# Technical Memo 3:
# Purpose and Need Statement

## *Highway 169 Mobility Study*

*Version 4.0*

**Prepared for: Minnesota Department of Transportation**

SRF Consulting Group, Inc. | Engineers Planners Designers

June 2016

SRF No. 8989

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# Origin of the Highway 169 Mobility Study

## Background and Previous Studies

Transportation investments in the Minneapolis-Saint Paul metropolitan region have shifted away from alleviating congestion by providing additional highway capacity for single-occupancy vehicles and toward investments that support efficient and reliable travel options via a system of regional transitways, a network of MnPASS lanes, and more sustainable development patterns.

Highway 169 is identified as a potential transitway in the "Increased Revenue Scenario" section of the Metropolitan Council's *2040 Transportation Policy Plan* (TPP). The Increased Revenue Scenario identifies a set of improvements to be pursued if/when additional funding is secured for transportation investments. Highway 169 was included in the TPP as a result of recommendations included in the Metropolitan Council's *Highway Transitway Corridor Study* completed in 2014. The study concluded that a bus rapid transit (BRT) investment may be feasible from Marschall Road in Scott County to downtown Minneapolis via Highway 169 and I-394.

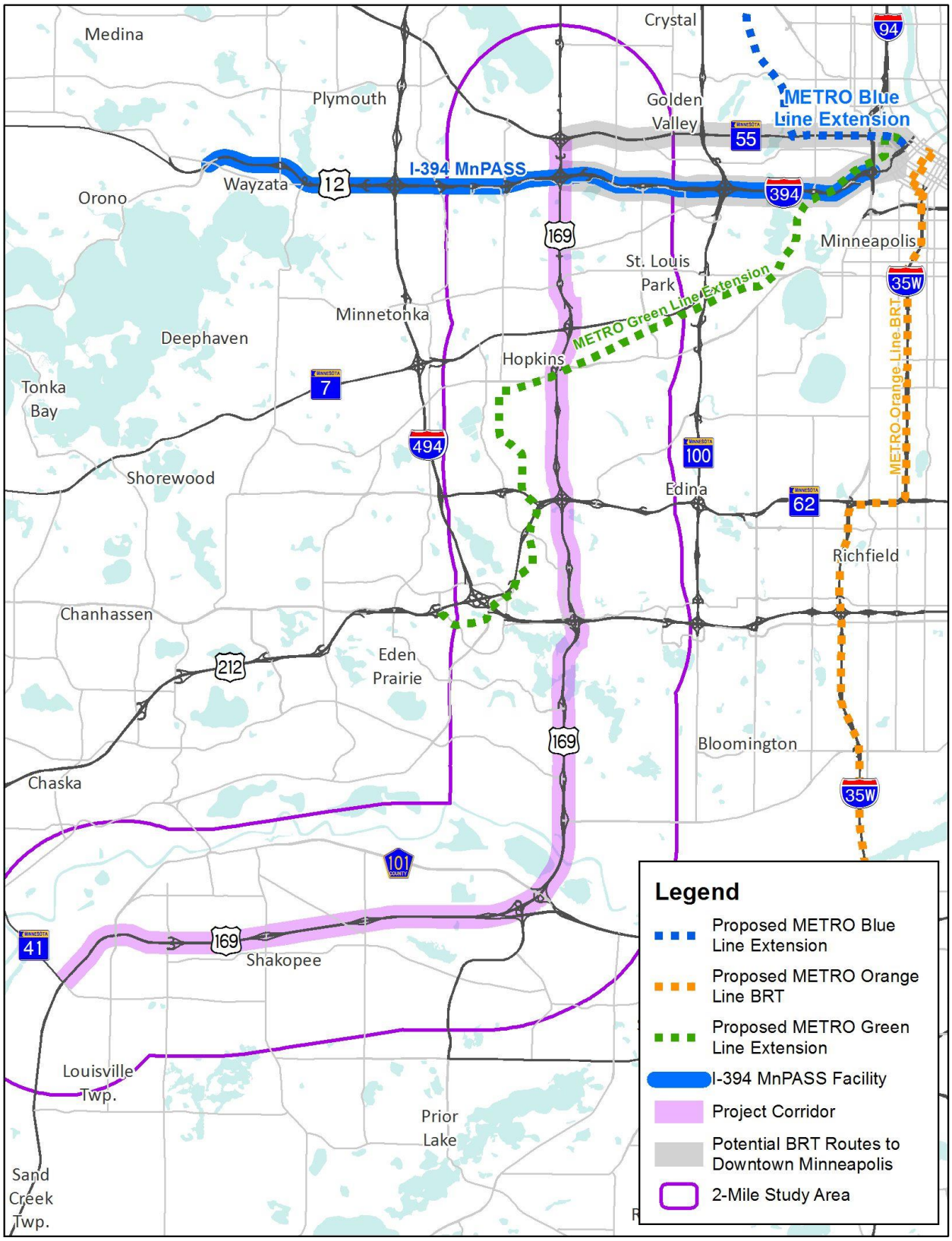
Based on recommendations from the *MnPASS System Study Phase 2* (2010) and the *Metropolitan Highway System Investment Study* (2010), Highway 169 between Marschall Road and I-494 is also designated as a MnPASS corridor in the Increased Revenue Scenario of the 2040 TPP.

This Highway 169 Mobility Study builds on the results of the *Highway Transitway Corridor Study* and *MnPASS System Study Phase 2* and will develop and evaluate potential options for improving transit and reducing congestion on Highway 169 between Shakopee and Golden Valley. To be consistent with regional policy and the results of previous studies, the Highway 169 Mobility Study will focus on a constrained set of alternatives: highway bus rapid transit (BRT); MnPASS Express Lanes; and spot mobility improvements such as the addition of auxiliary lanes or interchange modifications. See Figure 1 for a map of the study area.

## Partners and Funding

The Highway 169 Mobility Study is funded by Scott County, the Minnesota Department of Transportation (MnDOT), the Metropolitan Council, the Cities of Prior Lake and Shakopee, and the U.S. Highway 169 Corridor Coalition.

**Figure 1: Highway 169 Study Area**



# Purpose and Need

## Purpose of the Project

The purpose of the project is to increase access to jobs and destinations, provide transportation choices, and improve safety and travel time for Highway 169 users.

## Need for the Project

### Need improved connections between people, jobs, and other destinations throughout the corridor

Highway 169 crosses a range of landscapes and land uses that include corporate campuses, industrial and warehouse facilities, retail centers, single-family residential neighborhoods, clusters of apartment buildings, and several prominent natural features. Highway 169 in the study area connects the cities of Plymouth, Golden Valley, St. Louis Park, Minnetonka, Hopkins, Edina, Eden Prairie, and Bloomington in Hennepin County, and Savage and Shakopee in Scott County. The corridor is populous and jobs-rich, with more than 215,000 residents and 187,000 employees at thousands of businesses in a range of industries within two miles of Highway 169.

Both employment and population growth are expected to occur in the corridor over the next 25 years; by 2040 the corridor is projected to add more than 58,000 jobs and 63,000 people. Traffic volumes on Highway 169 in the study area range from 49,000 vehicles per day near Canterbury Road to more than 112,000 vehicles each day near I-394. Volumes are approaching the highway's capacity today on most of Highway 169 in the study area and reliance on single-occupancy vehicles limits the amount of residential and employment growth the corridor can absorb without significantly increasing delay on the highway.

The diversity of job types in office, industrial, medical, retail, and entertainment sectors requires a labor force with a wide variety of skills, education, and experience. However, the only way to reach most of the jobs in the Highway 169 study area is by automobile. According to Consumer Reports research, the median annual cost of owning a car is $9,100,[1] an expense that many workers who might otherwise pursue lower-wage employment in the corridor cannot afford. Because of the lack of transportation options to their locations, large employers in the southern part of the study area such as ValleyFair, Mystic Lake Casino, Canterbury Park, Shutterfly, and Amazon experience difficulty attracting workers to hourly-wage jobs. Meanwhile, low-income populations living in Golden Valley, Hopkins, and St. Louis Park cannot reach these jobs, or jobs at any of the other major employers in the corridor, without a car. In comparison to car ownership, unlimited rides on all Metro

[1] "What That Car Really Costs to Own". Consumer Reports, August 2012. Accessed at http://www.consumerreports.org/cro/2012/12/what-that-car-really-costs-to-own/index.htm May 2016

Transit, MVTA, Plymouth Metrolink, and SouthWest Transit local bus, light rail, and express service is a maximum of $113.50 each month, or $1,362 each year.[2] Please see the Land Use and Demographics section of the Existing Conditions and Market Analysis Memo for maps of large employers and demographic indicators in the study area.

Currently, nearly all transit service in the corridor is peak-period, peak-direction express bus service to and from downtown Minneapolis. Most roadway networks and development in the corridor exemplify typical post-war suburban American patterns, which limit the effectiveness of local-route bus service as well as commutes by foot or on bicycle. There are few transit options for reverse commuters or suburb-to-suburb commuters and few options available for transit-dependent populations (5.7 percent) in the corridor to reach jobs and destinations located outside of downtown Minneapolis. Please see the Transit Conditions section of the Existing Conditions and Market Analysis Memo for more detail on transit service in the corridor.

The results of the *Highway Transitway Corridor Study* demonstrated that there is relatively strong demand for high-frequency station-to-station transitway service on Highway 169 between Marschall Road Transit Station in Shakopee and downtown Minneapolis (via I-394). The study indicated potential 2030 forecasted daily ridership of approximately 7,800, based on demographic forecasts and transit improvements. Of these daily riders, about a quarter would be new transit riders, half would use the corridor during off-peak periods, and 40 percent would use the service to reverse commute to the south in the morning and/or to the north in the evening. Outside of downtown Minneapolis, the highest ridership potential were observed at:

- A station with a connection to Golden Triangle light rail station on the planned Green Line Extension
- Three stations along I-394 at Park Place Blvd, Louisiana Avenue, and General Mills Boulevard
- A station with a connection to potential arterial bus rapid transit on American Boulevard

## Need Highway 169 to move a growing number of people and goods with more travel options

Efficient use of Highway 169 for all users—transit riders, carpoolers, individual drivers, and freight haulers—is compromised by several conditions present in the corridor today. First, Highway 169 is congested during both the morning and evening peak periods. South of Highway 62, the congestion is more intense in the northbound lanes during the morning peak period, and in the southbound lanes in the evening peak period. North of Highway 62,

[2] A 31-day pass good for unlimited rides of $3.00 fare is $113.50 per month without subsidy. Employer and school-based subsidies are available that could reduce this cost to the rider. If the rider does not use express service they could purchase a 31-day pass for unlimited rides of $2.25 if they ride during rush hour ($85.00 per month) or $1.75 if they do not ride during rush hour ($59.00) per month. Fares are regional and apply to Metro Transit, SouthWest Transit, MVTA, and Plymouth Metrolink routes in the study area. Source: Metro Transit.

Highway 169 is congested in both directions for two to more than three hours in both the morning and evening peak periods. Among metro area highways, Highway 169 comprises 11.5 percent of total metro freeway congestion and has the fourth-most congested freeway miles in the region (after I-494, I-94, and I-35W).

Highway 169 is freight corridor as well as a commuter corridor. It plays a key role in moving goods, such as corn, soybeans, and ethanol produced in south-central and southwestern Minnesota, to regional and international markets. Highway 169 provides access to principal highways, rail lines, and the Ports of Savage for agricultural, energy, and mineral shippers.

Congestion is problematic because it results in delay for all users, makes travel times unreliable, and increases the likelihood of crashes. Crashes hurt people, cost money, and can disrupt highway operations, causing more congestion and in turn more crashes. Highway 169 between Highway 62 and I-394 has a crash rate greater than the average crash rate for segments with similar characteristics. Two of the segments in the corridor—between I-394 and Highway 55, and between I-494 and Highway 62—have a crash rate greater than the critical crash rate. While a higher than average crash rate does not necessarily indicate a significant crash problem, a crash rate that is greater than the critical crash rate indicates that there may be a geometric design or other issues that warrant further review or mitigation. In addition to crashes on the highway mainline, four interchanges in the study area are in the top 100 crash locations in the region: I-494, I-394, Highway 101, and Highway 7. Among metro area highways, Highway 169 has the third highest crash costs[3] after I-35W and I-94, and similar to I-494.

Reliable travel times are important because the more travel times vary on a given route, the earlier travelers must leave to ensure on-time arrival. A congested but consistent commute is easier to plan for than a less congested but very unreliable commute. In short, congestion affects quality of life by introducing uncertainty into commutes and other trips on Highway 169. Uncertain travel times especially affect transit riders, as transit routes must adhere to a schedule that is based on realistic travel times. If on a given day travel times are longer, it is likely that buses will be late picking up riders. When travel times are shorter, the bus still must stay on schedule, so riders cannot enjoy an appreciably shorter ride. Because of the congestion and lack of travel time reliability, SouthWest Transit has shifted several of its routes from Highway 169 to I-494.

Large segments of Highway 169 have poor travel time reliability in the peak periods: northbound Highway 169 between Scott County Highway 69 and Excelsior Boulevard in the morning, and southbound between Excelsior Boulevard and Old Shakopee Road and northbound between I-494 and Highway 55 in the evening. These segments all experience large amounts of delay lasting anywhere from 71 to 446 hours (for all vehicles) during an average peak period. For more detail on crashes and travel time reliability, please refer to the Travel Time Reliability section of the Existing Conditions and Market Analysis Memo.

The second condition affecting efficient movement of people and goods in the corridor is the absence of a "congestion-free" option in the form of a MnPASS lane. MnPASS lanes are

[3] Crash costs refer to the monetary representation of crash severity.

available only to transit vehicles, carpools, motorcycles, and individual motorists willing to pay a fee that fluctuates with the current level of congestion. By limiting users, MnPASS lanes are generally free-flowing, but dynamic pricing and policy allow them to be an option for anyone who wants to avoid congestion, whether that's by paying a fee, or by changing travel behavior from driving a single-occupancy vehicle to carpooling or taking transit.

The average vehicle occupancy rate[4] in the metro area is approximately 1.3 people per vehicle. This rate represents all roadway types and all times of day. Occupancy rates during the morning and evening peak periods tend to be lower, as most trips are commutes to work. Rates also tend to be lower on freeway facilities, since they are commuter-oriented and carry longer regional trips. Non-work trips such as shopping or school trips are more prevalent in off-peak times of day and tend to have higher occupancies. These trips are also frequently made within local communities and not on freeways. Though occupancy rates for Highway 169 are not available, the highway is estimated to have similar vehicle occupancy characteristics to other metro area freeways without MnPASS facilities, with a range of 1.05 to 1.10 persons per vehicle in the morning peak and 1.10 to 1.15 in the evening peak. Congestion-free MnPASS lanes offer an incentive to drivers to carpool, potentially increasing the vehicle occupancy rates on the highway, and allowing more people to use the corridor without increasing congestion. MnPASS lanes offer a congestion-free alternative to users who opt in, and movement of those users from general purpose lanes to MnPASS lanes helps to ease overall congestion.

Currently, express buses operating on Highway 169 during congested conditions use bus-only shoulders to bypass congestion. However, bus speeds are limited to 35 mph on shoulders so availability of MnPASS lanes to transit vehicles represents a significant potential increase in speed and corresponding reduction in travel time.

Finally, transportation technology continues to evolve in nearly every way. Dynamic pricing and flexible use of lanes, sophisticated signal timing and communication with vehicles, ride sharing subscription services like Uber and Lyft, car sharing programs like Car2Go, ZipCar, and Hourcar, real time transit information, and emerging driverless car technology make it very likely that the Twin Cities region, along with other urban centers in the United States, will experience a fairly radical departure from current transportation practices and patterns. These changes in technology all point toward more efficient use of both vehicles and infrastructure and are opportunities to positively affect the overall performance of Highway 169 and other regional highways.

## Need improvements to fit within the existing transportation system, current policy plans, and financial constraints

Transportation funding available at the federal, state, and regional levels of government is limited and highly sought. In order for potential improvements to Highway 169 to qualify

[4] As measured in the 2010 Metro Area Travel Behavior Inventory.

for funding and be implementable, they must be consistent with regional policy regarding highways and transitways. The TPP sets forth several strategies for realizing regional transportation goals that are directly applicable to the development of potential investments in Highway 169:

- *"The Council and regional transit providers will use regional transit design guidelines and performance standards, as appropriate based on Transit Market Areas, to manage the transit network, to respond to demand, and balance performance and geographic coverage.*
- *Regional transportation partners will continue to work together to plan and implement transportation systems that are multimodal and provide connections between modes. The Council will prioritize regional projects that are multimodal and cost-effective and encourage investments to include appropriate provisions for bicycle and pedestrian travel.*
- *Regional transportation partners will promote multimodal travel options and alternatives to single-occupant vehicle travel and highway congestion through a variety of travel demand management initiatives, with a focus on major job, activity, and industrial and manufacturing concentrations on congested highway corridors and corridors served by regional transit service.*
- *Regional transportation partners will manage and optimize the performance of the principal arterial system as measured by person throughput.*
- *Regional transportation partners will prioritize all regional highway capital investments based on a project's expected contributions to achieving the outcomes, goals, and objectives identified in Thrive MSP 2040 and the Transportation Policy Plan."*

Furthermore, with regard to investment in the highway system, the TPP states:

> *"If traffic management technologies and spot mobility improvements do not address the highway capacity issue identified, adding more physical capacity – expansion improvements – should be explored. Expansion improvements include new or extended MnPASS lanes, strategic capacity enhancements, and highway access investments. The regional objective of providing a congestion-free, reliable option for transit users, carpoolers and those willing to pay through MnPASS lanes is the region's priority for expansion improvements. General purpose lane strategic capacity enhancements should only be considered if adding capacity through MnPASS lanes has been evaluated and found to not be feasible, the improvement is affordable, and the improvement is approached with a lower cost/high-return-on-investment philosophy."*

Consistent with this approach, MnPASS lanes are being considered for Highway 169 but the addition of general purpose lanes are not because they would not constitute a plausible project. As the study advances a MnPASS alternative will be developed that, to the extent possible, uses existing transportation right-of-way, structures, pavement, and other infrastructure.

With regard to investment in the Twin Cities transitway system, the 2040 TPP states:

> *"The region will also need to build, operate, and maintain a system of transitways that will improve service in high-demand corridors and connect more areas of the region with frequent, reliable transit*

*service…Expansion of the transitway system will be guided by investment factors that will assist the region in setting priorities for investment that have the greatest return for the region."*

In following with this policy guidance, the Highway 169 Mobility Study will consider transit improvements that are consistent with regional strategies and provide a strong return on investment. Based on the results of previous studies, highway BRT will be the only transitway mode considered for the Highway 169 corridor.

# Project Goals and Objectives

*Goal 1: Improve access to local and regional destinations, activity centers, and employment concentrations*

- Improve transit access to people, places, and jobs
- Accommodate existing and future travel needs
- Improve opportunities for future economic development along the corridor
- Improve travel time reliability

*Goal 2: Provide better mobility in the corridor and options to avoid congestion*

- Maximize the number of users that can be served during peak periods
- Improve travel times and limit congestion's impact on all users
- Limit the duration and extent of congestion that contributes to safety issues
- Contribute to an improved overall travel experience across the transportation network

*Goal 3: Improve the attractiveness of transit to serve more people in the corridor*

- Provide transit advantages in addition to those already in place
- Provide transit options to serve a variety of riders including seniors, those who are transit reliant, and the emerging workforce of the future
- Link the variety of job types and times in the corridor to potential employees already living there

*Goal 4: Provide a high long-term return on the transportation investment*

- Limit capital and operating costs as they relate to benefits
- Qualify for potential funding based on policy parameters

*Goal 5: Prioritize service to existing transit-supportive areas and to those committed to implementing development patterns that support transit service*

- Improve transit in areas where planning policies for land use, zoning, densities, and parking requirements are transit-supportive
- Improve transit in areas with supportive plans and policies for direct and complete pedestrian and bicycle networks
- Provide travel options to accommodate forecast population and employment growth in the corridor

*Goal 6: Preserve and enhance the quality of the built and natural environments*

- Minimize impacts to community assets and the natural environment
- Use existing infrastructure and right-of-way to the maximum extent possible

# Evaluation Criteria

Evaluation criteria will be used to measure the performance of the three alternatives studied in detail in relation to the project goals and objectives.

*Goal 1: Improve access to local and regional destinations, activity centers, and employment concentrations*

- Improve transit access to people, places, and jobs
- Accommodate existing and future travel needs
- Improve opportunities for future economic development along the corridor
- Improve travel time reliability

| Evaluation Measure | Evaluation Data Source | Measure Type |
|---|---|---|
| Current population and employment within ½ mile of station areas (transitway alternatives) | Met Council TAZ current population and employment | Quantitative |
| Travel-time reliability | Highway forecast and operations analysis | Quantitative |
| Alternative serves top destinations in the corridor | PMT/TAC to decide on priority centers | Qualitative |

*Goal 2: Provide better mobility in the corridor and options to avoid congestion*

- Maximize the number of users that can be served during peak periods
- Improve travel times and limit congestion's impact on all users
- Limit the duration and extent of congestion that contributes to safety issues
- Contribute to an improved overall travel experience across the transportation network

| *Evaluation Measure* | *Evaluation Data Source* | *Measure Type* |
|---|---|---|
| Total peak-hour person throughput | Highway forecast and operations analysis | Quantitative |
| Delay per user (general purpose lane users, MnPASS users (both private vehicle and transit), and bus-on-shoulder users) | Highway forecast and operations analysis | Quantitative |
| Vehicle hours traveled (does not include transit vehicles) | Highway forecast and operations analysis | Quantitative |
| Reduction in crash risk factors (recurring congestion and freeway access conflicts) | Highway forecast and operations analysis | Quantitative |

*Goal 3: Improve the attractiveness of transit to serve more people in the corridor*

- Provide transit advantages in addition to those already in place
- Provide transit options to serve a variety of riders including seniors, those who are transit reliant, and the emerging workforce of the future
- Link the variety of job types and times in the corridor to potential employees already living there

| *Evaluation Measure* | *Evaluation Data Source* | *Measure Type* |
|---|---|---|
| Total corridor and system ridership benefitting from improved transit advantages (includes BRT and express bus ridership for all routes in each alternative's service plan) | Ridership forecast | Quantitative |
| Off-peak period, reverse-commute direction, and transit-dependent ridership | Ridership forecast | Quantitative |
| Bus rapid transit ridership | Ridership forecast | Quantitative |

*Goal 4: Provide a high long-term return on the transportation investment*

- Limit capital and operating costs as they relate to benefits
- Qualify for potential funding based on policy parameters

| *Evaluation Measure* | *Evaluation Data Source* | *Measure Type* |
|---|---|---|
| Capital costs | Capital cost estimate | Quantitative |
| Operating and maintenance costs | O&M cost estimate | Quantitative |
| Annualized capital plus operating costs per trip (transit) | Capital and operating cost estimates | Quantitative |
| Cost per reliable trip (MnPASS) | Capital and operating cost estimates | Quantitative |
| Operations and maintenance factors (maintenance performance, ease of enforcement, incident management) | Highway forecast and operations analysis | Qualitative |

*Goal 5: Prioritize service to existing transit-supportive areas and to those committed to implementing development patterns that support transit service*

- Improve transit in areas where planning policies for land use, zoning, densities, and parking requirements are transit-supportive

- Improve transit in areas with supportive plans and policies for direct and complete pedestrian and bicycle networks
- Provide travel options to accommodate forecast population and employment growth in the corridor

| *Evaluation Measure* | *Evaluation Data Source* | *Measure Type* |
|---|---|---|
| Existing multi-modal-supportive policies | Cities' comprehensive plans | Qualitative |
| Existing bicycle and pedestrian policies and networks | Cities' comprehensive plans and counties' bicycle plans | Qualitative |
| Forecast population and employment within ½ mile of station areas (transitway alternatives) | Met Council TAZ forecast population and employment | Quantitative |

*Goal 6: Preserve and enhance the quality of the built and natural environments*

- Minimize impacts to community assets and the natural environment
- Use existing infrastructure and right-of-way to the maximum extent possible

| *Evaluation Measure* | *Evaluation Data Source* | *Measure Type* |
|---|---|---|
| Potential environmental impacts (cultural and historic resources, park land, air quality) | Environmental/community analysis | Qualitative, Quantitative |
| Potential social/community impacts (bicycle and pedestrian, environmental justice populations, right-of-way) | Environmental/community analysis | Qualitative, Quantitative |