Leveraging Data and GIS to Prioritize Future Interchanges in Minneapolis-St. Paul
Minneapolis-St. Paul, MN

HOME OF SUPER BOWL LII
Likely February Weather
Congested Intersection
Interchange
Congested Intersection
Principal Arterial Intersection Conversion Study

- Mobility and safety problems at many at-grade intersections
- Identify regional priorities given high demand for grade separations and limited funding
- Constructed 16 interchanges in past 10 years; avg. construction cost of $20M
Balancing of Study Inputs

Traffic Engineering & Technical Judgement

Data, Analytics, & GIS Tools

Transportation Planning, Policy, & Local Context
Traffic Engineering and Technical Judgement

Daily Traffic Volume Criteria

- Volumes Do Not Support Potential Grade Separation
- Volumes Support Potential Grade Separation

Intersection Performance Threshold (Guidance)

Minor Leg Volume

Mainline Volume (PA)
Data, Analytics, and GIS Tools
Use of GIS

- Need for Automation
- Data Analysis: Formulas/Scripts
- Web GIS Applications (https://arcg.is/1DHiXS)
Data Layering
**Capacity Analysis**

- FHWA Capacity Analysis for Planning of Junctions (CAP-X) Tool
  - Test intersection data against various solutions
  - Ask: What type of investment to provide a reasonable volume/capacity (V/C) ratio?

<table>
<thead>
<tr>
<th>Capacity Analysis Summary</th>
<th>Existing Intersection</th>
<th>Expanded Intersection</th>
<th>Alternative At-Grade Intersection</th>
<th>Add PA Capacity</th>
<th>Hybrid Interchange</th>
<th>Full Interchange</th>
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<td>Key</td>
<td>$\square$ V/C ≥ 1.0</td>
<td>$\square$ V/C &gt; 0.85 &amp; &lt; 1.0</td>
<td>$\square$ V/C ≤ 0.85</td>
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CAP-X Tool: Example Outputs

Solutions Tested for One Intersection Location:

Intersection Analysis

Interchange Analysis
Planning, Policy, & Local Context
Interchange Under Construction
Weighted Criteria

• Criteria & Weights – *Which intersections:*
  
  – Serve higher volumes of traffic, reduce mobility, and cause variable travel times? **(Mobility = 40%)**
  – Have a higher rate/cost of severe crashes? **(Safety = 30%)**
  – Can accommodate grade separation, serve regional routes, and leverage other modes? **(Corridor Context = 30%)**

• Technical Steering Committee (TSC) members helped to establish these weights
Priority Map (91 Intersections)

**Grade-Separation Priorities:**
- 34 High
- 27 Medium
- 30 Low

**26 Focus Areas**
- Intersection locations & corridors
- Likely basis for future corridor studies
Role of the Study in Future Planning

• Results will:
  – Modify TPP and MnSHIP investment scenarios
  – Provide input to funding decisions for competitive state and federal awards
  – Serve as a reference for local planning and policy reviews
  – Make the case for additional funding

• Advises the right-sizing of proposed projects based on intersection priorities
Regional Investment Philosophy
For More Information

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Web GIS Applications: https://arcg.is/1DHiXS

Project Website: metrocouncil.org/PAICS