

## Addendum to the Arterial Transitway Corridors Study

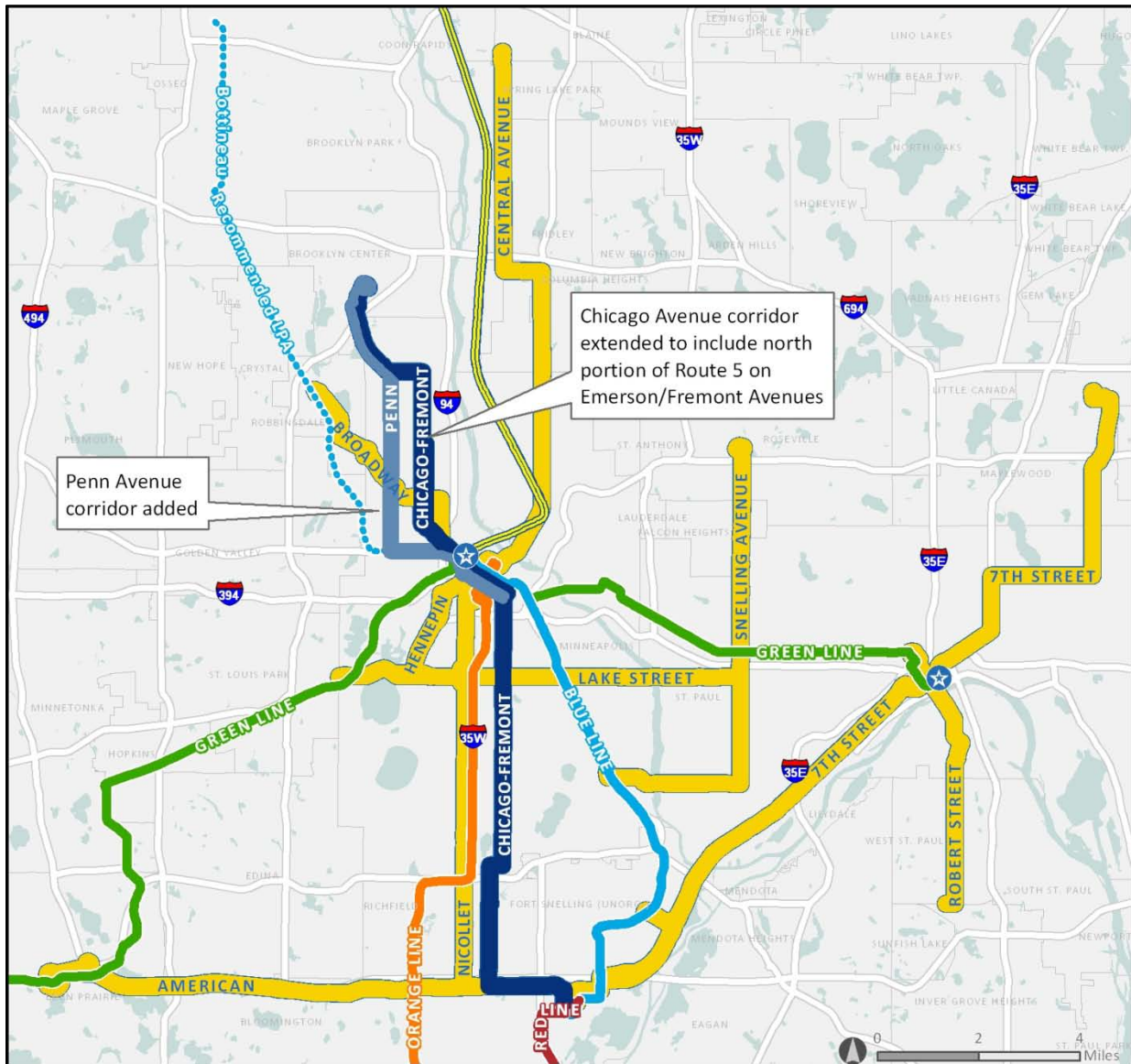
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The Arterial Transitway Corridors Study (ATCS) evaluated and prioritized arterial bus rapid transit (BRT) improvements to nine corridors identified for arterial BRT in the *2030 Transportation Policy Plan* (TPP): **Central Avenue, Snelling Avenue/Ford Parkway, West Broadway Avenue, Nicollet Avenue, Chicago Avenue, East 7th Street, Robert Street, West 7th Street, and American Boulevard**. Two other corridors not included in the TPP were also studied in the ATCS: **Lake Street** and **Hennepin Avenue**. Lake Street was added to prepare for a broader Alternatives Analysis of the Lake Street-Midtown corridor, and Hennepin Avenue was added due to high existing demand and enhanced connections to future Southwest LRT. The 11 corridors studied in the ATCS are shown on the following page.

Since the completion of the ATCS in April 2012, Metro Transit has undertaken additional study to further explore the arterial BRT concept in corridors not included in the original study. Planning efforts have focused on two corridors, shown in the figure on the following page:

- ▶ An extended version of the **Chicago Avenue** corridor, including **Emerson and Fremont Avenues** in north Minneapolis
- ▶ One new standalone corridor, **Penn Avenue**

This addendum presents the rationale for studying the additional corridors, outlines existing conditions and corridor concepts, and evaluates these corridors alongside those already studied in the ATCS.



## Why were additional corridors studied?

### Chicago-Fremont Corridor (Chicago Avenue with North Minneapolis Extension)

The Chicago-Fremont corridor, which follows the primary alignment of Route 5, runs from the Mall of America, Richfield, and south Minneapolis through downtown Minneapolis, and onto Brooklyn Center Transit Center via Emerson/Fremont avenues, 44th Avenue, and Osseo Road/Brooklyn Boulevard.

Chicago Avenue, running from downtown Minneapolis to the Mall of America, was one of highest scoring corridors evaluated in the ATCS. Despite its strong performance on technical criteria, however, the corridor was not recommended for near-term rapid bus implementation. Instead, the Chicago Avenue corridor was recommended for further study to better understand how rapid and local services could efficiently provide service over the entire length of Route 5.

ATCS results suggested that an extended Chicago-Fremont corridor could be more efficiently operated than a standalone corridor, because implementing rapid bus service on the length of Route 5 would present more opportunities to replace duplicative local bus service. In addition, current travel patterns show that a combined Chicago-Fremont corridor would offer greater customer benefits than a standalone corridor terminating in downtown Minneapolis. Stakeholders also expressed interest in studying rapid bus along Emerson and Fremont avenues.

### **Penn Avenue Corridor**

The Penn Avenue corridor, which follows the primary alignment of Route 19, runs from downtown Minneapolis to Brooklyn Center Transit Center via 7th Street, Olson Memorial Highway, Penn Avenue, and Osseo Road/Brooklyn Boulevard.

During the ATCS, the Hennepin County Regional Railroad Authority was actively studying Penn Avenue as a potential alignment alternative for the Bottineau Transitway. For this reason, the corridor was not studied for rapid bus, despite strong existing transit demand in line with other corridors studied. Since the ATCS concluded, Bottineau Transitway planning has progressed toward a locally preferred alternative (LPA) of light rail transit on an existing freight rail corridor parallel to Penn Avenue. The Bottineau Transitway would also run on Olson Memorial Highway into downtown, but would not preclude rapid bus operation along this segment; rather, the two modes could complement one another through stop locations. Because the line's LPA has not yet been adopted into the regional Transportation Policy Plan, ridership forecasting activities conducted as part of this study did not assume the benefit of connecting to a Bottineau Transitway.

With plans directing light rail outside of the Penn Avenue corridor, stakeholders have expressed interest in other improved transit options. Existing high ridership on Route 19 is commensurate with demand on other corridors studied for rapid bus in the ATCS, suggesting that the corridor warrants consideration for rapid bus investment. In addition, Hennepin County is developing a Penn Avenue Community Works project to support connectivity and mobility, safe and healthy communities, and economic opportunity and activity in the corridor. Potential synergies may exist between rapid bus and this project.

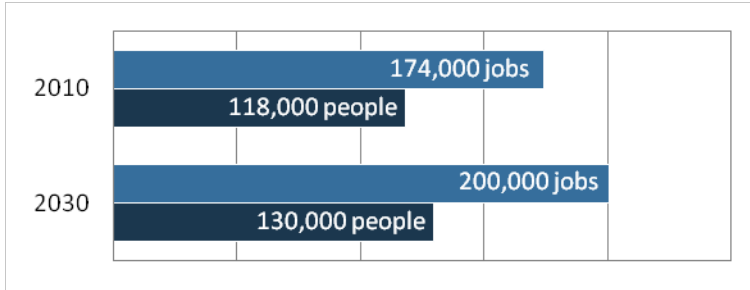
### **Existing Conditions and Concept Plans**

Details on the Penn Avenue and Chicago-Fremont corridors are presented on the following pages.

## PENN AVENUE EXISTING CONDITIONS

The proposed Penn Avenue corridor begins in downtown Minneapolis and extends through north Minneapolis and into Brooklyn Center on Olson Memorial Highway, Penn Avenue, and Brooklyn Boulevard, connecting to the Brooklyn Center Transit Center (BCTC). Major destinations along the corridor include Summit Academy OIC, NorthPoint, Henry High School, and a large retail concentration in and around the former Brookdale Center site (now Shingle Creek Crossings).

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



(2030 forecasts based on approved local plans)

### Future Land Use Changes

- ▶ Ongoing redevelopment at former Brookdale Mall site, now Shingle Creek Crossings.
- ▶ Designated Neighborhood Commercial Nodes at Penn/Plymouth, Penn/West Broadway, Penn/Lowry, and Penn/44th Avenue, according to the Penn Avenue North Redevelopment Plan, City of Minneapolis, January 2012.
- ▶ Two new facilities, a state workforce center and a north Minneapolis family services center, will be constructed somewhere on the Northside at a site to be determined, bringing improved services to area residents.

### General Roadway Conditions

Penn Avenue is generally a two-lane roadway with parking allowed in some locations. Olson Memorial Highway is a six-lane principal arterial with turn lanes in some locations. Signalized intersections are located approximately every 2-4 blocks along Penn Avenue and every 3-4 blocks on Olson Highway.



Penn Avenue at Plymouth Avenue



Olson Highway at Bryant Avenue

### Existing Transit Service

**Route 19** is the primary route serving the Penn Avenue corridor. Route 19 operates daily with a primary pattern between downtown and BCTC, with less frequent branched service to the Victory and Cleveland neighborhoods. The route generally operates every 15 minutes or better on weekdays and Saturdays, with 20-minute service during evenings and on Sundays. The portion of Route 19 south of Lowry Avenue is part of Metro Transit’s Hi-Frequency Network.

#### Key Performance Indicators (2011)

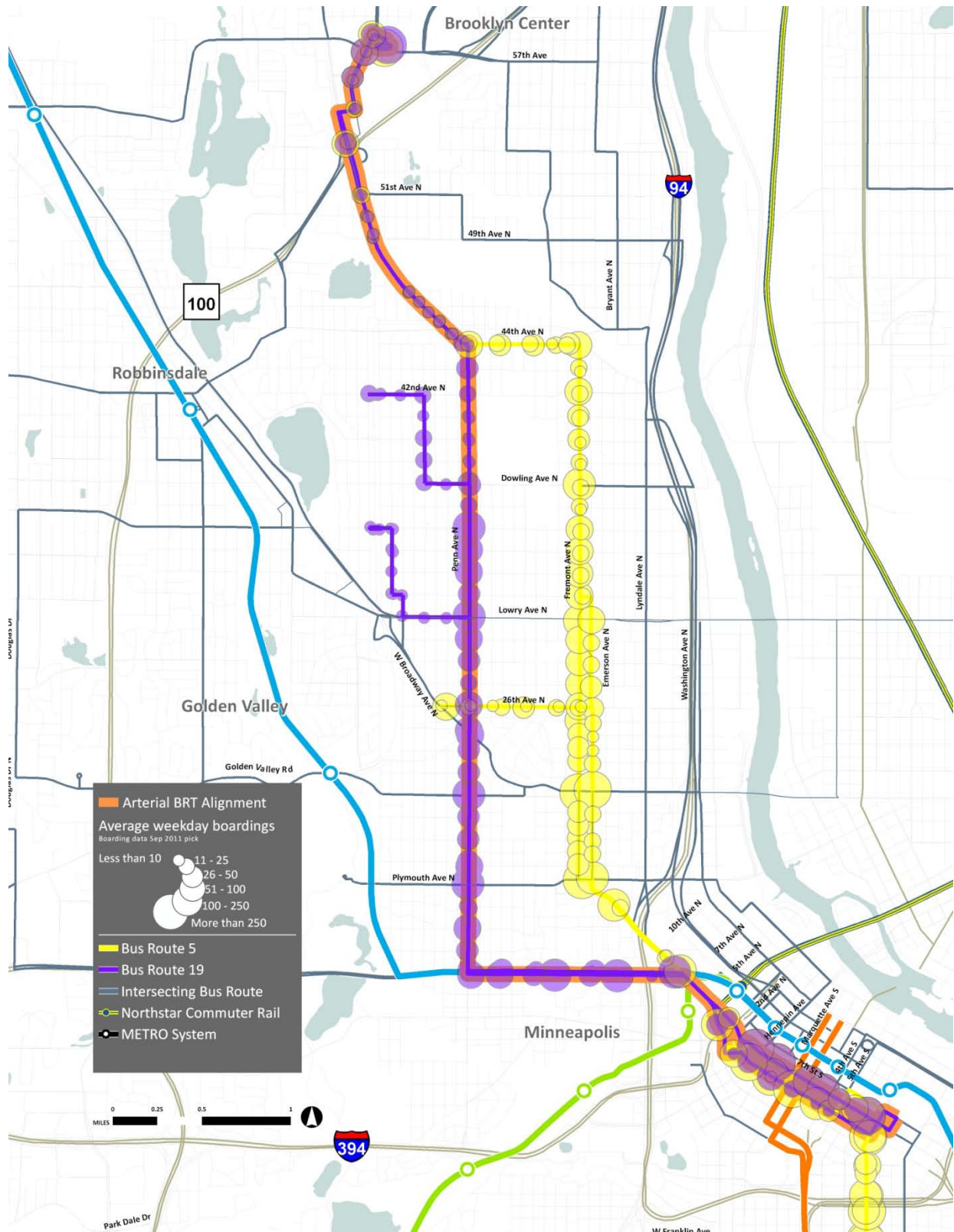
Average Weekday In-Service Speed	12.6 mph
Average Weekday Corridor Riders (Route 19)	6,200
On-Time Performance	85.2%

**Route 5** also operates on the southernmost (downtown) and northernmost (Brooklyn Center) parts of the Penn Avenue corridor. The route shares its downtown routing with the Route 19, splits off at Olson Memorial Highway/7th Street, and rejoins the corridor at 44th Avenue/Osseo Road, traveling along the corridor north to BCTC. **Route 721** and **Route 724** both serve the portion of the corridor north of 44th Avenue/Osseo Road.



# PENN AVENUE

## EXISTING TRANSIT SYSTEM



## PENN AVENUE RAPID BUS CONCEPT

### By the Numbers

- ▶ **8.4** miles long
- ▶ **21** proposed station locations
- ▶ **0.3 mile** on average between stations
- ▶ **20%** faster trip between downtown and Brooklyn Center Transit Center versus current Route 19
- ▶ **96%** of existing customers within one stop of a station
- ▶ **3** transitway connections (Green Line LRT, Orange Line BRT, and Blue Line LRT)
- ▶ **9 buses** needed to provide service

### Concept Operating Plan

Upon implementation of Penn Avenue Rapid Bus, the local service frequency on Route 19 is reduced to 30 minutes for most of the day. Most Route 19 service is rerouted to connect to Robbinsdale Transit Center, to connect to the planned Blue Line (Bottineau) LRT Extension. Route 5 continues to provide service to BCTC.

### Weekday Frequency

EXISTING SERVICE	Rush Hours	Midday	Evening	Late Night
Route 19	12	15	15	30

SERVICE CONCEPT	Rush Hours	Midday	Evening	Late Night
<b>Rapid Bus</b>	<b>10</b>	<b>10</b>	<b>15</b>	<b>30</b>
Route 19	30	30	30	60

### Conceptual Station Designs



Representative images: Marshall Avenue (St. Paul); Central Avenue (Mpls)

### Cost and Ridership

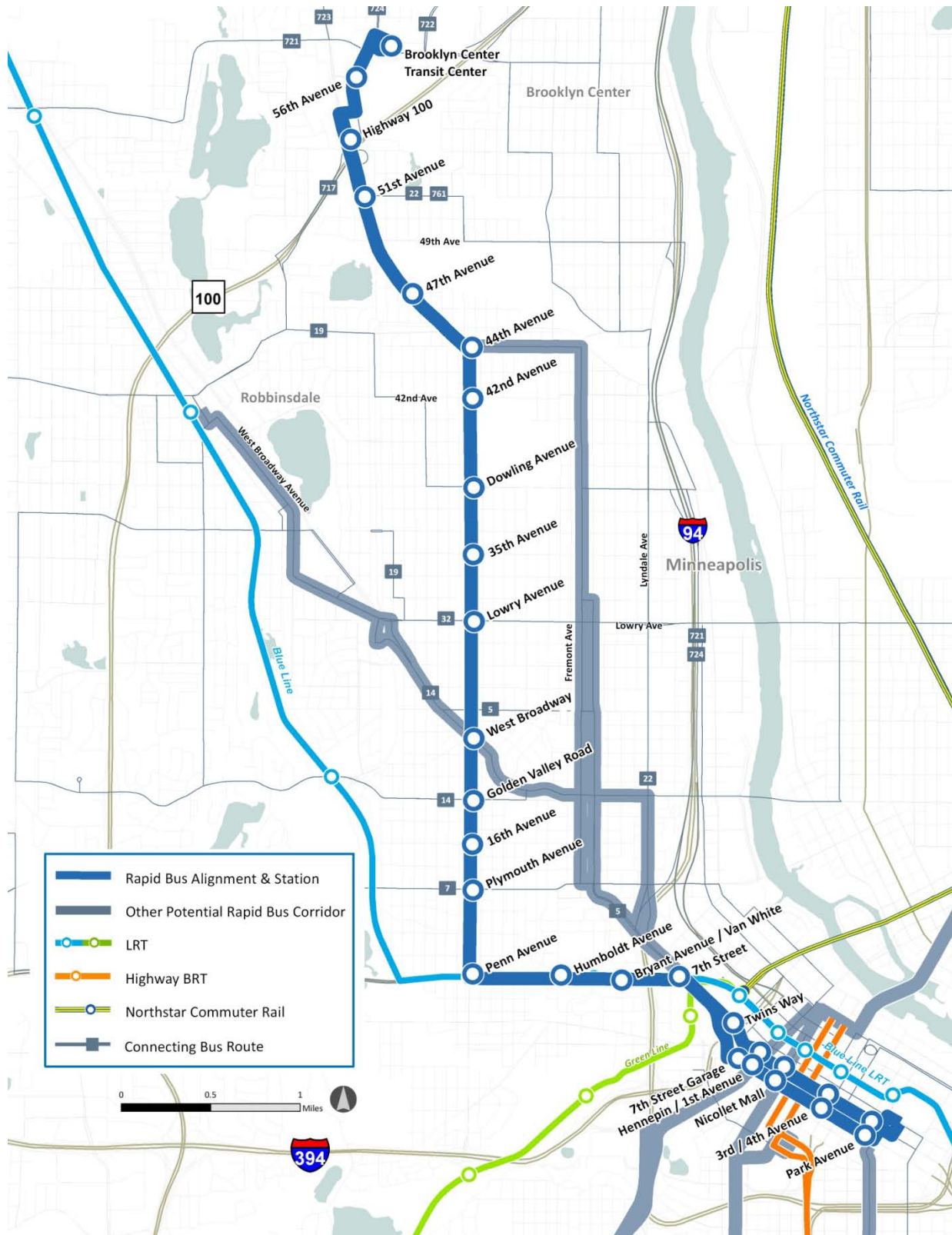
CONSTRUCTION COST (2011\$)	
Total Estimated Cost to Build (Includes Vehicles)	<b>\$32,000,000</b>
Cost per Mile	\$3,800,000

ANNUAL OPERATING COST (2011\$)	
Rapid Bus Base Service	\$5,300,000
Reductions to Existing Bus Service	-\$2,400,000
Net Change in Service Costs	\$3,000,000
Additional Rapid Bus Costs	\$1,200,000
<b>Total Change in Costs</b>	<b>\$4,200,000</b>

WEEKDAY RIDERSHIP	
2010 Corridor Ridership	5,400
2030 Corridor Ridership ("Baseline" without Rapid Bus)	6,500
Additional Ridership From Adding Rapid Bus	+ 2,800
<b>2030 Corridor Ridership (Rapid Bus + Background Service)</b>	<b>9,300</b>

# PENN AVENUE

## RAPID BUS CONCEPT



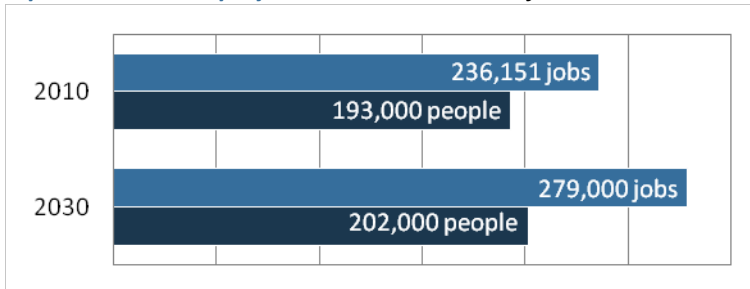
- Rapid Bus Alignment & Station
- Other Potential Rapid Bus Corridor
- LRT
- Highway BRT
- Northstar Commuter Rail
- Connecting Bus Route



## CHICAGO-FREMONT EXISTING CONDITIONS

The proposed Chicago-Fremont corridor begins at the Brooklyn Center Transit Center, follows Osseo Road, 44th Avenue, Fremont-Emerson Avenues, and 7th Street into downtown Minneapolis, then extends to the Mall of America via Chicago and Portland Avenues, and American Boulevard. The alignment serves destinations including the Shingle Creek Crossings (Brookdale Center) shopping area, medium-density residential neighborhoods, North and Henry high schools, the Midtown hospital/employment center, and the Mall of America.

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



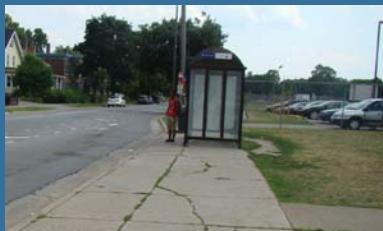
(2030 forecasts based on approved local plans)

### Future Land Use Changes

- ▶ Construction of the new Minneapolis Public Schools headquarters at West Broadway and Girard will increase the density of jobs in the corridor.
- ▶ Two new facilities, a state workforce center and a north Minneapolis family services center, will be constructed somewhere on the Northside at a site to be determined, bringing improved services to area residents.

### General Roadway Conditions

The Chicago-Fremont corridor has either one or two travel lanes per direction. Parking is allowed on most of the corridor. There is a bike lane on 7th Street in downtown. Signalized intersections are spaced every 3-4 blocks with closer spacing in downtown.



Fremont Avenue at West Broadway



Chicago Avenue at 38th Street

### Existing Transit Service

**Route 5** is the primary route serving the Chicago-Fremont corridor. Route 5 begins northwest of downtown Minneapolis at the Brooklyn Center Transit Center and travels through downtown Minneapolis and south on Chicago Avenue, ending at the Mall of America. There are two primary overlapping route patterns, with roughly half of trips traveling between BCTC and south Minneapolis, and half of trips travel between north Minneapolis and the Mall of America. The result is higher service frequencies along the trunk portion of the route between Fremont Avenue/West Broadway and 38th Street/Chicago Avenue, and lower frequencies north and south of the trunk.

Weekday service frequencies on the trunk portion of the route in Minneapolis are generally 5-10 minutes in the peak periods, 7-8 minutes in the midday, and 15 minutes in the evening. Saturday and Sunday frequencies are generally 10-15 minutes during the day, with lower frequencies into the evening and night.

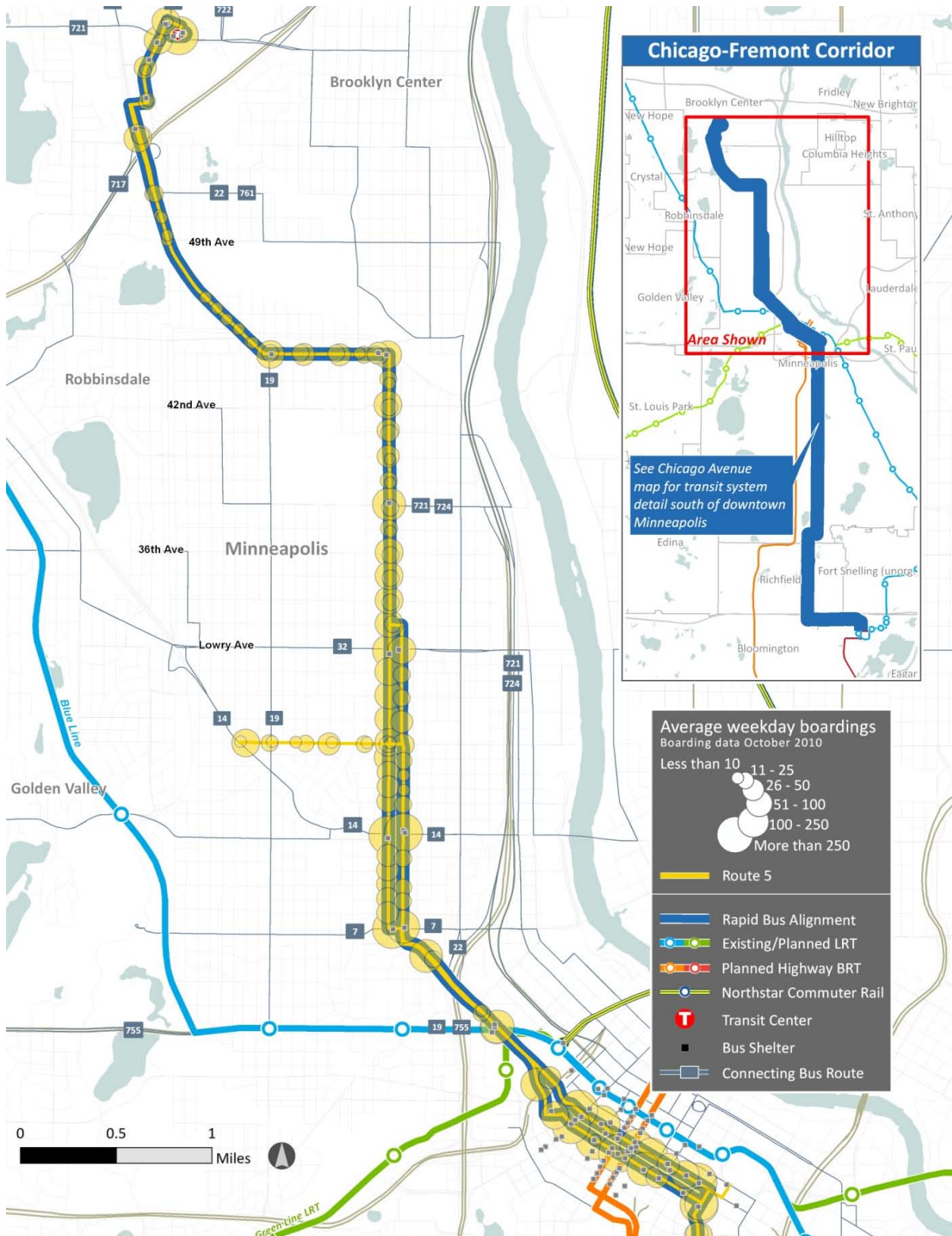
#### Key Performance Indicators (2011)

Average Weekday In-Service Speed (Route 5)	12.1 mph
Average Weekday Corridor Riders	18,000
On-Time Performance (Route 5)	81.6%



# CHICAGO-FREMONT

## EXISTING TRANSIT SYSTEM



## CHICAGO-FREMONT RAPID BUS CONCEPT

### By the Numbers

- ▶ **18.5** miles long
- ▶ **48** proposed station locations
- ▶ **0.4 mile** on average between stations
- ▶ **22%** faster trip between MOA and Brooklyn Center Transit Center versus current Route 5
- ▶ **93%** of existing customers within one stop of a station
- ▶ **5** transitway connections (Green Line, Blue Line (2), Orange Line, Red Line)
- ▶ **21 buses** needed to provide service

### Concept Operating Plan

Upon implementation of Chicago-Fremont Rapid Bus, Rapid Bus becomes the primary route serving the corridor, running from BCTC to MOA with an additional shortline between BCTC and 56th Street. Route 5's many patterns and termini are consolidated into a single pattern running from BCTC to 66th Street.

### Weekday Frequency

EXISTING SERVICE	Rush Hours	Midday	Evening	Late Night
Route 5 (trunk)	7-8	10-15	15	30-60

SERVICE CONCEPT	Rush Hours	Midday	Evening	Late Night
<b>Rapid Bus (trunk)</b>	<b>7.5</b>	<b>7.5</b>	<b>7.5</b>	<b>30</b>
Route 5	30	30	30	30

### Conceptual Station Designs



### Cost and Ridership

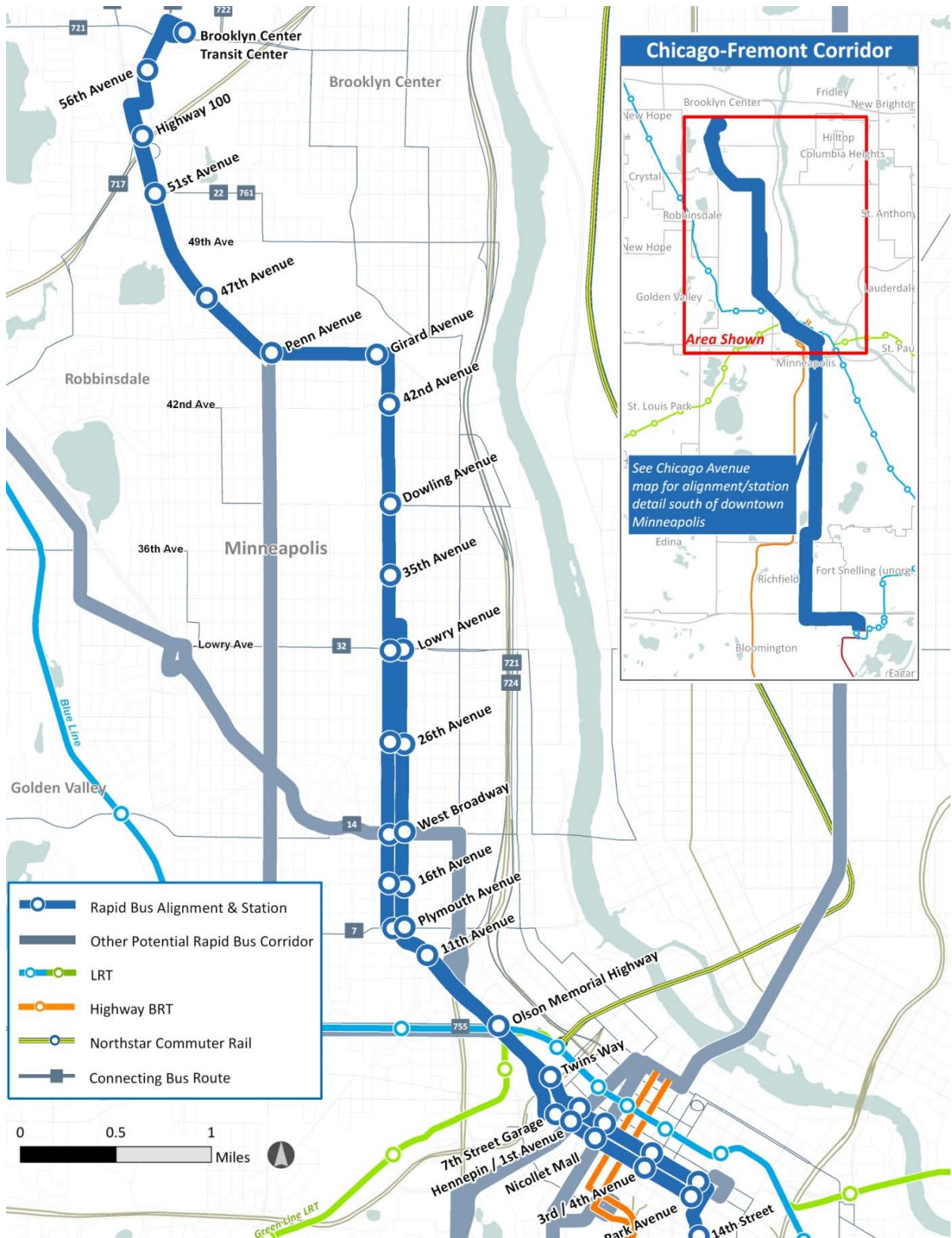
CONSTRUCTION COST (2011\$)	
Total Estimated Cost to Build (Includes Vehicles)	\$68,000,000
Cost per Mile	\$3,700,000

ANNUAL OPERATING COST (2011\$)	
Rapid Bus Base Service	\$12,200,000
Reductions to Existing Bus Service	-\$7,200,000
Net Change in Service Costs	\$5,000,000
Additional Rapid Bus Costs	\$2,600,000
<b>Total Change in Costs</b>	<b>\$7,600,000</b>

WEEKDAY RIDERSHIP	
2010 Corridor Ridership	15,600
2030 Corridor Ridership ("Baseline" without Rapid Bus)	18,000
Additional Ridership From Adding Rapid Bus	+ 5,600
<b>2030 Corridor Ridership (Rapid Bus + Background Service)</b>	<b>23,600</b>

# CHICAGO-FREMONT

## RAPID BUS CONCEPT





## Corridor Evaluation & Readiness

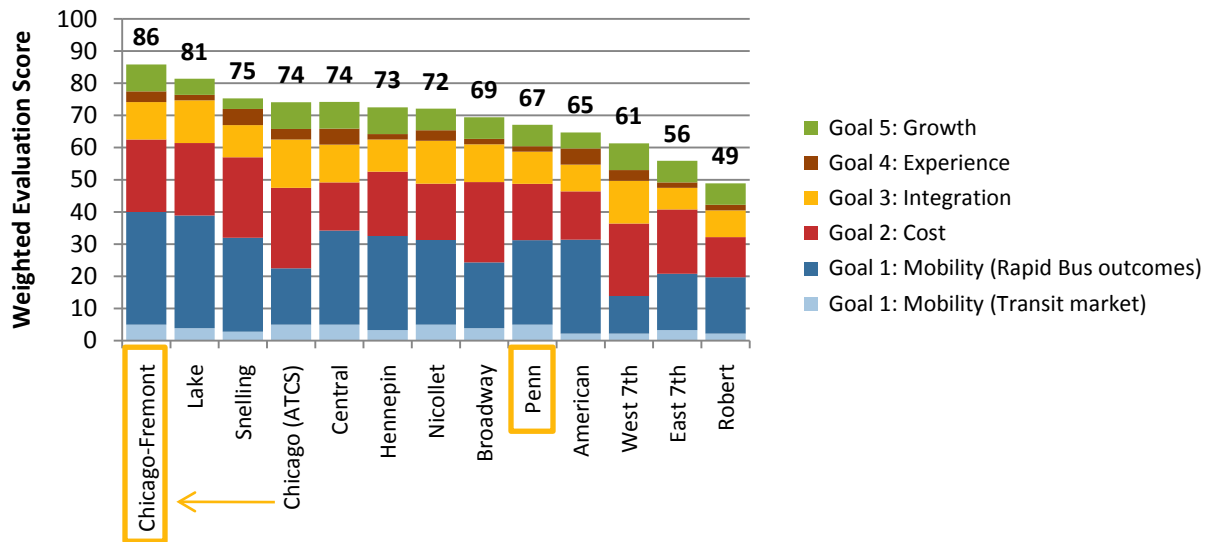
### Technical Evaluation

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.

		Snelling	Lake	American	Central	Broadway	Hennepin	Nicollet	Chicago	West 7th	East 7th	Robert	Penn	Chicago-Fremont	
<b>Key to Symbols</b>															
		●	Highest performance (3 points)												
		◐	Medium performance (2 points)												
		○	Lowest performance (1 point)												
<b>Goal 1: Provide mobility benefits by connecting major destinations (5% of total score)</b>															
<i>Transit market indicators (5% of total score)</i>															
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	○	●	○	●	○	○	●	●	○	○	○	●	●	
<i>Rapid Bus outcomes (35% of total score)</i>															
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)	●	●	●	●	○	○	○	○	○	○	○	●	●	
<b>Goal 2: Implement affordable transit improvements (30% of total score)</b>															
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	●	●	○	○	●	●	○	○	○	○	○	○	○	
<b>Goal 3: Seamlessly integrate with existing and planned transit systems (15% of total score)</b>															
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	○	●	●	○	○	○	○	●	○	○	○	○	○	
<b>Goal 4: Provide an enhanced customer experience (5% of total score)</b>															
4-A	Percent of stations where concept required modification to fit	●	○	●	●	○	○	○	○	○	○	○	○	○	
<b>Goal 5: Support anticipated corridor growth and redevelopment (10% of total score)</b>															
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	○	○	○	●	○	●	○	○	○	○	○	○	○	



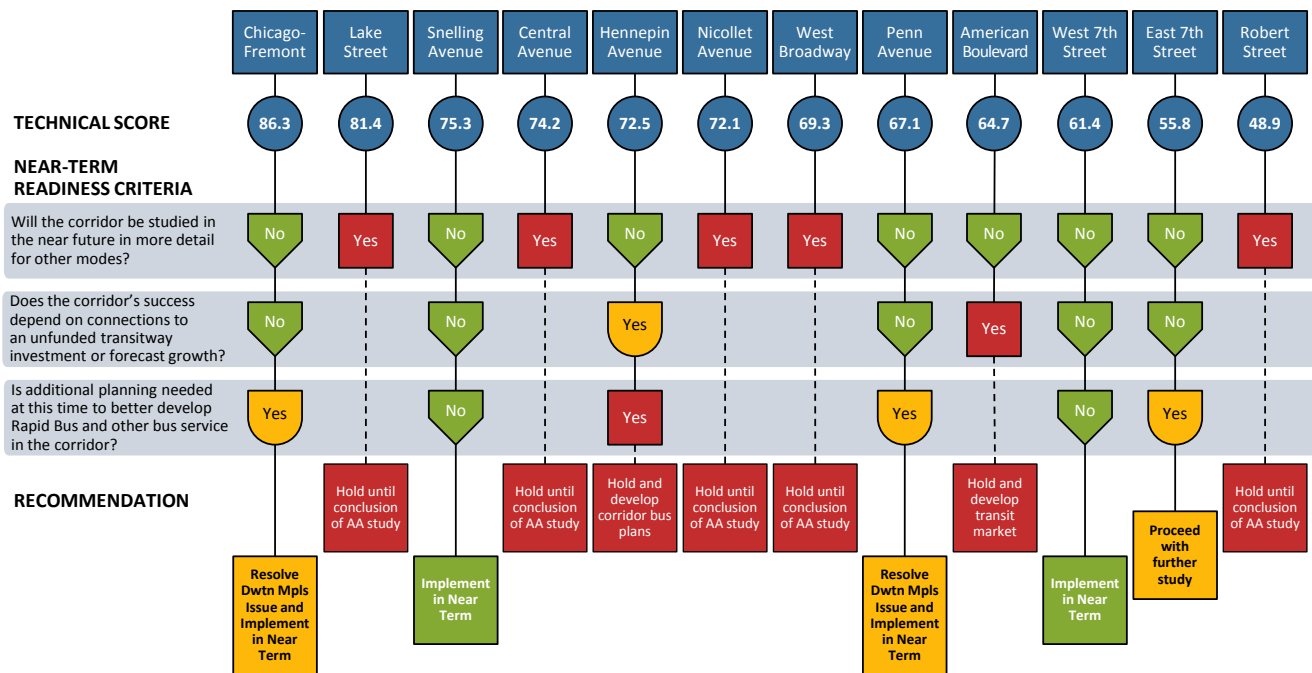
After scoring each measure on the three-point scale, measures were weighted on the same 100-point scale used in the ATCS. The figure below graphically represents the technical evaluation results.



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.



▶ **Will the corridor be studied in the near future in more detail for other modes?**

***Chicago-Fremont & Penn Avenue***

Neither Chicago-Fremont nor Penn Avenue will be studied in the near future for other modes. As identified prior to the ATCS, a portion of Chicago Avenue is part of Minneapolis' long term vision for streetcar service, but is not a near-term study or implementation priority.

***Revisions to Other Corridors***

Since the completion of the study, the City of Minneapolis has been actively pursuing funding to conduct an alternatives analysis (AA) on **West Broadway Avenue**, with interest in studying a modern streetcar alternative for the corridor. Although the future of the federal AA process is uncertain, the city has maintained a strong interest in studying rail transit alternatives along the corridor through this or another process. Therefore, rapid bus implementation or further project development on West Broadway is not recommended at this time, but the concept should be carried forward in upcoming transit mode studies.

▶ **Does the corridor's success depend on connections to an unfunded transitway investment or forecast growth?**

***Chicago-Fremont & Penn Avenue***

Neither Chicago-Fremont nor Penn Avenue's projected success is dependent on unfunded transitway connections or future growth.

***Revisions to Other Corridors***

No updates to ATCS results based on this criterion are needed at this time.

▶ **Is additional planning needed at this time to better develop rapid bus and other bus service in the corridor?**

***Chicago-Fremont & Penn Avenue***

When the ATCS was completed, the Chicago Avenue corridor was recommended for further study based on this criterion to better understand how rapid and local services could efficiently provide service over the entire length of Route 5. This has since been completed and is documented in this addendum. The results of the additional Chicago-Fremont study show an efficient concept service plan that would integrate well with local service.

As a result, neither the Chicago-Fremont nor the Penn Avenue corridor requires additional study to better understand service plans. However, the long-term location of east-west bus service in downtown Minneapolis must be resolved before these corridors can advance.

***Revisions to Other Corridors***

The **East 7th Street** corridor, which was also recommended for further study at the conclusion of the ATCS, continues to be examined as part of a streetcar study and combined West 7th-East 7th corridor planning efforts. Conceptual planning is advancing for a combined 7th Street corridor encompassing West 7th Street and a potential east side extension. East 7th Street will likely also be examined in the City of St. Paul's recently-launched streetcar feasibility study. The Ramsey County Regional Railroad Authority is also exploring portions of the East 7th Street corridor as part of the Rush Line corridor.

## **Future Considerations**

Based on these criteria, both the Chicago-Fremont and Penn Avenue corridors are ready for further corridor development, joining Snelling Avenue and West 7th Street as corridors well-positioned for near-term implementation.

While the Chicago-Fremont and Penn Avenue corridors are both candidates for further rapid bus concept development, other factors will affect timing and coordination of rapid bus implementation on these corridors.

## **Penn Community Works Project**

Hennepin County is in the beginning stages of developing a Penn Avenue Community Works project to support connectivity and mobility, safe and healthy communities, and economic opportunity and activity in the corridor. Preliminary ideas for items to be included in this project's scope relevant to the Rapid Bus project include roadway and/or intersection enhancements, streetscape, and other improvements to the avenue's public realm. As the scope for that project is defined, Metro Transit is working closely with Hennepin County to coordinate future efforts and align resources.

## **Downtown Minneapolis Transit Alignment**

Discussions continue regarding the future location of transit operations on one or more streets through downtown Minneapolis. The downtown east-west alignment remains an open question with potential to impact the Penn Avenue and Chicago-Fremont rapid corridors and their complementary local routes.

## **CMAQ Funding Awards**

In summer of 2012, Metro Transit was awarded federal CMAQ (Congestion Mitigation and Air Quality) funding through the regional solicitation process for bus purchases and three years of limited-stop operations on the Snelling Avenue, Chicago Avenue, West 7th Street, and East 7th Street corridors. All of these corridors scored highly in the ATCS evaluation, and are progressing into further project development. The Transportation Advisory Board is in the process of amending the regional Transportation Improvement Program (TIP) to include these projects in program years 2015 and/or 2016. Availability of these and other funds will be a key consideration for phasing implementation of these high-priority corridors.