

**Metro**Los Angeles County
Metropolitan Transportation AuthorityOne Gateway Plaza
Los Angeles, CA 90012-2952213.922.
metro.net**SYSTEM SAFETY AND OPERATIONS COMMITTEE
SEPTEMBER 20, 2012****SUBJECT: METRO BLUE LINE OPERATIONS ASSESSMENT****ACTION: RECEIVE AND FILE STATUS REPORT ON METRO BLUE LINE
OPERATIONS ASSESSMENT****RECOMMENDATION**

Receive and file a status report in response to a Board request for a Metro Blue Line Operations Assessment. On April 3, 2012 the Board requested a thorough review of the Blue Line service and operations (Attachment A).

ISSUE

Staff has prepared this receive and file in response to a request for an assessment of the Metro Blue Line operations. Additional information may also be found in a Board Box "Metro Blue Line Service Disruptions", sent to the Board on April 13, 2012 (Attachment B). Specifically, this request directed staff to respond to the following:

- Safety review of grade crossing operations and safety devices;
- Rail car preventative maintenance actions;
- Review of the traction power and propulsion systems state of good repair; and
- Rail maintenance staffing levels.

DISCUSSION

With the expansion of rail over the last 20 years, the Metro Blue Line has become one of the busiest light rail lines in the nation. On April 3, 2012 the Board directed us to provide a thorough review of the Metro Blue Line service and operations. Staff was requested to conduct a review and provide recommendations to the Executive Management Committee meeting on April 19, 2012. This report provides a response to the issues outlined in the request.

Safety Review of Grade Crossing Operations and Safety Devices

Safety has always been in the forefront of all rail projects starting with planning and design, and continuing into the construction and operation phases. Metro has implemented numerous safety measures that extend beyond regulatory and mandated requirements through the introduction of an array of Intelligent Transportation Systems.

Based on Rail Operations Safety staff's evaluation of safety measures, Metro has installed and incorporated all known safety engineering features on all of its rail lines in order to mitigate potential train incidents. These features surpass all mandated requirements of California Public Utilities Commission's (CPUC) General Orders, the Manual on Uniform Traffic Control Devices (MUTCD), industry standards and recommended practices. Since 1990, staff has successfully implemented a vast list of safety measures (Attachment C).

The safety measures and requirements represent highlights of implemented improvements that have contributed to making the Metro Blue Line a safer alignment. In fact, much of these improvements became lessons learned and became part of our design criteria for future light rail lines.

Staff has two projects planned for the near future. The first one will add pedestrian gates and/or swing gates to certain gated crossings, where we have adequate safe pedestrian waiting areas, on Metro's side of the Right of Way (excluding Union Pacific's side). The second project planned for next fiscal year is the addition of pedestrian-head sized LED (Light Emitting Diode) "Train" coming signs. They will be installed at intersections where the station entrance ramps end in the crosswalks, in the street running alignment of the Metro Blue Line.

Rail Car Preventative Maintenance Actions

In order to address the impacts of the mid-life overhaul deferred maintenance; staff developed a component overhaul program to repair, overhaul, and/or replace key vehicle systems that impact service reliability. In parallel, the fleet is undergoing an appearance makeover inclusive of interior and exterior painting. The makeover will bring the cars to like new condition and will include new seat inserts and window replacements to repair graffiti damage.

The component overhaul program is being executed with an approved budget of \$30 million dollars by overhauling traction motors, braking systems, couplers, and other systems that upon failure impact revenue service. The component overhaul program allows the fleet to mature to its design life of 30 years and will be retired upon delivery of the P3010 fleet. Additionally, the program utilizes contract staff to remove/replace refurbished components. Staff is cognizant of fleet age and performance reliability and is continually adjusting the Preventive Maintenance Program. This allows us to inspect key systems on a more frequent basis in a proactive manner.

Review of the Traction Power and Propulsion Systems State of Good Repair

Most recently, problems with the traction power system have caused service delays. Metro's Wayside Systems department is currently completing a modification program to provide additional security to overhead wires to protect against breaking insulators and is currently procuring new insulators for a system-wide retrofit. In addition, Wayside Systems is approximately 40% complete on an \$80 million system-wide substation replacement program. The Agency's capital program also encompasses projects for replacement portions of the train control and communications systems.

Improvements to the system began three years ago with multiple projects, in addition to the component overhaul, including traction power, track and communications improvements. It will take time to complete the replacement and deferred maintenance campaigns; however, it is a priority for the agency. Recent changes in Operations' top management will focus on improving service reliability on the Metro Blue Line and all other areas of the agency's extensive bus and rail operations.

Staff has been aggressively addressing the impact of deferred maintenance and is experiencing some improvement. More than \$64 million has already been spent and the agency has identified another \$494 million in projects through FY2020 on the Metro Blue Line. This problem was identified by staff and investments to recover the deferred maintenance were significantly increased in 2010 and 2011.

Rail Maintenance Staffing Levels

Operations is reinvesting existing resources to continue improvements in service quality. The plan will improve productivity and service performance by focusing efforts on safety, service and maintenance. As we transition our resources we will monitor all of our effectiveness measurements to assess performance throughout Operations. If necessary, we will redeploy resources to address changing priorities.

The Agency is committed to staffing appropriately to resolve issues related to maintenance of the Metro Blue Line and the entire system. We have identified the needs and are continuously reviewing staffing levels to reach optimal performance.

NEXT STEPS

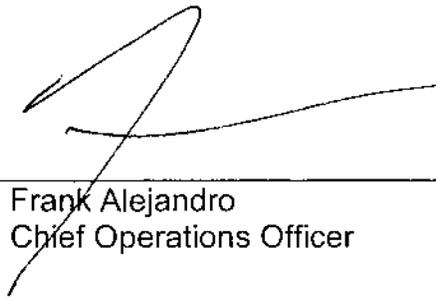
Staff will continue to work on Fiscal Year 2012 budgeted operating and capital programs targeted at addressing deferred maintenance of the Metro Blue Line system. Additionally, future fiscal year budgets will include specific requests for operating and capital funding that will continue to reduce the level of deferred maintenance and improve system reliability.

ATTACHMENTS

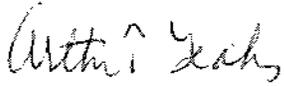
- A. Letter from Mayor Antonio Villaraigosa re: Metro Blue Line Service Disruptions
Dated April 3, 2012
- B. Metro Blue Line Service Disruptions Board Box Dated April 13, 2012
- C. Safety Measures and Requirements on Metro Blue Line

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Frank Alejandro
Chief Operations Officer



Arthur T. Leahy
Chief Executive Officer



ATTACHMENT A

ANTONIO R. VILLARAIGOSA
MAYOR

April 03, 2012

Mr. Art Leahy
Chief Executive Officer
Los Angeles County Metropolitan Transportation Authority
1 Gateway Plaza
Los Angeles, CA 90012

Re: Blue Line Operations Assessment

Dear Mr. Leahy:

Every member of the public deserves a transit system that is safe and secure and the Los Angeles County Metropolitan Transportation Authority (MTA) needs to make sure that we are meeting this level of service. Just this year there has been a noticeable increase in the number of delays, service disruptions and accidents along the Blue Line. The frequency of these incidents requires immediate attention and as Chairman of the MTA Board I request you perform a detailed evaluation of the line's operations.

Since it's opening in 1990, the Blue Line has been a major transportation backbone for LA County's transit system. This is the most used rail line in our MTA rail system carrying well over 80,000 passenger-boardings a day. It also serves a high level of transit dependent users from South Los Angeles to the City of Long Beach. Service disruptions and delays to this line can affect thousands of transit users in a single day.

As such, a thorough review of the Blue Line service and operations needs to be conducted. The assessment and recommendations for improvement should include:

- Safety review of grade crossing operations and safety devices
- Rail car preventative maintenance actions
- Review of the traction power and propulsion systems state of good repair
- Rail maintenance staffing levels



Mr. Art Leahy
April 4, 2012
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I hereby request that you convene a meeting with MTA executive management to discuss and provide recommendations at this month's Executive Committee meeting on April 19, 2012.

I know you, the entire agency, and the MTA Board all share the same commitment to making sure our transit system is safe and user friendly. If you have any questions, please contact me or Borja Leon, Deputy Mayor of Transportation at (213) 978-3061 or borja.leon@lacity.org. I look forward to your report and partnering with you to improve MTA Blue Line safety and operations.

Very truly yours,



ANTONIO R. VILLARAIGOSA
Mayor

ARV:bl

cc: MTA Board of Directors
Charles Safer, County Counsel



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Metropolitan Transportation Authority

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APRIL 13, 2012

TO: BOARD OF DIRECTORS

THROUGH: ARTHUR T. LEAHY *by [signature]*
CHIEF EXECUTIVE OFFICER

FROM: FRANK ALEJANDRO *[signature]*
CHIEF OPERATIONS OFFICER

SUBJECT: METRO BLUE LINE SERVICE DISRUPTIONS

ISSUE

Several incidents in January and February on the Metro Blue Line system have resulted in serious service delays. The service delays are due to a combination of power system failures, accidents, and scheduled delays related to the construction and activation of the Expo light rail line.

The number of trips delayed or canceled in January and February appear to be anomalies caused by the spikes in accidents and construction related problems. Metro Blue Line service dependability during the first two weeks of March was better than the delay rate for the 2011 average; however, we had significant delays on March 26 largely caused by damaged overhead power lines.

The Metro Blue Line which opened in July 1990 is Metro's oldest rail line and one of the busiest light rail lines in the nation. The Blue Line transports an average of 80,000 riders per weekday, over 26 million riders in 2011, and ridership is growing. Metro delivered 87,000 scheduled trips, traveled 1.7 million miles, and provided 77,000 scheduled train revenue hours. The Metro Blue Line has 69 Rail assigned cars with an average age of 22 years and 1.28 million miles per car. The line's rail cars programmed revenue service life is 30 years. There are 22 rail stations, 46 miles of track, 46 miles of overhead electrification wire, and 20 traction power substations.

More frequent service was recently added to the Metro Blue Line to improve the headways from 20 to 10 minutes during late night. Safety and security of the service has also improved with the deployment of additional Los Angeles Sheriff Department deputies, specialized teams and security assistants. Additional

Metro Security Officer coverage was assigned to more evening shifts, and Friday nights and Saturdays to ensure a safer, more secure trip for our patrons.

In addition, we are working closely with Los Angeles Sheriff Department and other law enforcement agencies to reduce delays caused by crime scene investigations. A recent unrelated shooting at a park next to the Metro Blue Line Firestone Station, for example, caused service delays of more than five hours.

DISCUSSION

An extensive review of service delays five minutes or more was recently conducted and noted that many of these service delays can be attributed to accidents, rail vehicle and rail operation incidents, and Expo construction. The delays or cancellations associated with downtown Expo construction, which accounted for most of the delays, took place late at night and bus bridges were established to minimize the impact on our patrons. With the Expo Line opening at the end of April, those impacts, which went on for almost three years, should be eliminated.

A total of (17) seventeen incidents on the Metro Blue Line caused the biggest delays in January and February 2012:

- Six delays due to equipment malfunction on rail vehicles;
- Five delays due to rail accidents;
- Two delays due to late completion of track work repair and operator error;
- Two delays due to traction power, power breakers tripped open and would not re-close and overhead cantenary system broken contact wires;
- One delay due to police/passenger activity;
- One delay due to track maintenance.

Fundamentally, the delays associated with car or traction power problems are the result of significant deferred maintenance. We expect this work to continue in the coming eight years.

Staff has been aggressively addressing the impact of deferred maintenance and is experiencing some improvement. More than \$64 million has already been spent and the agency has identified another \$494 million in projects through FY2020 on the Metro Blue Line. This problem was identified by staff and investments to recover the deferred maintenance were significantly increased in 2010 and 2011 (Attachment 1).

Accident related delays were unusually high during this time. Safety remains a top priority for the Agency and we are continuing outreach programs in the surrounding areas. We have reviewed the characteristics of the accident locations to determine if additional safety improvements are needed. Additionally, we are in the process of producing 250,000 door hangers with

safety messages and we have placed six rail safety ambassadors to educate the public about how to cross the tracks safely.

Track and traction power delays involved scheduled work which started late and damage to the overhead cantenary wires that failed multiple times. We will review scheduled work and reschedule accordingly to avoid any service impact to our customers. The overhead cantenary wires were repaired immediately following the delays and we have capital funding to complete refurbishment of the overhead cantenary system.

Deferred maintenance on the rail cars, power and other components has had an impact on service reliability as evidenced by the decline of miles between mechanical breakdowns, from 26,030 in fiscal year 2008 to 19,512 in fiscal year 2011.

In 2011, we identified \$1.3 billion in agency-wide deferred maintenance and replacements which included costs for the Metro Blue Line. Staff is aggressively addressing the deferred maintenance that built up over the last 8 to 10 years. The Metro Blue Line cost of deferred maintenance is \$239 million which includes \$138 million for rail cars (Attachment 2). This cost is for the mid-life rail car overhaul that was reprogrammed with the anticipated delivery of new rail cars. The new rail car delivery was delayed when the Breda rail car option deal was canceled. The work being done now on the rail cars is a component overhaul, including motors, electrical, brakes, communications, interior and exterior, which will keep the rail cars running in good order until scheduled replacement in six or seven years.

Improvements to the system began three years ago with multiple projects, in addition to the component overhaul, including traction power, track and communications improvements. It will take time to complete the replacement and deferred maintenance campaigns; however, it is a priority for the agency. Recent changes in Operations' top management will focus on improving service reliability on the Metro Blue Line and all other areas of the agency's extensive bus and rail operations.

NEXT STEPS

Staff will continue to work on Fiscal Year 2012 budgeted operating and capital programs targeted at addressing deferred maintenance of the Metro Blue Line system. Additionally, future fiscal year budgets will include specific requests for operating and capital funding that will continue to reduce the level of deferred maintenance and improve system reliability.

ATTACHMENTS

1. Annual Expenditure Summary of MBL Deferred Maintenance
2. Metro Blue Line Deferred Maintenance
3. List of Completed Deferred Maintenance and Other Improvements

ATTACHMENT 1

Annual Expenditure Summary of MBL Deferred Maintenance

Fiscal Year		
2005*	\$	1,783,000
2006*	\$	4,309,000
2007	\$	4,200,000
2008	\$	3,312,000
2009	\$	6,948,000
2010	\$	15,257,000
2011	\$	15,141,000
2012	\$	<u>19,292,000</u>
Effort Completed Through FY2012:		<u>\$ 64,150,000</u>

*2005 and 2006 expenditures are shown for information only. They are not included in the total.

ATTACHMENT 2

Metro Blue Line Deferred Maintenance

BLUE LINE DEFERRED MAINTENANCE (\$000)				
	Backlog Amount	Effort Completed Thru FY2012	Spending Plan: FY2013 - FY2020	Total Funding
Communication Systems & Equipment	\$ 4,000	\$ 6,650	\$ 12,610	\$ 19,260
Signal Equipment	\$ 6,000	\$ 10,000	\$ 43,000	\$ 53,000
Track Equipment	\$ 13,000	\$ 13,600	\$ 14,475	\$ 28,075
Electrification (Traction Power)	\$ 64,000	\$ 29,500	\$ 71,150	\$ 100,650
Stations/Parking Areas	\$ 14,000	\$ 1,000	\$ 24,090	\$ 25,090
Midlife Overhaul	\$ 138,000	\$ 3,400	\$ 46,000	\$ 49,400
LRV Procurement (Option 4 of P3010 Purchase)	\$ -	\$ -	\$ 283,000	\$ 283,000
Total Blue Line Deferred Maintenance	\$ 239,000	\$ 64,150	\$ 494,325	\$ 558,475

- The total Blue Line backlog is \$239M
- \$64M has been spent to date (FY2007 through FY2012) on projects & component campaigns to reduce the backlog.
- The spending plan for FY2013 through FY2020 to complete projects & dedicate resources for preventative maintenance of critical system components totals an additional \$494M.
- The \$64M spent through FY2012 plus the \$494M identified for use in FY2013 - FY2020 shows that MTA will dedicate \$558M to address deferred maintenance effort.

In summary, the total Blue Line backlog is \$239M. MTA has identified projects & campaigns totaling \$558M to address deferred maintenance. Full utilization of these resources will allow MTA to spend \$319M over the \$239M backlog.

ATTACHMENT 3

List of Completed or In Process Deferred Maintenance and Other Improvements

Completed projects

1. Rehabilitated and rebuilt track and pavement at grade crossings along the Metro Blue Line between Washington and Willow
2. Overhauled all switch machines on the Metro Blue Line.
3. Replaced existing fiber optic cable along the entire rail line with a new higher-capacity cable
4. Replaced obsolete train control equipment
5. Completed - 5 friction brake overhauls, 47 traction motors on 23 cars, 16 vital relay on 4 cars, motor-alternator circuit breaker #1 train line reset on 42 cars
6. Added, upgraded and replaced station penal code, ADA, warning and station identification
7. Installed 132 sets of Between Car Barriers (BCBs)
8. Upgraded the UPS (Uninterruptible Power Source) cabinets along Long Beach loop
9. Implemented the Rail Station Cleanliness Program

Projects in process

10. Replace and re-insulate rail in Long Beach
11. Replace and upgrade passenger information equipment
12. Rehabilitate station canopies
13. Procuring a new digital radio system for all of rail operations
14. Assessment of train control equipment identified obsolete equipment in need of replacement
15. Replacing 20 existing traction power substations approaching their end-of-life and suffering from parts obsolescence
16. Retrofitting the overhead catenary system with straps to keep the wire up even if an insulator breaks
17. Performing continuous on-scene inspection and monitoring of the Metro Blue Line overhead catenary system
18. Began component level overhaul - to improve fleet reliability and appearance: car body, coupler, passenger doors, HVAC, propulsion, pantograph, motor alternator, trucks, friction brakes, and automatic train protection
19. Fleet appearance upgrades with interior and exterior graffiti removal and painting
20. Improving landscaping, vegetation and irrigation systems at all stations
21. Completing station painting rehab at 11 of 22 stations current projects

Planned projects

22. Commence replacement of all c. 400 existing overhead catenary system insulators that have been a cause of recent problems
23. Painting rehab at Imperial station and all Metro Blue Line stations

ATTACHMENT 3 (continued)

24. Installing and fabricating mounting brackets for installation of LED monitors at all stations
25. Upgrading the compressors supporting the sewage ejectors at 7th Metro
26. Corrosion mitigation on all overhead structures
27. Full station flooring upgrades at Imperial and Artesia stations and partial upgrades at all other 20 stations
28. Improve station lighting at all stations

ATTACHMENT C

SAFETY MEASURES AND REQUIREMENTS ON METRO BLUE LINE

1. Installed a "Cyclops" light on all trains to enhance the visibility of approaching trains for pedestrians and motorists
2. Reduced the height of the right-of-way fencing at highway rail grade crossings to improve visibility for train operators of the grade crossings
3. Changed the mechanical horn on the trains to an electronic horn to provide a more focused warning
4. Installed additional flashing lights and bells at grade crossings to provide added active visual warnings on all approaches to the crossing
5. Installed active "No Left Turn" signs in street-running alignments to reinforce awareness of the prohibited movement
6. Modified the traffic signal system in Los Angeles to reduce the possibility of conflict between motorists turning left across the tracks and trains
7. Installed "Swing Gates" at several high-traffic pedestrian crossings, forcing pedestrians to stop prior to entering the crossing
8. Modified the headlights on all light rail trains to flash alternately when the horn is sounded to increase the awareness of the train's presence
9. Installed "Four Quadrant Gates" and Vehicle Detection Loops at 124th Street, Elm Street, Compton Blvd, Greenleaf Blvd, Alondra Blvd, and Myrrh Ave to completely seal the intersection and deter motorists from driving around lowered gates
10. Replaced passive "No Left Turn" signs with active LED "Train Coming" Signs in the cities of Los Angeles and Long Beach. Similar signs were later placed at all cross-traffic intersections in both cities.
11. Modified the design of train "T" signals in the City of Los Angeles and the City of Long Beach to "Bar" signals to reduce any possible confusion for motorists.
12. Installed active "Look Both Ways" sign at Vernon Station to remind pedestrians to look both ways prior to crossing the tracks
13. Installed "Pedestrian Gates" at several crossings to enhance the warning for pedestrians

ATTACHMENT C

SAFETY MEASURES AND REQUIREMENTS ON METRO BLUE LINE *CONTINUED*

14. Installed "Delineators" at Pico Station entrance to prevent motorists from illegally entering the rail right-of-way
15. Installed stamped crosswalks at Pico and Venice to clearly delineate the rail right of way (ROW), and enhance pedestrian and motorist awareness
16. Replaced filament lights on highway crossing warning devices with new LED's in order to increase the brightness and visibility of warning devices when activated by approaching trains.
17. Installed a 1.2 mile median fence in the City of Long Beach
18. Installed median Islands to prohibit illegal "S" turns around lowered gates.
19. Installed automatic photo enforcement cameras at 23 intersections to issue citations to motorists who ignore the warning devices and no left turn traffic signals.