



Midtown Corridor Alternatives Analysis **Ridership Forecast Methodology and Results**

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for



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Introduction

The Midtown Corridor Alternatives Analysis (AA) ridership forecasts were completed to inform decision makers about the potential ridership and travel patterns for each alternative and to provide input to other technical analyses in the AA. Ridership modeling is conducted on a regional basis; however, for the purposes of reporting ridership estimates for the project, the Midtown Corridor project area is defined as the Lake Street/Midtown Greenway corridor between the future Green Line (Southwest LRT) West Lake Station and the Blue Line (Hiawatha LRT) Midtown Station. One of the alternatives included an extension further east of the study area; consequently, additional analysis was conducted for the corridor segment between Hiawatha Avenue and Downtown Saint Paul.

Methodology

The Twin Cities Regional Travel Demand Model was used as the basis for the Midtown AA ridership forecasts. The model included the following adjustments to improve model performance in the Midtown Corridor.

- Travel Analysis Zones (TAZ) in the Midtown study area were divided. This refinement better distributes transit trips to the appropriate alignment and station locations.
- Mode choice alternative-specific modal constants developed for the Bottineau Transitway model were applied. These adjustments allow the model to better reflect the observed characteristics of rail transit on ridership as found in the 2010 regional on-board transit rider survey.
- Vertical and horizontal transfer time penalties were applied at stations where significant differences from typical transit system conditions existed (same intersection/at-grade transfers).
- The modeling included adjustments to reflect alternative-specific effects where appropriate, including characteristics such as: high frequency service, passenger amenities and off-board fare collection.

The Twin Cities Regional Travel Demand Model was validated based on updated data from the Metropolitan Council year 2010 Transit On-Board Survey, year 2010 Household Inventory Survey and Metro Transit year 2012 automated passenger counter (APC) data. Model validation was completed at a level appropriate to distinguish differences among alternatives.

Assumptions

Development

Year 2010 and year 2030 socioeconomic data were refined consistent with the Midtown TAZ structure. The 2010 population and household values are based on 2010 U.S. Census block level data. Employment allocations for 2010 are based on 2010 city-level data from the state of Minnesota, Metropolitan Council and visual inspection of aerial maps. The 2030 data is generally consistent with the allocation from comprehensive plans; however, some adjustments were made to the development allocations in consultation with the City of Minneapolis and Metropolitan Council where inconsistencies were identified between previous forecasts and existing data. The same set of assumptions was used in the Nicollet-Central Transitway Alternatives Analysis (2013).

Alternatives

The following build alternatives were analyzed, in addition to a no build alternative.

- Enhanced bus on Lake Street
- Double/single-track rail on Midtown Greenway
- Dual alignment including both the double/single-track on Greenway and enhanced bus on Lake Street

All three alternatives and the extension are defined in more detail in the *Detailed Definition of Alternatives* report. Additionally, in response to stakeholder input, an enhanced bus extension to downtown St. Paul was also studied.

No Build Alternative

The year 2030 no build alternative includes all transitways identified in the Metropolitan Council 2030 Transportation Policy Plan updated in May 2013. The no build alternative is included in the analysis as a point of comparison for build alternative results.

Light Rail

- Metro Green Line (Central Corridor)
- Metro Green Line Extension (Southwest)
- Metro Blue Line Extension (Bottineau)

Highway Bus Rapid Transit

- Metro Orange Line (I-35W BRT)

Arterial Bus Rapid Transit

- West Broadway
- Chicago-Emerson/Fremont
- Snelling Avenue
- Central Avenue
- Nicollet Avenue
- American Boulevard
- West 7th Street
- East 7th Street
- Robert Street

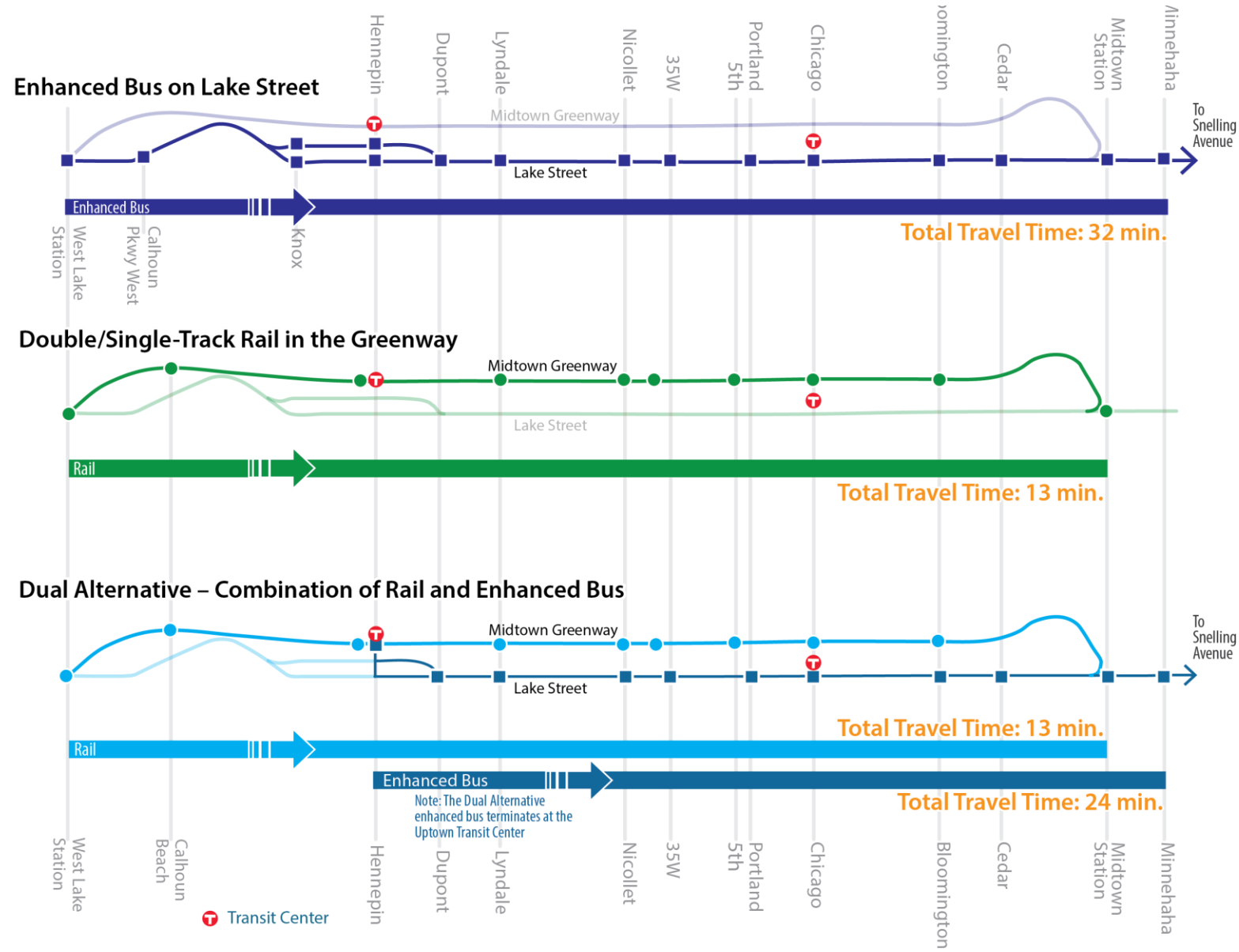
Travel Time for Build Alternatives

The one-way end-to-end travel time for each build alternative is depicted in Figure 1. Station to station travel time assumptions are provided in the *Operating and Maintenance Cost Estimates* report. It should be noted that the termini for each alternative vary slightly between alternatives; therefore, travel times in Figure 1 are not directly comparable. Table 1 provides a more direct comparison of travel times between like segments.

Table 1: Midtown Travel Times by Mode in Minutes

Mode	West Lake to Hiawatha	West Lake to Minnehaha	Uptown to Snelling
Local bus (no-build)	42	44	57
Enhanced bus	30	32	42
Rail in the Greenway	13	-	-

Figure 1: Year 2030 Travel Time Assumptions by Alternative





Service Frequency

The service frequency assumptions for the build alternatives and background busses are summarized in Table 2 through Table 4. See the *Operating and Maintenance Cost Estimates* report for additional information.

Table 2: Weekday Service - Enhanced Bus on Lake Street Alternative

Route	Early AM 4a – 5a	AM 5a – 9a	Midday 9a – 3p	PM 3p – 6p	Evening 6p – 10p	Night 10p – 1am
21A	30 min	15 min	15 min	15 min	15 min	20 min
Enhanced Bus	30 min	7.5 min	10 min	7.5 min	10 min	30 min

Table 3: Weekday Service –Double/Single-Track Rail on Greenway Alternative

Route	Early AM 4a – 5a	AM 5a – 9a	Midday 9a – 3p	PM 3p – 6p	Evening 6p – 10p	Night 10p – 1am
21A	30 min	15 min	15 min	15 min	15 min	20 min
53	-	15 min	-	-	-	-
Rail in the Greenway	30 min	10 min	10 min	10 min	15 min	30 min

Table 4: Weekday Service - Dual Alternative

Route	Early AM 4a – 5a	AM 5a – 9a	Midday 9a – 3p	PM 3p – 6p	Evening 6p – 10p	Night 10p – 1am
21A	30 min	15 min	15 min	15 min	15 min	20 min
Enhanced Bus	30 min	7.5 min	10 min	7.5 min	10 min	30 min
Rail in the Greenway	30 min	10 min	10 min	10 min	15 min	30 min



Results

Existing Corridor Ridership Summary

The two primary existing routes on Lake Street in the Midtown Corridor study area are the Route 21 and 53. Year 2010 and 2012 daily boardings by corridor segment are summarized in Table 5. This ridership summary is based on fall automated passenger count data. Currently, there are approximately 9,300 daily boardings on the Route 21 and 53 in the Midtown Corridor with most trips occurring on the Route 21.

Table 5: Existing Route Ridership

	Route	Fall 2010	Fall 2012
Within Midtown Corridor (West Lake station to Minnehaha Avenue)	21	8,750	8,910
	53	670	425
East of Midtown Corridor (Minnehaha Avenue to Downtown Saint Paul)	21	4,650	4,860
	53	480	415
Total	21	13,400	13,770
	53	1,150	840

Daily station boardings for the Route 21 are summarized in Table 6. Existing stations with the largest activity include the Uptown Transit Station, Nicollet, Chicago Transit Station and Midtown Station.

**Table 6: Existing Route 21 Ridership Statistics**

Stop	Boards	Alights
Girard Ave	197	8
Uptown TS	759	863
Freemont	1	31
Emerson	25	115
Dupont	112	41
Bryant	39	48
Lyndale	327	313
Grand	200	203
Blaisdell	326	202
Nicollet	607	568
1st Ave	416	474
I-35W West	22	143
I-35W East	46	19
3rd Ave	195	167
4th Ave	264	305
Portland	152	140
Park	195	189
Chicago TS	1,317	1,360
10th Ave	210	240
12th Ave	116	130
14th Ave	114	136
Bloomington	566	613
17th Ave	126	128
Cedar	325	329
19th Ave	23	56
21st Ave	301	333
Midtown Station	1,122	1,039
Snelling Ave South	379	331
Minnehaha Avenue	289	199
Total	8,771	8,723

Since approximately 95 percent of Midtown Corridor transit rides are made on the Route 21, it provides the best point of comparison for future analysis. Several key statistics related to existing Route 21 ridership in the Midtown Corridor were reviewed using the regional 2010 On-Board Transit Survey (Table 7). The following is a list of key observations of existing ridership in the Midtown Corridor.

- There is a high percentage of transfer trips in the Midtown Corridor on both the Route 21 (56 percent) and Route 53 (70 percent) compared to other local routes in the region.
- There is a high percentage (53 percent) of transit-reliant rides on the Route 21 in the Midtown Corridor compared to other local routes in the region. Within the Midtown Corridor, Route 53

has a lower percentage (28 percent) of transit-reliant rides however this represents a low magnitude compared to the route 21.

- There is a low percentage (29 percent) of Home Based Work trips on the Route 21 in the Midtown Corridor compared to other local routes in the region. Within the Midtown Corridor, Route 53 has a higher percentage (63 percent) of Home Based Work trips.
- There is a low percentage (11 percent) of trips both originating and destined for locations in the Midtown Corridor. Most trips have either an origin or destination outside the corridor. This is indicative of the high transfer rate in the corridor.

Table 7: Existing Route 21 and 53 Ridership Statistics

		2010 Transit Survey	
		Route 21	Route 53
Transfers	0 Transfers	44%	30%
	1 Transfers	45%	50%
	2+ Transfers	11%	20%
Transit Reliant		53%	28%
Trip Purpose	Home Based Other	20%	4%
	Home Based Recreation	9%	2%
	Home Based School	7%	14%
	Home Based Shop	6%	1%
	Home Based University	6%	2%
	Home Based Work	29%	63%
	Non Home Based	22%	14%
Transit Market	Midtown to Midtown	11%	
	Midtown East to/from Midtown East	1%	
	Midtown to/from Midtown East	6%	
	Midtown to/from Outside Corridor	57%	
	To/from Outside Corridor	25%	



Daily Ridership

Year 2030 daily ridership is summarized in two sections of Table 8.

- Midtown Corridor between West Lake station and Minnehaha Avenue
- Enhanced bus extension between Minnehaha Avenue and Downtown Saint Paul

The double/single-track rail alternative (11,000 rides per day) carries similar number of riders as the enhanced bus alternative (11,000) within the Midtown Corridor with comparable remaining levels of background ridership on the remnant Route 21 and 53 service.

The dual alternative, including both the enhanced bus and double/single-track rail alignment is forecast to have a combined daily ridership of 18,000 within the Midtown Corridor. This represents 80 percent of the 22,000 daily rides forecast on the independent enhanced bus and rail alternatives. This implies that the enhanced bus and rail alignments serve different markets.

Table 8: Year 2030 Daily Ridership Summary

	Midtown Corridor (West Lake Station to Minnehaha Avenue)				Enhanced Bus Extension (Minnehaha Ave to Downtown Saint Paul)		Corridor Total
	Background Routes (21 and 53)	Rail	Enhanced Bus	Study Area Total	Enhanced Bus Extension	Background Routes (21 and 53)	
2012 Existing	9,300	-	-	9,300	-	5,300	14,600
2030 No Build	9,600	-	-	9,600	-	8,400	18,000
2030 Enhanced Bus	1,700	-	11,000	12,700	3,000	6,800	22,500
2030 Rail in the Greenway	2,600	11,000	-	13,600	-	6,900	20,500
2030 Dual	700	9,500	8,500	18,700	8,000	5,300	32,000

Year 2030 daily transitway ridership, new transit ride and transit-reliant ride percentages are summarized in Table 9. The transitway ridership includes all boardings on the enhanced bus or double/single track rail from West Lake to Minnehaha Avenue as well as the boardings from the enhanced bus extension. A direct comparison among alternatives is difficult because the routes vary significantly in geographic coverage.

The implementation of the enhanced bus results in a minimal increase in new transit rides with most of the rides shifting from existing service on Lake Street. Alternatively, the implementation of the



double/single-track rail in the Greenway results in a more significant increase in new transit rides because it includes an area not currently well-served by transit.

The percent of year 2030 transit-reliant rides on the enhanced bus and double/single-track rail alternatives are relatively consistent with the 2010 survey of the Route 21 in the Midtown Corridor. The existing Route 53 transit-reliant percentage is lower than the alternatives; however, since existing Route 53 ridership accounts for only 5 percent of the existing Midtown Corridor rides, the alternative alignments are more similar to the Route 21.

The dual alignment serves a lower percentage but higher magnitude of transit-reliant rides compared with the enhanced bus and rail alternatives. The lower percentage of transit-reliant rides is due to the increase in geographic coverage and frequency of the enhanced bus alignment in the dual alignment alternative outside the Midtown Corridor. Transit-reliant markets in St. Paul are smaller than in the Midtown Corridor. The higher transit-reliant magnitude results from the increased ridership within the Midtown Corridor.

Table 9: Year 2030 Daily Transitway Ridership Summary

	Transitway/ Project Total (1)	New Transit Rides (2)	Transit-Reliant Rides	Percent Transit- Reliant Rides
2012 Existing	-	-	6,800	51%
2030 No Build	-	-	8,600	48%
2030 Enhanced Bus	14,000	300	8,100	58%
2030 Double/Single Track Rail	11,000	2,200	6,200	56%
2030 Dual	26,000	3,300	12,400	48%

(1) Includes double/single track rail and entire enhanced bus route both inside and outside corridor.

(2) Mode switch from auto or non-motorized based on travel demand model.



Geographic Markets

Year 2030 travel markets for double/single track rail and enhanced bus riders are summarized in Figure 2. These trip movements are illustrated in Figure 3. The following conclusions were determined from this analysis.

- Consistent with the existing analysis in Table 5, the trips both originating and destined for locations in the Midtown Corridor make up a relatively small portion of the overall travel market.
- Most of the trips on the transitways have either an origin or destination in the corridor. An example of this trip movement includes trips traveling between the Uptown Transit Center or West Lake Station to locations along future enhanced bus routes on Nicolet Avenue and Chicago Avenue.

Figure 2: Travel Market Illustration

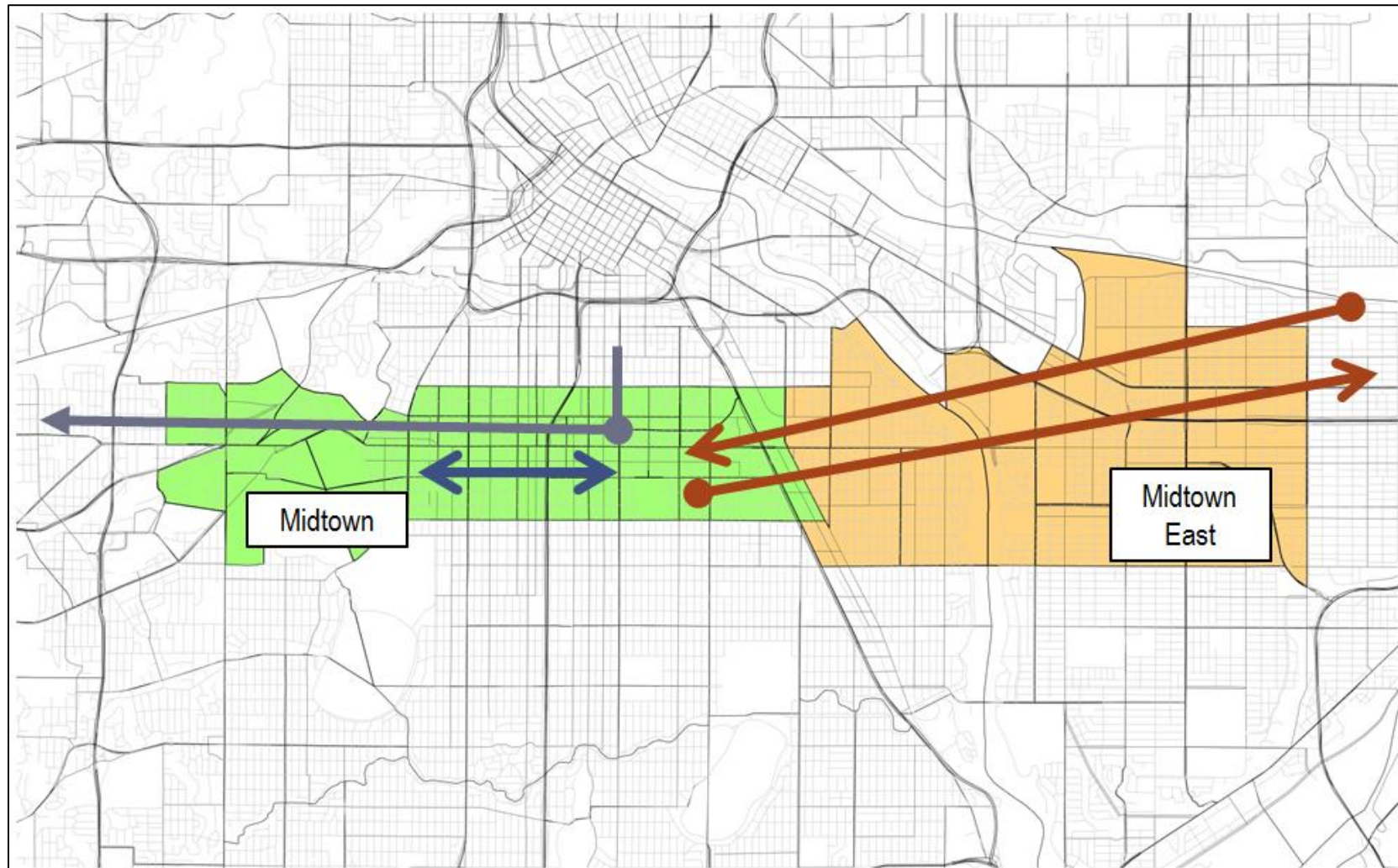
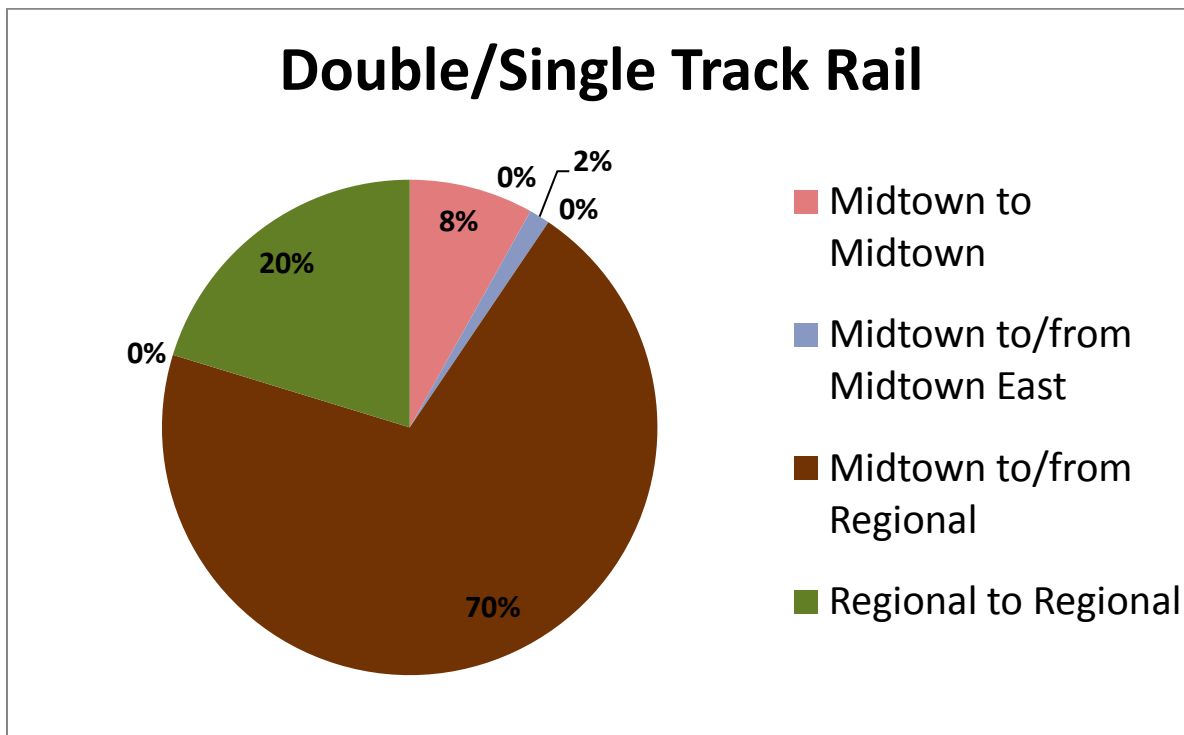
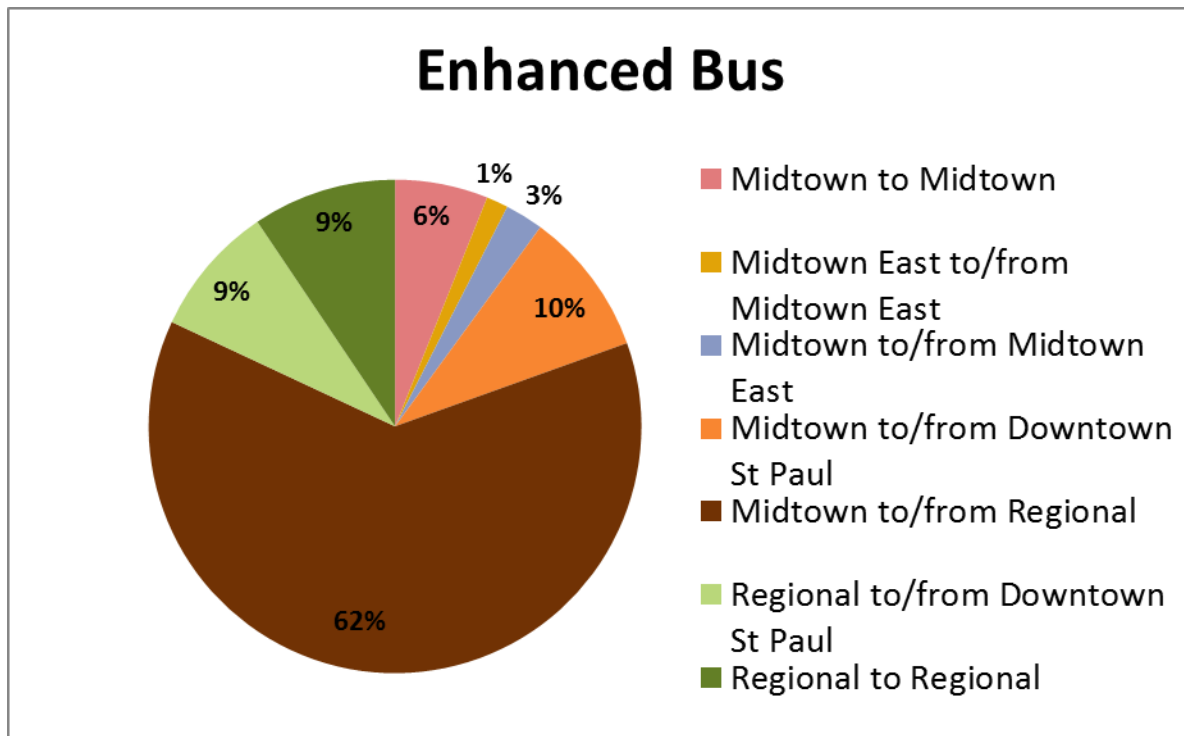


Figure 3: Enhanced Bus and Double/Single Track Rail Travel Market Summary



Travel Pattern Shifts

Travel pattern shifts resulting from the implementation of the double/single-track rail alternative and enhanced bus in the Midtown Corridor were reviewed to better understand the ridership induced from other routes. In all scenarios, a transit ride reduction was observed on portions of the Metro Green Line LRT both east and west of Downtown Minneapolis and on north/south rapid bus routes. The following conclusions were determined from this analysis.

- The double/single-track rail alternative results in small localized reductions on the Green Line related to a shift in travel patterns for trips traveling between St. Louis Park and just south of downtown Minneapolis including Loring Park, Elliot Park, Stevens Square and parts of Whittier and Phillips Neighborhoods. Instead of traveling north to access the Green Line, these trips will travel south to access the double/single-track rail alternative. Changes in travel patterns resulted from travel time savings on the double/single-track rail. In the double/single-track rail alternative, no trips are using the Midtown Corridor as a connection to transfer between the Green Line and Blue Line.
- Localized reductions in the enhanced bus alternative are due to reductions in stop locations on Lake Street. These reductions depict a shift of riders between access points and not a significant reduction in service.

Station Activity

Forecast station activity is depicted in Figure 4 and represents the sum of daily boardings and alightings. Station activity is affected by station area development, accessibility at transfer locations and proximity of nearby stations. Since the enhanced bus alternative has more stations than the rail alternative, the boardings and alightings are more evenly distributed between the stations. The rail alternative has increased accessibility for transfers at Lake Street station and Hennepin Avenue, while the enhanced bus has better accessibility for transfers at I-35W. The Dual alignment alternative station boardings are generally a combination of the enhanced bus and rail alternative alignments with some reductions resulting from competition between alignments and the elimination of enhanced bus service west of Hennepin Avenue.

Figure 4: Forecast Station Activity by Alternative

