The WISE Experience

Association of Monterey Bay Area Governments (AMBAG)

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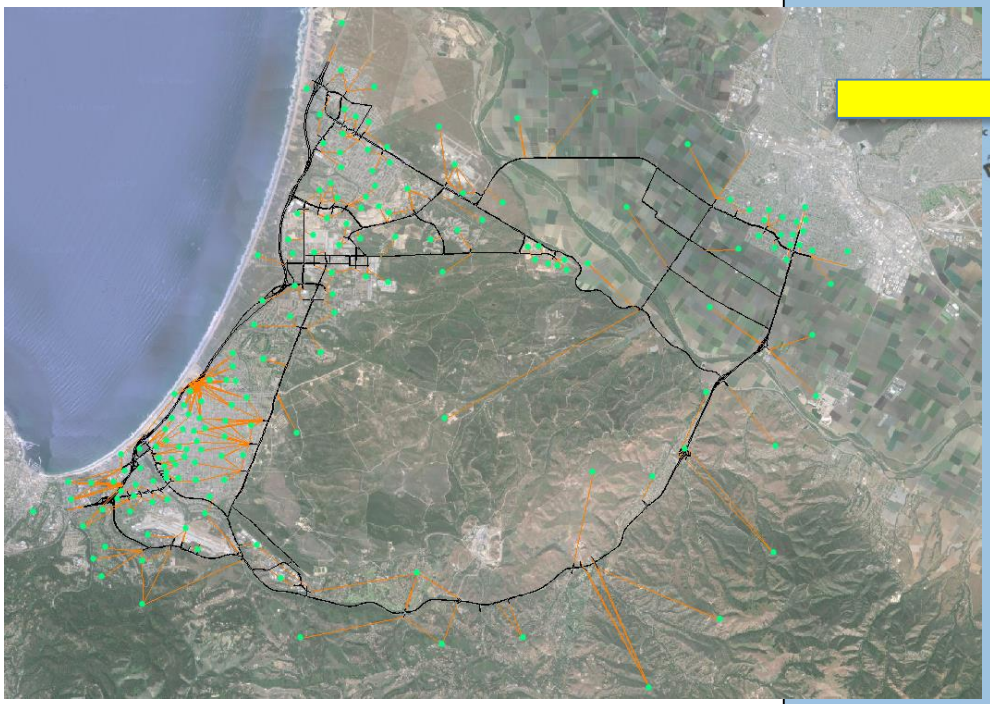
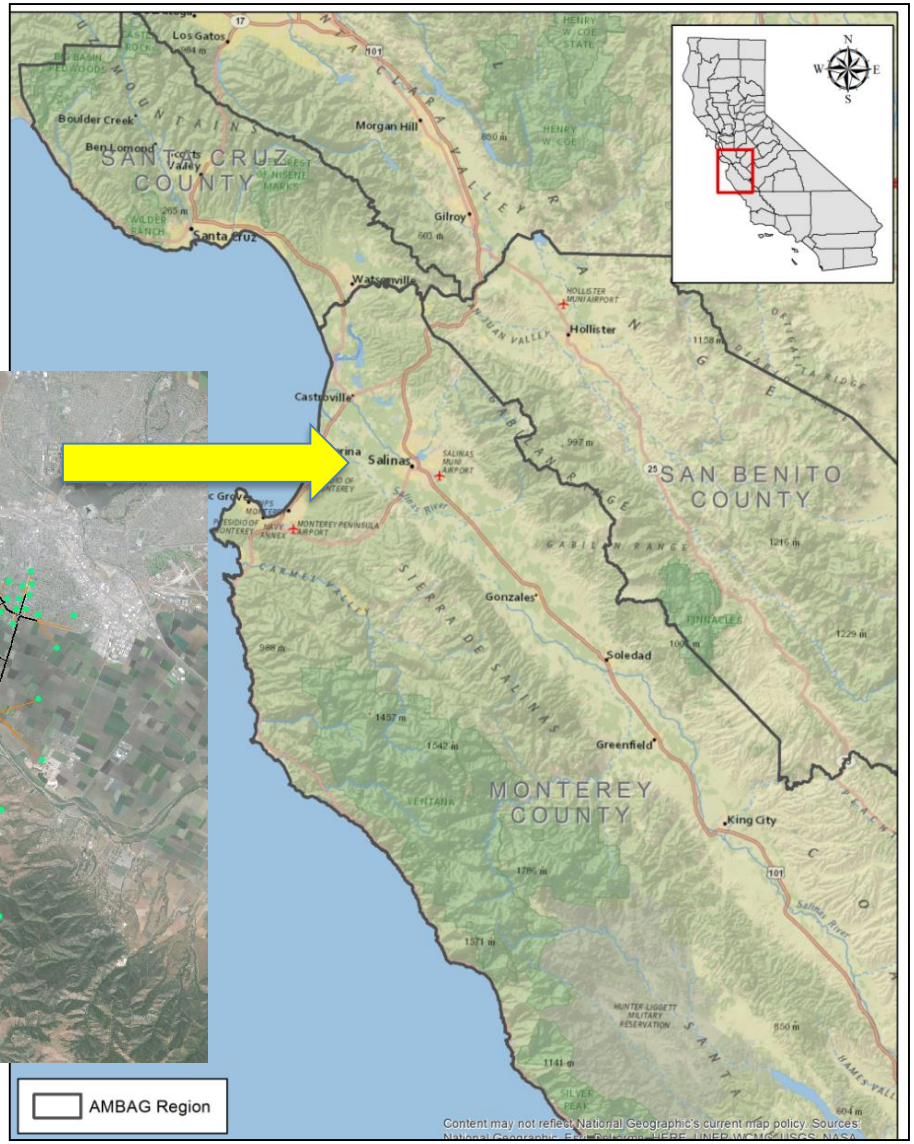
Presentation Outline

- Why is AMBAG interested in pilot testing WISE?
- Overview of WISE implementation project.
- WISE evaluation and proposed remedies.
- DTA Support: Data Collection, Processing, Analysis, and Utilization.
- Construction Project Overview
- Modeling Approach
- Questions

Why WISE pilot testing?

- Regional Challenges
- Evaluate impact of construction on travel time reliability
- Minimize travel delay for the public
- Reduce the variability in travel time
- Enhance safety
- Increase coordination and communication among agencies





Evaluation of WISE Software

- Needs better integration with existing assignment models in place of heuristics.
- Not capable of properly handling complex sequencing of simultaneous projects.
- Extensive manipulation of network data required for input.
- Initial implementation cumbersome and difficult to use.

Remedies to Improve WISE

- Allow network model to define detours through static OR dynamic assignment.
- Make WISE more usable and provide better integration with existing and accepted modeling tools.
- Improve all aspects of WISE (functionality, reporting, etc.) to potentially increase adoption and acceptance by MPOs and DOTs.

AMBAG WISE Approach

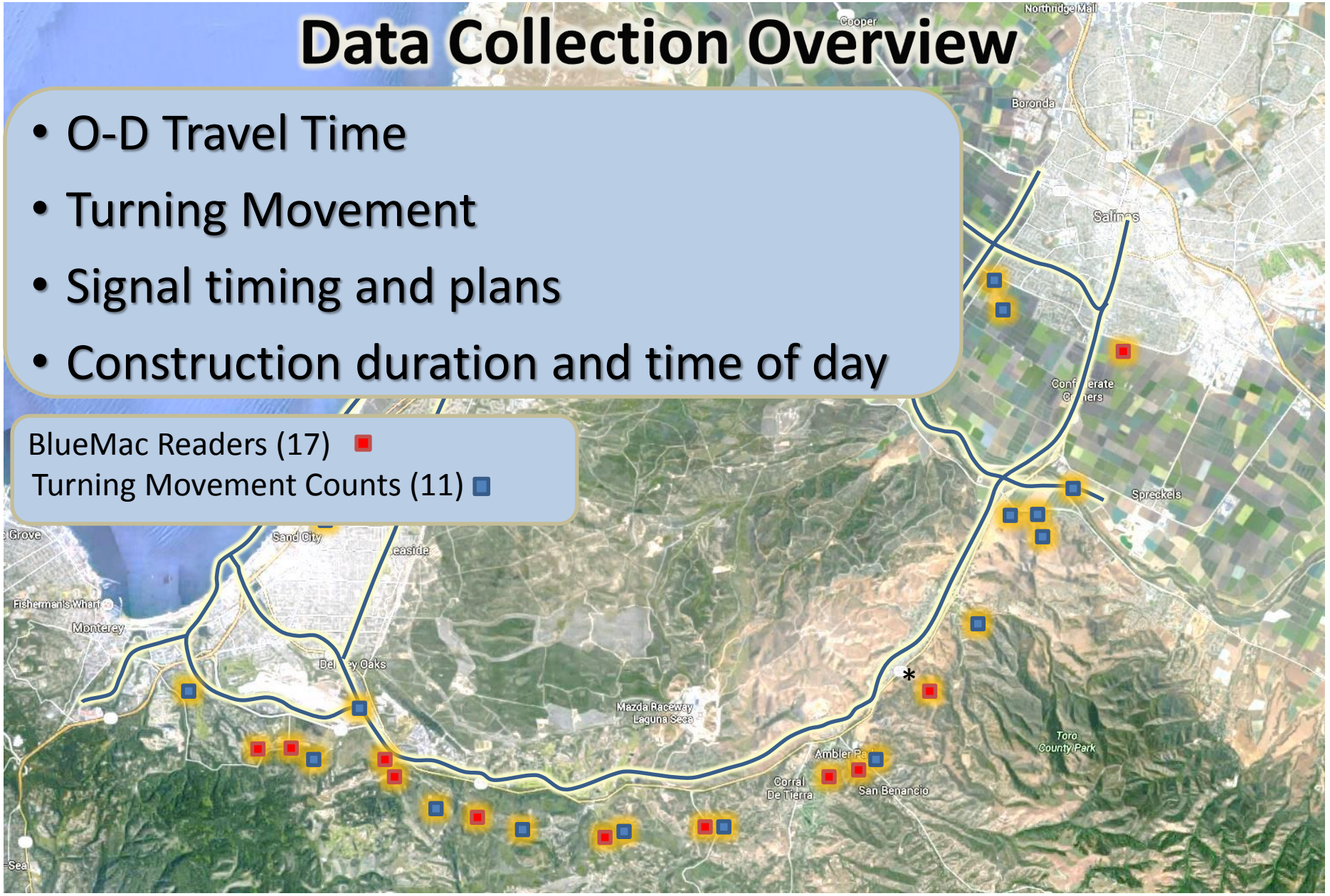
- Demonstrate WISE implementation using static assignment
  - Examine all feasible schedules
  - Employ existing calibrated travel demand model

- Explore fine-tuned delay estimation using DTA-based micro-simulation
  - Explore short-listed schedules from static analysis
  - Assemble data to facilitate simulation model calibration

Data Collection Overview

- O-D Travel Time
- Turning Movement
- Signal timing and plans
- Construction duration and time of day

BlueMac Readers (17)
Turning Movement Counts (11)



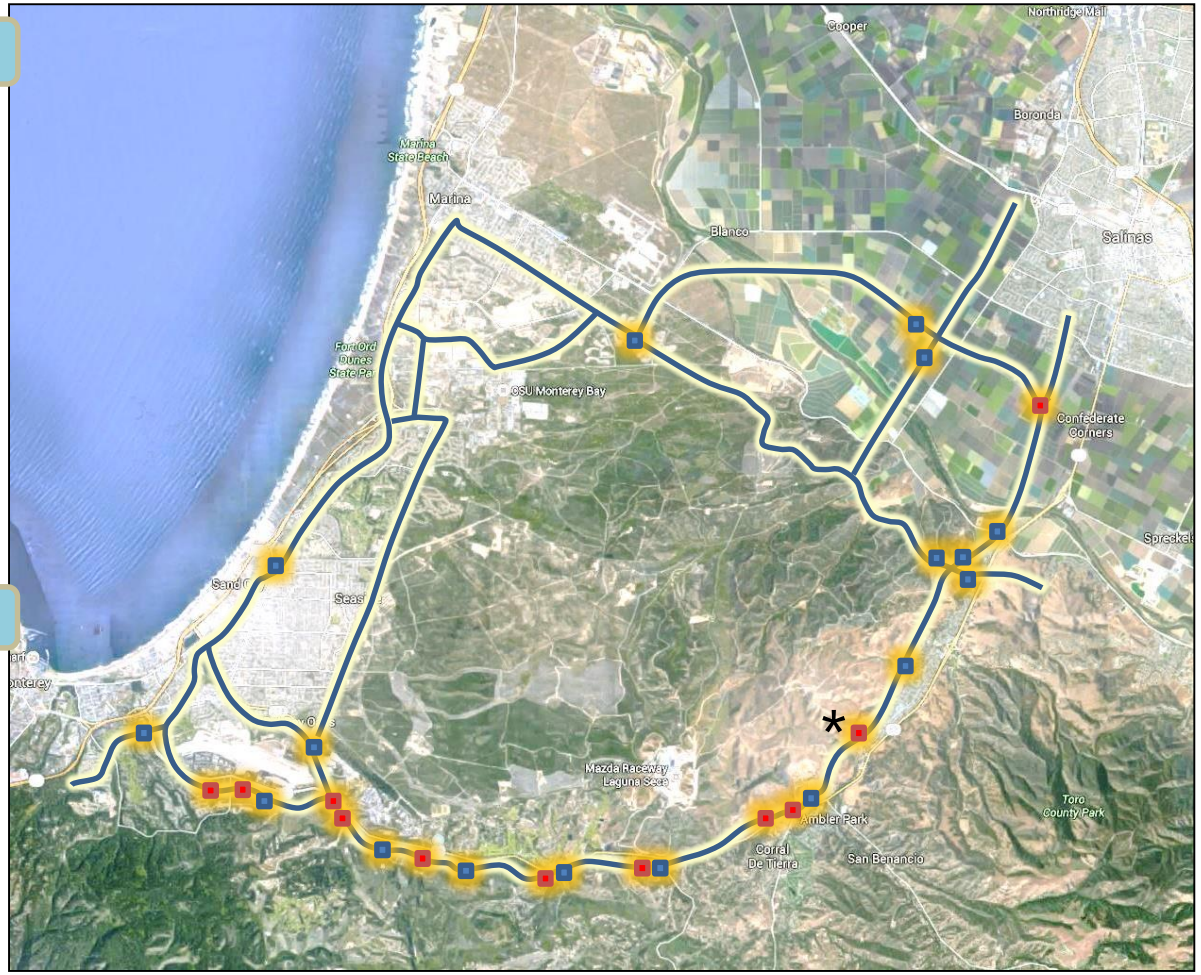
Data Collection Overview

- 17 BlueMAC devices installed
  - Data Collection period: 2/18/2016 ~ 4/22/2016
- 11 video recorders installed for turning movement counts
  - Data Collection period: 2 weeks
- 17 Additional intersections for signal timing/turn movement
  - Data is provided by Caltrans and 3 Local Municipalities
- Lane Level Network: Over 100 Miles of Roadway
  - Including California State Route (SR) 68, 1, and Local arterials

Data Collection Overview

- Turning Movement Videos (11)

- BlueMAC Readers (17)

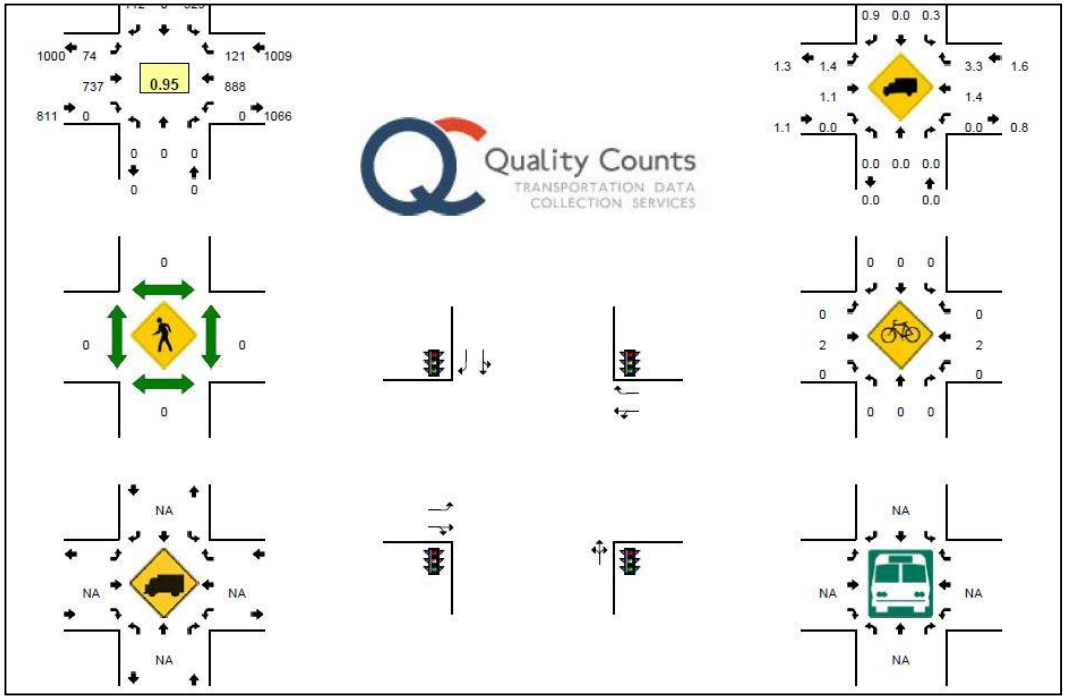


Data Collection Overview

- **OD Pair - BlueMAC Device**
  - Start and End point location
  - Start Time
  - End Time
  - Device ID
  - Passage locations
- **Turning Movement - Video**
  - Location
  - Day and Time
  - Directional Traffic Flow

Data Collection - Turning Movement data

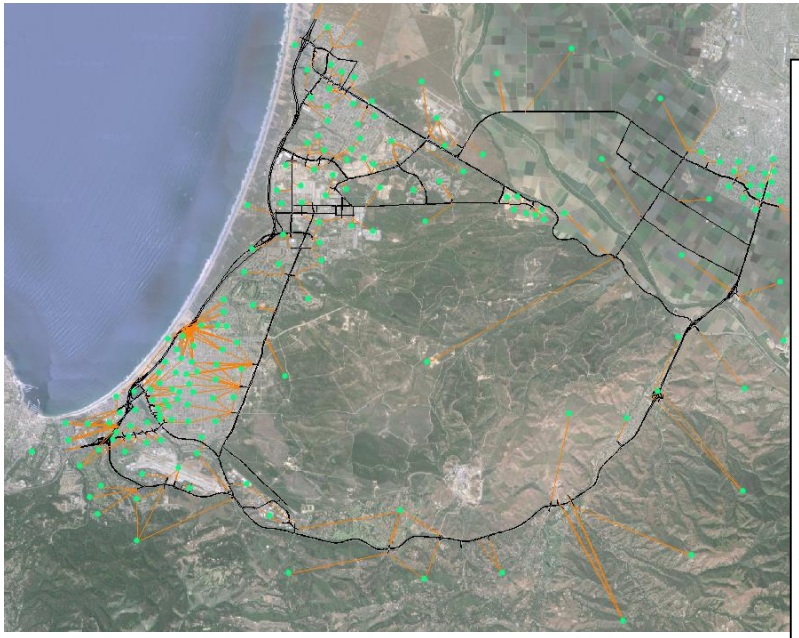
- Data for PM peak analysis
  - Feb 23~24, 2016
  - 4:00~6:00 PM



5-Min Count Period Beginning At	York Rd (Northbound)				York Rd (Southbound)				SR 68 (Eastbound)				SR 68 (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	0	0	0	25	0	13	0	7	69	0	0	0	53	14	0	181	
4:05 PM	0	0	0	0	22	0	8	0	7	80	0	0	0	69	7	0	193	
4:10 PM	0	0	0	0	40	0	9	0	3	83	0	0	0	68	4	0	207	
4:15 PM	0	0	0	0	31	0	11	0	10	60	0	0	0	48	7	0	167	
4:20 PM	0	0	0	0	22	0	8	0	3	65	0	0	0	72	4	0	174	
4:25 PM	0	0	0	0	14	0	4	0	8	42	0	0	0	75	9	0	152	
4:30 PM	0	0	0	0	19	0	4	0	6	50	0	0	0	74	16	0	169	
4:35 PM	0	0	0	0	35	0	6	0	8	55	0	0	0	66	12	0	182	
4:40 PM	0	0	0	0	24	0	7	0	5	62	0	0	0	78	12	0	188	
4:45 PM	0	0	0	0	31	0	5	0	5	64	0	0	0	65	9	0	179	
4:50 PM	0	0	0	0	22	0	15	0	13	73	0	0	0	70	10	0	203	
4:55 PM	0	0	0	0	26	0	11	0	7	66	0	0	0	86	16	0	212	2207
5:00 PM	0	0	0	0	35	0	10	0	7	70	0	0	0	57	3	0	182	2208
5:05 PM	0	0	0	0	36	0	12	0	5	61	0	0	0	75	5	0	194	2209
5:10 PM	0	0	0	0	22	0	15	0	6	61	0	0	0	77	10	0	191	2193
5:15 PM	0	0	0	0	27	0	12	0	5	59	0	0	0	73	11	0	187	2213
5:20 PM	0	0	0	0	35	0	10	0	3	61	0	0	0	81	8	0	198	2237
5:25 PM	0	0	0	0	17	0	5	0	4	55	0	0	0	86	9	0	176	2261
5:30 PM	0	0	0	0	18	0	10	0	2	71	0	0	0	59	6	0	166	2258
5:35 PM	0	0	0	0	16	0	11	0	4	76	0	0	0	69	7	0	183	2259
5:40 PM	0	0	0	0	17	0	5	0	3	43	0	0	0	77	5	0	150	2221
5:45 PM	0	0	0	0	13	0	5	0	3	63	0	0	0	73	5	0	162	2204
5:50 PM	0	0	0	0	10	0	2	0	5	67	0	0	0	70	6	0	160	2161
5:55 PM	0	0	0	0	14	0	8	0	4	45	0	0	0	42	5	0	118	2067
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	0	0	0	0	332	0	144	0	108	836	0	0	0	852	116	0	2388	
Heavy Trucks	0	0	0		0	0	4		4	8	0		0	16	0		32	

Data Collection - Signal Timing

- 17 additional intersections for signal timing/turn movements
- Data provided by
  - Caltrans
  - 3 Local Municipalities



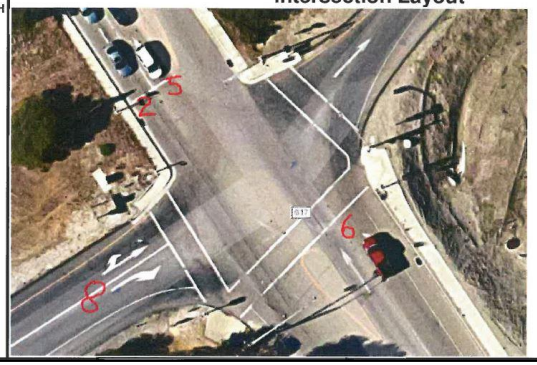
California Department of Transportation, Caltrans — 2070 Controller Timing Chart — TSCP: 2.20

Location: Mon-68-PM 17.18 EB Ramps@River Rd
System: 68-River/Resrv
Master At: EB ramps
District: 5
I/C:
Designed By: KJV
Installed By:
Service Info:

Timing Change: | Date Start: 4/17/2015 | Date End: | Designed: | Installed:

		FLASH
PHASE	1)	[ ]
	2) SB from Reservation	[ ]
	3)	[ ]
	4)	[ ]
	5) SB LT to EB on ramp	[ ]
	6) NB River Rd	[ ]
	7)	[ ]
	8) EB off ramp	[ ]
OVERLAP	A)	[ ]
	B)	[ ]
	C)	[ ]
	D)	[ ]
	E)	[ ]
	F)	[ ]

Intersection Layout



INTERSECTION: Gen JM & San Pablo

Row	Column Numbers → / Plan Name →	Plan 1	2	3	4	5	6	7	8	9	Row
0	Cycle Length	100	100	100	100	100	100	100	100	100	0
1	Phase 1 - ForceOff	55	60	60	63	60	61	65	65	65	1
2	Phase 2 - ForceOff	0	0	0	0	0	0	0	0	0	2
3	Phase 3 - ForceOff	20	15	20	25	20	25	25	25	25	3
4	Phase 4 - ForceOff	40	40	40	40	40	40	40	40	40	4
5	Phase 5 - ForceOff	55	60	60	61	60	63	65	65	65	5
6	Phase 6 - ForceOff	0	0	0	0	0	0	0	0	0	6
7	Phase 7 - ForceOff	20	15	20	25	20	25	25	25	25	7
8	Phase 8 - ForceOff	40	40	40	40	40	40	40	40	40	8
9	Ring Offset	0	0	0	0	0	0	0	0	0	9
A	Offset 1	0	0	0	0	0	0	0	0	0	A
B	Offset 2	0	0	0	0	0	0	0	0	0	B
C	Offset 3	0	0	0	0	0	0	0	0	0	C
D	Permissive	12	12	12	12	12	12	12	12	0	D
E	Hold Release	255	255	255	255	255	255	255	255	0	E
F	Zone Offset	0	0	0	0	0	0	0	0	0	F

Coordination <C Page>

Row	Column Numbers →	E		F
0	Exclusive Phases			
1	RR-1 Clear Phases		RR Overlap A - Phases	
2	RR-2 Clear Phases		RR Overlap B - Phases	
3	RR-2 Limited Service		RR Overlap C - Phases	
4	Prot / Perm Phases		RR Overlap D - Phases	
5	Overlap A - Green Omit		Ped 2P	
6	Overlap B - Green Omit		Ped 6P	6
7	Overlap C - Green Omit		Ped 4P	
8	Overlap D - Green Omit		Ped 8P	8
9	Overlap Yellow Flash		Yellow Flash Phases	
A	EV-A Phases		Overlap A - Phases	

Extra 1 Flags
1 = TBC Type 1
2 = NEMA Ext. Coord
3 = Auto Daylight Savings
4 = EV Advance
5 =
6 = Special Event
7 = Pretimed Operation
8 = Split Ring Operation

Assign 5 Outputs
1 = Right Turn Overlap

Force-Off Adjust: 0
Coord Force-Off Adjust for Ped Service <C+D+F>
Transition Type: 0
TBC Transition <C+D+D>

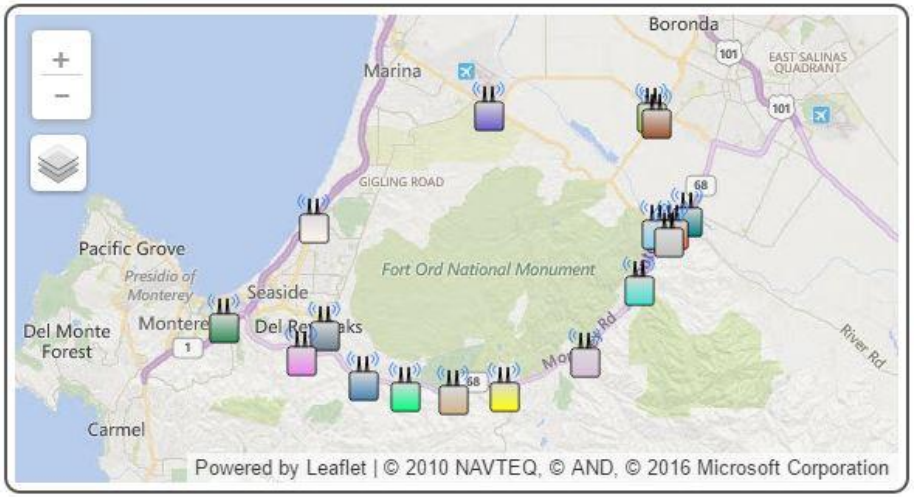
Transition Type
0 = Shortway
Non-zero = Lengthen

IC Select Flags
1 =

Data Collection - BlueMac Device Data (1/3)

Projects > Monterey Deployment

Hide Details



Overview

Status:	Complete
No of Locations/Devices:	17 x
Start Date/Time:	2/18/2016 12:00 AM (UTC-8)
End Date/Time:	4/22/2016 11:59 PM (UTC-8)

Description

Created by PRW 2/24/16

Travel Time Report | Origin-Destination Report

Overview

- Blanco @ S Davis (130)
- HWY 68 @ Laureles Grade (3)
- HWY 68 @ Olmsted (96)
- HWY 68 @ Portola (127)
- HWY 68 @ Reservation (77)

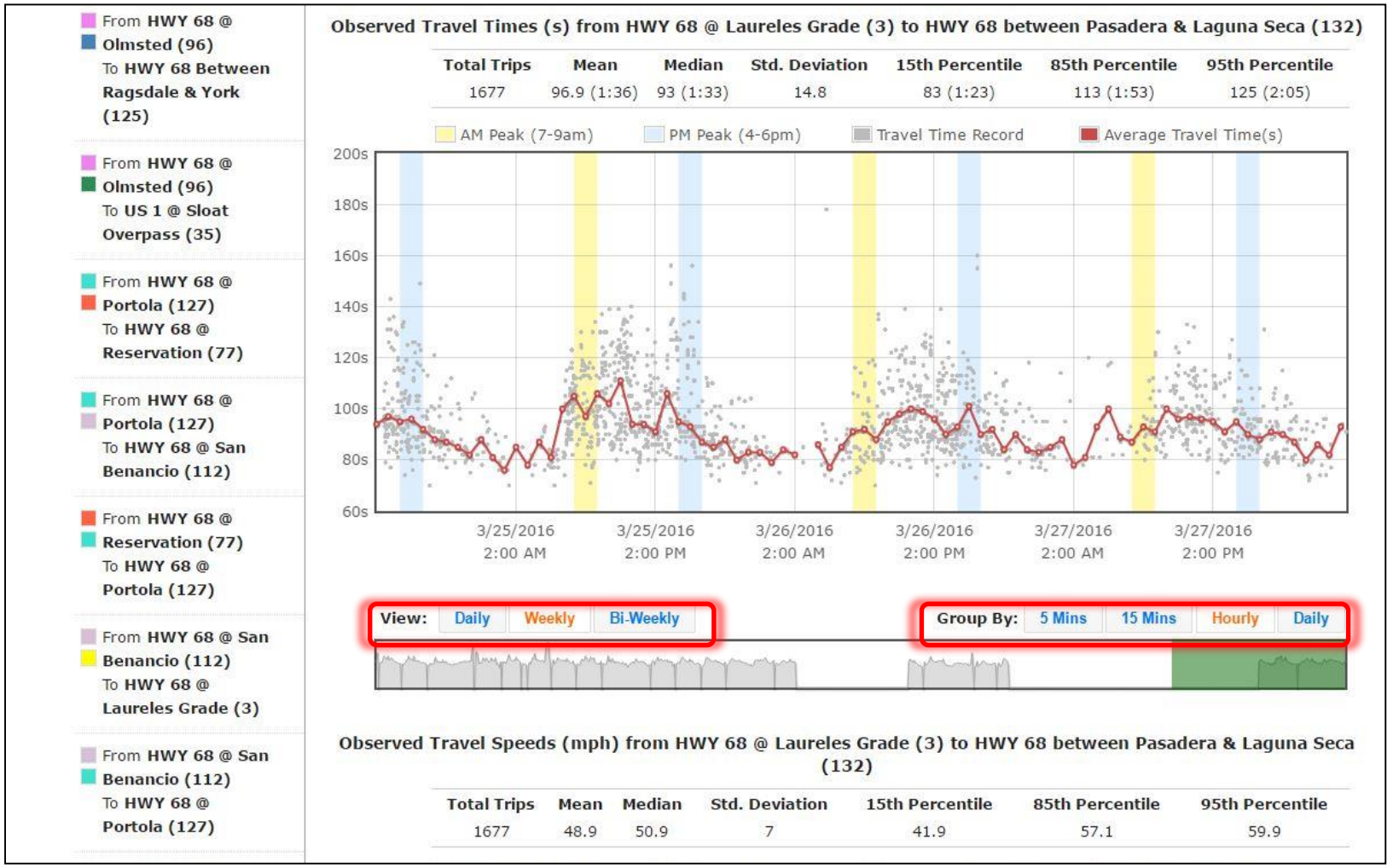
Overview

Download CSV

Status	Location	Last Checkin	Total Devices (Last 7 days)	Weekly Trend (Last 7 days)
	Blanco @ S Davis (130)	4/22/2016 11:53 PM	9,536	
	HWY 68 @ Laureles Grade (3)	4/22/2016 11:53 PM	11,326	
	HWY 68 @ Olmsted (96)	4/22/2016 11:59 PM	8,159	
	HWY 68 @ Portola (127)	4/17/2016 3:50 AM	7,650	
	HWY 68 @ Reservation (77)	4/22/2016 11:50 PM	10,067	
	HWY 68 @ San Benancio (112)	4/22/2016 11:56 PM	9,766	

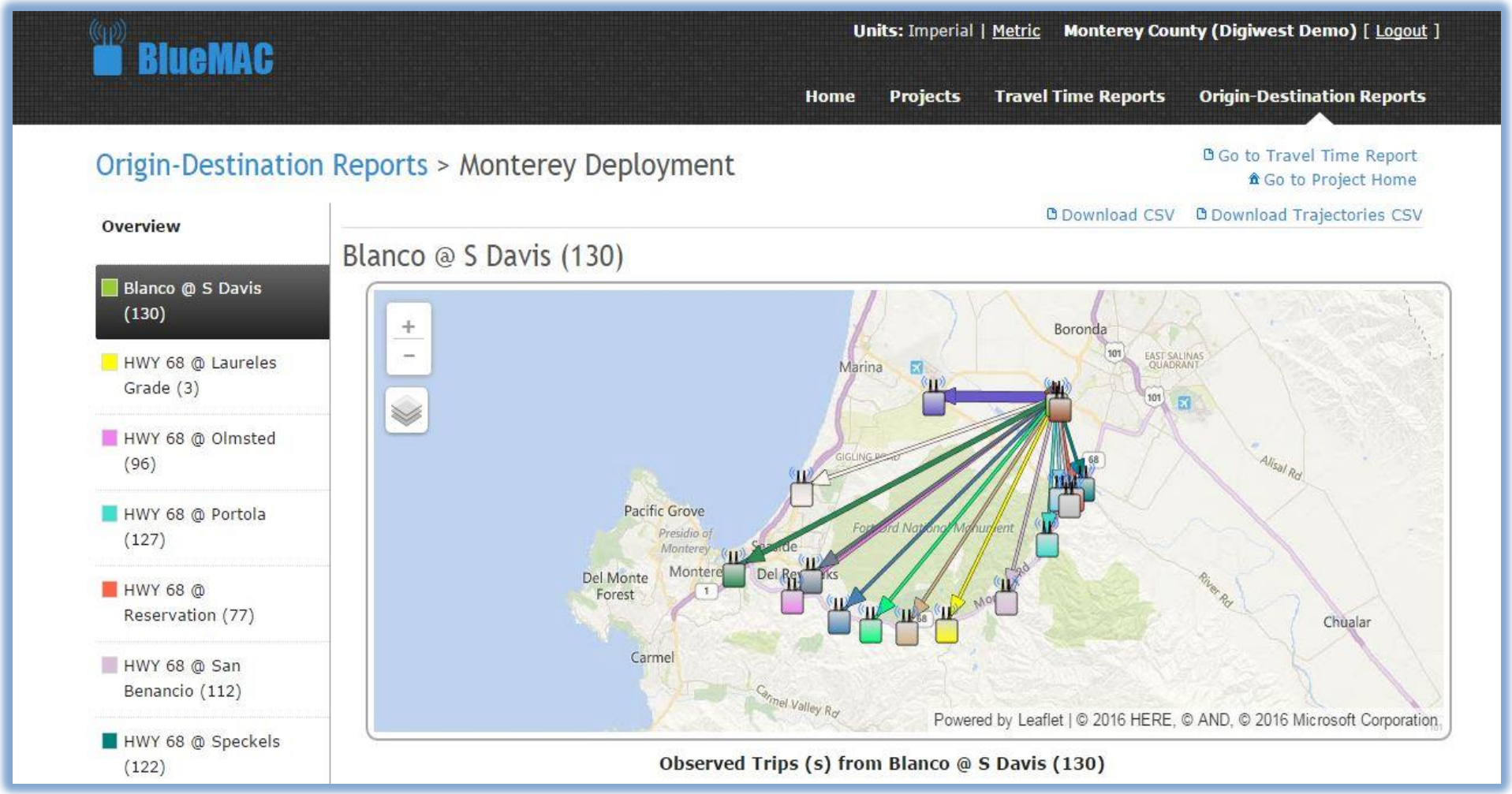
Data Collection - BlueMac Device Data (2/3)

- **Provides average travel times:** by 5min/15min/Hourly/Daily on a specific route between two installed detectors with link information

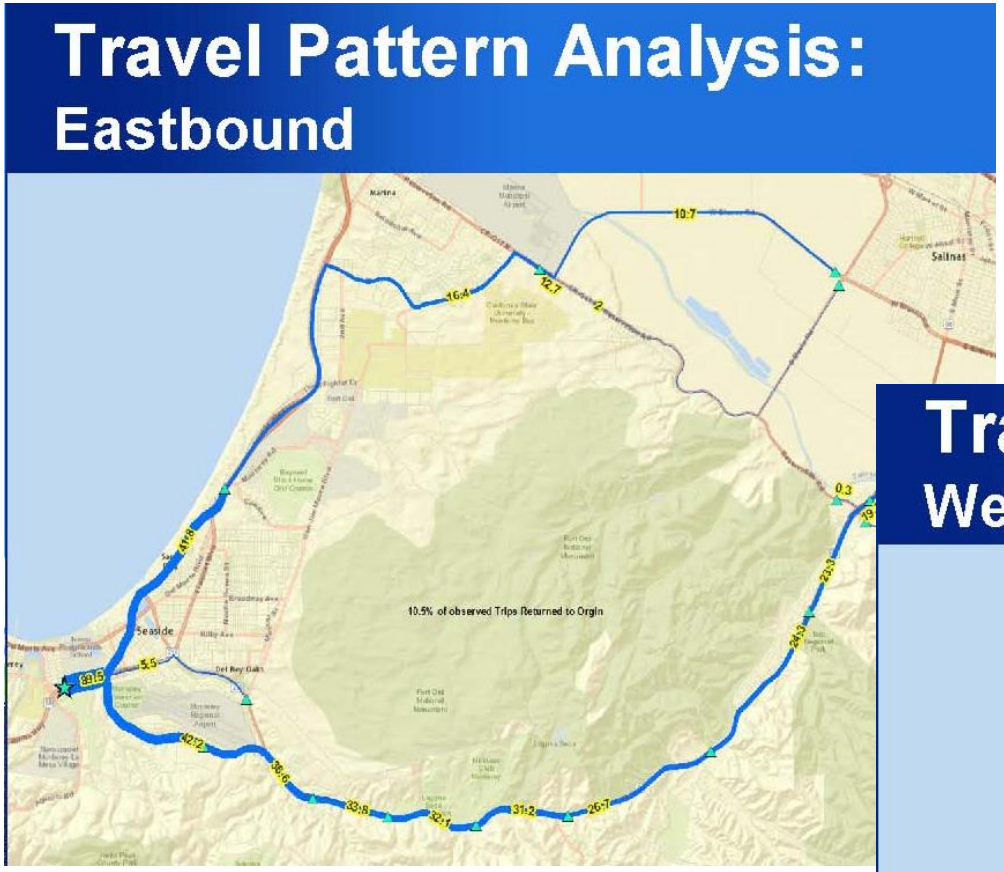


Data Collection - BlueMac Device Data (3/3)

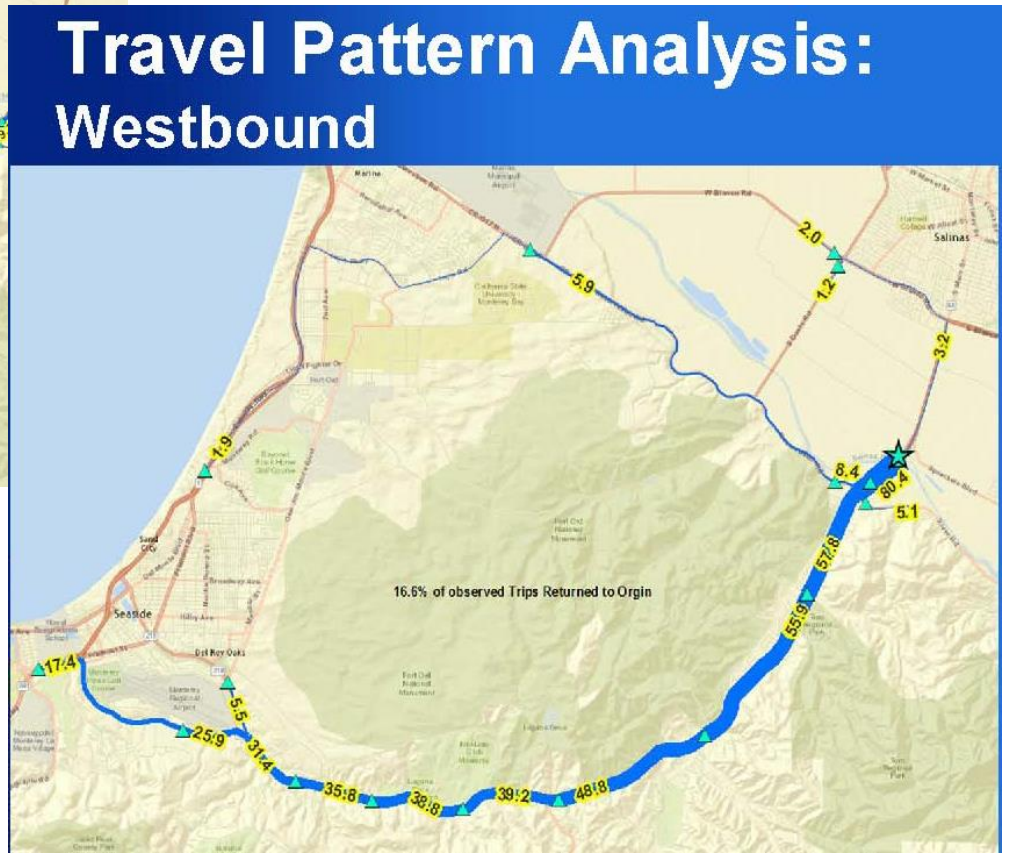
- BlueMAC Example



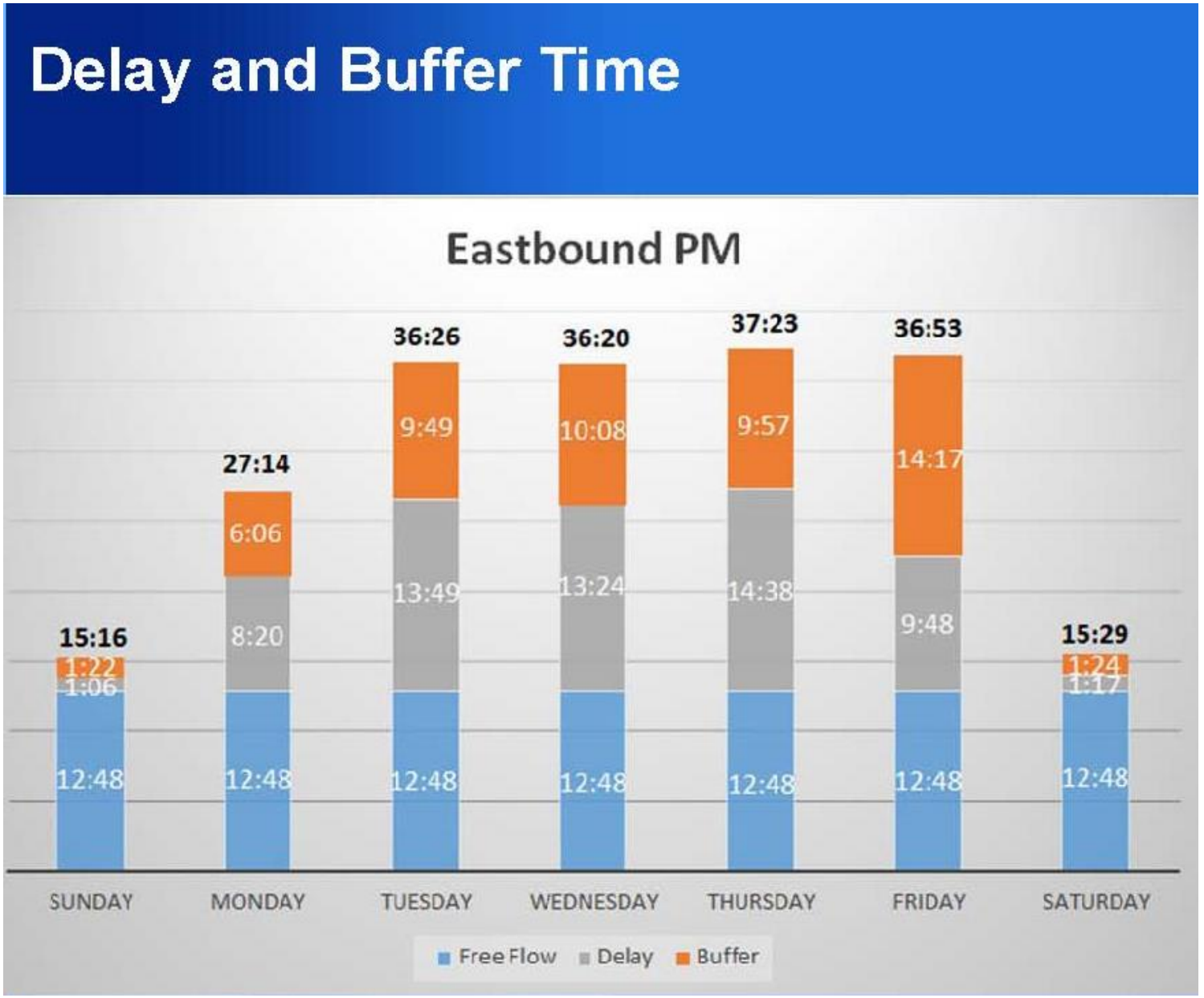
Data Collection - Principal Travel Patterns



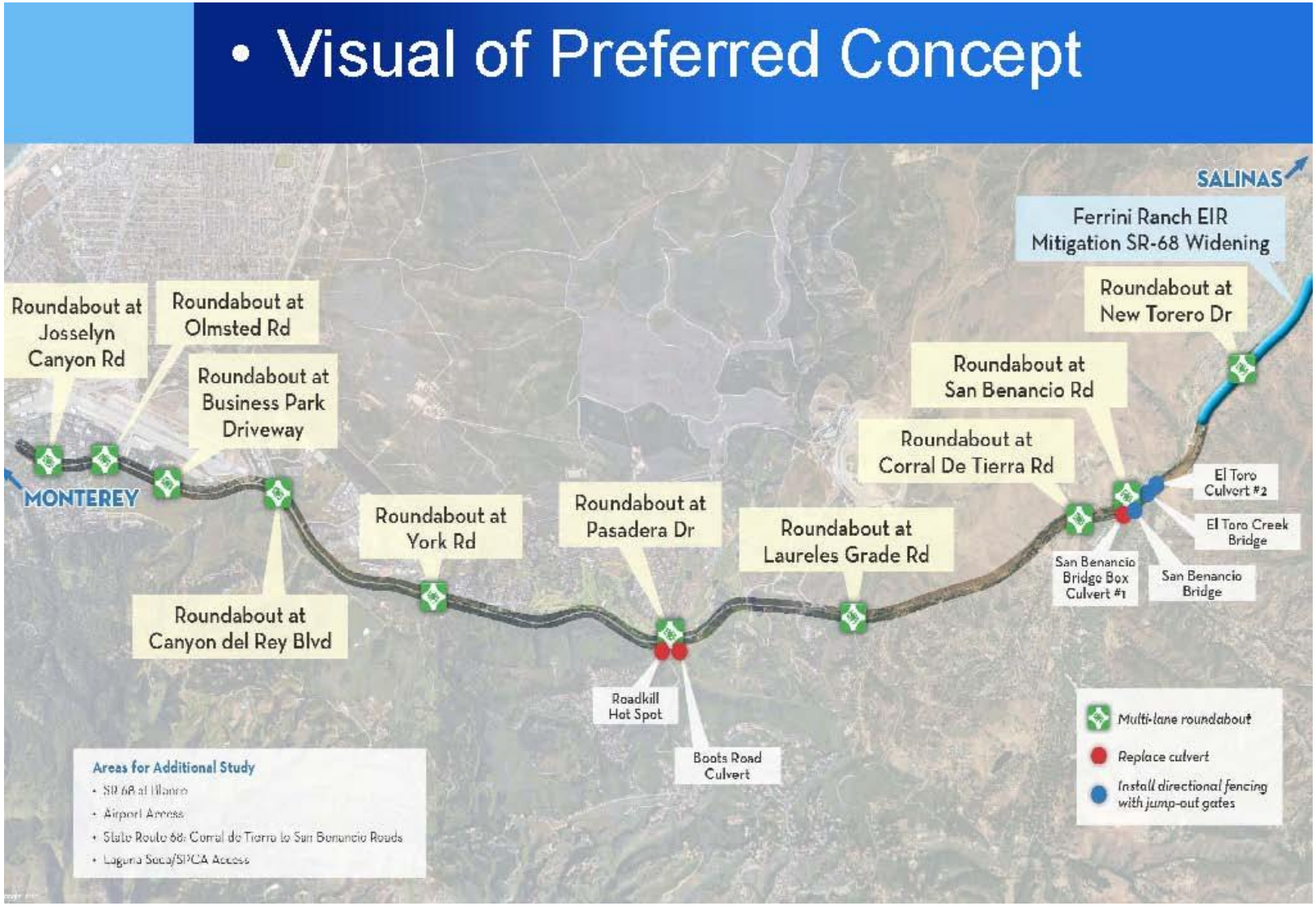
CA68 Primary Route Choices



Data Collection – Delay Analysis

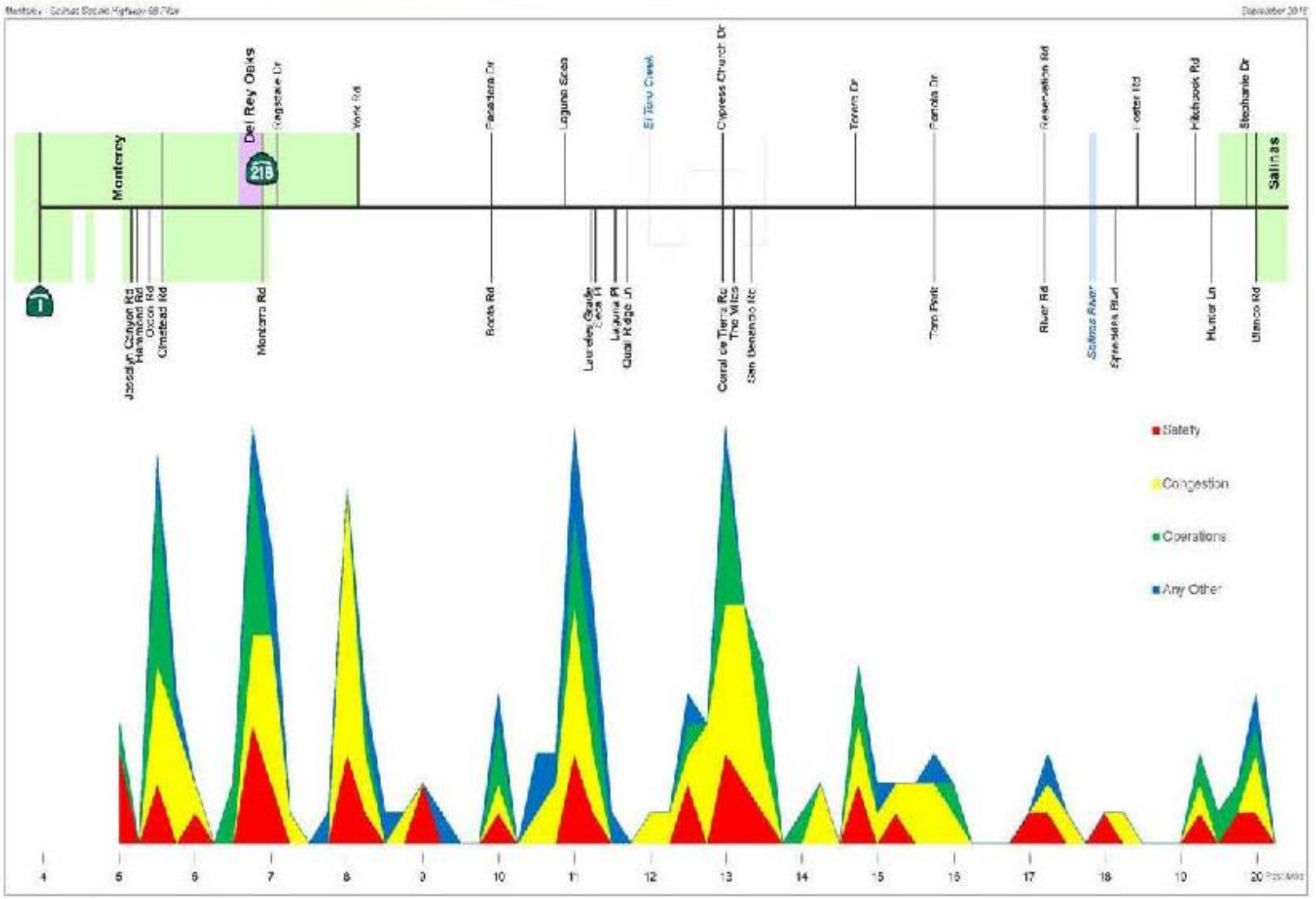


Construction Project Overview (1/2)
CA68 – Monterey to Salinas



Construction Project Overview (2/2)
CA68 – Monterey to Salinas

What the Public Says



Modeling Approach

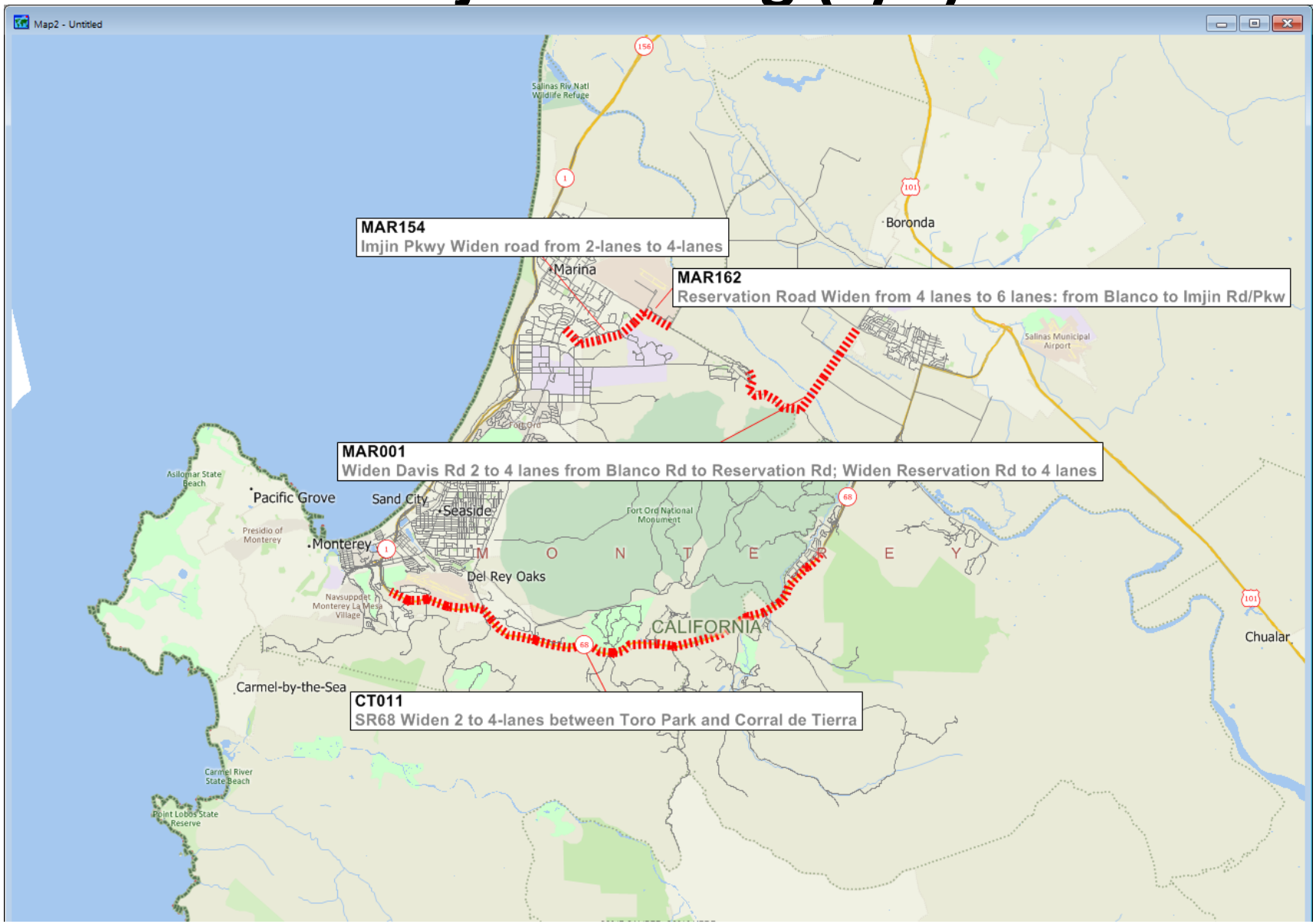
Multi-resolution, Static and Dynamic

- Coding of Construction Projects for WISE applications
- DTA Model application
- Static Model application
- Which approach is better – Static or Dynamic?

Project Coding (1/2)

- Per WISE grant scope, three projects were identified and coded into the various networks.
- Chosen projects interfered with each other in order to capture “worst case” detour scenario.
- Projects:
  - CA68 widening and intersection improvements, from Monterey to Salinas
  - Reservation Road widening, east of Marina
  - Imjin Parkway widening

Project Coding (2/2)



DTA Model Development (1/2)

- Lane level micro-simulation DTA created and calibrated for AMBAG study area using TransModeler software.
- Utilized traffic signal timings and BlueMac data collected in AMBAG region.
- Initial demand estimates from AMBAG RTDM for 4 time periods (AM, Mid-day, PM, Night)
- Fully integrated DTA with pathfinding responsive to construction activities.

DTA Model Development (2/2)

- Included scenario that mimics partial construction of roundabouts on CA68.
- Utilized DTA to quantify travel time impacts due to construction. Original WISE used DTA only to calculate diversion parameter.
- Results indicate value in DTA, although significant effort is required to develop the model.

Static Model Development (1/2)

- Static Traffic Assignment model developed from AMBAG RTDM using subarea analysis in TransCAD.
- Same time periods, initial demand estimates, and project definitions as utilized in DTA approach.
- Very efficient with the ability to run hundreds of scenarios and quantify macro-level performance measures, namely VMT and VHT.
- AMBAG RTDM well-calibrated for all periods, so no further link-level calibration was required.

Static Model Development (2/2)

- Static approach very relevant for large impacted areas, such as in the AMBAG scenario.
- Cost effective. Utilizes tools and concepts familiar and proven to most planners and engineers at MPOs and DOTs.
- Macroscopic environment allows for simpler representation of geography and quick editing.

Static vs. Dynamic

- Both approaches have merit in modeling construction phasing and impacts.
- Choice likely related to extents of impacted area and availability of an existing DTA application for the study area. If DTA is available, perhaps model only most likely scenarios.
- Chosen approach hinges on modeling objective and performance measures desired.
- Decision likely to be influenced by cost and duration of construction project and weight given to travel time impact to the public.
- Static approach far less costly to implement.

Questions?

For more information contact:

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