

HOT Before/After Analysis Framework

presented to
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Overview

- **Enhanced network of HOT/HOV lanes is coming to the Washington metropolitan region**
- **Framework to analyze impacts of new HOT/HOV lanes**
 - Gathering of “before” and “after” data
 - Flexible framework responsive to study conditions
- **Approach to analysis**
 - Regional-, system-, and facility-level evaluation
 - Market and corridor understanding
 - Research hypotheses for testing
 - Performance measures, traveler attitudes, and behavior



Literature review

- Ramp metering study in Twin Cities
- Minnesota DOT HOV Evaluation Study
- Minnesota DOT I-394 HOT Evaluation Study
- Portland ITS Integration Evaluation
- NCHRP 364: Estimating Toll Road Demand and Revenue
- NCHRP 377: Public Opinion Data on Tolls and Road Pricing

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Overview of Study Area



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Development of Hypotheses

- Hierarchy of expected changes in traveler behavior
 - Trip making
 - Time of day
 - Mode choice
 - Route choice
- Focus on testable hypotheses – region, system, and facility
- Refinement of hypotheses will guide:
 - Data collection on performance measures
 - Model enhancements to test “what if” scenarios
 - Design of revealed and stated preference surveys

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Examples of Hypotheses Region, System, and Facility

- Trip making
 - Regional VMT/VHT will change
 - Trip table may be affected by purpose
- Time of day
 - Demand shifts to peak shoulders
- Mode choice
 - Transit use increases with higher generalized costs
- Route diversion across and within facilities
 - Change from HOV3 to HOV2 increases volume
 - HOT use increases with congestion on parallel facilities

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Corridors of Interest

- **Examine locations of proposed HOT lanes**
 - Determine markets and study corridors
 - Corridor definitions to capture impacts
- **I-395**
 - One study corridor; or
 - Two corridors, breaking at the Alexandria-Arlington border
- **I-495 Capital Beltway**
 - Four quadrants may be the most manageable approach

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Competing Facilities

- **I-495 does not have any direct competitors**
 - Markets served by segment of I-495
 - Select link analysis of I-495 will help determine if sufficient traffic has a final destination in the District
- **I-395 has competing highway and transit services**
 - Other radial highway routes
 - Metro Blue/Yellow lines
 - VRE commuter rail line(s)
 - Commuter buses

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Data: Performance Measures

- Before and After estimates
- “Steady state” for “before” and “after” systems
- Control for the influence of other external factors
- Sources of measures
 - Regional model estimates
 - Travel time / speed runs
 - Observed traffic counts

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Data: Performance Measures

- Measures at daily, peak, and off-peak levels
- Measures at the region, system/corridor and facility
- Examples of performance measures
 - Vehicle miles traveled (VMT)
 - Vehicle hours traveled (VHT)
 - Traffic volumes – screenline and facility
 - Travel times – selected O-D pairs in each market
 - Transit market share and ridership
 - Reliability – deviation from average travel time
 - Changes in measures by time of day

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Data: User Attitudes and Behavior

- Survey of I-395 and I-495 users
 - Focus on current users of facilities
 - License plate matching technology
 - Attitudes, travel behavior, and socioeconomics
- Stated preference survey
 - “Before” intent of use and willingness to pay for HOT
 - “After” follow-up to assess behavioral change
 - Trip making, time of day, mode choice, route diversion
- Draw upon existing panel of DC metro residents
 - Drivers and transit riders in the corridor(s)

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Evaluation of HOT lanes

- What is the expected usage on the new HOT lanes?
 - Demand profile differences by time of day
 - Expected mix of SOV/HOV traffic
 - Estimate of project toll-generated revenues
 - Willingness to pay for different toll levels
- Impact of HOT lanes on regional highway and transit
- Impacts of HOT on regular lanes and competing facilities
- Differences in peak spreading due to HOT introduction

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