TRANSPORTATION PLANNING
PERFORMANCE MEASUREMENT
USING GIS

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2015 AMPO Conference
Clark County, NV
October 2015
Overview

• Transportation Alternatives Program (TAP) overview

• MPO TAP Scoring Methodology

• Implement TAP methodology in GIS

• Results

• Conclusion
Context: Federal Programs & the Greensboro MPO

- STP-DA
- CMAQ
- ARRA
- Transit
- TAP

Greensboro used suballocated funding over the last ten years to help implement over 59 miles of high need sidewalk, 12 intersection improvements, 16 miles of roadway widening projects, 115 buses, the $17.5 million Greensboro Transit Authority Maintenance and Administrative Facility, and renovated the multi-modal “Galyon Depot” in Downtown Greensboro.
Transportation Alternatives Program (TAP) Overview

SAFETEA-LU
- Safe Routes to School
- Recreational Trails Program
- Transportation Enhancements

MAP-21

Transportation Alternatives Program (TAP)
TAP Overview: Funding Decision

NCDOT ➔ Distributed through Prioritization

TMA ➔ Sub allocated to large MPOs
TAP Overview
Selection Process Requirement

- Transportation Alternatives Program (TAP)
- Competitive Selection Process
- FHWA reviews MPO process
- Public Review
TAP overview

Project Requirement

Transportation Alternatives Program (TAP)

- Implementable within the FY2014/2015
- Local match 20%
- Eligible Sponsors:
  - Local governments
  - Transit Agencies
  - National Park Agency
  - Guilford County Schools
TAP Overview
Eligible Projects

Transportation Alternatives Program (TAP)

- Bicycle & Pedestrian Infrastructure
- Safe Routes to School (Bike & Pedestrian Safety Education Program for K-8)
- Recreational Trails
- Environmental Mitigation
- Historic Preservation (Related to Transportation Facility)
- Archaeological Activities (Related to Transportation Impact)
How we approach TAP

- Systematic & GIS based
- Assess large number of potential projects
- Conceptual model derived from literature and field experience
- Testing scenarios & validation
TAP SCORING METHODOLOGY

MPO determined to consider 3 project types:

1. Bicycle Infrastructure
2. Pedestrian Infrastructure
3. Intersection Improvement

MPO put an emphasis on short term construction
TAP SCORING METHODOLOGY

Four criteria:

1. Land Use Connectivity
2. Transportation System Connectivity
3. Safety & Mobility
4. Project Readiness & Viability
1. Land Use Connectivity

- Residential Area
- Employment/ Retail Center
- School
- Park or Recreation Center
2. Transportation System Connectivity

- Connect to transit service
- Connect to other transportation modes and/or facilities
- Connect to existing facility and fill a gap
- Is the project in an area underserved by bicycle & pedestrian infrastructure?
- Extend key parts of the regional greenway system (Bicentennial, Piedmont, A&Y, Downtown Greenway, Mountains to Sea Trail)
3. Safety & Mobility

- Safety problem
- Barrier to mobility
- Improve mobility for disadvantaged populations
4. Project Readiness & Viability

- Meet funds obligation requirements in the funding availability timeframe
- Part of an adopted plan
- Local government support
- Community/public support
- Document source for the required 20% match
- ROW acquisition status
GIS Model to Automate Calculation

- Land Use Connectivity
- Transportation System Connectivity
- Safety & Mobility
- Project Readiness & Viability
1. Land Use Connectivity – 8 points

- Network Analyst
  - Pedestrian projects:
    - ½ mile: 2 points
    - 1 mile: 1 point
  - Bicycle projects:
    - 1 mile: 2 points
    - 1 ½ mile: 1 point
  - Intersection projects:
    - ½ mile: 2 points
    - 1 mile: 1 point
2. Transportation System Connectivity - Transit Connection – 2 points

- Network Analyst
- Pedestrian projects:
  - ¼ mile: 2 points
  - ½ mile: 1 point
- Bicycle projects:
  - ½ mile: 2 points
  - 1 mile: 1 point
- Intersection projects:
  - ¼ mile: 2 points
  - ½ mile: 1 point
2. Transportation System Connectivity - In an area underserved Bike/Ped facility – 3 points

- % of existing sidewalk over total length of sidewalk
  - <25%: 3 points
  - >=25 & <50%: 2 points
  - >=50% & <75%: 1 point
  - >=75%: 0 point

24.4% 3 points
2. Transportation System Connectivity - Connect to other transportation modes/facilities – 2 points

- Connect to 1 of these facilities:
  - Bus stop
  - Bike facility
  - Sidewalk
2. Transportation System Connectivity - Fill a gap – 3 points

- Connect to same facility

3 points
2. Transportation System Connectivity - Extend key trails – 4 points

- Bicentennial
- Piedmont
- A&Y
- Downtown Greenway
- Mountains to Sea Trail
3. Safety & Mobility - Safety problem – 3 points

- Bike/ pedestrian crash: 3 points
- Other safety issues (crossing, light, etc.): 2 points
3. Safety & Mobility - Barrier to Mobility – 2 point

- Fill a gap: 1 point
- % worker with no vehicle to work (over total worker in a census tract) >2.88%: 1 point

Fill a gap: 1 point
3.49%: 1 point
Total: 2 points
3. Safety & Mobility - Household Poverty – 2 points

- % of household poverty:
  - >= 26.44%: 2 points
  - 14.62% – 26.44%: 1 point
  - <14.62%: 0 point

Percentage of Household Poverty:
- <14.62%
- 14.62% - 26.43%
- >=26.44%
4. Project Readiness & Viability

- Meet funds obligation requirements in the funding availability timeframe (4 points)
- Part of an adopted plan (2 points)
- Local government support (2 points)
- Community/public support (2 points)
- Document source for the required 20% match (2 points)
- ROW acquisition status (2 points)
91 Sidewalk Projects
10 Trail Projects
234 Intersections
GIS Model
234 intersections

TAP Intersection
Total Score
- 22 - 31
- 32 - 35
- 36 - 37
- 38 - 44

Miles
# Results

<table>
<thead>
<tr>
<th>Map ID</th>
<th>Project</th>
<th>Description</th>
<th>Total Score</th>
<th>Estimated Cost</th>
<th>Land Use Connect</th>
<th>Transit Connect</th>
<th>Mode Type Connect</th>
<th>Mode Connect Score</th>
<th>Same Mode Connect Score</th>
<th>Percent of Existing Infrastructure</th>
<th>Infrastructure Score</th>
<th>Trail Connect</th>
<th>Safety</th>
<th>Barrier</th>
<th>Disadvantaged Score</th>
<th>Funds Obligation Score</th>
<th>Plan</th>
<th>Government Support</th>
<th>Community Support</th>
<th>Match</th>
<th>ROW acquired Score</th>
<th>Current Funding</th>
<th>Proposed Funding</th>
<th>Length (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>34</td>
<td>Phillips Avenue</td>
<td>Where name exists between Summit Ave and Huffine Mill Rd</td>
<td>34</td>
<td>$310,000.00</td>
<td>6</td>
<td>2</td>
<td>Sidewalk</td>
<td>3</td>
<td>3</td>
<td>18.53%</td>
<td>3</td>
<td>0</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>4</td>
<td>3</td>
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<td>TAP</td>
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<td>33</td>
<td>Aycock Street</td>
<td>Intersection improvement at Aycock Street and Walker Avenue</td>
<td>33</td>
<td>$173,000.00</td>
<td>8</td>
<td>2</td>
<td>Sidewalk</td>
<td>3</td>
<td>3</td>
<td>71.00%</td>
<td>1</td>
<td>0</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>None</td>
<td>TAP</td>
<td>213.85</td>
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<tr>
<td>33</td>
<td>Summit Ave</td>
<td>West side 16th St existing and east side from Rankin Rd to Avery Driveway</td>
<td>33</td>
<td>$100,000.00</td>
<td>6</td>
<td>2</td>
<td>Sidewalk</td>
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<td>3</td>
<td>11.47%</td>
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<td>0</td>
<td>3</td>
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<td>3</td>
<td>2</td>
<td>2</td>
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<td>0</td>
<td>STPDA</td>
<td>STPDA</td>
<td>7,025.94</td>
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<tr>
<td>33</td>
<td>Hamitt Street</td>
<td>Normal St to Hamitt Dr</td>
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<td>$110,000.00</td>
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<td>2</td>
<td>Sidewalk</td>
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<td>3</td>
<td>12.41%</td>
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<td>3</td>
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<td>0</td>
<td>STPDA</td>
<td>STPDA</td>
</tr>
<tr>
<td>33</td>
<td>Less Chapel Road</td>
<td>Yanceyville St to Brightwood School Rd</td>
<td>33</td>
<td>$110,000.00</td>
<td>8</td>
<td>2</td>
<td>Sidewalk</td>
<td>3</td>
<td>3</td>
<td>23.18%</td>
<td>3</td>
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<td>3</td>
<td>2</td>
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<td>3</td>
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<td>2</td>
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<td>0</td>
<td>STPDA</td>
<td>STPDA</td>
<td>9,778.48</td>
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<tr>
<td>32</td>
<td>Church Street</td>
<td>Less Chapel Road to Eucera Drive (last side only) Replace sidewalk and trim vegetation</td>
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<td>$100,000.00</td>
<td>8</td>
<td>2</td>
<td>Sidewalk</td>
<td>3</td>
<td>3</td>
<td>24.33%</td>
<td>3</td>
<td>0</td>
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<td>2</td>
<td>1</td>
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<td>CMMQ</td>
<td>CMMQ</td>
<td>6,482.54</td>
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</table>
Project: Greensboro Pedestrian Signals

• Description: Install or upgrade the pedestrian signals
• Cost: $350,000
• Total Score: 38
• Current Funding: None
• Proposed Funding: TAP
Project 21: Phillips Ave

- Description: Where none exists between Summit Ave and Huffine Mill Rd
- Cost: $330,000
- Total Score: 34

<table>
<thead>
<tr>
<th>Land Use Connect</th>
<th>Percent of Existed Infrastructure</th>
<th>Disadvantaged Score</th>
<th>Match</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>18.28%</td>
<td>1</td>
<td>2</td>
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</table>

<table>
<thead>
<tr>
<th>Transit Connect</th>
<th>Infrastructure Score</th>
<th>Funds Obligation Score</th>
<th>ROW acquired Score</th>
<th>Current Funding</th>
<th>Proposed Funding</th>
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</thead>
<tbody>
<tr>
<td>2</td>
<td>3</td>
<td>4</td>
<td>0</td>
<td>CMAQ</td>
<td>TAP</td>
</tr>
</tbody>
</table>

Mode Connect Score:
- Trail Connect: 0
- Safety: 3
- Government Support: 2
- Community Support: 0

Length (ft): 5,150.34
## Project 65: Aycock St

Cost: $173,000.00   Total Score: 33

<table>
<thead>
<tr>
<th>Land Use Connect</th>
<th>8</th>
<th>Percent of Existed Infrastructure</th>
<th>71.00%</th>
<th>Disadvantaged Score</th>
<th>2</th>
<th>Match</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transit Connect</td>
<td>2</td>
<td>Infrastructure Score</td>
<td>1</td>
<td>Funds Obligation Score</td>
<td>0</td>
<td>ROW acquired Score</td>
<td>2</td>
</tr>
<tr>
<td>Mode Type Connect</td>
<td></td>
<td>Trail Connect</td>
<td>0</td>
<td>Plan</td>
<td>2</td>
<td>Current Funding</td>
<td>None</td>
</tr>
<tr>
<td>Mode Connect Score</td>
<td>2</td>
<td>Safety</td>
<td>3</td>
<td>Government Support</td>
<td>2</td>
<td>Proposed Funding</td>
<td>TAP</td>
</tr>
<tr>
<td>Same Mode Connect Score</td>
<td>3</td>
<td>Barrier</td>
<td>2</td>
<td>Community Support</td>
<td>2</td>
<td>Length (ft)</td>
<td>211.85</td>
</tr>
</tbody>
</table>
Conclusion

• GIS models can be effective
• Conceptual underpinnings are key
• Validation is important
• This approach is consistent with the performance planning requirements of MAP-21 and good planning practice
• TAP process is somewhat time consuming but worthwhile
  • Effective way to distribute limited resources
  • Good practice for future requirements
THANK YOU!

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