Transportation Modeling for Toll Facilities
North Carolina Model Users’ Group

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Today’s Presentation

• What is a toll road financial feasibility study?
• Why is it necessary?
• What is the modeling process?
• What are the next steps?
Toll Facility Financial Feasibility Study Elements

- Expected toll facility revenue over project life
  - Traffic and Revenue Consultant
- Expected Capital Costs
  - Engineering Consultant
- Expected Operations and Maintenance Cost
  - Engineering Consultant/Traffic and Revenue Consultant
- Financial Structure
  - Financial Consultant
Reasons for Considering Toll Facilities

• Use of Tolls Becoming Increasingly Popular Throughout U.S.
  − Growing shortage of transportation funding from traditional sources
  − Need to manage demand and congestion

• Most New Projects in Urban Areas
  − Especially in high growth areas
  − Urban tollways
  − HOT and managed lanes

• Electronic Toll Collection Reduces Cost and Increases Efficiency
  − Fully cashless Open Road Tolling (ORT) – the wave of the future

• Synergies Between Tolls and Transit
  − Especially managed lanes and BRT
North Carolina Projects

• Throughout the State
  - Triangle Expressway
  - Gaston East-West Connector
  - Monroe Connector and Bypass
  - Cape Fear Skyway
  - Mid-Currituck Bridge
  - I-74 in Brunswick County
  - Yadkin River Bridge on I-85

• Completing Investment Grade Study of Triangle Expressway
Toll Road Studies in North Carolina

Proposed Gaston East-West Connector
Proposed Monroe Connector
Proposed Mid-Currituck Bridge
Proposed Cape Fear Skyway
Proposed Yadkin River Bridge
Proposed Triangle Expressway
I-74 Brunswick County
I-74 Brunswick County

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NCTA Candidate Toll Road Screening Criteria

• The road must have full control of access.

• The road must have a "free" alternate route.

• The road must have a high probability of being able to start construction within a reasonable time frame.

• The road should have demonstrated local support or a reasonable expectation of support for development as a toll facility.

• The road should be deemed to be financially feasible using available data and commercially reasonable assumptions.

• Special consideration should be given to those projects that would play a significant role in the statewide or regional highway system or serve major economic generators.
Toll Facility Traffic & Revenue Modeling

• How much travel demand is in the corridor?
  − Passenger vehicles
    ▪ Cars, HOV, Transit
  − Commercial vehicles
    ▪ Light, medium, heavy

• How much are people willing to pay to use the toll facility?

• How much will total demand grow?
Toll Modeling Overview

How Much Demand Exists?
- Data Collection
  - Traffic Counts
  - Travel Time Surveys
  - Vehicle Occupancy Counts

How Much Will Demand Grow?
- Regional Travel Demand Trip Tables
  - Independent Economic Inputs
  - Corridor Growth

How Much Are People Willing To Pay?
- Stated Preference Surveys:
  - Tolls
  - Other Factors
  - Market Share Micromodel

Typical Output
- Toll Sensitivity
- Traffic
- Revenue
- VMT General Purpose Lanes
- VMT Managed Lanes
- Average Speed General Purpose Lanes
- Average Speed Managed Lanes
Levels of Toll Studies

• Level 1 – Sketch level
  – Project screening

• Level 2 – Preliminary Study
  – Indicative toll traffic, revenue, and feasibility

• Level 3 – Investment Grade
  – “Certified” revenue, used by bond rating agencies and investors to evaluate financial return on the project
Toll Candidate Screening and Study Process

Level “0” Initial Screening Process

Level 1 Screening

Level 2 Screening

Level 3 Investment Grade Studies

Project Finance and Implementation
Level 1 – Sketch Level Traffic & Revenue Study

- 1 – 2 months
- Existing Data Sources – traffic counts, socioeconomic parameters
- Limited Travel Demand Modeling using Existing Models
- Used for Screening
Level 2 Preliminary Traffic & Revenue Study

- 3 – 6 months
- Existing Travel Demand Models – limited refinements
- New Traffic Counts
- Speed & Delay Studies
- Model Calibration in the Corridor
- Socioeconomic Review with Limited Adjustments
- Value of Time from Census Statistics
- Toll Sensitivity
- Total Corridor Demand
- Diversion to Toll Facility – Toll Revenue
- Input to Preliminary Financial Analysis
Level 3 – Investment Grade Traffic & Revenue Study

- 8 – 12 months
- Existing Travel Demand Models with Adjustments
- New Counts and Speed/Delay Studies
- Origin-Destination Surveys
- Stated Preference Surveys
- Independent Economic Review and Adjustments
- Operational Analysis and Toll Technology
- New Travel Demand Forecasts Including Transit
- Toll Sensitivity
- External Sensitivity Tests
- “Certified” Revenue Forecasts to Bond Rating Agencies and Investors
Example Toll Revenue Forecast

![Graph showing Gross Toll Revenue (Millions) from 2011 to 2046 with three scenarios: Scenario 1, Scenario 1A, and Scenario 1B. The graph includes a legend to distinguish between the scenarios.]

- **Scenario 1**: Light blue line and area.
- **Scenario 1A**: Light yellow line and area.
- **Scenario 1B**: Dark red line and area.

*LEGEND*
- Scenario 1
- Scenario 1A
- Scenario 1B

*Example Toll Revenue Forecast*
Triangle Expressway

- First Project to Move to Investment Grade Study
- Important New Access to RTP and Other Employment
- Preliminary Studies Show Strong Revenue Potential
  - But additional funding beyond tolls will be needed
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