SR 710 North Study

Technical Advisory Committee Meeting No. 9 – February 13, 2013

Stakeholder Outreach Advisory Committee Meeting No. 5 – February 14, 2013

Agenda

- Public Outreach Update
- Recap of Part 1 – Alternatives Analysis
- Update on Parts 2 and 3 – Project Report and Environmental Studies Documentation
- Next Steps

Ground Rules

- Q&A after each section of the presentation
- Focus questions on information presented
- General comments and Q&A at the end

Outreach Update:
November 2012 – February 2013

Summary of Outreach Activities November 2012 - February 2013

- Metro Board Staff Briefings
- Elected Official Briefings
- City Council Presentations
- City Commission Briefings
- Neighborhood Council Briefings
- Community Based Organizations Presentations
- School District Briefings
- Media Interviews
- Print Media

Summary of Outreach Activities (cont.)

- Continued participation in city-sponsored forums
- Continued outreach to employment centers, business community, and Study area-wide community groups
- Produced an information video about the Alternatives
- Posted educational items on website (FAQs, Fact Sheets, etc.)
- Created the E-Tool to personalize stakeholder engagement

January 2013 All Communities Convening Open Houses

- Pasadena
- San Marino
- Cal State Los Angeles

January 2013 All Communities Convening Open Houses (cont.)

- 17 elected officials in attendance
- Estimated 400 participants
- Received written feedback
- Print / Media Coverage
  - NBC Channel 4 News
  - KNX News Radio
  - Pasadena Star News
  - KPCC
  - Pasadena Sun
  - La Cañada Valley Sun
  - Eastern Group Publications

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Recap of Part 1 – Alternatives Analysis

- Recap of TAC/SOAC Meetings
- Feedback Received from TAC/SOAC Meetings
- Alternatives Analysis Report Status
- Fact Checks

Recap of TAC No. 8 and SOAC No. 4

- Public Outreach Update
- Update on Part 1 – Alternatives Analyses
  - Recap of TAC Meeting #7
  - Initial Discussion on Goods Movement
  - Fact Checks
  - Refinement of Alternatives
- Next Steps

Feedback Received During TAC No. 8/ SOAC No. 4

- Amount of trucks on freeway tunnel and Average Daily Traffic (ADT)
- The analysis of untolled tunnel is not representative
  - Truck only toll
- Emergency response for the tunnel
- Revision to RTP if an alternative chosen is not a freeway tunnel
- Steps taken to maximize performance of BRT and LRT alternatives

Feedback Received During TAC No. 8/ SOAC No. 4 (cont.)

- Minimize parking impacts in South Pasadena for the BRT alternative
- Constructability of tunnel
- Toll will reduce improvements to local streets

Some Feedback Received During Stakeholder Outreach

Topic	
Purpose and Need doesn't consider goods movement	How would a combined alternative meet the Purpose and Need?
Traffic benefits/impacts to freeways and local streets	Is the tunnel built for port trucks?
Construction cost of each alternative	Noise effects
Construction impacts associated with each alternative	What would be the toll cost?
Air quality impacts/benefits for each alternative	Potential impact to historic properties
Tunnel safety measures	Seismic response of tunnels
Groundwater contamination	Impact due to closure of ramps and bridges

Alternatives Analysis Report

- Summarized work performed over the past year
- Included results of conceptual engineering and technical study evaluation
- Described the basis of selecting alternatives for further evaluation

AA Report Posted on Caltrans Website on January 18, 2013

Alternatives Carried Forward

1. No Build
2. TSM/TDM (with refinements)
3. BRT (with TSM/TDM and refinements)
4. LRT (with TSM/TDM and bus feeder service)
5. Freeway Tunnel
   - A – Freeway with TSM/TDM*
   - B - Freeway with TSM/TDM and tolls*
   - C – Freeway with TSM/TDM and BRT through the tunnel*

   *With and without trucks studied for each

AA Conceptual Cost Estimate

Alternative	Total Cost
No Build	$0
TSM/TDM	$120 M
BRT	$50 M
LRT	$2.6 B
Freeway Tunnel	$5.4 B

Total costs reflect construction and right of way acquisition cost estimates.

Fact Checks

Cut and Cover Construction for Tunnels

Claim – The entire length of tunnels will be constructed using cut and cover methods for both freeway and transit tunnels.

Fact – Only the approaches at either end of the freeway tunnel will be constructed using cut and cover methods.

Fact – The majority of freeway tunnel and LRT tunnel construction will utilize tunnel boring machines.

Fact – Cut and cover method will be utilized for station construction for LRT alternative.

Trucks Will Use Local Streets for Soil Disposal

Claim – Local streets will be used to haul excavated material from freeway tunnel excavation.

Fact – Based on preliminary evaluation, the material from tunnel excavation will be disposed predominantly using freeways. Rail is also being considered for disposal of material.

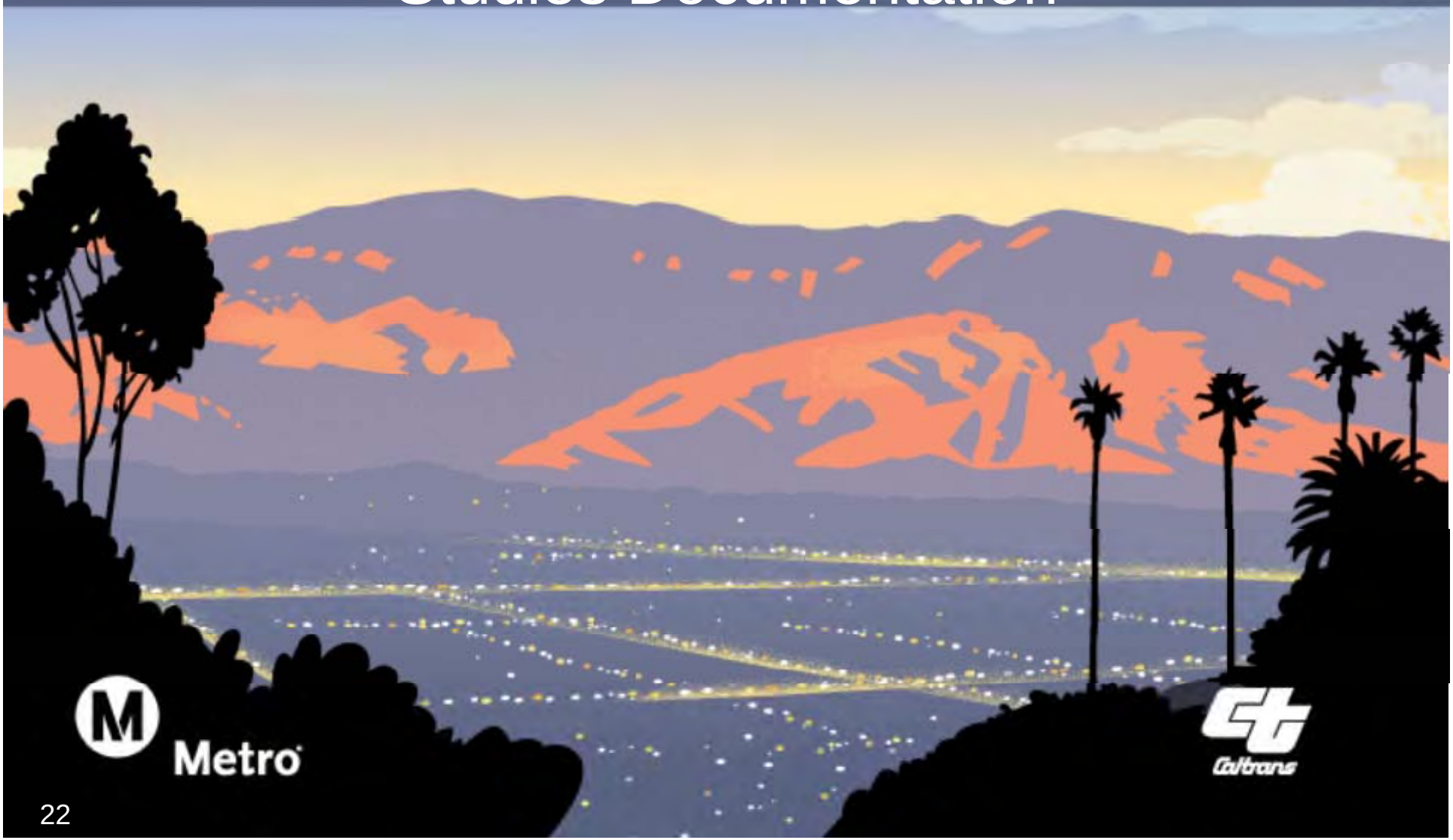
How Much Will the Toll Be?

Claim – The tunnel toll will be $15 (or similar).

Fact –Tunnel toll has not been evaluated.

Fact – Will likely vary by time of day (higher in the peak periods).

Update on Parts 2 and 3 - Project Report and Environmental Studies Documentation



Update on Parts 2 and 3 – Project Report and Environmental Studies Documentation

- Update on O-D study findings
- Status update on Environmental Studies Documentation
- Status update on Preliminary Engineering
- Preliminary Tunnel Considerations

Update on O-D Study Findings

Origin-Destination Data for the SR 710 Study

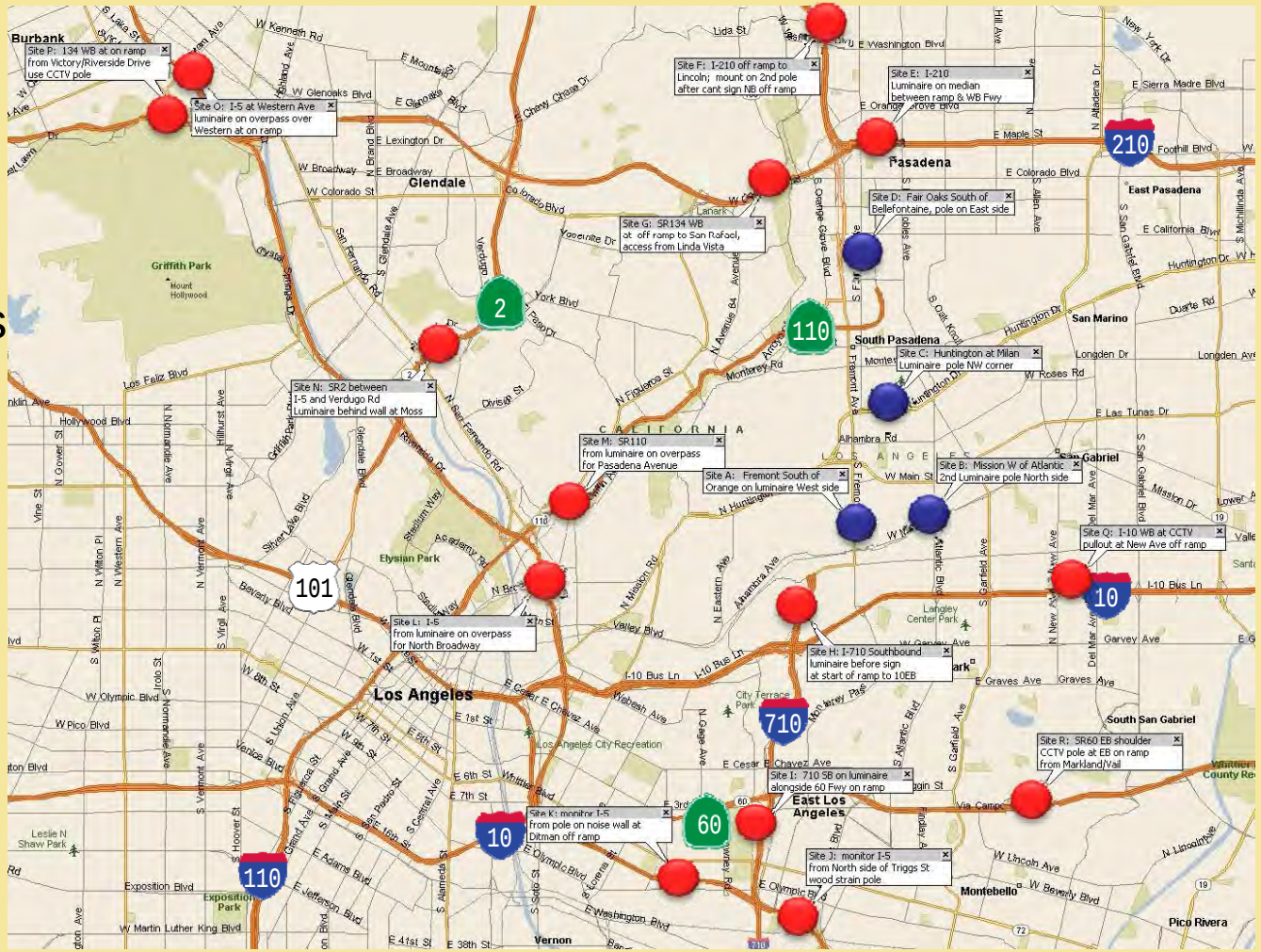
- O-D data are needed to understand the traffic patterns used in the study area
- Focus of the study:
  - Where is traffic on local streets (e.g. Fremont Avenue) going, and where did it come from?
  - How much of the I-5 traffic south of downtown ends north of downtown?
- BlueFax technology can help us answer these questions

What is BlueFax?

- Bluetooth-based technology that can collect vehicle information from multiple locations
- Matches Bluetooth observations at two or more sites
- BlueFax Units have over 300,000 hours of road side monitoring in all weather conditions

SR 710 BlueFax Study Area

- Approximately 80 square miles
- 18 BlueFax stations
- 14 freeway stations
- 4 surface street stations



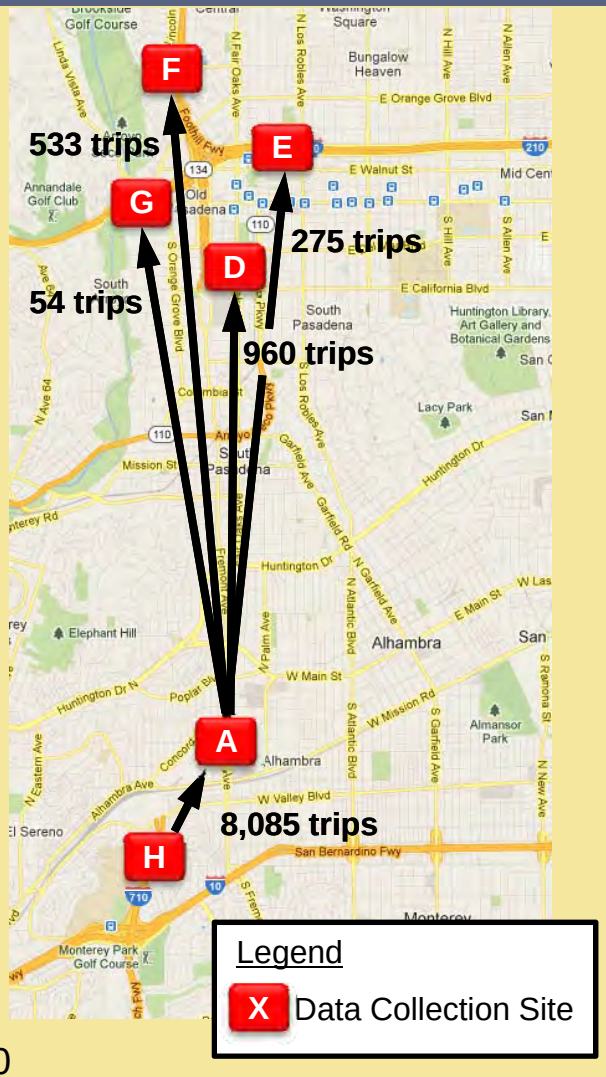
O-D Study Summary Statistics

- Data collected 9/23/12 – 10/8/12
  (14 days, 24 hrs/day)
- 99.7% operational success rate
  (one station went down on the last day)
- 8,076,725 Bluetooth hits recorded
- 1,412,455 O-D pairs collected
  (maximum possible 4,038,362 O-D pairs)
- 35% O-D trip conversion rate

O-D Trip Matrix

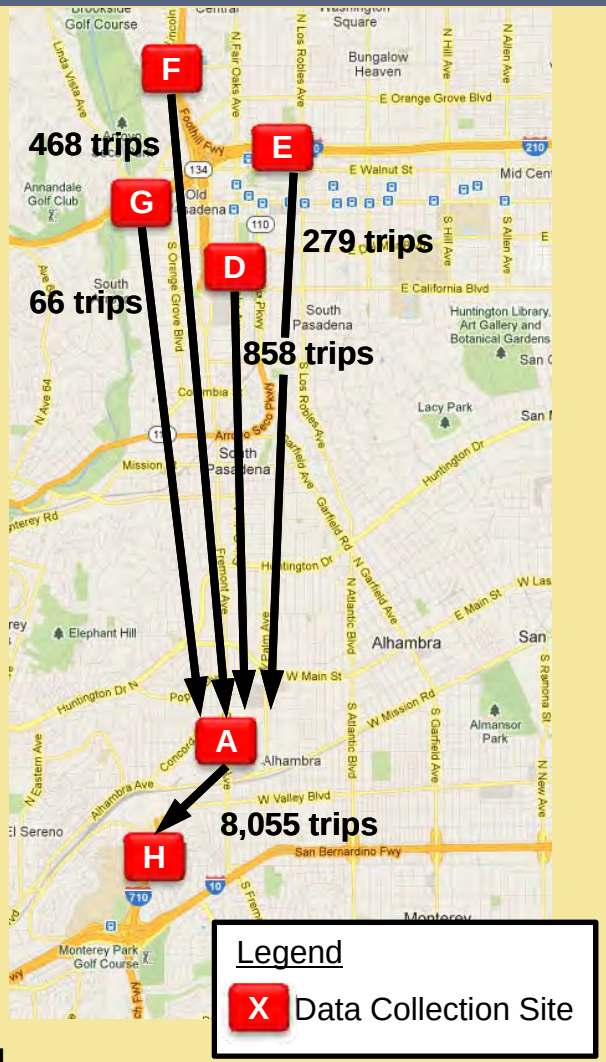
BEGIN STATION		END STATION																	
		Site A	Site B	Site C	Site D	Site E	Site F	Site G	Site H	Site I	Site J	Site K	Site L	Site M	Site N	Site O	Site P	Site Q	Site R
		Fremont (south of Orange)	Mission (west of Atlantic)	Huntington (east of Fremont)	Fair Oaks (south of Bellefontaine)	I-210 (east of SR-710)	I-210 (north of SR-134)	SR-134 (west of SR-710)	I-710 (south of Valley)	I-710 (south of SR-60)	I-5 (south of I-710)	I-5 (north of I-710)	I-5 (south of SR-110)	SR-110 (north of I-5)	SR-2 (north of I-5)	I-5 (north of SR-134)	SR-134 (west of I-5)	I-10 (east of I-710)	SR-60 (east of I-710)
Site A	Fremont (south of Orange)		1,332	1,458	1,854	425	1,042	250	8,055	5,816	2,481	33	335	75	35	146	172	1,339	441
Site B	Mission (west of Atlantic)	1,270		383	287	43	145	44	1,271	2,051	697	26	421	43	29	183	108	1,962	152
Site C	Huntington (east of Fremont)	1,351	524		1,644	130	416	406	674	620	231	5	589	475	22	90	158	225	15
Site D	Fair Oaks (south of Bellefontain	1,696	285	1,845		1,518	1,588	2,191	858	831	459	195	373	2,208	95	274	682	94	30
Site E	I-210 (east of SR-710)	586	66	160	2,366		46,039	78,334	279	414	327	385	1,040	4,435	9,853	9,825	30,442	122	101
Site F	I-210 (north of SR-134)	966	153	474	1,162	39,616		4,099	468	505	338	193	364	1,075	1,016	368	883	95	53
Site G	SR-134 (west of SR-710)	326	76	437	1,673	66,996	5,388		66	210	403	536	1,155	762	14,203	12,928	39,428	102	92
Site H	I-710 (south of Valley)	8,085	1,322	819	960	275	533	54		11,216	4,502	75	1,152	74	177	500	297	1,253	1,478
Site I	I-710 (south of SR-60)	5,830	1,565	671	885	357	538	200	12,194		23,415	564	9,180	759	1,767	4,035	2,059	8,636	18,566
Site J	I-5 (south of I-710)	2,264	541	257	390	276	286	344	4,529	19,108		75,712	29,138	1,785	4,013	16,886	5,211	1,281	1,253
Site K	I-5 (north of I-710)	63	22	14	92	284	180	431	107	809	96,022		33,535	2,043	4,449	19,519	5,523	355	643
Site L	I-5 (south of SR-110)	384	302	334	309	1,340	453	1,620	472	6,159	28,550	35,696		8,559	14,210	38,347	16,147	7,451	6,161
Site M	SR-110 (north of I-5)	113	39	579	1,738	2,958	1,265	719	56	602	1,901	2,437	6,943		445	742	817	558	450
Site N	SR-2 (north of I-5)	54	28	14	128	8,765	1,407	13,610	75	1,104	4,153	5,063	10,373	402		800	1,076	678	729
Site O	I-5 (north of SR-134)	155	122	100	216	8,270	435	11,216	199	2,924	18,254	22,422	31,916	790	959		2,075	2,509	3,027
Site P	SR-134 (west of I-5)	215	130	170	569	25,316	1,158	35,155	152	1,441	5,955	6,965	12,936	903	1,152	2,363		1,689	1,637
Site Q	I-10 (east of I-710)	2,816	2,260	245	201	94	113	93	2,057	13,269	1,956	425	10,490	838	938	3,212	2,279		366
Site R	SR-60 (east of I-710)	578	165	40	53	101	74	87	1,634	21,869	1,307	387	7,185	506	726	3,199	1,822	318	

Traffic on NB Fremont Avenue



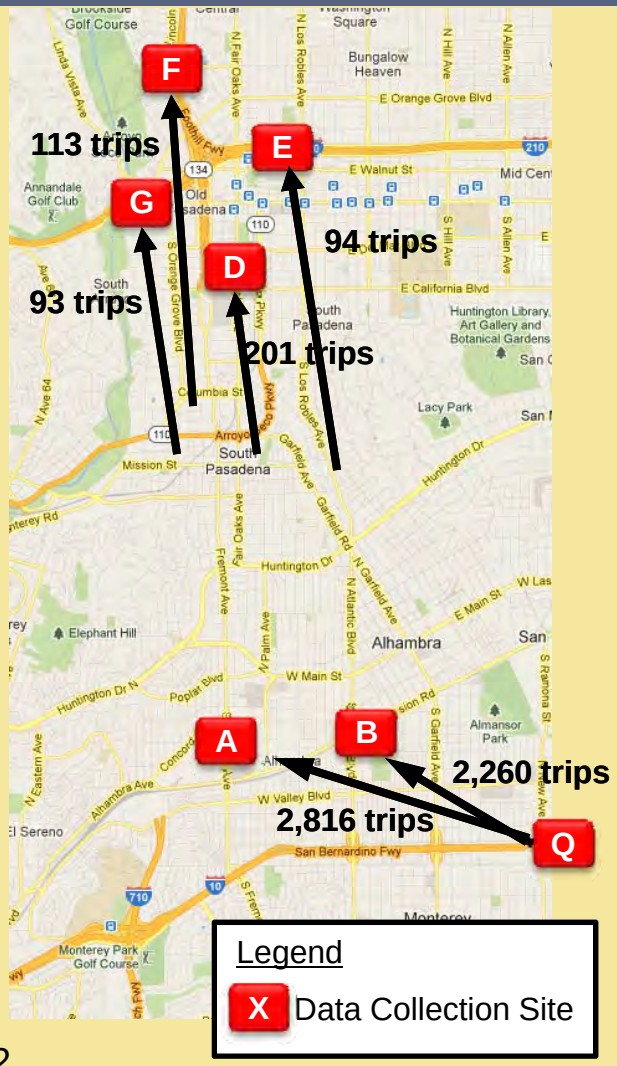
- 23% of the traffic that travels from NB SR 710 to NB Fremont Avenue continues to points around the I-210/SR 134 interchange and beyond

Traffic on SB Fremont Avenue



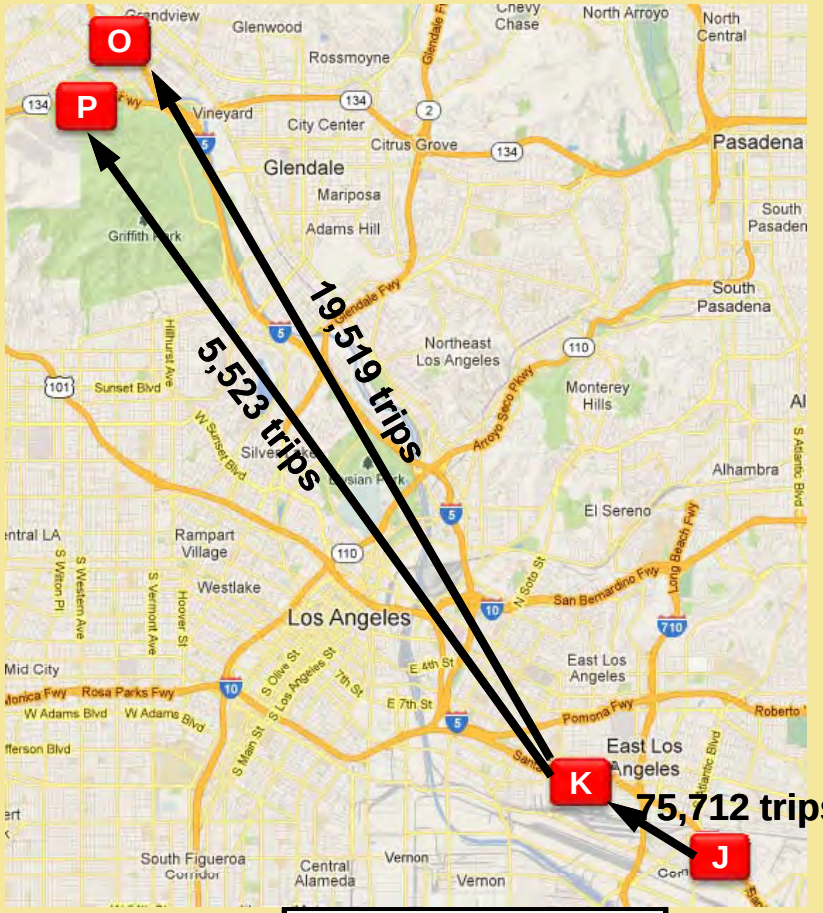
- 21% of the traffic that enters SB SR 710 from SB Fremont Avenue comes from points around the I-210/SR 134 interchange

North-South Traffic from I-10



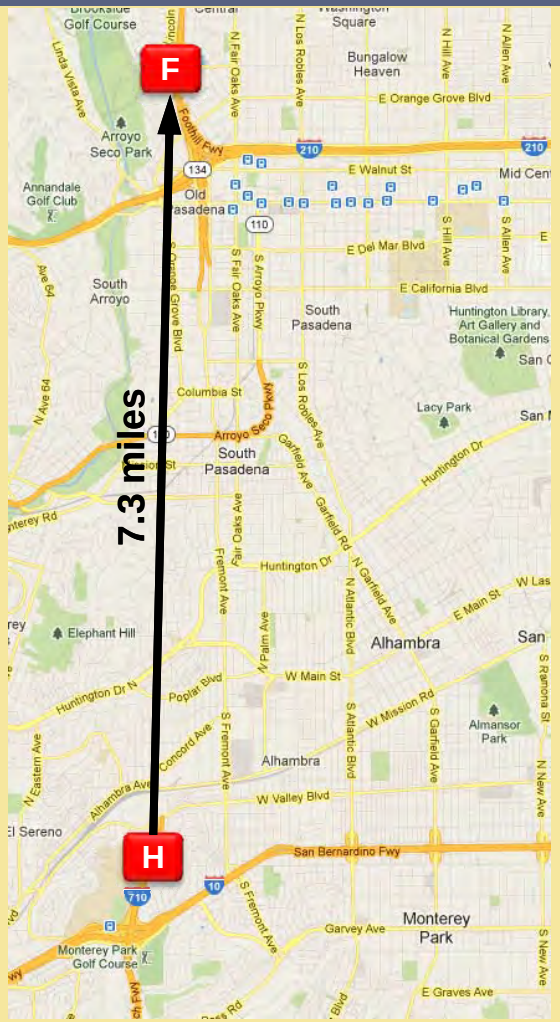
- Approximately 10% of the traffic leaving I-10 through Alhambra is estimated to travel through the corridor

Traffic on NB I-5

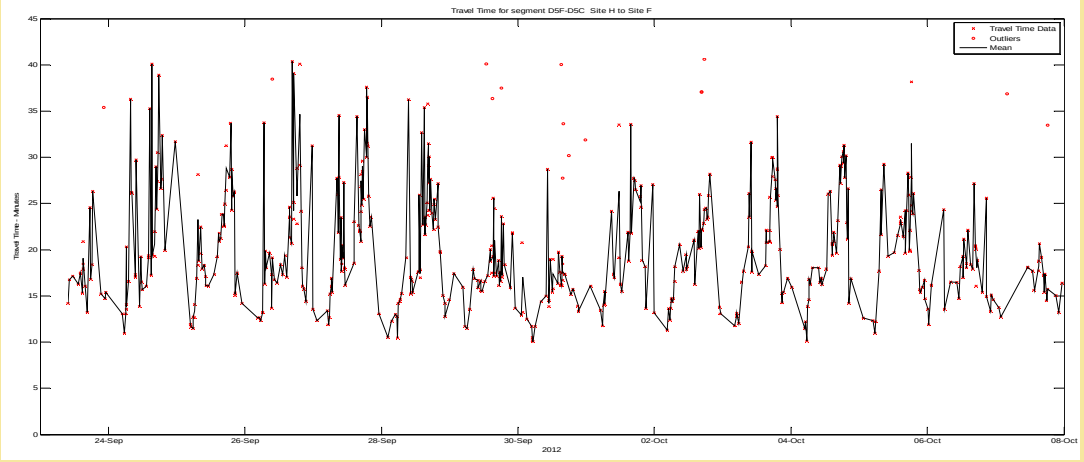


- 33% of the I-5 traffic south of downtown is regional through traffic destined for I-5 north or SR 134

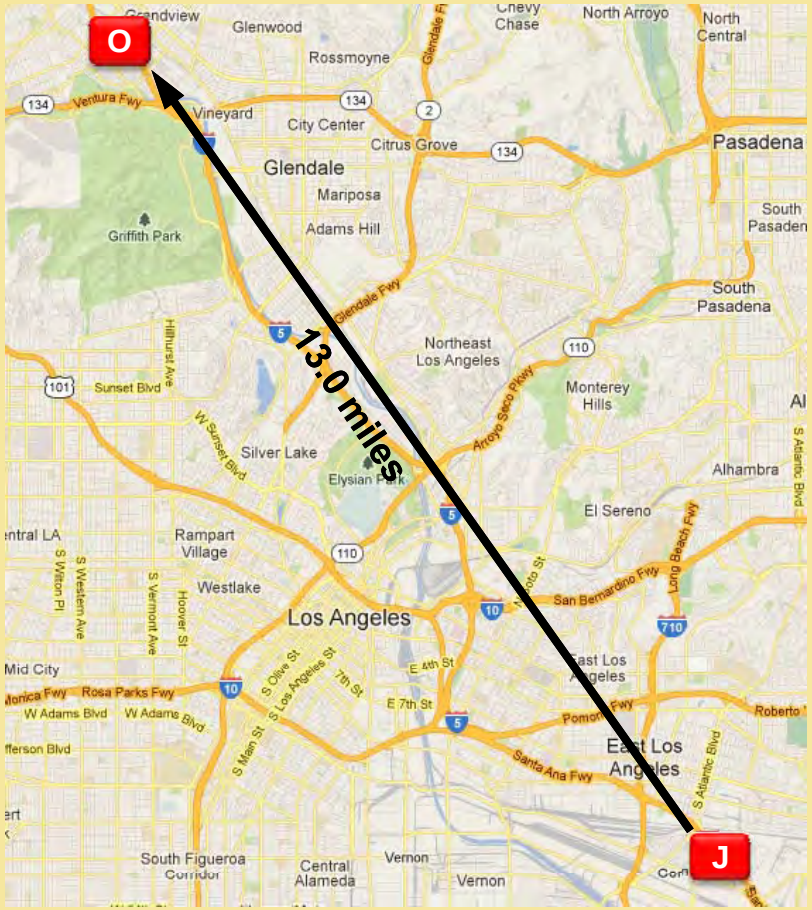
Travel Time Variation



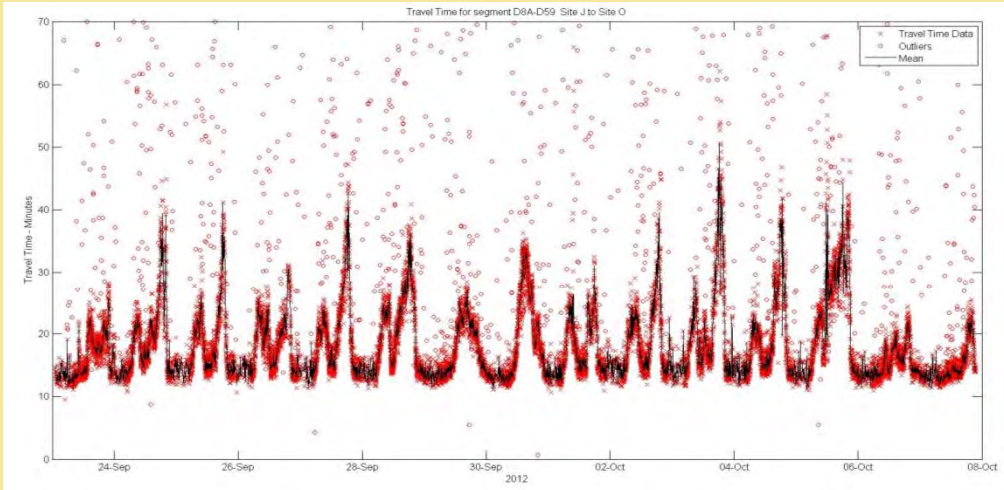
Travel Time Range	13 – 37 minutes		
	Travel Time (minutes)		
Period	Average	5th PCT	95th PCT
Weekday AM (7 to 9 am)	23.6	18.0	33.2
Weekday MD (12 to 2 pm)	20.3	16.2	26.3
Weekday PM (3 to 7 pm)	26.7	20.2	37.3
Weekend	18.5	12.5	33.1



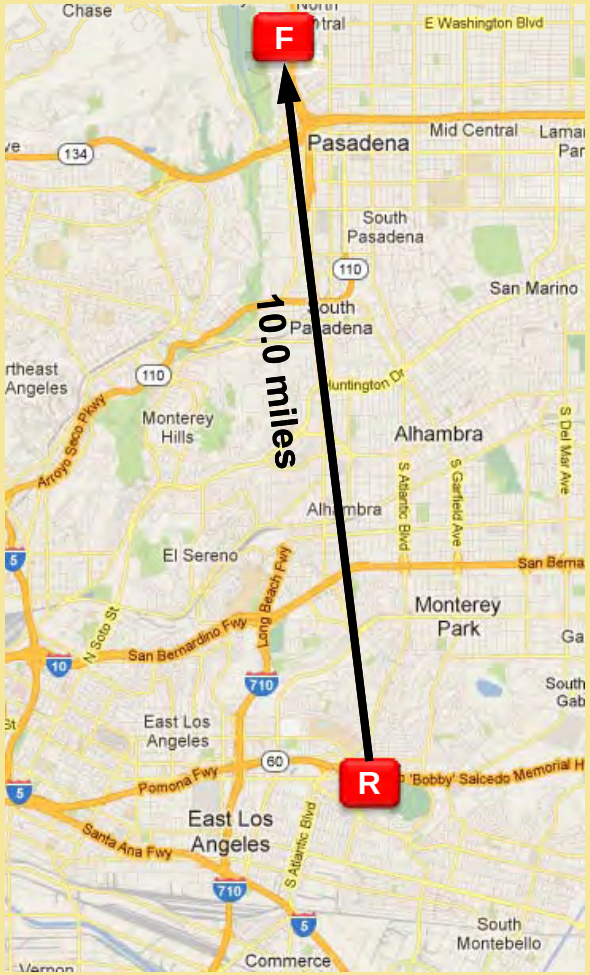
Travel Time Variation



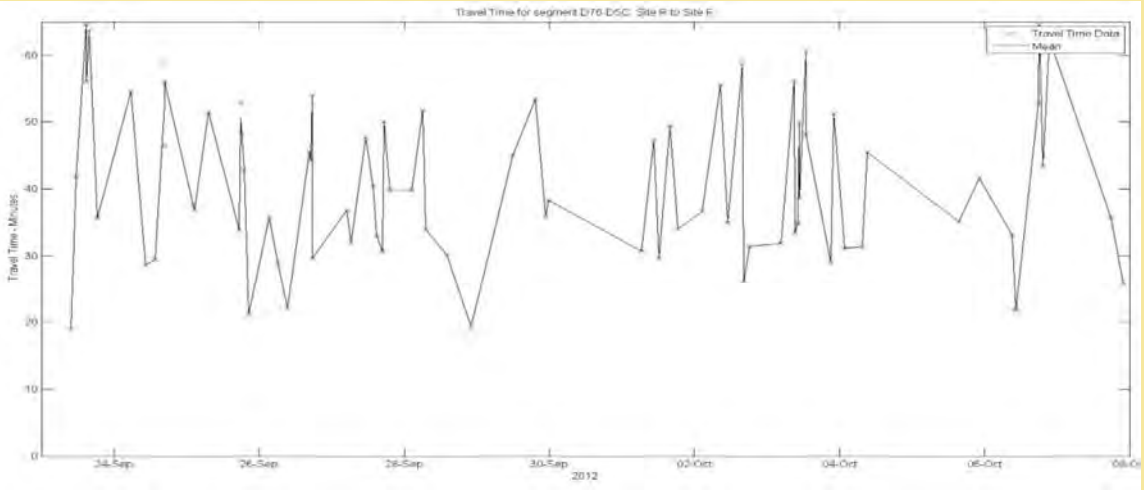
Travel Time Range	13 – 42 minutes		
Period	Travel Time (minutes)		
	Average	5th PCT	95th PCT
Weekday AM (7 to 9 am)	23.6	18.5	39.0
Weekday MD (12 to 2 pm)	19.7	13.6	32.8
Weekday PM (3 to 7 pm)	28.0	18.2	41.8
Weekend	18.2	12.5	30.8



Travel Time Variation



Travel Time Range			21 – 53 minutes
	Travel Time (minutes)		
Period	**Average**	**5th PCT**	**95th PCT**
Weekday AM (7 to 9 am)	33.1	23.5	43.6
Weekday MD (12 to 2 pm)	37.0	29.6	46.9
Weekday PM (3 to 7 pm)	41.2	28.8	53.1
Weekend	36.0	20.8	53.0



Summary

- Bluetooth data collection is a proven, reliable tool for O-D data collection
- Up to 20 to 25% of Alhambra/South Pasadena/ Pasadena traffic is not local
- About 33% of traffic on I-5 south of downtown is regional through traffic
- Speeds are low and travel time variability is high on surface streets in the study area
- Supports elements of project need related to travel speeds and time

Status Update on Environmental Studies Documentation

Initiation of Technical Studies

- Initiated development of refined survey/analysis areas for each Build Alternative
- Initiated focused research for each Build Alternative
- Initiated detailed Noise Work Plan
- Met with SCAQMD (2/7/13)

Cooperating/Participating Agency Coordination Meeting

- Meeting was held on December 7, 2012 at Caltrans
- Attended by USEPA, USACE, USFWS, CDFW, SGVCOG, Cities of Alhambra, La Cañada Flintridge, Los Angeles, Monterey Park, Pasadena and South Pasadena
- Presented purpose and need and range of alternatives
- Received three response letters:
  - City of La Cañada Flintridge
  - City of South Pasadena
  - U.S. EPA

Status Update on Preliminary Engineering

Preliminary Engineering Update

All Alternatives– Goal: Improve performance from AA Phase

- Met with all cities, CSULA, and LACDPW to get their input
- Refine geometrics using new topographic mapping
- Identify non-standard features and coordinate with agencies
- Add more detail to develop the preliminary engineering plans
- Gather utility and right of way information
- Coordinate with Environmental team
- Prepare Draft Project Report (Caltrans) & Draft Preliminary Engineering Report (Metro)
- Plan for geotechnical exploration
- Continue to coordinate with Stakeholders

Preliminary Engineering Update

TSM/TDM Alternative

- Gather additional traffic data with field counts
- Prepare revised screening matrix based on new traffic data and city input
- Determine/verify intersections and local street segments to be included in the Draft EIR/EIS
- Evaluate hook ramps at Fair Oaks/SR110
- Evaluate Valley to Mission local street connection

Preliminary Engineering Update

BRT Alternative

- Continue to develop plans including:
  - Developing intersection improvements
  - Evaluating concepts to reduce parking impacts
  - Refining/enhancing bus stations & locations
  - Confirming other bus station amenities
  - Evaluating improvements at freeway crossings
  - Refining bus service plans
  - Coordinating with regional Transit Signal Priority (TSP) & BRT plans

Preliminary Engineering Update

LRT Alternative

- Continue to develop plans including:
  - Fire and Life Safety (FLS) and ventilation
  - Rail Yard
  - Station plans
  - Aerial structure concepts
  - Power needs for tunnel boring machines
  - Construction staging
  - Mednik Avenue improvements

Preliminary Engineering Update

Freeway Tunnel Alternative

- Continue to develop plans including:
  - Walls, Advance Planning Studies for bridges, Drainage
  - Tunnel design
  - FLS and ventilation
  - Operations & Maintenance Building concepts
  - Power needs for tunnel boring machines
  - Construction staging

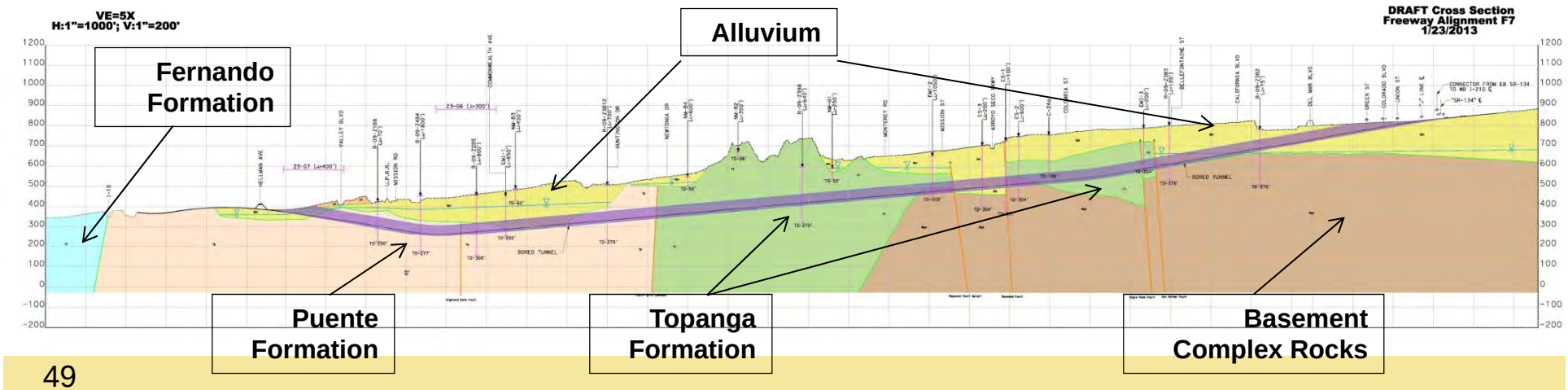
Preliminary Tunnel Considerations

Tunnel Design Considerations

- Anticipated Geologic Conditions
- Tunnel Configuration
- Tunnel Excavation Methods
- Fault Crossing Concept

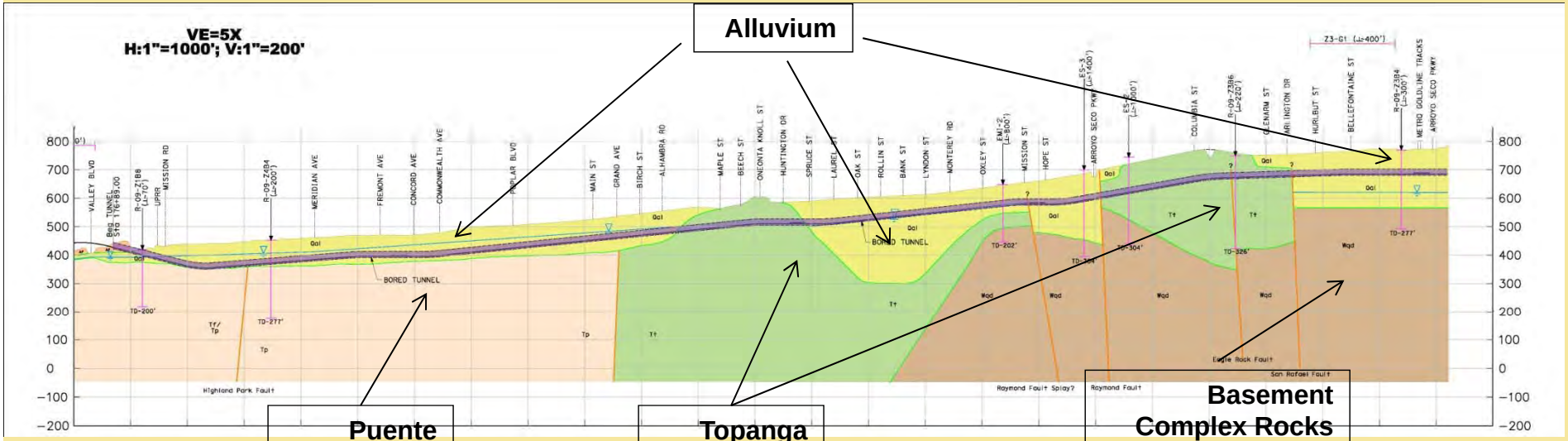
Anticipated Geologic Conditions

- Freeway Tunnel Alternative
  - Alluvium: ~25%
  - Topanga Formation: ~50%
  - Puente Formation: ~20%
  - Basement Rock (Quartz Diorite): ~5%

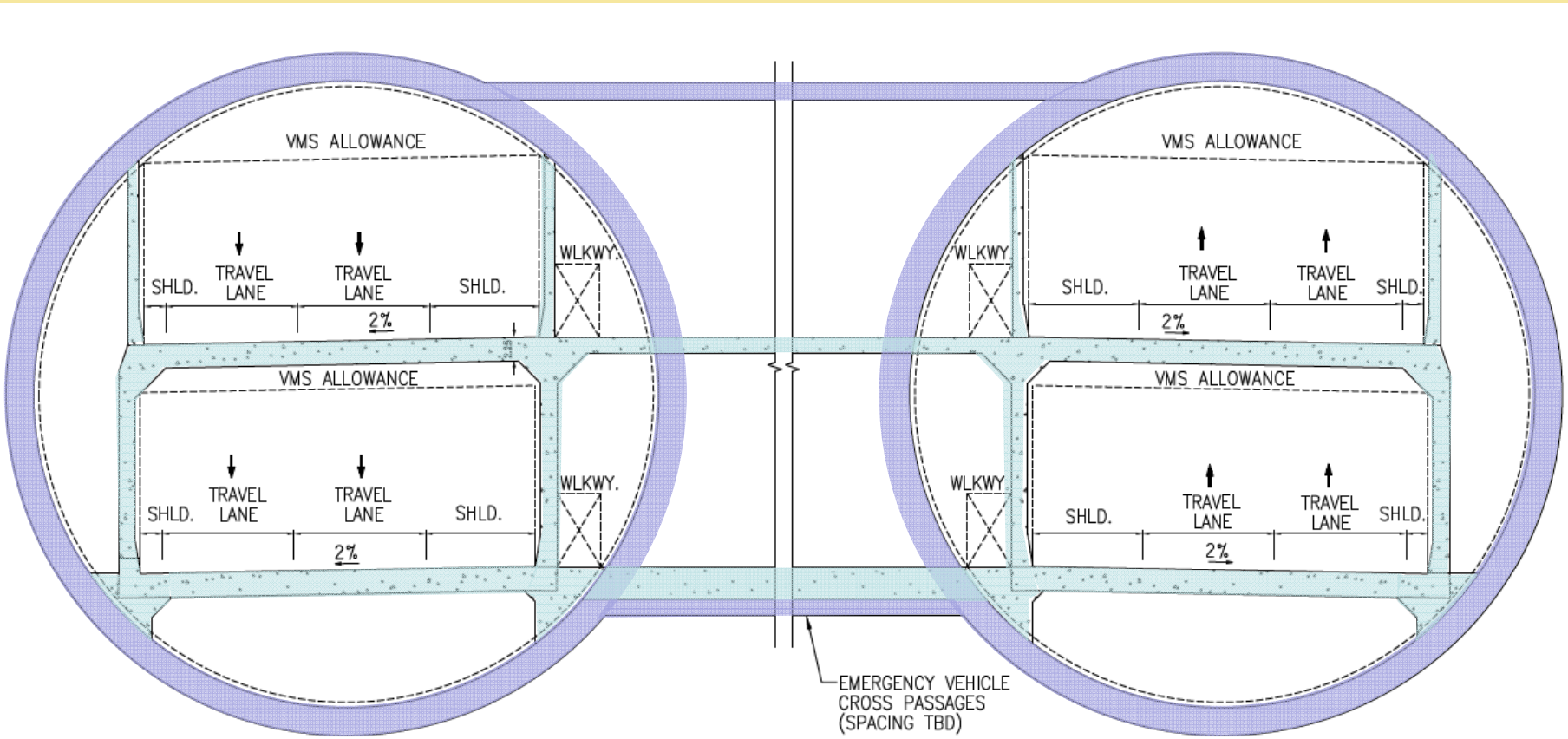


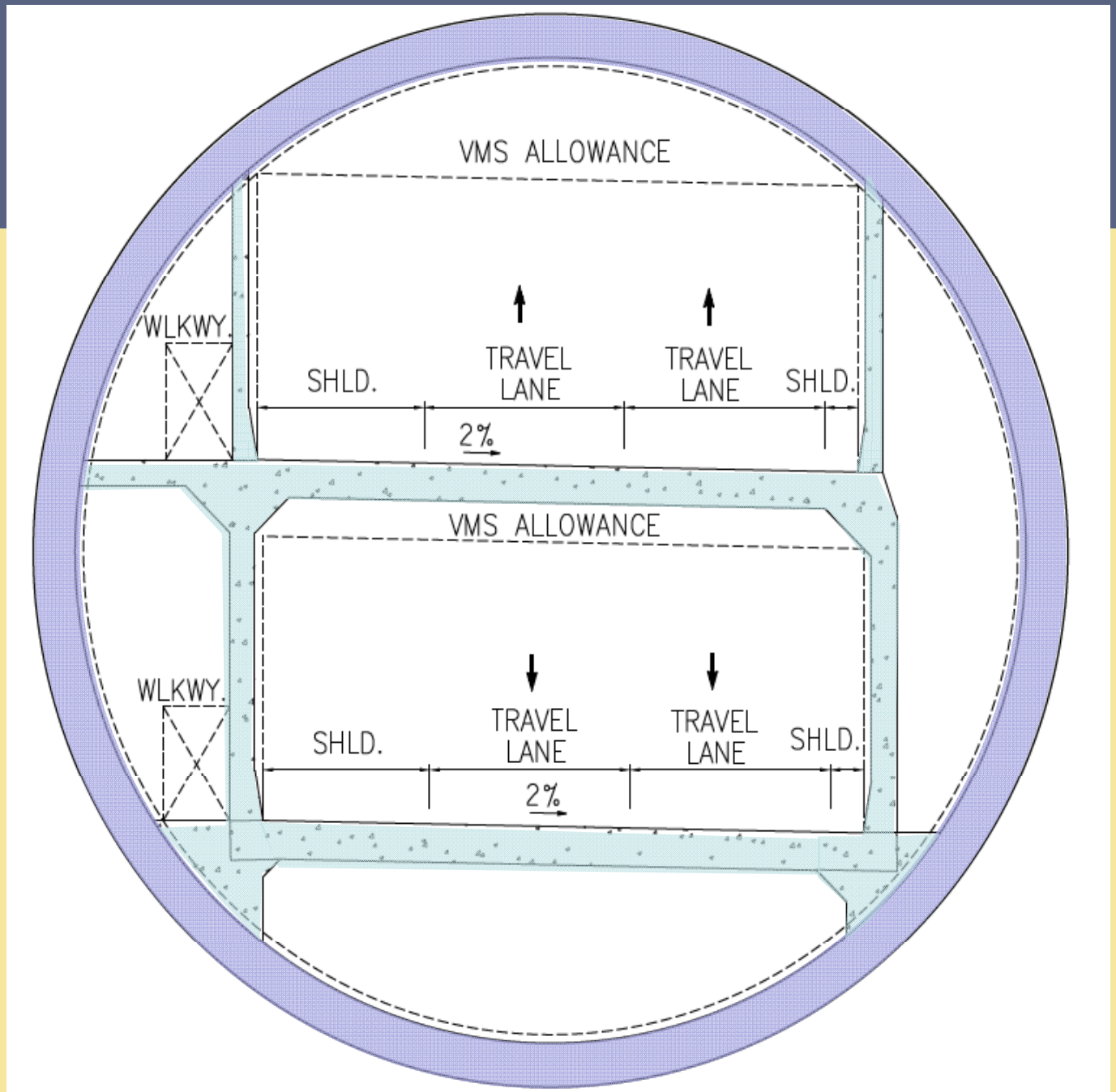
Anticipated Geologic Conditions

- LRT Alternative
  - Alluvium: ~75%
  - Topanga Formation: ~25%
  - Basement Rock (Quartz Diorite): <5%



Tunnel Configuration - Freeway




VMS ALLOWANCE
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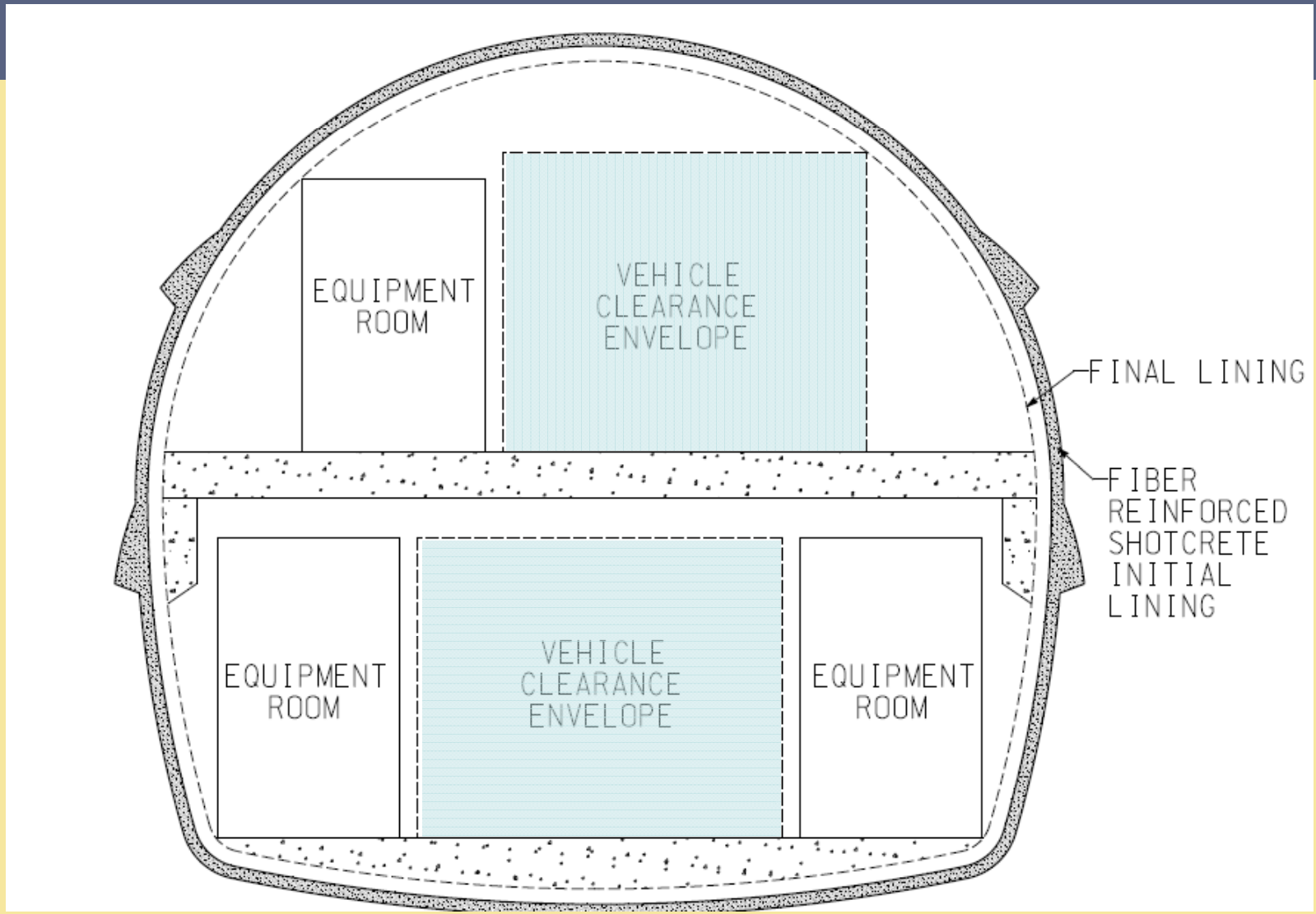
Emergency Vehicle Cross Passage

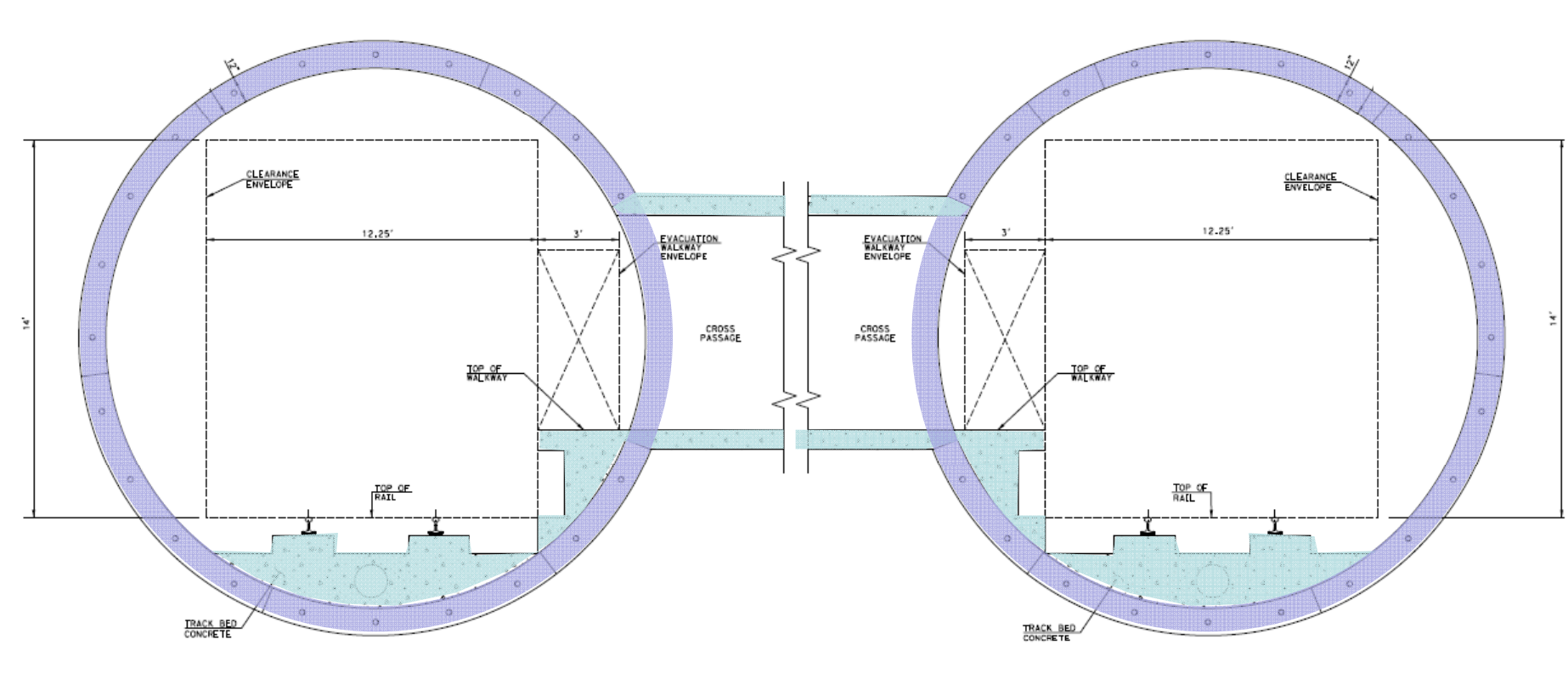


Development Process

- Reviewed Agency Requirements
  - Travel Lanes (Caltrans)
  - Shoulders (Caltrans)
  - Vertical Clearance (Caltrans)
  - Walkways (NFPA, ADA)
- Compared with other relevant projects

Paris A86 Tunnel

Tunnel Configuration - LRT



Development Process

- Metro has well developed design standards
- Similar to existing system
- Used our knowledge from other recent Metro projects (e.g. Gold Line Eastside Extension)

Gold Line Eastside Extension Tunnels

Tunnel Excavation Methods

Pressurized-Face Tunnel Boring Machine (TBM)

Tunnel Boring Machines

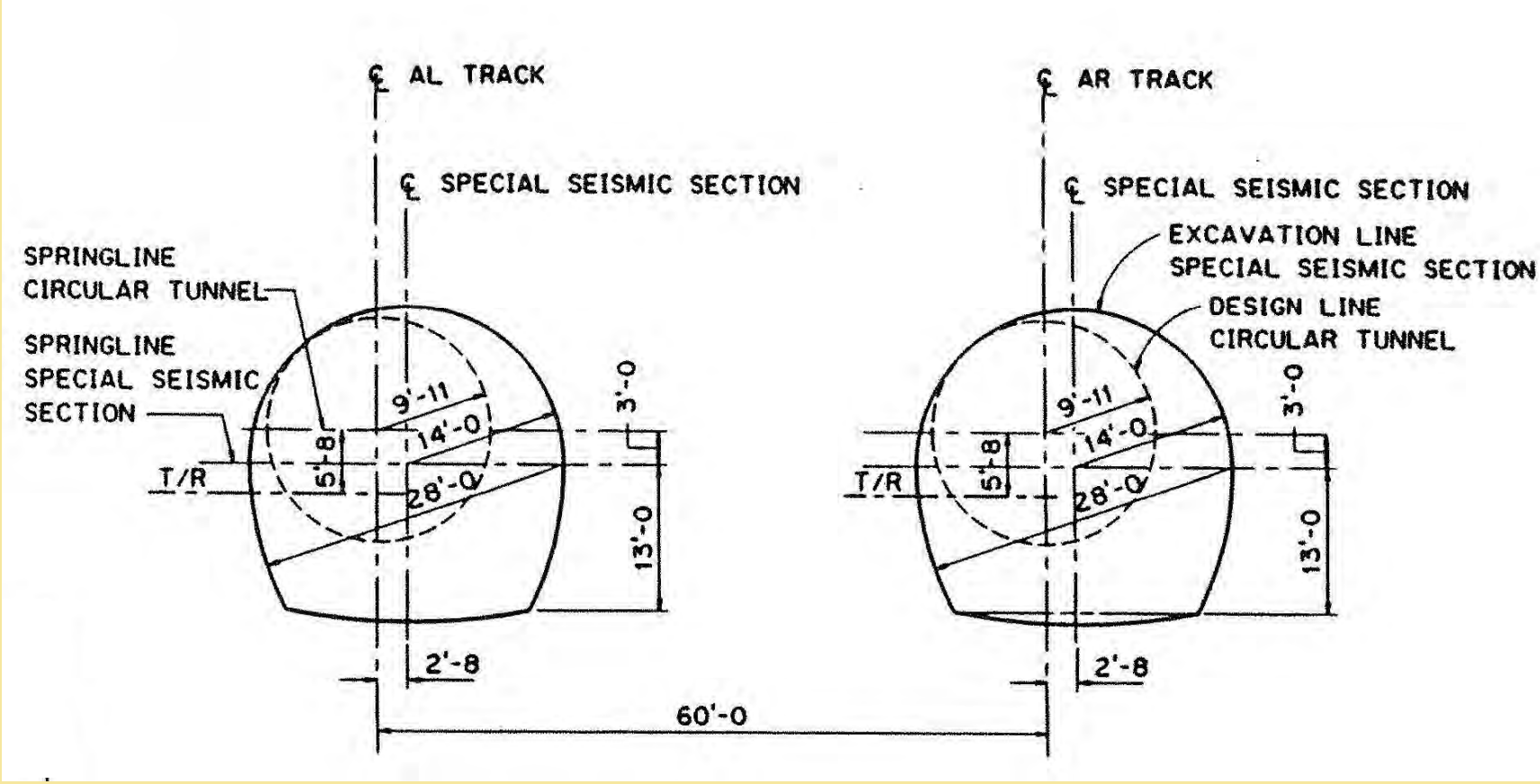
- State-of-the-art machines for long tunnel drives
- Adaptable to variable geologic conditions
- Pressurized-face operations
  - Controls face stability in soil and weak rock
  - Minimizes loss of ground and surface settlement
  - Prevents groundwater inflows into tunnel

LA Metro Gold Line Eastside Extension Tunnels

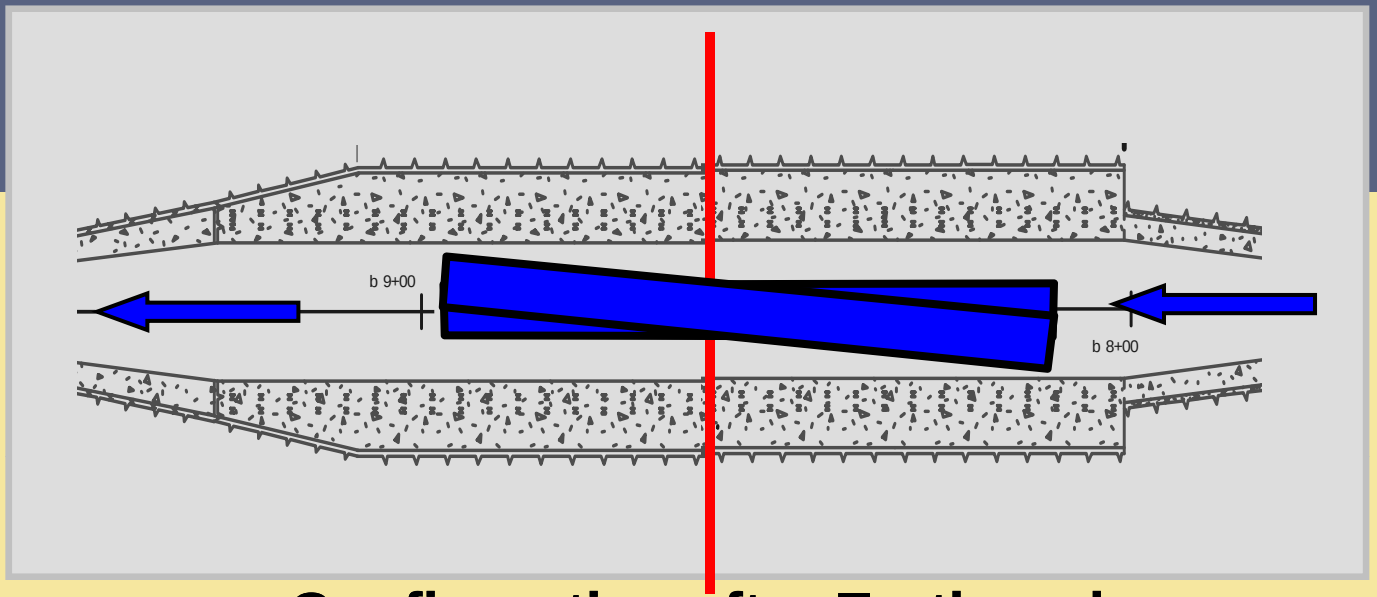
Fault Crossing Concept

- Create seismic vault to accommodate fault offset
- Over-excavate vault after TBM mines tunnel
- After ground movement occurs, roadway/track could be realigned to restore functionality

Red Line – Hollywood Fault Crossing Concept

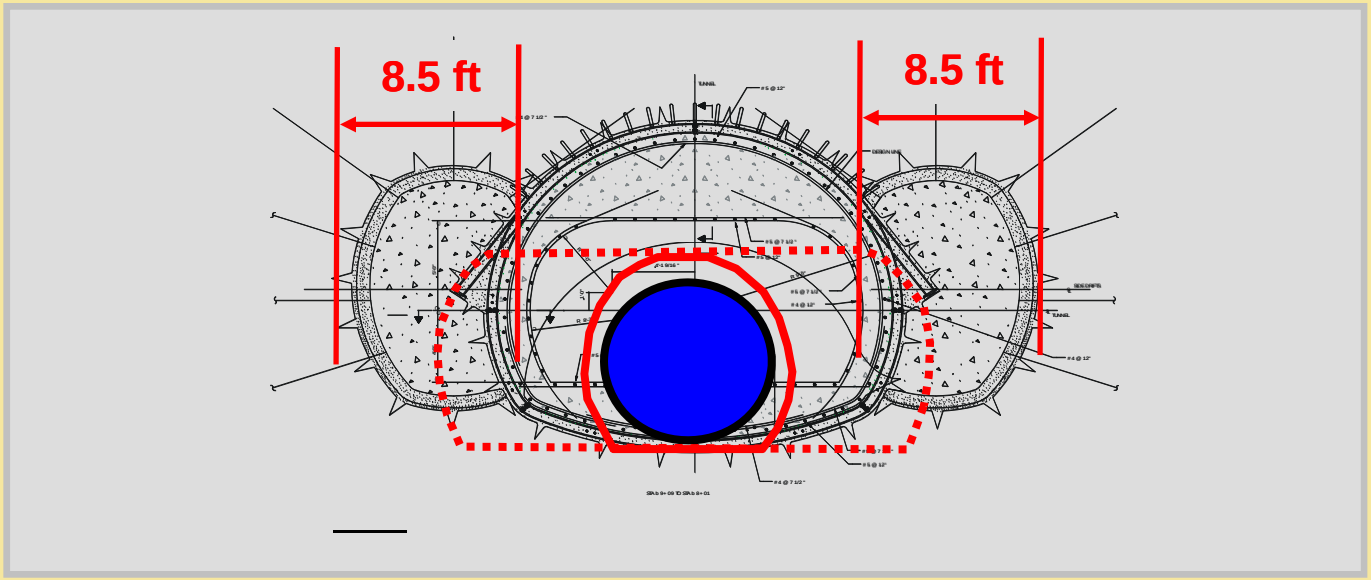


Oversized Vault Section



Plan

Configuration after Earthquake



Section

Tunnel Systems Design Considerations

Modern Tunnel Systems

- Lighting
- Communications
- Traffic Surveillance
- Ventilation
- Air Monitoring
- Motorist Aid Stations
- Emergency Egress/Refuge
- Public Address/Radio Rebroadcast

Tunnel Safety

Lighting and Communication

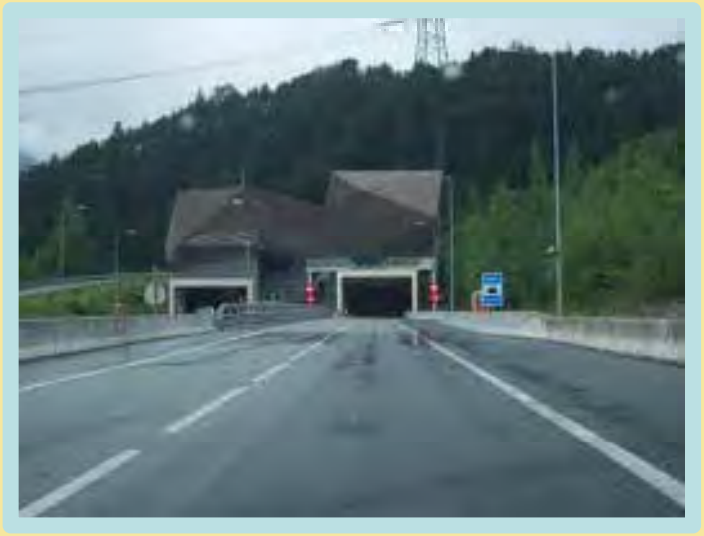
Traffic Surveillance and Communication

Motorist Assistance

Motorist Aid Station

Cross Passage for Emergency Access

Operations and Maintenance Center (OMC) Building/Ventilation



OMC Building

Jet Fan Ventilation

Ventilation and FLS Considerations

- Normal and emergency operations
- Schematic drawings of ventilation systems
- Key elements of ventilation design
- Key elements of fire and life safety design

Metro

Caltrans

Ventilation Objectives - Normal Operation

- Meet air quality standards
- Use self-ventilation by vehicles amplified by longitudinal ventilation if needed
- No intermediate exhaust stacks required
- Reduce emissions by air-scrubbing in portal stations

Metro

Caltrans

Ventilation Objectives - Emergency Operation

- Provide safe evacuation paths
- Facilitate access for rescue and fire personnel
- Control smoke and suppress fire
- Dampers extract smoke
- Fixed fire fighting system (FFFS)
- Pressurize escape paths

Metro

Caltrans

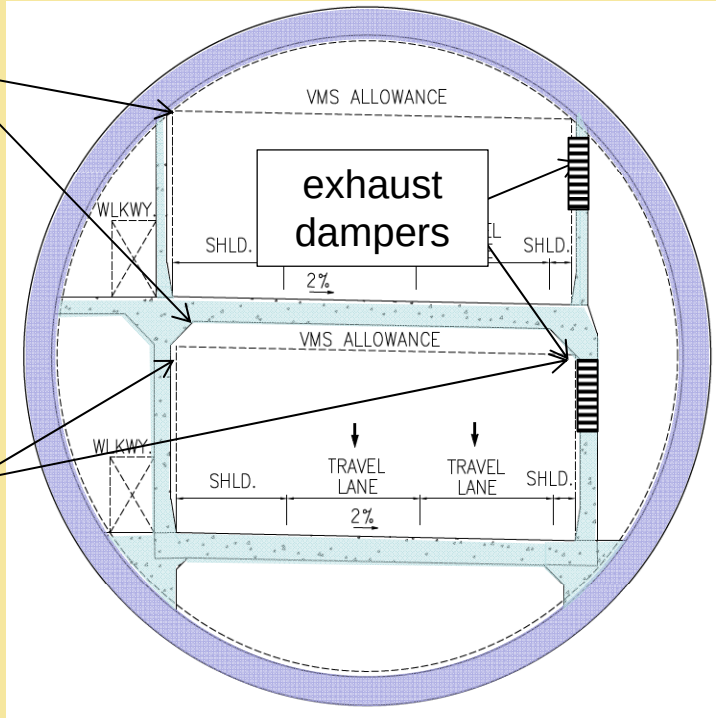
Schematic Drawing of a Highway Tunnel Ventilation System

Longitudinal ventilation with smoke extraction by dampers

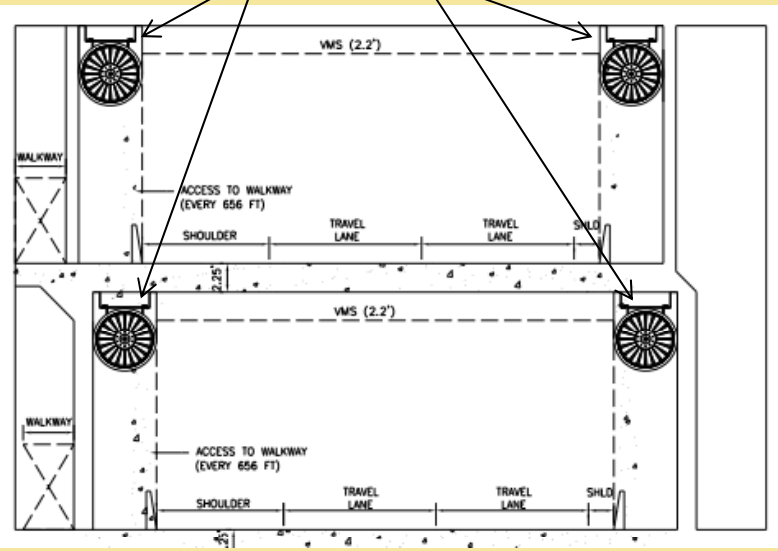
Key Elements of a Ventilation System

opacity sensor

air velocity sensor



jet-fans

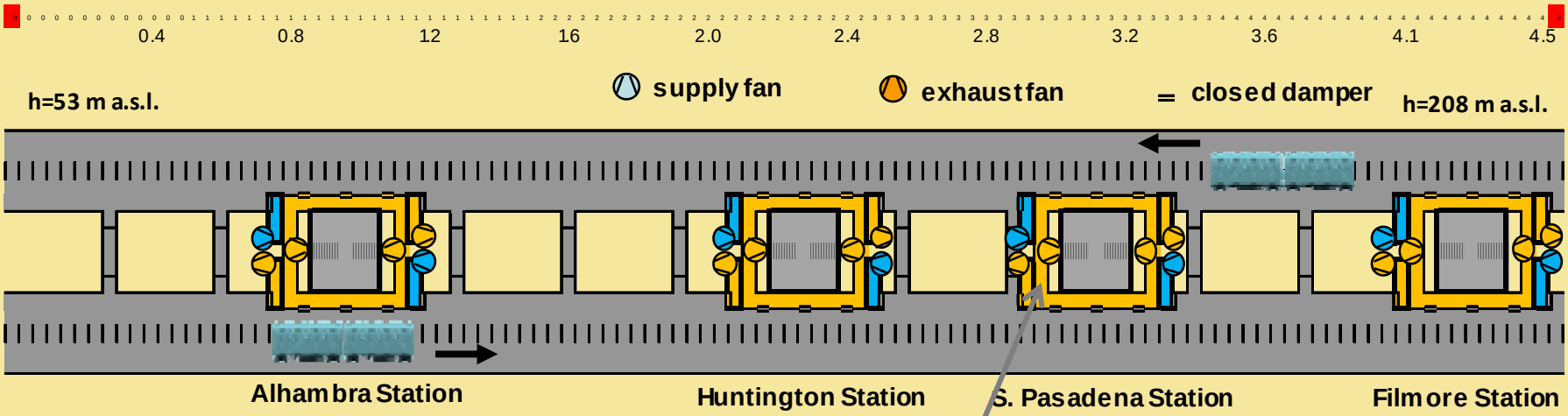


Some Examples of Air Scrubbing at the Portals

Location	Length (miles)	Year	Type
Japan			
Tunnel Tennozan	1.2	1998	electrostatic
Tunnel Kann-etsu	6.84	1985	electrostatic
Norway			
Tunnel Lærdal	15.22	2000	electrostatic / gas, bypass
Ekeberg	0.87	1995	electrostatic
Spain			
M30 Madrid	3.42	2008	electrostatic
South Korea			
Chinbu	1.44	1999	electrostatic, bypass
Vietnam			
Hai Van Tunnel	3.90	2005	electrostatic, bypass
Italy			
Cesena	0.98	2006	electrostatic
Sorrentina	3.21	2008	electrostatic
France			
Mont Blanc	7.21	2010	electrostatic
United States			
Alaskan Way	1.80	In Construction	none
Caldecott	0.61	2013	none
Devil‘s Slide	0.80	2012	none

Schematic Drawing of a LRT Ventilation System

Push-pull system with smoke extraction in the stations



FLS Objectives - Normal Operation

Normal operation

- Provide safe operation during normal conditions
- Create good sight conditions inside the tunnel (lighting system)
- Provide for security and continuous monitoring (CCTV)
- Provide periodic Variable Message Signs (VMS)
- Provide continuous power (redundant power connection, emergency power supply) for safety equipment (exit signs, emergency lighting, etc.)
- Include smoke and fire detection systems

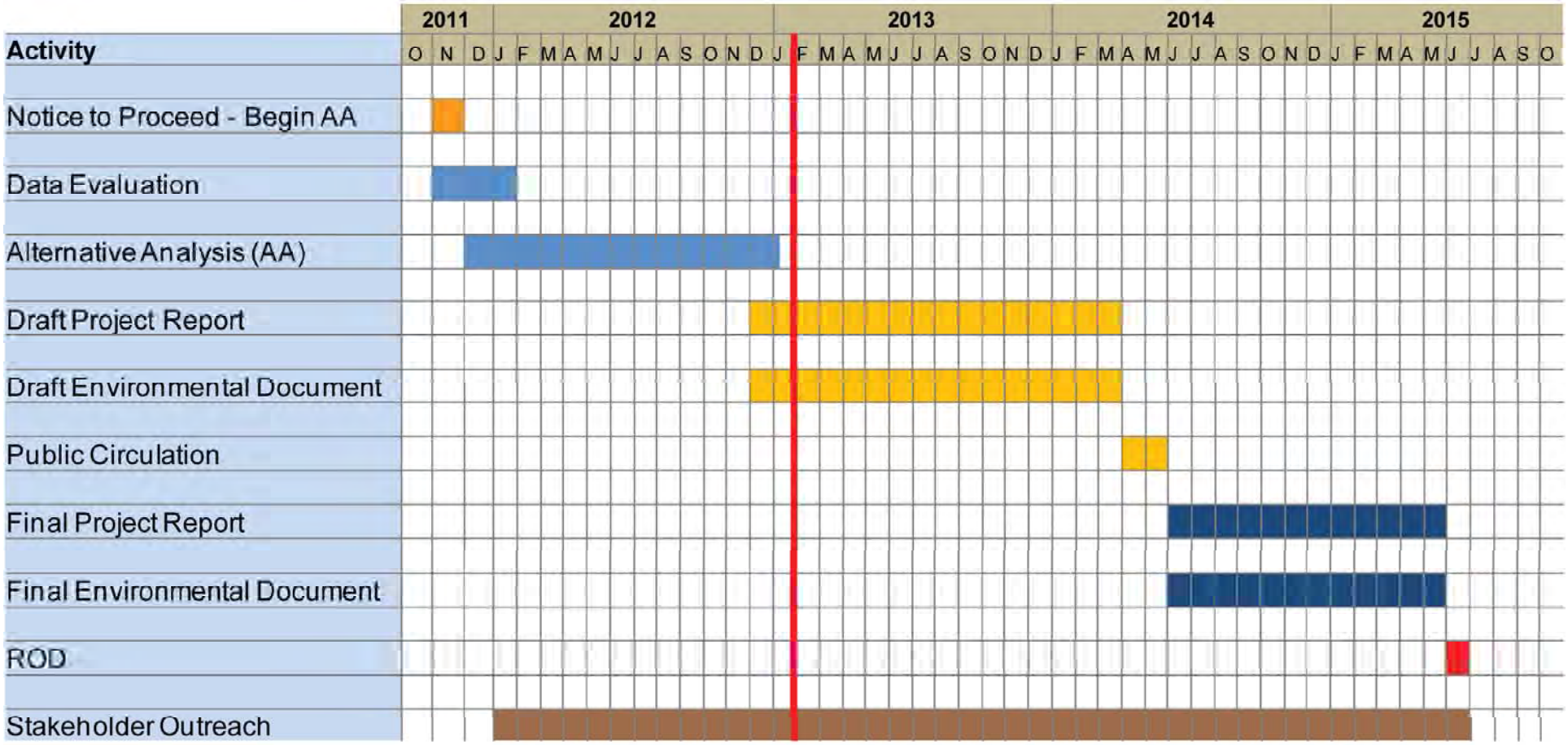
FLS Objectives - Emergency Operation

Emergency operation

- Provide life safety during evacuation and rescue phases
- Provide emergency light to support self-rescue
- Easy use of fire fighting system (fire alarm, extinguisher, etc.) during self-rescue phase
- Protect structural components of the facilities

Next Steps

Study Schedule



Tentative Meeting Dates for TAC/SOAC

- 2013 TAC/SOAC Meeting Schedule
  - April 24/25
  - July 17/18
  - September 11/12
  - November 13/14

Next Steps

- Continue validation of the 2012 RTP model
- Evaluate performance of Build Alternatives using 2012 RTP model
- Continue to develop alternatives
- Begin geotechnical exploration and field surveys
- Begin Technical Studies
- Value Analysis (VA) Study is planned for mid-March

Open Discussion