

**Metro**Los Angeles County
Metropolitan Transportation AuthorityOne Gateway Plaza
Los Angeles, CA 90012-2952213.922.2000 Te
metro.net**SYSTEM SAFETY AND OPERATIONS COMMITTEE
SEPTEMBER 20, 2012****SUBJECT: EXPO PHASE 1 SAFETY ASSESSMENT****ACTION: IMPLEMENTATION OF ADDITIONAL SAFETY
ENHANCEMENTS****RECOMMENDATION**

Receive and file report on implementation of safety recommendations.

ISSUE

In a letter dated May 29, 2012, Mayor Antonio Villaraigosa expressed concerns regarding the safety of phase 1 of the Exposition Line (Expo), and directed staff to conduct a comprehensive review of the Expo Line grade crossings to assess and evaluate all relevant safety issues and safety control devices, and to make recommendations aimed at enhancing safety on the alignment.

DISCUSSION

In response to the Mayor's letter, a task force consisting of Metro, Los Angeles Department of Transportation (LADOT), Los Angeles Sheriff's Department (LASD), and California Public Utilities Commission (CPUC) staff was formed in order to address the issues raised.

The Task Force conducted a field review of all crossings on June 12 and 13, 2012. This review included an evaluation of existing warning signs, devices, and other safety measures that are currently installed at each of the Expo Line crossings, verification of adequate traffic signal timing, verification of minimum warning times for railroad gates and signals, and confirmation of proper interface between the traffic signals and railroad signals. During the field review, members of the task force met with Metro's safety ambassadors (retired rail operators assisting at most crossings) to obtain their observations of motorist and pedestrian behavior, as well as their recommendations for mitigation.

In addition to the field evaluation, LADOT staff conducted tests of the programming and operation of the traffic signal system at their traffic control center to verify that the interface between the traffic signals and train signals was working as designed. This testing did not reveal any discrepancies. And finally, the task force reviewed rules and procedures

governing train operations and made recommendations for enhancement. The observations and recommendations made by the Task Force are included as Attachment 1 and Attachment 3. The Chief Executive Officer transmitted to Mayor Villaraigosa the task force's assessment through a letter dated June 27, 2012, which is included as Attachment 4.

FINANCIAL IMPACT

The estimated implementation cost for all recommended enhancements is \$287,500, the details of which are included as Attachment 2.

Impact to Bus and Rail Operating and Capital Budget

Operating Budget Impact

The cost of implementing the Task Force's safety recommendations will be paid from the Operations cost center 31396, account 50316, project 306006 under task 01.002.

Capital Budget Impact

The FY13 Capital Budget will not be impacted by this action.

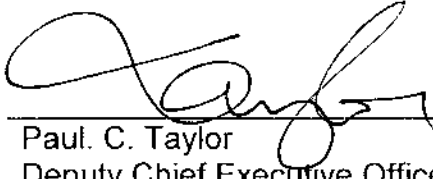
NEXT STEPS

Staff will begin implementation of the safety recommendations.

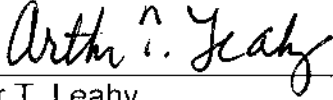
ATTACHMENTS

- A. EXPO Field Survey Recommended Enhancements
- B. Estimated Implementation Costs
- C. Task Force Findings
- D. Response to Mayor Villaraigosa's letter

Prepared by: Abdul Zohbi, Systems Safety Manager (213) 922-2114



Paul. C. Taylor
Deputy Chief Executive Officer



Arthur T. Leahy
Chief Executive Officer

ATTACHMENT A

EXISTING FIELD SURVEY RECOMMENDED IMPLEMENTATIONS

Flower/Washington Blvd.

- Install "Do Not Block Intersection" sign for eastbound traffic on Washington Blvd. to emphasize to motorists to keep the intersection clear

Flower/21st Street

- Install 2 LED "TRAIN" pedestrian signs at crosswalk to provide additional warning of approaching trains
- Add a second "near-side" "No Right Turn On Red" passive sign on 21st Street (facing eastbound motorists) due to lack of visibility of traffic on southbound Flower
- Swap passive "No U / No Left Turn" sign with passive "No Right Turn on Red" sign side traffic cantilever arm for westbound traffic

Flower/23rd Street

- Raise passive "No Right Turn" sign and below it install "Stop Here On Red" sign for Westbound traffic to reinforce the stopping point for vehicles
- Relocate dedicated left turn lane limit line to the nose of the median since the majority of motorists are not currently obeying the existing limit line
- Add Hash marks between new Limit Line and Crosswalk and "Stop Here On Red" with down right arrow (R10-6) sign on median
- Install Between-Car-Barrier (BCB) bollards between yellow lines at bottom of station ramp to discourage pedestrians from jaywalking across 23rd Street
- Install "Use Crosswalk" with arrows sign on pole at end of ramp to encourage use of crosswalk
- Evaluate relocating the south entrance further north, closer to the TVM area. This will enhance the visibility for both patrons and operators and will provide a larger waiting area for pedestrians
- If the south entrance cannot be relocated, install Indiana Station-type signage on South Crosswalk
- Install "No Trespassing" signs on the railing south of the station entrance to discourage trespassing on to the light rail right-of-way

Flower/Adams Blvd.

- Install 3 LED "TRAIN" pedestrian signs at crosswalks to provide additional warning of approaching trains

Flower/28th Street

- Install 3 LED “TRAIN” pedestrian signs at crosswalks to provide additional warning of approaching trains
- Replace active “No Right Turn” signs with diagonal red arrow “No Turn On Red ” (R10-11) signs

Flower/30th Street

- Install 3 LED “TRAIN” pedestrian signs at crosswalks to provide additional warning of approaching trains
- Remove Limit Line closest to Rail for westbound traffic to reduce the risk of motorists encroaching onto the tracks

Trousdale Ped. Crossing

- Extend/add railing on both platform sides up to truncated domes of crosswalk to eliminate jaywalking across Exposition Blvd.
- Realign LED “TRAIN” Pedheads for better visibility
- Widen Crosswalks on eastbound and westbound Exposition Blvd. to align with the existing pedestrian push-buttons per approved plan
- Install removable fence between the existing fences west of the crossing and the second Palm tree west of the crossing since this area is not a designated crosswalk

Exposition/Watt Way

- Install 2 LED “TRAIN” pedestrian signs at crosswalk to provide additional warning of approaching trains

Exposition/Menlo-Bill Robertson Avenue

- Install “cat-tracks” for northbound Bill Robertson to Westbound Exposition

Exposition/Vermont Avenue

- Install BCB-style bollards at the crosswalk limit line to deter motorists from encroaching into the pedestrian waiting areas at both east & west station platforms

Exposition/Raymond Avenue

- Modify signal timing so pedestrians begin and complete crossing before southbound Raymond goes green

Exposition/Denker Avenue

- Modify the existing crosswalk to a yellow ladder-type crosswalk for enhanced visibility and install "School Crossing" symbol (S1-1) signs for eastbound and westbound Exposition Blvd
- Install 2 additional LED "TRAIN" Pedestrian signs adjacent to each track to provide additional warning of approaching trains

Exposition/Western

- Install "Use Crosswalk" with arrows sign at end of ramp to encourage use of crosswalk
- Cross-hatch area between Northbound track and double-yellow line on West platform side (South side of Station)

Rodeo/Exposition

- Move hinges of South Swing Gates to the left (Move Swing Gate handles to the right)
- *Install a "No Left Turn" sign for northbound Gramercy vehicles—even though you can only travel eastbound on the south lanes of Exposition, vehicles are still making a left turn onto Exposition to continue westbound on Exposition.*
- *Install "Quick Curb" barriers along yellow painted double lines west of Gramercy to deter NB vehicles on Gramercy from making left turns onto Exposition*
- *Correct the pavement lane markings west of Gramercy on the northside of tracks (on Exposition.)*
- *Install signage for bicyclists who are northbound on Gramercy to access the bike route westbound on Exposition. Green bike route with right arrow signage should be posted on nearside of tracks.*
- *Install sign for westbound bike route on Exposition. Extend limit line across bike path.*
- *Install "Stop Here on Red" and yellow diamond "Look Both Ways" signs at the limit line.*
- *Reposition "No Bike" sign onto nearside signal.*
- *Change the bike signal from red, green, yellow traffic signal type aspects to red, yellow, and green bike symbol signals. This will provide a clear indication for bicyclists as to which signal governs their safe movement across the tracks.*
- *Install bike route pavement markings in the bike lane across the tracks.*
- *Install an audible bell on the 'bar signal' pole between the tracks which can activate simultaneously with the flashing LED "TRAIN" sign. This will provide both, an audible and a visual warning of approaching trains to bicyclists.*

- *At Ruthelen St. (on the northside of tracks, just east of Gramercy), modify the two (2) "Use crosswalk" signs with arrows facing west.*
- *Paint concrete curbs YELLOW on south median/walkway to caution pedestrians of the tripping hazard.*
- *Install WAIT HERE pavement markings at the swing gates*

Exposition/Arlington Avenue

- Install 2 "Do Not Cross When Lights Are Flashing" signs on #9As for Northbound traffic

Exposition/7th Avenue

- Install "Do Not Cross When Lights Are Flashing" sign on #9A for Northbound traffic

Exposition/11th Avenue/Degnan

- Install "Do Not Cross When Lights Are Flashing" sign on #9A for Northbound traffic

Exposition/Crenshaw Blvd.

- Swap METRO Pylon location with pedestrian push-button location adjacent to track #3
- Install BCB bollards between tracks to prevent motorists from mistakenly entering the right-of-way
- Change to "No Right Turn On Red" sign to the symbol "No Right Turn" with the words "On Red Arrow" on the right turn lane from eastbound Exposition to southbound Crenshaw
- Remove north/south cat-tracks and install southbound left turn cat-tracks on Crenshaw

Exposition/Buckingham

- Install "Do Not Cross When Lights Are Flashing" sign on #9A for Northbound traffic

Exposition/Farmdale

- Install "Do Not Cross When Lights Are Flashing" sign on #9A for Northbound traffic

Jefferson/Hauser Blvd.

- Modify the operation of the "No Right Turn" sign such that it remains active until gates are in the "UP" position
- Replace existing "No Right Turn" and "No Left Turn" active signs with brighter LEDs

- Install 2 “Do Not Cross When Lights Are Flashing” signs on #9As for Northbound traffic

RULES AND PROCEDURES RECOMMENDATIONS

- 1- Revise the type and sequence of audible warning on board the train to provide a more pronounced warning as trains approach the crossings.
- 2- At side-platform stations, such as Trousdale, reduce the speed of the incoming train to no more than 15 MPH when the departing train is within the nearside crossing.

ATTACHMENT B

ESTIMATED IMPLEMENTATION COSTS

1- Passive Signs - Pavement Markings	\$ 35,000
2- Active LED Pedestrian Signs	\$ 110,000
3- 23 rd Street Station Modifications	\$ 101,000
4- Crenshaw Station Modifications	\$ 30,000
5- Trousdale Fencing	<u>\$ 11,500</u>
Total	\$ 287,500

ATTACHMENT C

TASK FORCE FINDINGS

Grade Crossing	Cab/Street	TRAFFIC SIGNALS	V. "TRAIN" Coming Signs	P. "TRAIN" Coming Signs	WALK/DON'T WALK Ped Sign	Passive LOOK BOTH WAYS	USE CROSSWALK Signs	Active NRT Sign	Passive NRT ON RED Sign	PHOTO ENFORCEMENT	RxR PAVEMENT MARKING	ADVANCE WARNING SIGNS	SWING GATES	PED GATES	MEDIANS	FOUR QUAD GATES	No U TURN	Passive NLT Signs	Active NLT Signs	WAIT HERE	KEEP CLEAR	DO NOT STOP ON TRACKS	WAIT HERE ON RED Signs
Flower/Washington Blvd.	Street	X	X	X	X	X				X												X	
Washington Blvd.	Street	X	X	X	X						X	X					X	X				X	
Flower/21st Street	Street	X	X	X	X												X	X					
21st Street	Street	X	X		X												X	X				X	
Flower/Trade Tech Driveway	Street	X	X		X				X	X							X	X					
Trade Tech Driveway	Street	X	X		X						X						X	X		X	X		
Flower/23rd Street	Street	X	X		X					X							X	X			X		
23rd Street	Street	X	X	X	X	X					X	X					X	X					
Flower/Adams Blvd.	Street	X	X		X				X	X			X				X	X		X	X		
Adams Blvd.	Street	X	X	X	X		X		X	X							X	X			X		
Flower/28th Street	Street	X	X		X					X			X				X	X			X		
28th Street	Street	X	X	X	X		X	X			X	X					X	X					
Flower/30th Street	Street	X	X		X					X			X				X	X			X		
30th Street	Street	X	X	X	X		X				X	X					X	X					
Flower/Jefferson Blvd.	Street	X	X		X					X			X				X	X		X	X		
Jefferson Blvd.	Street	X	X	X	X						X	X					X	X					
Trousdale Ped. Crossing	Street	X		X	X	X															X		

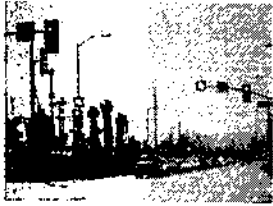
Grade Crossing	Cab/Street	TRAFFIC SIGNALS	V. "TRAIN" Coming Signs	P. "TRAIN" Coming Signs	WALK/DON'T WALK Ped Sign	Passive LOOK BOTH WAYS	USE CROSSWALK Signs	Active NRT Sign	Passive NRT ON RED Sign	PHOTO ENFORCEMENT	RxR PAVEMENT MARKING	ADVANCE WARNING SIGNS	SWING GATES	PED GATES	MEDIANS	FOUR QUAD GATES	No U TURN	Passive NLT Signs	Active NLT Signs	WAIT HERE	KEEP CLEAR	DO NOT STOP ON TRACKS	WAIT HERE ON RED Signs
Exposition/Watt Way	Street	X	X		X		X			X	X						X				X		
Watt Way	Street	X	X		X		X			X	X						X				X		
Exposition/Menlo Avenue	Street	X	X		X		X			X	X						X				X		
Menlo Avenue	Street	X	X		X		X			X	X						X				X		
Exposition/Vermont Avenue	Street	X	X		X		X			X	X						X				X		
Vermont Avenue	Street	X	X		X		X			X	X						X				X		
Exposition/Raymond Avenue	Street	X	X		X		X			X	X						X				X		
Raymond Avenue	Street	X	X		X		X			X	X						X				X		

Cab/Street		TRAFFIC SIGNALS	V. "TRAIN" Coming Signs	P. "TRAIN" Coming Signs	WALK/DON'T WALK Ped Sign	Passive LOOK BOTH WAYS	USE CROSSWALK Signs	Active NRT Sign	Passive NRT ON RED Sign	PHOTO ENFORCEMENT	RxR PAVEMENT MARKING	ADVANCE WARNING SIGNS	SWING GATES	PED GATES	MEDIANS	FOUR QUAD GATES	No U TURN	Passive NLT Signs	Active NLT Signs	WAIT HERE	KEEP CLEAR	DO NOT STOP ON TRACKS	WAIT HERE ON RED Signs	
Exposition/Normandie Avenue	Street	X	X		X					X														
Normandie Avenue		X	X		X	X					X	X					X							
Exposition/Halldale Avenue	Street	X	X		X					X														
Halldale Avenue		X	X		X	X	X				X	X					X							
Exposition/Denker Avenue	Street	X	X		X					X														
Denker Avenue		X	X		X	X	X				X						X							
Exposition/Western	Street	X	X		X					X											X	X		
Western		X	X	X	X	X					X	X					X							
Rodeo/Grammercy	Street	X	X	X	X	X	X				X	X					X							
																					X			
Exposition/Arlington Avenue	Cab	X	X		X			X	X				X	X		X			X					
Arlington Avenue		X			X		X		X		X	X			X		X						X	X
Exposition/7th Avenue	Cab	X	X		X			X					X	X		X			X					
7th Avenue		X			X				X		X	X			X		X						X	X
Exposition/11th Avenue/Degnan	Cab	X	X		X			X					X	X		X			X					
11th Avenue/Degnan		X			X						X	X			X		X						X	X
Exposition/Crenshaw Blvd.	Street	X	X		X	x*	X		X	X									X	X	X			
Crenshaw Blvd.		X		X	X						X	X					X						X	
Exposition/Buckingham Road	Cab	X	X		X		X	X	X				X	X		X			X					

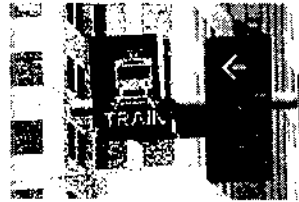
Cab/Street	TRAFFIC SIGNALS	V. "TRAIN" Coming Signs	P. "TRAIN" Coming Signs	WALK/DON'T WALK Ped Sign	Passive LOOK BOTH WAYS	USE CROSSWALK Signs	Active NRT Sign	Passive NRT ON RED Sign	PHOTO ENFORCEMENT	RxR PAVEMENT MARKING	ADVANCE WARNING SIGNS	SWING GATES	PED GATES	MEDIANS	FOUR QUAD GATES	No U TURN	Passive NLT Signs	Active NLT Signs	WAIT HERE	KEEP CLEAR	DO NOT STOP ON TRACKS	WAIT HERE ON RED Signs
Buckingham Road	X			X	X*					X	X				X	X					X	X
Exposition/Farmdale Avenue	X	X		X			X	X		X		X	X		X	X					X	X
Farmdale Avenue	X				X*	X				X	X				X	X					X	X
Jefferson/Hauser Blvd.	X	X		X		X	X					X	X			X						
Hauser Blvd.	X					X	X	X		X	X					X					X	X

* - ONE SIDE ONLY

TRAFFIC SIGNAL



Vehicular "TRAIN" Coming Sign



Pedestrian "TRAIN" coming Sign - Walk / Don't Walk Sign



Passive LOOK BOTH WAYS Sign



USE CROSSWALK Sign



Active NO RIGHT TURN Sign - Passive NO RIGHT TURN ON RED Sign

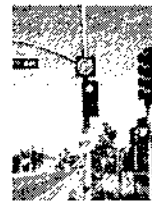


PHOTO ENFORCEMENT



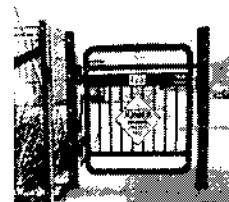
RXR Pavement Markings



ADVANCE WARNING Signs



SWING GATE



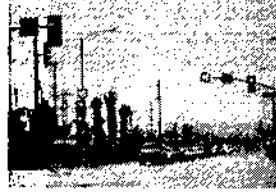
PED GATE



Passive NO LEFT NO U Turns Sign



Active NO LEFT TURN Signs



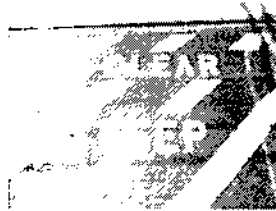
DO NOT STOP ON TRACKS STOP HERE ON RED Signs



WAIT HERE Marking



KEEP CLEAR Marking



FOUR QUADRANT GATES



MIDIAN



	"TRAIN" Coming Signs (Veh & Ped) Operational?	Train Signals (Bars) Operational?	Conflict Between Train Bars and Traffic Signals?	Active Signs (NL, T-NRT) & Vehicle & Ped. Gates Operational?	Adequate Pre-emption Time?	Minimum 20 Seconds Warning @ Gated Crossings?	
	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N
Flower/Washington Blvd.	Y	Y	N	N/A	N/A		N/A
Flower/21st Street	Y	Y	N	N/A	N/A		N/A
Flower/Trade Tech Driveway	Y	Y	N	N/A	N/A		N/A
Flower/23rd Street	Y	Y	N	N/A	N/A		N/A
Flower/Adams Blvd.	Y	Y	N	N/A	N/A		N/A
Flower/28th Street	Y	Y	N	Y	N/A		N/A
Flower/30th Street	Y	Y	N	N/A	N/A		N/A
Flower/Jefferson Blvd.	Y	Y	N	N/A	N/A		N/A
Trousdale Ped. Crossing	Y	Y	N	N/A	N/A		N/A
Exposition/Watt Way	Y	Y	N	N/A	N/A		N/A
Exposition/Wario Avenue	Y	Y	N	N/A	N/A		N/A
Exposition/Vermont Avenue	Y	Y	N	N/A	N/A		N/A
Exposition/Raymond Avenue	Y	Y	N	N/A	N/A		N/A
Exposition/Normandie Avenue	Y	Y	N	N/A	N/A		N/A
Exposition/Haldale Avenue	Y	Y	N	N/A	N/A		N/A
Exposition/Denker Avenue	Y	Y	N	N/A	N/A		N/A
Exposition/Western	Y	Y	N	N/A	N/A		N/A
Rodeo/Grammercy	Y	Y	N	N/A	N/A		N/A
Exposition/Arlington Avenue	N/A	N/A	N/A	Y	Y		Y
Exposition/7th Avenue	N/A	N/A	N/A	Y	Y		Y
Exposition/11th Avenue/Degnan	N/A	N/A	N/A	Y	Y		Y
Exposition/Crenshaw Blvd.	Y	Y	N	Y	N/A		N/A
Exposition/Buckingham Road	N/A	N/A	N/A	Y	Y		Y
Exposition/Farmdale Avenue	N/A	N/A	N/A	Y	Y		Y
Jefferson/Houser Blvd.	N/A	N/A	N/A	Y	Y		Y

ATTACHMENT D



Metro

Los Angeles County
Metropolitan Transportation Authority

One Gateway Plaza
Los Angeles, CA 90012-2952

Arthur T. Leahy
Chief Executive Officer
213.922.6888 Tel
213.922.7447 Fax
metro.net

June 27, 2012

Mayor Antonio Villaraigosa
City of Los Angeles
200 North Spring Street, Room 303
Los Angeles, CA 90012

Dear Mayor Villaraigosa:

In my June 1, 2012 response to your letter regarding the safety of Phase 1 of the Exposition (Expo) Line, I informed you that a task force consisting of Metro, Los Angeles Department of Transportation (LADOT), and Los Angeles Sheriff's Department (LASD) staff would be conducting a comprehensive review of the Expo Line grade crossings. I am pleased to report that the task force has concluded its review of all crossings on the Expo Line. Its recommendations and the associated costs are included in Attachments 1 and 2 respectively of this letter. The overall conclusion of the task force is that the Expo Line exceeds industry safety standards; nevertheless, the task force believes that additional enhancements could be made to complement the existing design.

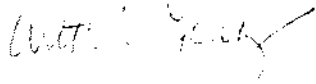
The task force, which also included representatives from the California Public Utilities Commission (CPUC), conducted its field review on June 12 and 13, 2012. During the field review, members of the task force discussed with the safety Ambassadors their observations of motorist and pedestrian behavior, as well as their recommendations for mitigation. These recommendations have been incorporated in Attachment 1. The task force also reviewed rules and procedures governing train operations and made recommendations for enhancement, which are included in Attachment 1.

As far as the Exposition/Rodeo intersection is concerned, in March 2012, in response to an Exposition Authority Board motion, Metro, LADOT and Expo staff conducted an extensive evaluation of this intersection. This review resulted in a number of recommendations which are also listed in Attachment 1 (*in italics*). These recommendations were approved by the Expo Authority Board and are in the process of being implemented. Other than a minor modification to the swing gates at this intersection, the task force determined that additional enhancements were not warranted beyond those that were already made in the previous review.

Finally, Attachment 3 includes the task force's findings which represent the existing warning signs, devices, and other safety measures that are currently installed at each of the Expo Line crossings. This attachment also includes photographs of these safety measures as well as the results of the field evaluation of the signal timing, gates and sign operation, and the interface between the traffic signals and railroad signals. In addition to the field evaluation, LADOT staff conducted testing of the programming and operation of the traffic signal system. This testing did not reveal any discrepancies.

I hope the task force's efforts provide reassurance that the design and operation of the Exposition line crossings is safe. As part of our commitment to safety, staff will initiate implementation of the recommendations in FY 13. Thank you for your support with enhancing the safety of our operations.

Sincerely,

A handwritten signature in black ink, appearing to read "Arthur T. Leahy". The signature is written in a cursive style with a prominent flourish at the end.

Arthur T. Leahy
Chief Executive Officer