MIDTOWN CORRIDOR ALTERNATIVES ANALYSIS

FINAL REPORT APRIL 2014

midtowntransitway.org

TABLE OF CONTENTS

For additional project information, please see online project library

EXECUTIVE SUMMARY

The Midtown Corridor Alternatives Analysis (AA) evaluated the benefits, costs, and impacts of implementing a transitway in the Midtown Corridor – a corridor located in the City of Minneapolis, Minnesota. The study was initiated to identify a transit alternative that best meets the transportation needs of the local community in terms of technical feasibility, costs, and benefits.

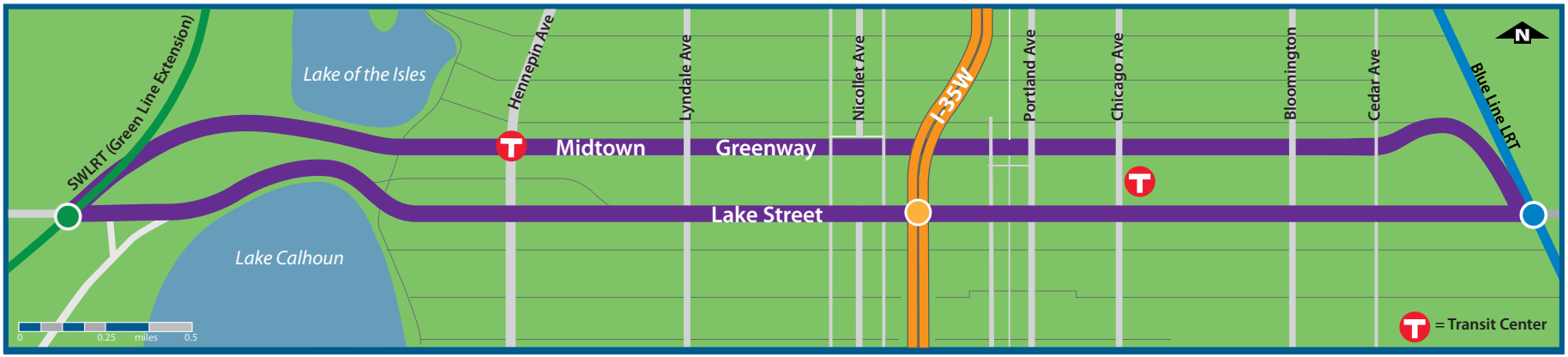
Project Process and Public Involvement

The AA was an 18 month collaborative effort between Metro Transit, the City of Minneapolis, Hennepin County, the Metropolitan Council and multiple community businesses, groups and stakeholders. Stakeholders from these groups staffed four project committees that met throughout the AA process to guide the project. Besides the formal committee structure, the process also included a multitude of public outreach and events all designed to meet people 'where they were' (i.e., at community events and neighborhood gatherings) instead of insisting the public come to the project.

Project Purpose and Goals

The purpose of the Midtown Corridor Transitway Project is to provide transit service that meets current and future travel needs, attracts new riders, connects users with job centers and key destinations, and supports environmentally sustainable growth and development. The AA sought to determine the type of transit investment that best meets these needs. The following five broad goals were established to guide the project process:

1. Increase transit use among the growing number of corridor residents, employees, and visitors.
2. Improve corridor equity with better mobility and access to jobs and activities.
3. Catalyze and support housing and economic development along the corridor.
4. Develop a cost-effective transitway that is well-positioned for implementation.
5. Build upon the vibrancy and diversity of the corridor by supporting healthy, active communities and the environment.



Determining the Alternatives

The project initially considered ten transitway alternatives. Each one combined an alignment within the corridor –Lake Street, the Midtown Greenway, or both – with a transit mode. The 10 initial combinations are shown below.

Alternatives Initially Under Consideration

Lake Street

1. Enhanced Bus
2. Streetcar
3. Light Rail Transit (LRT)
4. Dedicated Busway

Midtown Greenway

5. Double/Single-Track Rail
6. Full Double-Track Rail
7. Dedicated Busway
8. Personal Rapid Transit
9. Commuter Rail
10. Streetcar Lake Street/Greenway Loop

A collaborative, iterative process, based on discussions with stakeholders, was used to narrow down the initial set of alternatives down to the three most promising alternatives within the corridor. Those alternatives were:

- Enhanced bus on Lake Street
- Double/single-track rail in the Greenway
- Dual alternative (i.e., a combination of enhanced bus on Lake Street and rail in the Greenway)

Also, an enhanced bus extension was designed and studied in response to stakeholder feedback. The enhanced bus extension extended transit service from the project study area into Saint Paul to connect with the METRO Green Line LRT.

Analyzing the Alternatives

The study analyzed the benefits, costs, and impacts of the three most promising alternatives and the enhanced bus extension. The cost estimate and ridership projections are highlighted on the next page.

Evaluating the Alternatives

The results of each alternative's benefits, costs, and impacts were comparatively evaluated against each other. The results of the technical analysis demonstrated that the dual alternative, with the enhanced bus extension, was the strongest alternative. Public feedback from a series of public meetings and an online survey supported this conclusions.

Project Outcome: Locally Preferred Alternative Recommendation

After reviewing the technical results and listening to feedback from the project committees and the public, the project's Policy Advisory Committee (PAC) unanimously recommended the dual alternative, with the enhanced bus extension to Saint Paul, as the locally preferred alternative (LPA) for the Midtown Corridor.

Midtown Corridor

Lake Street

Cost Estimates

Alternative	Capital Costs	Operating Costs (annual)
Enhanced Bus	$50 million	$7 million
Rail	$185 - 220 million	$8 million
Dual	$215 - 250 million	$15 million

Ridership Projections (Year 2030)

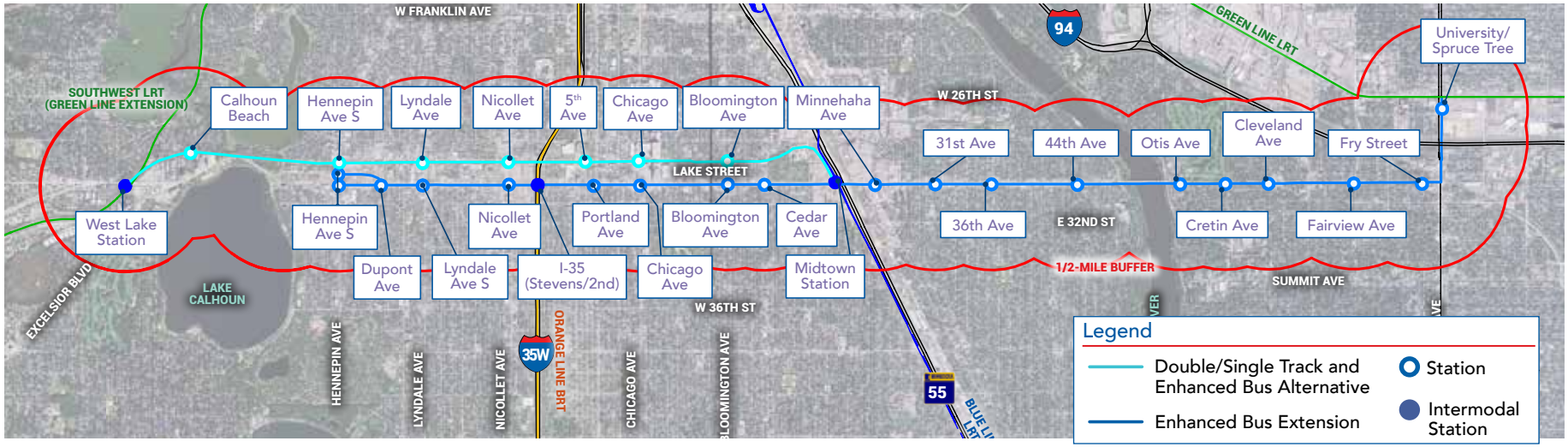
Alternative	Local Bus	Rail	Enhanced Bus		Corridor Total
			Study Area	Extended Corridor	
Existing (2012)	14,600	–	–	–	14,600
Enhanced Bus	8,500	–	11,000	3,000	22,500
Rail	9,500	11,000	–	–	20,500
Dual Alignment	6,000	9,500	8,500	8,000	32,000

Next Steps

The Metropolitan Council is in the process of updating the region's Transportation Policy Plan, which guides the development of the region's transportation system. The Midtown Corridor LPA will be incorporated into the Transportation Policy Plan during this planning process. Due to the funding constraints facing the region, the corridor will mostly likely appear as an unfunded corridor in the 2014 Transportation Policy Plan update. However, it is possible that the project will move forward in phases. Considering the funding situation, it is likely that the enhanced bus alignment, the less expensive portion of the project, will be implemented first.

Also, as one of the earlier steps on the way towards the implementation of a transitway, the AA process is designed to study a corridor at a relatively high-level. Future phases of study will address the project in greater detail.

The Dual Alternative + Enhanced Bus Extension



This page left intentionally blank.

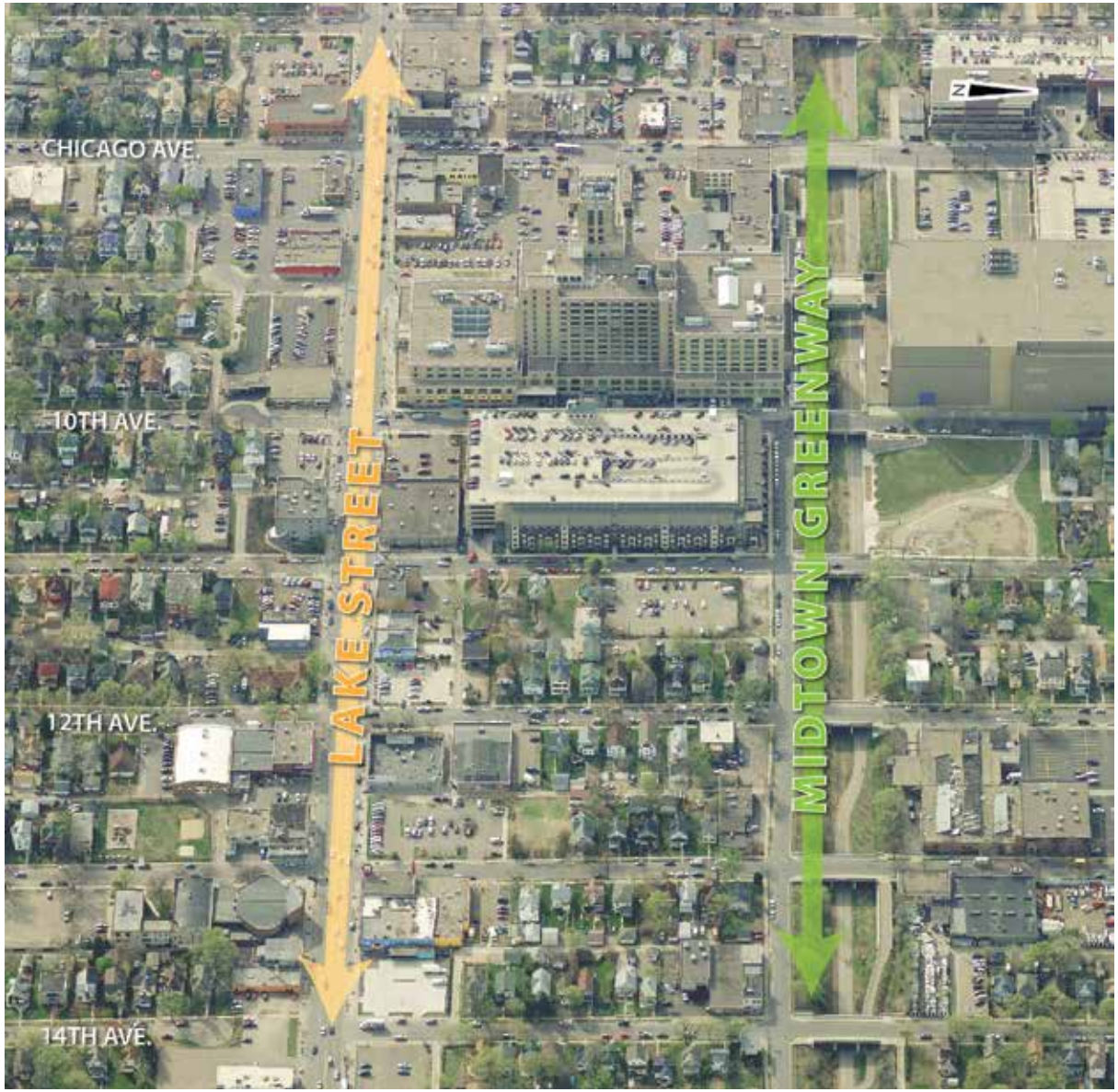
INTRODUCTION

Metro Transit, in partnership with Hennepin County and the City of Minneapolis, conducted an 18-month alternatives analysis (AA) to identify possible transit improvements in the Midtown Corridor. The study was initiated to identify a transit alternative that best meets the transportation needs of the local community in terms of technical feasibility, costs, and benefits. The project study area is shown in Figure 1.

The AA was collaborative effort between Metro Transit, the City of Minneapolis, Hennepin County, the Metropolitan Council and multiple community businesses, groups and stakeholders.

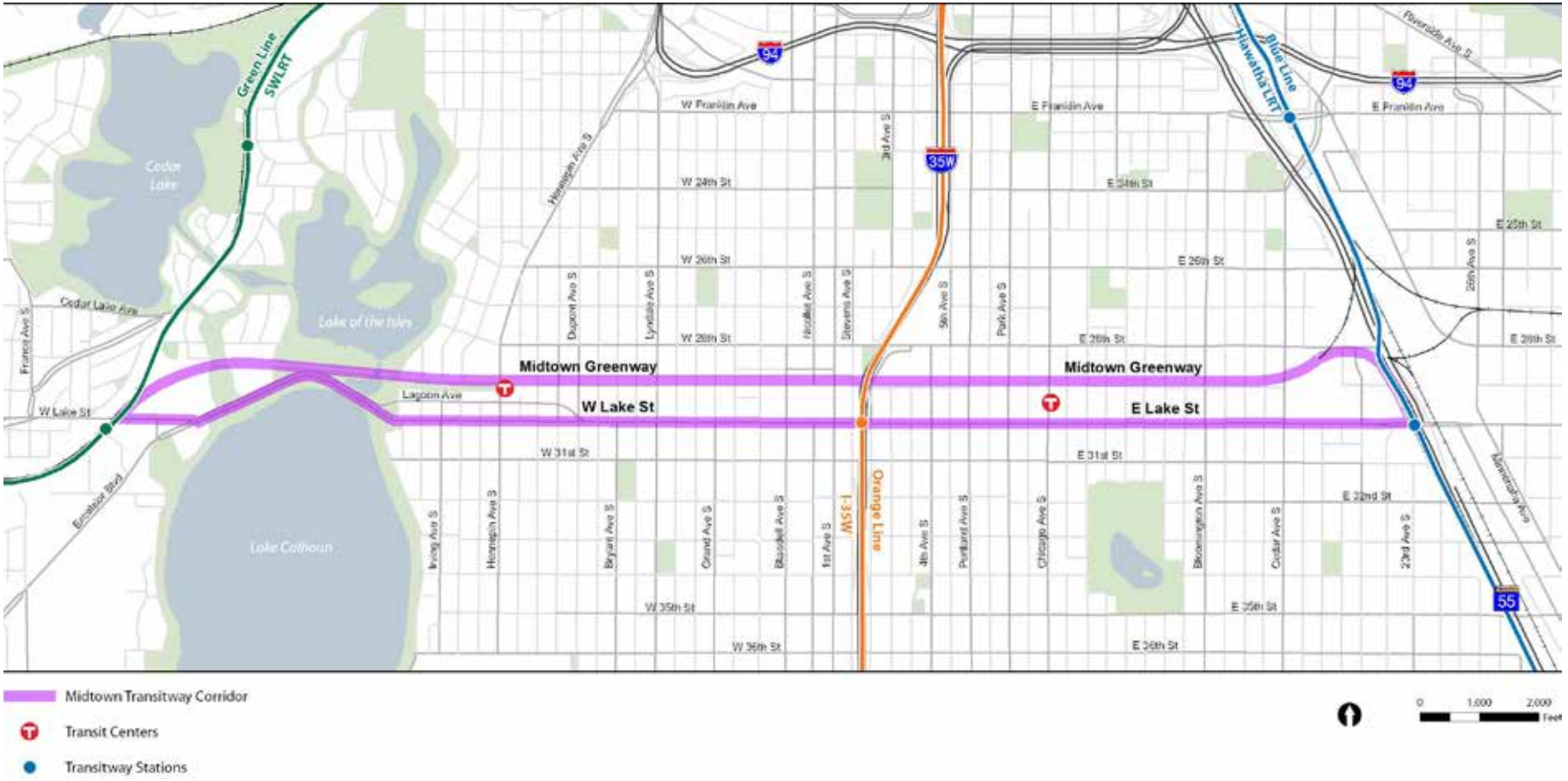
How to Use this Document

This report provides a high level overview of the AA process. Detailed technical documentation and technical results are contained in the project's technical memorandums and appendices. These documents are referenced with hyperlinks throughout the document. Clicking a hyperlink will download a PDF of the referenced material. All project documentation can also be found at the project website: www.midtowntransitway.org



A view of the Midtown Exchange Building and surrounding neighborhood in the Midtown Corridor

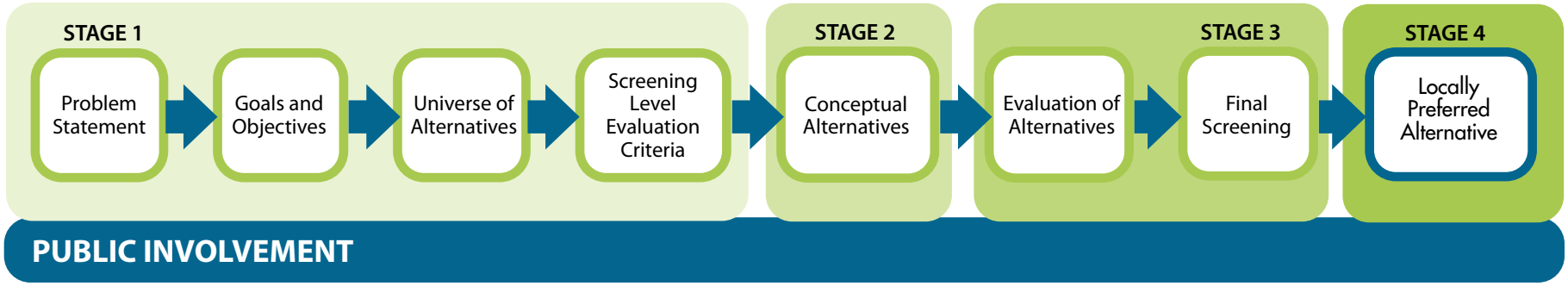
Figure 1: Study Area



What Is an Alternatives Analysis (AA)?

An AA is a planning study that follows Federal Transit Administration (FTA) guidelines to develop and evaluate transit alternatives. An AA analyzes the benefits, cost and impacts associated with various transit alternatives and is the first step towards federal funding of a transitway project.

AA Study Process: The 18 month AA study process fell into four main stages:



Stage 1: Identification of a problem statement and creation of a set of goals and objectives to evaluate potential solutions to the problem.

Also, an initial 'universe of alternatives,' (a list of all potential alternatives in the study area) is identified.

The last step in stage one is to narrow the universe of alternatives down to the most promising alternatives.

Stage 2: Conceptual development of the most promising alternatives.

Stage 3: Refinement and detailed evaluation of the most promising alternatives.

Stage 4: Final assessment of alternatives and development of recommendations.

Public Involvement

Public involvement and outreach occurred throughout every stage in the Midtown Corridor AA. The outreach strategies included a formal committee structure as well as a multitude of events, meetings and public relations designed to meet people where they were (i.e., at community events and neighborhood gatherings).

Project Committee Structure

Four project committees met throughout the AA process. The committees were staffed by elected and appointed officials and staff from Metro Transit, City of Minneapolis, City of Saint Paul, Hennepin County, and the Minneapolis Park and Recreation Board. Committee members were also tapped from local community groups and businesses. For a full list of committee members, see Appendix A: Stakeholder Engagement Plan.

The overall decision making process is shown in Figure 2. The Technical Advisory Committee, Community Advisory Committee, and Project Management Team informed the Policy Advisory Committee, whom in turn passed along the locally preferred alternative (LPA) recommendation to the Metropolitan Council.

The committee structure was organized as follows:

Project Management Team

The Project Management Team (PMT) led the day-to-day management of the AA and coordinated activities among the partner agencies, consultant team, FTA, and other project partners.

Technical Advisory Committee

The Technical Advisory Committee (TAC) consisted of staff representatives from a wider group of public agencies with interest in the project. The TAC gave technical input to the project team and assisted in the resolution of technical issues in their field. The TAC provided guidance to the PAC to inform the LPA recommendation.

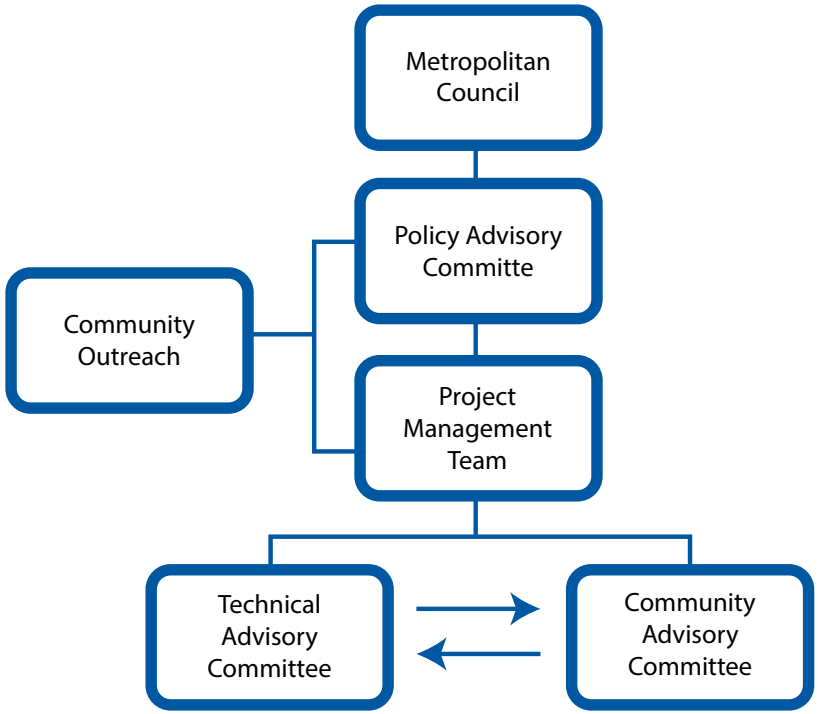
Community Advisory Committee

The Community Advisory Committee (CAC) consisted of representatives from key stakeholder groups in the community including neighborhood organizations, business organizations, non-profit groups, institutions, and major employers. The CAC reviewed goals and objectives, discussed project alternatives, identified concerns, and made recommendations to the PAC.

Policy Advisory Committee

The Policy Advisory Committee (PAC) consisted of policymakers and elected and appointed officials. The PAC participated in the overall direction and guidance of the study process, discussed project alternatives, and made the final recommendation on the LPA.

Figure 2: Midtown Corridor Alternatives Analysis Formal Decision Making Process



Public Outreach Techniques

A variety of techniques were used to get stakeholders involved in the AA.

Partnerships with Midtown Community and Business Groups

The project team fostered partnerships with multiple Midtown community and business groups by inviting group members to participate in the Community Advisory Committee (CAC). Along with representatives from most of the neighborhood associations, the group also included members of the Lake Street Council, Midtown Greenway Coalition, and Midtown Business Association.

Neighborhood Meetings

The project team presented the technical results of the project to 16 neighborhood association and community groups in the study area to present the results of the technical analysis. The project team presented to 11 of the 14 neighborhoods that line the corridor.

Meetings with Local Business Owners

The project team met with a diverse group of business owners in the corridor, including several meetings with Latino business owners at Mercado Central.

Onboard Outreach

The project team handed out surveys and engaged in one-on-one conversations with riders on the Route 21 – the existing local bus route on Lake Street to inform them about the project. The team also set up an information table at the Uptown Transit Center to engage with other transit users.

National Night Out

The project team visited multiple National Night Out parties in the study area to inform community members about the project. National Night Out is an annual nationwide event that encourages residents to hold block parties and get to know their neighbors as a way to encourage crime prevention.

Public Meetings

The project team held three rounds of public meetings during different stages of the AA process. The following attendance was recorded at each round of meetings:

January 2013: 121 attendees

May 2013: 103 attendees

November 2013: 144 attendees

Online Survey

The project team created an online survey to garner feedback on the project's technical results from community members who did not or could not attend the public meeting. The team received 223 responses.

Project Website

The project team maintained a project website throughout the AA process. Meeting minutes, technical memorandums and other project updates were posted on the site. The site attracted approximately 15,000 visitors over the course of the study.

www.midtowntransitway.org

This page left intentionally blank.

STUDY AREA EXISTING CONDITIONS

The Midtown Corridor study area is located entirely within the City of Minneapolis and Hennepin County. The map shown in Figure 1 shows the two study alignments: Lake Street and the Midtown Greenway. The alignments have connections with three existing or planned METRO transitway stations:

- Lake Street/Midtown Station of the Blue Line (Hiawatha) light rail transit (LRT)
- Future location Green Line (Southwest LRT) West Lake Station
- Future Orange Line (I-35W) bus rapid transit (BRT) intersects the corridor at I-35W

This study area covers 60 percent of Route 21 ridership. It is a multimodal transportation corridor that includes transit, other motor-vehicle traffic, bicycles, and pedestrians. These modes all compete for the safe and efficient movement of people and goods in the corridor.

The two alignments are described in further detail in the following sections. For a more in-depth description of the study area, see Appendix B: Purpose and Need Statement.

Lake Street at Hennepin Avenue

Midtown Greenway at 10th Avenue South

Midtown Greenway

Lake Street

Lake Street

A former streetcar corridor and current high-frequency bus corridor, Lake Street is the primary east-west commercial corridor in south Minneapolis. The corridor contains a mix of retail and residential uses and borders 14 diverse Minneapolis neighborhoods.

In addition to high traffic counts, the Midtown Corridor has high levels of pedestrian traffic found in activity centers (Uptown and Lyn-Lake) and major transit connections (Chicago Lake Transit Center and Hiawatha Avenue). Pedestrian counts are comparable to the densest parts of Minneapolis; daily pedestrian counts on Lake Street are more than 3,000 per day in Uptown, 3,700 per day around Lake Calhoun, and 4,900 per day near the Blue Line LRT.

The Midtown Greenway

Owned by the Hennepin County Regional Railroad Authority (HCRRA), the Midtown Greenway is a former Canadian Pacific Railway/Soo Line freight rail facility. The property was purchased by HCRRA in 1993 for the purpose of constructing LRT or other transportation systems and associated facilities. The Greenway is located approximately one block north of Lake Street within most of the study area. One of the unique features of the Greenway is that it is grade-separated from and passes under the street grid between Hennepin and Cedar avenues (with one at-grade crossing at 5th Avenue). The right of way in the corridor is generally 100 feet wide between France Avenue and Hiawatha Avenue, but the width between the embankments varies.

Since 2000, the corridor has been transformed into a bicycle and pedestrian facility. It is now one of the region's most active bicycle routes and an important community asset that combines mobility with open space. The Midtown Greenway is one of the busiest bicycle corridors in the region, carrying up to 3,500 cyclists per day according to City of Minneapolis bicycle traffic counts.

Existing Transit Network in the Study Area

The Midtown Corridor is rich with transit service, as shown in Figure 3. Metro Transit currently operates two bus routes along Lake Street: Route 21 that provides frequent, all-day local service and Route 53 that offers peak-period limited-stop service. Both routes continue into Saint Paul past the eastern boundary of the Midtown Corridor study area.

Route 21 has the third-highest average daily ridership of all Metro Transit routes, providing over 8,000 rides within the study area alone.

Key destinations served by these routes within the study area include the Uptown Transit Station, the Uptown commercial district, Calhoun Square, Kmart at Nicollet Avenue, the I-35W/Lake Street stop, the Chicago Lake Transit Center and Midtown Exchange (east of Chicago Avenue), South High School, Hi-Lake Shopping Center, and the Lake Street/Midtown Station on the Blue Line LRT.

Figure 3: Midtown Corridor Existing Transit Routes

This page left intentionally blank.

PROJECT GOALS

Project Purpose and Need

In an AA, the project's problem statement, called 'the purpose and need,' clearly communicates the transportation problem the project is attempting to address. The problem statement is a key factor in determining the range of project alternatives. Alternatives that do not meet the purpose and need are dismissed from the analysis.

Key Elements of the Purpose and Need

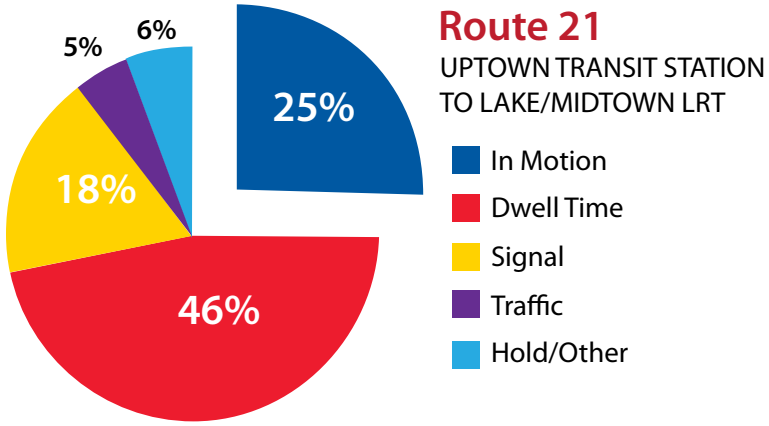
- **Purpose** – Clear and succinct statement of the fundamental reasons the project is being proposed
- **Needs** – The current transportation problems in the corridor that the project is intended to address
- **Goals/objectives** – Broader vision and desired outcomes for the project
- **Evaluation criteria** – Help compare and contrast alternatives based on a set of identified criteria

For a detailed discussion of the issues driving the project's purpose and need statement, see Appendix B: Purpose and Need Statement.

Project Purpose

The purpose of the Midtown Corridor AA is to provide transit service that meets current and future travel needs, attracts new riders, connects users with job centers and key destinations, and supports environmentally sustainable growth and development.

Figure 4: Delay factors for Route 21



Need for the Transitway

The Midtown Corridor is an important part of the regional multimodal transportation network; however, there are several unmet transportation needs that constrain the area's potential development. Key destinations for employment, recreation, commerce, and high-density residential housing are located along many of the major north-south streets intersecting Lake Street and the Midtown Greenway. These are the types of features that could support a transitway; however, today's transit experience is not competitive with other transportation modes, including the automobile. The following factors contribute to a need for a transitway investment in the Midtown Corridor.

A need for reliable and attractive transit service in the corridor

Route 21, the corridor's main local bus route has an average speed of six miles per hour on Lake Street in the Midtown Corridor, and for an average trip the bus is in motion for only 25 percent of the time, as shown in Figure 4. A high number of customer boardings and frequent bus stops contribute to significant boarding delay and an extend trip travel time. Additionally, Lake Street has many signalized intersections, and buses operate in mixed traffic. Together these factors result in a slow speed of service. For example, via transit it takes approximately 29-35 minutes to travel from the Uptown Transit Center to the Lake Street/Midtown Station on the Blue Line LRT, a distance of roughly three miles, with no unscheduled delays. The same trip by car takes about 11 minutes, and by bicycle using the Midtown Greenway it takes

15 minutes. Lower transit travel speeds lead to decreased service attractiveness.

Improvements to transit service and passenger facilities are needed to provide a transportation alternative that is competitive with the automobile and encourages more people to use transit for both commuting trips and other travel.

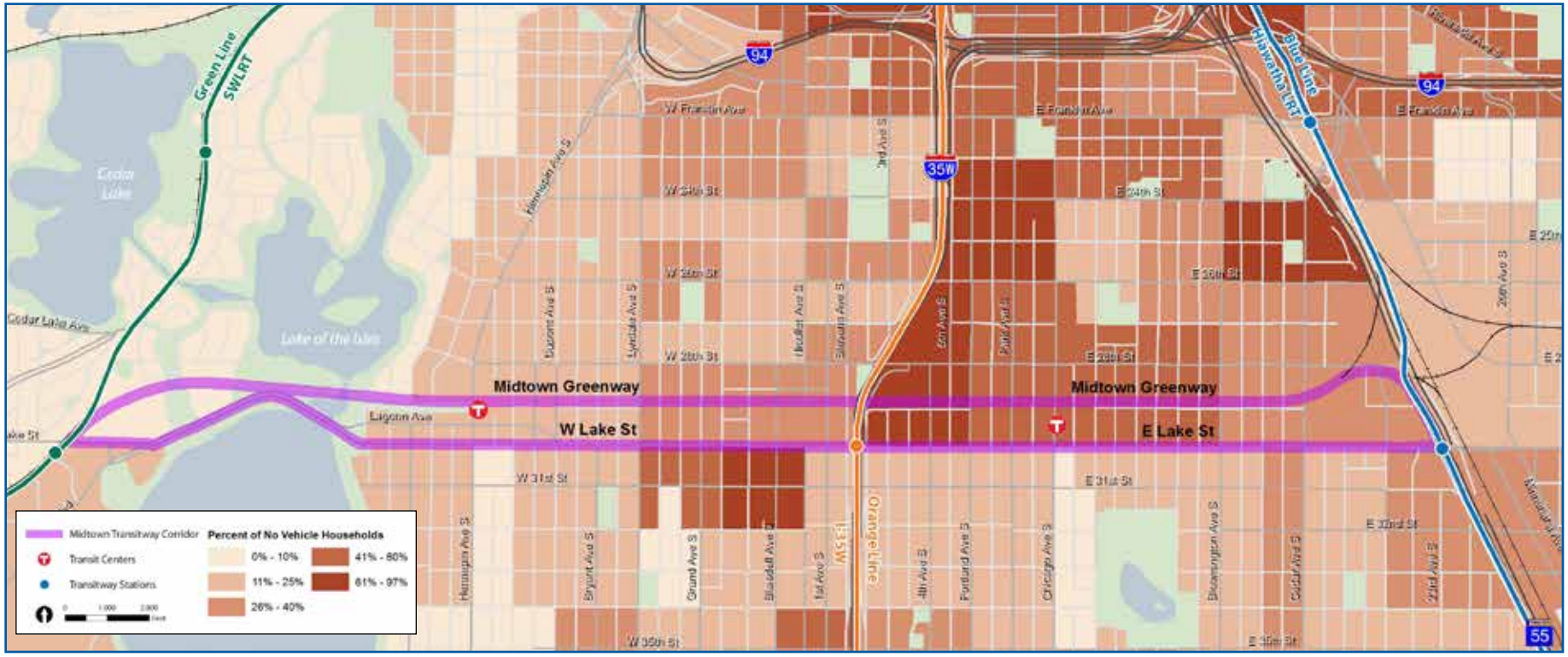
A need for improved access to job centers and key destinations

The Midtown Corridor is a major non-downtown center of professional employment in the region. Currently, there are approximately 33,500 daily commuters traveling to the corridor. Approximately 20 percent of these commuters originate from residences that are within a ½ mile of a planned or current regional transitway that connects to the Midtown Corridor. Approximately 2,600 residents both live and work within the Midtown Corridor.

In addition to containing multiple job centers and key destinations, the Midtown Corridor is located in a vital location. It is anchored on the west by the planned Green Line (Southwest LRT), bisected in the middle by the Orange Line (I-35W BRT), and on the east by the Blue Line (Hiawatha LRT). A lack of fast and efficient connections to the regional transitway system limits access to opportunities inside and outside the corridor.

Therefore, improved access to job centers both inside and outside the corridor is needed. As the region's travel patterns continue to decentralize, transit must be more attractive to attract riders to growing non-downtown travel markets. Better east-west connections to existing and planned transitways will increase accessibility for transit users and create synergy between our growing network of high-frequency, high-capacity transitways in the region.

Figure 8: Percentage of households that do not own a car in the Midtown Corridor



A need to serve the large number of people who rely on transit in the corridor

The Midtown Corridor study area has a large number of people whom do not own cars and whom rely on transit as their main means of transportation, as shown in Figure 5. A demographic analysis of the study area shows that residents in the corridor own 30 percent fewer cars per driver the rest of the metropolitan area. This characteristic indicates that more of the people in the corridor rely on transit. Improved transit in the corridor is needed to better serve these people.

A need to support city and regional policies encouraging growth and development in the corridor

The Midtown Corridor is targeted for growth and investment which is supportive of enhanced transit and increased densities. As shown in Table 1, both population and employment are forecasted to grow significantly through 2030 in the Midtown Corridor. This projected growth will result in increased travel demand within the Midtown Corridor, demand which cannot be accommodated with the existing transportation system in the corridor. Lake Street has limited right-of-way and already high volumes of vehicular traffic. Existing transit service is at or near capacity and will not be able to accommodate growth in population and employment forecasted for the corridor.

Project Goals

Five broad goals for the desired outcomes associated with a transitway investment were developed to address the purpose and need for transit improvements in the Midtown Corridor. More specific objectives were also developed for each goal. For a full list of the objectives, see Appendix B: Purpose and Need Statement.

The five project goals are as follows:

1. Increase transit use among the growing number of corridor residents, employees, and visitors
2. Improve corridor equity with better mobility and access to jobs and activities
3. Catalyze and support housing and economic development along the corridor
4. Develop a cost-effective transitway that is well-positioned for implementation
5. Build upon the vibrancy and diversity of the corridor by supporting healthy, active communities and the environment

The goals served as a framework to compare and evaluate the project's alternatives. The project's evaluation process and measures (discussed later in the document) tie directly back to the project goals.

Table 1: Midtown Corridor Population and Employment Forecasts

	2010	2030	2010-2030 Growth	Percentage Growth
Population	103,653	114,779	11,126	10.7%
Households	47,653	54,374	6,748	14.2%
Retail Employment	9,051	10,913	1,862	20.6%
Non-Retail Employment	39,976	47,970	7,994	20.0%

This page left intentionally blank.

INITIAL ALTERNATIVES

Initial Screening Analysis

After defining the goals and objectives of the desired transitway investment, the next step in the AA process was to establish the full range of potential alternatives, called the "universe of alternatives," within the study area. This full set of alternatives is screened at a high level to determine if they meet the project's purpose and need. For example, if an alternative did not catalyze and support economic development along the corridor it was dropped from the analysis.

Only those alternatives that meet the purpose and need were advanced to the next level of analysis where the costs, benefits and impacts of the alternatives were estimated. This allows the most promising alternatives to be analyzed at a greater level of detail. For an in-depth discussion of the initial screening process, see Appendix C: Initial Screening Analysis.

Initial Alternatives

The initially considered alternatives all combined an alignment –Lake Street, the Midtown Greenway, or both – with a transit mode. The 10 initial combinations are listed at right. Of the 10 initially considered alternatives, two alternatives, commuter rail on the Greenway and PRT on the Greenway, were not consistent the purpose and need, and were dropped from the screening process. The remaining transit modes and alignments are described in the next section.

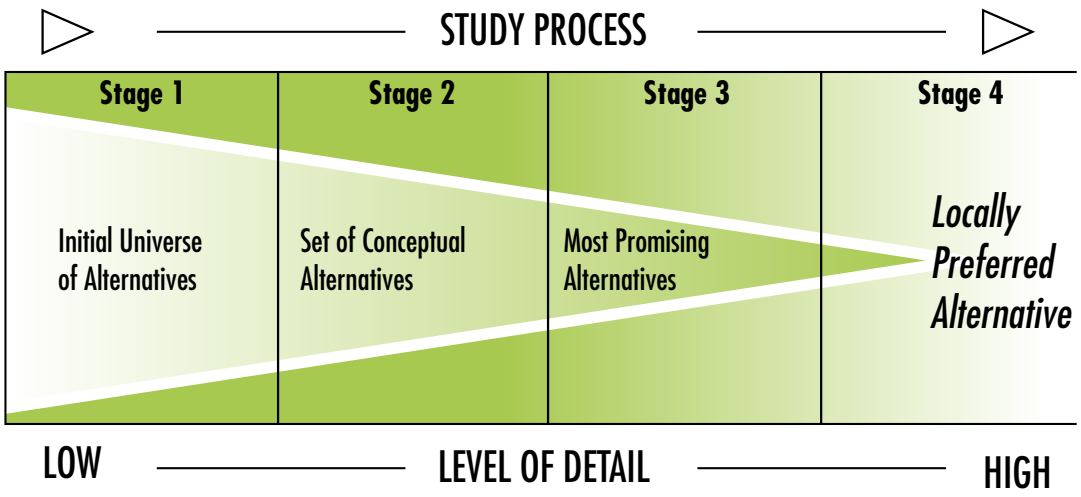
Alternatives Initially Under Consideration

Lake Street

1. Enhanced Bus
2. Streetcar
3. Light Rail Transit (LRT)
4. Dedicated Busway

Midtown Greenway

5. Double/Single-Track Rail
6. Full Double-Track Rail
7. Dedicated Busway
8. Personal Rapid Transit
9. Commuter Rail
10. Streetcar Lake Street/Greenway Loop



Initial Alignments

The initially considered alignments along Lake Street and the Midtown Greenway are shown in Figure 6. Both alignments ran from the proposed Green Line West Lake station to the Blue Line Lake-Street Midtown Station. One initially considered alternative, the streetcar Lake Street/Greenway loop, travelled counterclockwise along both alignments. For maps of each initially considered alignment, see Appendix: C: Initial Screening Analysis.

Initial Modes

With the removal of commuter rail and PRT from the screening process, the initial screening process analyzed four remaining modes: enhanced bus, streetcar, dedicated busway and LRT. The characteristics of each mode are shown in Figure 7. The figure splits the modes into two types: modes that travel in a dedicated guideway (i.e., in a space reserved only for transit vehicles) and modes that travel on the street in mixed-traffic.

Double/Single-Track Rail versus Full Double Track Rail in the Greenway

Two configurations of rail in the Greenway were analyzed in the initial screening process. Double/single-track rail consisted of sections of double track (two parallel tracks allowing two rail vehicles to travel in opposite direction without any hindrance) and sections of single track (one track that is used by both eastbound and westbound rail vehicles). The full double track rail alternative assumed the entire alignment used double track. The main difference between these two alternatives was that the full double track alternative was assumed to need greater amounts of right-of-way for operations.

Figure 6: Initial Alignments

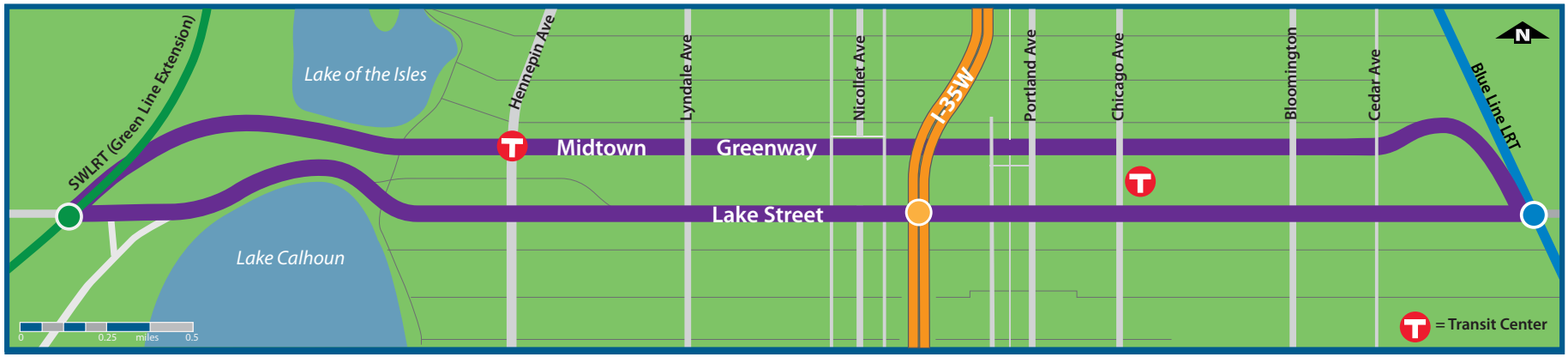


Figure 7: Initially Considered Modes

	DEDICATED GUIDEWAY		MIXED TRAFFIC	
	Dedicated Busway	**Light Rail (LRT)**	**Streetcar**	**Enhanced Bus**
				
Runningway	Vehicles operate in right-of-way exclusively for buses. Sometimes a mixed-traffic lanes is used for short distances	Operates in right-of-way exclusively for the LRT vehicles	Typically operates in mixed-traffic lanes, but can also be in right-of-way exclusively for streetcar vehicles	Enhanced bus vehicles operate in mixed traffic
Station Spacing	In exclusive right-of-way corridors, stations are located every ½ to one mile	Station located every ½ to one mile	Station located every ¼ to ¼ mile	Stations can be located every ¼ to ½ mile
Station Amenities	Distinct shelters with passenger amenities like real-time information, fare-collection, and security features	Distinct shelters with passenger amenities like real-time information, fare-collection, and security features	Stations can range from basic stops with minimal passenger amenities to LRT-like stations	Stations can range from basic stops with minimal passenger amenities to LRT like stations
Vehicle Type	Diesel or diesel-electric hybrid vehicles. Some vehicles testing battery electric-only operation.	Electrically powered vehicles with overhead wires.	Electrically powered vehicles with overhead wires. Some vehicles are testing on-board batteries for short distances	Diesel or diesel-electric hybrid vehicles. Some vehicles testing battery electric-only operation.
Passenger Capacity	Between 60 and 105 passengers per vehicle.	Between 200 passengers per vehicle. LRT vehicles are coupled together to increase passenger capacity	Between 115 and 160 passengers per vehicle. Unlike LRT, vehicles operate as single units.	Between 60 and 105 passengers per vehicle.
Cost per Mile	$10-50 million per mile	$80-125 million per mile	$30-60 million per mile	$2-6 million per mile
Example Operating Locations	Boston, Cleveland, Los Angeles	Minneapolis, Dallas, San Diego	Portland, Seattle, Toronto	Kansas City, Oakland, Seattle

Initial Screening Analysis Methodology

Screening Criteria

The initial screening analysis used six screening criteria, summarized in Table 2, to evaluate the project's initial alternatives. The screening criteria reflect different aspects of the project's purpose and need statement. For a full description of the initial screening criteria and requirements, see Appendix C: Initial Screening Analysis.

Scoring the Initial Alternatives

Alternatives were given a score of Poor, Fair, Good or Best depending on how well they fulfilled each criterion. Alternatives with the highest overall score were advanced to the next phase of the study for further in-depth technical analysis.

The results of the initial screening analysis are shown in Figure 13 . The detailed analysis and scoring of each alternative is included in Appendix C: Initial Screening Analysis.

Advanced Alternatives

As shown in Figure 8, enhanced bus on Lake Street and double/single-track rail had the highest overall scores and were advanced for further in-depth analysis.

Screening Criteria	Screening Requirements
Consistency with regional and local plans	Mode characteristics are consistent with Metropolitan Council recommendations stated in the Transportation Policy Plan and Regional Transitway Guidelines. Mode characteristics are consistent with local and other plans and policies.
Level of access provided to jobs and residents	Mode station spacing guidelines provide sufficient numbers of stations within the study area to adequately serve major destination and activity centers.
Ability to provide desired transit capacity and speed increases	Mode design characteristics allow for transit speed increases. Mode is appropriate scale current ridership levels but also provides room for growth.
Compatibility with existing transportation modes and infrastructure	Mode integrates well with existing transportation infrastructure and systems.
Potential ROW impacts	Mode requires minimal right-of-way.
Community and stakeholder sentiment	Mode is compatible with the following five sentiments consistently expressed by the public and the project advisory and stakeholder committees: Does not require reconstruction of Lake Street. Does not remove a travel lane or greatly impact parking on Lake Street. Minimizes impacts to Greenway historic and cultural resources. Minimizes impacts to Greenway bicycle and pedestrian facilities. Mode is felt to have potential to spur economic development.

Figure 8: Initial Screening Results

		Lake Street				Midtown Greenway			Both
	Screening Criteria	Enhanced Bus	Streetcar	LRT	Dedicated Busway	Double / Single-Track	Full Double-Track	Dedicated Busway	Streetcar Loop
1	Consistency with regional and local plans	Very Good	Fair	Good	Good	Very Good	Good	Good	Good
2	Level of access provided to jobs and residents	Fair	Good	Fair	Fair	Fair	Fair	Fair	Poor
3	Ability to provide desired transit capacity and speed increases	Fair	Fair	Good	Good	Good	Very Good	Good	Fair
4	Compatibility with existing transportation modes and infrastructure	Very Good	Good	Poor	Poor	Good	Poor	Good	Fair
5	Potential right of way impacts	Very Good	Fair	Poor	Poor	Good	Good	Good	Poor
6	Community and stakeholder sentiment	Good	Fair	Poor	Poor	Very Good	Poor	Poor	Fair
	Overall rating	Good	Fair	Poor	Poor	Good	Fair	Fair	Poor
		Alternative Advanced				Alternative Advanced			

An Iterative Process: Adding Alternatives

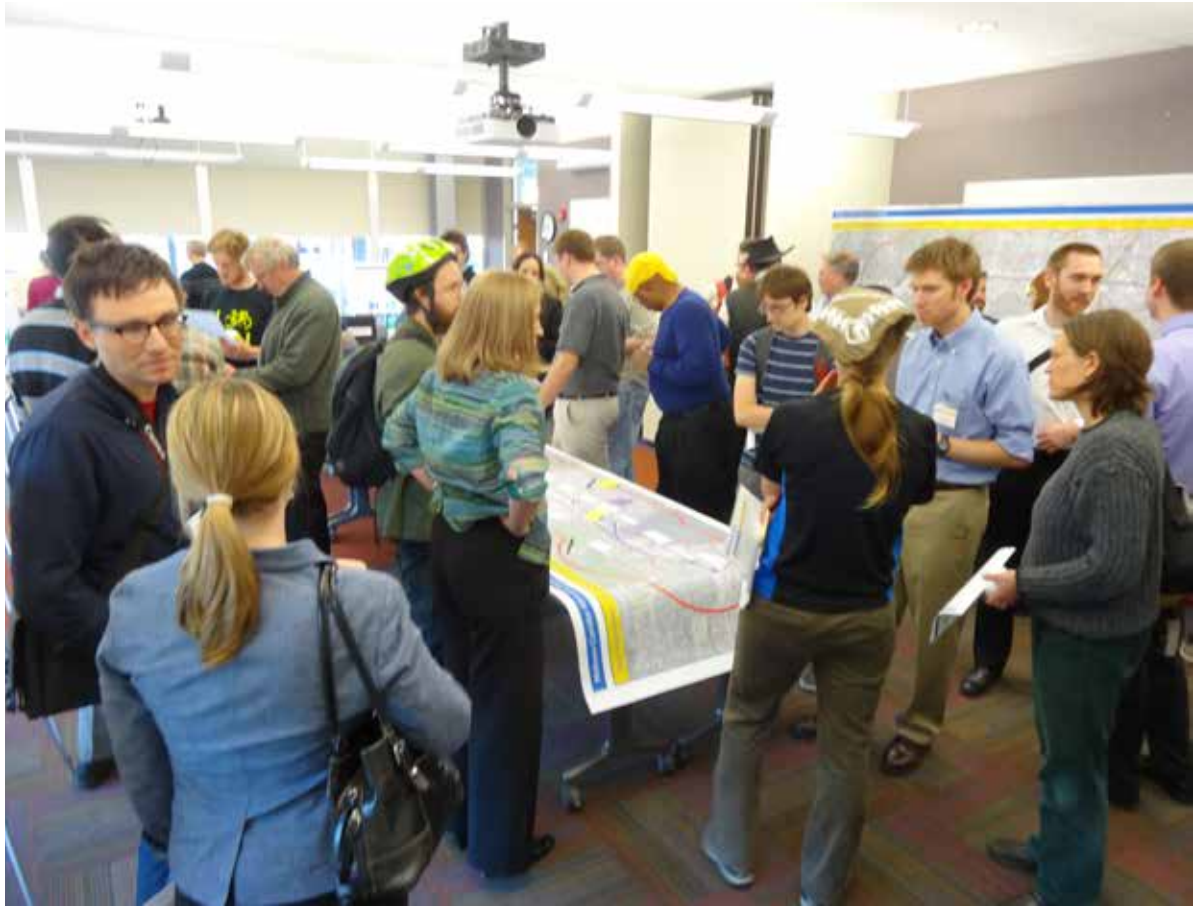
The initial screening analysis was an iterative process. The initial screening results were shared with the public, and their feedback was then presented to the project's committees. This feedback lead to the inclusion of a dual alternative and an enhanced bus extension.

Dual Alternative

The dual alternative combines the two highest scoring initial alternatives: an enhanced bus on Lake Street combined with a double/single-track rail in the Greenway. The end points (the proposed Green Line West Lake LRT Station and the existing Blue Line Midtown-Lake Street LRT Station) remain the same for this alternative; however some of the station locations for each mode were changed. These changes are discussed in the next section.

Enhanced Bus Extension

The enhanced bus extension was included to respond to stakeholder interest in providing transitway improvements on Lake Street east of Hiawatha Avenue. The extension of the enhanced bus alignment travels east of the Hiawatha LRT station and into Saint Paul to connect with the Green Line's Snelling Avenue Station.



The initial screening results were shaped by feedback gathered at public outreach events and other meetings

CONCEPT DEVELOPMENT

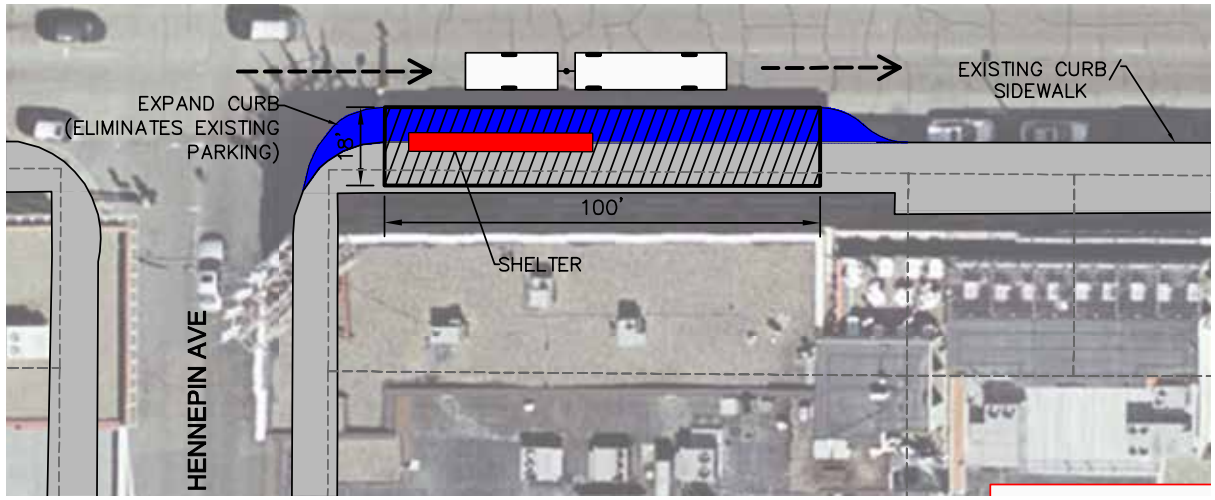
Designing the Alternatives

The next step in the AA process was to design the three alternatives advanced for more detailed analysis (enhanced bus on Lake Street, double/single-track rail in the Greenway, and the dual alternative). Some of the features addressed included:

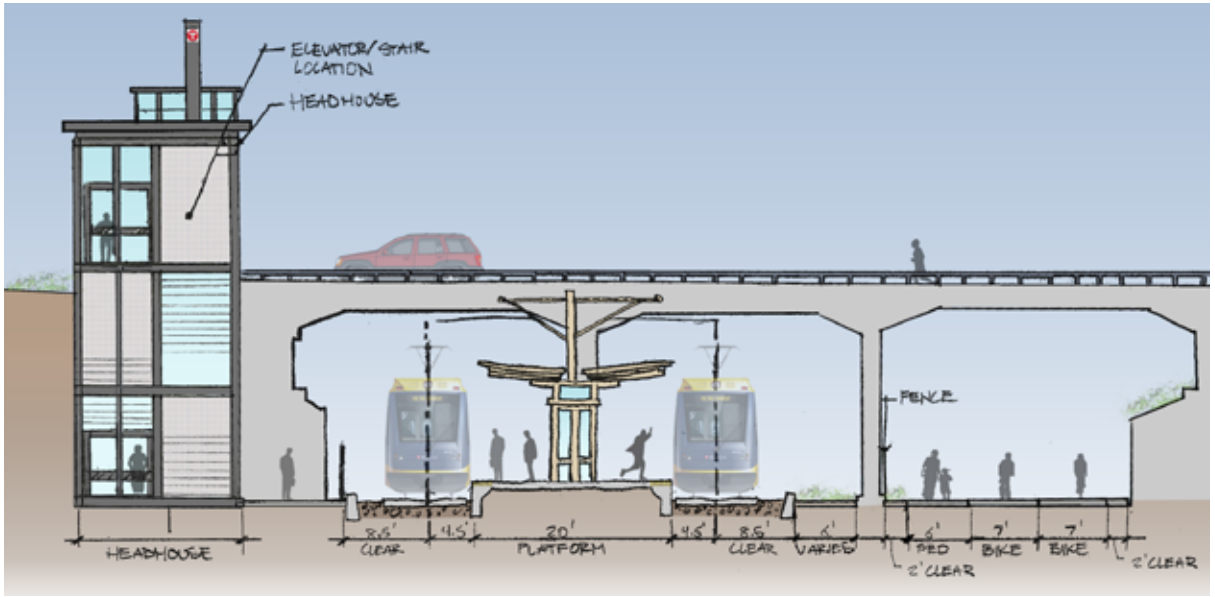
- Station platform and design
- Station siting
- Guideway design (e.g., curb extensions for the enhanced bus alternative, retaining walls for the rail alternatives, etc.)
- Operation and maintenance facilities
- Power systems
- Service planning

These designs were conceptual and were used to develop an approximate cost estimate for each alternative. They were also used to compare the relative benefits and impacts of each alternative. For an in-depth discussion of the details of each alternative, see Appendix D: Detailed Definition of Alternatives.

A map and an overview of the characteristics of each alternative are discussed in the next section.

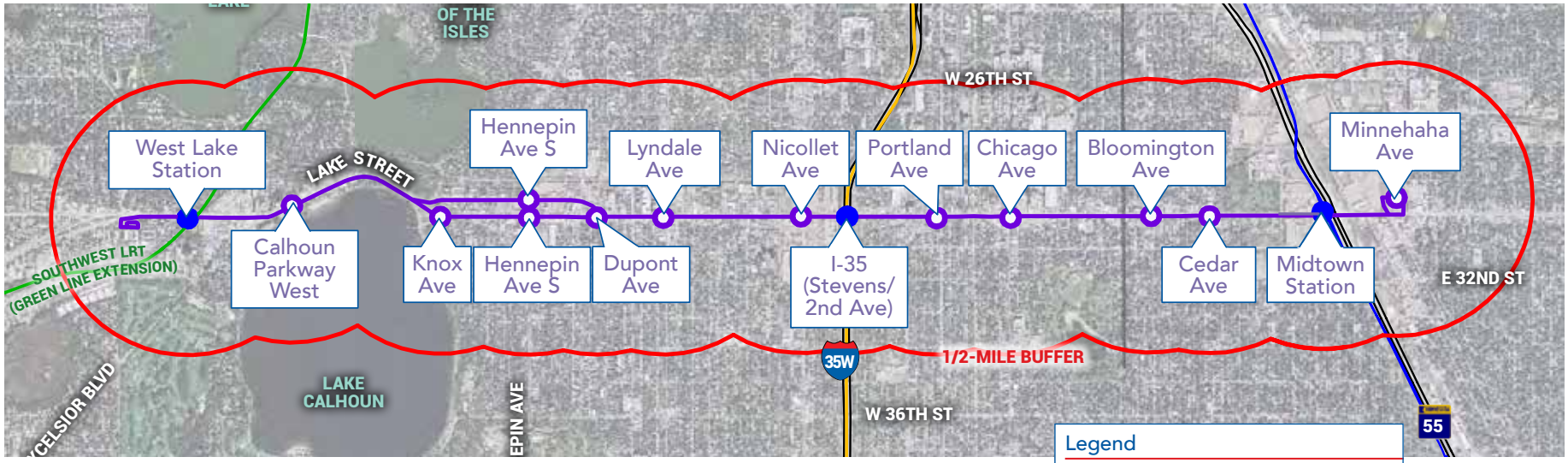


Conceptual layout of enhanced station on Lake at Hennepin



Conceptual layout of a typical rail station in the Greenway

Enhanced Bus on Lake Street Alternative



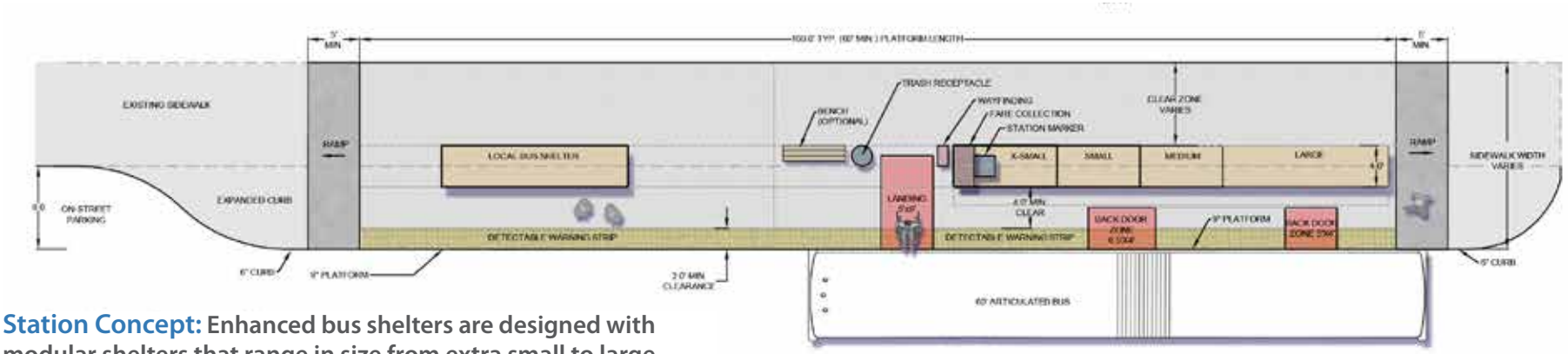
The project's **enhanced bus alternative** runs in **mixed traffic** similar to a local bus, and it incorporates **limited-stop service, technology improvements, and branding** to differentiate the service from regular bus routes. The primary objective of enhanced bus is to provide **faster and more frequent service** as well as an improved customer experience. Faster service is accomplished by reducing signal and passenger boarding delay, and stopping at fewer locations. An improved passenger experience is achieved through more **comfortable vehicles**, stations, information technology, and **improved service reliability**.

Enhanced bus in Kansas City, Missouri

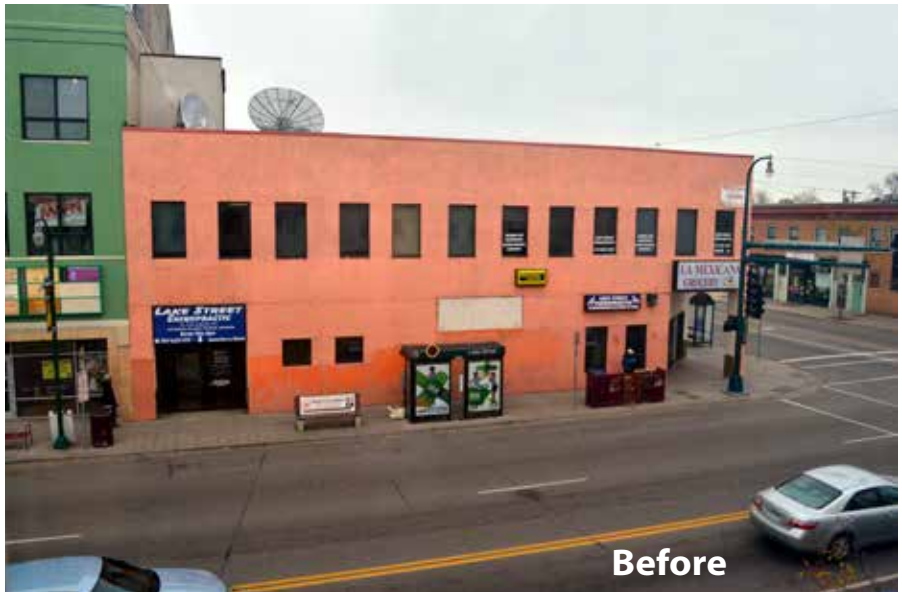
Key Characteristics

- 4.1-mile long alignment
- 14 stations, located approximately every 1/3 mile
- 32 minute one-way travel time
- Assumes a 60-foot articulated bus.
- Eliminates 26 parking spaces.

Enhanced Bus on Lake Street Alternative



Station Concept: Enhanced bus shelters are designed with modular shelters that range in size from extra small to large.



Station Visualization: Before and after enhanced bus station visualization at the corner of Lake Street and Bloomington Avenue.

Double/Single-Track Rail in the Greenway Alternative

The **double/single-track rail alternative** uses rail transit technology operating on tracks within an **exclusive fixed guideway**. The study assumes this alternative uses either a **single car light rail vehicle (LRV)** or **modern streetcar**. The vehicle will be **propelled along rails by electricity** supplied through an overhead wire.

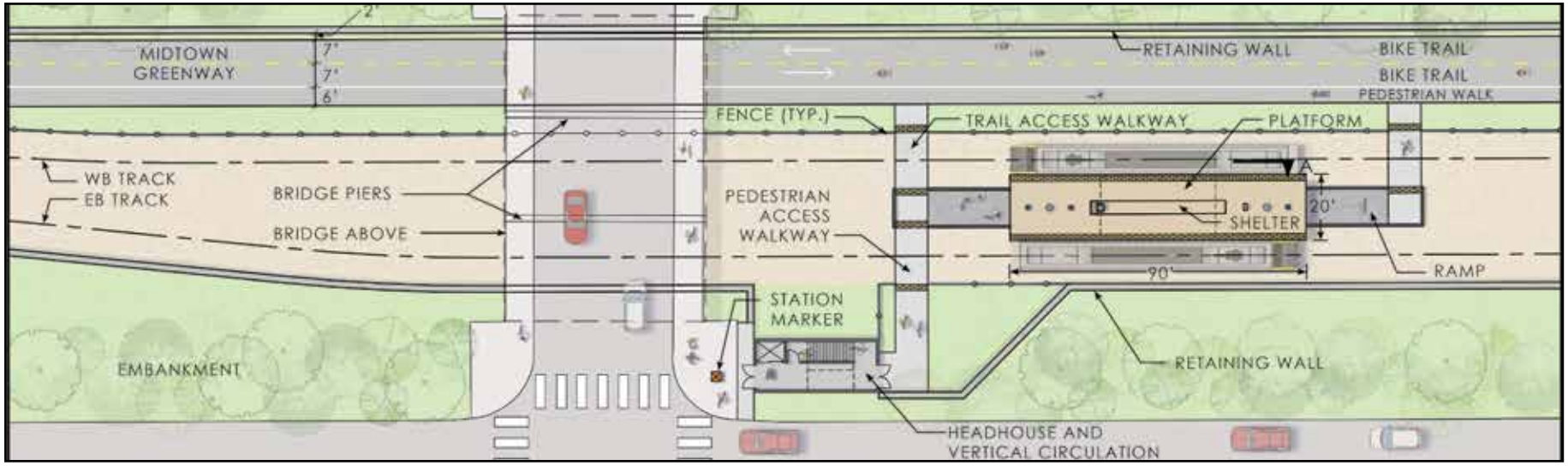
Key Characteristics

- 4.4-mile long alignment
- 10 stations, located approximately every 1/2 mile
- 13 min one-way travel time
- Assumes a 94-foot single car light rail vehicle (LRV) or modern streetcar
- Retains the existing Greenway multiuse path.

Metro Transit Single Car Light Rail Vehicle (LRV)

Modern Streetcar

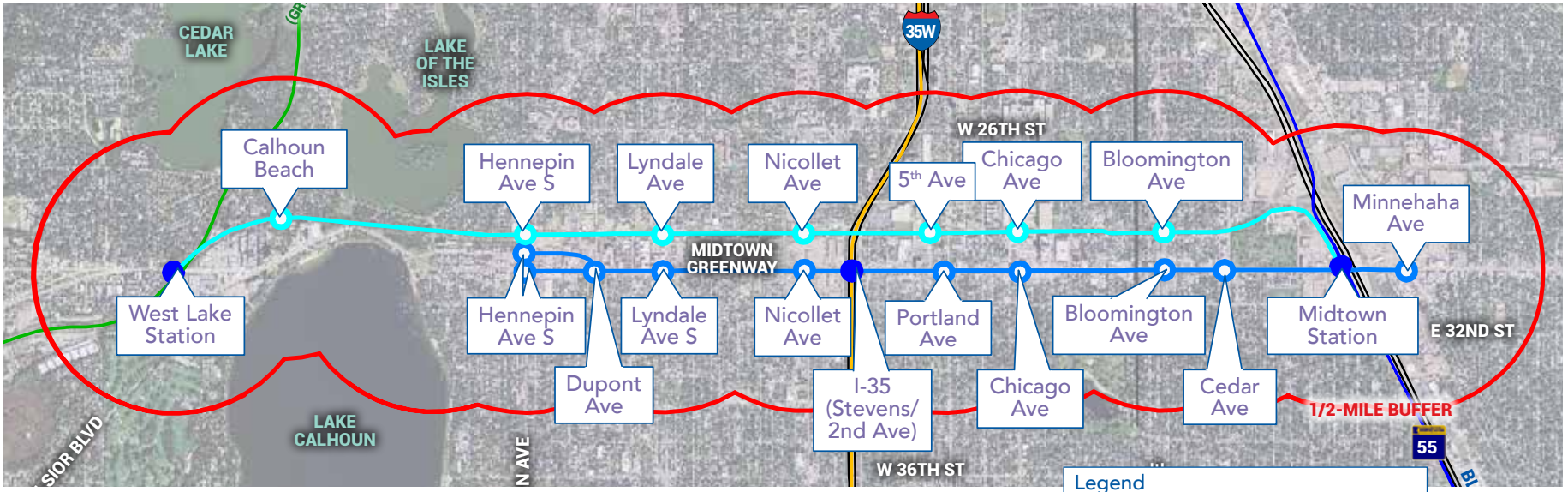
Double/Single-Track Rail in the Greenway Alternative



Station Concept: Rail in the Greenway stations area designed and placed so passengers can easily enter and exit the Greenway.

Station Visualization: Before and after rail in the Greenway station visualization at Bloomington Avenue in the Greenway.

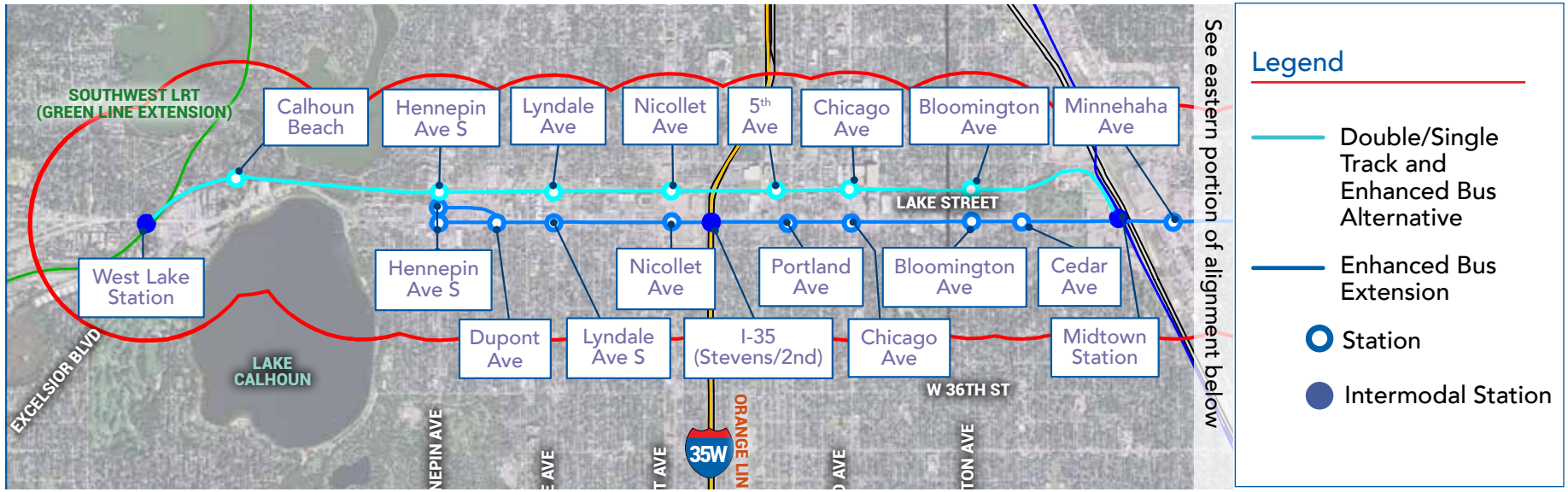
Dual Alternative



The dual alternative is a combination of the first two alternatives: an enhanced bus on Lake Street and a double/single-track rail in the Greenway, as shown above. For the rail portion of the alternative, the alignment and station locations remain the same as the original rail alternative. However, the alignment and station locations for the enhanced bus are slightly different in the dual alternative than what were assumed in the enhanced bus on Lake Street alternative. In that alternative the alignment spanned from West Lake Street Station to the Minnehaha Avenue Station. In the dual alternative, the western terminus is shifted from West Lake Station to the Uptown Transit Center on Hennepin Avenue, located just north of the Lake Street/Lagoon Avenue one-way couplet. Hence, the dual alternative has 10 enhanced bus stations versus the 14 stations assumed in the enhanced bus on Lake Street alternative. All other design assumptions for both alignments remain consistent.

The dual alternative is a combination of the first two alternatives: an enhanced bus on Lake Street and a double/single track rail in the Greenway.

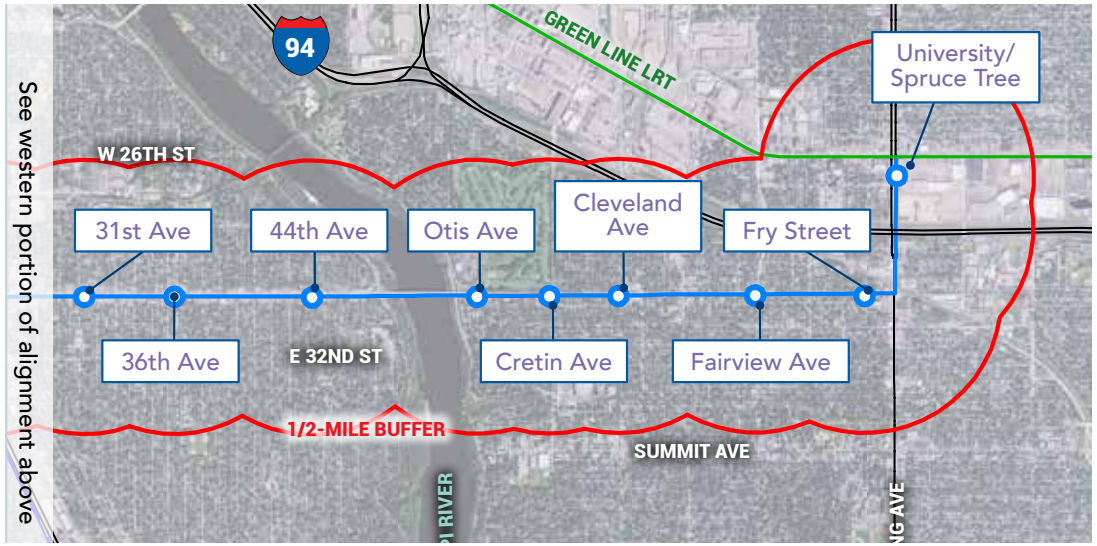
Enhanced Bus Extension



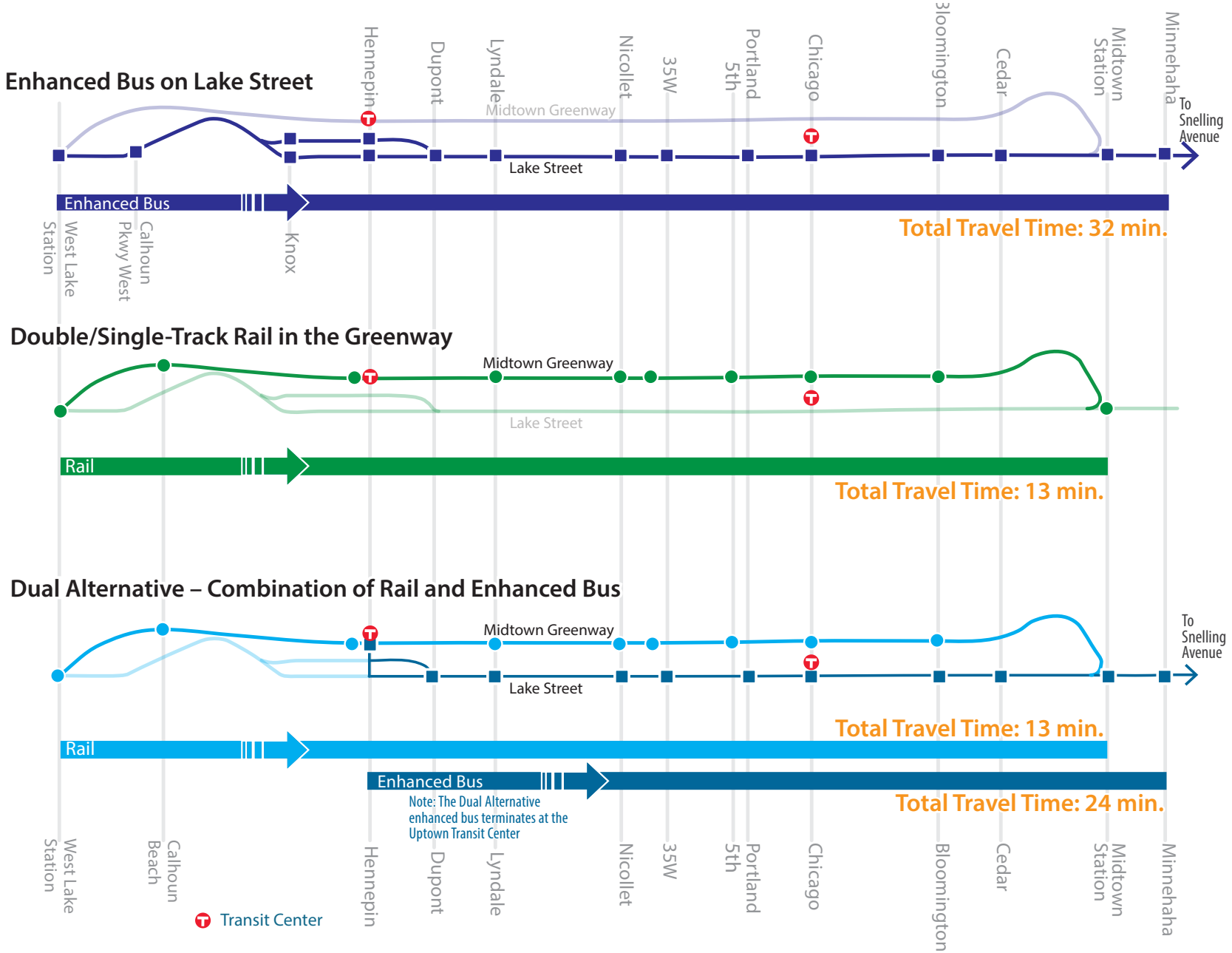
As previously mentioned, the **enhanced bus extension** was analyzed at the request of stakeholders. Because the majority of the extension was outside the project study area, it was only evaluated using a **subset** of evaluation measures.

Key Characteristics

- Provides 4.2 miles of expanded service.
- Adds ten stations (21 total).
- Attracts 8,000 more riders.
- Provides access to 11,000 more jobs.
- Adds $18.9 million of capital costs.
- Adds $3.2 million of annual operating costs.



Schematic Comparison of Alternatives



Service Plans

All three alternatives would operate from 5 a.m. until 10 p.m. at the frequencies shown in Table 3.

Changes to Existing Bus Service on Lake Street

Overall, all three alternatives retain or improve the current level of bus service on Lake Street. The implementation of enhanced bus operations would replace the corridor limited-stop service, Route 53. Currently, Route 53 makes three east-bound trips in the morning peak hour to Saint Paul. Enhanced bus would dramatically improve the span and frequency of this service.

No service changes are made to the local Route 21A under any of the alternatives; however the local Routes 21D and 21E are eliminated.

For an in-depth discussion of the service plan and changes to the existing bus service on Lake Street, see Appendix E: Operating and Maintenance Costs.

Table 3: Route Frequencies (in minutes)

Alternative	Local Bus		Rail		Enhanced Bus	
	Peak	Midday	Peak	Midday	Peak	Midday
Enhanced Bus	15	15	–	–	7.5	10
Rail	15	15	10	10	–	–
Dual	15	15	10	10	10	10

What about the No-Build Alternative?

The no-build alternative is included in every AA to establish a starting point for evaluating the benefits and costs of other alternatives, as well as to identify the consequences of doing nothing. The 2030 no-build alternative includes current services as well as planned enhancements to the existing transit as stated in the Metropolitan Council's 2030 Transportation Policy Plan, as amended in May 2013. These changes are based upon approved funding and are being built into the operational planning.

The 2030 no-build alternative assumes that no significant additional transit service changes will be made within the Midtown Corridor, representing a fiscally constrained plan that is consistent with service policies. However, the 2030 no-build alternative includes several significant improvements to the regional transit system, such as Central Corridor LRT and Southwest LRT (future Green Lines). For a full list of projects included in the no build alternative, see Appendix D: Detailed Definition of Alternatives

RESULTS & EVALUATION

With the three alternatives defined, the costs, benefits and impacts of each were estimated and evaluated. The project's purpose, need, goals and objectives provided the framework for quantitative and qualitative evaluation of the alternatives.

A set of evaluation measures, each one tied back to a project goal, were identified to evaluate the project alternatives. The evaluation measures are listed on the right along with a link to the appendix containing the detailed analysis for each measure.

Results Snapshot

The results for a few of the evaluation measures, capital costs, operating costs and ridership projections, are shown in the next section.

Goal	Evaluation Measures	Appendix
1	Daily project linked trips	Appendix F
2	Number of transit reliant riders	Appendix F
	Travel time savings	Appendix E
3	Development potential	Appendix G
	Existing TOD policies	Appendix G
	Station area population densities (2010)	Appendix J
	Corridor employment (2010)	Appendix J
	Level of affordable housing	Appendix H
	Affordable housing policies	Appendix H
4	Capital costs ($2013)	Appendix I
	Operating and maintenance costs ($2012)	Appendix E
	Annualized capital plus operating costs per trip	Appendix J
	Passengers per revenue hour	Appendix J
	Subsidy per passenger	Appendix J
5	Potential impacts to historic and cultural resources	Appendix H
	Potential impacts to parklands	
	Potential impacts of noise and vibration	
	Potential right of way impacts	
	Potential traffic impacts	
	Potential pedestrian and bicycle impacts	
	Daily reduction in automobile vehicle miles traveled (VMT)	

Range of Capital Costs

The capital costs are presented in ranges for the rail alternatives to reflect several options still being considered in the study. These options are the length of the single-track segments and the use of turf track instead of the more common ballast track. These issues are discussed in more detail on page 40.

Ridership Results

The ridership results are broken into two main parts: the number of riders that would choose to ride local service (i.e., Route 21) and the riders that would choose to ride the new service. The corridor total represents the sum of both types of riders. Ridership projections by station are shown on page 32.

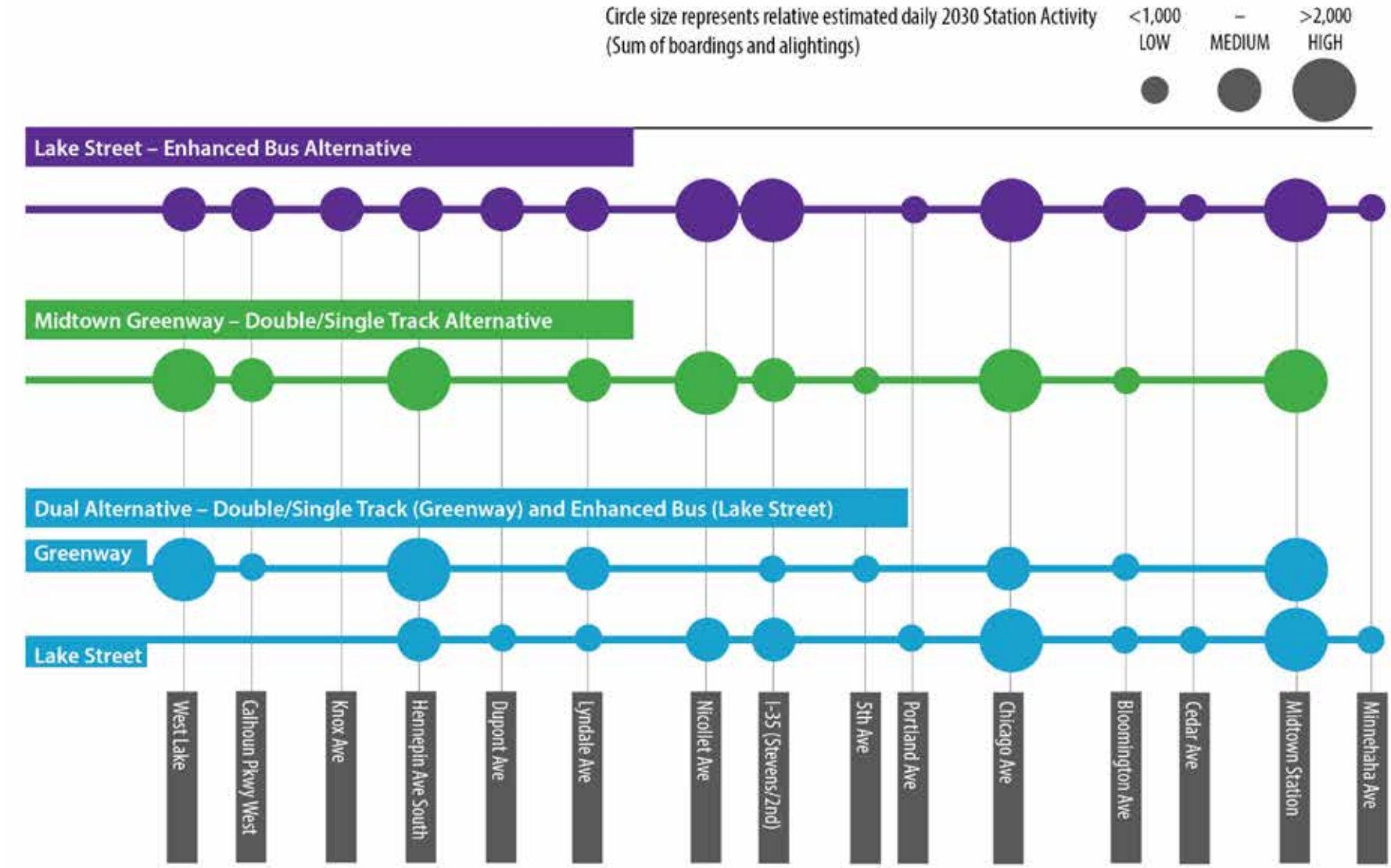
Cost Estimates

Alternative	Capital Costs	Operating Costs (annual)
Enhanced Bus	$50 million	$7 million
Rail	$185 - 220 million	$8 million
Dual	$215 - 250 million	$15 million

Ridership Projections (Year 2030)

Alternative	Local Bus	Rail	Enhanced Bus		Corridor Total
			Study Area	Extended Corridor	
Existing (2012)	14,600	–	–	–	14,600
Enhanced Bus	8,500	–	11,000	3,000	22,500
Rail	9,500	11,000	–	–	20,500
Dual Alignment	6,000	9,500	8,500	8,000	32,000

Ridership Projections (2030) by Station



Evaluating the Results

Since the purpose of an AA is to identify a transit alternative that best meets the transportation needs of the local community in terms of technical feasibility, costs, and benefits, the results associated with each alternative were evaluated and scored relatively against each other.

Scoring the Results

The results of each evaluation measure were comparatively scored on a three point scale by alternative (i.e., a total maximum score of three points per evaluation measure).

The scoring for the measures associated with goals one, two and three are shown in Figure 9 and the scoring for goals four and five are shown in Figure 10.

Please see Appendix J: Evaluation for a detailed discussion of the scoring methodology as well as a summary of the quantitative and qualitative data associated with each evaluation measure.

Interpreting the Results

There was little differentiation between the alternatives for measures relating to demographic criteria (i.e., population, employment, affordable housing, etc.) because the two corridors are located are very close together. However, the differentiation that occurred in the following areas drove the results of the final scores.

Figure 9: Scoring for Goals 1, 2, & 3

		Enhanced Bus	Rail in the Greenway	Dual Alternative
Goal 1: Increase transit use among the growing number of corridor residents, employees, & visitors				
1	Project Daily Linked Trips	◐	◐	●
	Goal 1 sub total	◐	◐	●
Goal 2: Improve corridor equity with better mobility and access to jobs and activities				
2	Number of transit reliant riders	◐	◐	●
3	Travel time savings	○	●	●
	Goal 2 sub total	◐	●	●
Goal 3: Catalyze and support housing and economic development along the corridor				
4	Development potential	◐	●	●
5	Existing TOD policies	●	●	●
6	Station area population densities (2010)	●	●	●
7	Corridor employment (2010)	◐	◐	●
8	Proportion of affordable housing rating	●	●	●
9	Affordable housing policies	●	●	●
	Goal 3 sub total	◐	●	●

KEY TO SYMBOLS: ● Strongly supports goal ◐ Supports goal ○ Does not support goal

Costs

The enhanced bus alternative scored the highest on most evaluation measures relating to costs. However, when costs were combined with ridership in Measure 14: subsidy per passengers (i.e., a per passenger estimate of the cost of the project that is not covered by the fare) the enhanced bus and the dual alternative received the same score.

Ridership

The dual alternative performed the strongest of the three alternatives on evaluation measures relating to projected ridership. It had the highest number of project daily linked trips and the highest number of transit-reliant riders.

Travel Time Savings

The rail and the dual alternatives provide markedly faster trips through the corridor than the enhanced bus alternative and consequently received higher scores for Measure Three: travel time savings.

Impacts to Historic and Cultural Resources

The rail and dual alternatives scored poorly for potential impacts to historic resources, because the majority of the Greenway corridor lies within the Chicago, Milwaukee & St. Paul Railroad Grade Separation Historic District, a listed historic district in the National Register of Historic Places (NRHP). The district includes the Greenway trench, bridges, and other contributing resources. While there are some historic resources along Lake Street that could potentially be impacted by the enhanced bus alternative, the footprint of the alternative is relatively small. Building rail transit in the Greenway has much a higher potential of disturbing the historic district and therefore the alternatives with a rail component scored poorly on this measure.

Right of Way Impacts

Similarly, the enhanced bus alternative had the fewest potential right of way impacts due to its small footprint and therefore received the highest score for this measure.

Figure 10: Scoring for Goals 4 & 5

		Enhanced Bus	Rail in the Greenway	Dual Alternative
Goal 4: Develop a cost-effective transitway that is well-positioned for implementation				
10	Capitol costs (2013)	●	○	○
11	Net Operating and maintenance costs (2013)	●	◐	○
12	Annualized capital plus operating costs per trip	●	○	◐
13	Passengers per revenue hour	○	●	◐
14	Subsidy per passenger	◐	○	◐
	Goal 4 sub total	●	◐	◐
Goal 5: Build upon the vibrancy and diversity of the corridor by supporting healthy, active communities and the environment				
15	Potential impacts to historic and cultural resources	●	○	○
16	Potential impacts to parklands	●	●	●
17	Potential impacts of noise and vibration	◐	◐	○
18	Potential right of way impacts	●	○	○
19	Potential traffic impacts	●	●	●
20	Pedestrian and bicycle impacts	●	◐	◐
21	Reduction in vehicle miles traveled (VMT)	○	●	●
	Goal 4 sub total	●	◐	◐

KEY TO SYMBOLS

● Strongly supports goal ◐ Supports goal ○ Does not support goal

Overall Scores

The total score for all three alternatives are shown below. When the subtotals for all five goals are averaged, the dual alternative receives the highest score.

Goals		Enhanced Bus	Rail in the Greenway	Dual Alternative
Goal 1:	Increase transit use among the growing number of corridor residents, employees, and visitors	◐	◐	●
Goal 2:	Improve corridor equity with better mobility and access to jobs and activities	◐	●	●
Goal 3:	Catalyze and support housing and economic development along the corridor	◐	◐	●
Goal 4:	Develop a cost-effective transitway that is well-positioned for implementation	◐	◐	◐
Goal 5:	Build upon the vibrancy and diversity of the corridor by supporting healthy, active communities and the environment	●	◐	◐
	TOTAL	◐	◐	●

Key to Symbols

● Strongly supports goal ◐ Supports goal ○ Does not support goal

This page left intentionally blank.

LOCALLY PREFERRED ALTERNATIVE RECOMMENDATION

Public Feedback on the Technical Results

The results of the technical analysis were presented to the public at two meetings in November 2013. Public feedback on the alternatives was collected at both meetings and via an online survey.

Comment cards at the public meetings and the online survey asked the two following questions:

- Which alternatives best meet the goals outlined in the project's purpose and need statement?
- Rank the importance of the project goals on a scale of 1 to 5 (one being the best).

In total, 286 responses to the questions were collected. The summary of the responses are shown in Figures 11 and 12.

As shown in Figure 11, the dual alternative was chosen as the alternative that best met project goals one, two and five, and it barely trailed the rail alternative as the best alternative for goal three. The only goal where it trailed significantly was in goal four - develop a cost-effective transitway - where the enhanced bus alternative was chosen as the best alternative.

Figure 12 shows that goal one - increase transit use among the growing number of corridor residents, employees, and visitors - was ranked as the most important among the five. The dual alternative was chosen as the best alternative to meet goal one (Figure 11). Taken together, public feedback shows support for the dual alternative.

Figure 11: Which alternatives best meet the goals outlined in the project's purpose and need statement?

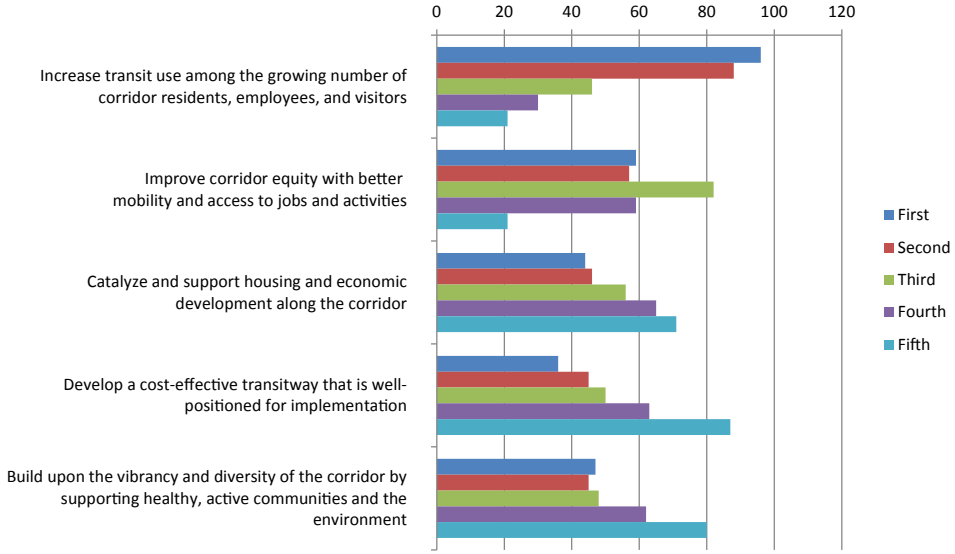
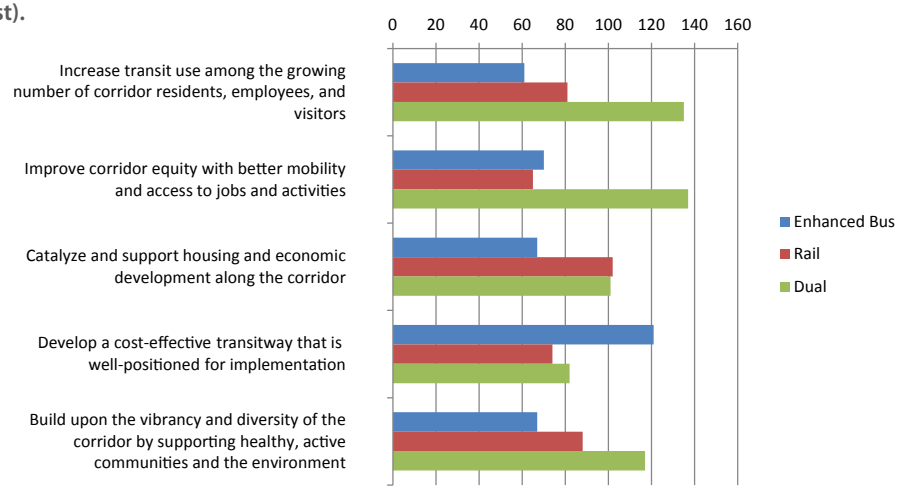


Figure 12: Rank the importance of the project goals on a scale of 1 to 5 (one being the best).



Locally Preferred Alternative Recommendation

The technical results and public feedback were presented to project stakeholders in a joint meeting of the CAC, TAC, and PAC. At the end of the meeting, the PAC unanimously recommended the dual alternative with the enhanced bus extension to Saint Paul as the LPA for the Midtown Corridor. The complete official LPA recommendation can be seen in Appendix K: LPA Recommendation.

Topics Requiring Additional Analysis

Selecting an LPA is an important step on the way towards the implementation of a transitway; however, it is one of the earlier steps in the overall process, as shown in Figure 13. Future phases of study will address greater details for the project. During the Midtown Corridor AA process the following issues were identified for future analysis:

Double versus Single-Track Sections

The AA provided two high-level design concepts for the rail portion of the corridor in response to community feedback asking for a larger application of single-track segments in the Greenway. Carefully designed single-track segments could create cost savings, could reduce the need for retaining walls and potentially create fewer overall impacts to the character of the Greenway. However, double-track segments increase the reliability and flexibility of the system, making it possible to quickly and easily address service disruptions and maintenance issues. In future phases of study the balance between these two needs will continue to be studied.

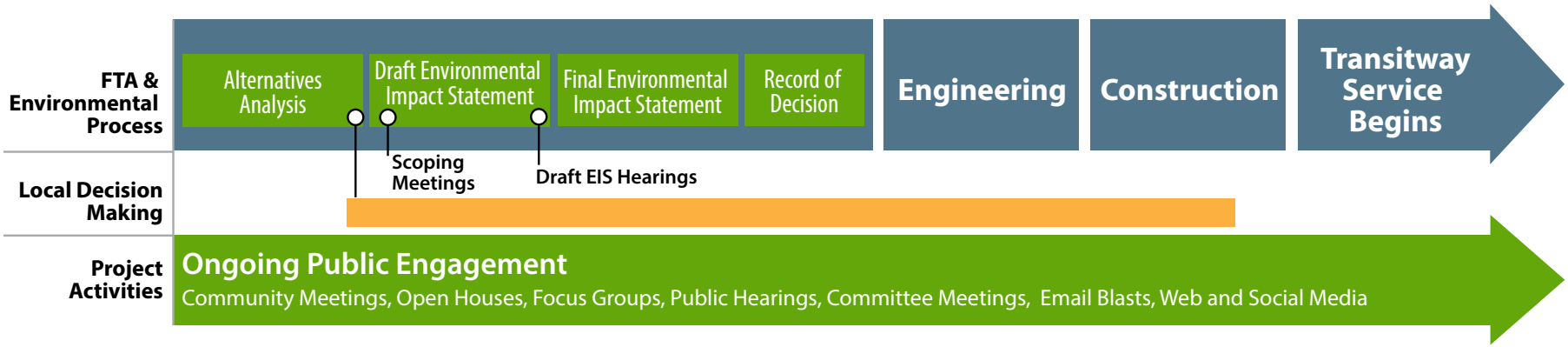
Retaining Walls in the Greenway

The implementation of rail in the Greenway would require additional retaining wall segments in the Greenway. The placement of retaining walls is tied to the application of single versus double-track. The concept drawings of the two track configurations mentioned above both include the estimated placement and height of retaining walls in the corridor. These drawings are included in Appendix D: Detailed Definition of Alternatives. These concept drawings will be refined in future study phases.

At-grade Street Crossings

Several community members expressed concern about noise associated with the traffic control devices (e.g., gate arms equipped with bells that ring when a rail vehicle approaches) that may be necessary to control in intersection of rail, automobile, bicycle and pedestrian traffic at the six at-grade crossings created by the rail portion of the dual alternative. The design and application of the necessary traffic control devices will be analyzed in future study phases. Future environmental studies will also identify impacts associated with noise and/or vibration.

Figure 13: Next Steps for the Midtown Corridor



Type of Rail Vehicle

The LPA did not recommend a specific type of rail vehicle for the corridor. Streetcar and light rail vehicles (LRVs) are both under consideration. Streetcar vehicles are slightly shorter than LRVs, as shown in Figure 14, which translates to a slightly shorter station platform in final design. The Greenway has long been considered a streetcar corridor. However, given the corridor's geographic context (e.g., a grade separated trench), it will function much more like a light rail system no matter what type of vehicle is ultimately chosen. Furthermore, a single-car LRV would be interchangeable with Metro Transit's current fleet of LRVs, creating opportunities for savings on parts, maintenance equipment, mechanic expertise and other operating costs. Lastly, a slightly larger vehicle would provide a greater capacity for bicycles and luggage. Considering the corridor's connection to the airport via the Blue Line and its proximity to one of the most popular bikeways in the region the extra capacity may be necessary.

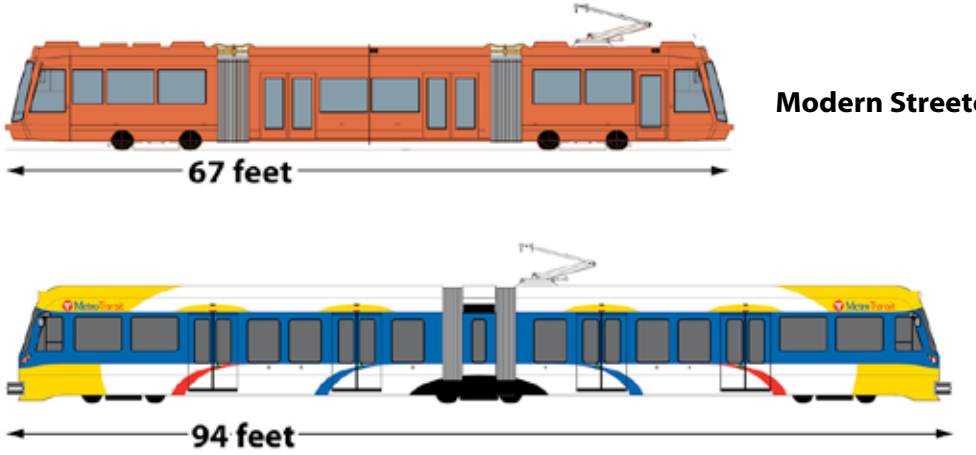
Metro Transit plans to continue to facilitate a dialogue with the community and policy leaders in future phases of study regarding the rail vehicle selection process.

Bridge Pier Protection

Bridge pier protection, the practice of reinforcing bridge piers with a concrete barrier to protect against a bridge collapse in the event of a crash, is a modern requirement for all bridges adjacent to transit facilities. An example of a modern Greenway bridge with pier protection is shown in Figure 15. The historic bridges in the Greenway are no longer consistent with modern safety standards and pier protection would need to be added to the majority of bridges in the corridor. The height, width and overall design of the necessary pier protection will continue to be analyzed in future project phases.

Figure 15: Example of pier protection on a modern bridge in the Greenway

Figure 14: Comparison of a streetcar and a single-car light rail vehicle



Modern Streetcar

Single Light Rail Vehicle

Figure 16: Visualization of ballasted track (left) and turf track (right) in the Greenway

Turf versus Ballasted Track in the Greenway

Community feedback highlighted the desire to experiment with turf track in the Greenway. Turf track, the practice of covering the rail bed in grass, would maintain the green look of the corridor and potentially dampen noise and heat from the rail system. However, turf track is untested in the Midwest region and there are few examples of turf track in North America. Ballasted track (i.e., tracks placed in a bed of crushed stone) is a proven and reliable technology with lower costs and fewer maintenance requirements. Metro Transit will continue to analyze the cost and benefits of the application of turf track in the Greenway. A visualization of both ballasted and turf track is shown in Figure 16.

Impacts to Historic and Cultural Resources

The majority of the Greenway corridor lies within the Chicago, Milwaukee & St. Paul Railroad Grade Separation Historic District. The district is listed in the National Register of Historic Places (NRHP). The district includes the Greenway trench, bridges, and other contributing resources. Introducing a modern rail system into the corridor, no matter how many segments of single-track are implemented, has a high potential to impact the historic nature of the corridor. Future study phases will analyze how to mitigate impacts to the district and its resources.

Connection with Southwest LRT

The western end of both the enhanced bus and the rail alignments are designed to connect to the planned Green Line (Southwest LRT) West Lake Station. The West Lake station is a constrained site and careful analysis will be necessary to provide a smooth transition between all three alignments. However, Green Line planners are working in tandem with Metro Transit to ensure the connection is compatible.

NEXT STEPS

The Metropolitan Council is in the process of updating the region's Transportation Policy Plan, the plan for guiding the development of the region's transportation system. The Midtown Corridor LPA will be incorporated into the Transportation Policy Plan during this planning process. Due to the funding constraints facing the region the corridor will mostly likely appear as an unfunded corridor in the 2014 Transportation Policy Plan update. However, it is possible that the project will move forward in phases. Considering the funding situation, it is likely that enhanced bus alignment, the less expensive portion of the project, will be implemented first.

When funding is identified in the future, for either a phased approach or full project implementation, Hennepin County and the city of Minneapolis would need to provide resolutions of support to move the project forward.