



SB I-680 Express Lane "After" Study



A Presentation to the
Planning, Policy and
Legislation Committee

June 10, 2013

Presentation Overview – Express Lane "After" Study

- Background
- Process
- Data Collection
- Performance Measures
- Highlights of Results
- Results
- Meeting Express Lane Objectives
- Recommendations
- Action Requested and Next Steps

Express Lane "After" Study Background

- Legislative Requirement (AB 2032)
 - Evaluation report submission required to the Legislature within 3 years of Express Lane opening
- SB I-680 Express Lane opened to the public in September 2010
- A "Before" Study was completed in 2009 – A Control Corridor was also studied
- "After" Study data collection began in Fall 2012
- Report due to legislature before September 2013

Express Lane "After" Study Process

- Data Collection and Analysis consistent with the "Before" Study
- Study development was also informed by
 - Discussion with the stakeholders in December 2012 and May 2013
 - Caltrans, CHP, MTC and VTA
 - Comments from local jurisdictions in December 2012
 - Alameda County, Cities of Pleasanton and Fremont

Express Lane "After" Study Data Collection

- Traffic counts
- Travel time surveys
- Manual vehicle occupancy survey
 - Study corridor – 4 locations
 - Control corridor – 2 locations
- Aerial photography
- Video recordings 4 locations
- Existing data sources
 - Toll detector and toll revenue records, transit ridership, collision reports, citation



Express Lane "After" Study - Data Analysis Periods

- Comparison between "Before" and "After" conditions
 - Three distinct time periods
 - AM peak period (5AM – 9 AM)
 - PM peak period (3 PM – 7 PM)
 - Daytime period (7 AM - 7 PM)
 - Peak Periods generally consistent with the HOV operations hours in the "Before" condition
 - Focused Analysis for AM Peak Period – the peak commute direction

Express Lane "After" Study Performance Measures

- Travel Time
- Travel Speeds
- Vehicle and Person Throughput
- Bottlenecks and Queues
- Vehicle Occupancy
- Level of Service
- Transit Ridership
- Safety
- HOV/Express Lane Violations and Enforcement

"After" Study: Highlights of Results



Performance Measure	Evaluation Results	Time Period	Change from "Before" to "After"
Strong Positive	Green circle		
Partially Positive	Light green circle		
Mix of Positive and Negative	Yellow circle		
Partially Negative	Light red circle		
Strong Negative	Red circle		
TRAVEL TIMES			
Express Lane	Green circle	AM peak average	-0.5 minutes (-4%)
Express Lane	Green circle	PM peak average	-0.2 minutes (-2%)
General purpose lanes	Green circle	AM peak average	-2 minutes (-13%)
General purpose lanes	Green circle	PM peak average	-0.2 minutes (-2%)
TRAVEL SPEEDS			
Express Lane	Green circle	AM peak average	+3 mph
Express Lane	Green circle	PM peak average	+1 mph
General purpose lanes	Green circle	AM peak average	+6 mph
General purpose lanes	Green circle	PM peak average	+2 mph
THROUGHPUT			
Vehicle throughput	Green circle	AM peak period	+1% to +11%
Vehicle throughput	Green circle	PM peak period	+1% to +38% at 3 north locations -13% at the southern location
Person throughput	Yellow circle	AM peak period	-2% to +2%
Person throughput	Green circle	PM peak period	+1% to +38% at 3 locations, -17% at 1 location

"After" Study: Highlights of Results



Southbound I-680 Express Lane "After" Study Draft Results

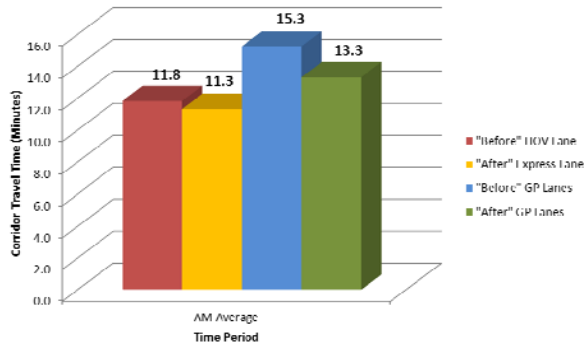
Performance Measure	Evaluation Results	Time Period	Change from "Before" to "After"
BOTTLENECKS AND QUEUES			
Number of bottlenecks	Yellow	AM peak period	Existing two bottlenecks at the southern section remain new bottleneck added at SR 84
Length of queues	Green	AM peak period	Max. queue reduced from 7.4 to 2.9 miles
VEHICLE OCCUPANCY			
HOV percent (all lanes)	Red	AM peak period	-32%
HOV percent (all lanes)	Red	PM peak period	-7%
LEVEL OF SERVICE			
Express Lane	Green	AM and PM peak periods	Remains LOS A or B
General purpose lanes	Green	AM peak period	4 segments in middle of corridor improve from LOS F, 1 in north and 1 in south become LOS F
General purpose lanes	Green	PM peak period	Increased density. Although LOS changed from B to C in many segments, all segments remain LOS C
TRANSIT RIDERSHIP			
Daily transit passengers on lines serving corridor	Red	Daily	-6% (Lines reduced from 10 to 6)
SAFETY			
Collision rate	Green	Annual	-50%
VIOLATIONS AND ENFORCEMENT			
Toll violations	Red	AM peak period	20% of SOVs or 11% of all vehicles in the Express Lane
Illegal crossing of double white line	Green	AM peak period	<1%
Illegal egress at Washington ingress	Red	AM peak period	6%
Number of citations	Green	Annual	205 in 2009, 478 in 2011, 223 in 2012



Travel Time Results

The Express Lane significantly improved the travel times on the general purpose lanes. Travel times on the Express Lane also improved despite the addition of solo toll paying vehicles to this lane.

- Average AM peak travel time reduced
 - General purpose lanes – 2 min (13%)
 - Express Lane – 0.5 minute (4%)



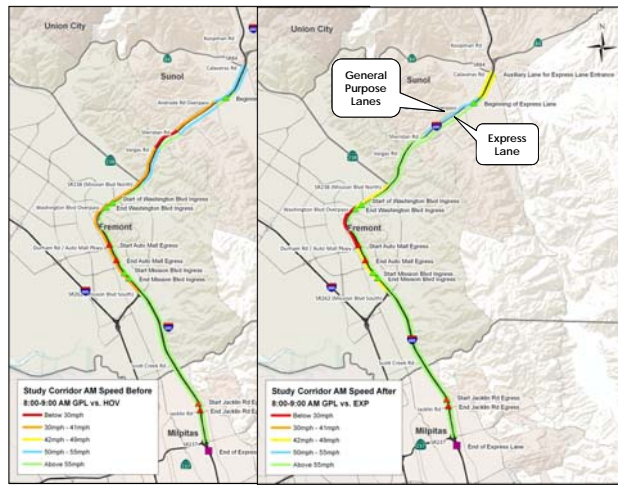
Southbound I-680 Express Lane "After" Study Draft Results



Travel Speed Results

The Express Lane improved speeds in both General Purpose and Express Lanes

- General purpose lanes AM peak average speeds increased by 6 mph
- Express Lane AM peak speeds increased by 3 mph
- Maximum AM peak increase was 11 mph in the general purpose lanes and 6 mph in the Express Lane



Vehicle and Person Throughput Results

Overall, the Express Lane increased corridor vehicle and person throughput

- Vehicle throughput increased in all locations during AM peak and three locations during PM peak and daytime periods
- Decreases at one location at the southern end of corridor at SR 237/Calaveras Blvd during the PM peak (17%) and daytime periods (12%)
 - The completed I-880/Mission interchange that provides improved access to Santa Clara County through I-880 in combination with the implementation of the Express Lane has contributed to decreases in throughput on I-680 at the south end of the corridor
- Person throughput shows modest decline to modest improvements for the AM peak and follows the trend for the PM peak and all day periods.

Bottlenecks and Queues Results

Queues in the general purpose lanes during AM peak decreased from 7.4 miles to 2.9 miles. New queue found at SR 84 due to vehicles weaving to enter the Express Lane

- Two bottlenecks remain from “Before” conditions:
 - Off-ramp to Auto Mall/Durham
 - Off-ramp to SR 262/Mission



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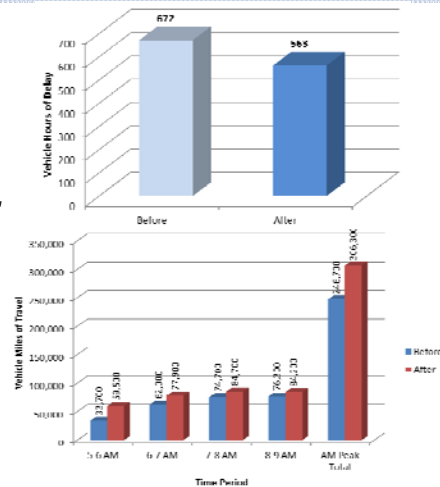


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Level of Service and Other Measures Results

Overall LOS improved or stayed the same. Vehicle Hours of Delay reduced and Vehicle Miles Traveled increased.

- Express Lane level of service remained at LOS A or B, above the required LOS C
- General purpose lanes LOS improved in the middle of corridor, with LOS F at north end and approaching SR 262/Mission – consistent with bottleneck and queue locations
- Other Measures for AM peak-
 - Vehicle Delay decreased by 16%
 - VMT increased by 24%



Vehicle Occupancy Results

Vehicle Occupancy in the corridor declined likely due to a combination of factors - general decline in carpooling regionwide, changes in employment due to the recession contributing to changes in modal preferences, and improvements in travel time in the general purpose lanes.

- In Express Lane, single-occupant vehicles increased from 27-35% "Before" to 54-61% "After"
- The "After" study showed a decrease in HOV usage in all lanes combined
 - Average HOV percentage decreased by 32% in AM peak and 7% in PM peak
 - Control Corridor HOV percentage also decreased comparably

Transit Ridership Results

The decreases in transit ridership experienced were related to the transit service reductions, part of a larger regional trend, and are not related to the implementation of the Express Lane.

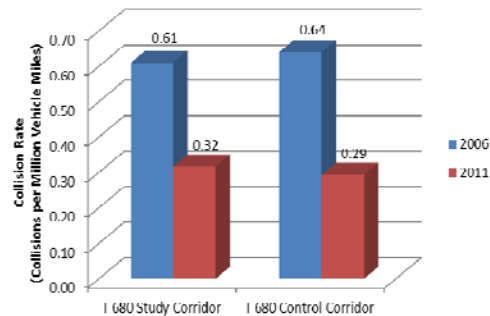
- Average weekday ridership on transit lines using the Express Lane corridor decreased by 6%, and the control corridor decreased by 5%.
- Service reductions of approximately 50% was experienced in both corridors.



Safety Results

Express Lane did not contribute to any increases in collision rates.

- Average collision rates decreased by 50% from 2008 to 2011 in both study and control corridors



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Analysis and Results: Violations and Enforcement

The maximum toll violation rate was 20% of SOVs in the Express Lane. Access violation at Washington Boulevard ingress was estimated as 6%.

- The maximum toll violation rate (single-occupant vehicles not paying a toll) was 11% of all vehicles or 20% of SOVs in the Express Lane
- The rate of illegal crossings of the double white line was less than 1%
- A minimum violation rate of 6% was estimated for vehicles using the Washington Blvd. ingress as an egress location
- Express Lane enforcement has resulted in reduced citations

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Other Factors Affecting Study Corridor

Employment levels are comparable between 2008 and 2012 but fluctuated significantly in between

The significant changes in employment in the years between 2008 and 2012 likely created some changes in types of employment and modal preferences

Implementation of ramp metering in 2011 slightly increased the corridor volumes and travel times

Despite the increase in volume and travel time, the Express Lane and general purpose lanes showed improvement

Other Factors Affecting Study Corridor

I-880/Mission interchange was completed in 2009 after the "Before" Study

The improved interchange in combination with the implementation of the Express Lane has contributed to decreases in throughput volumes on I-680 at the south end of the corridor

The percentage of commuters using carpools declined by 0.3% in Alameda County and nearly 2% in Contra Costa County between 2008 and 2011

Decreases in corridor vehicle occupancy are likely affected by the overall larger declining trend in carpool trips

Express Lane "After" Study: Meeting Legislative Objectives

- 1. Objective:** Optimize the HOV lane usage to improve traffic throughput in the corridor.

Results: Overall vehicle and person throughput in the corridor increased, average travel times decreased by 2 minutes (13 percent) in the general purpose lanes and 1 minute (4%) in the Express Lane, and average speeds increased by 6 mph in the general purpose lanes and 3 mph in the Express Lane.
- 2. Objective:** Maintain LOS C or better for all Express Lane users.

Results: Express Lane LOS levels did not go below LOS B.

Express Lane "After" Study: Meeting Legislative Objectives

- 3. Objective:** Use net revenue to improve highway and transit in the corridor.

Results: Currently all toll revenues are being used towards the Express Lane operations. When net revenue becomes available over and above covering the Express Lane operations, it will be used to improve highway and transit in the corridor.
- 4. Objective:** Employ new intelligent transportation system (ITS) technologies.

Results: Dynamic pricing is currently being deployed to optimize the throughput. Working with the regional partners, technology options for other purposes are being explored including switchable toll tags and automated license plate reading for enforcement purposes.

Express Lane “After” Study: Recommendations

- Based on “After” Study findings, some improvements can be implemented to further improve the corridor performance in terms of occupancy (carpool use), transit ridership, level of service and related bottlenecks, and toll violations
 - Increase HOV usage and transit ridership for trips within Alameda County through focused implementation of a Transportation Demand Management program that includes tools to promote use of alternate modes
 - Reduce toll violation rates through implementation of new technologies such as automated license plate reading combined with switchable toll tag capabilities that are currently being explored by Alameda CTC and regional partners

Express Lane “After” Study: Recommendations

- Conduct studies to Identify potential options to improve operations
 - at the new congested conditions at SR 84
 - at the two existing bottlenecks in the southern portion of the Express Lane at the Auto Mall Parkway/Durham Road and SR 262/Mission Boulevard interchanges
 - to address the Express Lane access issues experienced at the Washington Boulevard and Auto Mall Parkway/Durham Road interchanges

“After” Study: Action Requested and Next Steps

- Recommend that the Commission approve the Southbound I-680 Express Lane “After” Study
- Next steps
 - Seek approval from I-680 SSCL JPA on June 10, 2013
 - Seek approval from the Alameda CTC Commission on June 27, 2013
 - Forward the report to Legislature by July 2013
 - Follow up on recommendations from the “After” Study

Questions?

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