Midtown Corridor Alternatives Analysis

Review and Summary of Previously Completed Work

2/13/2013

Prepared by the
SRF Consulting Group Team

for

Metro Transit

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Introduction and Background

Few parts of the Minneapolis-St. Paul Region have been studied or transformed as extensively as the Midtown Corridor. Many planning documents, transportation studies, and design guidelines have offered recommendations as to the corridor's future development. To better understand the Midtown Corridor and guide the project management team (PMT) and stakeholders on the definition of purpose and need, the consultant team identified key recommendations, specifications, and points of interest through a review of the following documents and programs:

- Metropolitan Council 2030 Transportation Policy Plan, 2010
- Metro Transit Arterial Transitway Corridors Study Draft Technical Memos, 2011
- Metropolitan Council Regional Transitway Guidelines, 2011
- Minneapolis Streetcar Feasibility Study, 2007
- Minneapolis Streetcar Funding Study, 2010
- Southwest Transitway Draft Environmental Impact Statement, 2012
- Access Minneapolis Citywide Transportation Action Plan, 2009
- Midtown Corridor Historic Bridge Study, City of Minneapolis, 2007
- The Feasibility of a Single-Track Vintage Trolley in the Midtown Greenway, 2001
- Minneapolis Bicycle Master Plan, 2011
- The Minneapolis Plan for Sustainable Growth, City of Minneapolis, 2009
- Hiawtha/Lake Station Area Master Plan, 2001
- Corcoran Midtown Revival Plan, 2002
- Midtown Minneapolis Land Use and Development Plan, 2005
- Midtown Greenway Land Use and Development Plan, 2007
- Uptown Small Area Plan, 2008
- Lyn-Lake Small Area Plan, 2009
- Phillips West Master Land Use Plan, 2009
- Metropolitan Council Corridors of Opportunity Initiative, 2011
- DOT-HUD-EPA Partnership for Sustainable Communities, 2011
- I-35W Lake Street Transit/Access Project, ongoing

South Minneapolis is well covered by local bus service, express bus service to downtown Minneapolis, express bus service to downtown St. Paul during peak periods, and the Blue Line (Hiawatha) light rail transit (LRT). These all provide reliable and effective transit service in a north-south direction, and to/from the central business districts of the Twin Cities. However, there is not a competitive alternative to automobile travel when using transit to travel east or west through the study area. There is no apparent travel time advantage when using transit, and often bus service has substandard performance on Lake Street.

Several planning documents to date have identified a desire for fixed guideway service in the form of a vintage or modern streetcar, or LRT. Additionally, recent studies have indicated that arterial bus rapid transit (BRT) is a particularly viable mode on Lake Street. There is broad consensus that the Midtown Corridor is ripe for transit improvement, but the category of improvement will be determined by the market for the service. Current and future regional connections via LRT exist at the termini of the corridor. Planning studies to date have signified that the feasibility of a streetcar line on the Midtown Corridor is dependent upon having meaningful regional connections to these LRT lines.

Population density in the Midtown Corridor is already among the highest in the region, and on an upward trajectory. Additionally, there are several thriving commercial nodes and activity centers. Any improvements to the study area are recommended to build on this character, calling for added mixed-use developments, increased housing density along major corridors, and transportation investments that prioritize person throughput and equitable multi-modal transportation over outcomes that favor the single occupancy automobile. The physical environment does provide some constraints for each potential mode that need to be weighed when evaluating alternatives. While a transitway in the Midtown Greenway offers advantages in travel time due to its dedicated right-of-way, the presence of historic bridges and variations in corridor width may require the railway to be single tracked at points, posing operational challenges. The Midtown Greenway is also home to a well-used bicycle and pedestrian trail and public open space that should be preserved. Additionally, portions of Lake Street are congested and it is recommended that the pedestrian environment be improved with wide sidewalks, plazas, etc., that limit the amount of the street cross-section that can be continuously dedicated to buses.

Another area of consensus is that future development along the entire corridor should be transit supportive. In addition to prioritizing alternative transportation modes when improving the physical environment, trends that are evident in Uptown Minneapolis should be promoted throughout the Midtown Corridor, delivering a walkable environment, higher housing densities, and urban design that encourages a mix of uses.

The passage of the transportation bill Moving Ahead for Progress in the 21st Century (MAP-21) and its redesign of several Federal Transit Administration (FTA) programs render some previous planning and analysis of the Midtown Corridor obsolete, with the discontinuation of smaller fixed guideway programs such as the Urban Circulator Program. Core Capacity BRT projects that are focused on improving corridor capacity by a factor of 10 percent or more are now a program category within New Starts, complementing fixed guideway BRT projects that operate within their own dedicated right-of-way and emulate the features of rail transit. Additionally, the manner in which federal formula programs accounted for fixed guideway mileage was refined.

Historically, the Midtown Greenway was home to an active freight rail corridor serving areas with industrial and warehouse uses. Many of the studies and plans completed at the local and regional level over the past decade recommend exploring the redevelopment of the Midtown Greenway to include a

transitway. Typically this has been mentioned in the form of LRT or a streetcar. A portion of the Midtown Greenway was identified as a potential alignment for the Southwest Transitway that would have gone east from the West Lake station area, and then traveled via Nicollet Avenue to downtown Minneapolis. The Midtown Corridor has also been identified as a potential route for a streetcar by the City of Minneapolis, and the Metropolitan Council has identified the Midtown Corridor as a part of the 2030 Transitway Network. Lake Street was recently identified as a candidate corridor for arterial BRT, and is projected to perform well relative to other regional corridors, though it has not been studied at the same level of detail as an AA. Thus far, none of the aforementioned modes have fatal flaws that would preclude their further study. Their relative preference will be guided by how they meet evaluation criteria defined in the purpose and need.

The following is a summary of planning and analysis to date on the Midtown Corridor. The assumptions and recommendations offered in these studies and plans will be referenced and updated as necessary throughout this alternatives analysis (AA) process.

Metropolitan Council 2030 Transportation Policy Plan (TPP), 2010

Objective: Provide overall policy and investment framework for transportation in the Twin Cities Region from 2010-2030.

Recommendations Affecting Midtown Corridor Study Area:

Planning:

In Chapter 2 of the document, Policy 15: Transitway Development and Implementation, Strategy 15c states that "every transitway corridor will be studied in-depth before investments are made. Every potential commuter rail and light rail project will undergo an alternatives analysis and develop an environmental impact statement before seeking funding for implementation. All BRT corridors will be studied and a range of alternatives developed." Therefore, despite policy changes in MAP-21, the Metropolitan Council still recommends an AA for the study of transitway corridor development.

Highways:

Lake Street is identified as an "A" Minor Augmenter in terms of functional class, and further development of the "A" Minor Arterial system includes management and improvement to provide for "maximum person throughput, safety, and mobility."

Local access standards on "A" Minor Arterials should be consistent with MnDOT's Access Management Manual.

Transit:

In Chapter 7 of the document, Policy 15, Strategy 15c, the process for transitway selection (alternatives analysis) is further defined beyond what is mentioned in Chapter 2 and states the following: "Alternatives analyses will examine potential alignments and modes, including enhanced bus service. All alternative analyses must include both bus and rail options. Bus options must include improvements to highways and roads that would provide transit advantages, such as bus-only shoulders, signal priority or preemption, dynamic shoulder lanes, dynamic parking lanes, ramp meter bypass lanes, managed lanes, or other advantages. Land use and zoning needs must also be evaluated. The Council must adopt alternatives analyses results and a locally preferred alternative before funding can be sought for implementation for rail projects, for New Starts applications or for Small Starts applications. BRT corridors seeking federal New Starts or Small Starts funding may require alternatives analyses and environmental documentation which should be adopted by the Council before federal funding is sought. The project development process and corresponding technical assumptions must be consistent with the Regional Transitway Guidelines to be adopted by the Council in 2011."

A future Transit Center is identified at I-35W and Lake Street and Nicollet Avenue and Lake Street.

The Midtown Corridor preferred mode and alignment is listed as “to be determined” through further study.

The TPP also discusses streetcars. The viability of a streetcar mode and its eligibility for FTA funding in the region is measured by its ability to provide positive, significant, and FTA measures of cost effective transportation benefits.

Bicycle and Pedestrian

Chapter 9 of the TPP discusses the importance of pedestrian and bikeway connectivity to transit and its role in improving the region’s multimodal network. Infrastructure projects should serve to increase opportunities for people to take advantage of transit, improve the safety of transit passengers, improve accessibility and mobility for people with disabilities, and support transit oriented, compact development. Bicycle connections can increase transit’s mode share when they are convenient and meaningful, and technologies that allow bikes to be carried on-board a transit vehicle or bike racks should be pursued.

Metro Transit Arterial Transitway Corridors Study (ATCS) Technical Memos, 2011

Objective: The ATCS was a year-long study of some of the most heavily traveled transit corridors in the Twin Cities area. The study was performed to develop a bus facility and service plan to enhance efficiency, speed, reliability, customer experience, and transit market competitiveness. The study was not as detailed as an AA, particularly in terms of traffic and roadway impacts on Lake Street; however, it identified corridors that showed strong potential for arterial BRT. Many of the assumptions developed through the ATCS will be used as a foundation for this AA.

Historical Information and Context Offered:

Lake Street is currently well served by Metro Transit Routes 21 and 53. It is identified by the City of Minneapolis as a part of the Primary Transit Network and is part of Metro Transit's High Frequency Network. Both routes run beyond the Midtown Corridor to the University of St. Thomas, the Midway Marketplace, Concordia University and finally end in downtown St. Paul. Weekday frequencies are 6-10 minutes along the corridor. Route 53 frequencies are 20-30 minutes during peak periods. Route 21 is Metro Transit's third busiest route, with approximately 4,266,235 passengers per year. Connections can also be made to the following Metro Transit routes along the Midtown Corridor:

- Uptown Transit Station – Routes 6, 12, 17, 23, 114, 115
- Lyndale Avenue – Route 4
- Nicollet Avenue – Route 18
- I-35W and Lake Street – Multiple express routes
- 4th Avenue – Route 11
- Chicago Avenue – Route 5
- Chicago Lake Transit Center – Routes 5, 39
- Bloomington Avenue – Route 14
- Cedar Avenue – Routes 22, 27, 111
- Lake Street/Midtown Station – Routes 7, 27, Hiawatha LRT

There is a park-and-ride facility at the Lake Street/Midtown LRT station and a park-and-ride is being considered for the West Lake Station on the Southwest Transitway.

Both housing and job density are projected to increase along the Midtown Corridor, with housing growth being particularly evident. The area around Excelsior Boulevard has several conditions that make it ripe for future development (future transit investment, large parcels with single owners, strong real estate market) and increased densities that would be transit supportive.

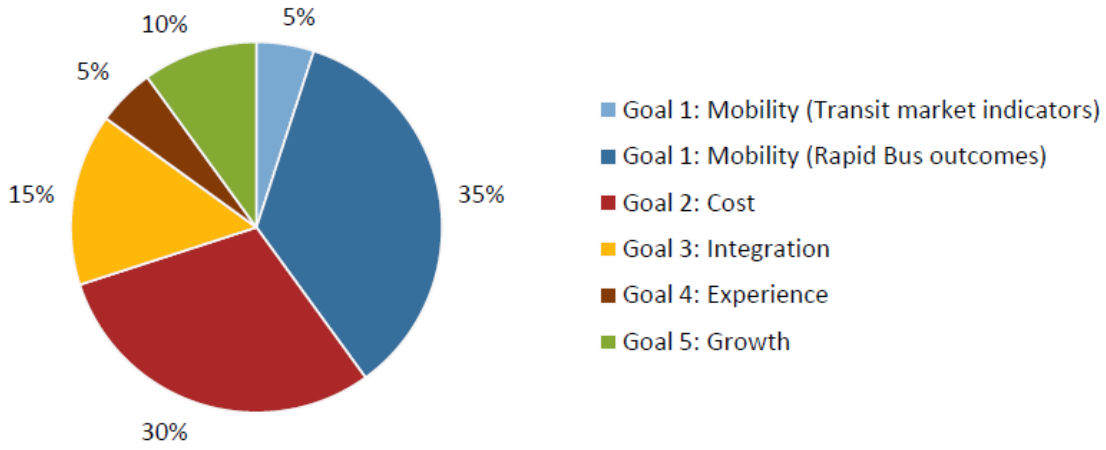
Recommendations Affecting Midtown Corridor Study Area:

Goals and Objectives of Arterial BRT

1. Provide mobility benefits by connecting major destinations along the study corridors more quickly with more frequent transit service.
2. Provide an enhanced customer experience by developing passenger infrastructure and information commensurate with existing and planned levels of transit service.
3. Seamlessly integrate with existing and planned transit systems.
4. Implement affordable transit improvements.
5. Support anticipated corridor growth and redevelopment.

For this study, the goals were weighted as follows:

Figure 1: Arterial BRT Goals (Metro Transit, 2011)



Proposed Service

The following excerpt from the Technical Memo #3 (Table 1) shows the proposed scope of service on Lake Street if arterial BRT is implemented.

Table 1: Lake Street Proposed Route Frequencies (Metro Transit, 2011)

	Weekday Frequency					Saturday Frequency					Sunday Frequency				
	AM	MD	PM	EE	LE	AM	MD	PM	EE	LE	AM	MD	PM	EE	LE
Lake Street BRT	7.5	10	7.5	10	30	15	10	10	10	30	30	10	10	10	-
Proposed Route 17	10	15	10	20	30	20	15	15	30	60	30	30	30	30	60
Proposed Route 21	20	20	15	20	30	20	20	20	20	30	30	20	20	30	30
Eliminate Route 53	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Technical Memo #3 also outlines very specific cost estimates and assumptions for the entirety of the Lake Street corridor. The total costs, however, go beyond the geographic scope of the Midtown Corridor and would need to be adjusted for this specific study. When aggregated into performance measures, the Lake Street corridor competes favorably with other corridors. The final recommendation for Lake Street through the ATCS was to evaluate arterial BRT in more detail through the upcoming AA. Below is a summary of arterial BRT performance measures for Lake Street:

Highest Performance:

- Population within ¼ mile of corridor
- Transit dependent individuals within ¼ mile of corridor
- Percent decrease in end-to-end travel time
- 2030 corridor ridership (weekday)
- 2030 ridership over 2030 baseline
- Annual user benefits
- Operations and maintenance cost per passenger
- Capital cost per annual rapid bus passenger
- Percent of existing local bus corridor boardings proximate to proposed stations
- Number of connections to fixed guideway transitways

Medium Performance

- 2030 rapid bus passengers per in service hour (annual average)
- Percent of rapid bus revenue hours paid for by existing service hours
- Forecasted change in population within ½ mile of proposed stations

Low Performance

- Capital cost per corridor mile
- Percent of stations where concept required modification to fit

- Forecasted change in jobs within ½ mile of proposed stations

Using study technical score measures, the Lake Street Corridor had the greatest potential for success among the 11 corridors studied. A subsequent addendum to the study showed that an extended Chicago Avenue corridor along Emerson-Fremont Avenues in north Minneapolis slightly eclipsed Lake Street as the top-scoring corridor on technical measures. Excerpts from the study and addendum regarding these corridors are included in Appendix A.

Metropolitan Council Regional Transitway Guidelines, 2012

Objective: "The purpose of the Regional Transitway Guidelines is to provide technical guidance, based in best practices, that supports the development and operation of transitways in a way that is consistent, equitable, and efficient, and delivers an effective, integrated, and user-friendly transit system throughout the Twin Cities region."

"The Transitway Guidelines currently do not directly address Express Bus with Transit Advantages, Dedicated Busway, or Streetcar modes. However, transitway projects in planning stages where these modes are being considered can use the general information in the Transitway Guidelines as a basis for decision-making." The aforementioned modes may be incorporated in future amendments to the Regional Transitway Guidelines. Streetcar modes, in particular, require further study as to their application in the region.

Recommendations Affecting Midtown Corridor Study Area:

Service Standards

Table 2: Excerpt from Table 2-1, Transitway Service Standards (Metropolitan Council, 2012)

	Local Bus	Arterial BRT	Light Rail Transit
Service Definition and Network Design	A single route defined by frequent stops (1/8-1/4 mile) and basic infrastructure	A single route with a coordinated corridor defined by neighborhood scale infrastructure.	A single route and all associated stations, track and infrastructure.
Route Structure	Branches and short lines are acceptable and are an important part of the route structure.	Short lines are acceptable. Branches are acceptable if each branch meets all arterial BRT guidelines. Tails operating as local service through neighborhoods are strongly discouraged.	Short lines are acceptable. Branches are unlikely but could be acceptable if justified by ridership.
Transit Services Coordination	Transfers with connecting services	Coordination with local service in the same right-of-way; transfers with connecting services	Coordination with other rail services in corridor; transfers with connecting services
Minimum Frequency	Varies by transit market area served and route type	WEEKDAY Combined frequency for the station-to station and local services should be 10-min. peak period, 15-min. midday/evening, 30- to 60-min. early/late	WEEKDAY 10-min. peak period, 15-min. midday/evening, 30- to 60-min. early/late WEEKEND 15-min. day/evening, 30- to 60-min. early/late

	Local Bus	Arterial BRT	Light Rail Transit
Minimum Frequency (continued)		WEEKEND Combined frequency for the station-to-station and local services should be15-min. day/evening, 30- to 60-min. early/late	
Minimum Span of Service	Varies by transit market area served and route type	7 days a week, 16 hours a day	7 days a week, 18 hours a day
Travel Time	Baseline	Should be at least 20% faster than local bus	Should be at least 20% faster than local bus
Average Productivity	20 passengers per in-service hour	20 passengers per in-service hour	70 passengers per in-service hour
Maximum Loading Guidelines	Peak Period 125% Off-Peak 100%	Peak Period 125% Off-Peak 100%	200% Peak Period and Off-Peak
Market Area	1,2,3	1,2,3	1,2,3

Station Spacing and Siting Guidelines

This document defines three basic design standards for transitway station types: online, inline, and offline. They are defined as follows:

- Online stations are located within the vehicle runningway and the transitway vehicle can access the station without leaving the runningway. Examples of online stations in the region include all LRT and Commuter Rail stations, the I-35W & 46th Street BRT station, and the Apple Valley Transit Station on Cedar Avenue.
- Inline stations are located adjacent to the vehicle runningway, typically along freeway interchange ramps. Although they require the transitway vehicle to exit the primary runningway, they provide easy access to a station and immediately return to the runningway. Few or no turns are required. Examples include the I-35W BRT stations at 66th Street and future stations at 82nd Street and 98th Street.
- Offline stations require transitway vehicles to exit the runningway and require several turning movements resulting in potential traffic delays that impact transitway service speed and reliability, especially during peak travel times. Examples of current offline transitway stations are Cedar Grove Transit Station and Burnsville Transit Station.

Table 3: Excerpt from Table 3-1, Transitway Station Guidelines (Metropolitan Council, 2012)

	Local Bus	Arterial BRT	Light Rail Transit
Primary Station Market Analysis Factors and Methods	Population and employment density	Major travel patterns (including location of major activity centers), population and employment density, auto ownership, and trip purpose (e.g., commuters, students, shoppers, other), existing transit ridership; regional travel demand forecast model or similar resource	Major travel patterns (including location of major activity centers), population and employment density, auto ownership, and trip purpose (e.g., commuters, students, shoppers, other), existing transit ridership; regional travel demand forecast model or similar resource for stations without a park-and-ride; Commuter Market Analysis: Park-and-ride Plan Chapter 5 for park-and-ride-based stations
Transportation Site Location Factors	Primary: Access to, and visibility of, stop for transit vehicle and customers via existing walk, trail, and transit transfer connections	Online or inline stations preferred. Primary: Access to, and visibility of, station/stop for transit vehicle and customers via existing walk, trail, and transit transfer connections	Stations should be online. Primary: Access to, and visibility of ,station for customers via existing walk, trail, and transit transfer connections and impacts on existing road network Secondary: Park-and-ride lot need based on commuter market analysis (e.g., Park-and-ride Plan Chapter 5)
Minimum Daily Boardings for Transitway Opening Year Forecast	N/A	50 or more boardings per station	300 or more boardings per station
Average Station Spacing for the Line	1/4 to 1/8 mile	1/4 mile to 1/2 mile	1 mile
Minimum Spacing Between Two Stations	1/8 mile or longer	1/8 mile or longer	1/2 mile or longer

Station and Support Facility Guidelines

- All transitway stations should have sheltered waiting areas; these shelters should include lighting, radiant heat, passive cooling, and security features.

- Transitway stations should have passenger information and wayfinding. Signage should guide passengers through the station and its functions, and be consistent with the transitway branding scheme. Real-time transit information should be provided wherever site conditions allow.

Runningways, Technology

- LRT runningways should generally be at-grade, should be double track with crossovers and storage tracks provided as needed to support efficient operations. LRT runningway should be dedicated to that mode.
- Arterial BRT runningways can operate in mixed traffic or dedicated lanes and should incorporate travel time advantages.
- Analysis in transitway planning should include an assessment of the viability of Transit Signal Priority (TSP), and approval should be sought from by the implementation from appropriate coordinating parties (cities, counties, MnDOT, etc.). TSP should prioritize person throughput.

Minneapolis Streetcar Feasibility Study, 2007

Objective: This study, conducted in conjunction with the Access Minneapolis Ten-Year Transportation Plan, involved a detailed analysis of the feasibility of a modern streetcar network in Minneapolis. The study evaluated 14 of the busiest bus corridors in Minneapolis and proposed a long-term streetcar network of seven of the corridors studied.

Historical Information and Context Offered:

The goals for the long-term streetcar network as stated in the study are to:

- Increase transit ridership by regular and occasional riders, especially by providing enhanced and attractive local circulation service connecting city neighborhoods with the downtown core.
- Increase the attractiveness of transit to new markets by providing a unique vehicle and customer experience.
- Provide connections and distribution between high capacity regional transit and local neighborhoods.
- Enhance the environment by replacing diesel bus service with clean and quiet electric vehicles
- Catalyze and organize development and redevelopment potential around a transit investment by providing a quality transit line with a sense of permanence.

Both Lake Street and the Midtown Corridor were evaluated as part of the study. The long-term network of seven corridors recommended in the study includes the Midtown Corridor, but not Lake Street. While Lake Street is a more traditional surface streetcar corridor, the Midtown Corridor was selected over Lake Street due to its higher potential to provide regional connections between the Hiawatha and Southwest LRT lines and the major streetscaping and reconstruction underway on Lake Street.

Recommendations Affecting Midtown Corridor Study Area:

The study evaluated the Midtown Corridor in greater detail than the other surface street corridors due to its unique physical environment, and the final report devotes an entire chapter to the Midtown Corridor. It indicates that the Midtown Corridor is a somewhat different discourse from the rest of the long-term streetcar network given that it does not serve the downtown core, is fully grade-separated, and transects a physical environment that is different from the rest of the corridors. The report recommends that the alignment be below grade along the Midtown Greenway and not on Lake Street. As such, the ridership, bus service replacement, and cost measures are affected by different factors. All of the estimates for operations and ridership are significantly affected by the development of the Southwest LRT corridor.

Chapter 3 is attached to this report in Appendix B. It includes a detailed summary of the following:

- Operating plan
- Station locations
- Single vs. Double Track Operations
- Ridership Estimates
- Maintenance and Storage Facility
- Historic Bridges
- Power
- Vertical Circulation
- Embedded vs. Ballasted Track
- Capital Cost Estimates
- Development Potential
- Owner/Operator Arrangements
- Staging of Construction

Minneapolis Streetcar Funding Study, 2010

Objective: This study builds on the "Minneapolis Streetcar Feasibility Study" that was completed in 2007 and explores options for funding the implementation of an initial Minneapolis streetcar project. The study evaluated several potential initial streetcar projects, including the Midtown Corridor.

Recommendations Affecting Midtown Corridor Study Area:

This study analyzed revenue sources to construct and operate a Midtown Streetcar line, including the following:

- Federal funding for 50 percent of capital costs;
- Operating revenues, including farebox and passes, federal formula funds, and advertising;
- Regional and private funding for 10 percent of capital and operating costs;
- A 25 percent increase in parking revenue within ¼ mile of streetcar line; and
- Either limited City property tax abatement for 10 years within ¼ mile of stations or a Special District assessment on commercial and some multifamily property within ¼ mile of stations.

The study evaluated the feasibility of funding both an $87 million ballasted track scenario and a $115 million embedded track scenario. It concluded that these funds alone would not be adequate to fund the Midtown Streetcar, given the funding assumptions in the study.

Southwest Transitway Draft Environmental Impact Statement, 2012

Objective: The Draft Environmental Impact Statement (Draft EIS) describes the transportation and environmental impacts associated with the construction and operation of an LRT project to improve transit service in the Southwest Transitway Corridor in Hennepin County, Minnesota. All potentially significant environmental, social, economic, and transportation benefits and impacts of the proposed alternatives are evaluated including transportation systems, land use, socio-economic conditions, air quality, noise, vibration, visual, ecosystems, water resources, historic resources, archeological resources, parklands, geology, hazardous/regulated materials, safety/security, public involvement, financial analysis, and secondary and cumulative effects.

Historical Information and Context Offered:

- The Southwest Transitway DEIS was released in October 2012 by the United States Department of Transportation, FTA, and Hennepin County Regional Rail Authority (HCRRA) in cooperation with the Surface Transportation Board. The DEIS was prepared pursuant to the requirements of the National Environmental Policy Act (NEPA) of 1969 for the proposed Southwest Transitway Project, which is a 15-mile LRT corridor that links Eden Prairie, Minnetonka, Edina, Hopkins, St. Louis Park, and Minneapolis. The proposed corridor will link with the Hiawatha LRT line and the Central Corridor LRT line currently under construction to improve transportation within the Southwest Transitway corridor, which is bounded roughly by I-494 to the south, the HCRRA right-of-way (ROW) and I-494 to the west, TH 169 south of Excelsior Boulevard and I-35W south of downtown Minneapolis to the east, and I-394 to the north. The DEIS was prepared to identify potential environmental effects associated with project construction and operation, and to provide agencies and the public the opportunity to review and comment on the potential effects of the proposed project.
- During the AA phase of the Southwest Corridor study process, several alignments were considered for both LRT and rapid bus applications. Alignment C for LRT uses the Midtown Corridor from the proposed West Lake Station to Nicollet Avenue. During the NEPA/MEPA scoping period, two new alignments were proposed that were evaluated for their feasibility, including Alignment 3E. Alignment 3E followed a similar travel path but omitted the West Lake Station. All alignments using the Midtown Corridor and Nicollet Avenue were screened out during the AA Phase of the process due to their greater noise and vibration impacts on sensitive receptors, cost, historic resources, or detriment to mobility along the segment (impact on local bus service).

Recommendations Affecting Midtown Corridor Study Area:

<u>Space Needs for LRT</u>

- Ballasted double-track at grade: approximately 58 feet wide

- Aerial structure: approximately 30 feet
- Embedded double-track: approximately 26 feet

Figure 2: LRT Cross Section, Ballasted Track (Hennepin County, 2009)

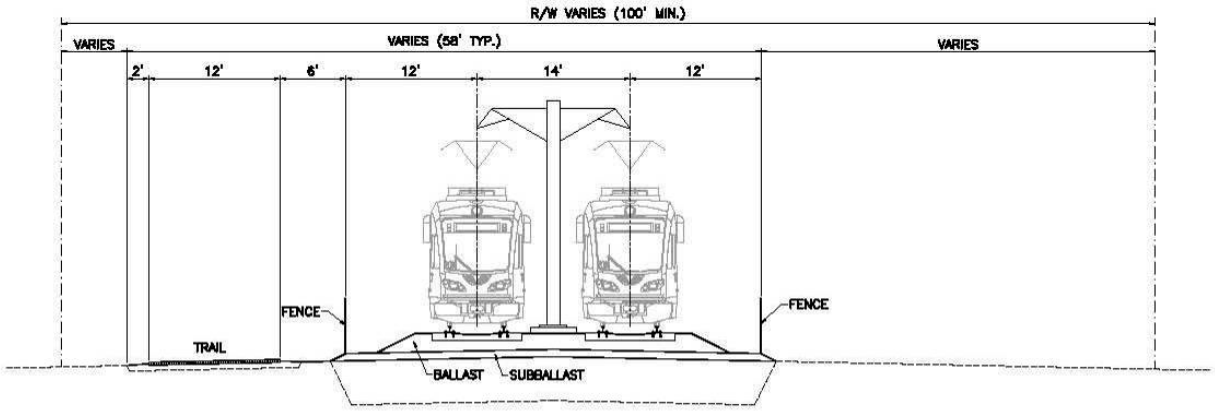


Figure 3: LRT Cross Section, Elevated Track (Hennepin County, 2009)

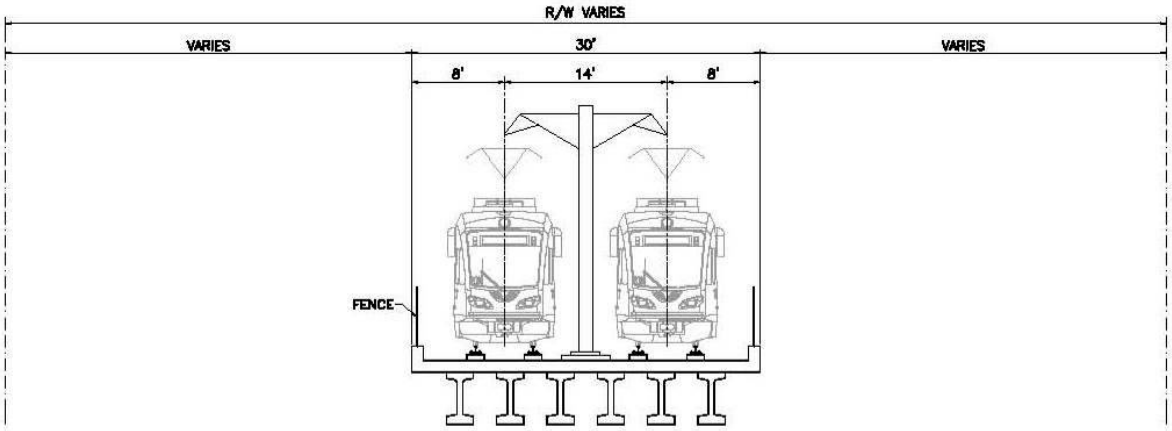
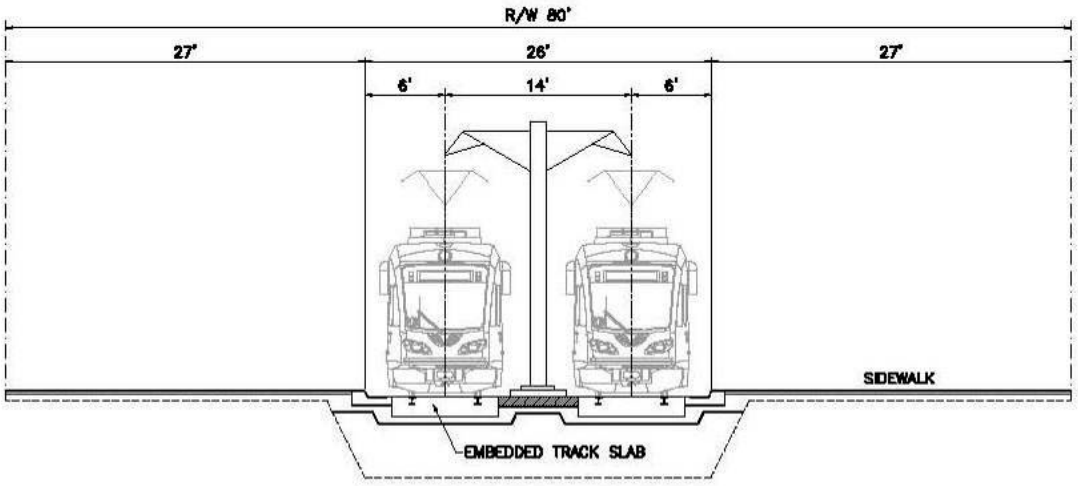


Figure 4: LRT Cross Section, Embedded Track (Hennepin County, 2009)



Impacts to Local Bus Service

- For the alignments that serve the Midtown Corridor, the major change would be that Metro Transit Route 6 would terminate at the West Lake Station going northbound and serve as a shuttle between that station and Southdale/Edina.

Description of Land Use and Zoning near the Midtown Corridor

"The Uptown and Midtown regions are the most densely populated neighborhoods of the study area. Retail commercial land uses comprise the greatest amount of land (17.0 percent), followed by multi-unit residential land (15.8 percent), and single family residential (detached housing, 13.4 percent)."

"Circling Lake of the Isles and Lake Calhoun are multi-use trails and public open space, while the Midtown Corridor contains a heavily used multi-use trail, referred to locally as the Midtown Greenway (the Midtown Greenway trail is part of the Midtown Corridor, which includes the entire trench and the Chicago Milwaukee & St. Paul Railroad Grade Separation Historic District). Parks and open space (undeveloped) areas make up 8.8 percent of the total land use surrounding Segment C-1."

"On the eastern side of Lake Calhoun, where the proposed alignment of Segment C-1 would be located in the Midtown Corridor…the alignment … would travel through, or adjacent to, land areas zoned as [residential (R2, etc.), commercial, or industrial]."
The portions of the corridor directly east of the West Lake Station are in a City of Minneapolis Pedestrian Overlay District that covers much of Uptown. A Pedestrian Overlay District is described in Title 20, Chapter 551, Article II of Minneapolis code as follows, "The PO Pedestrian Oriented Overlay District is established to preserve and encourage the pedestrian character of commercial areas and to

promote street life and activity by regulating building orientation and design and accessory parking facilities, and by prohibiting certain high impact and automobile-oriented uses." In general, setbacks should be sort and buildings should offer protection to pedestrians. Also, accessory parking is carefully regulated and auto entrances are only permitted at the side or rear of buildings. LRT is a transportation mode that is consistent with the requirements of this overlay district, provided that pedestrian circulation is preserved.

Cultural Resources (Historic and Architectural)

- Railroad bridges over Grand Rounds features at Dean Parkway, the Calhoun-Isles Channel, and Lake Calhoun Parkway
- The Mall and Grand Rounds Scenic Byway
- Chicago Milwaukee & St. Paul Railroad Grade Separation Historic District (potential effects of building stations, reconstructing retaining walls, etc. may affect the historic character of the district)

Potentially Impacted Park Land

There are several areas that have uses associated with parks and recreation along the western portion of the Midtown Corridor. Below is Figure 3.5.3 from the DEIS that displays this park land on a map in green shading:

Figure 5: SWLRT Parkland Impacts (Hennepin County, 2009)

Long term impacts on parkland are identified on the area between Lake of the Isles and Lake Calhoun. Approximately 0.09 acres of parkland would need to be acquired to support an LRT right-of-way. It is also noted that those that live in residential areas and recreational users of the lakes area would bear a visual impact on the construction of the LRT guideway and station areas. These impacts are less substantial on the below-grade portions of the corridor.

Environmental Effects

- Areas along the Midtown Corridor along the isthmus between Lake Calhoun and Lake of the Isles have patches of shallow groundwater with significant groundwater sensitivity against which mitigation measures must be put into place during construction.
- The Midtown Corridor is in both the Minnehaha Creek and Mississippi River Water Management Organizations' management areas.
- State listed threatened species are known to exist in the Midtown Corridor study area. Animal species include the Blanding's Turtle, Black Sandshell Mussel, Eastern Pipstrelle Bat, Peregrine Falcon, Pugnose Shiner Fish, and Least Darter Fish. One plant species is listed in the area: Valerian.
- According to the Noise and Vibration Impact study, there are 195 moderate noise impact sites and 216 severe noise impact sites along the western segment of the midtown corridor. There are also vibration impact sites; however, the geographic scope of that measurement was never limited to solely the Midtown Corridor.
- Given its history as a working rail and industrial corridor, the Midtown Corridor has multiple potential hazardous materials sites that would merit further investigation and remediation.

Study Conclusion – Cultural Resources

Section 3.4 of the DEIS describes and evaluates the existing cultural resources within the Southwest Transitway corridor and discusses the potential impacts to these resources that would result from the proposed build alternatives. The Southwest Transitway project is anticipating federal funding from the FTA and, therefore, must comply with Section 106 of the National Historic Preservation Act (Section 106) of 1966, as amended, as well as applicable state mandates governing cultural resources. These state mandates include the Minnesota Field Archaeology Act, the Minnesota Historic Sites Act, and the Minnesota Private Cemeteries Act. Section 106 requires federal agencies to consider the effects their actions may have on historic properties.

To aid in complying with Section 106 and applicable state mandates, cultural resources surveys were conducted, including a Phase I and II architectural history survey (Goodson 2010 – Volume 1; Roise et al. 2012 – Volume 2; Schmidt and Vermeer 2012 – Volume 3; Goodson 2012 – Volume 4) and a Phase IA archaeological assessment (Harrison and Madson 2010; Arnott 2012). The cultural resources surveys identified a number of listed and eligible architectural history resources, as well as several areas of archaeological potential along the segments that make up the Southwest Transitway corridor.

As detailed in the DEIS, the build alternatives for the Southwest Transitway could result in adverse effects to historic properties and districts along the corridor. Because the engineering plans for the project are in the conceptual stage, the assessment of effects to historic properties will be refined and updated as planning efforts and the design move forward. Additionally, once the archaeological field investigation is completed, the effects to eligible archaeological sites identified will also need to be assessed. Also, as the planning and Section 106 process moves forward, attempts will be made to avoid, minimize, or mitigate effects to historic resources, possibly through modifications to the design of the project during Preliminary Engineering.

If there will be adverse effects to historic resources, the FTA, in consultation with the Minnesota State Historic Preservation Office (SHPO), will develop measures to minimize or mitigate the adverse effects. These mitigation measures will be documented in a Section 106 Agreement.

Cultural and Historic Resources -- Impact to Midtown Corridor Transitway Alternative Analysis

According to information in the technical reports for the cultural resources surveys, the archaeological assessment included the Midtown Greenway corridor from West Lake Station to approximately Lyndale Avenue. Within this segment, two areas of archaeological potential were identified in close proximity to two National Register eligible archaeological resources between Lake Calhoun and Lake of the Isles (Harrison and Madson 2010). Both of these areas are located within the current study area for the Midtown Corridor Transitway. If these areas cannot be avoided by the proposed design for the Midtown Corridor, in compliance with Section 106 and applicable state mandates, these areas will need to be surveyed prior to construction to determine if any National Register eligible archaeological resources may be impacted. If eligible archaeological resources are identified, potential effects to those resources will need to be assessed.

During the architectural history surveys, three individual properties listed on the National Register of Historic Places (NRHP) and four individual properties eligible for listing in the NRHP were identified within one block of the Midtown Greenway between the West Lake Station and Lyndale Avenue. One NRHP listed historic district (the Chicago Milwaukee & St. Paul Railroad Grade Separation Historic District) and three NRHP eligible historic districts (Grand Rounds Historic District, Lake of the Isles Residential Historic District, and Lyndale Corners Historic District) were also identified. The potential effects of the alternatives and design of the Midtown Corridor Transitway on these resources will also need to be considered.

Access Minneapolis Citywide Transportation Action Plan, 2009

Objective: The objective of the Access Minneapolis Citywide Transportation Action Plan is to identify specific actions that the City of Minneapolis and its partner agencies need to take to implement the multi-modal transportation policies articulated in the City of Minneapolis comprehensive plan.

Historical Information and Context Offered:

Two of the most significant components of the plan address the Primary Transit Network and Designing Complete Streets.

Primary Transit Network

The plan recommends that the City work with its partner agencies to establish and maintain a Primary Transit Network (PTN) that is a permanent network of all-day transit service, either bus or rail, that is reliable, frequent (at least every 15 minutes or better at least 18 hours a day, 7 days a week), maintains reasonable speeds and has vehicles and passenger facilities that have the same amenities and quality of service as rail transit. Lake Street is one of the PTN corridors identified (see Figure 6).

The plan recommends providing the best possible transit service on a Primary Transit Network:

- 4.1. Improve PTN speed and reliability through signal improvements.
- 4.2. Improve PTN speed and reliability through bus stop location and design improvements.
- 4.3. Improve PTN speed and reliability through fare payment technology improvements.
- 4.4. Improve the frequency and span of services on the PTN.
- 4.5. Improve transit shelters and street furniture.
- 4.6. Improve snow removal at transit stops.
- 4.7. Improve pedestrian and bicycle access to the PTN.
- 4.8. Improve transit information at transit stops.
- 4.9. Support implementation of regional transitways.
- 4.10. Support investigation of arterial Bus Rapid Transit corridors.
- 4.11. Continue evaluation of streetcar service on the PTN.

Designing Complete Streets

It is the intent of the plan to foster the practice of providing complete streets that support and encourage walking, bicycling and transit use while promoting safe operations for all users. The plan includes a street typology to accomplish these objectives by more directly linking land use, street design, and urban form. This street typology is shown Table 4 and Figure 6 and is based upon the designated land use features in the Minneapolis Plan for Sustainable Growth.

Most of Lake Street in the study area is defined as a Commerce Street, which is a medium capacity street that supports retail, service commercial and higher intensity residential land uses on a corridor basis. In Uptown, Lake Street is an Activity Area Street, which supports retail, service commercial, and higher intensity residential land uses in a large node of several blocks.

Table 4: Street Designations in Midtown Corridor Study Area (City of Minneapolis, 2009)

Street Designation	Location
Activity Area Street	• Lake and Lagoon between Dupont Ave. and Lake Calhoun • Girard Ave. • Blaisdell Ave. • Nicollet Ave. • Stevens Ave. • 31st Street between Humboldt Ave. and Dupont Ave.
Commerce Street	• Lake St from Lake Calhoun and west • Lake St. from Dupont Ave. and east • Lyndale Ave north of Lake St.
Community Connector	• 31st St. from Dupont Ave. to Longfellow Ave., Excelsior Blvd. • Lyndale Ave. south of Lake St. • Portland Ave. south of Lake St. • Park Ave. south of Lake St. • Elliot Ave. south of Lake St. • Longfellow Ave.
Commuter Street	• Hiawatha Avenue
Industrial Street	• 21st Ave. S north of Lake Street
Neighborhood Connector	• 31st St. west of Humboldt Ave. • Dean Parkway • Bryant Ave. south of 31st. St. • 4th Ave., Bloomington Ave.
Parkway Street	• Calhoun Parkway (east and west)

Figure 6: Minneapolis Primary Transit Network (City of Minneapolis, 2009)

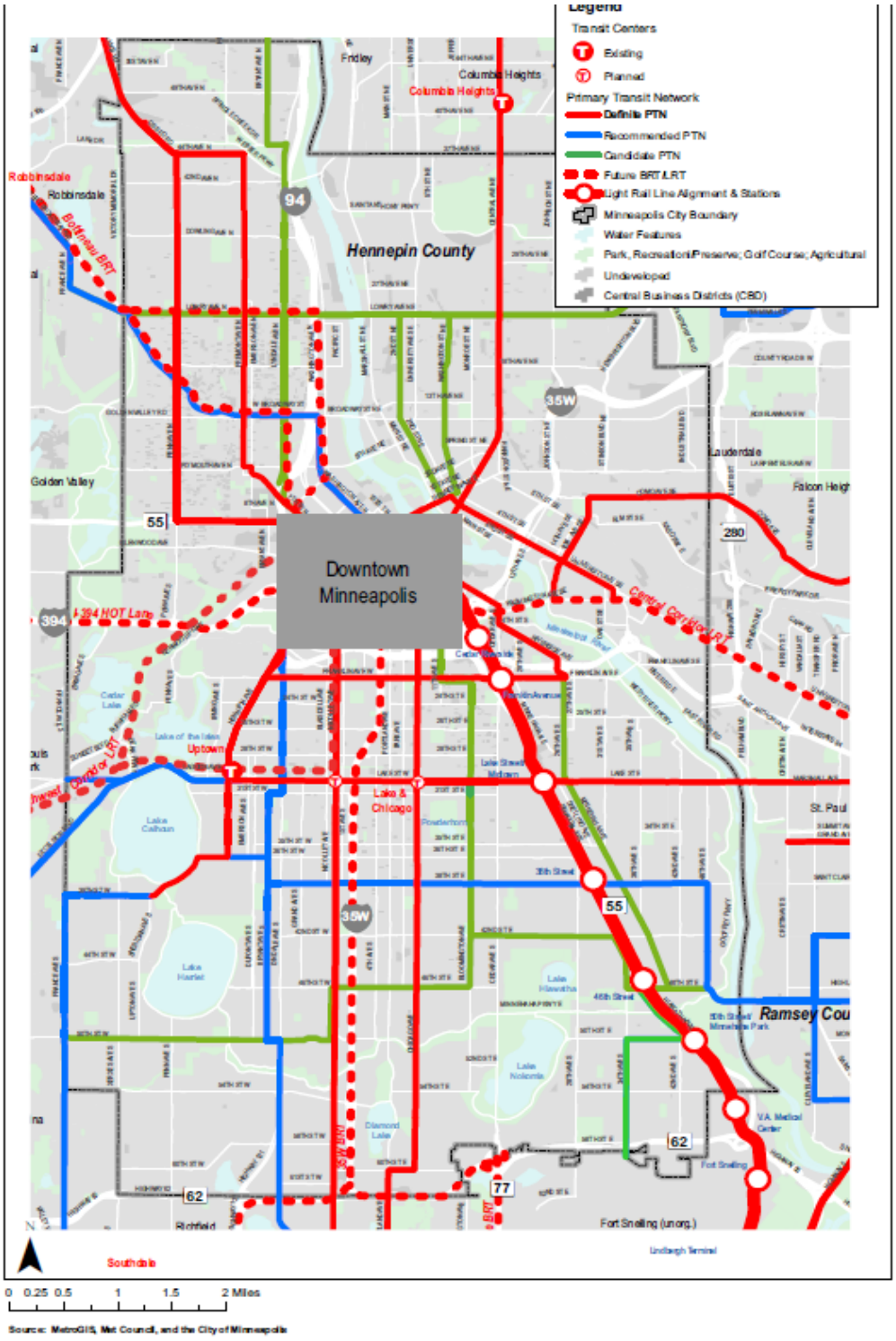


FIGURE 1 - PRIMARY TRANSIT NETWORK

ACCESS MINNEAPOLIS

Midtown Corridor Historic Bridge Study, 2007

Objective: Per compliance with a Section 106 Memorandum of Understanding between the SHPO and the Federal Highway Administration, an analysis of the foreseeable effects of bridge removal along the Midtown Corridor was completed.

Historical Information and Context Offered: The document conducts a meticulous inventory of each bridge that spans the Midtown Corridor, including materials, age, structural condition, need for repair and replacement, and specific location characteristics. For identifying key issues in this technical memo, particular attention will be paid to information related to transitway development within the Midtown Corridor and relevant cultural resources. If needed for future reference, the Midtown Corridor Historic Bridge Study document contains detailed cost information for bridge reconstruction and repairs.

Recommendations Affecting Midtown Corridor Study Area:

LRT

For LRT, a ballasted double track alignment requires a minimum 32 foot width for the rail construction and an additional 3 feet on either side for the ballast. Double track LRT platforms may be located either between the tracks or on the outsides of the double track. Double track at a station with side platforms would require a minimum width of approximately 53 feet for construction. Double track at a station with a center platform would require a minimum width of approximately 51 feet for construction.

Having a vertical pedestrian connection to the center platform, by elevators and escalators, requires an additional 6 feet to the platform width, so the necessary minimum width would become approximately 56 feet. The necessary width needed for side platforms and vertical connections would be 60+ feet. Due to the nature of this corridor, there would likely need to be elevators/escalators at some or most of the stations. Stations would be anticipated near Hennepin, Lyndale, Nicollet, and Chicago Avenues.

Due to the slopes at the edges of the corridor, a center alignment is the only viable location for an LRT line in the Midtown Greenway. Also, the bridges east of 12th avenue pose challenges for maintaining both bicycle and pedestrian right-of-way and LRT in terms of width. The locations of utilities, water lines, and adjacent buildings may pose conflicts during any bridge reconstruction.

Modern Streetcar/BRT

There are no current streetcar standards in Minnesota, but one could assume they would be very similar to the LRT horizontal and geometric constraints noted above. Several differences are that a streetcar line would have less restrictive vertical constraints, the platform would be lower to the tracks, profile grades could be steeper, curves could have smaller radii, and there is the possibility that segments could be implemented as single-track. Similar to modern streetcars, a dedicated busway on the corridor would not have the vertical constraints of LRT. However, because portions of a streetcar track could be single-track, a busway has greater width requirements as it needs two standard traffic lanes and station platforms on either side to accommodate safe boarding and alighting.

SHPO Recommendations

SHPO considers the bridges that span the Midtown Corridor to be important parts of the historic character of the district. The report contains the following remarks expressing this finding:

"The integrity of the section of the corridor between Stevens and 11th Avenues has already been compromised beyond redemption. Removal of other bridges would pose a serious threat to the integrity of the remaining sections. The fate of the district from Stevens to Fremont Avenues is perhaps already sealed by the intense pace of redevelopment in this area and the accompanying pressure to transform the corridor's industrial character into something more comfortable for the new, nonindustrial uses. The best hope for retaining a justifiable district lies in the section east of 11th Avenue. The loss of any bridge in this section, given the integrity problems to the west, could be the last straw for the district. The challenge will be to balance the practical needs and economic realities identified by engineers and planners with the unique qualities that characterize the Chicago Milwaukee and St. Paul Railroad Grade Separation Historic District.

SHPO and the MnDOT Cultural Resources Unit (CRU) have been afforded an opportunity to review this report. SHPO and the CRU do not agree with the recommendation of the report that there should be changes to the contributing /non-contributing status of the 10th, Elliot, Nicollet, and Pillsbury Avenue bridges in the Chicago Milwaukee and St. Paul Railroad Grade Separation Historic District. There are twenty-nine bridges in the district, twenty-seven of which are contributing. It is the opinion of SHPO and the CRU that the district is large in scale and changes to the parapet railings of these three bridges does not warrant changing their contributing status, particularly when one considers that the piers and decks remain. In addition, SHPO and the CRU concur that the district should not be segmented and should stand as a whole. The district is significant for both the engineering and scale of the project, and any smaller segment could not adequately reflect the original historic resource."

In the conclusion of the report, the City of Minneapolis responds to the aforementioned findings as follows:

"To ensure their continued use and preservation, the City is committed to monitoring the Midtown Corridor bridges' condition and possible accelerated deterioration, as part of its annual bridge safety inspections. The City is further committed to solicit funding that would provide the resources for additional ordinary maintenance and betterments; for exploration of structural rehabilitation technology as successfully used by others; and for exploration of technologies to halt and/or stabilize existing deterioration. Rehabilitation will be considered as possible bridge replacement projects develop. Prior to any infrastructure work, the City will employ the proper methods for project development, which includes a context sensitive design process. This includes gathering input on future development of the corridor and through the community involvement process from owners, residential and business communities, planners, engineers, the City Council and the Historic Preservation Commission. As such, the recommendations may change for the bridges presented within this report."

The Feasibility of a Single-Track Vintage Trolley in the Midtown Greenway, 2001

Objective: This study was undertaken to assess the feasibility of a vintage trolley designed to minimize costs and environmental impact on the Midtown Greenway Corridor while meeting ridership levels of 7,300 passengers per day.

Historical Information and Context Offered:

- Midtown Greenway's history as a working rail corridor.

Recommendations Affecting Midtown Corridor Study Area:

The study recommends an alignment for a historic streetcar that travels from Minnetonka Boulevard and Chowen Avenue to a connection with the Hiawatha LRT station traveling along the Midtown Greenway. The estimated one-way travel time for the line is 14.3 minutes, which includes 20 seconds of dwell time at each station and 10 minute service frequency. Station locations are assumed as follows:

- West of Lake Street Bridge (near Lakes Area)
- Between Hennepin Avenue and Fremont Avenue
- Lyndale Avenue
- Between Blaisdell Avenue and Nicollet Avenue
- Interstate 35W
- Between Fourth and Fifth Avenues
- Chicago Avenue
- Cedar Avenue
- Adjacent to Lake Street Hiawatha Station

There are also several at-grade crossings on the eastern and western ends of the trolley line where it would operate outside of the Midtown Greenway trench. These are at James Avenue, Irving Avenue, Humboldt Avenue, Fifth Avenue, 20th Avenue, and 21st Avenue. All of the crossings would require gates and flashers, with the exception of at 20th avenue which is just a plant access point and would not require gates.

The average speed of the line is 12.9 mph. The report also identifies several conflicts with the historic bridges that span the Midtown Greenway; however all of the bridges could accommodate at a minimum single track or gauntlet track operations. Most of the bridges would require some modification to accommodate double track operations.

For the purposes of aesthetics and noise mitigation the study recommends using track embedded in turf similar to that of Kenosha, Wisconsin and portions of the New Orleans RTA system.

The total capital costs for design, engineering, and construction of the vintage streetcar line is approximately $46 million; annual operating costs are estimated at approximately $1.6 million.

The study also does not contradict the future development of LRT along the Midtown Greenway, and states that any streetcar development should be done keeping future transit investments in mind.

Rolling stock recommendations are rehabilitated streetcars similar to those used in Kenosha, Wisconsin and Newark, New Jersey. Station areas can be as simple as decorated concrete pads that are 50 feet in length and eight to twelve feet wide.

Minneapolis Bicycle Master Plan, 2011

Objective: "The purpose of the Bicycle Master Plan is to establish goals, objectives, and benchmarks that improve safety and mobility for bicyclists and increase the number of trips taken by bicycle."

Recommendations Affecting Midtown Corridor Study Area:

For infrastructure projects within the City of Minneapolis, the plan outlines several goals that outline the criteria for meeting objectives related to bicycling and questions that are asked of every project.

- Goal #1: Increase bicycle mode share
    - Is the project expected to increase the number of people bicycling and/or increase the number of trips taken by bicycle?
    - Does the project help create a demand for bicycling in population and employment concentrations, with a focus on high trip generation areas? Is the project anticipated to serve travel needs in all seasons?
- Goal #2: Bicycling in Minneapolis is safe and comfortable
    - Does the project provide a safer and more appealing alternative to what currently exists in a given corridor?
- Goal #3: Destinations in Minneapolis are reasonably accessible by bicycle.
    - Does the proposed project supplement the existing bicycle system by removing barriers and closing system gaps?
    - Does the proposed project serve populations with lower than average rates of bicycling? Considerations include race/ethnicity, class, gender, and age.
    - Does the project connect Minneapolis to surrounding communities and facilitate the ability to take longer trips by bicycle?
    - Does the project provide bicycle access to popular destinations?

Additional Criteria:

- Timeliness: Is the project timely and will it be ready for construction in the funding cycle? Timeliness will depend on external factors such as redevelopment projects, street reconstructions, availability of external funds and timelines from funding sources. Project readiness will depend on internal factors such as planning, design, right-of-way acquisition, and City funding.

- Cost Effectiveness: Is the project cost effective? How much will each project cost, how many users will it benefit and what level of safety and convenience benefit will it provide to users? Are the operations and maintenance responsibilities defined? Are there differences between projects in the ability to maintain the facility over time? Does the project leverage funding from external sources?

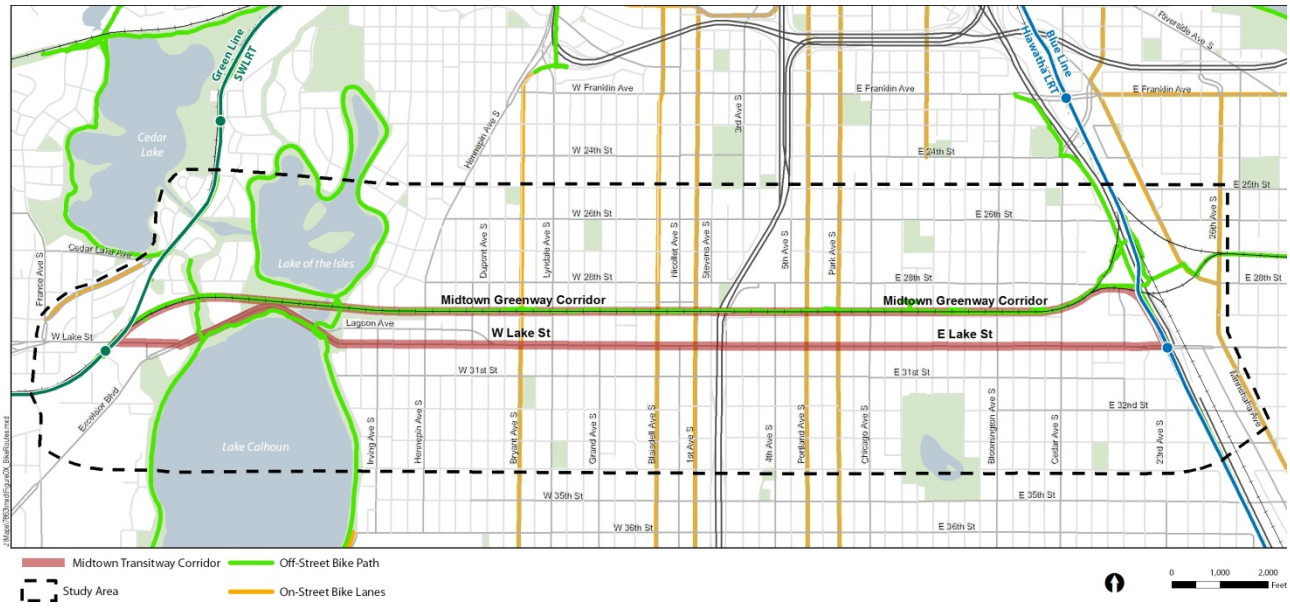
- Adopted Plan: Is the project part of an approved regional, city, agency or neighborhood plan?

- Public Support: Has there been or is there public outreach planned for the project? What is the level of community support for the project?

- Innovation: Does the project allow the City to pilot a new approach or design element to improve safety, comfort and/or accessibility that is not currently used in Minneapolis? Does the project incorporate a successful approach that has been tried in other cities but not used in Minneapolis?

The plan identifies gaps in the bicycle network throughout the city, one such gap in the Midtown Corridor that has not been fully addressed is 31st Street. There are other gaps in the Midtown area, however since the plan was adopted those improvements have been completed. Below, Figure X shows the existing bicycle network in the Midtown Corridor study area.

Figure 7: 2012 Bicycle Network in Midtown Corridor



Additionally, where feasible, the plan recommends facilitating private investment into bicycling. Private investment includes the development of bicycle facilities in new buildings or infrastructure, employers offering commuter option, and the provision of bicycle parking.

The plan also supplies some specifications for bicycle facility development:

- There must be at least a five foot clear zone between a bike path and rail, with fencing recommended
- Facilities must be planned and constructed following the MN/DOT Bicycle Facility Development Manual
- If retaining walls are used (as they are along the Midtown Greenway) the following materials are allowable:
    - Modular block
    - Sheet piling

- Gabion walls
- Cast-in-place concrete

The plan encourages a productive and safe interaction between bicycles and transit. As such mid-block stops should be discouraged when possible on side runningways as this produces conflicts between buses and cyclists.

The Minneapolis Plan for Sustainable Growth, City of Minneapolis, 2009

Objective: To serve as a guide for Minneapolis' growth through 2030.

Policies Affecting Midtown Corridor Study Area:

Land Use

The Midtown Corridor is a place within the Minneapolis-St. Paul region that is targeted for growth and investment that is supportive of enhanced transit and increased densities. The following are the planned land uses and street types in the Midtown Corridor:

Commercial Corridor – Hennepin Avenue, Lake Street, Lyndale Avenue, Nicollet Avenue

- Commercial corridors accommodate intensive commercial uses and high traffic volumes. Development encouraged on commercial corridors is mixed-use at medium to high densities (50-120 dwelling units per acre).
- Auto-oriented uses should be redirected to areas that are not near the intersection of two intersecting commercial corridors, where traditional urban form is more appropriate.

Community Corridor – Bloomington Avenue, Cedar Avenue, Chicago Avenue

- Community corridors commonly follow former streetcar routes and connect two or more neighborhoods. They are mainly minor arterials and are part of the HFN.
- Uses are typically residential with commercial focused on nodes; where these corridors cross the Midtown Corridor would be nodes that support commercial and mixed-uses that serve the immediate neighborhood.

Activity Centers – Midtown Corridor at Chicago Avenue, Hennepin Avenue, Hiawatha Avenue, Lyndale Avenue, and Nicollet Avenue

- Activity centers are areas well served by transit and support a wide range of complementary commercial, office, and residential uses. Activity centers are pedestrian-oriented with an urban form, character, and scale.
- Activity centers are active all day long and into the evening.

Transit Station Area – ½ Mile Radius of Blue Line and future Green Line LRT Stations; Org

- Transit station areas are areas in the immediate market of transitways and parts of the Primary Transit Network. These areas are places where pedestrian oriented scale and massing, transit oriented uses, and increased density are of critical importance.

- Future development in transit station areas will be encouraged to serve those arriving and departing via transit.

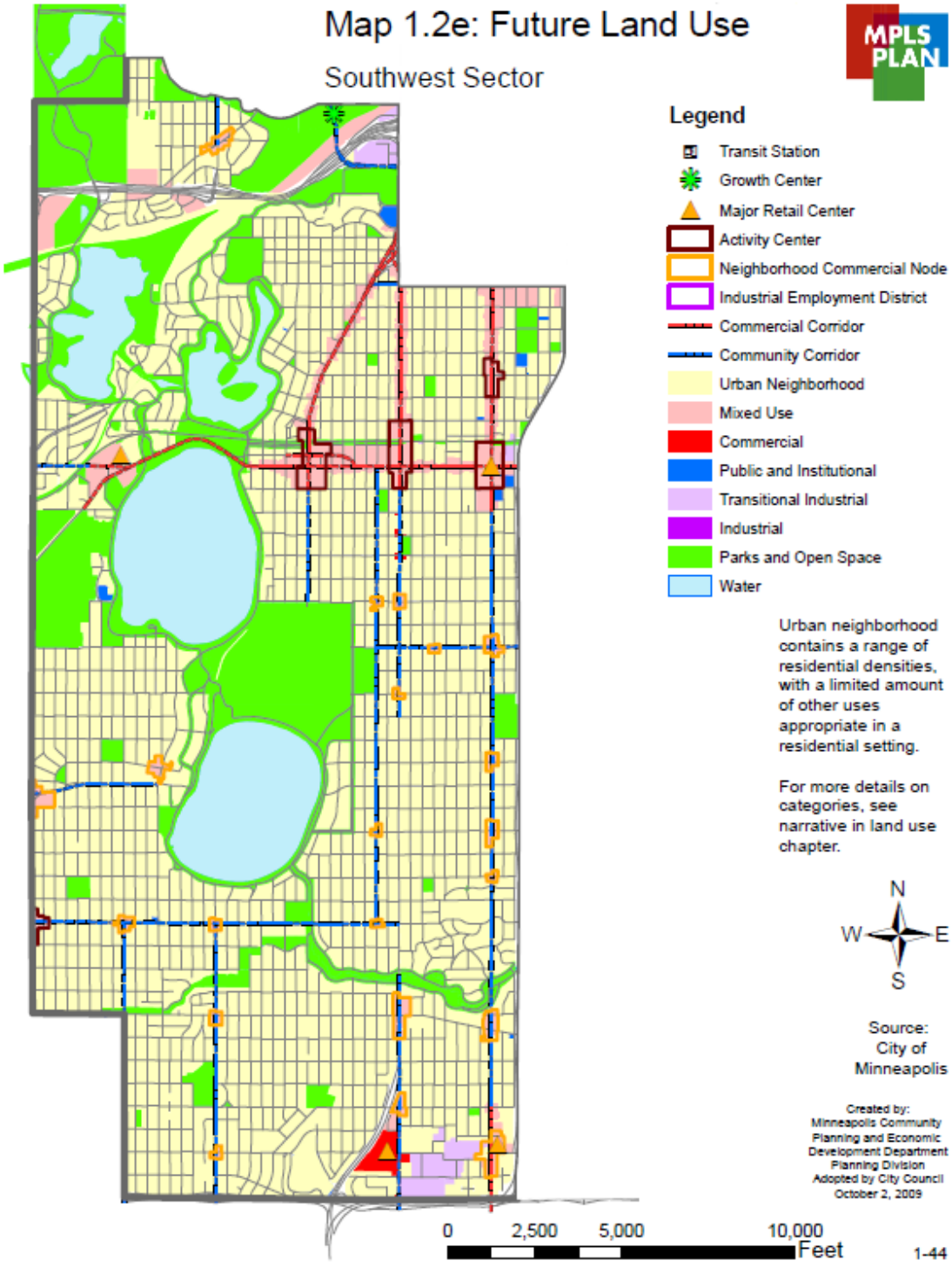
Major Retail Centers – Hiawatha Avenue at Lake Street, Nicollet Avenue at Lake Street, and Excelsior Boulevard at Lake Street.

- Major Retail Centers are important nodes of economic activity that can accommodate the largest floor space for retail use.
- Connectivity to highways or other major roadways is important in addition to connectivity to transit.

Additionally, the area just to the north of the Chicago-Lake Transit Center is a Growth Center marked by Wells Fargo Home Mortgage, Allina, Children's Hospital, and Abbott Northwestern Hospital. These areas contain a significant concentration of employment activity and a wide range of activities, including residential, office, retail, entertainment and recreational uses. Future land uses for the Midtown Corridor study area are defined in the following maps.

Figure 8: South Sector Future Land Uses (City of Minneapolis, 2009)

Figure 9: Southwest Sector Future Land Uses (City of Minneapolis, 2009)



Transportation

The Minneapolis Plan for Sustainable Growth promotes development of a balanced multimodal transportation system, including automobile, transit, bicycle, and pedestrian modes. The plan identifies transit as the principal means to efficiently meet the needs of the traveling public; of particular importance is the provision of frequent and reliable service along major transportation corridors across all modes (auto, transit, bicycle, and pedestrian). Linking transportation planning with land use planning will promote a consistent vision. Transit should serve key markets, and there should be incentives to make transit more convenient and affordable for users.

Housing

To position the City of Minneapolis well for growth the housing supply must be increased. In doing so, development of new housing should be developed in and near major corridors, activity centers, growth centers, retail centers, transit station areas, and neighborhood commercial nodes at urban densities. The plan emphasizes new development adjacent to major transit investments.

Parks and Open Space

The plan broadly supports the preservation, maintenance, and improvement of parks and open space as they are not only an amenity that improves the quality of life for Minneapolis residents, but contribute to the regional economy as a tourist destination. The Midtown Greenway is a key part of the Minneapolis trail network, and policy 7.8.2 of the plan of particular importance as it states to "support the preservation of former transportation corridors that are intact or largely intact and use them to connect neighborhoods to each other and to major amenities."

Urban Design

The Midtown Corridor, particularly on Lake Street, calls for the increased development of mixed use parcels. Policy 10.9 outlines several strategies for meeting this standard of development:

- 10.9.1 Encourage both mixed-use buildings and a mix of uses in separate buildings where appropriate.
- 10.9.2 Promote building and site design that delineates between public and private spaces.
- 10.9.3 Provide safe, accessible, convenient, and lighted access and way finding to transit stops and transit stations along the Primary Transit Network bus and rail corridors.
- 10.9.4 Coordinate site designs and public right-of-way improvements to provide adequate sidewalk space for pedestrian movement, street trees, landscaping, street furniture, sidewalk cafes and other elements of active pedestrian areas.

City of Minneapolis Small Area Plans, 2001-2009

Objective: The following Small Area Plans in the Midtown Corridor Study Area have been adopted by the Minneapolis City Council and supplement the Minneapolis Plan for Sustainable Growth. The plans provide detailed land use policy, development recommendations, and design guidance at more a refined level for each geographic area, and include:

- Hiawatha/Lake Station Area Master Plan, 2001
- Corcoran Midtown Revival Plan, 2002
- Midtown Minneapolis Land Use and Development Plan, 2005
- Midtown Greenway Land Use and Development Plan, 2007
- Uptown Small Area Plan, 2008
- Lyn-Lake Small Area Plan, 2009
- Phillips West Master Land Use Plan, 2009

Land Use Policies Affecting Midtown Corridor Study Area:

Hiawatha/Lake Station Area Master Plan, 2001

The Hiawatha/Lake Station Area Master Plan is the first in a series of land use plans for development around stations on the Hiawatha LRT corridor. The plan focuses explicitly on the ¼ mile surrounding the Hiawatha/Lake Station area, but also addresses development and design on the Lake Street Commercial Corridor west of Hiawatha Avenue.

The plan offers several design standards and land use policies for the station area and Lake Street Commercial Corridor, including the implementation of a Pedestrian Oriented Overlay District and mixed-use Transit Station Area zoning to encourage redevelopment and increased commercial and residential densities in the station area. One specific project envisioned in the plan is the phased redevelopment of the Hi-Lake Shopping Center to a higher density, mixed-use district that is better integrated with, and oriented to, the LRT station and Lake Street. The plan also anticipates the then-planned Midtown Greenway project.

While these articulated land use policies have already been adopted into the comprehensive plan and many improvements have been implemented as several parcels have been redeveloped over the past decade, the transit supportive nature and design standards of the plan remain relevant to the Midtown Corridor.

Corcoran Midtown Revival Plan, 2002

The Corcoran Midtown Revival Plan is a land use and action plan for the Corcoran Neighborhood. The plan was created to refine land use policy and address community development issues in the

neighborhood (e.g., property crime and vacant/underutilized property), which extends along the Lake Street Commercial Corridor from the commercial node at the intersection of Cedar Avenue to Hiawatha Avenue.

The plan adopts TOD densities identified in the Hiawatha/Lake Station Area Plan. Specifically, it envisions redevelopment opportunities at the Lake Street and 21st Avenue commercial node, and anticipates the then-planned temporary public market at the Minneapolis Public School (MPS)-owned commercial site immediately west of the Hiawatha/Lake Station. As of 2009, MPS confirmed the anticipated temporary nature of the public market when it announced its desire to re-purpose the existing building or sell the entire site to a private development team to recover debt.

The key land use policy contribution of the Corcoran Midtown Revival Plan is an affirmation of the comprehensive plan policy encouraging higher-density mixed-use development along Lake Street.

Midtown Minneapolis Land Use and Development Plan, 2005

The Midtown Minneapolis Land Use and Development Plan provides land use policy for the Midtown Corridor between Blaisdell Avenue and 11th Avenue South. The plan adopts into City policy the re-opening of Nicollet Avenue at the Kmart site, anticipates the then-planned completion of the Midtown Greenway, and offers land use and urban design guidance that builds on the planned reconstruction of Lake Street and provision of additional ramps to and from I-35W. The plan also anticipates the possibility of transit in the Greenway trench.

The key land use policy contribution of the Midtown Minneapolis Land Use and Development Plan is support for medium- and high-density housing along the Midtown Greenway and an affirmation of the comprehensive plan policy encouraging high-density mixed-use development along Lake Street.

Midtown Greenway Land Use and Development Plan, 2007

The Midtown Greenway Land Use and Development Plan provides land use policy and development guidelines for the Midtown Corridor between the western border of Minneapolis and Hiawatha Avenue.

The plan assigns future land uses to one of three types of development intensity districts along the corridor (i.e., Transit-Oriented, Urban-Oriented, and Neighborhood Oriented) and addresses “Principles of Greenway-Supportive Development.” Based off of Transit Oriented Development (TOD) principles identified in the comprehensive plan policy, Principles of Greenway-Supportive Development relevant this study include encouraging compact and mixed-use development in existing commercial areas and the concentration of the most intensive development near future transit stations (bus or rail) and existing commercial nodes. Design guidance to promote safety, comfort, accessibility, and vibrancy in and around the Midtown Greenway is also included in these principles.

The Midtown Greenway Land Use and Development Plan adopts into policy the reestablishment of 29th Street, a parallel roadway to the Greenway, in the blocks between Emerson and Dupont Avenues and Portland and Chicago Avenues, and anticipates bus rapid transit service on I-35W. The plan also acknowledges the possibility of transit operations in the Greenway, recognizes the seven potential transit stations at the Greenway level that were previously identified in transit studies, and prioritizes right-of-way acquisition and preservation along the corridor to optimize potential future operating conditions and ridership.

Key land use policy contributions from the Midtown Greenway Land Use and Development Plan include the delineation of the three aforementioned development intensity districts, which locates the highest densities within the Transit-Oriented development districts, and an affirmation of the comprehensive plan policy for the encouragement of mixed-used and medium-high density residential development along the Midtown Corridor and Lake Street.

Uptown Small Area Plan, 2008

The Uptown Small Area Plan includes land use policy for the Midtown Corridor from immediately east of the Chain of Lakes to Bryant Avenue. In addition to maintaining the Pedestrian Oriented Overlay District in the core of Uptown, the plan provides land use policy and design guidance for six defined "character areas" for the area, which reinforce the varied urban characteristics and development patterns of Uptown. These designated character types include Activity Center, Urban Village (North and South Sub-Areas), Neighborhood, the Hennepin Avenue Commercial Corridor, the West Lake Street Live/Work area, and the South Hennepin Community Corridor.

Similar to the Midtown Greenway Land Use and Development Plan, this plan places a high priority on access to the Midtown Greenway, a community amenity and common space, and provides development guidance regarding the orientation of buildings, public promenade construction, and easements between privately-owned parcels for pedestrian access. The plan also acknowledges future opportunities for rail transit in the Greenway, advocates for future transit stations at the Greenway level, and encourages new development to provide transit station facilities.

The key land use policy contribution of the Uptown Small Area Plan is support for medium- and high-density housing along the Midtown Greenway. The plan also designates all parcels on Lake Street and Lagoon Avenue between the Hennepin Avenue/Lake Street and Lyndale Avenue/Lake Street Activity Centers as mixed-use to encourage increased housing density and street-level activity.

Lyn-Lake Small Area Plan, 2009

The Lyn-Lake Small Area Plan provides land use policy for the Midtown Corridor between Bryant Avenue South and Blaisdell Avenue. Although it was intentionally developed separately from the Uptown Small

Area Plan to capture the "character and flavor that is unique and separate" from the Uptown area, the plan incorporates adjacent land use policies identified within the Uptown Small Area Plan and the Midtown Greenway Land Use and Development Plan.

The plan also acknowledges the findings of the 2007 Minneapolis Streetcar Feasibility Study, which determined that the Midtown Greenway alignment was not considered a viable minimal operable segment within the six studied potential streetcar corridors. However, although this may preclude a future project's ability to "bolster creative funding options," private partners are continuing to pursue the project.

Significant land use policy contributions to the Midtown Corridor include the plan's support of mixed-use development along Lake Street, medium-high residential densities along Lake Street and Lagoon Avenue to the west of the Lyndale Avenue/Lake Street Activity Center, and focused mixed-use and commercial development surrounding this commercial node.

Phillips West Master Land Use Plan, 2009

The Phillips West Master Land Use Plan provides land use policy for the Midtown Corridor through Phillips West Neighborhood, which extends from I-35W to Chicago Avenue. Although they were not funded or programmed at the time of the Phillips West Master Land Use planning process, the plan acknowledges and supports future potential transportation infrastructure improvements and outlined in the I-35W Access plan at Lake Street/31st Street and 28th Street. The land use plan also acknowledges the transit stations identified in the Midtown Greenway Land Use and Development Plan. Furthermore, it identifies the land immediately adjacent to the Greenway as the "best suited to accommodate future growth because of its proximity to the Midtown Exchange Transit Station and the potential for rail transit on the Greenway."

Following existing land use plans, the Phillips West Master Land Use Plan supports the development of medium- and high-density residential uses along the Midtown Greenway, as well as mixed-use development on Lake Street. The most significant contribution to land use policy along the Greenway is the phase-out of industrial uses within the neighborhood, which is a significant change from existing conditions. Finally, to maintain low-density single family detached housing desired by the Phillips West Neighborhood, the plan also provides guidance for focusing high-density development along the Midtown Greenway.

Metropolitan Council Corridors of Opportunity Initiative, and the USDOT-HUD-EPA Partnership for Sustainable Communities

Objective: Metropolitan Council and a broad consortium of policymakers, foundations, community organizations and leaders are currently undertaking the Corridors of Opportunity Initiative to promote sustainable, vibrant and healthy communities, using the region's emerging transitway system as a development focus. This project is funded by a $5 million U.S. Department of Housing and Urban Development "Sustainable Communities" grant and $16 million in grants and loans from Living Cities, a consortium of foundations and financial institutions. The six principles of this initiative are: equity, economic competitiveness, transparency, sustainability, collaboration, and innovation. The Midtown Corridor is not one of the seven transitway corridors included in this initiative; however, the goals, outcomes, and implementation tools being developed through this initiative may be relevant to the Midtown Corridor. This effort is anticipated to continue through 2013.

In 2009, the U.S. Department of Housing and Urban Development, Department of Transportation, and the Environment Protection Agency developed the Partnership for Sustainable Communities to help communities nationwide improve access to affordable housing, increase transportation options, and lower transportation costs while protecting the environment. The Partnership coordinates federal housing, transportation, water and other infrastructure investments. The Partnership's six livability principles are: value communities and neighborhoods; coordinate policies and leverage investment; support existing communities; enhance economic competitiveness; promote equitable affordable housing; and provide more transportation choices.

Recommendations Affecting Midtown Corridor Study Area:

Corridors of Opportunity

Goals:

- Stimulate economic development
- Strengthen neighborhoods
- Engage historically under-represented communities
- Support distinctive places to live, work and play
- Provide people of all backgrounds with better access to opportunities

Desired Outcomes:

- 400–600 units of transit-accessible affordable housing (rental and owner-occupied) created or preserved.
- 100 small businesses along transit corridors receive some combination of technical assistance, façade improvement grants or new loans to support business growth.
- Public sector resources and strategies for housing, economic development, workforce training and community building strategies are better aligned and leveraged along transit corridors.

- New inter-jurisdictional and cross-sector investment frameworks will identify and secure financing for community-supported improvements while leveraging private sector investment.
- Identify, understand and institutionalize best practices in transit development to create a "new normal" for the region.

Currently the implementation tools that have been developed in the Corridors of Opportunity initiative are focused on housing, promoting access to affordable housing, location and energy efficient housing options and financing, and assessing fair housing in the Twin Cities Region. Several research projects are also in progress that will look at taking a "program of projects" approach to address barriers to simultaneous development of transit corridors, and achieving an improved transit-oriented balance of jobs and housing.

USDOT-HUD-EPA Partnership for Sustainable Communities

In 2009 these three federal agencies initiated a partnership to help improve access to affordable housing, increase transportation options, and lower transportation costs while protecting the environment in communities nationwide. The partnership is guided by the following livability principles:

- **Provide more transportation choices.** Develop safe, reliable, and economical transportation choices to decrease household transportation costs, reduce our nation's dependence on foreign oil, improve air quality, reduce greenhouse gas emissions, and promote public health.
- **Promote equitable, affordable housing.** Expand location- and energy-efficient housing choices for people of all ages, incomes, races, and ethnicities to increase mobility and lower the combined cost of housing and transportation.
- **Enhance economic competitiveness.** Improve economic competitiveness through reliable and timely access to employment centers, educational opportunities, services and other basic needs by workers, as well as expanded business access to markets.
- **Support existing communities.** Target federal funding toward existing communities—through strategies like transit oriented, mixed-use development, and land recycling—to increase community revitalization and the efficiency of public works investments and safeguard rural landscapes.
- **Coordinate and leverage federal policies and investment.** Align federal policies and funding to remove barriers to collaboration, leverage funding, and increase the accountability and effectiveness of all levels of government to plan for future growth, including making smart energy choices such as locally generated renewable energy
- **Value communities and neighborhoods.** Enhance the unique characteristics of all communities by investing in healthy, safe, and walkable neighborhoods—rural, urban, or suburban.

Alignment of future DOT, HUD, and EPA programs to meet these goals will occur in the future, as will joint research, data collection, and outreach.

Smart growth is one of the key tenets of the partnership, and many of the plan documents that study the Midtown Corridor encourage best practices in urban reinvestment. The partnership has several

toolkits for zoning, environmental justice, land use, and smart growth planning that may be of use moving forward through the project's subsequent phases.

I-35W Lake Street Transit/Access Project

Objective:

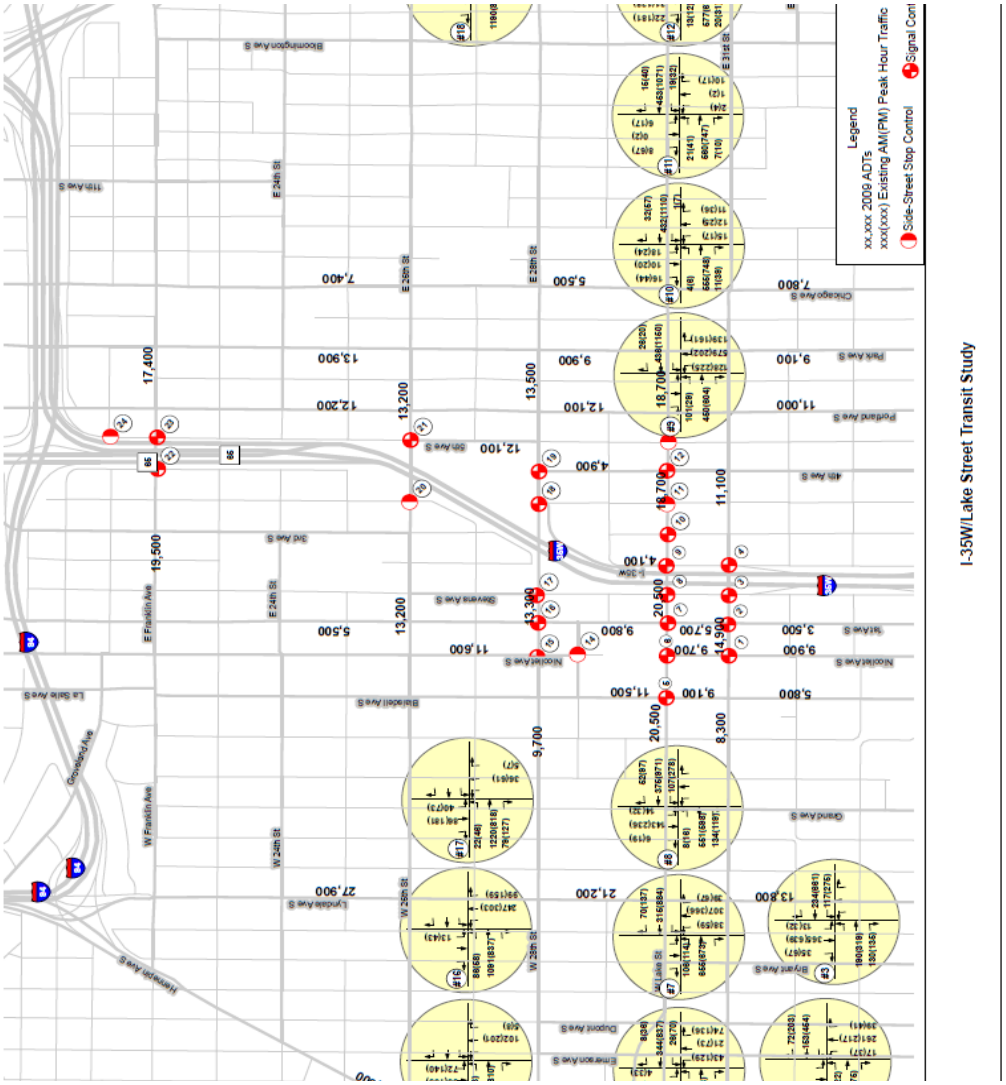
- Determine a recommended location and the preliminary design of a new BRT station in the median of I-35W with connections to/from Lake Street, the Midtown Greenway, Nicollet Avenue and I-35W.
- Complete the preliminary design of I-35W between approximately 32nd Street and I-94; including, the Lake Street/28th Street interchange, the areas to the north of the interchange, and replacement of two bridges.
- Provide guidance on streetscape features, landscaping, pedestrian facilities, and other features that create corridor continuity and neighborhood integration.
- Complete an Environmental Assessment to document any potential environmental impacts and appropriate ways to avoid, minimize and/or mitigate those impacts.

Historical Information and Context Offered: The project is underway using the assumptions that 1) Nicollet Avenue will be reconnected through the Kmart parcel, and 2) that a streetcar will someday operate in the Midtown Greenway. An objective of the project will be to maintain equitable access to all of these investments.

Recommendations Affecting Midtown Corridor Study Area:

The study identifies several projections for traffic volumes through the year 2038. Changes to the roadways, including the additions of on/off ramps to I-35W at Lake Street, could significantly affect volumes on Lake Street and north-south streets depending on the particular scenario. Below is a map of existing traffic volumes, additional projections can be found here: http://www.35lake.com/reports/Final%20I-35W%20Transit%20Access%20Forecast%20Memo%2001_13_2012.pdf

Figure 10: Current Traffic Volumes at I-35W and Lake Street (I-35W and Lake Street Transit Access Project, 2012)



The PAC for the project also made several recommendations directing improvements to pedestrian and transit access on Lake Street. Below are maps and cross sections that identify these recommendations:

Figure 11: PAC Recommended Roadway for Lake Street at I-35W (I-35W and Lake Street Transit Access Project, 2012)

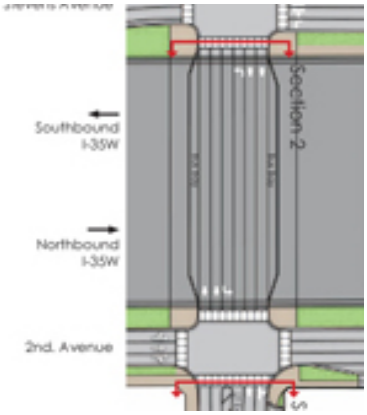
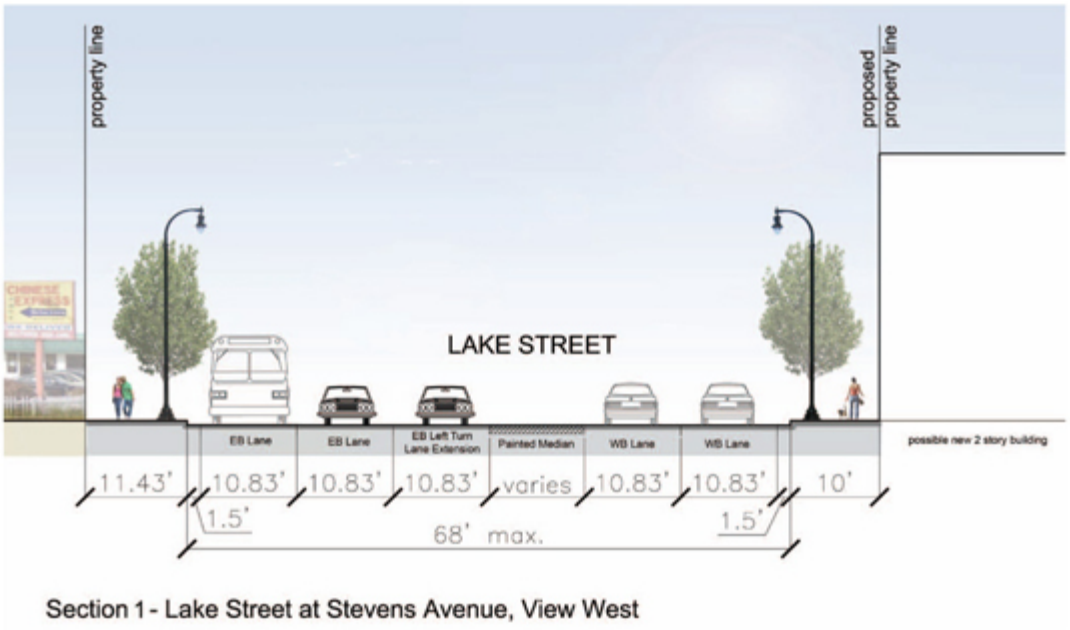
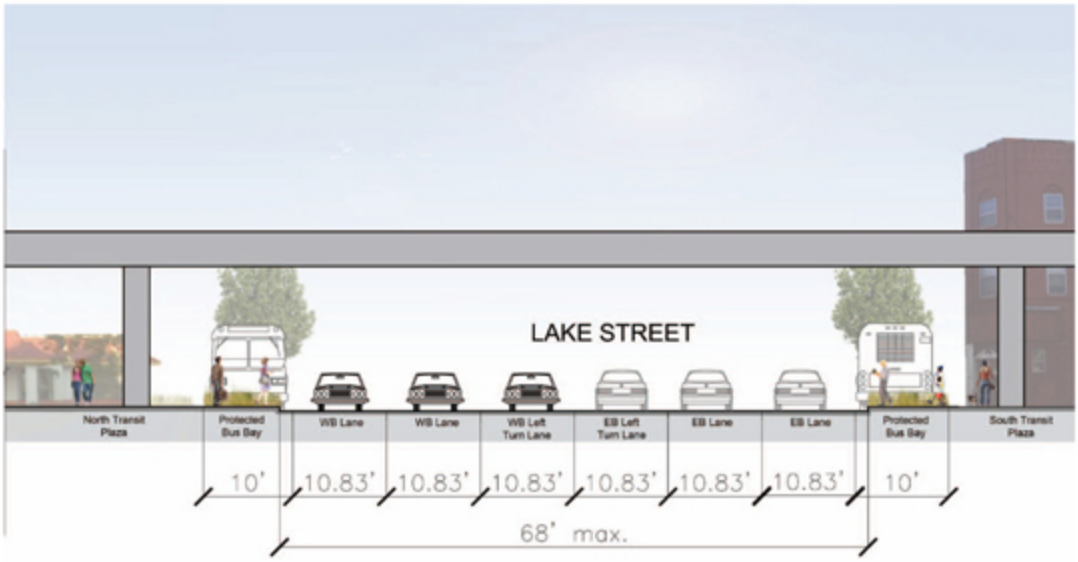


Figure 12: PAC Recommended Roadway Cross Section for Lake Street West of I-35W (I-35W and Lake Street Transit Access Project, 2012)



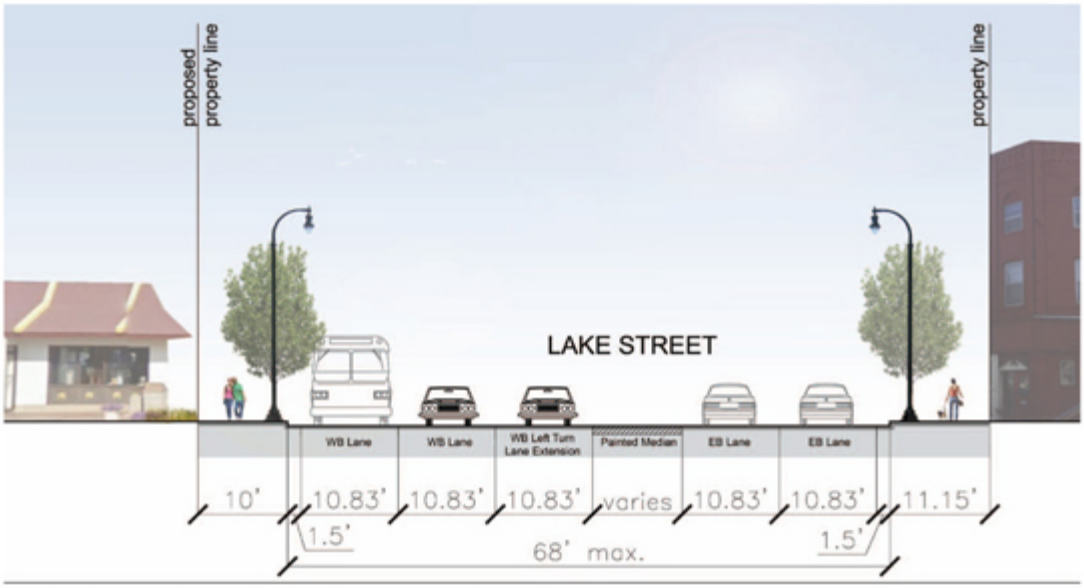
Section 1 - Lake Street at Stevens Avenue, View West

Figure 13: PAC Recommended Roadway Cross Section for Lake Street under I-35W (I-35W and Lake Street Transit Access Project, 2012)



Section 2 - Lake Street under Bridge, View East

Figure 14: PAC Recommended Roadway Cross Section for Lake Street East of I-35W (I-35W and Lake Street Transit Access Project, 2012)



Secton 3 - Lake Street at 2nd Avenue, View East

The project is also in the process of evaluating three new ramps that would offer access to/from Lake Street in I-35W: a southbound exit from I-35W to Lake Street, a northbound entrance from Lake Street to I-35W, and a northbound exit from I-35W to 28th Street. None would have a negative impact on the Midtown Greenway, however when considering the Lake Street alignment the potential of new on/off ramps area factor. Their development could mean a widening of Stevens Avenue and the presence of platform access points below I-35W on Lake Street. Additionally, the I-53W bridge that spans the Midtown Greenway will be replaced as part of this project, and its construction may impact future transit development on the corridor and the character of the Greenway. This project will be complete in mid-2013, and final recommendations will need to be tracked as part of this AA.

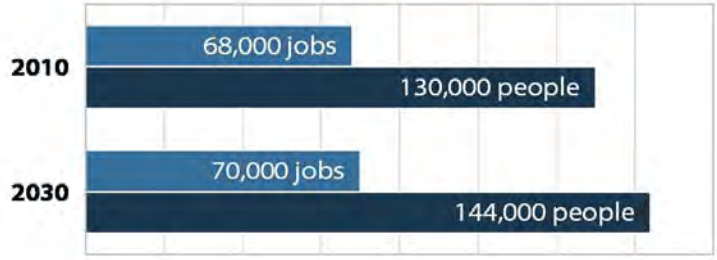
Appendix A:

Excerpts from the Metro Transit Arterial Transitway Corridor Study (ATCS), 2011

LAKE STREET EXISTING CONDITIONS

The proposed Lake Street corridor begins west of Excelsior Boulevard at the West Lake Station on the planned Green Line (Southwest) LRT extension. The corridor follows Lake Street and Marshall Avenue to Snelling Avenue, and then follows Snelling to University Avenue. Major destinations along the corridor include the Uptown commercial district, the Chicago-Lake Transit Center and Midtown Exchange, South High School, Hi-Lake Shopping Center, the Lake Street/Midtown Station on the Blue Line (Hiawatha) LRT, and the Midway Shopping Center in St. Paul.

***Population and Employment** within 1/2 mile of corridor*



(2030 forecasts based on approved local plans)

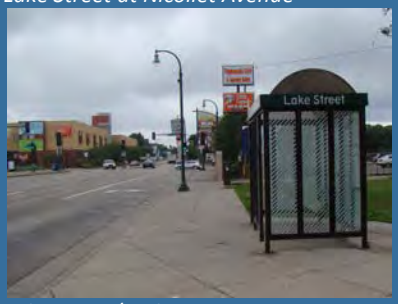
Future Land Use Changes

- Significant increases in housing density likely at West Lake and Midtown LRT stations.
- Several fairly large-scale housing development projects in planning or implementation phases along Midtown Greenway.
- Stable and successful Uptown Activity Center at Lake/Hennepin.
- Stable residential corridor on St. Paul side of river, with University of St. Thomas contributing to transit market and long-term housing densification potential.
- Redevelopment opportunity at Snelling and University, with potential for St. Paul's highest density development outside of downtown.

General Roadway Conditions

The majority of Lake Street has two travel lanes per direction. On Marshall Avenue, the roadway consists of one lane per direction with striped bike lanes. Parking is allowed in much of the corridor on both sides of the river. Signalized intersections are spaced every 2-3 blocks.

Lake Street at Nicollet Avenue



Lake Street/Midtown LRT Station

Existing Transit Service

Route 21 is the primary route serving the Lake Street corridor. The route begins at the Uptown Transit Station at Lake and Hennepin and follows Lake Street/Marshall Avenue to Snelling Avenue. The route turns north to the Midway Shopping Center at Snelling and University, and then follows Selby Avenue into downtown St. Paul. Two primary route patterns operate on weekdays—one traveling the full alignment to downtown St. Paul, and one shortline ending at the University of St. Thomas.

Combined weekday frequencies are generally 6 to 10 minutes; frequencies east of Summit and Finn are generally 15 to 20 minutes. Route 21 is part of Metro Transit's Hi-Frequency Network between the Uptown Transit Station and Cretin Avenue. Saturday frequencies along the trunk portion of Route 21 are generally 6 to 10 minutes. Sunday frequencies are 6 to 15 minutes.

Key Performance Indicators (2010)	
Average Weekday In-Service Speed	10.0 mph
Average Weekday Corridor Riders (All Routes)	10,000
On-Time Performance	86.1%

In addition to Route 21, peak-only **Route 53** provides limited stop service between the Lake Street corridor and downtown St. Paul via I-94 east of Snelling Avenue. **Route 17** operates on Lake Street west of Hennepin Avenue, along with Routes 12 and 114.

EXISTING TRANSIT SYSTEM

LAKE STREET RAPID BUS CONCEPT

By the Numbers

- **8.5** miles long
- **24** proposed station locations
- **0.4 mile** on average between stations
- **31%** faster trip between Uptown and Snelling/University compared to current Route 21
- **98%** of existing customers within one stop of a station
- **4** transitway connections (Green Line LRT [2], Orange Line BRT, Blue Line LRT)
- **14 buses** needed to provide service

Concept Operating Plan

Upon implementation of Lake Street Rapid Bus, the University of St. Thomas pattern of Route 21 is replaced. Route 53 is also replaced by Rapid Bus and Green Line (Central) LRT. Route 17 is unchanged.

Conceptual Station Designs

Weekday Frequency

EXISTING SERVICE	Rush Hours	Midday	Evening	Late Night
Route 21	10	7	10	15
Route 53	20-30	--	--	--

SERVICE CONCEPT	Rush Hours	Midday	Evening	Late Night
Rapid Bus	**7.5**	**10**	**10**	**30**
Route 21	15-20	20	20	30
Route 53		*Replaced*		

Cost and Ridership

CONSTRUCTION COST (2011$)	
Total Estimated Cost to Build (Includes Vehicles)	**$42,500,000**
Cost per Mile	$5,000,000

ANNUAL OPERATING COST (2011$)	
Rapid Bus Base Service	$6,970,000
Reductions to Existing Bus Service	-$3,630,000
Net Change in Service Costs	$3,340,000
Additional Rapid Bus Costs	$1,470,000
Total Change in Costs	**$4,810,000**

WEEKDAY RIDERSHIP	
2010 Corridor Ridership	10,700
2030 Corridor Ridership ("Baseline" without Rapid Bus)	14,300
Additional Ridership From Adding Rapid Bus	+ 3,800
2030 Corridor Ridership (Rapid Bus + Background Service)	**18,100**

RAPID BUS CONCEPT

Corridor Evaluation & Readiness

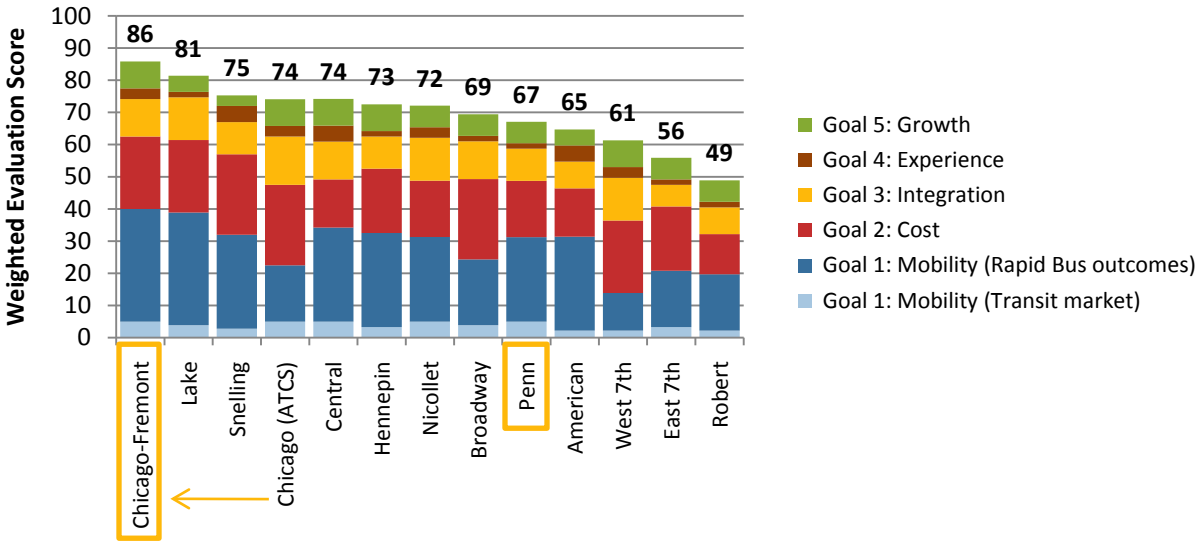
Technical Evaluation

The additional corridors were compared to previously-studied corridors using the technical evaluation scale developed for the ATCS. Technical evaluation measures were scored using a three-point scale (a minimum of one point and a maximum score of three points per evaluation measure). The chart below shows the scores for each of the measures in the technical evaluation process, with Penn and Chicago-Fremont highlighted in the rightmost columns.

Key to Symbols
● Highest performance (3 points)
⭘ Medium performance (2 points)
○ Lowest performance (1 point)

		Snelling	Lake	American	Central	Broadway	Hennepin	Nicollet	Chicago	West 7th	East 7th	Robert	Penn	Chicago-Fremont
Goal 1: Provide mobility benefits by connecting major destinations														
Transit market indicators (5% of total score)														
1-A	Jobs within ½ mile of corridor (2008)	○	○	⭘	●	●	●	●	●	⭘	⭘	⭘	●	●
1-B	Population within ½ mile of corridor (2010)	⭘	●	○	●	⭘	○	●	●	○	⭘	○	●	●
1-C	Transit-dependent persons within ½ mile of corridor	⭘	●	○	●	⭘	⭘	●	●	○	⭘	○	●	●
Rapid Bus outcomes (35% of total score)														
1-D	Percent decrease in end-to-end travel time	●	●	●	⭘	●	⭘	⭘	○	○	○	⭘	⭘	●
1-E	2030 corridor ridership (weekday)	⭘	●	○	⭘	○	●	●	⭘	○	⭘	○	⭘	●
1-F	2030 ridership over 2030 baseline	⭘	●	●	●	○	●	⭘	○	○	⭘	○	⭘	●
1-G	User benefits (annual)	●	●	●	●	⭘	⭘	⭘	⭘	○	○	⭘	●	●
Goal 2: Implement affordable transit improvements (30% of total score)														
2-A	O&M cost per annual Rapid Bus passenger	⭘	●	○	⭘	⭘	⭘	⭘	●	⭘	⭘	○	●	●
2-B	2030 Rapid Bus passengers per in-service hour (annual average)	⭘	⭘	○	○	●	⭘	⭘	●	⭘	⭘	○	○	⭘
2-C	Capital cost per corridor mile	●	○	●	⭘	⭘	○	○	⭘	●	⭘	⭘	⭘	⭘
2-D	Capital cost per annual Rapid Bus passenger	●	●	○	○	●	●	⭘	⭘	⭘	⭘	○	○	⭘
Goal 3: Seamlessly integrate with existing and planned transit systems (15% of total score)														
3-A	Percent of Rapid Bus revenue hours paid for by existing service hours	⭘	⭘	○	⭘	⭘	○	●	●	●	○	○	⭘	●
3-B	Percent of existing local bus corridor boardings proximate to proposed stations	⭘	●	○	●	●	●	●	●	●	⭘	●	⭘	⭘
3-C	Number of connections to fixed guideway transitways	⭘	●	●	⭘	⭘	⭘	⭘	●	⭘	○	○	⭘	⭘
Goal 4: Provide an enhanced customer experience (5% of total score)														
4-A	Percent of stations where concept required modification to fit	●	○	●	●	○	○	⭘	⭘	⭘	○	○	○	⭘
Goal 5: Support anticipated corridor growth and redevelopment (10% of total score)														
5-A	Forecasted change in jobs within 1/2 mile of proposed stations	○	○	⭘	⭘	⭘	⭘	⭘	●	●	⭘	⭘	⭘	●
5-B	Forecasted change in population within 1/2 mile of proposed stations	○	⭘	○	●	⭘	●	⭘	⭘	⭘	⭘	⭘	⭘	⭘

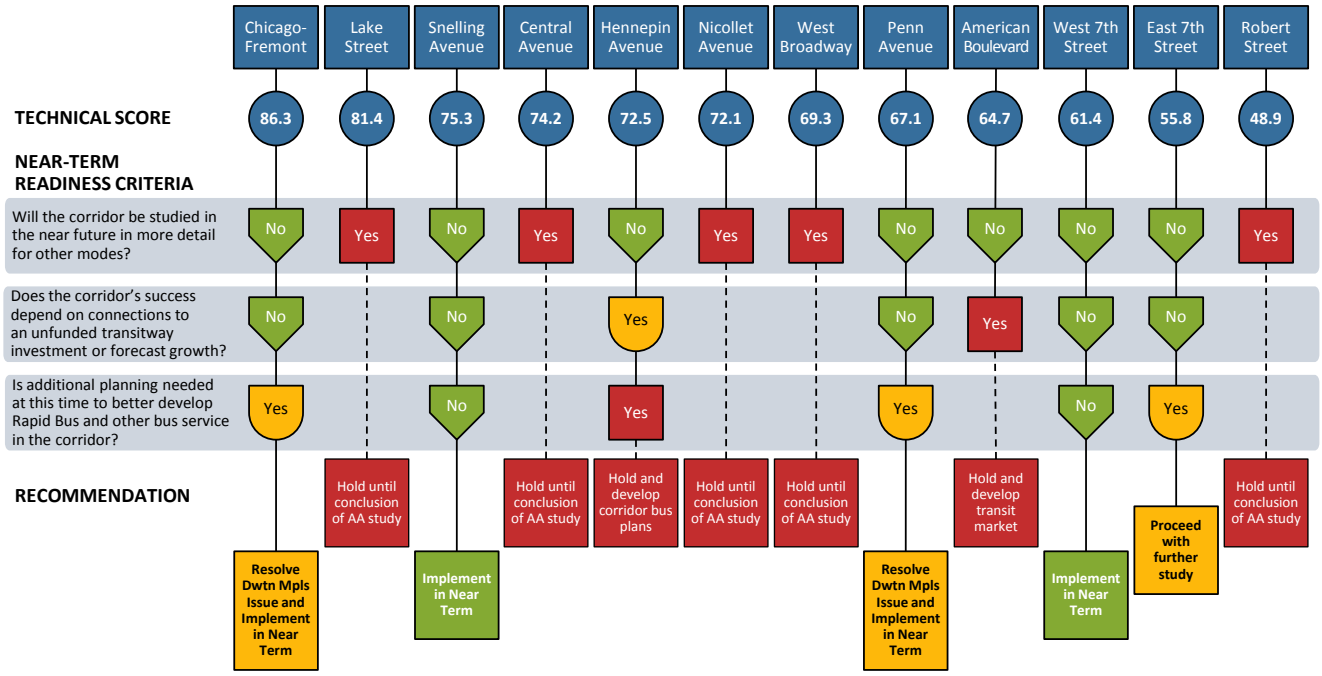
After scoring each measure on the three-point scale, measures were weighted on the same 100-point scale used in the ATCS. The figure below graphically represents the technical evaluation results.



Chicago-Fremont becomes the highest scoring corridor, with Penn Avenue scoring near the middle of the range.

Corridor Readiness

In the second screen of the ATCS evaluation process, three qualitative readiness criteria were applied to identify corridors ready for further development and near-term implementation, and those where rapid bus should not be implemented until other determinations are made. These criteria were applied to the Chicago-Fremont and Penn Avenue corridors. Other ATCS corridors were also examined to reflect additional progress since the study was completed.



Appendix B:

Minneapolis Streetcar Feasibility Study, 2007 –

Chapter 3 – Midtown Corridor

Chapter 3. Midtown Corridor

The Midtown Corridor is a part of the long-term streetcar network but it has some characteristics that set it apart from the rest of the network and required additional analysis or a different method of analysis. These differences are related primarily to the fact that the Midtown Corridor is not an existing Primary Transit Network corridor (Lake Street is the PTN alignment) and the Greenway is in a below grade abandoned railroad corridor rather than along an existing at-grade street. These factors influence ridership, ability to replace bus service, capital and operating costs.

This chapter summarizes the information developed for the corridor, including projected ridership, capital and operating costs and provides additional information about the unique conditions on this corridor.

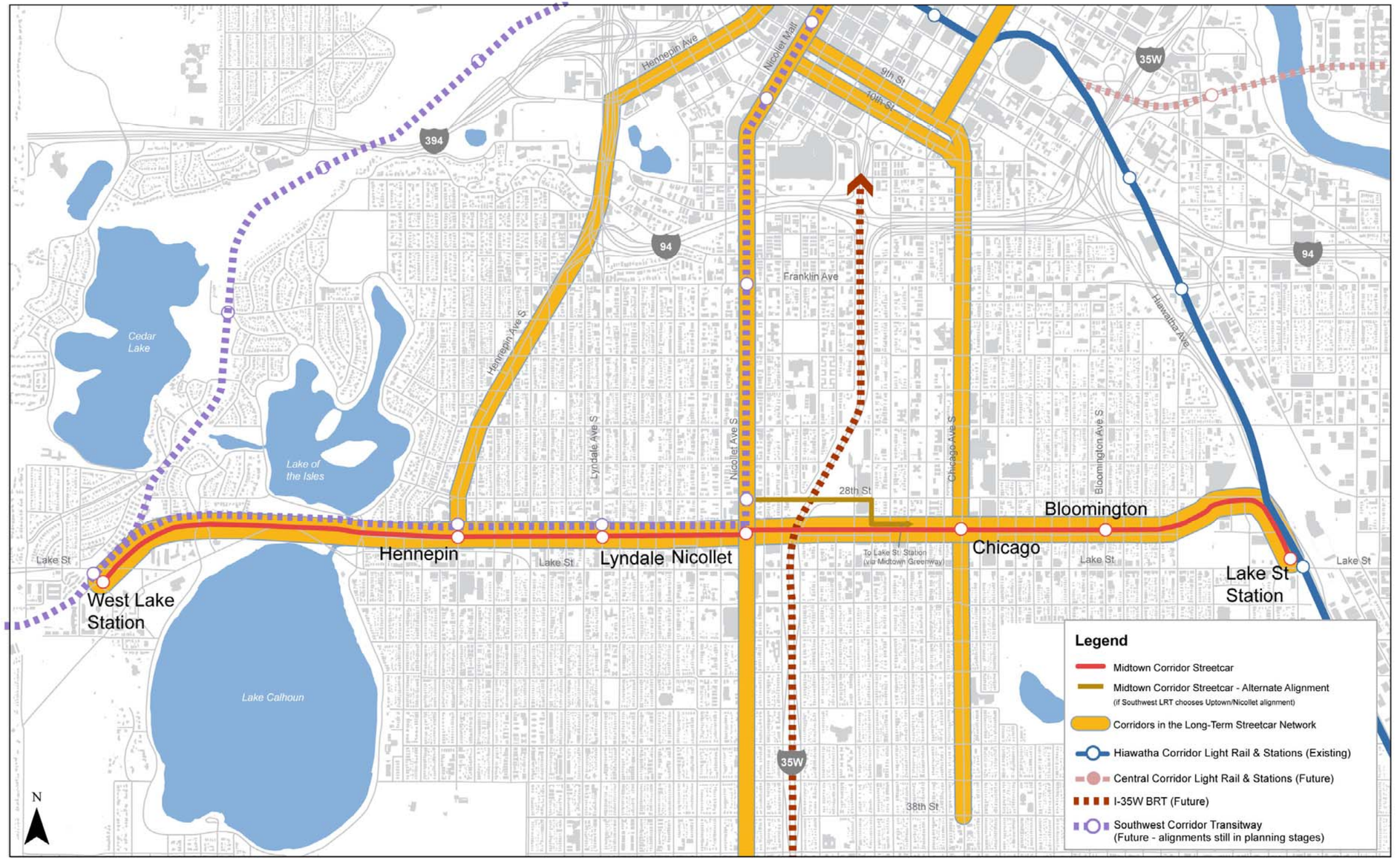
Midtown Corridor Routing

The Midtown Corridor streetcar alignment primarily serves as an extension of the SW LRT and Hiawatha LRT lines into south Minneapolis and a connection between the two lines. It would operate in the 29th Street abandoned railroad trench next to the existing Midtown Greenway multi-use trail. Streetcar service would operate from the West Lake Station (SW LRT line) to the Lake Street Station (Hiawatha LRT line). A total of seven stations are recommended along the Midtown Corridor, including the two LRT stations:

- West Lake Station (along future Southwest Corridor LRT line)
- Hennepin Avenue S (Uptown Transit Center)
- Lyndale Avenue S
- Nicollet Avenue S
- Chicago Avenue S
- Bloomington Avenue S
- Lake Street Station (along Hiawatha LRT line)

Figure 3-1 shows the alignment of streetcar lines in the Midtown Corridor, along with the proposed stations and alignments of planned and existing LRT lines. The limited number of stations (about every one-half mile) and the exclusive right-of-way will allow streetcar to operate with speeds and service characteristics very similar to LRT.

Figure 3-1 Conceptual Midtown Corridor Streetcar Alignment



Nelson|Nygaard consulting associates

The Midtown Corridor Streetcar is recommended to be implemented in a single segment, rather than in phases, because its ridership is very closely tied to the SW LRT service (see ridership section for further details). A decision on whether to proceed on the Midtown Corridor is dependent on the alignment decision in the SW LRT Draft Environmental Impact Statement, which is currently underway, because one of the SW LRT alignment alternatives uses a significant portion of the Midtown Corridor. While construction is not technically dependent on construction of the SW LRT line, ridership on the Midtown Corridor would be higher if the SW LRT line were operational prior to service in the Midtown Corridor. For purposes of comparative analysis, most of the information presented in this chapter assumes that the Southwest LRT line connects to downtown Minneapolis via the Kenilworth alignment and would require a transfer to the Midtown Corridor at the proposed West Lake Station. However, this should not be interpreted as a recommendation for or against the Kenilworth alignment.

Operating Plan

The operating plan for streetcar service in the Midtown Corridor is based on several key variables:

- **Length of the corridor.** This is the round trip distance of the line in miles. The round-trip distance of the corridor is approximately 8.8 miles (4.4 miles each direction).
- **Travel speed.** With exclusive ROW, service in the Midtown Corridor was estimated at a consistent 18 mph throughout the day. This includes a 20 second dwell time at each station. This is consistent with travel times on the Hiawatha and Southwest LRT lines, and is faster than streetcars operating in mixed traffic.
- **Layover requirements.** Assuming Metro Transit would be the streetcar operator, layover time for streetcars is the same as for buses, or a minimum of 15% of the total round-trip running time.
- **Frequency of service.** Streetcar headways in the Midtown Corridor should provide meaningful connections between the Hiawatha and Southwest LRT lines. Currently, the headway on the Hiawatha line is every 7-8 minutes during peak periods, 10 minutes during the midday and every 15 minutes in the evening. It is assumed that the Southwest Corridor LRT line will have similar headways. The frequency of streetcar service in the Midtown Corridor is assumed to be the same as LRT.
- **Hours and days of service.** Total hours of service for the long-term network mimic that of the LRT service, or approximately 23 hours per day on weekdays and 21 hours per day on weekends. Streetcar service is assumed to operate 255 weekdays, 52 Saturdays and 58 Sundays and holidays annually.

Based on these variables, Figure 3-2 estimates the total number of vehicles required to operate streetcar service in the Midtown Corridor for weekdays, Saturdays and Sundays, as

well as an estimate of daily revenue hours, annual revenue hours and annual operating cost[1].

Figure 3-2 Estimated Revenue Hours and Operating Costs

	Peak Vehicles	Daily Rev. Hours	Annual Rev. Hours	Annual Op. Cost
Weekday	5	79	20,145	$3,016,714
Saturday	4	73	3,796	$568,451
Sunday	4	73	4,234	$634,042
Total		225	28,175	$4,219,206

Single- Versus Double-Track Operation

It is assumed that streetcar service in the Midtown Corridor would have a single-track along the entire corridor with sections of double-track where necessary for passing. This alignment will provide adequate capacity to match peak period LRT headways as currently planned.

When considering single-track versus double-track construction, it is important to note that only full double-track construction provides total operational flexibility – e.g., the ability to change streetcar headways with maximum flexibility. While the current plan will allow for frequent operations, and will allow streetcars to run at the same frequencies proposed for light rail during peak periods, headways may not be able to be changed easily, as the location of double-track segments is entirely dependent on the frequency of service. For example, streetcar service operating every 7-1/2 minutes in each direction would require three separate sections of double-track to allow vehicles to pass each other along the line. Because it is exactly half the amount of service, 15 minute headways can utilize the same sections of double-track. However, service every 10 minutes would require three sections of double-track but in different locations then the other frequencies require. In order to operate a service that mimics light rail frequencies throughout the day, between 6 and 8 short sections of double-track would be required along the corridor. The sections of double-track would need to be located between bridges and strategically placed to ensure an efficient, reliable and safe operation. It is assumed that, regardless of the headway, double-track sections are required at the West Lake and Lake Street/Hiawatha stations.

The decision to utilize the proposed alignment rather than a full double-track operation is not based strictly on a desire to reduce capital costs, although clearly, building less track will reduce costs significantly. Currently, there are 37 bridges that span the Midtown Corridor, all of which vary in the year they were built, the location of bridge supports and

[1] Operating cost per revenue hour is estimated at $149.75. This estimate is less than Metro Transit's operating cost per revenue hour for light rail service (approx. $167/rev. hour), but more than Metro Transit's operating cost per revenue hour for bus (approx. $99.00/rev. hour). Based on experience in other streetcar cities, operating cost per revenue hour is typically higher than bus but less than light rail.

the distance between bridge supports. Several of these bridges would not accommodate a double-track right of way along side the bicycle and walking path. Although capital cost estimates for constructing double-track along the entire length of the Midtown Corridor have not been developed, it is assumed for high-level planning purposes that these costs would be prohibitive and the construction would be unnecessary unless streetcar headways were changed significantly.

It should be noted that the Hennepin County Regional Railroad Authority (HCRRA), as the owner of the right-of-way will ultimately determine whether single-track operation is sufficient in this corridor. Initially, the right-of-way was acquired as a potential light rail alignment, which would have required full double-track operation. Part of the alignment is still a potential LRT alignment, and no final decision has been made on the requirements for this facility. While the alignment identified for streetcar service is physically feasible, the HCRRA will need to determine the long-term plan for this corridor.

Because a transfer will be required between the Midtown Corridor streetcar and both LRT lines, it is important to ensure that the streetcar schedule is coordinated with the LRT schedules. Because the Hiawatha LRT line is already operational, the streetcar schedules should be developed around this service first. The Southwest LRT schedules should then be developed around the streetcar's arrival and departure times at the West Lake Station.

Alternative Alignment

If the Southwest LRT connects to downtown Minneapolis via the Midtown Corridor and Nicollet Avenue S, streetcar service in the Midtown Corridor would not operate between the West Lake Station and Nicollet Avenue S. However, the connection between the Southwest LRT and Hiawatha LRT lines could still be made.

To make this connection, an alternate routing in the Midtown Corridor was developed. From the Midtown/Lake Street station, the line would travel westbound via the Midtown Corridor. At 5th Avenue S (the only at-grade crossing in the Midtown Corridor between Cedar Avenue and Hennepin Avenue), the streetcar would travel north to 28th Street, and then westbound to Nicollet Avenue S. The streetcar would return via 28th Street and 5th Avenue S to the Midtown Corridor. Because 28th Street is a one-way eastbound street, an exclusive streetcar lane would be required in the westbound direction. It is assumed that double-track would be required on 28th Street and 5th Avenue S, but that single-track with sections of double-track would be sufficient in the Midtown Corridor.

At this point in the study, a detailed operating plan has not been developed for this alternative alignment. If the Uptown to Nicollet alignment is chosen for the Southwest LRT line, however, total operating costs are estimated to be approximately 50% less than service in the entire corridor. Capital cost estimates would also be significantly lower for this alternative alignment since it is about half the length of the full corridor. Capital cost estimates for the alternative alignment are provided later in this report.

Ridership Estimates

The Southwest Transitway Alternatives Analysis Study prepared a detailed model of ridership in the Midtown Corridor for the year 2030 using the same operating assumptions as those described in the previous section. The model was run assuming the LRT 1A alignment from Eden Prairie via the Kenilworth alignment to downtown Minneapolis. The estimates were made using the Twin Cities Travel Demand Model and assumed streetcar service would have the same attributes as light rail transit. It is important to note that the ridership estimates using the 1A LRT alignment are conservative and made to understand the system-wide impacts of operating an LRT line via the Kenilworth alignment with a rail service in the Midtown Corridor that connects to the Hiawatha LRT line. The ridership estimates developed for the Midtown Corridor are very different than ridership estimates presented in the next chapter for other corridors in the long-term streetcar network.

Based on the travel demand model, approximately 3,300 weekday boardings were generated along the Midtown Corridor. The model produced several primary trip types:

- Internal trips on the Midtown Corridor (50%)
- Trips from Midtown Corridor to the southbound Southwest LRT line (25%)
- Trips from the Southwest LRT line to the Midtown Corridor (12%)2
- Trips from the Midtown Corridor to the southbound Hiawatha LRT line (8%)
- Trips from the Hiawatha LRT line to the Midtown Corridor (3%)
- Trips from the Midtown Corridor to the northbound Southwest LRT line (2%)
- Trips from the Midtown Corridor to the northbound Hiawatha LRT line (<1%)
- Trips from the Central LRT line to the Midtown Corridor (<1%)

Overall, the model suggests that about half of all boardings on the Midtown Corridor streetcar are internal – that is, approximately 1,650 daily trips originate and terminate within the corridor. Approximately 39% of all boardings are directly linked to the SW LRT line and about 11% are directly linked to the Hiawatha LRT line. The model also predicted an increase in total light rail boardings of approximately 1,000 as a result of the streetcar in the Midtown Corridor.

Ridership estimates were not developed for the alternate streetcar alignment if the Uptown to Nicollet alignment is chosen for the Southwest LRT line.

It should be noted that the Hennepin County Regional Railroad Authority is studying several light rail variations on the south end of the alignment which could produce increased light rail ridership and likely would produce more streetcar ridership than the numbers presented in this report. The linkage between higher LRT ridership resulting from

[2] Trips are primarily destined for either Uptown (Hennepin) or Lynlake (Lyndale).

alternative alignments outside of the Midtown Corridor and ridership on any proposed streetcar line has not yet been established.

Unique Physical Issues in the Midtown Corridor

This section provides an initial assessment of the unique physical issues associated with operating a streetcar in the Midtown Corridor. This section is intended for planning purposes only – a more detailed evaluation of each element identified below would be required before moving forward with implementation.

Maintenance and Storage Facility

As with any rail transit, streetcar service requires a maintenance and storage facility for the streetcar vehicles. The Phase II evaluation included an initial assessment of areas appropriate for a maintenance/storage facility and identified the east end of the corridor as the most appropriate area to explore.

The area with the greatest potential to accommodate a maintenance/storage facility along the Midtown Corridor is in the vicinity of Hiawatha Avenue and 28th Street E. Most of the land in this area is currently zoned industrial (I-1, I-2 or I-3), and it appears that several parcels are either vacant or underutilized. Access to this area would likely be via 28th Street E and require less than 1,300 feet of non-revenue track.

Although there are several other areas along the Midtown Corridor that may be conducive to a maintenance/storage facility, accessing those areas will likely be too expensive due to grade issues. There is, however, an at-grade crossing of the Midtown Corridor at 5th Avenue S which could provide access to this area (currently zoned I-1). It should be noted, however, that while industrial zoning currently exists along the corridor, the long-term vision is for more residential and commercial uses, which is not entirely compatible with a maintenance/storage facility.

The existing LRT maintenance facility located near Hiawatha Avenue and Franklin Avenue is not expected to be available for routine streetcar maintenance and storage because the facility will be at capacity when vehicles are acquired for the Central LRT. However, major maintenance work on streetcar vehicles could be conducted at this facility by moving the streetcar vehicles to this location by truck. This is currently done in Portland where the main TriMet light rail maintenance facility is used for all major mechanical work on the streetcars.

Another possible location for a maintenance/storage facility is the proposed Southwest Corridor LRT line, where streetcar vehicles could share space with LRT vehicles. This option would need to be discussed further with the Hennepin County Regional Railroad Authority.

Historic Bridges

The Midtown Corridor Streetcar would pass under 35 bridges, many of which are designated historic structures. The Phase I report determined that a minimum height of 14′8″ was required for streetcar operation in mixed flow traffic. Although the minimum height may be somewhat flexible because streetcars would operate in an exclusive right-of-way, this standard is assumed to be a reasonable benchmark. Based on a review of all bridges in the Midtown Corridor, none of the bridges the streetcar would pass underneath is lower than 18 feet – and many of the newer bridges have over 20 feet of vertical clearance.

While the streetcar is likely to be able to "fit" under the historic bridges, it is important to note that the width of the bridges is a major factor in deciding to build a single-track system with passing tracks rather than a full double-track system. Many of the historic bridges have spans that clearly require the rebuilding of a number of bridges to accommodate a double-track right-of-way built to full LRT standards. Right-of-way for a double-track is approximately 30-35 feet.

Power

Because the Midtown Corridor is entirely in a grade-separated, exclusive right-of-way, streetcars can achieve a higher average speed compared to streetcars operating at-grade in mixed flow traffic. The estimated average speed for streetcars in the Midtown Corridor is 18 miles per hour, which includes stops. Between stops, speeds can be higher – between 25-30 mph. Because of higher average speeds, it is assumed that overhead lines required to power streetcars in the Midtown Corridor will need to use a catenary system similar to that used for LRT. A catenary system utilizes two wires – one that is strung between supporting poles and has a natural "catenary" curve. A second wire is then held parallel to the streetcar track by a series of connecting wires and clamps. Because the second wire providing power to the streetcar is parallel to the tracks, higher speeds are possible. Catenary wire generally requires 18-19 feet of height for standard operations. Catenary wire should be hung by special support poles rather than make use of the existing bridges or other structures in the corridor. Depending on the height of each bridge, it may be necessary to install protective coverings under the bridge for safety purposes.

Vertical Circulation

Unlike other streetcar corridors, the Midtown Corridor is grade separated from the surrounding areas. Because of this, access to the line will require vertical circulation at each station. Because the Americans with Disabilities Act (ADA) requires adequate access to public transit for all transit users, the five stations between Hennepin and Bloomington will require vertical circulation. A typical station will consist of at least an elevator and a stairwell.

Embedded versus Ballasted Track

Streetcars can operate on either embedded or ballasted track. Embedded track is embedded in the roadway and is appropriate where other modes must also be able to utilize the same right-of-way, as is the case with all other streetcar corridors. Ballasted track, on the other hand, can only be utilized by rail vehicles. Figure 3-3 shows embedded track on the left and ballasted track on the right. Ultimately, the Hennepin County Regional Railroad Authority will need to determine whether ballasted track is sufficient for the Midtown Corridor operation.

Figure 3-3 Embedded versus Ballasted Track

Embedded

Ballasted

While ballasted track is less expensive than embedded track, it does have trade-offs. The primary concerns with ballasted track are that it is more difficult to cross and access across the track may need to be limited or restricted. Also, the ballast consists of loose rocks which can be "kicked up" by the vehicle or purposely thrown. Given the number of cyclists and pedestrians who would need to cross the trackway to reach the multiuse path and who will be riding alongside the streetcar, ballasted track may also be considered hazardous. It should also be noted that both Hennepin County Regional Railroad Authority and the ultimate operator of this service could have standards for rail operation that would need to be considered. The negatives associated with this type of construction may be outweighed by the potential savings and reduction of paved surface that ballasting provides. Separate capital cost estimates are provided in the next section, comparing both types of track options.

The use of turf track has also been suggested for the Midtown Corridor. However, turn track is not recommended because this type of track is not compatible with the higher operating speeds expected in this corridor, because it is susceptible to fire and this is a safety hazard for the adjacent trail users, and because it creates additional maintenance costs and maintenance problems.

At-Grade Crossings

It should be noted that there are several at-grade crossings of the Midtown Corridor where embedded track would be required. These locations include 5th Avenue S, James Avenue, Irving Avenue and Humboldt Avenue as well as 21st Avenue S near the Hiawatha LRT station.

Station Design, Safety and Lighting

All stations in the Midtown Corridor must be designed to meet appropriate ADA standards and include at a minimum a platform, shelter, benches, passenger information and vertical circulation. In addition, it is assumed that each station will be designed to maximize visibility and provide adequate lighting. Because the Midtown Corridor does not have the advantage of "eyes on the street" as do other street-running transit modes, clearly identified emergency telephones and perhaps surveillance cameras should be considered for all station platforms.

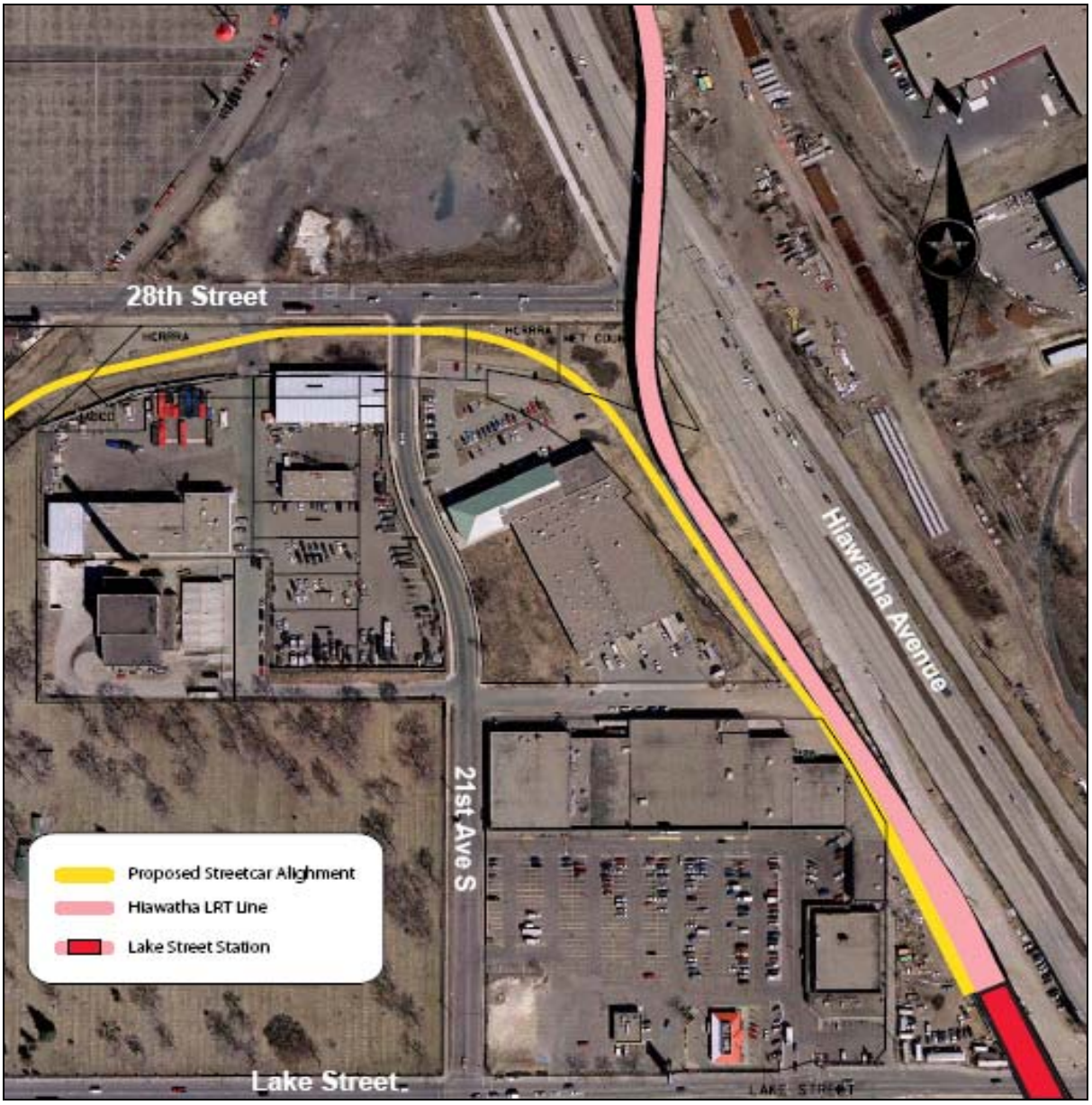
Connection to LRT Stations

Streetcar service in the Midtown Corridor is proposed to connect with the Southwest and Hiawatha LRT lines. While the streetcar stations are proposed to be as close to the LRT stations as possible, a transfer is required between the two modes.

On the west end of the line, at the West Lake Station, the Southwest LRT line and the streetcar station will both be at-grade. Although the streetcar would require a separate station, it should be located as close as possible to the LRT station to allow for seamless connections.

On the east end, the Lake Street Station is elevated and requires the use of a stairwell or elevator to access the platform. Pedestrian access between the streetcar terminal and the Lake Street Station should be reinforced to minimize the transfer time between modes. Figure 3-4 shows the proposed streetcar alignment to the Lake Street station.

Figure 3-4 Midtown Corridor Proposed Alignment at Lake & Hiawatha LRT Station



Capital Cost Estimates

This section provides order-of-magnitude capital cost estimates for streetcar service in the Midtown Corridor. The methodology used for developing these costs is consistent with the costing completed for the other long-term streetcar corridors.

Capital Costing Methodology

Initial order-of-magnitude cost estimates were developed based on component costs from other comparable projects in the same region of the country. The capital cost estimates developed for the Southwest Corridor LRT being conducted by Hennepin County Regional Railroad Authority provided local unit cost information for many of the materials required to build a streetcar. Because there are only a small number of examples of modern streetcar systems already built in North America, Portland, OR was selected as a good peer to help formulate costs appropriate to a modern streetcar system. Since cost estimates were completed in previous years, costs were inflated and adjusted to more closely match local construction costs in 2007.

All estimates presented in this report are order-of-magnitude for planning and feasibility assessment purposes only and do not represent any level of design. A preliminary design and engineering study would need to be completed to increase the accuracy of capital costs.

A number of key components drive the cost of rail streetcar in an urban environment. These include:

- **Trackwork** – as noted earlier, trackwork in the Midtown Corridor could either be embedded or ballasted, depending on local preference. Costs are provided for both embedded and ballasted track and are estimated on a per mile basis. These costs also include additional costs for switches, crossovers and other special devices/improvements.
- **Platforms** – a basic cost for platforms at each station include the base, ramps, shelter/bench, trash receptacle, static passenger information and possibly street lighting and drainage modification as needed. Other costs unique to the Midtown Corridor, such as vertical circulation to and from the platform, are included as an additional cost.
- **Catenary system, signals and substations** – this category is also referred to as the Power System. It includes costs for the catenary system itself (poles and wires), train control system for single-track sections of the alignment and the cost of required power stations. Power cost estimates were based on the Southwest Corridor study using a general figure of $2.0 million per route mile.
- **Utilities** – A utility cost estimate was derived from the Southwest Corridor study on a linear foot basis and adjusted for this report. Major public utilities (water, sewer, sanitation) are not expected to be a significant issue in the Midtown Corridor, but

"minor" costs associated with utility work is included at this level of analysis to account for potential fiber optic relocation and any additional unforeseen utility relocation issues.

- **Switch** – a standard amount per switch was used per the Southwest Corridor study. Two switches per mile were assumed where a transition from single-track to double-track was needed.
- **Construction soft-costs and taxes** – this cost estimate includes an allowance to cover unforeseen costs related to the road itself (utilities, traffic systems, street lighting, drainage, etc.) as well as any State of Minnesota taxes that may apply to construction materials.
- **Engineering and project management** – this category assumes a cost estimate of 20% for project design and engineering, and the administration of the project startup.
- **General Contingency** – a 25% general contingency was added for all other unforeseen costs to the project as a whole.

The cost estimation methodology uses these component costs to develop a generic cost per single-track mile estimate for the Midtown Corridor. Figure 3-5 shows an estimated cost per track mile for embedded track, while Figure 3-6 shows an estimated cost per track mile for ballasted track.

Figure 3-5 Streetcar per Track Mile Construction Costs (Order of Magnitude) $2007 – Embedded Track

Cost Category	Unit Cost	Quantity	Total Price
Trackwork - Embedded Track Installation	$420 / LF	5,280	$2,217,600
Catenary System, Signals and Substations	$228 / LF	5,280	$1,203,840
Switch	$18 / LF	5,280	$95,040
Utilities – Moderate Conflicts	$360 / LF	5,280	$1,900,800
Platforms	$60,000 each	avg. 5 per mile	$300,000
Construction Soft Costs and Taxes	20%	of cost	$1,143,456
Sub-Total Construction Cost	–	–	$6,860,736
Engineering and Project Management	20%	of sub-total	$1,372,147
General Contingency	25%	of sub-total	$1,715,184
Total Anticipated Construction Cost ($2007)	Per Mile		$9,948,067

Figure 3-6 Streetcar per Track Mile Construction Costs (Order of Magnitude) $2007 – Ballasted Track

Cost Category	Unit Cost	Quantity	Total Price
Trackwork – Ballasted Track Installation	$192 / LF	5,280	$1,013,760
Catenary System, Signals and Substations	$228 / LF	5,280	$1,203,840
Switch	$18 / LF	5,280	$95,040
Utilities – Minor Conflicts	$120 / LF	5,280	$633,600
Platforms	$60,000 each	avg. 5 per mile	$300,000
Construction Soft Costs and Taxes	20%	of cost	$649,248
Sub-Total Construction Cost	–	–	**$3,895,488**
Engineering and Project Management	20%	of sub-total	$779,098
General Contingency	25%	of sub-total	$973,872
Total Anticipated Construction Cost ($2007)	Per Mile		**$5,648,458**

Figure 3-4 and 3-5 Assumptions:

- All costs are for single-track miles; double-track cost is twice the amount per mile
- Cost estimates are based on Southwest Corridor LRT unit costs and adjusted where needed based on the Portland Streetcar project or Midtown Corridor estimates.
- Unit costs are based on 2003 data and inflated 5% per year to 2007 dollars. The inflation rate of 5% was used to account for recent increases in the cost of steel, concrete and other construction materials required for streetcars.

Other Costs

The following costs are not included in the standard cost per track mile calculation shown in Figure 3-5 and Figure 3-6, but do add to the total cost of the project.

- **Vehicles** – a wide range of vehicle types are available for streetcar service. This study does not presuppose a preferred vehicle type, but does assume a cost associated with modern vehicles similar to those used in Portland and Tacoma (between $2.5 and $3.0 million each). Based on the operating plan presented above, the peak vehicle requirement in the Corridor is 5 vehicles (assuming a maximum frequency of 7-1/2 minutes). At least one spare vehicle should be obtained to account for scheduled maintenance and unexpected breakdowns. A total estimated vehicle cost for the Midtown Corridor is approximately $18 million.
- **Maintenance and storage facility** – a maintenance or storage facility is a requirement of any streetcar service. Assuming streetcar service in the Midtown Corridor is operated independent of other future streetcar corridors in the city, a

maintenance and storage facility would be required as close as possible to the alignment. Maintenance and storage facility costs vary, but a small facility required to house streetcars in the Midtown Corridor is estimated at $4.0 million.

- **Right-of-way** – Because the Midtown Corridor is in an existing ROW and owned by the Hennepin County Regional Railroad Authority, property acquisition costs are not anticipated.
- **Vertical circulation** – This cost item includes vertical circulation to the platform in the Midtown Corridor, such as elevators and stairwells. These costs are assumed only for the stations in the corridor that are not at-grade (Hennepin, Lyndale, Nicollet, Chicago and Bloomington).
- **Double-track passing sections** – This cost item includes short sections of double-track required for passing. Eight sections of double-track at approximately 400' long would be required to provide varying service headways in the corridor.
- **Embedded track for at-grade crossings** – For the capital costs developed for ballasted track, several short sections of embedded track are required for the at-grade crossings along the corridor (5th Avenue S, James Avenue, Irving Avenue, Humboldt Avenue and 21st Avenue S). These costs are estimated by assuming the cost per mile for embedded track for the short sections that are required.

Rather than present costs for the corridor as a whole, the Midtown Corridor has been broken into three shorter segments. In addition, capital costs for the alternate routing via 5th Avenue S and 29th Street (to serve the 28th Street Station) have also been included. Figure 3-7 provides an estimate of costs per segment assuming the track is embedded in pavement. Figure 3-8 provides an estimate of capital costs if the track is ballasted along the entire segment.

Figure 3-7 Order of Magnitude Streetcar Capital Costs by Segment (Midtown Corridor) – Embedded Track

From	To	Track Miles	Standard Cost per Track Mile	Standard Cost	Additional Capital Items	Additional Capital Cost	Total Capital Cost (excluding vehicles and maintenance facility)[3]
Entire Corridor							
West Lake Station	Hennepin	1.4	$9,948,067	$13,927,294	1) Side Track – (3) 2) Vertical Circulation – (1)	$1,860,000 $400,000	$16,600,000
Hiawatha / Lake Station	Chicago	1.3	$9,948,067	$12,932,487	1) Side Track – (3) 2) Vertical Circulation – (2)	$1,860,000 $800,000	$15,200,000
Chicago	Hennepin	1.7	$9,948,067	$16,911,714	1) Side Track – (4) 2) Vertical Circulation – (2)	$2,480,000 $800,000	$20,200,000
Total	–	4.4	–	–	–	$10,460,000	$52,000,000
Alternate Alignment (if Southwest Corridor LRT via the Midtown Corridor / Nicollet is chosen)							
Hiawatha / Lake Station	28th St Station	4.4	$9,948,067	$43,771,495	1) Side Track – (3) 2) Vertical Circulation – (2)	$1,860,000 $800,000	$29,100,000

[3] Figures rounded to the nearest 100,000.

Figure 3-8 Order of Magnitude Streetcar Capital Costs by Segment (Midtown Corridor) – Ballasted Track

From	To	Track Miles	Standard Cost per Track Mile	Standard Cost	Additional Capital Items	Additional Capital Cost	Total Capital Cost (excluding vehicles and maintenance facility)[4]
Entire Corridor							
West Lake Station	Hennepin	1.4	$5,648,458	$7,907,841	1) Side Track – (3) 2) Vertical Circulation – (1) 3) At-Grade Embedded Track	$1,860,000 $400,000 $195,000	$10,400,000
Hiawatha / Lake Station	Chicago	1.3	$5,648,458	$7,342,995	1) Side Track – (3) 2) Vertical Circulation – (2) 3) At-Grade Embedded Track	$1,860,000 $800,000 $122,000	$10,100,000
Chicago	Hennepin	1.7	$5,648,458	$9,602,378	1) Side Track – (4) 2) Vertical Circulation – (2) 3) At-Grade Embedded Track	$2,480,000 $800,000 $65,000	$13,000,000
Total	–	4.4	–	–	–	$8,582,000	$33,500,000
Alternate Alignment (if Southwest Corridor LRT via the Midtown Corridor / Nicollet is chosen)							
Hiawatha / Lake Station	5th Ave S	1.5	$5,648,458	$8,472,686	1) Side Track – (3) 2) Vertical Circulation – (2) 3) At-Grade Embedded Track	$1,860,000 $800,000 $122,000	$10,900,000
5th Ave S[5]	28th Street Station	1.2	$9,948,067	$11,937,681	–	–	$11,900,000
Total	–	2.7	–	$25,040,716	–	$2,382,000	$22,800,000

[4] Figures rounded to the nearest 100,000.
[5] This section of track shares right-of-way with other uses and therefore must be embedded.

Other Issues

This section discusses other issues related to implementation of streetcar service in the Midtown Corridor.

Development Potential

As noted in the Phase II report, strong development potential exists along the Midtown Corridor although the intensity of development is less than is likely to occur in the downtown and near-downtown neighborhoods. While development potential is significant along the corridor itself and at major nodes, the breadth of this development potential is limited to approximately one or two blocks on either side of the corridor and the height of development to date has typically been 3-4 stories. A limited amount of higher intensity development may be acceptable in one or more of the nodes but this is an issue that is currently being debated by many of the adjacent neighborhoods. The majority of development potential in the Midtown Corridor exists in the Uptown/Lynlake area, at Nicollet Avenue S, Chicago Avenue S and at both LRT station locations.

Owner / Operator Arrangements

As the owner of the Midtown Corridor right-of-way, the Hennepin County Regional Railroad Authority (HCRRA) will play a critical role in determining policies and developing design guidelines for the corridor. No decisions have been made regarding the development, ownership and operation of streetcar lines in Minneapolis, including the Midtown Corridor. See Chapter 6 for further discussion of strategies for streetcar ownership and operation.

Staging of Construction

As mentioned earlier in this chapter, it is recommended that the Midtown Corridor be constructed as one project, rather than phased in smaller segments over time. This is recommended because the long-term projected ridership for the corridor, when fully completed, is relatively low (3,300 trips per weekday) and half of this ridership is directly linked to the SW LRT line (39%) and the Hiawatha LRT line (11%). While the construction of streetcar in the Midtown Corridor is not dependent on construction of the SW LRT, much of the ridership is. Therefore, this linkage should be considered when determining the timing of construction of the Midtown Corridor.

Finally, a *decision* on whether to construct streetcar in the Midtown Corridor should not be made until a decision is made on the alignment of the SW LRT line. If the Midtown/Nicollet alignment is the preferred alignment for LRT, then streetcar would likely not be a feasible alternative in the Midtown Corridor or in the Nicollet Corridor.