

Los Angeles – Pasadena Metro Gold Line

Noise and Vibration: Challenges and Solutions

83rd Annual TRB Meeting
January 14, 2004

Outline

- Overview
- Noise
- Vibration
- Ongoing Issues

Strategic and Logistical Challenges

- Separate planning/operations and construction authorities
- Tight schedule and budget
- Consultant-driven organization
- Build/Design not Design/Build
- Organized and highly vocal opposition

Technical Challenges

- Noise
 - Residences
 - Movie studios
 - Audible warning devices (CPUC applications contested)
 - Grade crossing bells
- Vibration
 - Colorado cut



Noise - Challenges

● Residences

- S. Pasadena and Mt. Washington
- Close proximity to alignment (<20')
- Second story windows
- Highly engaged and concerned citizens and politicians

Noise - Solutions

● Residences

- Sound walls (5,000-linear feet)
 - 6' above top-of-rail
 - Required step-downs and intersections
- Sound Insulation
 - 40 windows of varying STC ratings





Noise - Challenges

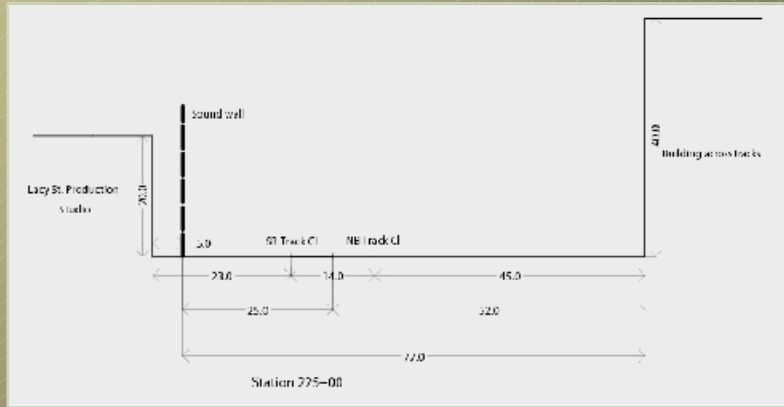
- Lacy Street Production Center
 - Historic movie studio
 - State of “arrested decay”
 - NC 35 standard





Noise - Solutions

- Lacy Street Production Center
 - The “Great Wall of Lacy Street”
 - Up to 25’ High
 - Sound Absorption
 - Façade Improvements
 - Windows, doors, and vent shafts

The "Great Wall of Lacy Street"



Noise - Challenges

- Audible Warning Devices
 - Focus of CPUC protests
 - Regulations are vague (operator discretion)
 - “Quacker” vs. horn
 -  
 - Initially, horn used system-wide
 - Special dispensation for Mt. Washington Community

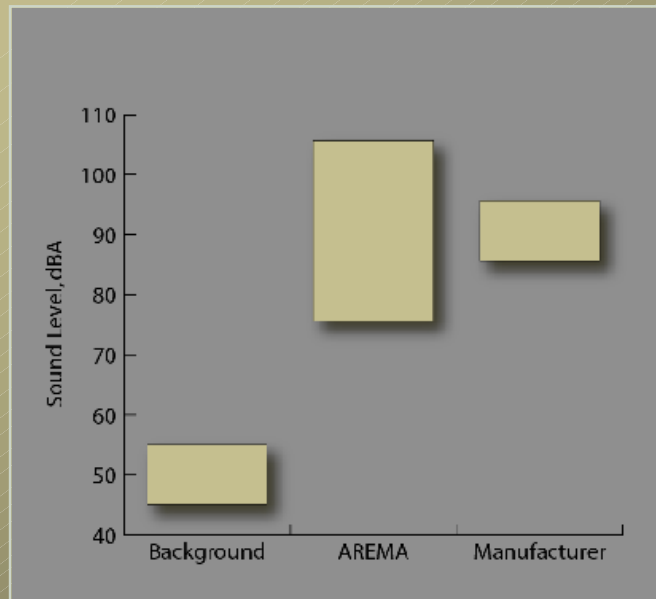
Noise - Solutions

- Audible Warning Devices
 - Adjust levels
 - Horn location (directivity)
 - New MTA operating policy – “Quacker” only



Noise - Challenges

- Crossing Bells
 - Duration (up to 2 min)
 - Nighttime operations
 - Close proximity of grade crossings
 - Local geography
 - Sound level



Noise - Solutions

- Crossing Bells
 - Limit duration
 - Adjust (reduce) sound levels
 - Less annoying sounding bell
 - Develop “shrouds”
 - Lower bell height



Vibration - Challenges

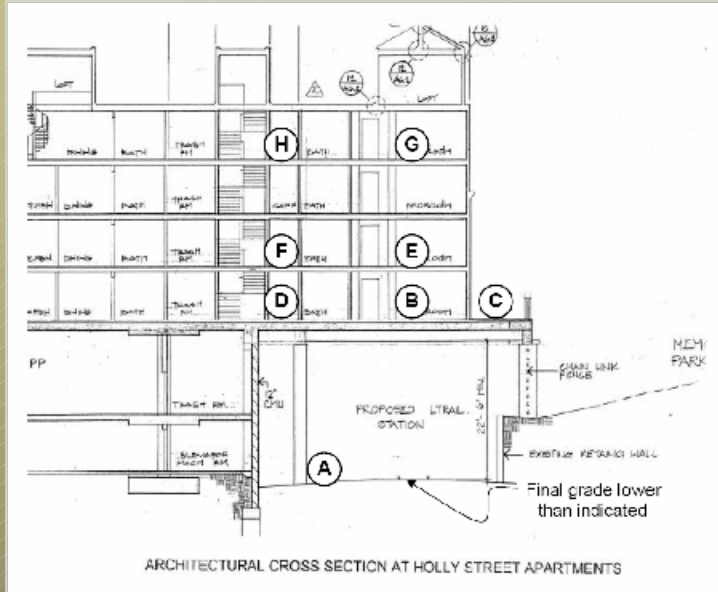
● Colorado Cut

- Cut-and-cover tunnel through “Old Town” Pasadena
- Passes under or adjacent to:
 - Historic building
 - Holly Street Apartments



Vibration - Solutions

- Elastomer Mats
 - Between Bld. Foundation and Subway Structure
 - Ballast Mat for Del Mar Development
- Vibration Propagation Testing
 - DF Fasteners Spec'd through Tunnel
 - Following Up Tests Confirm Compliance





Ongoing Issues

● Noise

- Litigation & PUC challenges
- Crossing bells
- Wheel squeal
- Phase II

● Vibration

- A non-issue

