Bus Service Allocation Study

Project Overview
TAC Planning

Cole Hiniker, Daniel Peña
January 14th, 2021
AGENDA

• Study Purpose
• Stakeholder Engagement
• Existing Conditions
• Scenario Analysis
• Coverage Guidelines
• Next Steps
STUDY PURPOSE

**Facilitate** regional discussion with policy makers on transit priorities

**Understand** region-wide need for better mobility options

**Develop and evaluate** a series of expansion scenarios that reflect regional goals

**Document** regional values to inform future service investment
STAKEHOLDER ENGAGEMENT
SUMMARY OF STAKEHOLDER ENGAGEMENT

• Transit Network Design and Service Tradeoffs Workshop - July 2019
• Public Transit Agency Staff Interviews – Early 2020
• Policymaker Workshop: Existing Conditions - April 2020
• Policymaker Workshop: Scenario Evaluation – December 2020
JULY SERVICE TRADEOFF WORKSHOP

• Service allocation workshop with Met Council and TAB Members

• Developed route network using limited resources in hypothetical city

• Key themes:
  o Leveraged pre-existing rail network
  o Focus on sociodemographic equity
  o Job access to outlying suburban areas
  o Focus on medical and higher education destinations
  o 15-minute service frequency in core areas
PUBLIC TRANSIT AGENCY INTERVIEWS

• All transit agencies use similar industry standard performance metrics to measure:
  o Service efficiency
  o Revenue effectiveness
  o Cost effectiveness

• All transit agencies focus on quality service to areas with highest ridership potential

• All transit agencies noted challenges in providing service in areas with need, but lower ridership demand

• Social equity is important, but applied inconsistently in existing service allocation processes

• Not all agencies have written service allocation processes, but all agencies engage in service allocation annually
APRIL 22 POLICY-MAKER WORKSHOP

• Presentation included:
  o Characteristics of current riders
  o Summary of agency interviews
  o Population and employment served within region
  o Level of socioeconomic groups are served within region
  o Trade-off questions

• Discussion of Priorities

Workshop Survey Results
What does success look like for area transit?

1ST
MORE RIDERSHIP

2ND
MORE SERVICE TO THOSE WHO NEED IT MOST

3RD
MORE LINES ON THE MAP
STUDY ANALYSIS ROUTE CLASSIFICATIONS

• **High Frequency Service**  
  - Service every 15 minutes or better  
  - Includes bus, Bus Rapid Transit, and Light Rail  
  - Convenient for all trip types, no schedule necessary

• **Local Service**  
  - Service at least every 30 minutes  
  - Requires a schedule  
  - Less flexible than high frequency service, but will support discretionary trips

• **Basic Service**  
  - Service more than every 30 minutes  
  - Requires a schedule  
  - Not conducive to convenient trip making

• **Commuter & Express Service**  
  - Any service that has long, non-stop segments  
  - Includes peak service to CBD’s, reverse commute, and all-day service
Productivity by Segment for High Frequency Transit, Local, and Basic Transit Service

Boardings per In Service Hour

- 10 or Less
- 11 - 20
- 21 - 40
- 41 - 60
- >60

Transit Authority Service Areas
County Boundary
Productivity by Route for Commuter & Express Service

Boardings per Trip

- 10 or Less
- 11 - 20
- 21 - 40
- 41 - 60
- >60

Transit Authority Service Areas
County Boundary
MARKET AREAS

• The seven-county metro region is divided into Transit Market Areas representing different levels of potential transit demand
  
  o Market Area 1 = highest level of transit demand
  o Anticipated demand in Market Area 2 = half of Area 1
  o Anticipated demand in Market Area 3 = half of Area 2
GUIDELINES FOR TRANSIT SERVICE LEVELS

Service every 10 minutes or better
45+ residents per acre
25+ employees per acre

Service every 10–15 minutes
30–45 residents per acre
15–25 employees per acre

Service every 15–30 minutes
15–30 residents per acre
10–15 employees per acre

Service every 30–60 minutes
10–15 residents per acre
5–10 employees per acre

Flexible and demand response services

<10 residents per acre
<5 employees per acre

Source: Thresholds are based on research by Nelson\Nygaard.
Resident and jobs per acre (service frequency supported)

- Less than 10 (flexible and demand response services)
- 10 - 25 (service every 30 - 60 minutes)
- 25 - 45 (service every 15 - 30 minutes)
- More than 45 (service every 15 minutes or better)

Transit Authority Service Areas
County Boundary
## EXISTING CONDITIONS

### Percent of total population served by transit

<table>
<thead>
<tr>
<th>Service</th>
<th>Market Area 1</th>
<th>Market Area 2</th>
<th>Market Area 3</th>
<th>Market Area 4</th>
<th>Market Area 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Frequency and High Capacity Transit (&lt;15-min frequency)</td>
<td>72%</td>
<td>25%</td>
<td>1%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Local Service (&lt;30-min frequency)</td>
<td>97%</td>
<td>84%</td>
<td>21%</td>
<td>&lt;1%</td>
<td>0%</td>
</tr>
<tr>
<td>Basic Service (&gt;30-min frequency)</td>
<td>97%</td>
<td>87%</td>
<td>41%</td>
<td>6%</td>
<td>&lt;1%</td>
</tr>
<tr>
<td>Commuter &amp; Express Transit</td>
<td>97%</td>
<td>89%</td>
<td>57%</td>
<td>16%</td>
<td>1%</td>
</tr>
<tr>
<td>No Transit Access</td>
<td>3%</td>
<td>11%</td>
<td>43%</td>
<td>84%</td>
<td>99%</td>
</tr>
</tbody>
</table>
TOTAL EMPLOYMENT
Total jobs not served by transit
### EXISTING CONDITIONS

#### Percent of total jobs served by transit

<table>
<thead>
<tr>
<th>Service</th>
<th>Market Area 1</th>
<th>Market Area 2</th>
<th>Market Area 3</th>
<th>Market Area 4</th>
<th>Market Area 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Frequency and High Capacity Transit</td>
<td>80%</td>
<td>21%</td>
<td>1%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>(&lt;15-min frequency)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Local Service</td>
<td>96%</td>
<td>78%</td>
<td>19%</td>
<td>&lt;1%</td>
<td>0%</td>
</tr>
<tr>
<td>(&lt;30-min frequency)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Basic Service</td>
<td>96%</td>
<td>82%</td>
<td>43%</td>
<td>14%</td>
<td>1%</td>
</tr>
<tr>
<td>(&gt;30-min frequency)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Commuter &amp; Express Transit</td>
<td>97%</td>
<td>85%</td>
<td>59%</td>
<td>23%</td>
<td>3%</td>
</tr>
<tr>
<td>No Transit Access</td>
<td>3%</td>
<td>15%</td>
<td>41%</td>
<td>77%</td>
<td>97%</td>
</tr>
</tbody>
</table>
EXISTING CONDITIONS

Current Service Distribution by Service Type

- **High Frequency Transit**: 20% Annual Service Hours, 44% Annual Ridership
- **Local**: 53% Annual Service Hours, 39% Annual Ridership
- **Basic**: 10% Annual Service Hours, 3% Annual Ridership
- **Commuter & Express**: 18% Annual Service Hours, 14% Annual Ridership
APRIL 22 POLICY-MAKER WORKSHOP

Key Themes

• Regional transit success looks different for different policymakers.
• Providing service to those who need it most was a top priority for measuring success
• Other themes included increasing ridership, connecting people to destinations, neighborhood coverage, serving high-need communities, and matching service with land use
• The top priorities for service expansion scenarios were:
  o Serving low-income populations
  o Improving job access
SCENARIO ANALYSIS
**SCENARIO DEVELOPMENT**

- **Two different networks** were developed to illustrate different service delivery strategies.
- Service built on **pre-COVID network and Met Council Funded transitways** as outlined in 2040 Transportation Policy Plan.
- Both scenarios were developed under assumption of **25% service increase** (based on hours of service).

<table>
<thead>
<tr>
<th>SCENARIO 1</th>
<th>SCENARIO 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Invest additional resources in improving transit that serves all trip types</td>
<td>Invest additional resources in increasing regional access to transit</td>
</tr>
</tbody>
</table>
## SUMMARY OF SCENARIO INVESTMENT STRATEGIES

<table>
<thead>
<tr>
<th>IMPROVEMENT TYPE</th>
<th>SCENARIO 1</th>
<th>SCENARIO 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>High-frequency routes improved</td>
<td>6</td>
<td>-</td>
</tr>
<tr>
<td>Local routes improved to high-frequency</td>
<td>27</td>
<td>-</td>
</tr>
<tr>
<td>Basic routes improved to local</td>
<td>-</td>
<td>20</td>
</tr>
<tr>
<td>Commuter routes improved</td>
<td>-</td>
<td>4</td>
</tr>
<tr>
<td>New reverse commute and suburb-to-suburb routes</td>
<td>-</td>
<td>5</td>
</tr>
<tr>
<td>New local routes</td>
<td>5</td>
<td>30</td>
</tr>
<tr>
<td>New commuter routes</td>
<td>-</td>
<td>2</td>
</tr>
<tr>
<td>Expanded on-demand service</td>
<td>-</td>
<td>✓</td>
</tr>
</tbody>
</table>
SCENARIO EVALUATION

- Evaluation of the two 2040 expansion scenarios that were developed to illustrate the potential outcomes of differing investment strategies.
- Criteria were designed to measure how well each network addresses potential needs of the region.
- The criteria were informed by feedback from Met Council staff, area transit providers, regional policymakers, key stakeholders, and national experience.

<table>
<thead>
<tr>
<th>Ridership Potential</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Access to Transit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expanded Access to All-Day Transit</td>
</tr>
<tr>
<td>Improved Transit Service</td>
</tr>
<tr>
<td>Change in Access to Transit by Service Level</td>
</tr>
</tbody>
</table>

<p>| Network Access to Jobs |</p>
<table>
<thead>
<tr>
<th><strong>WHICH SCENARIO BETTER...</strong></th>
<th><strong>SCENARIO 1</strong></th>
<th><strong>SCENARIO 2</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Generates ridership</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Improves service for region's population and employment</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Expands new access to all-day transit to population and employment</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Serves more diverse population groups</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Expands 15-minute transit to population and employment</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Expands 30-minute transit to population and employment</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Better serves Market Areas 1 and 2</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Better serves Market Area 3</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Better increases transit access to jobs</td>
<td>✓</td>
<td></td>
</tr>
</tbody>
</table>
**EXPANDED ACCESS TO ALL-DAY TRANSIT – POPULATION**

Scenario 2 expands new all-day transit access to more people and jobs than Scenario 1 compared to the base network.

<table>
<thead>
<tr>
<th>SCENARIO 1</th>
<th>SCENARIO 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>+3%</td>
<td>+9%</td>
</tr>
<tr>
<td>💼💼💼💼💼💼💼💼💼💼💼💼</td>
<td>💼💼💼💼💼💼💼💼💼💼💼💼💼💼💼💼💼💼</td>
</tr>
<tr>
<td>+4%</td>
<td>+10%</td>
</tr>
<tr>
<td>💼💼💼💼💼💼💼💼💼💼💼💼</td>
<td>💼💼💼💼💼💼💼💼💼💼💼💼💼💼💼💼💼💼💼💼💼💼</td>
</tr>
</tbody>
</table>

💼💼💼💼💼💼💼💼💼💼💼💼💼💼💼💼💼💼💼💼💼💼 = 10,000 jobs

= 10,000 people
EXPANDED ACCESS TO ALL-DAY TRANSIT – SOCIAL EQUITY

Scenario 2 expands new all-day transit access to more people and jobs than Scenario 1 across all social equity groups compared to the base network.

<table>
<thead>
<tr>
<th></th>
<th>SCENARIO 1</th>
<th>SCENARIO 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BIPOC</strong></td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td><strong>Low-income population</strong></td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td><strong>Affordable housing units</strong></td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td><strong>Low-auto access population</strong></td>
<td>* Less than 2,000 increase</td>
<td>* Less than 2,000 increase</td>
</tr>
<tr>
<td><strong>Older people</strong></td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td><strong>Low-wage jobs</strong></td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td><strong>High-wage jobs</strong></td>
<td>+</td>
<td>+</td>
</tr>
</tbody>
</table>

👥 = 10,000 people, 🏢 = 10,000 housing units, 💼 = 10,000 jobs
### IMPROVED TRANSIT SERVICE – POPULATION

Scenario 1 provides more people and jobs with improved or expanded transit than Scenario 2.

<table>
<thead>
<tr>
<th>SCENARIO 1</th>
<th>SCENARIO 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>37%</strong></td>
<td><strong>27%</strong></td>
</tr>
<tr>
<td>of the region's population</td>
<td>of the region's population</td>
</tr>
<tr>
<td>🧑‍💼🧑‍💼🧑‍💼 = 10,000 people</td>
<td>🧑‍💼🧑‍💼🧑‍💼 = 10,000 jobs</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SCENARIO 1</th>
<th>SCENARIO 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>51%</strong></td>
<td><strong>44%</strong></td>
</tr>
<tr>
<td>of the region's employment</td>
<td>of the region's employment</td>
</tr>
<tr>
<td>🧑‍💼🧑‍💼🧑‍💼 = 10,000 people</td>
<td>🧑‍💼🧑‍💼🧑‍💼 = 10,000 jobs</td>
</tr>
</tbody>
</table>
**IMPROVED TRANSIT SERVICE – SOCIAL EQUITY**

Scenario 1 provides more improved or expanded transit service to more people and jobs within social equity groups than Scenario 2.

<table>
<thead>
<tr>
<th></th>
<th>SCENARIO 1</th>
<th>SCENARIO 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIPOC</td>
<td><img src="image" alt="BIPOC" /></td>
<td><img src="image" alt="BIPOC" /></td>
</tr>
<tr>
<td>Low-income population</td>
<td><img src="image" alt="Low-income population" /></td>
<td><img src="image" alt="Low-income population" /></td>
</tr>
<tr>
<td>Affordable housing units</td>
<td><img src="image" alt="Affordable housing units" /></td>
<td><img src="image" alt="Affordable housing units" /></td>
</tr>
<tr>
<td>Low-auto access population</td>
<td><img src="image" alt="Low-auto access population" /></td>
<td><img src="image" alt="Low-auto access population" /></td>
</tr>
<tr>
<td>Older people</td>
<td><img src="image" alt="Older people" /></td>
<td><img src="image" alt="Older people" /></td>
</tr>
<tr>
<td>Low-wage jobs</td>
<td><img src="image" alt="Low-wage jobs" /></td>
<td><img src="image" alt="Low-wage jobs" /></td>
</tr>
<tr>
<td>High-wage jobs</td>
<td><img src="image" alt="High-wage jobs" /></td>
<td><img src="image" alt="High-wage jobs" /></td>
</tr>
</tbody>
</table>

- 👤 = 10,000 people
- 🏢 = 10,000 housing units
- 💼 = 10,000 jobs
HIGH-LEVEL RIDERSHIP ESTIMATE

Scenario 1 will generate between 30 and 40% more new ridership than Scenario 2.
CHANGE IN ACCESS TO TRANSIT BY SERVICE LEVEL BY MARKET AREA - POPULATION

SCENARIO 1

SCENARIO 2
CHANGE IN ACCESS TO TRANSIT BY SERVICE LEVEL BY MARKET AREA - EMPLOYMENT

SCENARIO 1

SCENARIO 2
NETWORK ACCESS TO JOBS

Scenario 1 expands access to more jobs for the average resident than Scenario 2.

<table>
<thead>
<tr>
<th></th>
<th>SCENARIO 1 OVER BASELINE</th>
<th>SCENARIO 2 OVER BASELINE</th>
<th>RELATIVE CHANGE SCENARIO 1 OVER SCENARIO 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>30-minute transit trip</td>
<td>📢</td>
<td>📢</td>
<td>7x</td>
</tr>
<tr>
<td>45-minute transit trip</td>
<td>📢</td>
<td>📢</td>
<td>3x</td>
</tr>
<tr>
<td>60-minute transit trip</td>
<td>📢</td>
<td>📢</td>
<td>2x</td>
</tr>
</tbody>
</table>

Note: Results are preliminary and in the process of being finalized under contract with University of Minnesota Accessibility Observatory
**SCENARIO 1**

**Ridership Estimate**
- Will generate between 30-40% more additional ridership than Scenario 2

**Improved Transit Service**
- Improves service for 37% of the region’s population and 51% of the region’s employment vs. Scenario 2’s 27% of the population and 44% of employment
- Improves service for 280,000 more people than Scenario 2, 150,000 of which are low-income people and 160,000 are BIPOC
- Improves service for 120,000 more jobs than Scenario 2, including 60,000 low-wage jobs

**Change in Access to Transit by Service Level**
- Provides 400,000 additional people and 220,000 additional jobs with access to high-frequency transit
- Most people and jobs with a change in access are in Market Areas 1 and 2

**Network Access to Jobs**
- Scenario 1 expands access to between 2-7 times more jobs for the average resident than Scenario 2

**SCENARIO 2**

**Expanded Access to All-Day Transit**
- Scenario 2 provides 110,000 more people with access to all-day service, and 20,000 more affordable housing units than Scenario 1
- Scenario 2 provides all-day access to 60,000 more jobs, of which 30,000 are low-income, than Scenario 1

**Change in Access to Transit by Service Level**
- Provides 380,000 additional people and 290,000 additional jobs with access to local transit
- Most people and jobs with a change in access are in Market Area 3
SCENARIO ANALYSIS WORKSHOP

Key Takeaways

• Regional policymakers express consistent support for transit service improvements that prioritize equity, including service to low-income populations and communities of color

• Policymakers express a moderate preference for improving transit service frequency over expanding geographic coverage

• When evaluating future transit expansion options, the region’s planning and funding structure should be resilient in a range of possible future travel conditions

• While most participants preferred a balanced scenario of some sort, the group expressed a moderate preference for Scenario 1 compared to Scenario 2
COVERAGE SERVICE GUIDELINES

• Proposed methodology for defining coverage routes
  • Proposed evaluation criteria for coverage services
    o Job-access coverage service criteria:
      ▪ At least one-third of the jobs are within ¼ mile of the route pay $40,000 or less annually
    o Minimum productivity for Job-Access Coverage Service
      ▪ 5 boardings per hour
    o Minimum Combined Population and Employment Density for New Service
      ▪ New fixed routes: 10 residents or 5 jobs per acre within ¼ mile of proposed route
      ▪ New on-demand service: 3 residents and/or jobs per acre within ¼ mile of proposed route
FINAL TAKEAWAYS

• Providing equitable transit service is important for supporting historically underserved and underrepresented populations. Serving these populations should be used to prioritize future service investment.

• Increasing job access should be an important consideration in expanding the regional transit network.

• Future service investment should be coordinated with the continued development of planned transitways, as well as evolving land use patterns.

• Service improvements should prioritize providing high-quality and frequent transit service to both increase ridership and provide the region’s population with reliable and sustainable mobility options.
NEXT STEPS

• Outreach

• Share results of blended scenarios
  o Working on tool for stakeholders understand the impacts of alternative service allocation scenarios

• Adjusting policies and informing partners of regional values
  o Transit Service Design Guidelines and Performance Standards
  o Regional Solicitation
  o Transit provider service improvement plans
  o Transitway connecting bus service planning

• Keep the conversation going
QUESTIONS

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