unstable flow), as specified in the Highway Capacity Manual. The PM peak period is identified as 32.4 seconds corresponding to Level of Service C (stable flow). Although LADOT would prefer Level of Service C (stable flow) or better at all intersections, this is not achievable at many locations. Accordingly, Level of Service D or better is acceptable to LADOT.

Finally, the queue lengths that would extend upstream of the light rail crossing up to 5% of the time, as modeled by the Authority, are as follows:

Northbound, AM peak: 495 feet
Northbound, PM peak: 315 feet

Southbound, AM peak: 97 feet
Southbound, PM peak: 362 feet

These queue lengths would not impact the operation at adjacent signalized intersections which are further upstream – 3,370 feet for northbound and 550 feet for southbound.

The queue lengths and delay cited above reflect normal conditions. We note that Sepulveda Boulevard sometimes serves as a *de facto* alternate route for Interstate 405 during freeway incidents. When this occurs, motorists divert to Sepulveda Boulevard and traffic demand increases dramatically. Accordingly, we encourage consideration of the Design Option and believe that an aerial grade separation at Sepulveda Boulevard would be a better long-term measure than at-grade operation.

In summary, on-street parking loss can be accommodated by available off-street parking. Under normal conditions, delay and queuing would be within acceptable limits with at-grade operation. However, when freeway incidents and the corresponding diversion occurs, southbound vehicles on Sepulveda Boulevard might queue into the intersection at Pico Boulevard. We support serious consideration of the aerial grade separation Design Option, due to the important role of Sepulveda in serving regional traffic. The Design Option would have to accommodate the ultimate width of Sepulveda Boulevard to Major Highway standards.

Military Avenue

This location will be signalized in order to provide appropriate safety features. Due to the relatively lighter traffic volumes on Military Avenue, the Authority did not analyze delay and queue lengths for this crossing. It is reasonable to conclude that there would be no significant impacts at this location.

Westwood Boulevard

Fifty-eight on-street parking spaces would be lost in order to provide two lanes in each direction plus a left-turn lane. This proposed striping of two lanes in each direction near the crossing would reduce excessive queuing. We have worked extensively with the Authority to develop viable alternatives to minimize parking loss and street tree removal with minor street widening.

The at-grade proposal would still prohibit parking to some fronting residences along Westwood Boulevard near the crossing, although access from parallel alleys and parking on cross streets would still be available. We note that parking is not fully utilized on Westwood Boulevard near Exposition Boulevard. The Authority's proposal to make park-and-ride spaces available to residents would reduce the parking inconvenience to residents.

The designated school crossing at Ashby Avenue would become signalized as part of the project, thus providing more positive control.

The queue lengths that would extend upstream of the light rail crossing up to 5% of the time, as modeled by the Authority, are as follows:

Northbound, AM peak: 258 feet
Northbound, PM peak: 190 feet
Southbound, AM peak: Not identified
Southbound, PM peak: Not identified

The northbound queue lengths would not impact the operation at the adjacent signalized intersection which is 1,220 feet upstream. Although the southbound queue lengths were not identified by the Authority, it is reasonable to conclude that they would not impact the operation at the adjacent signalized intersection which is 970 feet upstream.

The Authority did not identify delays due to light rail pre-emption at Westwood Boulevard. Due to the relatively lighter volumes on Westwood Boulevard, it is reasonable to conclude the delay would be less than those shown for the other analyzed at-grade crossings.

As mentioned to the Authority before, LADOT strongly recommends a side platform station design at the Westwood Boulevard station, instead of a center platform design. A side platform design would allow the provision of sidewalks aligned in the projected area of the platforms. The sidewalks would provide pedestrian refuge when light rail trains are approaching and pedestrian gates are down.

In summary, there would be some inconvenience to those who might wish to continue to park on Westwood Boulevard near Exposition Boulevard. Delay and queuing would likely be within acceptable limits. We strongly recommend a side platform station design.

Overland Avenue

The Authority now commits to a minor widening of Overland Avenue so as to add one lane in each direction. The additional lanes would avoid excessive queuing, while the widening would preserve parking for homes fronting on Overland Avenue on the west side. Parking would be prohibited on the east side where there is no frontage.

We are aware of safety concerns expressed with regard to students attending Overland Avenue School. We note that the designated school crossing at Ashby Avenue has a crossing guard and is signalized with actuation by pedestrians. Pedestrian gates and pedestrian signals would be installed at the light rail crossing.

The queue lengths that would extend upstream of the light rail crossing up to 5% of the time, as modeled by the Authority, are as follows:

Northbound, AM peak: 358 feet
Northbound, PM peak: 312 feet
Southbound, AM peak: 237 feet
Southbound, PM peak: 378 feet

These queue lengths would not impact the signalized intersection to the south at Coventry Place, which is 580 feet from the crossing. However, they would impact the

signalized intersection to the north at Ashby Avenue which is 230 feet from the crossing. Accordingly, a queue-cutter feature would be provided. This feature would activate a red signal display for northbound traffic approaching the light rail crossing when downstream queues come close to extending across the light rail crossing, even in the absence of an approaching light rail train.

The average delay due to the at-grade crossing signal (northbound and southbound combined) under the preemption mode is identified by the Authority as 33.8 seconds during the AM peak period and 24.7 second during the PM peak period, corresponding to Level of Service C (stable flow), as specified in the Highway Capacity Manual. Level of Service D or better is acceptable to LADOT.

In summary, on-street parking would be available for properties fronting on Overland Avenue. Pedestrian safety features would be present at the light rail crossing and at Ashby Avenue. Delay and queuing would be manageable and within acceptable limits.

Bagley Avenue

This location will be signalized in order to provide appropriate safety features. Due to the relatively lighter traffic volumes on Bagley Avenue, the Authority did not analyze delay and queue lengths for this crossing. It is reasonable to conclude that there would be no significant impacts at this location.

LADOT strongly recommends that the bicycle path easterly of Bagley Avenue be located south of the Exposition Light Rail tracks, so that bicyclists would not need to cross the tracks.

We appreciate the opportunity to comment on your study and look forward to continue coordination with the Authority and elected officials in the design and implementation phases of this important transportation project.

Sincerely,

Rita L. Robinson
General Manager

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c: Honorable Paul Koretz, Council District 5
Honorable Bernard C. Parks, Council District 8
Honorable Jan Perry, Council District 9
Honorable Herb J. Wesson, Jr., Council District 10
Honorable Bill Rosendahl, Council District 11
Jaime de la Vega, Mayor's Office
Borja Leon, Mayor's Office
Lisa Hansen, Mayor's Office
Monica Born, Exposition Construction Authority
Vivian Rescalvo, Supervisor Zev Yaroslavsky's Office
Betsy Weisman, City Planning Department

Appendix F:

Letter from CPUC to Expo Dated December 4, 2009

STATE OF CALIFORNIA

Arnold Schwarzenegger, *Governor*

PUBLIC UTILITIES COMMISSION
320 WEST 4TH STREET, SUITE 500
LOS ANGELES, CA 90013
(213) 576-7083

INEX2 - 00650

December 4, 2009

Richard D. Thorpe, PE,
Chief Executive Officer
Exposition Metro Line Construction Authority
707 Wilshire Boulevard, 34th Floor
Los Angeles, CA 90017

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DEC 11 2009

Exposition Metro Line
Construction Authority
Document Control

Re: Exposition Light Rail Transit Project – Phase 2

Dear Mr. Thorpe:

We are in receipt of your November 16, 2009 letter that provides a progress summary of the Exposition Light Rail Transit Project, Phase 2 (Project) crossings since release of the Draft Environmental Impact Report (DEIR) for public comment. The Staff of the California Public Utilities Commission (CPUC) submitted comments, dated March 27, 2009, to your Project DEIR.

Since submission of our comments on the Project DEIR, CPUC staff has had several meetings with the Exposition Metro Line Construction Authority (Expo Authority) staff to discuss and evaluate revisions to the Project proposed by Expo Authority in response to the CPUC and other comments. The Expo Authority provided additional analysis of potential impacts of Project crossings and has proposed additional Project revisions and mitigation measures to further reduce these impacts. Additional analyses are still being undertaken in consultation with CPUC staff as part of our regulatory approval process.

As we have indicated in our previous meetings, neither the Commission nor the CPUC Staff have made a final determination regarding the Project's compliance with CPUC regulatory requirements. Final determinations cannot be made prior to the certification of the Project Final EIR and the completion of the CPUC Rail Crossing Hazard Analysis process outlined in our General Order (GO) 164-D. However, as a responsible agency under CEQA section 15381 with regard to this project, the CPUC is obligated to provide comments to the Expo Authority to ensure that the Final EIR adequately addresses impacts of the Project within the jurisdiction and expertise of the CPUC.

CPUC staff acknowledges the additional work and analysis by the Expo Authority on the crossing issues, and appreciates the extensive coordination and consultation by the Expo Authority with the CPUC, the City of Los Angeles Department of Transportation (LADOT) and the City of Santa Monica on the crossings proposed as part of the Project. The Expo Authority has been responsive to issues raised by the CPUC staff and LADOT concerning the impacts of the proposed crossings, and the parties continue to discuss the various issues raised to minimize and mitigate those impacts. We look forward to continuing this effective working relationship with the Expo Authority, LADOT and City of Santa Monica during the next steps of the CPUC approval process.

Under the Rail Crossing Hazard Analysis process outlined in our GO 164-D, Section 10, the hazard analysis must be completed for each crossing proposed at-grade as part of the Project, in order for the CPUC staff to develop its recommendations to the Commission on each of the Project crossings.

Should you have any questions, please contact me at (213) 576 – 7083 or email at jfp@cpuc.ca.gov.

Sincerely,

Jose Pereyra
Utilities Engineer
Rail Crossings Engineering Section
Rail Transit and Crossings Branch
Consumer Protection and Safety Division

CC: Monica Borne, Project Director, Expo Phase II