Street Running Light Rail and Traffic Operations (Metro Expo Line)

By:

Jay Dinkins, PE
Jonathan Hofert, PE, TE, PTOE

Metro Provides Excellence in Service and Support.
Agenda

• Background
• Overview of City and Metro
• Expo Phase 2 Project
• MRDC / 5 minute Headway
• White Paper Approach to Operations
• Maintenance
• Questions
City of Santa Monica

- 8.3 Square Miles
- 13 Miles West of Downtown Los Angeles
- 8 Miles North of LAX
City of Santa Monica

- 8.3 Square Miles
- 13 Miles West of Downtown Los Angeles
- 8 Miles North of LAX
- Bounded by Pacific Ocean and City of Los Angeles
• World Class Destination
  – Santa Monica Pier
City of Santa Monica

- World Class Destination
  - Santa Monica Pier
  - Third Street Promenade
City of Santa Monica

- World Class Destination
  - Santa Monica Pier
  - Third Street Promenade
  - Beaches
By the Numbers

• 91,000 Residents
• 100,000 Employees/day
• 300,000 People/day on any given warm weekend
City of Santa Monica

• Special Events
  – Summer Pier Concert Series (70,000 people)
  – LA Marathon Finish Line (100,000 people)
History
LA Metro Service Area

The Service Area includes:

- 14,041 Bus Stops
- 164 Bus Routes
- 93 Rail Stations
- 105 Miles of Rail Service
LA Metro Ridership

- 357,892 average weekday rail boardings
- 913,280 average weekday bus boardings
- 329 rail cars
- 2,270 buses
Metro Expo Line Phase 2

- Service began on May 20, 2016
- 6.6 mile route that extends the Expo Light Rail Line from Culver City to Santa Monica
- 7 new stations (4 at-grade and 3 aerial)
Colorado Street Running

- Median Street Running (Dec 2013)
Colorado Street Running

• Median Street Running (Present)
4. Operating headways are the basis by which the Operations and Maintenance Plans shall be developed, and eventually all systems and infrastructure support, and shall be sufficient for maximum consist lengths operating at fully loaded passenger capacities.

5. Included in the Operations and Maintenance Plan shall be a “Systems Impact & Mitigation Report”. See Section 10.3.5.5.

6. To achieve the LRTP vision, all aspects of system operations and maintenance (O&M) planning, and the O&M Plan, shall be consistent with the following objectives:

10.3.1 SERVICE:

1. Provide a rail public transportation system that is consistent with the Los Angeles County Metropolitan Transportation Authority, LRTP assumptions, whereas, all operational systems, including trackwork, Automatic Train Control system, Traction Power Substation system and others shall be designed and constructed to reliably support a scheduled and functional Operational Headway.

   a. Light-Rail - The Light-Rail Operational Headway shall be as defined by Operations and Maintenance Plan and consist of not greater than 5-minute interval of time between trains for single-line normal operations, not greater than 2-1/2 minute interval of time in trunk segments and through junctions.

   The Light Rail Design Headway shall be as defined by Operations and Maintenance Plan and consist of not greater than 200 seconds for single-line normal operations, and not greater than 100 seconds for trunk segments and through junctions.
Train Operations

- Normally Rail Transit Signals shall be placed to the Left Side of the respective track so that all wayside signals are easily distinguished for the appropriate track that that signal is to govern.
Expo Phase II
Segment 3B/3C Signal Timing
Review of Median-Running Signal Operations
90/120 and 100/150 Cycle Length Alternatives

This memorandum summarizes the interface of train and traffic signal operations on the at-grade median-running portion of Expo Light Rail Phase II along Colorado Avenue. Train operations associated with 5-minute headways, 6-minute headways, and their multiples (i.e., 10-minute, 12-minute, 15-minute) were analyzed. Locations where modifications to signal operations are required to best serve train operations are noted.

The light rail corridor will extend within the middle of Colorado Avenue between 5th Street and 15th Court. Light-rail stations are to be located west of 5th Street (4th Street Station) and east of 15th Court (17th Street Station). Light rail vehicles are planned to run in each direction every five or six minutes during the peak period. Off-peak headways will need to be a multiple of five or a multiple of six to utilize one of the timing sets discussed in this document.

The objective is to minimize train vehicle stops within the study area, while achieving auto vehicle flow objectives through the corridor. One of the solutions proposed to facilitate train and vehicular flow is to operate the corridor with two different cycle lengths. The use of different cycle lengths between the western and eastern portions of the corridor will result in inconsistent offsets and green bands between the two coordinated segments. However, given the proposed cycle lengths, the offset relationship between the signals will repeat. The repeating pattern allows for the development of a green band through the corridor that repeats over a duration that coincides with the planned train frequency.

Two proposed alternatives are evaluated:

- Six Minute Headway (and multiples): 120 second cycle length along entire Colorado Avenue corridor.
- Five Minute Headway (and multiples): 100 second cycle length at 5th Street, 6th Street, and 7th Street along Colorado Avenue and a 150 second cycle length at Lincoln Boulevard, 11th Street, 14th Street, 15th Court, and 17th Street along Colorado Avenue.
Traffic Operations

- Street running for 13 blocks, then Metro right-of-way
- 5 minute headways
Traffic Operations Outbound

Goal: 4th St to 17th St without stopping
Traffic Operations

Countdown Heads
Traffic Operations Inbound

Goal: No goal.
# Maintenance

## EXHIBIT 2

**METRO LIGHT RAIL TRAIN (LRT)**

**MAINTENANCE RESPONSIBILITIES**

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<thead>
<tr>
<th>I. SANTA MONICA LINE SEGMENT STATIONS</th>
<th>MTA</th>
<th>CITY</th>
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<td><strong>A.</strong> Platform and Equipment/Structures on Platforms</td>
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<td><strong>I.</strong> Station Surfaces/Ticket Machines/Benches/Trash Receptacles</td>
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<td>2. General Maintenance, Cleaning &amp; Repair in City Right-of-Way at the 4th Street Station on Colorado Avenue.</td>
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<td><strong>J.</strong> Transit-Related Pedestrian/Architectural Lighting within the Stations</td>
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<td>1. Major Structural Poles/Replacement</td>
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<td>2. Maintenance and Repair of Luminaries, Lamps, Glassware and Ornamental Casting</td>
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Future Project

- Interconnection of Train Control and Countdown Timer.
Contact Info

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