Highway Transitway Corridor Study

Highway 55: Final Report Addendum

Prepared for: Metropolitan Council

SRF Consulting Group, Inc. | Engineers Planners Designers

February 2015

SRF No. 7994

Table of Contents

List of Figures

Introduction

The Metropolitan Council initiated the Highway Transitway Corridor Study (HTCS) to examine the potential for all-day, frequent, station-to-station, highway bus rapid transit (BRT) along eight Twin Cities corridors. The corridors are shown in blue on Figure 1. The figure also identifies other corridors that are being studied or have been studied for Highway BRT through studies led by other agencies. This addendum to the HTCS final report documents a separate but related analysis of Highway 55 BRT completed after the initial study.

Why were these corridors selected for the study?

The Metropolitan Council's 2030 *Transportation Policy Plan* (TPP) recommends a mix of investments in the transitway system for the Twin Cities region, including commuter rail, light rail transit (LRT), dedicated busways, BRT on both arterial streets and highways, and express bus corridors with transit advantages. Prior to adopting the 2030 TPP, the Metropolitan Council completed the *Transit Master Study* to determine the feasibility of transitway investments along an extensive list of corridors in the region. At the time, only LRT and dedicated busway were analyzed for relative demand and costs when compared across corridors.

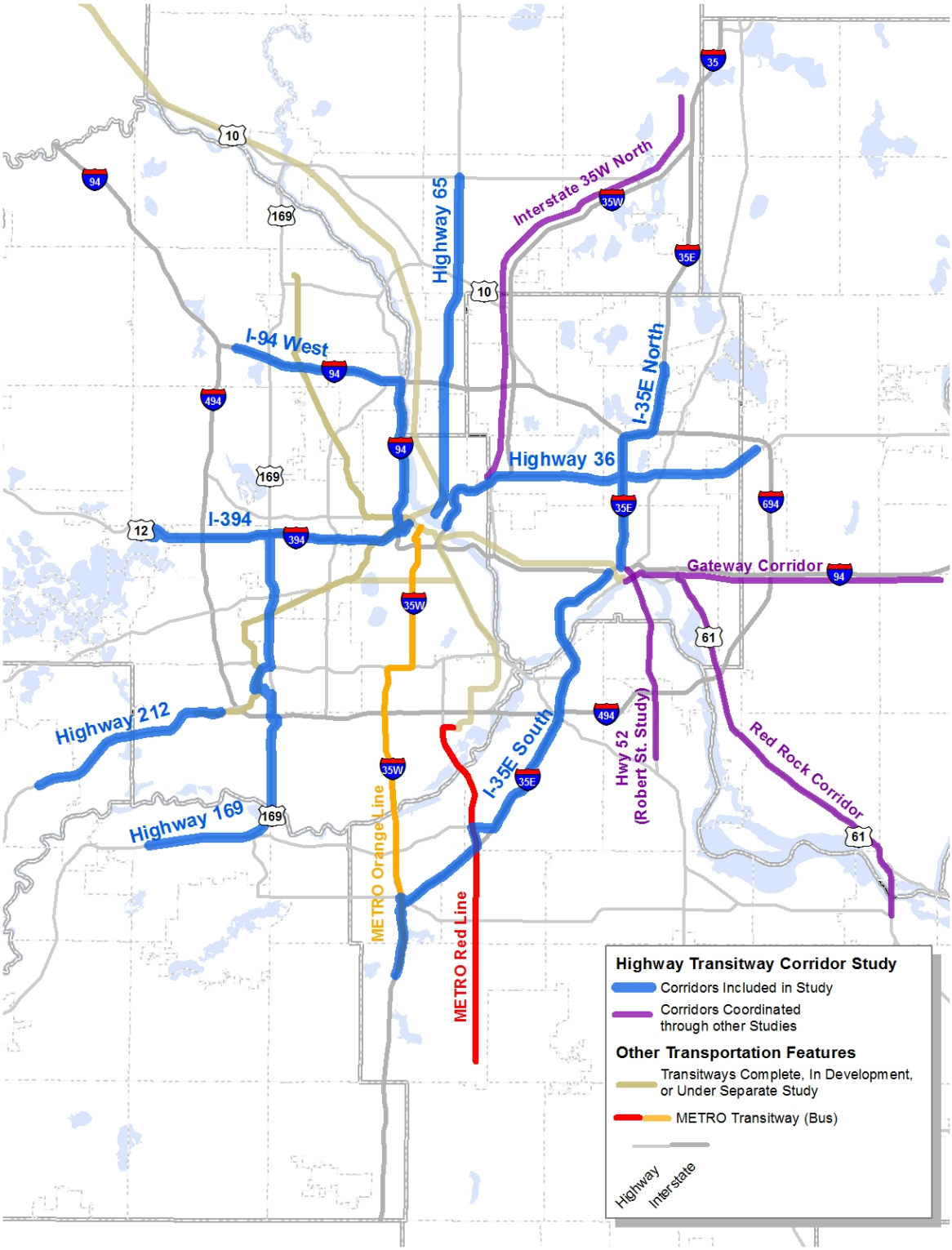
In the 2030 TPP, a number of transitway corridors in the region remain undetermined in terms of identification of a preferred mode and alignment. The TPP recommends further study of these corridors. The Highway Transitway Corridor Study focused on these corridors to determine the potential for Highway BRT. The corridors studied included:

- I-94
- Highway 65
- I-35E North
- Highway 36
- I-35E South
- Highway 169
- Highway 212
- I-394

Highway 55 Corridor

The original study was completed in May 2014. However, during the final phases of the process, stakeholders from the cities of Medina and Plymouth approached the Metropolitan Council and expressed interest in including the Highway 55 corridor in the Highway Transitway Corridor Study analysis. The Metropolitan Council extended the study to include an analysis of the Highway 55 corridor in response to this request.

Figure 1: Highway Transitway Corridor Study Corridors



What analysis was completed for Highway 55?

The purpose of conducting an analysis for Highway 55 was to determine the demand for all-day, frequent Highway BRT service in the corridor using similar analysis techniques that were used in the original study. Similar to the analysis completed for the other study corridors, the Highway 55 analysis included documenting existing conditions, concept development, and corridor evaluation.

Who was involved in the Highway 55 analysis?

The Metropolitan Council was the lead agency for the Highway 55 addendum; however, a group of stakeholders from various agencies participated in the Highway 55 analysis process. This group included stakeholders from the following agencies and communities:

- Metropolitan Council
- Minnesota Department of Transportation
- Hennepin County
- Metro Transit
- Plymouth Metrolink
- City of Medina
- City of Plymouth
- City of Golden Valley
- City of Minneapolis

At the beginning of the Highway 55 BRT analysis, representatives from these agencies and communities met at a stakeholder workshop to provide input on the Highway 55 BRT concept, particularly focused on recommendations for station locations and alignment with local plans. A summary of this meeting and the feedback received is including in Appendix A of this addendum. Metropolitan Council staff also conducted multiple meetings with individual agency and community staff to gather detailed feedback on stations and routing throughout the Highway 55 analysis process.

What is Highway BRT?

The purpose of Highway BRT is to provide fast, frequent, all-day service that is cost-effective in serving high-demand regional population, employment, and transit nodes in highway corridors. Highway BRT is a practical approach to developing improved transit service that fits within highway infrastructure and serves regional transit demand where cost of transitway alternatives, such as light rail transit (LRT), are prohibitive. The Regional Transitway Guidelines defines Highway BRT station-to-station service as:

> "A coordinated set of routes that stop at all or most stations in the Highway BRT corridor, which is defined by stations and runningway infrastructure. It provides service seven days a week, 16 hours per day, and at least every 10 minutes during peak periods with lower frequencies during mid-day and evenings."

At the beginning of the study, five goals were identified for use in later evaluation stages of the study. The five goals are:

1. Provide mobility benefits and respond to trip patterns/needs and deficiencies for markets identified in the purpose and need
2. Provide affordable, effective transportation improvements
3. Meet 2030 *Transportation Policy Plan* ridership goals
4. Seamlessly integrate with existing systems and provide valuable regional connections
5. Support area development plans, forecast growth assignment, redevelopment potential

The key elements of Highway BRT are briefly described in this section. For a more in-depth discussion of Highway BRT elements please see the *Highway Transitway Corridor Study Final Report* (under separate cover).

Stations

Bus rapid transit on highways can include three different station types: online, inline, and offline (see descriptions in *Highway Transitway Corridor Study Final Report*). For Highway 55, the majority of stations considered during concept development were assumed to be either inline or offline stations. Inline stations are located adjacent to the runningway and usually require BRT vehicles to exit the runningway to access a station. Few or no turns are required for inline stations as they are typically located on the access ramps of the highway. Since the majority of Highway 55 has at-grade intersections, stations would be located at an intersection rather than on an access ramp and would be functionally similar to online stations. Offline stations are located away from the runningway and always require BRT vehicles to leave the runningway and travel some distance to access a station. This is often to access a nearby park-and-ride facility that is not directly adjacent to the runningway. For Highway 55, the majority of stations were assumed to be inline stations, similar to what is shown in Figure 2.

Highway BRT stations were assumed to have the premium amenities included at other transitway stations in the region. Highway BRT stations would include shelters with on-demand heat, off-board

fare collection, real-time vehicle arrival and departure information, as well as many other customer amenities.

Figure 2: Example of an Inline Highway BRT Station Design

Runningways

The study assumes that Highway BRT vehicles would travel in mixed traffic on the highways. Buses would travel in the outside lanes to provide smooth transitions to and from station locations. For highways that currently have bus-only shoulders, BRT buses would use these shoulders during congested times of day under MnDOT and Metro Transit's and other regional transit providers' operational requirements.

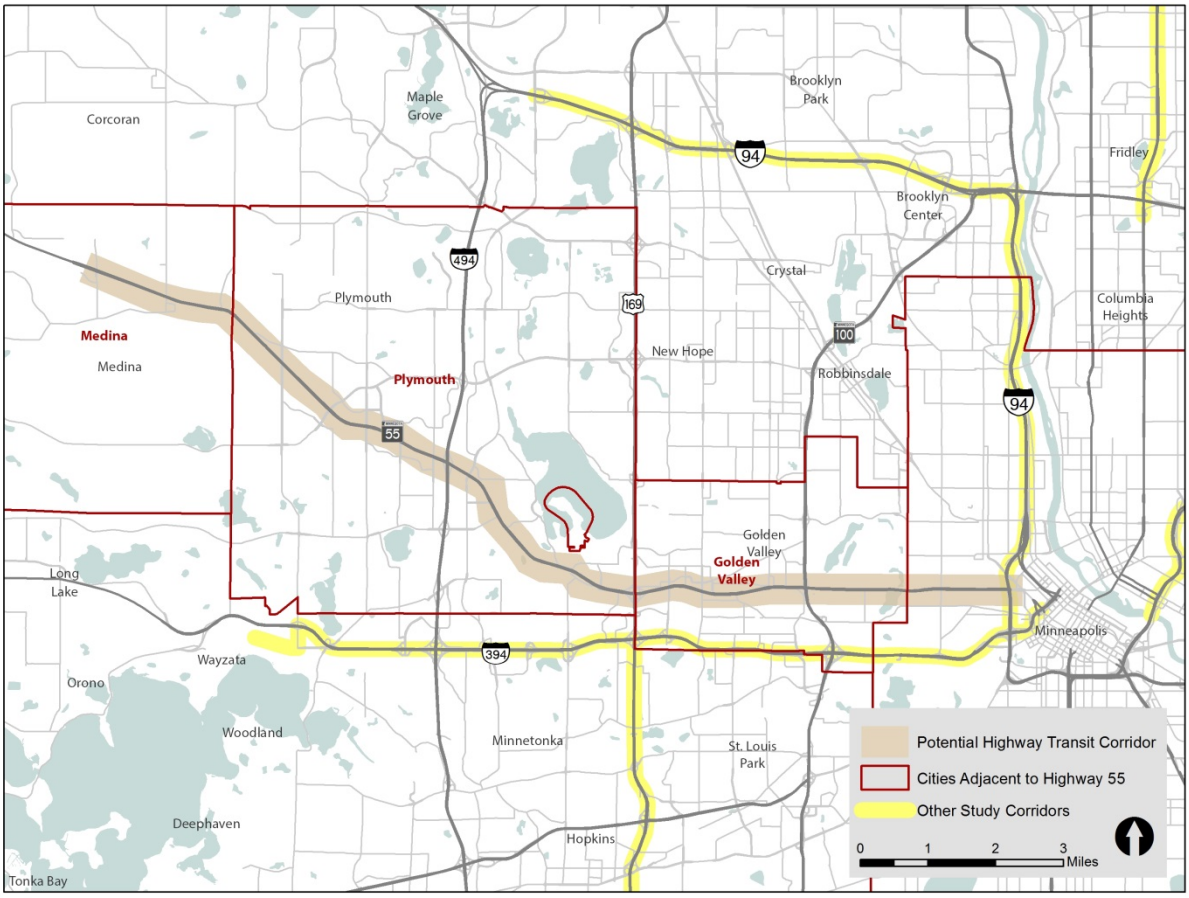
Vehicles

Highway BRT vehicles would have a unique look distinct from regular local and express service, similar to those used on the METRO Red Line, and would be designed to allow for faster boarding and alighting.

Highway 55 Existing Conditions

The Highway 55 corridor runs approximately 15 miles from downtown Minneapolis to the city of Medina, as shown in Figure 3. Highway 55 serves the cities of Medina, Plymouth, Golden Valley, and Minneapolis.

Figure 3: Highway 55 Corridor



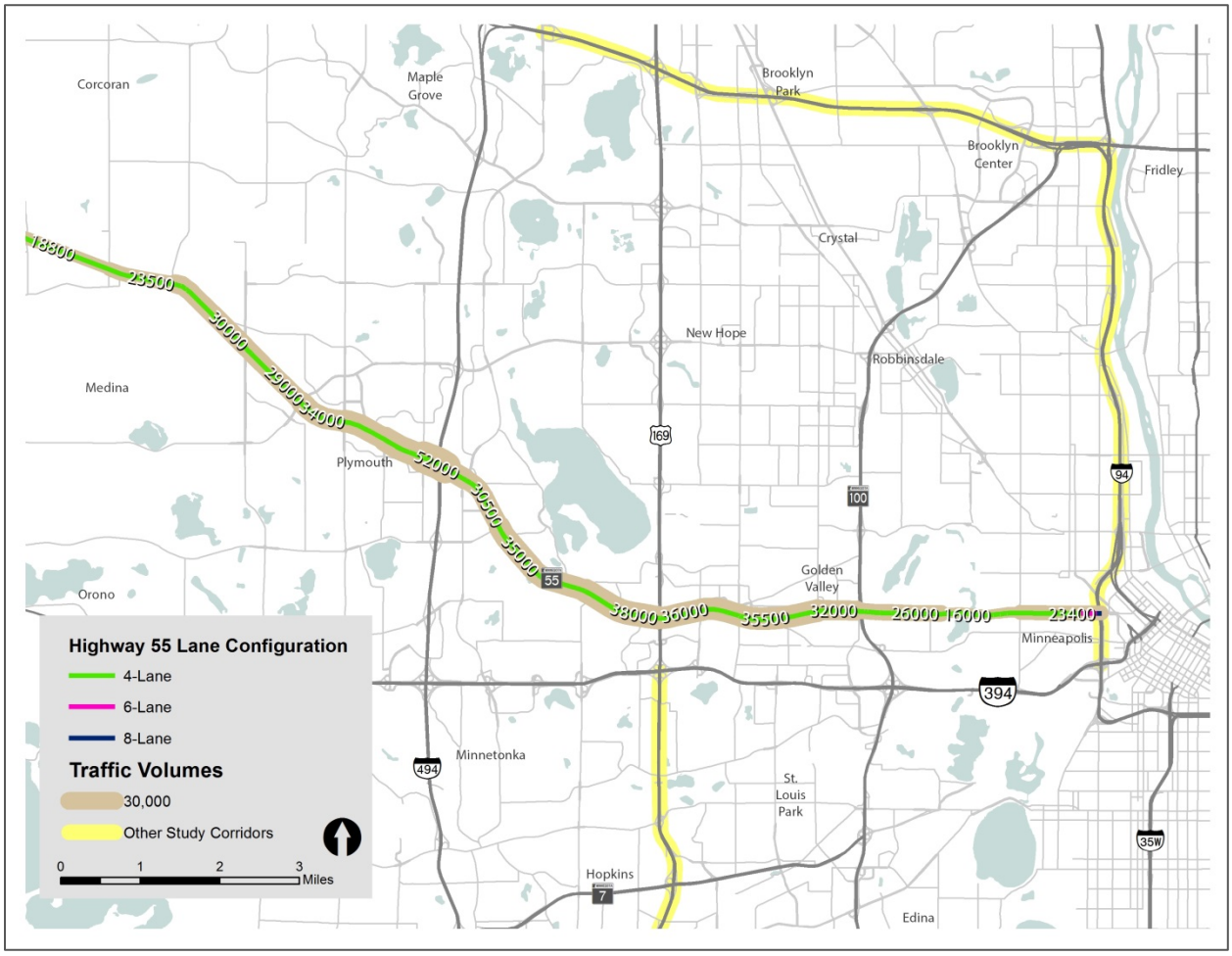
Roadway Characteristics

Highway 55 is a divided highway with two lanes in each direction for the entire length of the study area except for a small portion near downtown Minneapolis where it widens to three lanes in each direction.

Traffic Volumes

2012 average daily traffic (ADT) volumes on Highway 55 are shown in Figure 4. Traffic volumes in the Highway 55 corridor stay between 30,000 and 38,000 vehicles per day on average between County Road 101 and Highway 100. Traffic levels start to taper off east of Highway 100 as Highway 55 enters downtown Minneapolis. Traffic levels peak at the intersection of Highway 55 and I-494.

Figure 4: Highway 55 Traffic Volumes



Transit Infrastructure

Existing transit routes, transit infrastructure, and transit advantages are shown in Figure 5. There is one park-and-ride facility on Highway 55 in the City of Plymouth: Station 73 on Highway 55 at County Road 73. Station 73 serves express routes 747, 772, 774, 777, and 795 to downtown Minneapolis. Table 1 shows the existing park-and-ride capacity and use in the Highway 55 corridor. Figure 6 illustrates the home origins of park-and-ride users in the Highway 55 corridor and the adjacent I-394 corridor.

Table 1: Highway 55 Park-and-Ride Usage

Park-and-Ride Facility	Park-and-Ride Usage		
	Use	Capacity	% Used
Station 73	143	280	51%

Source: Metropolitan Council, 2013

Figure 5: Highway 55 Existing Transit Routes and Infrastructure

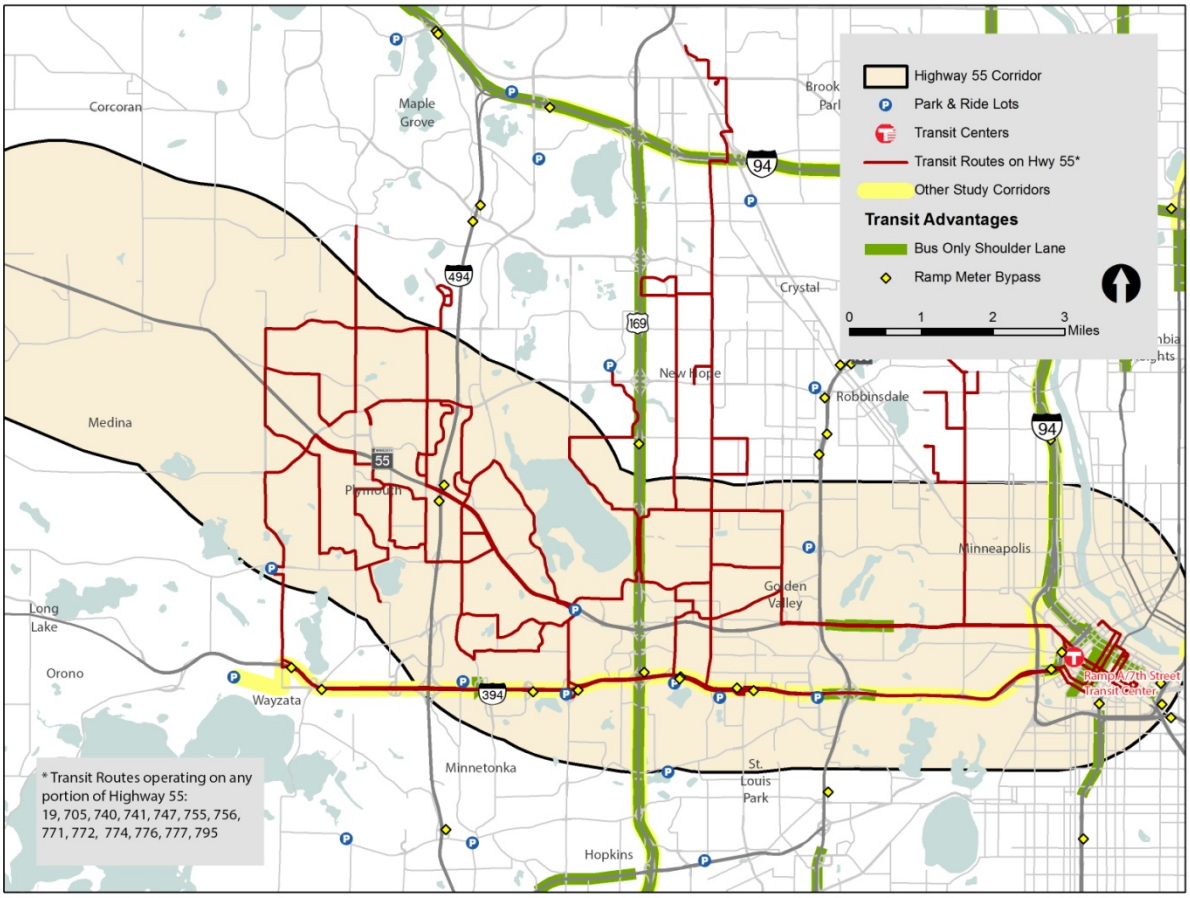
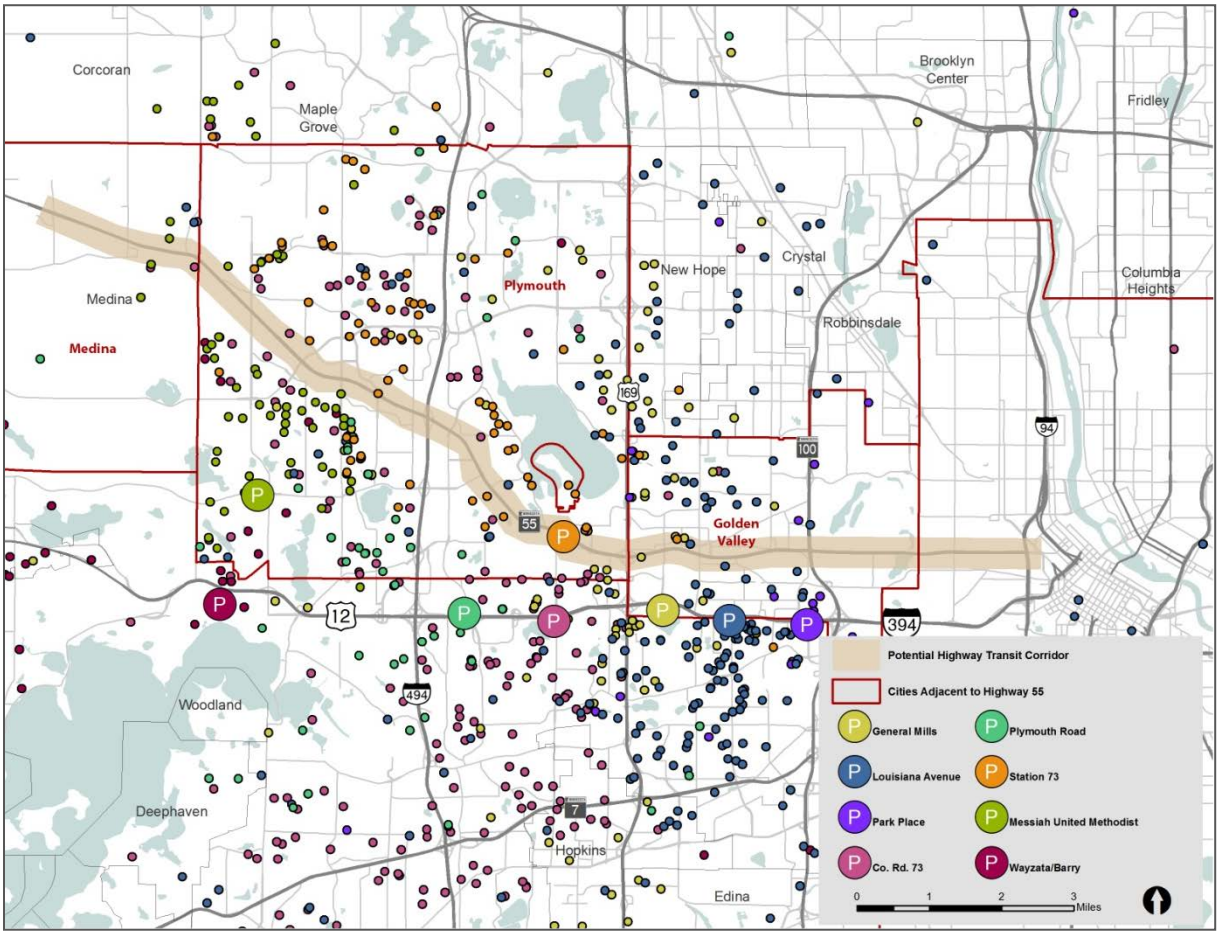


Figure 6: Highway 55 and I-394 Park-and-Ride User Origins



Existing Transit Routes

Currently eleven bus routes serve the Highway 55 corridor, primarily connecting through the Station 73 park-and-ride. Table 2 presents current service characteristics of each route.

Table 2: Highway 55 Transit Service and Performance Characteristics by Route

Route	Span of Service	Frequency (minutes) (Peak/Mid/Eve)
19	2:30AM – 1:38AM	10 / 10 / 12
705	5:10AM – 9:19PM	60 / 60 / 0
740	6:15AM – 5:37PM	30 / 0 / 0
741	6:15AM – 5:12PM	30 / 0 / 0
747	5:11AM – 6:10PM	30 / 0 / 0
755	5:05AM - 6:54PM	30 / 0 / 0
771	5:45AM – 6:45PM	30 / 0 / 0
772	5:57AM – 6:31PM	30 / 0 / 0
774	6:09PM – 7:41PM	2 trips
777	5:43AM – 6:48PM	30 / 0 / 0
795	12:11PM – 2:58 PM	0 / 120 / 0

Employment Centers

Corridor employment centers are defined as contiguous areas with 7,000 or more jobs and a job density of ten or more jobs per acre. The Metropolitan Council used a combination of 2010 Quarterly Census of Employment and Wages (QCEW) data and the Metropolitan Council's Generalized Land Use boundaries to identify corridor employment centers. The Council also classified each job center as a Metro Center, a Regional Center, or a Subregional Center. Metro Centers have the most jobs and highest job densities and subregional centers have the fewest jobs.

There is one regional employment center and one subregional employment center in the Highway 55 corridor, as shown in Table 3.

Table 3: Highway 55 Corridor Employment Center Characteristics

Employment Centers	Type of Center	Number of Jobs at Employment Center
Highway 55/I-494	Regional Employment	24,700
Highway 55/Highway 169	Subregional Employment	12,400

Existing and Forecast Population and Employment Levels

The existing and forecast population and employment levels at all potential Highway 55 BRT station locations are shown in Figure 7 through Figure 10. All full-access local intersections were considered potential station locations in the Highway 55 corridor. Full access local intersections were defined as any non-interstate roadway intersection with Highway 55 that allows for travel in both directions.

Population and employment figures were estimated for the land area within two miles of a potential station location.

Figure 7: 2010 Employment Density (Employment per Acre)

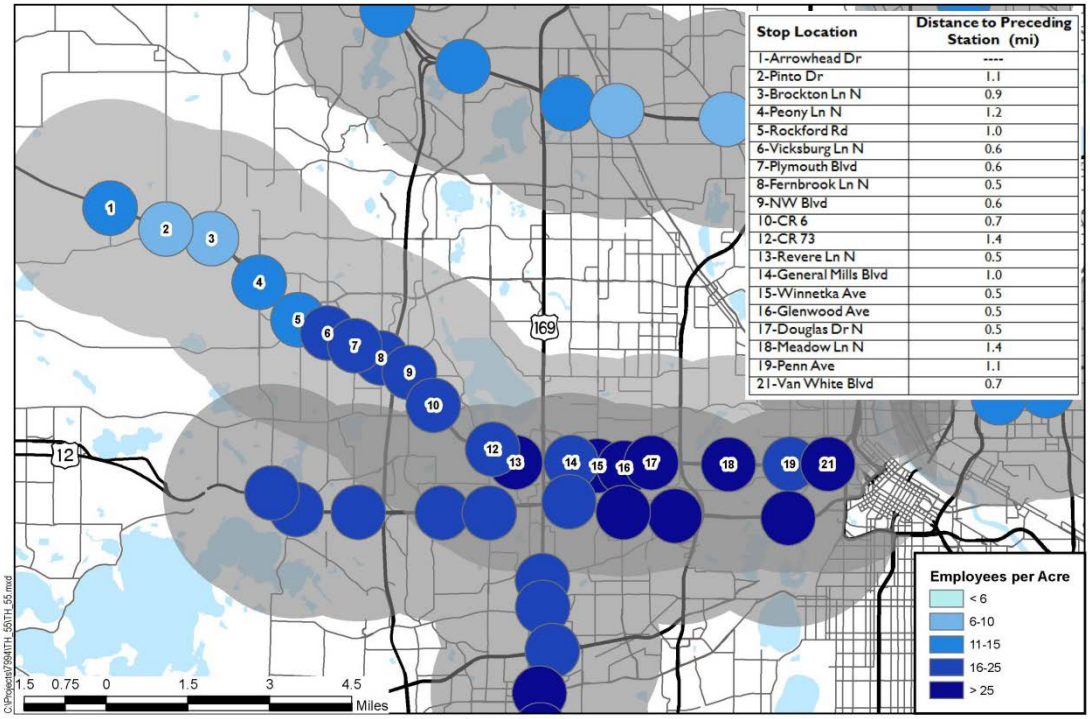


Figure 8: 2010 Population Density (People per Acre)

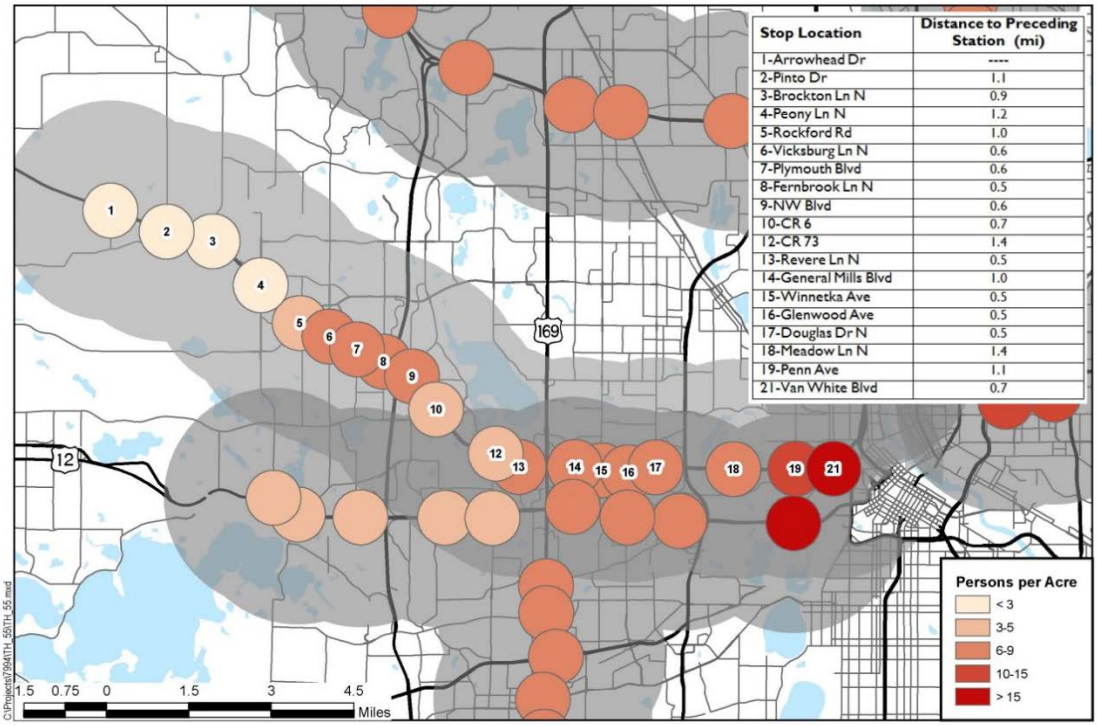


Figure 9: 2030 Employment

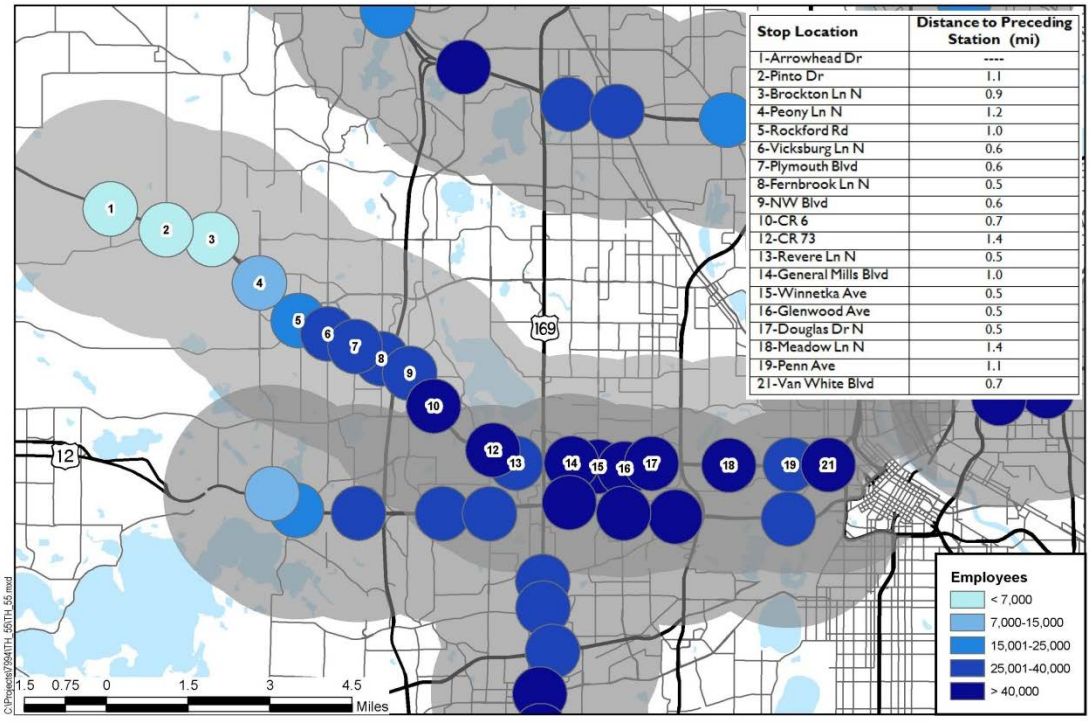
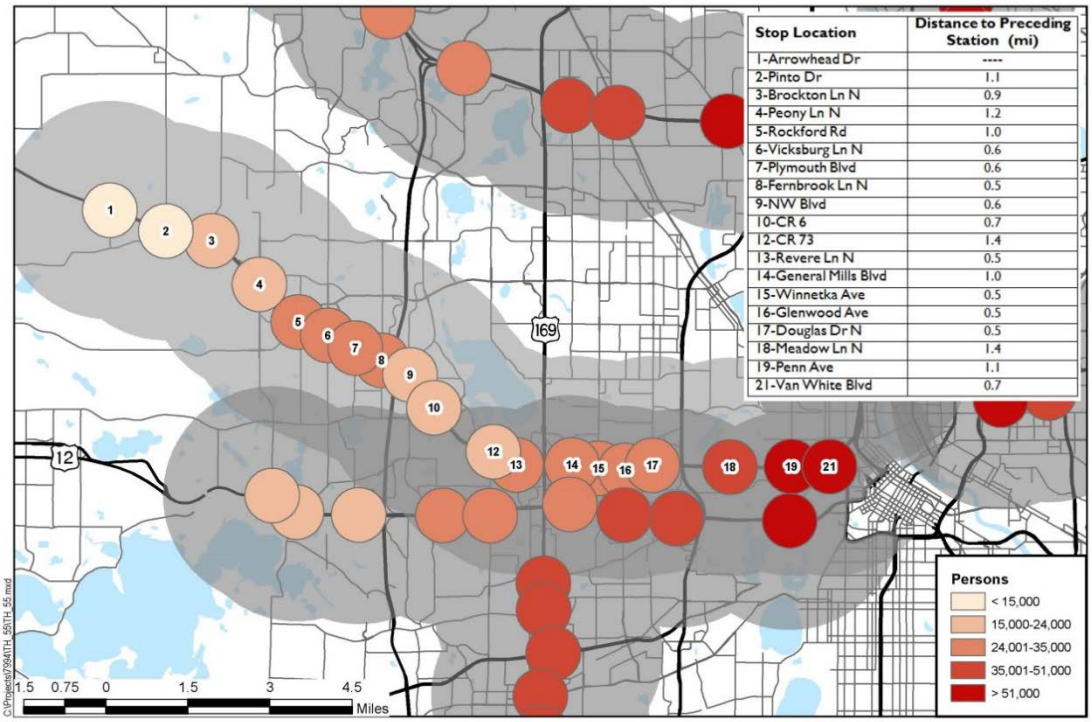


Figure 10: 2030 Population



Highway 55 Concept Development

The concept development process for the Highway 55 corridor was consistent with the process for the original eight study corridors. The purpose of concept development was to identify the costs and ridership of station-to-station BRT service. The methodology for estimating these costs and the ridership for the Highway 55 BRT service is briefly described in this section. For a more in-depth discussion of concept development please see the *Highway Transitway Corridor Study Corridor Final Report* (under separate cover).

Selecting Stations for Analysis

Station locations for the Highway 55 BRT analysis were selected through a collaborative stakeholder workshop. At the workshop, stakeholders were given an overview of the existing conditions and asked to provide recommendations for station locations. A summary of this workshop is included in Appendix A. The outcome of the stakeholder workshop was a draft set of Highway 55 BRT station location recommendations. After the workshop, project staff spoke one-on-one with project stakeholders to address any specific issues with the draft station locations in their communities or areas of influence. For example, project staff spoke with MnDOT to confirm the stations were consistent with future planning within MnDOT right-of-way. Specific right-of-way needs and availability were only examined at a conceptual level for this study and not thoroughly examined and agreed upon by all partners. After some minor adjustments, project stakeholders agreed upon the 11 station locations shown in Figure 11. It should be noted that, consistent with the original study analysis, downtown station locations and Highway BRT routing was not analyzed as a part of Highway 55 BRT analysis.

Capital Cost Estimates

Highway 55 capital cost estimates include the initial expenditure to build the system, any necessary corridor construction, stations and technology systems, operations and maintenance facilities, vehicles, and right-of-way acquisition. "Soft costs" were also included in the cost estimate for items such as engineering, construction services, insurance, and owner's costs, as well as contingencies for uncertainty in both the estimating process and the limited scope of this study. A summary of the capital cost estimate for the Highway 55 concept is included in Appendix C.

Operating Plans

Operating plans for the corridor were focused on new Highway BRT station-to-station service in the corridor, with some minor modifications to other routes to provide better connectivity to stations and eliminate redundancy. The analysis assumed that station-to-station service would operate seven days a week with a 16-hour span of service (for example 6 a.m. – 10 p.m.) on weekdays and Saturdays and 13 hours (for example 7 a.m. – 8 p.m.) on Sundays. It is assumed that service frequency would be every 15 minutes on weekdays and during the day on Saturdays, and every 30 minutes on Saturday evenings and Sundays.

Operating plans were developed for the Highway 55 BRT corridor using the service frequency assumptions and a Highway 55 BRT station-to-station travel time estimate was developed through this analysis. This operating plan was used to estimate operating and maintenance costs for the corridor. A summary of the operating plan for the Highway 55 concept is included in Appendix B and a summary of operating and maintenance costs for the Highway 55 concept is included in Appendix D.

Ridership

Forecast Year 2030 ridership was estimated for the Highway 55 BRT corridor using the Twin Cities Regional Travel Demand Model. Ridership forecasts were based on land use and development assumptions consistent with the Metropolitan Council's Regional Development Framework and local comprehensive plans as of January 2012. As part of the model validation process, the region was divided into study corridor or sub-corridor districts so mode choice and travel patterns could be analyzed.

The following set of ridership information was developed for each corridor:

- **Corridor Bus Route Ridership**: number of trips taken on local or express route (but not BRT station-to-station route) in the study corridor; must use at least one non-downtown Highway BRT station and utilize a significant portion of the Highway BRT runningway.
- **Highway BRT Station-to-Station Ridership**: number of trips taken on the proposed Highway BRT all-day station-to-station route in the study corridor.
- **Transitway Total**: combined total of "corridor bus route ridership" and "highway BRT station-to-station" ridership.
- **Percent Transit Reliant Ridership**: percentage of "station-to-station" rides taken by persons from zero-car households.
- **New Transit Riders**: estimated number of new riders that would choose to use "highway BRT station-to-station" service rather than making a trip by automobile.
- **Current Year Ridership with Build Alternative**: estimated number of riders on "highway BRT station-to-station" service assuming all concept plan improvements were implemented in current year (2010 data).

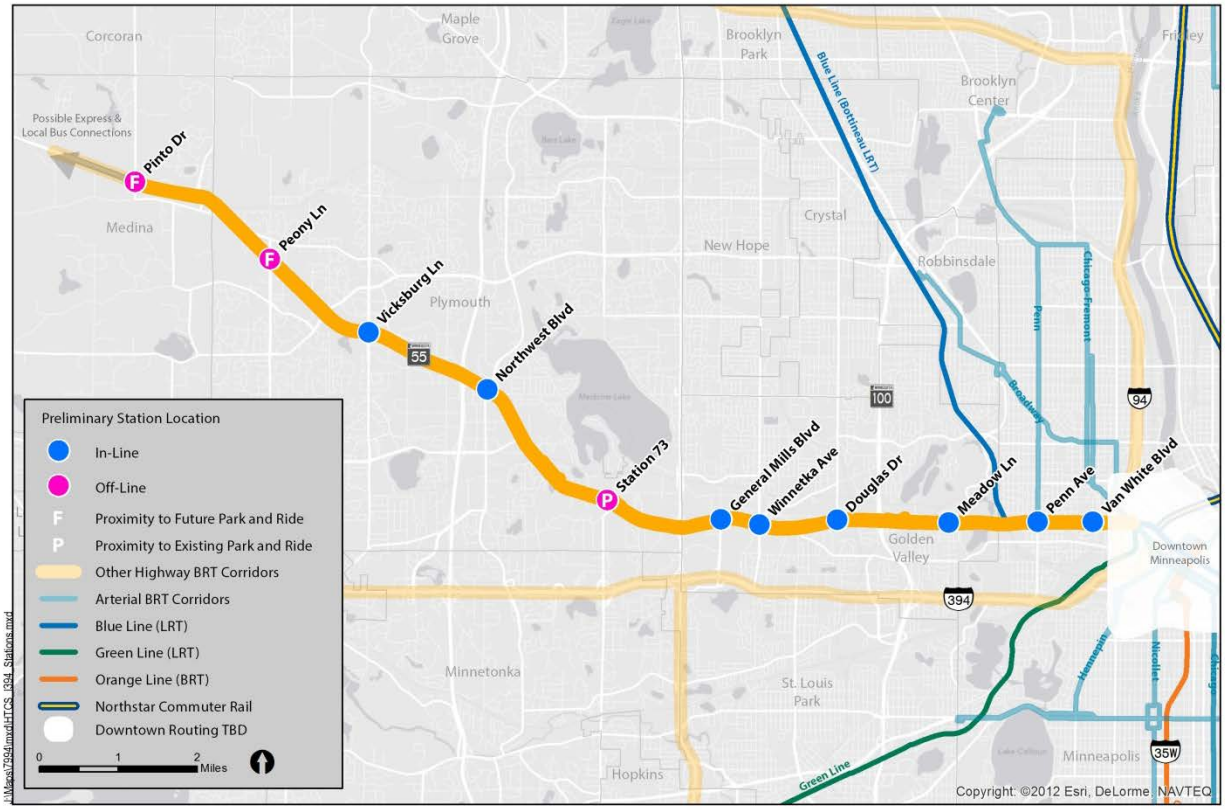
Modeling Highway 55 versus I-394

Ridership estimates for the original study analysis were modeled as a system, meaning the model assumed all eight corridors (i.e. all eight Highway BRT lines together) as opposed to individual corridors. In the Highway 55 BRT ridership analysis, the I-394 Highway BRT corridor was removed from the model and replaced with the Highway 55 BRT corridor. By removing the I-394 corridor from the model, the project team ensured the Highway 55 ridership estimates were not affected by the corridors' overlapping travel markets.

Highway 55 Corridor Concept Development Summary

The Highway 55 corridor runs from Pinto Drive in Medina to downtown Minneapolis, as shown in Figure 11. The corridor has a total of 11 stations and is 16 miles long. The concept would directly connect with the METRO Blue Line LRT Extension and the C Line (Penn Avenue BRT) at the Penn Avenue station and at the Van White Boulevard station. This concept includes the cost of constructing new park-and-ride facilities at both Pinto Drive and Peony Lane.

Figure 11: Highway 55 BRT Concept



Operating Characteristics

Peak-Period End-to-End Travel Time	52 minutes
Off-Peak End-to-End Travel Time	48 minutes
Required Fleet	9 peak vehicles, 2 spare vehicles
Background Local and Express Bus Service Adjustments[1]	• Eliminate Routes 747 and 774 • Turn back the 795 at Station 73 • Add four new circulator routes to improve local connections to Highway BRT stations

Capital Costs (2013$)

Cost Categories	Costs
Corridor Construction	$0
BRT Stations	$20,099,000
BRT Maintenance Facility	$3,300,000
Right of Way	$3,168,00
Vehicles	$6,732,000
Soft Costs	$7,797,000
25% Contingency	$10,274,000
Corridor Total Cost	$51,370,000

Operating and Maintenance Costs (2012$)

Item	Costs
Highway BRT Station–to-Station Service	$5,947,700
Background Bus Changes (Net)	$876,600
Total Operating and Maintenance Costs Increase over No Build	$6,824,300

Ridership Data

Existing Service (2010)	No Build (2030)	2030		
Corridor Bus Routes	Corridor Bus Routes	Station-to-Station Service	Corridor Bus Routes	**Transitway Total**
1,000	3,400	4,300	4,000	**8,300**

Descriptor	Data
Percent transit reliant ridership (station-to-station service)	43%
Current year ridership on station-to-station service with build alternative (2010)	3,500
New transit riders	2,400

[1] These service adjustments do not represent actual recommendations of the study and would need to be explored in more detail if bus rapid transit progresses to a more detailed level of analysis.

Station Level Ridership Activity

The level of ridership activity at each proposed Highway 55 BRT station location is shown in Table 4. Stations with less than 300 estimated riders per day were rated as 'Low' activity stations. Stations with 300 to 1,000 riders per day were rated as 'Medium' and stations with greater than 1,000 riders per day were rated as 'High' activity stations. The Penn Avenue station, where both the METRO Blue Line Extension and the C Line intersect with the Highway 55 BRT, was the only High ridership activity station. The majority of the Highway 55 BRT stations were rated as Medium ridership activity stations.

Table 4: Station Level Ridership Activity

Station Name	Station Activity
Pinto Dr. (Future P&R)	Low
Peony Ln. (Future P&R)	Medium
Vicksburg Ln.	Medium
Northwest Blvd.	Medium
Station 73 (Existing P&R)	Medium
General Mills Blvd.	Medium
Winnetka Ave.	Medium
Douglas Dr.	Medium
Meadow Ln.	Low
Penn Ave.	High
Van White Blvd.	Low

Station Activity Key
Low < 300 riders
301 < Medium < 1,000 riders
< 1,000 riders High

Evaluation

At the beginning of the original Highway Transitway Corridor Study process, five goals were identified for use in later evaluation stages. As mentioned previously, the five goals are:

1. Provide mobility benefits and respond to trip patterns/needs and deficiencies for markets identified in the purpose and need
2. Provide affordable, effective transportation improvements
3. Meet 2030 *Transportation Policy Plan* ridership goals
4. Seamlessly integrate with existing systems and provide valuable regional connections
5. Support area development plans, forecast growth assignment, redevelopment potential

To evaluate the eight corridors, technical evaluation measures were developed for each of the identified goals. The measures were scored on a three-point scale (i.e., a total maximum score of three points per evaluation measure). The same evaluation technique was applied to the Highway 55 BRT results. The evaluation results are shown below. Ridership is based on 2030 data unless otherwise noted. A summary of the thresholds and figures used in this evaluation is included in Appendix E. For more detail on the evaluation methodology, please see the *Highway Transitway Corridor Study Corridor Final Report* (under separate cover).

KEY TO SYMBOLS

● Strongly supports goal (3 points) ◐ Supports goal (2 points) ○ Does not support goal (1 point)

		I-94	Hwy 65	I-35E North	Hwy 36	I-35E South	Hwy 169	Hwy 212	I-394	Hwy 55
Goal 1: Provide mobility benefits and respond to trip patterns/needs and deficiencies for markets identified in the purpose and need.										
1	Guideway total ridership	●	○	○	●	◐	●	○	●	◐
2	Growth in guideway total ridership	◐	○	◐	●	◐	●	○	●	◐
3	Off-peak hour ridership and reverse-commute direction	●	●	○	◐	●	●	●	●	●
4	Transit-reliant ridership	●	○	◐	◐	◐	◐	○	◐	●
5	Minority residents in the service area	●	○	●	◐	○	○	○	○	◐
Goal 2: Provide affordable, effective transportation improvements.										
6	Cost effectiveness	◐	○	◐	●	○	◐	○	●	◐
Goal 3: Meet Transportation Policy Plan (TPP) ridership goals.										
7	Station-to-station ridership	◐	○	○	●	◐	●	○	●	◐
8	New transit riders	●	◐	○	◐	◐	●	○	●	◐
Goal 4: Seamlessly integrate with existing systems and provide valuable regional connections.										
9	2010 Trips with the build alternative	◐	○	○	●	◐	●	○	●	◐
10	Connections to existing or planned high frequency transitways	○	○	○	◐	●	◐	○	○	●
Goal 5: Support area development plans, forecast growth assignment, redevelopment potential										
11	Forecast growth in population	○	○	○	○	○	◐	●	○	◐
12	Forecast growth in employment	●	○	◐	○	○	◐	◐	○	○
	TOTAL	●	○	○	●	◐	●	○	●	●

Based on the evaluation results, the original eight study corridors were placed into categories showing the potential feasibility of all-day, station-to-station BRT service, as shown in Table 5. The corridors identified in the "High" category represent those that had the highest technical score in the evaluation. Those four corridors strongly support the goals for the study. These corridors were: I-394, Highway 36, Highway 169, and I-94. Based on the results of the evaluation, the Highway 55 scored comparatively as well as these four corridors and therefore was also placed in the "High" category.

Table 5: Potential for All-Day, Station-to-Station BRT Service

Potential Rating	Corridors
High	• Highway 36 • Highway 169 • I-394 • I-94 • Highway 55
Moderate	• I-35E South
Low	• Highway 65 • I-35E North • Highway 212

For a discussion of how all the study corridors compare to other Highway BRT transitways that are currently under study in the region, please see the *Highway Transitway Corridor Study Corridor Final Report* (under separate cover).

Highway 55 Sensitivity Test

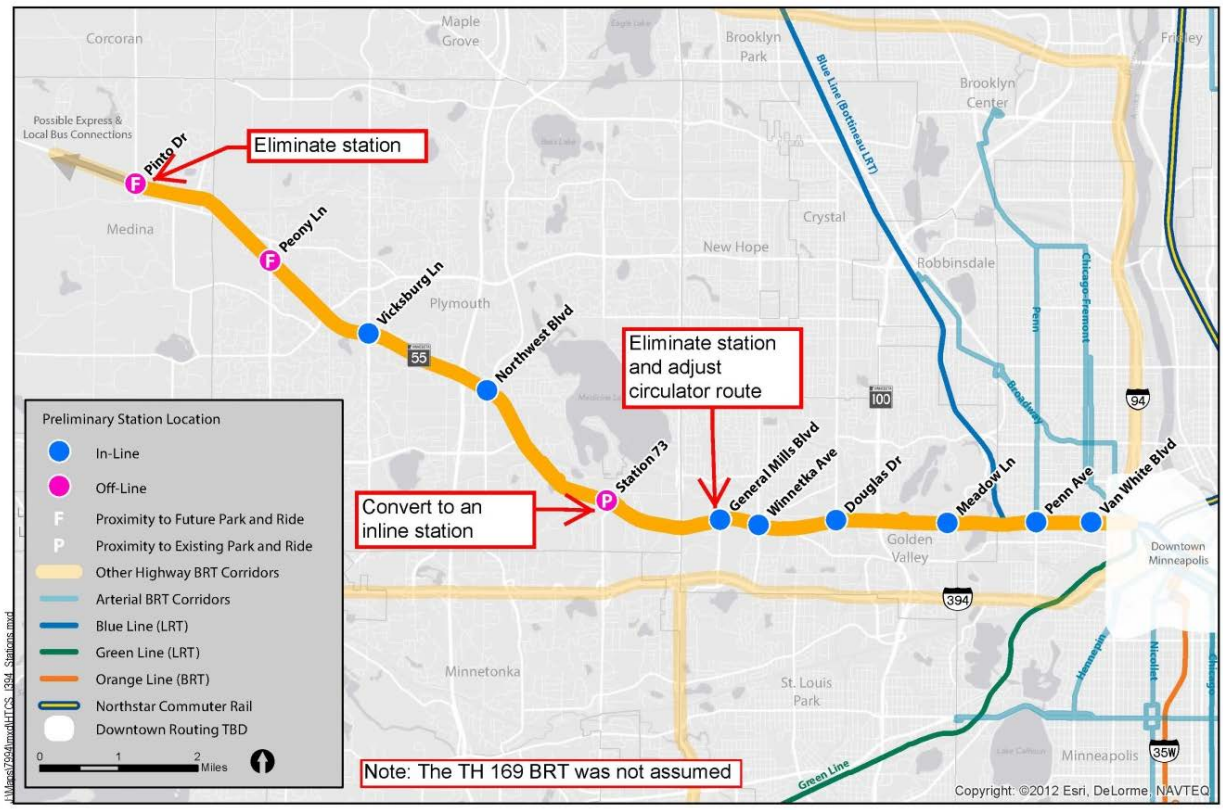
A ridership sensitivity test was performed to analyze how different operating assumptions would affect the Highway 55 BRT station-to-station service ridership results. The test scenario and results are described in this section.

Sensitivity Test Adjustments

As shown in Figure 12, the following adjustments were made to the Highway 55 BRT concept plan for a ridership sensitivity test:

- The Pinto Drive station was eliminated due to low productivity.
- Station 73 was assumed to be an inline station instead of an offline station, given its proximity to the Highway 55 right-of-way.
- The General Mills station and the circulator route associated with this station were eliminated due to the station spacing relative to Winnetka Ave.
- The Highway 169 BRT service was removed from the ridership model assumptions.

Figure 12: Highway 55 Sensitivity Test Changes



Sensitivity Test Results

These adjustments reduced the travel times of the station-to-station service along Highway 55 by about 25%. While capital and operating costs were not fully recalculated to reflect these changes, it was estimated that these changes would lower capital and operating expenses by approximately 15% each.

As shown in Table 6, the sensitivity test adjustments had a minimal but positive impact on overall Highway 55 BRT ridership estimates. In general, the faster service would result in both a less costly and more attractive service for users. This is an important consideration for any future analysis in the corridor.

Table 6: Sensitivity Test Results

	Existing Service (2010)	No Build (2030)	2030		
	Corridor Bus Routes	Corridor Bus Routes	Station-to-Station Service	Corridor Bus Routes	Transitway Total
Original Concept	1,000	3,400	4,300	4,000	8,300
Sensitivity Test	1,000	3,400	4,700	4,300	9,000

A summary of sensitivity test data is available in Appendix F.

Highway 55 BRT Analysis Key Findings

This section discusses the key findings of the Highway 55 BRT analysis. For a full discussion of the original study key findings, please see the *Highway Transitway Corridor Study Corridor Final Report* (under separate cover).

North Minneapolis to Plymouth and Golden Valley Transit Market

The ridership forecasting analysis identified a strong reverse commute transit market for the Highway 55 station-to-station service between north Minneapolis and communities along the Blue Line Extension and the employment in the cities of Plymouth and Golden Valley. This market shows up as the strongest market not directly on the Highway 55 corridor. It is supported by increased transit accessibility from investments in the Blue Line Extension, C Line, and Highway 55 station-to-station service. Future planning for this corridor should investigate and look for opportunities to grow this market.

Highway BRT Inline Station Placement and Pedestrian Infrastructure

The original study analysis determined that the most cost-effective Highway BRT station type is an inline station. Inline stations offer a significant time savings by not requiring BRT vehicles to leave the freeway and use local roads to access a station, as would be necessary for an offline station. Also, inline stations offer significant cost savings compared to an online station that is located in the median of a highway. Inline stations were also assumed for the majority of Highway 55 BRT stations; however, the high level review of the corridor during concept development revealed that the existing design of many of the Highway 55 intersections make it difficult to site inline BRT stations near intersections. As shown in Figure 13, typical intersections on Highway 55 are designed with "pork chop" islands and long right turn lanes on both sides of the intersection. To accommodate this design, station platforms must be pushed out away from the intersection. This means pedestrians would often have a long walk along Highway 55 from the station platform to connecting transit service and destinations located at the intersection.

Furthermore, similar to the original eight study corridors, the pedestrian environment around the proposed Highway 55 stations was identified as challenging or non-existent. Very few walk-up passengers can be expected if these conditions are not improved. Thus, the implementation of transit stations would need to be closely coordinated with local transportation improvements and design to ensure that pedestrian connections are provided if the station is intended to serve more than just park-and-ride customers.

Figure 13: Typical Highway 55 Intersection Design

Bus-Only Shoulders

The majority of stations assumed for the Highway 55 corridor are inline and the original study concept design process concluded that BRT station-to-station service should operate along bus-only shoulders during the peak periods and in mixed traffic during the off-peak periods. This eliminates the need for BRT vehicles to weave in and out of traffic lanes to access various station types. There is currently only one small section of bus-only shoulder along the Highway 55 corridor (east of Highway 100 and east of Penn Avenue). To maximize the potential of a future transitway investment in this corridor, the addition of bus-only shoulders should be considered when planning for and designing roadway improvements in the Highway 55 corridor. An important next step may include a more in-depth analysis of the roadway improvements that could support increased transit service in the corridor.

Development Patterns

Land use plays a key role in determining the success of a transitway investment. Denser, high-activity land uses are considered more conducive to transit use than low-density uses. The proposed Highway 55 BRT station locations were placed to take advantage of existing and planned land uses, such as employment centers and park-and-rides, to the extent possible. However, much of the land use surrounding many station locations is relatively low density. Communities along the corridor would be encouraged to support future BRT and other transit investments by encouraging planned development and forecasted growth around potential station locations. Concentrating development, people, households, and jobs at these locations will produce more transit-friendly land use patterns and set the stage for future successful transitways. This would be an important step of coordination

between local governments doing land use planning and the agencies planning potential transitway investments. The sooner this coordination can occur, the better positioned a corridor will be to become a transitway investment priority.

Frequency, Speed, and Access for BRT Service

The service planning assumptions for the Highway 55 BRT analysis assumed a high level of service frequency. Providing a high level of service frequency should be balanced with other constraints, such as the cost to operate and maintain a higher level of service. While this level high level of service is necessary to meet the definition of Highway BRT as defined in the Regional Transitway Guidelines, it may make sense to explore the possibility of a less frequent transit service tailored to serving the demand in the corridor cost-effectively in the near term while continuing to plan for Highway BRT in the long term. In addition, the Highway 55 corridor stakeholders may want to consider phasing improvements in transit service (i.e. introducing increasingly higher levels of service over time) by creating initial demand by providing basic accessibility and facilities. For example, a limited number of mid-day transit trips may be a starting point, followed by station-to-station service at 30 minute frequencies after initial demand is established and proven effective. If the route is continually successful, frequencies could be increased during the peak period and eventually expanded to 15 minute all-day Highway BRT level of service. Matching the appropriate level of service to the demand for transit service ensures regional transit investments are as cost-effective as possible.

The sensitivity analysis for the corridor also demonstrated a need to do more in-depth service planning and analysis to maximize the balance between speed and access for a possible BRT service. An important trade-off for transit providers is limiting the number of stops to provide a more attractive travel time, but the trade-off is fewer stops where customers can board. This can result in lower costs but often with fewer riders. More analysis of the highest demand locations will allow the service potential to be maximized for both a cost and benefit perspective. In future, more detailed analysis, this may result in fewer stations along the corridor through reduction or consolidation of lower-performing stations considered in this study.

Express Transit Market Demand

The Highway 55 corridor has a strong market for express bus service that connects corridor communities to jobs in downtown Minneapolis. Future studies should examine how to support and grow this ridership market in the corridor. The specific service adjustments in this study do not represent recommendations for implementation and would be further analyzed in a more detailed study of bus rapid transit in the corridor.

What are the next steps after the study?

The original study provided a strong foundation for identifying the corridors with the greatest potential for all day station-to-station Highway BRT service. The additional analysis of the Highway 55 corridor demonstrated that the corridor also has strong potential for a future Highway BRT

service. However, the Highway 55 BRT corridor should undergo additional, more detailed study and vetting with local communities and policymakers for consideration in adopted plans.
In addition, funding for Highway BRT would need to be explored with local and regional partners. Both the capital and operating needed to implement Highway BRT and associated local bus improvements are currently unidentified and unfunded in any local or regional plans.

APPENDIX A: STAKEHOLDER WORKSHOP SUMMARY

Highway Transitway Corridor Study

Highway 55 Technical Working Group Meeting

Friday June 27, 2014
1:00-3:00
SRF Consulting, Lake Superior Room
One Carlson Parkway North, Suite 150, Minneapolis, MN 55447

Attendees: Bernie Maciej (Plymouth Metrolink), Barb Thomson (City of Plymouth), Kim Zlimen (Hennepin County), April Crockett (MnDOT), Lynne Bly (MnDOT), Mark Grimes (City of Golden Valley), Cole Hiniker (Metropolitan Council), Don Pflaum (City of Minneapolis), Steve Wilson (SRF), Mona Elabbady (SRF), Liz Heyman (SRF), Adam Harrington (Metro Transit, phone), Dusty Finke (City of Medina, phone)

Introductions and Study Background

- The Highway 55 corridor BRT analysis will take approximately 2-3 months to complete.
- The request to study Highway 55 as a highway BRT corridor came from the mayors of Plymouth and Medina.
- The Highway 55 corridor will be modeled as an alternate to the I-394 corridor (already studied in the first stage of HTCS).
- The study will continue to use 2030 demographic forecasts. It will not use the Metropolitan Council's draft 2040 forecasts.
- The study does not analyze how any of the highway BRT corridors would be routed in downtown Minneapolis or St. Paul. This will be studied in more detail if/when the highway BRT corridors more forward.
- Cole told the group that the project team is available to attend City council meeting or meet with elected officials to explain the process and gather more public feedback.
- The other corridors were model with the majority of existing service in place. However, some redundancies were removed and some feeder serviced was added. The team will use a similar approach for Highway 55.
    - Generally all of the express service was maintained on the other study corridors.
- We will be able to distinguish between the number of riders that stay on the express service and the number of riders that will use the new station-to-station service.

Comments from the City of Medina

- The interest from Medina started as more of a peak hour service/park and ride discussion.
- The city is planning relatively dense development near Tamarack Drive (between Arrowhead Drive and Pinto Drive):
    - Planning for five units per acre
    - A new local street is planned for this location
    - City owns 2-3 acres of land at this location already
    - Tamarack Drive would connect to some of the larger employers in Medina

- The City has been discussing putting a park and ride at this location
- There is a lot traffic coming down CR 116 (Pinto Drive) from the north to get on Highway 55
  - The downside of this location is that Arrowhead Drive is located to the west
- The Metropolitan Council has no planned park and rides for the City of Medina.
- City of Plymouth is looking at expanding a park and ride (near County Road 6 and Olive Lane) and potentially upgrading service to Medina.
- There are inconsistent shoulder widths (6-10 feet) along Highway 55 as the road travels further west.
- An attendee asked if Medina need to join the taxing district to make this project feasible:
  - The results of the study will help Medina make a decision about the taxing district if necessary
  - There is no expectation to commit to anything as a result of this study

Comments from the City of Plymouth

- It would be nice to have a park and ride at Highway 101 and Highway 55, but the City of Plymouth doesn't own any land there.
- Bernie said that Plymouth Metrolink would not be reducing express service
  - May also be expanding some of this service
- Plymouth Metrolink does not currently run any existing midday service; however, they are interested in all day service on Highway 55.
- TCF is moving the headquarters to City of Plymouth
  - 4105 Xenium (on County Rd 61) – in the old Home Depot site
  - Plymouth Metrolink will be ramping up some service to serve TCF employees
- There is an existing Metrolink park and ride at County Rd 73.
- The West Health Allina campus is a major employment area.
  - Vicksburg Lane is the city center; there is some higher density housing located here.
- Parkers Lake development south of Highway 55 on Niagara Lane is relatively high density.
- There is some workforce housing at County Rd 47 and Vicksburg.
- Highway 101/Peony Lane – near Wayzata High School
  - Adding residential uses near this location
- Plymouth Metrolink would like to connect to Target Station.
- Shoulders along Highway 55 are mostly 10 feet wide.
- MnDOT is doing some intersection improvements on Highway 55 west of 494
  - Also adding auxiliary lanes from Plymouth to Vicksburg Lane
  - Putting in an urban section in through Plymouth
- MnDOT can provide the project team some congestion data on Highway 55
  - No loop detector data available on Highway 55
- Stakeholders felt that a station at County Rd 73 would serve more people and jobs than a station located at Revere Lane.
- There is a concentration of Section 8 housing near Revere Lane and Highway 55 in Plymouth
  - Plymouth would like to see some kind of circulator service near here
- From the map: Would like stations at the following locations
  - CSAH 61

- Revere Lane
- Vicksburg
- Peony Lane

- The stakeholders mentioned the chicken and egg of problem of needing density to build a transitway, but that having a transitway will bring in the density.
- Industrial areas around Medicine Lake may turn into residential uses

Comments from the City of Golden Valley

- Eliminate Glenwood as a stop.
- Stakeholders would like to see the following stops:
  - General Mills Boulevard
  - Winnetka Ave
  - Douglas Drive (currently being improved)
    - The city struggles with pedestrian crosses at this location, especially with the students from the arts high school.
    - Golden Valley looked at a tunnel at Douglas Drive
  - Meadow Lane
- Golden Valley supports highway BRT on Highway 55; however, stakeholders are worried about how riders would access stations, because it is very difficult to cross Highway 55 since it is so wide.
- The city is interested in looking at skyway stations.
- One of the number one priorities in the next comprehensive plan is how to get people across Highway 55 at Winnetka Drive.
- Golden Valley would like to provide access to the Theodore Wirth Parkway.
- Stakeholders mentioned that the project team should talk to the Minneapolis Park Board about providing access to Wirth Park and how the Bottineau stations will serve the park.

Comments from City of Minneapolis

- City of Minneapolis supports highway BRT.
- The city would want to make strong connections to Target Field.
- No one is 100 percent sure how the Bottineau LRT project will affect the width of Highway 55.
- Minneapolis would like to serve Penn Avenue and Van White Boulevard.
- Minneapolis would also like to improve the pedestrian environment at Highway 55.

Other questions/comments

- An attendee asked if there would there be station area planning for the Highway BRT stations.
  - Yes, but not until the corridor progresses much further toward development
- An attendee asked if it is part of the scope to identify funding sources for these lines
  - Cole said no – this study will help shape how the region goes after funding in the future
  - These lines fit in with the vision of an increased sales tax supporting transit
  - Cole would like to add a section/mention funding sources in the final plan
- The region and the cities along Highway 55 should work to make sure no current/near term projects preclude putting transit on Highway 55 in the future.

Next steps

- The project team will send a follow up email with what we heard today.
- The next step is getting a travel time estimate and starting service planning.

APPENDIX B: HIGHWAY 55 CAPITAL COST ESTIMATE

TH 55 Corridor

		Inline	Online	Offline
Length (mi)	13.6			
No. of Stations	11	16	0	3

Item No.	Item Description	Quantity	Unit	Unit Cost	Cost	Allocated	Final Cost
Corridor Improvement					**$0**	**$0**	**$0**
1	Slip Ramp	0	LF	$200.00	$0	$0	$0
2	Earthwork(Import/Excavation & Embankment)	0	CY	$15.00	$0	$0	$0
3	Retaining Wall	0	SF	$150.00	$0	$0	$0
BRT Station					**$16,750,000**	**$3,349,000**	**$20,099,000**
4	Station (Shelter and Amenities)	19	EA	$350,000.00	$6,650,000	$1,330,000	$7,980,000
5	Inline Station Platform	16	EA	$24,000.00	$384,000	$77,000	$461,000
6	Offline Station Platform	3	EA	$34,000.00	$102,000	$20,000	$122,000
7	Roadway Improvements (TH 55)	16	EA	$42,000.00	$672,000	$134,000	$806,000
8	Surface Park and Ride Lot	600	STALL	$4,000.00	$2,400,000	$480,000	$2,880,000
9	Additional Earthwork/Retaining Walls (Major)	1	EA	$390,000.00	$390,000	$78,000	$468,000
10	Additional Earthwork/Retaining Walls (Minor)	5	EA	$100,000.00	$500,000	$100,000	$600,000
11	Utilities and Drainage Improvements (Major)	4	EA	$20,000.00	$80,000	$16,000	$96,000
12	Utilities and Drainage Improvements (Minor)	8	EA	$4,000.00	$32,000	$6,000	$38,000
13	Pedestrian Improvements (TH 55)	7	EA	$21,000.00	$147,000	$29,000	$176,000
14	Intersection Improvements (TH 55)	2	EA	$755,000.00	$1,510,000	$302,000	$1,812,000
15	Traffic Control (Inline/Online)	0	EA	$15,000.00	$0	$0	$0
16	Traffic Control (Offline)	3	EA	$10,000.00	$30,000	$6,000	$36,000
17	Traffic Control (TH 55)	16	EA	$15,000.00	$240,000	$48,000	$288,000
18	Platform Systems Allowance	19	EA	$190,000.00	$3,610,000	$722,000	$4,332,000
19	Tree Removal	6	EA	$500.00	$3,000	$1,000	$4,000
BRT Maintenance Facility					**$2,750,000**	**$550,000**	**$3,300,000**
20	BRT Maintenance Facility	11	EA	$250,000.00	$2,750,000	$550,000	$3,300,000
Total Construction Costs					$19,500,000	$3,899,000	$23,399,000
Right of Way					**$2,640,000**	**$528,000**	**$3,168,000**
21	Commercial	12	ACRE	$220,000.00	$2,640,000	$528,000	$3,168,000
22	Residential		ACRE	$0.00	$0	$0	$0
Vehicles					**$5,610,000**	**$1,122,000**	**$6,732,000**
23	Low Floor 40-foot Buses	11	EA	$502,000.00	$5,522,000	$1,104,000	$6,626,000
24	Low Floor 60-foot Buses		EA	$854,000.00	$0	$0	$0
25	Hybrid buses		EA	$1,107,000.00	$0	$0	$0
26	On-Board Go To Validator (per bus door)	22	EA	$4,000.00	$88,000	$18,000	$106,000
Soft Costs							**$7,797,000**
27	Preliminary Engineering						$780,000
28	Final Design						$1,279,000
29	Project Management for Design and Construction						$555,000
30	Construction Administration and Management						$1,586,000
31	Insurance						$780,000
32	Legal; Permits; Review Fees by Other Agencies						$327,000
33	Surveys, Testing, Investigation, Inspection						$766,000
34	Agency Force Account Work						$1,490,000
35	Public Art						$234,000
25% Contingency							**$10,274,000**
TH 55 Total Cost							**$51,370,000**

Station Location	Inline Station	Offline Station	Add. Earthwork/Ret. Walls (Major)	Add. Earthwork/Ret. Walls (Minor)	Util & Drainage (Major)	Util & Drainage (Minor)	Ped. Improv. (TH 55)	Intersection Improv. (TH 55)
Van White Blvd	2					2		
Penn Ave	2					2		
Meadow Ln	2							
Douglas Dr	2			1		1		
Winnetka Ave	2			1	1		2	
General Mills Blvd	2		1			2	2	
County Rd 73		1						
Northwest Blvd	2			1	1	1	1	1
Vicksburg Ln	2			2	2		2	1
Peony Ln		1						
Pinto Dr		1						
TOTAL	**16**	**3**	**1**	**5**	**4**	**8**	**7**	**2**

APPENDIX C: HIGHWAY 55 CORRIDOR SERVICE PLAN

Highway 55

New Highway BRT Station to Station Service

- Weekdays: 15-minute frequencies from 5:30 a.m. to 9:30 p.m.
- Saturdays: 15-minute frequencies from 5:30 a.m. to 6:00 p.m. and 30-minutes from 6:00 p.m. to 9:30 p.m.
- Sundays: 30-minute frequencies 15-minute frequencies from 8:30 a.m. to 9:30 p.m.
- Existing routes that use portions of TH55 are: 19, 755, 705, 795, 772, and 740. Those routes continue to use TH 55

Proposed Route Connections to
Highway Transit Corridor Stations

Station	Route		Existing Frequencies Peak	Midday	Comments
Pinto Drive	none		-	-	
Peony Lane	776	Express	30	-	no change to existing service
	777	Express	30	-	no change to existing service
Vicksburg Lane	740	Express	30	-	no change to existing service
Northwest Boulevard	741	Local	30	-	no change to existing service
	777	Express	30	-	extend south to connect at Northwest Boulevard station
	new	Local	30	30	add Xenium, CR6,Fernbrook circulator
Station 73	740	Express	30	-	no change to existing service
	741	Local	30	-	no change to existing service
	747	Express	30	-	Replaced with BRT service
	771	Local	30	-	no change to existing service
	772	Express	30	-	no change to existing service
	774	Express	-	-	Replaced with BRT service (two evening trips)
	777	Express	30	-	no change to existing service
	795	Express	-	120	turn back at Station 73 (two midday trips)
	new	Local	30	30	add Revere Lane circulator
General Mills Boulevard	756	Express	30	-	no change to existing service
	new	Local	30	30	add General Mills circulator
Winnetka Avenue	705	Local	60	60	no change to existing service
Douglas Drive	705	Local	60	60	no change to existing service
	755	Express	30	-	no change to existing service
	new	Local	30	30	add Park Place circulator
Meadow Lane	755	Express	30	-	no change to existing service
Penn Avenue	19	Local	10	10	no change to existing service
	755	Express	30	-	no change to existing service
Van White Boulevard	19	Local	10	10	no change to existing service
	755	Express	30	-	bypass station

Notes:

1. Near-term, Plymouth Metrolink planning to extend Route 747 to Xenium to accommodate new employment growth. For purposes of this study, this employment would instead be served by Hwy 55 BRT and proposed Xenium circulator.
2. Proposed circulator from Douglas Drive to Park Place could mimic portions of the old Route 719 alignment.

Highway 55 Estimated Running Times

	Pinto Dr.	Peony Ln.	Vicksburg Ln.	Northwest Blvd.	Station 73	General Mills Blvd.	Winnetka Ave.	Douglas Dr.	Meadow Ln.	Penn Ave.	Van White Blvd.	Downtown Minneapolis
Station Type	offline	offline	inline	inline	offline	inline	inline	inline	inline	inline	inline	offline
Incremental Distance	-	2.1	1.6	1.7	2.1	1.5	0.5	1.0	1.4	1.1	0.7	2.3
Cumulative Distance	-	2.1	3.7	5.4	7.5	9.0	9.5	10.5	11.9	13.0	13.7	16.0
Peak Period Times												
Incremental Run Time	-	8	3	4	8	3	2	3	3	3	3	12
Cumulative Run Time	-	8	11	15	23	26	28	31	34	37	40	52
Midday Period Times												
Incremental Run Time	-	8	3	3	8	3	2	2	3	2	3	11
Cumulative Run Time	-	8	11	14	22	25	27	29	32	34	37	48

Current 755 Schedule: 21-22 min Douglas Dr. -> Gateway Ramp

APPENDIX D: HIGHWAY 55 OPERATING AND MAINTENANCE COST ESTIMATE

Metropolitan Council
Highway Transitway Corridor Study
Annual O&M Cost Estimates ($2012)

Transit Service	Cost Drivers	Unit Cost ($2012)	I-35 North	I-35 South	I-94	I-394	TH 36	TH 65	US 169	US 212	TH 55
Highway	Peak Buses	$36,330	5	11	7	9	8	5	14	5	9
BRT	Ann. Rev. Bus-Hr.	$75.25	26,460	50,310	36,860	39,920	38,390	22,320	62,230	22,320	43,120
Service	Ann. Rev. Bus-Mi. (40')	$3.05	444,900	1,010,600	611,200	524,000	736,000	386,700	1,118,600	374,300	665,300
	Directional Stops	$18,250	9	15	9	8	16	11	16	5	19
	On-line Stops with Elevators	$20,000	0	0	2	0	0	0	0	0	0
	Change in O&M Cost *(from Existing)*		$3,694,000	$7,541,500	$5,096,400	$5,075,200	$5,716,300	$3,241,400	$8,895,200	$3,094,100	$5,947,700
Background	Peak Buses	$36,330	1	2	0	0	0	1	0	0	1
Bus	Ann. Rev. Bus-Hr.	$75.25	3,060	6,120	1,148	765	1,530	3,060	0	-1,721	9,945
Changes	Ann. Rev. Bus-Mi. (40')	$3.05	45,900	91,800	11,475	-68,850	0	45,900	0	-120,488	30,141
	Change in O&M Cost *(from Existing)*		$406,600	$813,200	$121,300	-$152,400	$115,100	$406,600	$0	-$497,000	$876,600
TOTAL CORRIDOR O&M COST ESTIMATE			**$4,100,600**	**$8,354,700**	**$5,217,700**	**$4,922,800**	**$5,831,400**	**$3,648,000**	**$8,895,200**	**$2,597,100**	**$6,824,300**

Notes
1. Counts of directional stops do not include downtown Minneapolis or St. Paul Stations. In-line stations counted as two (for each direction).
2. Vertical circulation (elevators (assumed at each in-line stop (one per stop, on each side of highway.
3. No exclusive lane miles or TSP costs are included.
4. All cost estimates assume 40' buses.
5. HTCS service plans assume 16 hour span of service Mon-Sat, 13-hours on Sun.
6. HCTS service plans assume 15-min. all-day service on weekdays and Saturdays, 30-min. on Sat. nights and Sundays.
7. Costs for background bus changes are general.
8. Unit costs consistent with those used in current Met Council corridor studies (Robert St., Nicollet-Central, Midtown).

Metropolitan Council
Highway Transitway Corridor Study
Highway Corridor Service Statistics

Corridor	From	To	Time Period	Travel Time	Distance (miles)	Day	Headway AM	Mid	PM	Eve	Late	Vehicles Peak	Total	Daily Rev.-Miles	Rev-Hrs	Annual Rev.-Miles	Rev.-Hrs
I-35E North	Highway 96	Downtown St. Paul	Peak	32	10.7	M-F	15	15	15	15	n/a	5	6	1,370	80	349,200	20,400
			Midday	28	10.7	Sat	15	15	15	30	n/a			1,220	73	63,400	3,800
						Sun	n/a	30	30	30	n/a			556	39	32,300	2,260
												5	**6**			**444,900**	**26,460**
I-35E South	167th St. W	Downtown St. Paul	Peak	73	24.30	M-F	15	15	15	15	n/a	11	14	3,110	156	793,200	39,780
			Midday	57	24.30	Sat	15	15	15	30	n/a			2,770	130	144,100	6,760
						Sun	n/a	30	30	30	n/a			1,264	65	73,300	3,770
												11	**14**			**1,010,600**	**50,310**
I-94	Hemlock Ln.	Downtown Minneapolis	Peak	44	14.70	M-F	15	15	15	15	n/a	7	9	1,882	112	479,800	28,560
			Midday	40	14.70	Sat	15	15	15	30	n/a			1,676	102	87,100	5,280
						Sun	n/a	30	30	30	n/a			764	52	44,300	3,020
												7	**9**			**611,200**	**36,860**
I-394	Central Ave. / CSAH 101	Downtown Minneapolis	Peak	58	12.60	M-F	15	15	15	15	n/a	9	11	1,613	124	411,300	31,620
			Midday	45	12.60	Sat	15	15	15	30	n/a			1,436	102	74,700	5,280
						Sun	n/a	30	30	30	n/a			655	52	38,000	3,020
												9	**11**			**524,000**	**39,920**
Trunk Hwy 36	Hadley Ave.	Downtown Minneapolis	Peak	47	17.70	M-F	15	15	15	15	n/a	8	10	2,266	118	577,700	30,090
			Midday	42	17.70	Sat	15	15	15	30	n/a			2,018	102	104,900	5,280
						Sun	n/a	30	30	30	n/a			920	52	53,400	3,020
												8	**10**			**736,000**	**38,390**
Trunk Hwy 65	125th Ave. NE	53rd Ave. NE	Peak	26	9.30	M-F	15	15	15	15	n/a	5	6	1,190	70	303,600	17,850
			Midday	23	9.30	Sat	15	15	15	30	n/a			1,060	57	55,100	2,960
						Sun	n/a	30	30	30	n/a			484	26	28,000	1,510
												5	**6**			**386,700**	**22,320**
US 169	Marschall Rd.	Downtown Minneapolis	Peak	88	26.90	M-F	15	15	15	15	n/a	14	17	3,443	194	878,000	49,470
			Midday	69	26.90	Sat	15	15	15	30	n/a			3,067	159	159,500	8,240
						Sun	n/a	30	30	30	n/a			1,399	78	81,100	4,520
												14	**17**			**1,118,600**	**62,230**
US 212	TH 41	Southwest Transit Center	Peak	27	9.00	M-F	15	15	15	15	n/a	5	6	1,152	70	293,800	17,850
			Midday	23	9.00	Sat	15	15	15	30	n/a			1,026	57	53,400	2,960
						Sun	n/a	30	30	30	n/a			468	26	27,100	1,510
												5	**6**			**374,300**	**22,320**
Hwy 55	Pinto Dr.	Downtown Minneapolis	Peak	52	16.00	M-F	15	15	15	15	n/a	9	11	2,048	134	522,200	34,170
			Midday	48	16.00	Sat	15	15	15	30	n/a			1,824	114	94,800	5,930
						Sun	n/a	30	30	30	n/a			832	52	48,300	3,020
												9	**11**			**665,300**	**43,120**
TOTALS FOR ALL CORRIDORS:												**73**	**90**			**5,871,600**	**341,930**

Metropolitan Council
Highway Transitway Corridor Study
Background Bus Service Changes (Order-of-Magnitude Estimates)

Corridor	Background Bus Change	Pk Buses	Daily Hrs	Daily Mi's.	Ann. Hrs.	Ann. Miles
I-35 N.	Hwy 96 White Bear Lake Circ.	1	12	180	3,060	45,900
I-35 S.	Extend 426 to Burnsville Ctr.	1	12	180	3,060	45,900
	New Burnsville Circ.	1	12	180	3,060	45,900
		2	24	360	6,120	91,800
I-94	Eliminate midday service on 781	0	-1.5	-45	-383	-11,475
	Improve midday freq. on 787.	0	6	90	1,530	22,950
		0	4.5	45	1,148	11,475
I-394	Eliminate Route 675	-2	-21	-630	-5,355	-160,650
	New circ. Between Mounds & Cental	1	12	180	3,060	45,900
	New Hwy 55/Hwy 494 Circ.	1	12	180	3,060	45,900
		0	3	-270	765	-68,850
TH 36	Eliminate 264 midday service.	-1	-6	-180	-1,530	-45,900
	New Stillwater Circ.	1	12	180	3,060	45,900
		0	6	0	1,530	0
TH 65	New Anoka-125th Ave Circ.	1	12	180	3,060	45,900
US 169	Rtes 17, 615,667,668 ext. to TH 7 Sta	0	0	0	0	0
US 212	1/2 Elimination of Route 698	-2	-24.75	-742.5	-6,311	-189,338
	Chanhassen-Eden Prarie	1	9	135	2,295	34,425
	Chaska-Chanhassen	1	9	135	2,295	34,425
		0	-7	-473	-1,721	-120,488
TH 55	Eliminate 747	-3	-8	-156	-2,040	-39,780
	Eliminate 774	0	-1	-20	-255	-4,973
	Turnback 795, operate as 2 rnd trips	0	0	-9	0	-2,219
	New Xenium/Ferbrook Circulator	1	12	72	3,060	18,360
	New Revere Lane Circulator	1	12	72	3,060	18,360
	New General Mills Circulator	1	12	48	3,060	12,240
	New Park Place Circulator	1	12	110	3,060	28,152
		1	39	118	9,945	30,141

APPENDIX E: UPDATED EVALUATION THRESHOLDS

GOAL 1

Guideway Total Ridership

I-94	TH 65	I-35E North	TH 36	I-35E South	TH 169	TH 212	I-394	Hwy 55
13,700	1,200	3,400	11,400	5,700	12,000	3,800	14,400	8,300
3	1	1	3	2	3	1	3	2

Used threshold methodology 2

Thresholds	Points
14,400	3
9,600	2
4,800	1

Growth in Guidway Total Ridership

I-94	TH 65	I-35E North	TH 36	I-35E South	TH 169	TH 212	I-394	Hwy 55
4,400	600	3,100	9,300	4,200	8,600	1,400	7,900	4,900
2	1	2	3	2	3	1	3	2

Used threshold methodology 2

Thresholds	Points
9,300	3
6,200	2
3,100	1

Off-peak hour ridership and reverse-commute direction

I-94	TH 65	I-35E North	TH 36	I-35E South	TH 169	TH 212	I-394	Hwy 55
35%	43%	12%	28%	37%	38%	45%	42%	45%
3	3	1	2	3	3	3	3	3

Used threshold methodology 1

Thresholds	Points
45%	3
34%	2
23%	1

Transit Reliant Ridership

I-94	TH 65	I-35E North	TH 36	I-35E South	TH 169	TH 212	I-394	Hwy 55
45%	26%	35%	35%	38%	33%	29%	37%	43%
3	1	2	2	2	2	1	2	3

Used threshold methodology 1

Thresholds	Points
45%	3
39%	2
32%	1

Minority residents in the service area

I-94	TH 65	I-35E North	TH 36	I-35E South	TH 169	TH 212	I-394	Hwy 55
52%	18%	46%	30%	21%	21%	17%	17%	32%
3	1	3	2	1	1	1	1	2

Used threshold methodology 1

Thresholds	Points
52%	3
41%	2
29%	1

GOAL 2

Cost Effectiveness

I-94	TH 65	I-35E North	TH 36	I-35E South	TH 169	TH 212	I-394	Hwy 55
$5.12	$19.96	$6.81	$2.77	$8.50	$4.67	$18.36	$2.85	$7.13
2	1	2	3	1	2	1	3	2

Used threshold methodology 3

Thresholds	Points
$ 19.96	1
$ 8.00	2
$ 4.00	3

GOAL 3

Station to Station Ridership

I-94	TH 65	I-35E North	TH 36	I-35E South	TH 169	TH 212	I-394	Hwy 55
5,400	800	2,500	9,300	4,000	7,800	600	6,600	4,300
2	1	1	3	2	3	1	3	2

Used threshold methodology 2

Thresholds	Points
9,300	3
6,200	2
3,100	1

New Transit Riders

I-94	TH 65	I-35E North	TH 36	I-35E South	TH 169	TH 212	I-394	Hwy 55
1,400	700	500	1,300	1,200	2,000	300	1,600	1,300
3	2	1	2	2	3	1	3	2

Used threshold methodology 2

Thresholds	Points
2,000	3
1,333	2
667	1

GOAL 4

2010 Trips with Build Alternative

I-94	TH 65	I-35E North	TH 36	I-35E South	TH 169	TH 212	I-394	Hwy 55
2,600	400	1,300	5,200	2,500	4,600	400	3,600	3,000
2	1	1	3	2	3	1	3	2

Used threshold methodology 2

Thresholds	Points
5,200	3
3,467	2
1,733	1

Connections to existing or planned high frequency transitways

I-94	TH 65	I-35E North	TH 36	I-35E South	TH 169	TH 212	I-394	Hwy 55
1	1	0	2	3	2	1	0	3
1	1	1	2	3	2	1	1	3

Used threshold methodology 2

Thresholds	Points
3	3
2	2
1	1

GOAL 5

Forecast growth in population

I-94	TH 65	I-35E North	TH 36	I-35E South	TH 169	TH 212	I-394	Hwy 55
3%	8%	6%	9%	6%	15%	25%	7%	13%
1	1	1	1	1	2	3	1	2

Used threshold methodology 1

Thresholds	Points
25%	3
18%	2
10%	1

Forecast growth in employment

I-94	TH 65	I-35E North	TH 36	I-35E South	TH 169	TH 212	I-394	Hwy 55
28%	14%	19%	13%	15%	19%	18%	8%	6%
3	1	2	1	1	2	2	1	1

Used threshold methodology 1

Thresholds	Points
28%	3
21%	2
15%	1

APPENDIX F: SENSITIVITY TEST SCENARIO SUPPORT

Revised TH 55 Travel Time Estimate

	Peony Ln.	Vicksburg Ln.	Northwest Blvd.	Station 73	Winnetka Ave.	Douglas Dr.	Meadow Ln.	Penn Ave.	Van White Blvd.	Downtown Minneapolis
Station Type	offline	inline	inline	inline	inline	inline	inline	inline	inline	offline
Incremental Distance		1.6	1.7	2.1	2.0	1.0	1.4	1.1	0.7	2.3
Cumulative Distance		1.6	3.3	5.4	7.4	8.4	9.8	10.9	11.6	13.9
Peak Period Times										
Incremental Run Time		3	4	4	4	3	3	3	3	12
Cumulative Run Time		3	7	11	15	18	21	24	27	39
Midday Period Times										
Incremental Run Time		3	3	4	4	2	3	2	3	11
Cumulative Run Time		3	6	10	14	16	19	21	24	35

Revised Hwy 55 Operating Plan Table

Highway Corridor Transit Study (HCTS)
Highway Corridor Service Statistics

Corridor	From	To	Time Period	Travel Time	Distance (miles)	Day	Headway AM	Mid	PM	Eve	Late	Vehicles Peak	Total	Daily Rev.-Miles	Rev-Hrs	Annual Rev.-Miles	Rev.-Hrs
I-35E North	Highway 96	Downtown St. Paul	Peak	32	10.7	M-F	15	15	15	15	n/a	5	6	1,370	80	349,200	20,400
			Midday	28	10.7	Sat	15	15	15	30	n/a			1,220	73	63,400	3,800
						Sun	n/a	30	30	30	n/a			556	39	32,300	2,260
												5	**6**			**444,900**	**26,460**
I-35E South	167th St. W	Downtown St. Paul	Peak	73	24.30	M-F	15	15	15	15	n/a	11	14	3,110	156	793,200	39,780
			Midday	57	24.30	Sat	15	15	15	30	n/a			2,770	130	144,100	6,760
						Sun	n/a	30	30	30	n/a			1,264	65	73,300	3,770
												11	**14**			**1,010,600**	**50,310**
I-94	Hemlock Ln.	Downtown Minneapolis	Peak	44	14.70	M-F	15	15	15	15	n/a	7	9	1,882	112	479,800	28,560
			Midday	40	14.70	Sat	15	15	15	30	n/a			1,676	102	87,100	5,280
						Sun	n/a	30	30	30	n/a			764	52	44,300	3,020
												7	**9**			**611,200**	**36,860**
I-394	Central Ave. / CSAH 101	Downtown Minneapolis	Peak	58	12.60	M-F	15	15	15	15	n/a	9	11	1,613	124	411,300	31,620
			Midday	45	12.60	Sat	15	15	15	30	n/a			1,436	102	74,700	5,280
						Sun	n/a	30	30	30	n/a			655	52	38,000	3,020
												9	**11**			**524,000**	**39,920**
Trunk Hwy 36	Hadley Ave.	Downtown Minneapolis	Peak	47	17.70	M-F	15	15	15	15	n/a	8	10	2,266	118	577,700	30,090
			Midday	42	17.70	Sat	15	15	15	30	n/a			2,018	102	104,900	5,280
						Sun	n/a	30	30	30	n/a			920	52	53,400	3,020
												8	**10**			**736,000**	**38,390**
Trunk Hwy 65	125th Ave. NE	53rd Ave. NE	Peak	26	9.30	M-F	15	15	15	15	n/a	5	6	1,190	70	303,600	17,850
			Midday	23	9.30	Sat	15	15	15	30	n/a			1,060	57	55,100	2,960
						Sun	n/a	30	30	30	n/a			484	26	28,000	1,510
												5	**6**			**386,700**	**22,320**
US 212	TH 41	Southwest Transit Center	Peak	27	9.00	M-F	15	15	15	15	n/a	5	6	1,152	70	293,800	17,850
			Midday	23	9.00	Sat	15	15	15	30	n/a			1,026	57	53,400	2,960
						Sun	n/a	30	30	30	n/a			468	26	27,100	1,510
												5	**6**			**374,300**	**22,320**
Hwy 55	Pinto Dr.	Downtown Minneapolis	Peak	39	13.90	M-F	15	15	15	15	n/a	7	9	1,779	112	453,700	28,560
			Midday	35	13.90	Sat	15	15	15	30	n/a			1,585	86	82,400	4,450
						Sun	n/a	30	30	30	n/a			723	39	41,900	2,260
												7	**9**			**578,000**	**35,270**
TOTALS FOR ALL CORRIDORS:												**57**	**71**			**4,665,700**	**271,850**

Revised Hwy 55 Operating Cost Table

HIGHWAY TRANSITWAY CORRIDOR STUDY
ANNUAL O&M COST ESTIMATES ($2012)

Transit Service	Cost Drivers	Unit Cost ($2012)	I-35 North	I-35 South	I-94	I-394	TH 36	TH 65	US 212	TH 55
Highway	Peak Buses	$36,330	5	11	7	9	8	5	5	7
BRT	Ann. Rev. Bus-Hr.	$75.25	26,460	50,310	36,860	39,920	38,390	22,320	22,320	35,270
Service	Ann. Rev. Bus-Mi. (40')	$3.05	444,900	1,010,600	611,200	524,000	736,000	386,700	374,300	578,000
	Directional Stops	$18,250	9	15	9	8	16	11	5	17
	On-line Stops with Elevators	$20,000	0	0	2	0	0	0	0	1
	Change in O&M Cost *(from Existing)*		$3,694,000	$7,541,500	$5,096,400	$5,075,200	$5,716,300	$3,241,400	$3,094,100	$5,001,500
Background	Peak Buses	$36,330	1	2	0	0	0	1	0	0
Bus	Ann. Rev. Bus-Hr.	$75.25	3,060	6,120	1,148	765	1,530	3,060	-1,721	6,885
Changes	Ann. Rev. Bus-Mi. (40')	$3.05	45,900	91,800	11,475	-68,850	0	45,900	-120,488	17,901
	Change in O&M Cost *(from Existing)*		$406,600	$813,200	$121,300	-$152,400	$115,100	$406,600	-$497,000	$572,700
TOTAL CORRIDOR O&M COST ESTIMATE			**$4,100,600**	**$8,354,700**	**$5,217,700**	**$4,922,800**	**$5,831,400**	**$3,648,000**	**$2,597,100**	**$5,574,200**

Notes

1. Counts of directional stops do not include downtown Minneapolis or St. Paul Stations. In-line stations counted as two (for each direction).
2. Vertical circulation (elevators (assumed at each in-line stop (one per stop, on each side of highway.
3. No exclusive lane miles or TSP costs are included.
4. All cost estimates ass ume 40' buses.
5. HTCS service plans assume 16 hour span of service Mon-Sat, 13-hours on Sun.
6. HCTS service plans assume 15-min. all-day service on weekdays and Saturdays, 30-min. on Sat. nights and Sundays.
7. Costs for background bus changes are general.
8. Unit costs consistent with those used in current Met Council corridor studies (Robert St., Nicollet-Central, Midtown).