Presentation Outline

- Overview of Durham-Orange LRT
- FTA New Starts Program
- Transit Modeling and Ridership Forecasting under FTA New Starts Program
- Durham-Orange LRT Ridership Forecasting
Overview of Durham-Orange LRT
The Federal Transit Administration (FTA) approved the Durham and Orange Counties’ light rail project to advance into the Engineering phase of the federal Capital Investment Grant Program, on July 28, 2017.

On December 14, 2016, the FTA issued an Amended ROD, Final Section 106 Effects Determination, and Final Section 4(f) Determination for the D-O LRT Project NCCU Station Refinement (the requirements of the NEPA).

In February 2016, the FTA issued FEIS/ROD on the D-O LRT Project

Project website with publications, interactive maps and videos

http://ourtransitfuture.com/projects/lrt/
https://youtu.be/XK3B2UjPrs4
https://youtu.be/haLr578l5oo

Source: GoTriangle
Durham-Orange Corridor History and Timeline

Source: DEIS
DEIS Alternatives

Project Overview

DURHAM-ORANGE LIGHT RAIL TRANSIT PROJECT

Source: D-O LRT DEIS
Supplemental EA – NCCU Station

Source: D-O LRT Supplemental EA
Capital Investment Grant Program

- Discretionary & Competitive Federal Grant Program
  - Demand for funds exceeds supply; 63 projects currently in the program
  - FAST authorized level = $2.64 billion through FY2019

-Legislatively directed multi-year, multi-step process to receive funds, with FTA project evaluation & rating required at specific points during the process

Source: FHWA Overview of Capital Investment Grant Program
Capital Investment Grant Program

» New Starts

   » Fixed guideway > $300 million or seeking >$100 million in CIG funds

» Small Starts

   » Fixed guideway or corridor-based BRT < $300 million and seeking <$100 million in CIG funds

» Core Capacity

   » Expands capacity by > 10% in an existing fixed guideway corridor that is at capacity today or will be in five years

Source: FHWA Overview of Capital Investment Grant Program
New Starts and Core Capacity Process

**Project Development**
- Complete environmental review process including developing and reviewing alternatives, selecting locally preferred alternative (LPA), and adopting it into the fiscally constrained long range transportation plan

**Engineering**
- Gain commitments of all non-New Starts funding
- Complete sufficient engineering and design

**Full Funding Grant Agreement**
- Construction

Source: FHWA Overview of Capital Investment Grant Program
Project Evaluation and Rating

Individual Criteria Ratings
- Mobility Improvements (16.66%)
- Environmental Benefits (16.66%)
- Congestion Relief (16.66%)
- Cost-Effectiveness (16.66%)
- Economic Development (16.66%)
- Land Use (NS or SS) or Capacity Needs (CC) (16.66%)
- Current Condition (25%)
- Commitment of Funds (25%)
- Reliability/Capacity (50%)

Summary Ratings
- Project Justification†
  (50% of Overall Rating)
  †Must be at least "Medium" for project to get "Medium" or better Overall Rating
- Local Financial Commitment†
  (50% of Overall Rating)
  †Must be at least "Medium" for project to get "Medium" or better Overall Rating

Overall Rating

Source: FHWA Overview of Capital Investment Grant Program
FTA Guidance on Ridership Forecasting

Five aspects of the forecasts

- Properties of the forecasting methods
- Adequacy of current ridership data to support useful tests of the methods
- Successful testing of the methods to demonstrate their grasp of current ridership
- Reasonableness of inputs (demographics, service changes) used in the forecasts
- Plausibility of the forecasts for the proposed project
FTA Guidance on Ridership Forecasting (continued)

Three approaches to prepare ridership forecasts

» Regionwide travel models

» Incremental data-driven methods

» Simplified Trips-on-Project Software (STOPS)

Properties of Methods

Mode choice model formulation – coefficients

» Need compelling evidence if out of ranges

» Coefficient of in-vehicle time (Civtt): 0.03 < Civtt < 0.02 for work trips, but lower for nonwork trips?

» Coefficient of out-of-vehicle time (Covtt); does it satisfy? \(2.0 < \frac{Covtt}{Civtt} < 3.0\)

» Cost coefficients and implicit value of time; does it satisfy?
\[
\frac{AverageWage}{4} < \frac{Civtt}{Ccost} < \frac{AverageWage}{3}
\]
Simplified-Trips-on-Project Software (STOPS)

A simplified software package released by FTA

- Quantifies FTA’s trips-on-project evaluation measure for FTA major capital funding
- Useful for areas where a regional model or an incremental approach is not currently available or not suitable
- Useful for quality control – to provide a second ridership forecast for comparison to a forecast by other methods
## Timelines for Submittal of Travel Forecasting Information

<table>
<thead>
<tr>
<th>Information for FTA Review</th>
<th>Region-wide Model</th>
<th>Incremental Model</th>
<th>STOPS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Documentation of the model methodology</strong></td>
<td>4</td>
<td>3</td>
<td>n/a</td>
</tr>
<tr>
<td><strong>Documentation of model testing</strong></td>
<td>4</td>
<td>3</td>
<td>n/a</td>
</tr>
<tr>
<td><strong>Documentation of project-specific inputs</strong></td>
<td>3</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td><strong>Draft-final forecasts for the project</strong></td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

*Months in advance of anticipated ratings request*

Source: FHWA
Forecasting Activities

Alternative Analyses (AA) for three priority corridors
  » “TRM Version 4 Enhanced” or “TRM4E.1”

DEIS
  » Triangle Regional Model (TRM), Version 5

EA
  » TRM Version 5 (Revalidated)
  » STOPS
Model Domain (TRM Version 5)

Source: Triangle Regional Model Service Bureau, 2012, Triangle Regional Model Version 5
Locations of TAZs that are related to Auto Intercept Trips

Source: CS

- Estes Rd PnR
- Southern Village PnR
- Friday Center PnR
- Jones Ferry Rd PnR
- Leigh Village PnR
- Carrboro Plaza PnR

Auto Intercept PnR in TRM
New Auto Intercept PnR for LRT
UNC Campus TAZ

Source: CS
Unmeasured Attributes of Guideway Transit

Three categories of attributes are recognized for credits
- Guideway-like characteristics
- Span of good service
- Passenger amenities

Two types of adjustments
- Equivalent minutes of travel time savings to increase the attractiveness
- A discount on the weight applied to in-vehicle travel time on the guideway

Source: FHWA
Further Model Testing and Validation

GoTriangle conducted a transit on-board (TOB) survey in the fall of 2014

- 58 existing bus routes in or near the proposed D-O LRT corridor with a total ridership of 53,000
- 18 routes have been designated as in-corridor routes
- collected 5,831 samples

- Transit fare
- Transit assignment of observed trips
- Corridor validation of 2014 model
Transit Fare and Discount Fare Programs

- GoPass programs has expanded significantly over the recent years
- Weighted average fares by providers/services
Transit Assignments

- Ridership by Transit Operator for all Surveyed Routes
- Ridership by Transit Operator for Routes in the Orange-Durham Corridor

<table>
<thead>
<tr>
<th>Transit Operator</th>
<th>Observed Ridership$^2$ for Surveyed Routes</th>
<th>Modeled Ridership for Surveyed Routes</th>
<th>Difference</th>
<th>Percentage Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>GoTriangle</td>
<td>5,193</td>
<td>4,601</td>
<td>-592</td>
<td>-11.4%</td>
</tr>
<tr>
<td>CHT</td>
<td>25,373</td>
<td>26,623</td>
<td>1,250</td>
<td>4.9%</td>
</tr>
<tr>
<td>GoDurham</td>
<td>22,350</td>
<td>22,080</td>
<td>-270</td>
<td>-1.2%</td>
</tr>
<tr>
<td>Total</td>
<td>52,916</td>
<td>53,304</td>
<td>388</td>
<td>0.7%</td>
</tr>
</tbody>
</table>
2014 Model Validation

- Ridership by Transit Operator for all Surveyed Routes
- Ridership by Transit Operator for Routes in the Orange-Durham Corridor
2014 Model Validation

Shares of Trip Purposes in the Corridor

[Charts showing modeled and observed trip purposes for 2014 and 2006]
STOPS

Used to conduct a reference forecast as part of the uncertainty analysis and quality control and quality assurance

“Incremental” Approach
» 2014 Durham-Orange Corridor Transit On-Board survey

Sensitivity tests
» Fare assumptions for LRT
» Fare assumptions for background transit
» Regional transit trips
Resources

D-O LRT Project Website

» http://ourtransitfuture.com/projects/lrt/
» EA/FEIS/DEIS documentation
» Project interactive maps and videos
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