Integrated Corridor System Management

A Case Study of State Route 4 (SR-4) in California

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31-Mile Freeway Corridor from I-80 to SR-160

I-80

SR-160

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Two Sequential Studies

- Freeway performance assessment / corridor system management plan
  - Define current and future corridor problems
  - Determine and rank potential improvement strategies
  - Measures of effectiveness are quantitative and qualitative
  - Cost effectiveness based on life cycle costs
  - Assessment methodology and results are the primary focus of this presentation
- Integrated corridor analysis
  - Develop corridor management plan for three planning area action plans
  - Identify and prioritize previously identified corridor projects
  - Advance local community goals for corridor priority development areas
  - Recommend corridor Multi-modal Transportation Service Objective

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Seven Performance Analysis Questions

1. What are the current and future problems of the corridor?
2. Where are the existing and future congestion areas?
3. Where are the existing and future bottleneck locations?
4. What are the causes of congestion?
5. What are possible improvement strategies?
6. How to direct resources to where they will have the greatest impact?
7. How do strategies rank by cost effectiveness?

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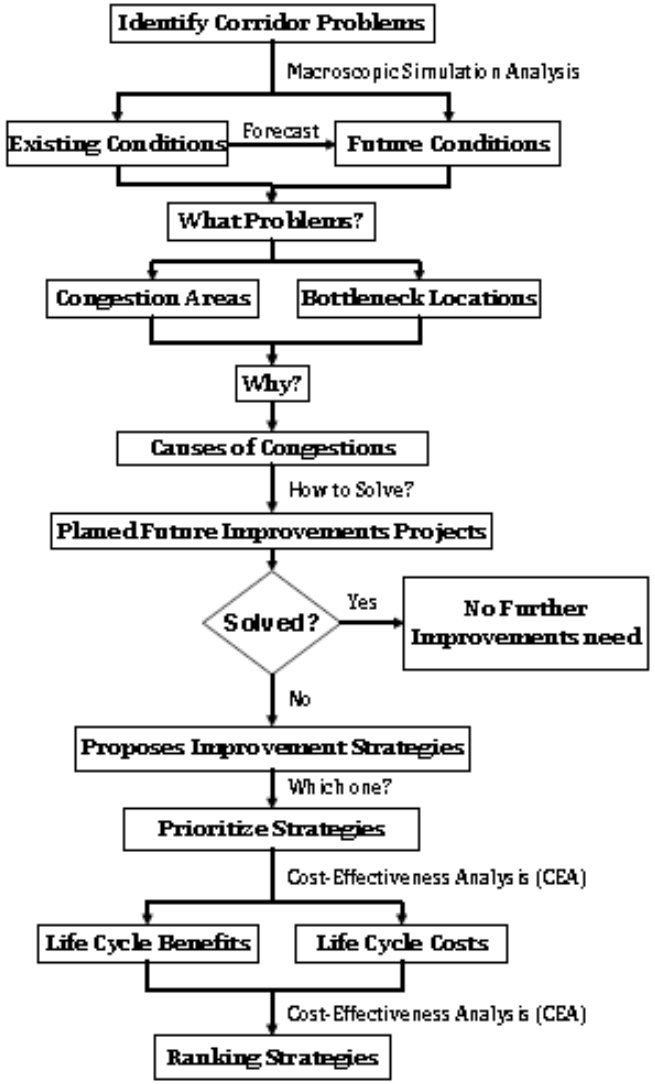
Study Framework to Address Questions



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Data Collection to Define Existing Conditions

- Loop detector data where available – Freeway Performance Measuring System (PeMS)
- Tach runs (floating car speed runs) used when PeMS data not available or reliable
- Additional field reviews conducted to fill data gaps
- Validation accomplished by comparing data over time period and source
- Transit data obtained from BART

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Performance Analysis Methodology

- FREQ12 macro simulation model to assess freeway performance with respect to recurrent delay
- ITS Deployment Analysis System (IDAS) to assess reliability improvements with respect to non-recurrent delay
- Life-cycle (21-year) analysis of quantitative benefits and costs

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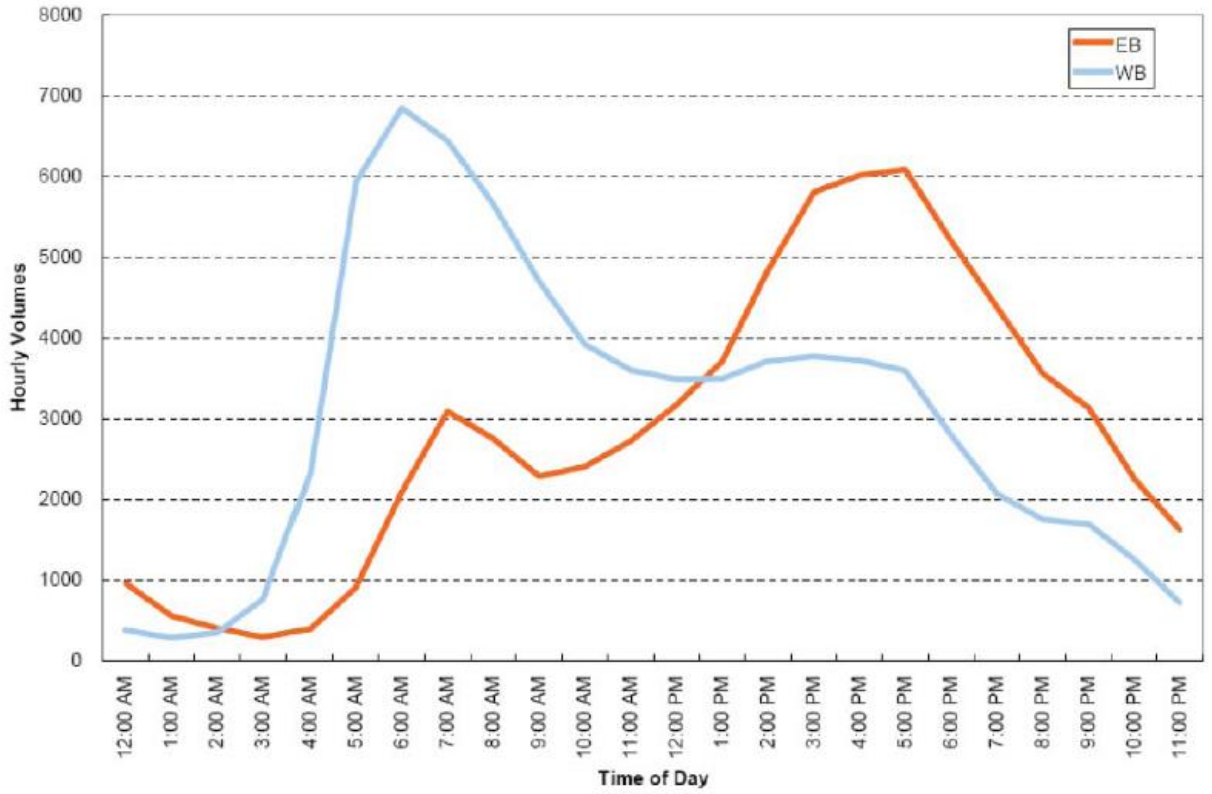
Sample Existing 2009 Hourly Volume Results – SR-4 at Willow Pass Road



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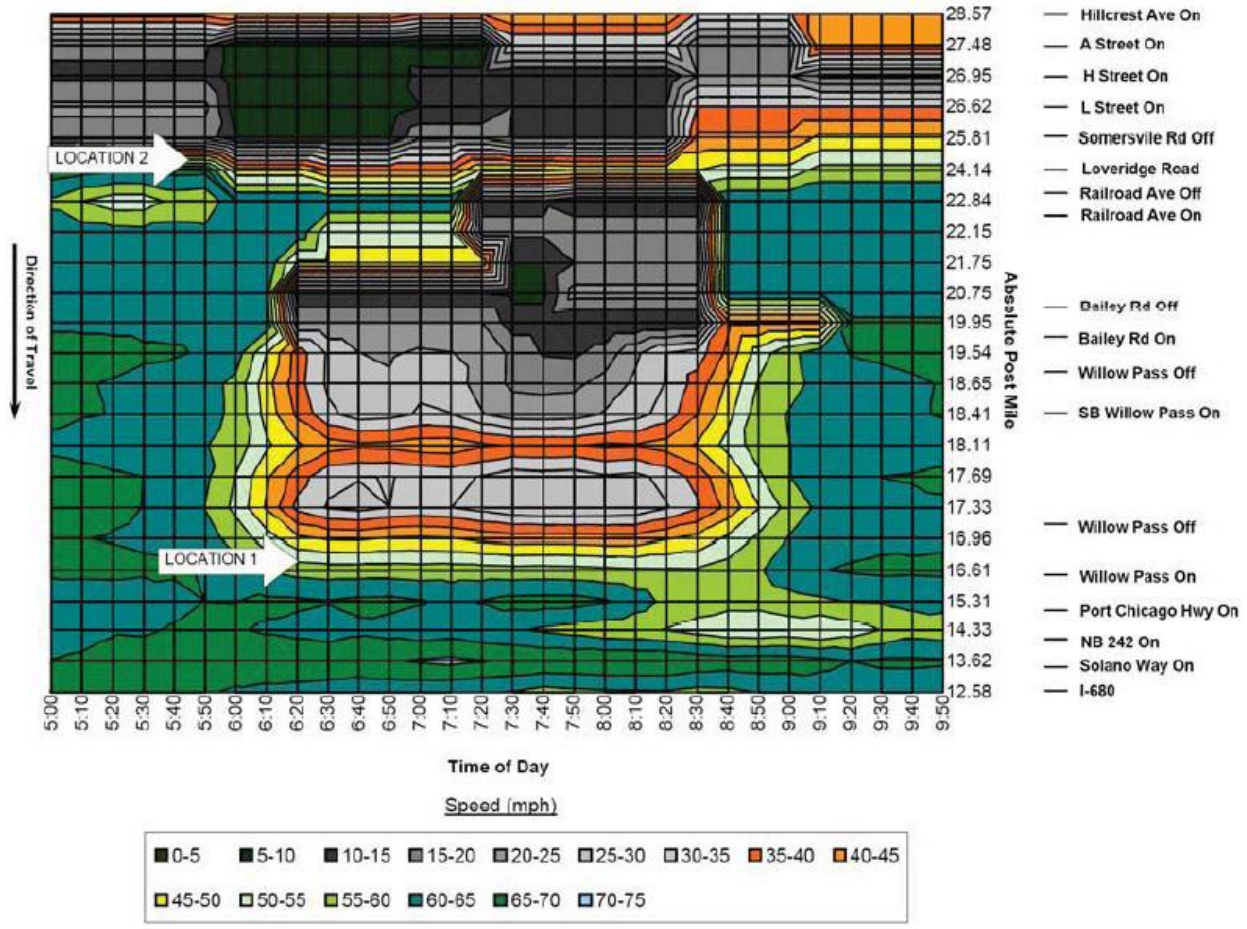
Sample Existing 2009 Speed Results – Westbound AM Peak Period



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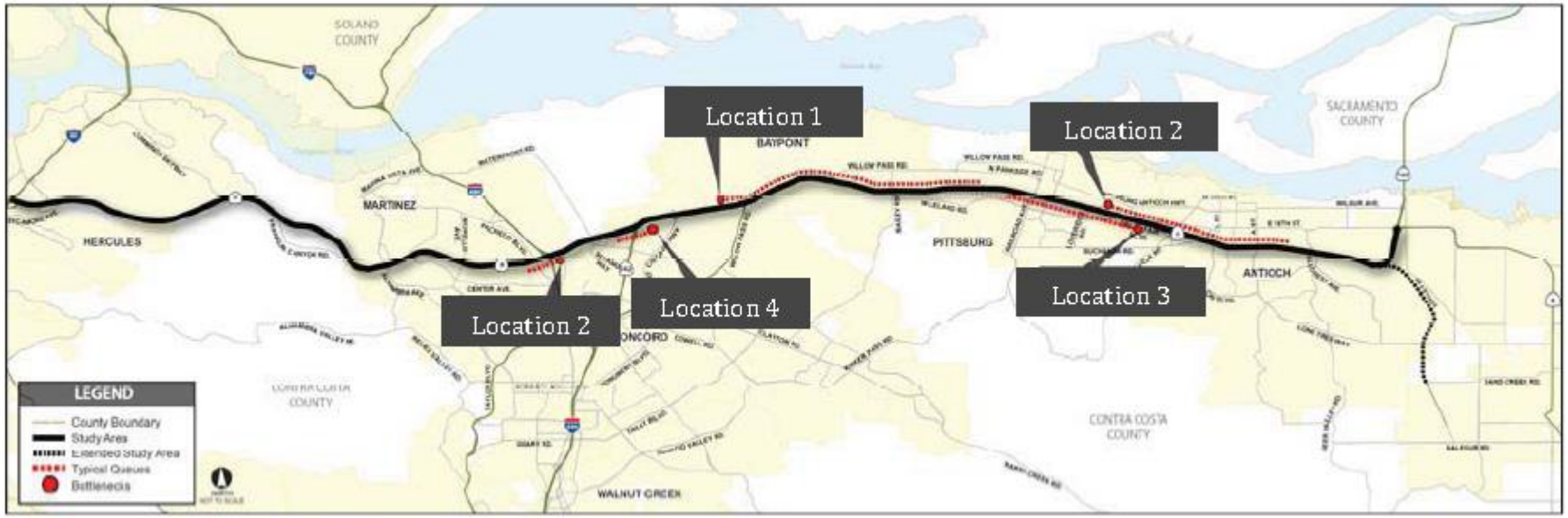
Existing 2009 Conditions – Location of Bottlenecks and Recurrent Congestion



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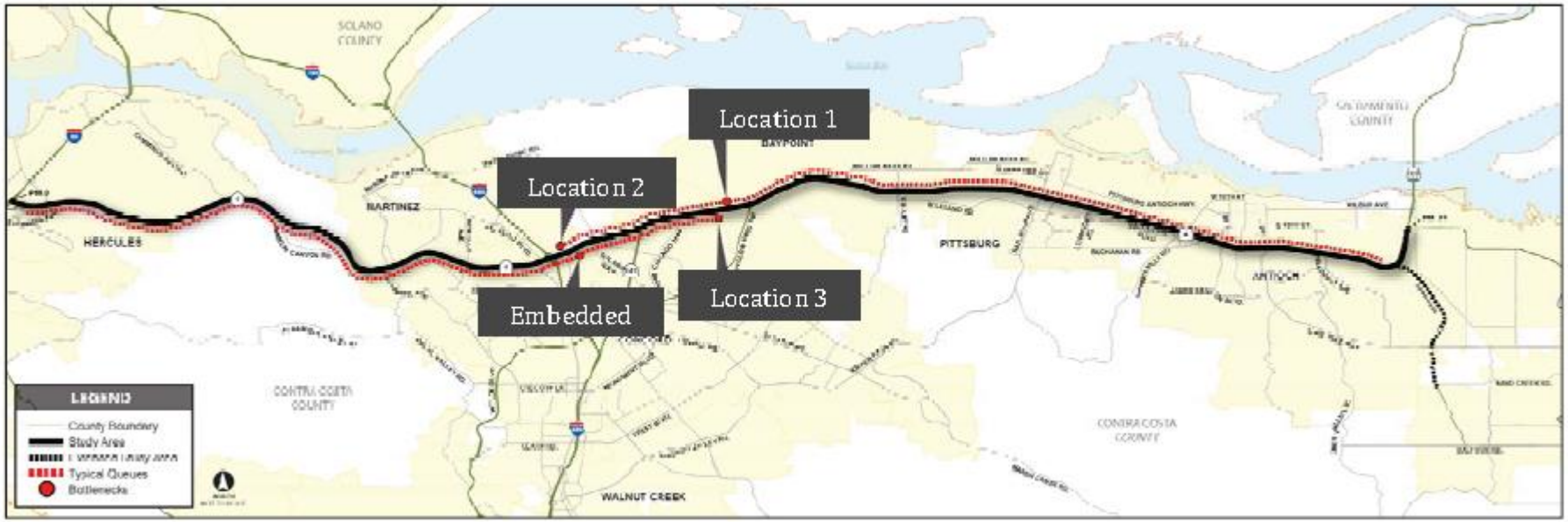
2030 Unimproved Conditions – Location of Bottlenecks and Recurrent Congestion



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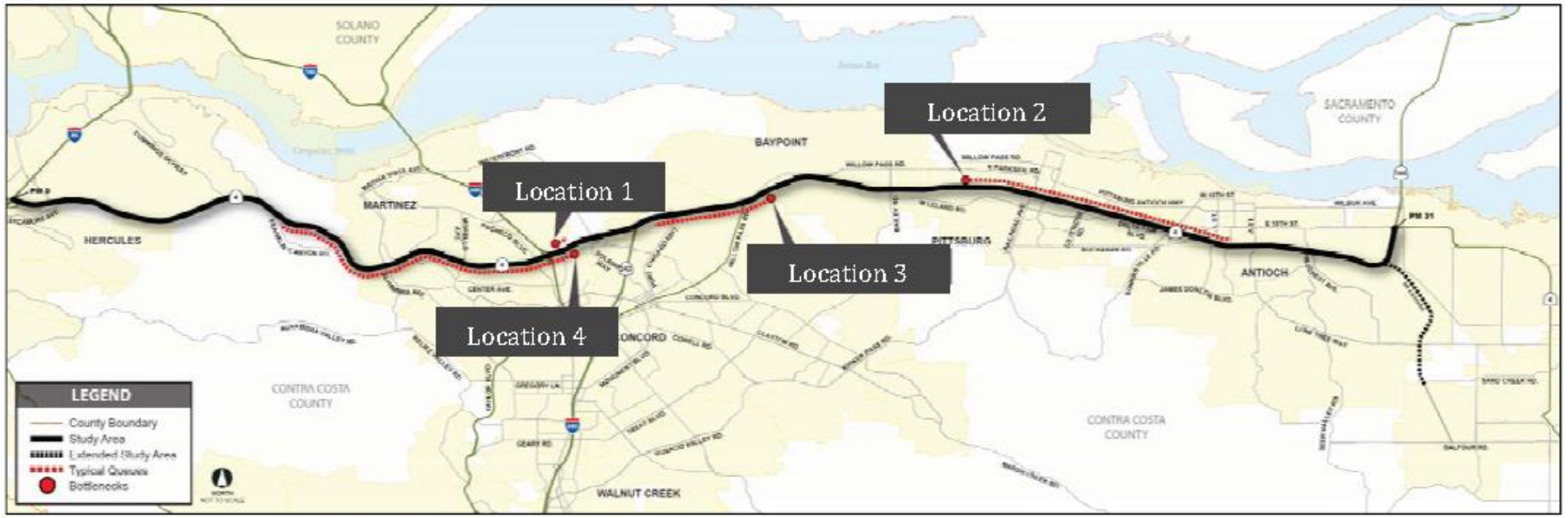
2030 Improved Conditions – Location of Bottlenecks and Recurrent Congestion



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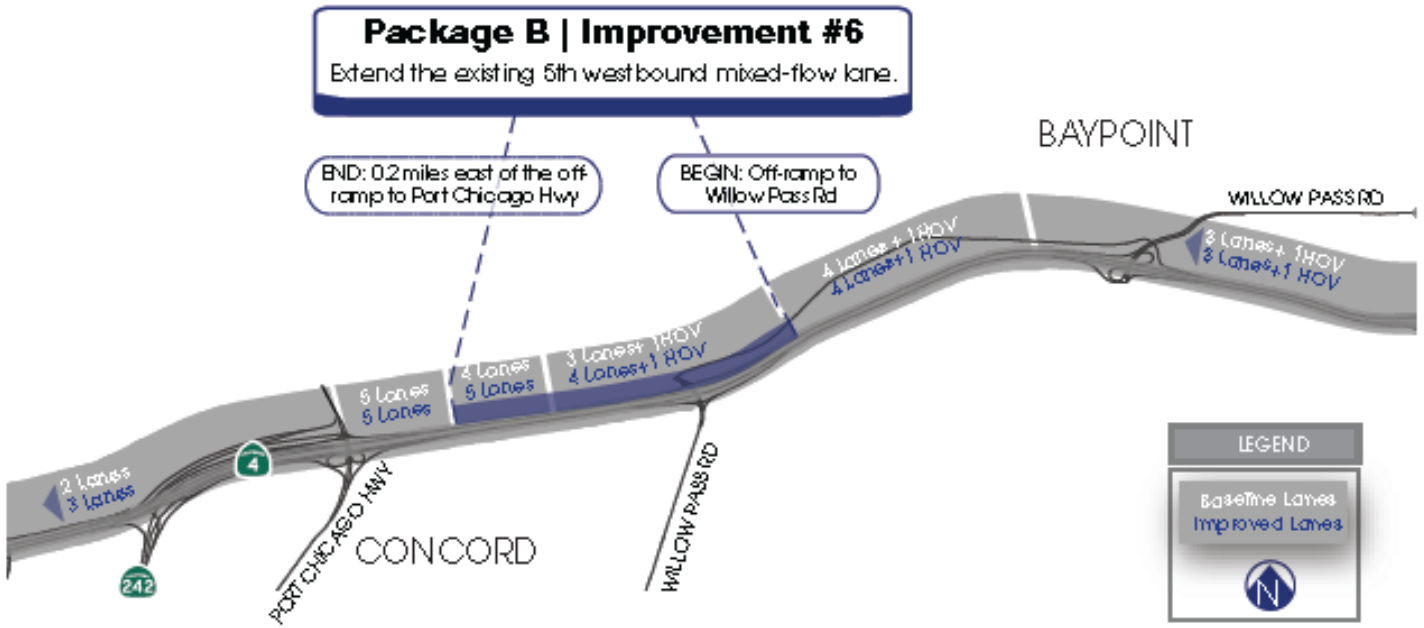
Sample Improvement – Extended 5th Westbound Mixed Flow Lane



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Ranking Metric – Cost per Person Hour Saved

Benefits

- Mobility – recurrent delay under congested (< 35 mph) conditions
- Reliability – non-recurrent congested delay used with 3X factor to match driver perception
- Qualitative (not used in cost-effectiveness analysis)
  - Goods movement – no explicit effect assigned since SR-4 not designated as a goods movement corridor
  - HOV system connectivity – yes or no for improvement
  - Access management – yes or no for reduction in access points

Costs

- Construction capital costs
- O&M costs
- 21-year life cycle
- 4% discount rate (applied to benefits as well)

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Cost-Effectiveness Ranking of Improvement Packages

Strategy	Pkg.	Dir.	Cost-Effectiveness	Package Rank
ITS Improvement Strategy	A	Both	$1.16 / person-hour of delay saved	4
Transportation management and capacity enhancement strategy	B	WB	$0.77 / person-hour of delay saved	1
	C	EB	$1.00 / person-hour of delay saved	2
Ramp Metering Strategy in the off-peak direction	D	WB	$3.75 / person-hour of delay saved	5
	E	EB	$1.14 / person-hour of delay saved	3
Transit Improvement Strategy	G	Both	>$15/ person-hour of delay saved	--

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Final Step - SR-4 Corridor Integration

- The 31-mile corridor includes three local planning areas (West, Central, and East), consisting of 14 city jurisdictions plus Contra Costa County
- Engaged stakeholders from three planning areas
- Developed methodology to analyze project benefits and costs
- Developed corridor management plan for three planning area action plans
  - Identified and prioritized previously identified corridor projects
  - Advanced local community goals for corridor priority development areas
  - Recommended corridor Multi-modal Transportation Service Objective

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Performance Assessment Limitations

- Future analyses dependent upon traditional 4-step forecasting:
  - Did not capture effect of improvements on future land use
  - Induced travel not addressed
- Transit enhancement investigated at more qualitative level
  - 10-20% increase in corridor BART capacity possible
  - Transit cost effectiveness is only rough estimate

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Q&A and Contacts

- Questions?

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