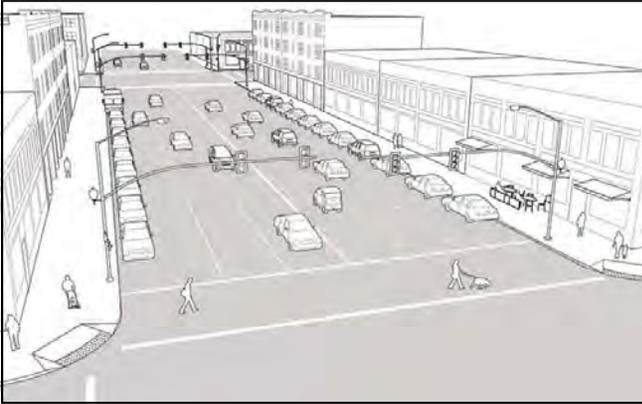


Table of Contents (*continued*)

9. Recommendations	114
Explanation of the maps and tables	114
Recommendations focused on improvements for motor vehicles and heavy trucks	117
Recommendations focused on improvements for regular-route transit service	119
Recommendations focused on improving priority sidewalk segments	120
Recommended short-range (2016-2019) improvements for cyclists.....	122
Recommendations focused on reducing risks along 27th Avenue W between Superior Street and Michigan Street	122
Recommendations focused on creating improved connections between neighborhood activity centers	124
Appendices	125
Appendix A: List of maps, figures, and tables	125
Appendix B: Methodologies	136
Appendix C: Summary notes from open house meetings.....	140

9. Recommendations

Before



After



Image source: NACTO.org (2015)

Figure 9.1 | Improving multimodal integration

The above before and after scenes show ways that existing streets can be improved to better integrate different modes of transportation without large investments in additional infrastructure or right-of-way expansion.

This chapter offers a summary of recommendations that were developed from the analyses and stakeholder input described in the previous chapters. Together, they represent a comprehensive set of projects that would lead to improved multimodal transportation throughout the Lincoln Park neighborhood over the next 30 years.

The recommendations were developed in concurrence with the development of the City of Duluth’s Lincoln Park Small Area Plan (SAP). They also reflect, in part, the recommendations of previous planning efforts, infrastructure investments being planned for in the coming years, and a number of recommendations that are anticipated to result from of the City’s SAP process.

Most of the recommendations are intended to improve multimodal integration within the constraints of existing public rights-of-way (see Figure 9.1). They were also developed with an appreciation for the limited availability of funding. That said, the MIC acknowledges that many of the improvements listed in the following pages would, collectively, cost more than the resources expected to be available to the City and others under recent funding trends. Therefore, these recommendations are being presented as an inventory of potential responses to the issues and opportunities that have been identified in this study, from which the City and stakeholders can pursue or ignore selectively going forward.

Explanation of the maps and tables

The recommendations of this study are presented as a corresponding set of maps and tables in the pages that follow. They are organized according to the different modes discussed in the preceding chapters, and the individual recommendations are listed

according to timeframes based on the levels of financial investment that are anticipated to implement those recommendations. Figure 9.2 shows the four cost categories used (Low, Medium, High, and Very High) to determine which timeframe to list a particular recommendation. Those timeframes are identified as:

- Short-range (year 2015 to 2019)
- Mid-range (year 2020 to 2029)
- Long-range (year 2030 and beyond)

Maps:

The recommended improvements are identified in maps 9.1 through 9.8 on the following pages. In general, the maps are arranged according to the different modal categories discussed in the prior chapters of this document. Maps 9.1 and 9.2, for instance, identify recommended improvements that are focused on motor vehicles and heavy trucks. Map 9.3 is focused on transit improvements, and maps 9.4 through 9.8 identify various improvements for active transportation users.

Within each map, the recommended improvements are denoted by both a symbol and a number. The numbers correspond to those items listed in the table on the pages preceding the map.

Tables:

Along with a brief description of each improvement, the tables include *possible* parties that could be involved with their implementation. Also included are estimates of the levels of investment needed for the implementation and maintenance of each improvements. Those levels correspond to the scale shown in Figure 9.2, and are provided as a “quick gauge” for stakeholders to reference when undertaking further planning efforts in the near future, or during meetings to discuss the scope or coordination of potential improvements projects in the area.

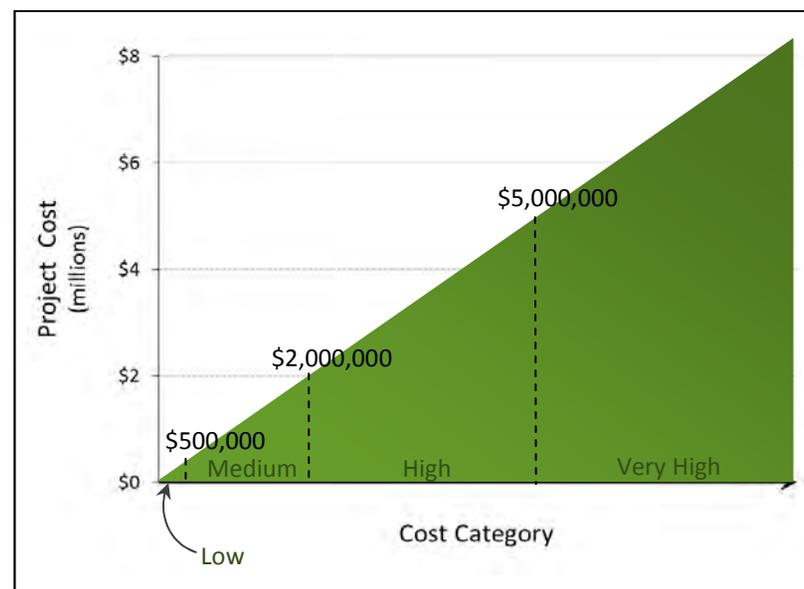


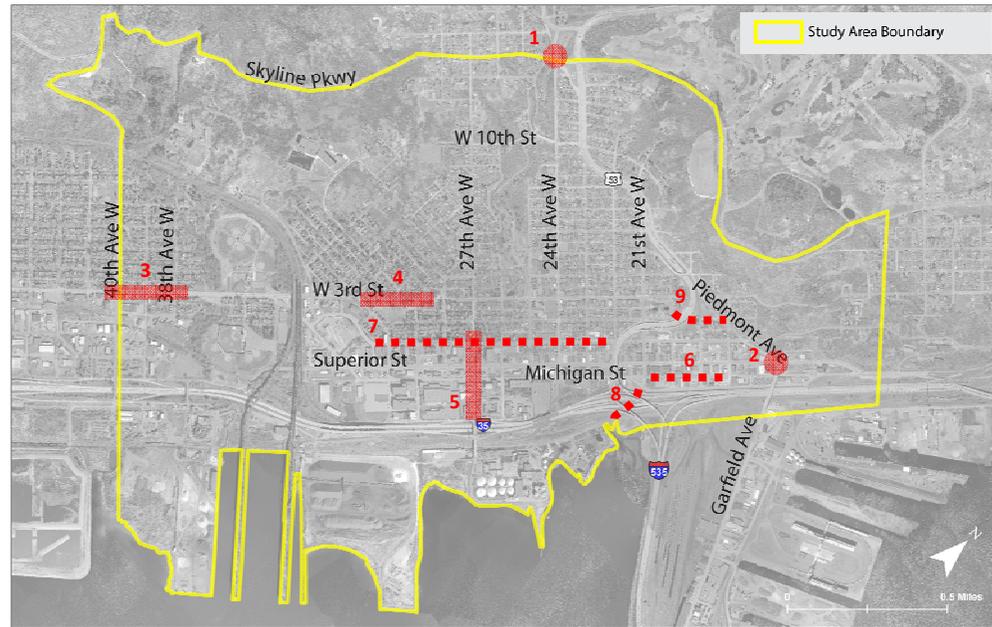
Image source: MIC (2015)

Figure 9.2 | Range of cost estimates for recommended improvements

The estimated costs of recommended improvements represent current prices (U.S. dollars, year 2015). The costs of each recommended improvement includes estimates for engineering, labor, and materials and is represented as belonging to one of four cost bands: “Low” (\$0 - \$500,000), “Medium” (\$500,000 - \$2 million), “High” (\$2 million - \$5 million), “Very High” (>\$5 million).

Map 9.1 | Recommended short-range (2016-2019) improvements for motor vehicles

The numbered features in this map correspond to recommendations 1 through 9 in Table 9.1 on page 117. Included are recommendations to convert existing one-way segments to two-way travel, as well as a call for some additional analysis of the intersections or roadway segments that showed signs of potential safety or operational issues in this study. Also recommended are studies to determine the feasibility of creating future road connections in the neighborhood.



Map 9.2 | Recommended mid-range (2020–2029) improvements for motor vehicles

The features in this map correspond with recommendations 10 through 16 in Table 9.1. The recommendations include the resurfacing or reconstruction of priority road segments, improving vehicle clearance at the historical bridge on Jenswold Street, and enhancement of a public parking area below US Highway 53 at Superior Street & 22nd Avenue W.



Table 9.1 | Recommendations focused on improvements for motor vehicles and heavy trucks

Time Frame	Map ID	Recommended Improvements	Implementing Entities	Cost of Implementation	Cost of Maintenance
Short-range (2015-2019)	1 (Map 9.1)	Study intersection safety and operations at Skyline Parkway & 24th Avenue W. Investigate need for additional stop-control or needed improvements to intersection geometry.	City of Duluth, MIC	Low	NA
	2 (Map 9.1)	Conduct a study of intersection design and operations at Superior St. & Garfield Ave. - Consider the impacts of adjacent developments, looking specifically at the interactions of traffic volumes, heavy truck movements, transit operations, and bike and pedestrian crossings.	City of Duluth, MIC	Low	NA
	3 (Map 9.1)	Conduct a more detailed study of traffic safety and operations on Grand Avenue between 40th Avenue W and 38th Avenue W. Assess the potential conflicts between motorists, cyclists, transit operations, and pedestrian crossings.	City of Duluth, MIC	Low	NA
	4 (Map 9.1)	Conduct a more detailed study of traffic safety and operations on W 3rd Street between Lincoln Park Middle School Road and Exeter Street. Specifically assess the potential conflicts between motorists, cyclists, and pedestrian crossings.	City of Duluth, MIC	Low	NA
	5 (Map 9.1)	Assess safety and operational needs along 27th Avenue W between W 1st Street and Helm Street. Look for opportunities to consolidate accesses and improve pedestrian safety. Develop a plan for a future redesign of the segment, seeking ways to accommodate projected increases in traffic, but also ways to improve the street environment for pedestrian and cyclists.	City of Duluth, MIC	Low	NA
	6 (Map 9.1)	Convert existing one-way segment to a two-way segment on Michigan Street between 21st Avenue W and 18th Avenue W.	City of Duluth	Low	Low
	7 (Map 9.1)	Convert existing one-way segment to a two-way segment on W 1st Street between 30th Avenue W and 22nd Avenue W.	City of Duluth	Low	Low
	8 (Map 9.1)	Study feasibility of a future road connection between Lower Michigan Street and Courtland Street. If feasible, coordinate with MnDOT’s planning for future “Can of Worms” redesign.	City of Duluth, MIC, MnDOT	Low	NA
	9 (Map 9.1)	Study feasibility of a future realignment that directly connects W 3rd Street to Piedmont Avenue. If feasible, coordinate with MnDOT’s planning for future “Can of Worms” redesign.	City of Duluth, MIC, MnDOT	Low	NA
Mid-range (2020-2029)	10 (Map 9.2)	Continue to maintain and protect the road segment between US 53 and Piedmont Avenue to be used for Oversized/Overweight staging area.	MnDOT, City of Duluth	Low	Low
	11 (Map 9.2)	Resurface or reconstruct Wellington Street from Anson Avenue to Grand Forks Avenue. Address needed sidewalk repairs.	City of Duluth	Medium to High	Medium
	12 (Map 9.2)	Resurface or reconstruct 20th Avenue W from Superior Street to W 1st Street.	City of Duluth	Medium to High	Medium
	13 (Map 9.2)	Resurface or reconstruct 27th Avenue W from Skyline Parkway to W 1st Street.	City of Duluth	Medium to High	Medium
	14 (Map 9.2)	Resurface or reconstruct Courtland Street from the CN ore dock to WLSSD.	City of Duluth	Medium to High	Medium
	15 (Map 9.2)	Redesign public parking spaces below US 53 to have Superior St. & 22nd Ave W be the focal point. Improve surfaces, landscaping and lighting. Market it to shoppers and as a trail head for users of the Cross City Trail.	City of Duluth	High	Medium
	16 (Map 9.2)	Raise the height of bridge (or lower the road) on Jenswold Street to allow for the passage of semi-trailer trucks.	City of Duluth, Port Authority	High	Medium

Map 9.3 | Recommended transit improvements

The features in this map represent recommendations focused on improvements to the regular-route transit service in the Lincoln Park neighborhood. These recommendations include creating a transit-overlay zoning district along W 3rd Street, creating or improving certain bus stop locations, and studying the need for specific transit amenities along 24th Avenue W.



Map 9.4 | Recommended sidewalk improvements

This map shows the location of sidewalk segments that are being recommended as priority segments in the Lincoln Park neighborhood. These segments are deemed important because they are estimated to be serving a substantial number of pedestrian movements, are on a transit line, on a slope, or are on routes recognized as important walking routes to the Lincoln Park Middle School.

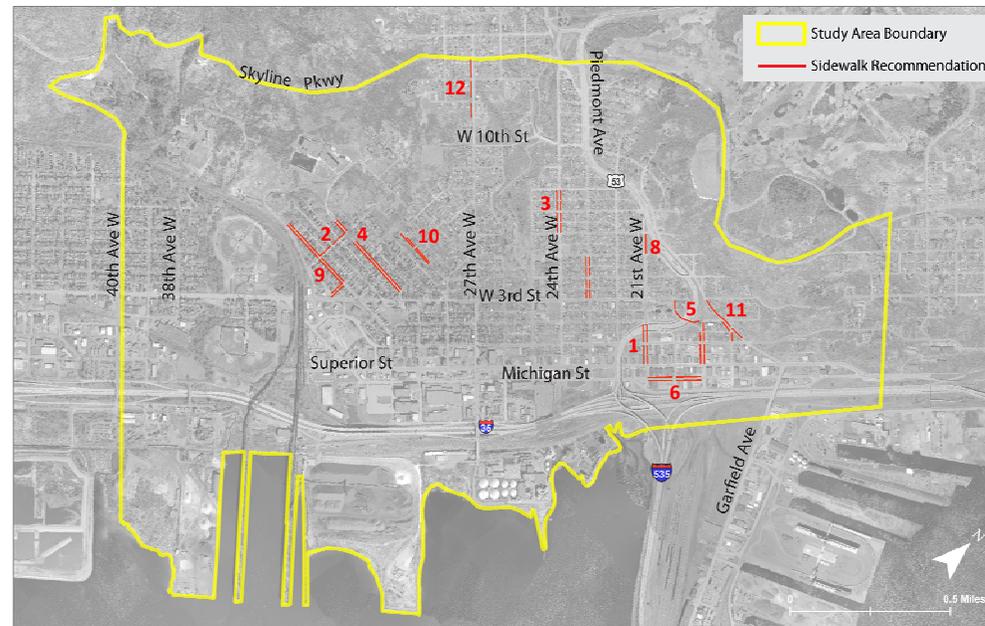
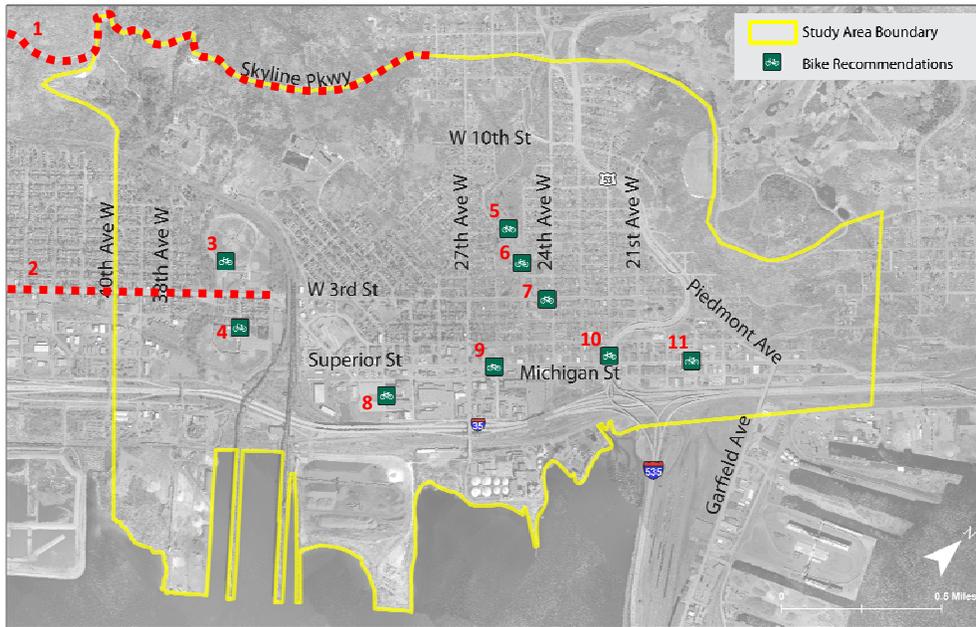


Table 9.2 | Recommendations focused on improvements for regular-route transit service

Time Frame	Map ID	Recommended Improvements	Implementing Entities	Cost of Implementation	Cost of Maintenance
Short-range (2015-2019)	1 (Map 9.3)	Study the need for specific transit amenities and sidewalk improvements on 24th Avenue W.	DTA, MIC	Low	NA
	2 (Map 9.3)	Create a transit-overlay zoning district along W 3rd Street westward from 21st Avenue W out to 59th Avenue W in the Spirit Valley neighborhood that supports transit-supported development forms and streetscape designs.	City of Duluth	Low	NA
	3 (Map 9.3)	Establish a shuttle service between the Lincoln Park Middle School and W 3rd Street. Construct necessary facilities to navigate vehicles; install a bus shelter, and coordinate the scheduling of the service with the DTA’s regular-route buses.	ISD 709, DTA, City of Duluth	High	Low
Mid-range (2020-2029)	4 (Map 9.3)	Construct a bulb out in the shoulder for a bus stop waiting in the shoulder of the south side of Superior Street to serve riders from the Clyde Iron/Heritage Center while keeping the travel-ways open on the Cross City Trail and spur trail.	City of Duluth, DTA	High	Low
	5 (Map 9.3)	Create a bus stop with benches and other amenities in the vacant right-of-way at 28th Avenue W on the south side of Superior Street. Install a paved surface and benches in order to help keep bus riders from waiting in the Cross City Trail. Consider also removing the bus stop at 27th Avenue W to help direct riders to wait at the new bus stop.	City of Duluth, DTA	Medium	Low to Medium
	6 (Map 9.3)	Create a bus stop in the vacant right-of-way at 26th Avenue W on the south side of Superior Street. Install a paved surface and benches in order to help keep bus riders from waiting in the Cross City Trail. Consider also removing the bus stop at 27th Avenue W to help direct riders to wait at the new bus stop.	City of Duluth, DTA	Medium	Low to Medium
	7 (Map 9.3)	Enhance bus stops at the intersection of Superior Street & Garfield Avenue to better support the transfer point for buses traveling to and from the City of Superior. Also support this area with better traffic signal programming and pedestrian-crossing amenities.	City of Duluth, DTA	High	Medium to High
	8 (Map 9.3)	Construct transit shelters at the intersection of W 3rd Street & 24th Avenue W to serve as the future primary connection point for route transfers in the neighborhood.	DTA, City of Duluth	High	Medium
	9 (Map 9.3)	Create an enhanced bus stop with shelters, benches and amenities as future development occurs in this area. Orient these stops to serve users of the adjacent recreational areas, as well as any commercial and residential development that may occur there.	City of Duluth, Developer, DTA	Medium to High	Low to Medium

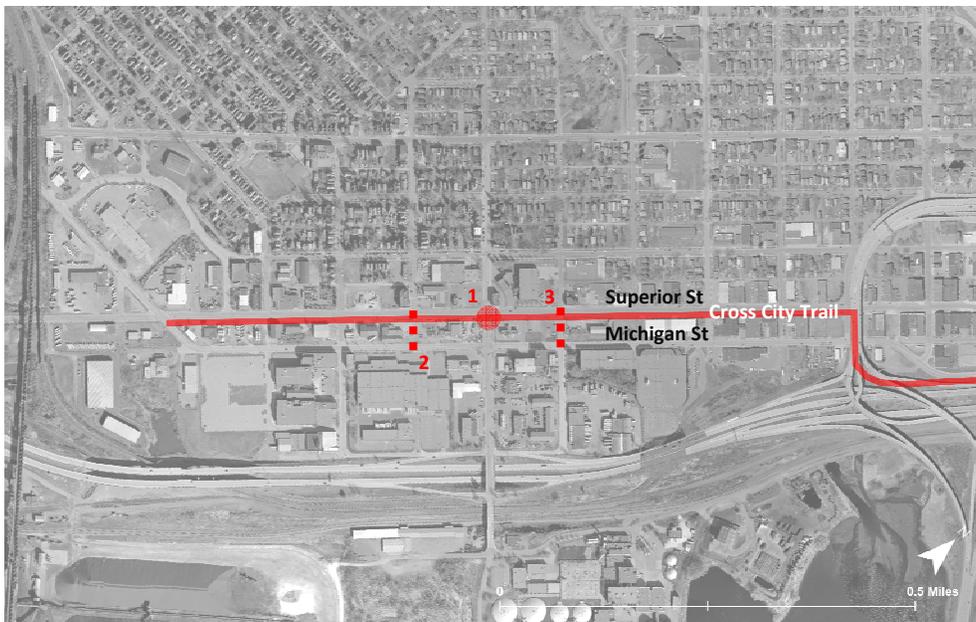
Table 9.3 | Recommendations focused on improving priority sidewalk segments

Time Frame	Map ID	Recommended Improvements	Implementing Entities	Cost of Implementation	Cost of Maintenance
Short-range (2015-2019)	1 (Map 9.4)	Replace sidewalks on 21st Avenue W between W 2nd Street and Superior Street and bring into compliance with current ADA design standards.	City of Duluth	Medium	Low
	2 (Map 9.4)	Replace sidewalks on Atlantic Avenue between Vernon Street and Devonshire Street and bring into compliance with current ADA design standards.	City of Duluth	Medium	Low
	3 (Map 9.4)	Do spot repairs to sidewalks on 24th Avenue W between W 8th Street and W 7th Street.	City of Duluth	Low	Low
Mid-range (2020-2029)	4 (Map 9.4)	Repair/replace sidewalk segments on Devonshire Street between Michigan Avenue and the street's western terminus. Upgrade curb cuts to meet current ADA standards. *Coordinate with recommendation 1 in Table 9.6 on page 124.	City of Duluth	Medium to High	Low
	5 (Map 9.4)	Repair, replace, and construct sidewalk segments on the southwest side of 20th Avenue W / 19th Avenue W between W 3rd Street and Superior Street.	City of Duluth	Medium to High	Low
	6 (Map 9.4)	Replace the sidewalk segments in poor condition on Michigan Street between 22nd Avenue W and 19th Avenue W and bring curb cuts up to current ADA design standards.	City of Duluth	Medium	Low
	7 (Map 9.4)	Replace the sidewalk segments in poor condition on the northeast side of 23rd Avenue W between W 4th Street and W 3rd Street. Bring curb cut up to current ADA design standards.	City of Duluth	Low	Low
	8 (Map 9.4)	Replace sidewalks on 21st Avenue W between W 5th Street and W 6th Street and bring into compliance with current ADA design standards.	City of Duluth	Medium	Low
	9 (Map 9.4)	Repair/replace sidewalks on Vernon Street between Anson Avenue and Pacific Avenue. Repair/replace sidewalk segments on Pacific Avenue between W 3rd Street and Chestnut Street. Bring curb cuts up to current ADA standards.	City of Duluth	Medium to High	Low
	10 (Map 9.4)	Repair/replace sidewalks on at least one side of Wicklow Street between Pacific Avenue and Winnipeg Avenue. Upgrade curb cuts to current ADA design standards.	City of Duluth	Medium	Low
	11 (Map 9.4)	Repair/replace sidewalk segments on Piedmont Avenue between W 3rd Street and W 1st Street. Upgrade curb cuts to current ADA design standards.	City of Duluth	Medium to High	Low
	12 (Map 9.4)	Replace sidewalk on northwest side of 24th Avenue W between Skyline Parkway and W 11th Street. Upgrade widths and curb cuts to be compliant with current ADA design standards.	City of Duluth	Medium	Low



Map 9.5 | Recommended short-range (2016-2019) improvements for cyclists

This map shows recommendations focused on relatively inexpensive, short-range improvements that can be in support of cycling in the Lincoln Park neighborhood. These recommendations include restriping segments of Skyline Parkway and Grand Avenue to create more room for cyclists, as well as nine locations for creating or improving bike parking facilities.



Map 9.6 | Recommended improvements to help mitigate safety risks at 27th Avenue W & Superior Street

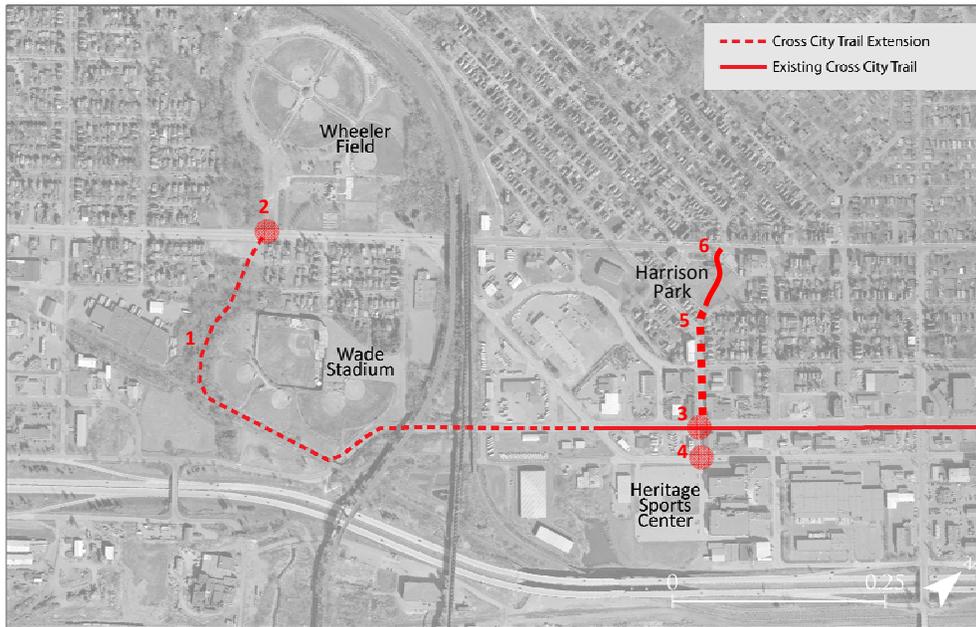
This map shows three improvements that could be made to help reduce the potential for conflicts between motorists and cyclists and pedestrians at the busy intersection of 27th Avenue W & Superior Street. These include painting the Cross City trail across the intersection of 27th Avenue W and adding bike-signal heads to the traffic signals there. They also include formalizing pedestrian pathways between Superior Street and Michigan Street at 28th Avenue W and at 26th Avenue W as alternative routes that can help pedestrians avoid traveling along 27th Avenue W.

Table 9.4 | Recommended short-range improvements for cyclists

Time Frame	Map ID	Recommended Improvements	Implementing Entities	Cost of Implementation	Cost of Maintenance
<i>Short-range (2015-2019)</i>	1 (Map 9.5)	Restripe Skyline Parkway to narrow the travel lanes and allow for wider shoulder widths for cyclists and pedestrians. Add sharrow markings to travel lanes to help notify motorists of possible encounter with cyclists around blind corners. Extend treatment from 24th Avenue W to as far west as Getchell Road.	City of Duluth	Low	Low
	2 (Map 9.5)	Convert parking lane on the north side of Grand Avenue to a marked bike lane from Carlton Street westward to the Spirit Valley neighborhood.	City of Duluth	Low	Low
	3 (Map 9.5)	Install bike racks at Wheeler Fields recreational area.	City of Duluth	Low	Low
	4 (Map 9.5)	Install additional bike parking at Wade Stadium recreational area.	City of Duluth	Low	Low
	5 (Map 9.5)	Install bike parking near upper parking area in Lincoln Park.	City of Duluth	Low	Low
	6 (Map 9.5)	Install bike parking near lower parking area or the pavilion in Lincoln Park.	City of Duluth	Low	Low
	7 (Map 9.5)	Install bike parking near the entrance to the Boys & Girls Club.	Private party, Non-profit	Low	Low
	8 (Map 9.5)	Install bike parking at the west-side entrance of the Clyde Iron/Heritage Center complex.	Private party, Non-profit	Low	Low
	9 (Map 9.5)	Install bike parking in the unused right-of-way at Superior Street and 26th Avenue W. *Coordinate with recommendation 6 in Table 9.2 on page 119 and recommendation 13 in Table 9.4.	City of Duluth	Low	Low
	10 (Map 9.5)	Install bike parking near parking area under US Hwy 53 and the trailhead to the Cross City Trail. *Coordinate with recommendation 15 in Table 9.1 on page 117.	City of Duluth	Low	Low
	11 (Map 9.5)	Install additional bike parking at pocket-park at Superior Street & 19th Avenue W.	City of Duluth	Low	Low

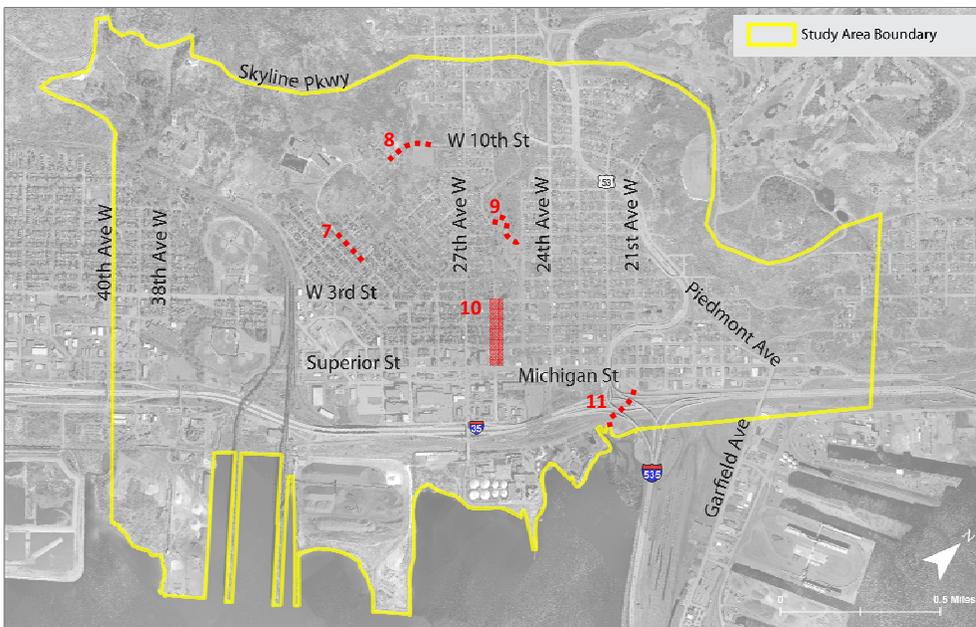
Table 9.5 | Recommendations focused on reducing risks along 27th Avenue W between Superior Street and Michigan Street

Time Frame	Map ID	Recommended Improvements	Implementing Entities	Cost of Implementation	Cost of Maintenance
<i>Short-range (2015-2019)</i>	1 (Map 9.6)	Add bike-specific signal heads to the traffic signal system at Superior Street & 27th Avenue W for users of the Cross City Trail. Paint solid bike lane marking across 27th Avenue W.	City of Duluth	Low	Low
	2 (Map 9.6)	Formalize a pedestrian pathway in the right-of-way at 28th Avenue W with a paved surface. *Coordinate with recommendation 5 in Table 9.2 on page 119.	City of Duluth, Non-profit	Low	Low
	3 (Map 9.6)	Formalize a pedestrian pathway in the right-of-way at 26th Avenue W with a paved surface. *Coordinate with recommendation 6 in Table 9.2 on page 119 and recommendation 9 in Table 9.3.	City of Duluth, Non-profit	Low	Low



Map 9.7 | Recommended connections to the Cross City Trail

This map shows recommendations aimed at capitalizing on the recent Cross City Trail investment by creating connections between existing recreational activity centers. Those connections include enhanced street crossings on Superior Street and Michigan Street at 30th Avenue W, as well as a paved, on-street bikeway connection to Harrison Park, and the construction of a greenway portion of the Cross City Trail along Merritt Creek.



Map 9.8 | Recommended future trails and greenways

The features in this map represent future trail segments that will improve connectivity and access to different activity centers and transit lines. These include a paved Devonshire Trail connection and a W 10th Street connection to the middle school, as well as a pathway to and through Lincoln Park and the waterfront at 21st Avenue W.

Table 9.6 | Recommendations focused on creating improved connections between neighborhood activity centers

Time Frame	Map ID	Recommended Improvements	Implementing Entities	Cost of Implementation	Cost of Maintenance
Short-range (2015-2019)	1 (Map 9.7)	Extend the Cross City Trail along Merritt Creek to create a greenway segment, while still connecting to both the Wade Stadium and Wheeler Fields recreational areas.	City of Duluth	High	High
	2 (Map 9.7)	Create a high-visibility, enhanced crossing on Grand Avenue connecting the Cross City Trail to the Entrance of Wheeler Fields.	City of Duluth	Low to Medium	Low
	3 (Map 9.7)	Install a curb-cut to the Cross City Trail at Superior Street & 30th Avenue W. Create a high-visibility, enhanced crossing across Superior Street.	City of Duluth	Medium	Low
	4 (Map 9.7)	Create a high-visibility, enhanced crossing at Michigan Street & 30th Avenue W to improve the safety of the spur trail connection to the entrance of the Clyde Iron/Heritage Center complex.	City of Duluth	Low to Medium	Low
Mid-range (2020-2029)	5 (Map 9.7)	Install a painted bike lane from Superior Street to Harrison Park along the north side of 30th Avenue W and Grand Forks Avenue.	City of Duluth	Low	Low
	6 (Map 9.7)	Update Harrison Park: rearrange the park's amenities and construct a paved use path that links a Grand Forks entrance to the Harrison Community Club building.	City of Duluth	Medium to High	Medium
	7 (Map 9.8)	Convert the existing Devonshire Trail to a multiuse, paved path ; ensure ADA compliant design.	City of Duluth	Medium	Low
	8 (Map 9.8)	Construct a paved, multi-use trail connecting W 10th Street to Anson Avenue.	City of Duluth	Medium to High	Low
	9 (Map 9.8)	Construct a paved, multi-use trail across Lincoln Park that connects W 6th Street to W 6th Street and uses the existing bridge across Miller Creek.	City of Duluth	Medium to High	Low
	10 (Map 9.8)	Create an active transportation corridor and possible greenway segment in/along 26th Avenue W between Lincoln Park and the Cross City Trail. Include a high-visibility crossing across Superior Street.	City of Duluth	Medium to High	Low to Medium
	11 (Map 9.8)	In coordination with MnDOT's planning for a future redesign of the "Can of Worms" interchange, create an active transportation connection to the waterfront at 21st Avenue W (either on-street or a separate facility) . *Coordinate with recommendation 8 in Table 9.1 on page 117.	City of Duluth	Medium to High	Low to Medium

Appendix A: List of Maps, Figures, and Tables

Chapter 1 INTRODUCTION

Maps – Chapter 1

Map 1.1: The Lincoln Park neighborhood in Duluth, MN.....1

Map 1.2: Study area boundaries2

Figures – Chapter 1

Figure 1.1: US Highway 53 overpass at 22nd Avenue W4

Chapter 2 STAKEHOLDER INPUT

Maps – Chapter 2

Map 2.1: A summary of input received related to motor vehicles10

Map 2.2: A summary of input received related to Heavy Trucks.....11

Map 2.3: A summary of input received related to transit.....12

Map 2.4: A summary of input received related to bikes & pedestrians.....13

Figures – Chapter2

Figure 2.1: Coordinated stakeholder engagement model.....5

Figure 2.2: Project webpage8

Figure 2.3: Heavy commercial truck crossing the Cross City Trail in Lincoln Park9

Tables – Chapter 2

Table 2.1: Stakeholders representing the City of Duluth’s Lincoln Park Small Area Plan (SAP) committee6

Table 2.2: Professional transportation stakeholders representing the MIC Technical Advisory Committee (TAC).....6

Table 2.3: Key stakeholders identified for one-on-one engagement7

Chapter 3 EXISTING CONDITIONS & ANALYSIS

Maps – Chapter 3

Map 3.1: Alternative through routes & regional trails	24
Map 3.2: Highway 23 context zones & West Duluth neighborhoods	25
Map 3.3: Transit frequency	29
Map 3.4: Daily transit boarding & alighting	29
Map 3.5: Posted speeds on Highway 23	31

Figures – Chapter 3

Figure 3.1: View of Lincoln Park from Skyline Parkway	14
Figure 3.2: Higher density, mixed-use urban form in sub-area 9	15
Figure 3.3: Estimates of future households by study sub-area by year 2040	26
Figure 3.4: Estimates of added jobs by study sub-area by year 2040	27
Figure 3.5: Household projections for the Lincoln Park study	27
Figure 3.6: Employment projections for the Lincoln Park study	27
Figure 3.7: Estimated changes in job types by growth scenario (year 2040)	28
Figure 3.8: Daily trip estimates of future growth scenarios (year 2040)	28

Tables – Chapter 3

Table 3.1: Land-use types in Lincoln Park	14
Table 3.2: Higher density, mixed-use urban form in sub-area 9	15
Table 3.3: Zoning Districts within the Lincoln Park study area	18
Table 3.4: Job and trip-generation estimates of employment zones	19
Table 3.5: Unit estimates of key land use types in each sub-area in the Lincoln Park neighborhood	21

Table 3.6: Trip generation rates and daily for Lincoln Park neighborhood sub-areas.....	21
Table 3.7: Average running slope for roads within the Lincoln Park sub-areas.....	22
Table 3.8: Household (HH) characteristics by study sub-area	23
Table 3.9: Growth scenarios and assumptions used for analysis.....	25

Chapter 4 THE ROAD NETWORK

Maps – Chapter 4

Map 4.1: Functional classification of roadways within the Lincoln Park neighborhood	31
Map 4.2: Annual Average Daily Traffic (AADT) in the Lincoln Park Neighborhood (2012)	32
Map 4.3: Annual Average Daily Traffic (AADT) for intersections in the Lincoln Park Neighborhood (2012).....	33
Map 4.4: Key thoroughfares and stop controls on the local street network in Lincoln Park	35
Map 4.5: Potential improved connection between W 3rd Street and Piedmont Avenue	36
Map 4.6: Roadway access to regional arterials and key activity centers with access concerns	37
Map 4.7: Potential connection between Anson Ave and W 10th St.....	38
Map 4.8: Potential improved connection between Lower Michigan St and Courtland St	38
Map 4.9: Location of off-street surface parking space in the business areas of the Lincoln Park neighborhood.....	39
Map 4.10: Change in annual average daily traffic (AADT): years 1992 to 2012	42
Map 4.11: Locations of poor level of service (LOS) - PM peak hour of traffic (year 2015)	42
Map 4.12: Priority pavements identified as being in “poor” condition.....	50

Figures – Chapter 4

Figure 4.1: View of US Highway 53 from W 5th Street & 22nd Avenue W	30
Figure 4.2: Roadway classification and intended function.....	31
Figure 4.3: On-street parking on Superior Street between Garfield Ave and 18th Ave - Weekday, midmorning	39

Figure 4.4: Underutilized off-street parking space underneath US Highway 53.....	40
Figure 4.5: Location of the renovated Esmond building.....	40
Figure 4.6: On-street parking demand along 27th Avenue W.....	40
Figure 4.7: US Highway 53 - before and after.....	41
Figure 4.8: Congestion on Piedmont Ave during PM peak hour of traffic.....	43
Figure 4.9: 24th Ave W at W 3rd St during PM peak hour of traffic.....	43
Figure 4.10: Superior St at Lower Michigan St during Weekday PM peak traffic.....	44
Figure 4.11: 27th Ave W between Superior St and Michigan St - PM peak hour of traffic.....	44
Figure 4.12: Location of high-volume adjacent intersections on 27th Ave W.....	44
Figure 4.13: Comparison of peak periods of traffic - adjacent intersections on 27th Ave W.....	44
Figure 4.14: Directional counts at Superior St & 27th Ave W - Oct 30, 2014 (4:15 pm to 5:15 pm).....	45
Figure 4.15: Directional counts at Michigan St & 27th Ave W - Nov 6, 2014 (4:15 pm to 5:15 pm).....	45
Figure 4.16: PM peak traffic by direction - Intersection of 27th Ave W & Michigan St.....	46
Figure 4.17: PM peak queue length for southbound traffic vs. actual storage space - 27th Ave W & Michigan St.....	46
Figure 4.18: 25-year growth scenarios for daily vehicle-miles traveled (DVMT) for the local street network in Lincoln Park.....	47
Figure 4.19: Example of pavement in “poor” condition - 20th Avenue W.....	47
<i>Tables – Chapter 4</i>	
Table 4.1: Commute-to-work trips: Duluth and US (5-Yr est., 2009 -2013).....	30
Table 4.2: Key thoroughfares of the local street network in the Lincoln Park neighborhood.....	34
Table 4.3: Roadway miles in and daily vehicle miles traveled (DVMT) - Lincoln Park neighborhood - years 2000 and 2012.....	41
Table 4.4: Level of Service (LOS) ratings of traffic congestion for road segments.....	43

Table 4.5: Vehicle-capacity (V/C) ratios for critical lane groups at the intersections of Superior St & 27th Ave W and Michigan St & 27th Ave W	46
Table 4.6: Estimates of operations at 27th Ave W & Michigan St traffic signal	46
Table 4.7: 25-year growth scenarios for trip-demand in Lincoln Park (local street network)	47
Table 4.8: 25-year growth scenarios for daily vehicle-miles traveled (DVMT) per functional class in Lincoln Park	47
Table 4.9: Ranges of annual average daily traffic (AADT) on 27th Avenue W and Piedmont Avenue under two 2040 growth scenarios	46

Chapter 5: THE FREIGHT NETWORK

Maps – Chapter 5

Map 5.1: Rail lines, designated truck routes, and intermodal facilities in the Lincoln Park study area	54
Map 5.2: Regional truck routes and weight-restricted segments	56
Map 5.3: Percent of traffic that is heavy trucks & 10-yr change in that percentage (year 2012)	60

Figures – Chapter 5

Figure 5.1: Heavy truck traveling on US 53 in Lincoln Park	53
Figure 5.2: The CN ore docks	53
Figure 5.3: Relation of Truck Center Drive to truck routes	54
Figure 5.4: Restricted commercial truck traffic on W 1st St	55
Figure 5.5: Bypass connections for oversize/overweight loads on US 53	57
Figure 5.6: OS/OW staging area on “Upper” Piedmont Avenue	57
Figure 5.7: Height restriction on Jenswold Street	57
Figure 5.8: MnDOT Vehicle Classifications	58
Figure 5.9: Percentage of heavy vehicle crash incidents in the Lincoln Park Study Area (2009-2013)	58
Figure 5.10: Heavy truck traveling on Superior Street in the Lincoln Park CBD	59

Figure 5.11: Key intersections and One-way segment in the Lincoln Park CBD	59
Figure 5.12: The intersection of Superior Street & Garfield Avenue	61
Figure 5.13: Comparison of typical semi-truck lengths with the available storage space - Southbound, 27th Ave W & Michigan St. .	61
Figure 5.14: Peak traffic counts at Michigan Street & 27th Avenue W	62
<i>Tables – Chapter 5</i>	
Table 5.1: AADT and HCAADT Comparisons for years 2002, 2007, and 2012	60

Chapter 6: THE TRANSIT SYSTEM

Maps – Chapter 6

Map 6.1: Transit routes and key transfer points within the Lincoln Park study area	66
Map 6.2: Transit-supportive areas and relative service levels of transit routes within Lincoln Park	67
Map 6.3: Transit routes connecting Lincoln Park to key destinations and activity centers in the Duluth-Superior metropolitan area	71
Map 6.4: Geographic comparison of transit service scores with transit demand scores for Lincoln Park sub-areas	73
Map 6.5: Average daily boardings and alightings at bus stops within the Lincoln Park study area.....	73

Figures – Chapter 6

Figure 6.1: A DTA west mainline bus making a stop on Superior Street near the Garfield Avenue transfer point to Superior, Wisconsin.....	65
Figure 6.2: The bus stop at W 2nd Street & 21st Avenue W.....	66
Figure 6.3: The bus stop at Superior Street & Garfield Avenue W	67
Figure 6.4: Hours of operation for transit routes traveling through the Lincoln Park study area	68
Figure 6.5: Weekday and Saturday frequency of buses in the Lincoln Park neighborhood	70
Figure 6.6: Location of bus lines relative to the Super One grocery store in West Duluth.....	72
Figure 6.7: Pedestrian ways across US 53 to access transit	74

Figure 6.8: Suggested path across Lincoln Park to access transit	74
Figure 6.9: Location of the middle school relative to transit	75
Figure 6.10: Concept alternatives for a middle school shuttle / DTA bus transfer point	75
Figure 6.11: Concept for transit connection to the Heritage Center	76
Figure 6.12: Possible zoning changes that could support transit.....	77
Figure 6.13: Current redevelopment along the west mainline transit routes.....	77
Figure 6.14: Wade Stadium & Wheeler Fields: Opportunity for future transit-support development and an enhanced transit stop	78
Figure 6.15: W 2nd Street & 21st Avenue W: Potential impact from future redesign of I-35/I-35/US 53 interchanges.....	78
Figure 6.16: Comparison of DTA annual operating costs, revenues, and grants (excluding STRIDE shares): 2009-2013	79
Figure 6.17: Comparison of DTA regular route passenger trips and revenue miles operated: 2009–2013	79

Tables – Chapter 6

Table 6.1: Hours of operation for transit routes traveling through the Lincoln Park study area.....	68
Table 6.2: Level of Service (LOS) ratings for hours of transit service available	68

Chapter 7: ACTIVE TRANSPORTATION

Maps – Chapter 7

Map 7.1: Comparison of average daily boardings/alightings at bus stops with “transit demand” rankings of neighborhood sub-areas.	83
Map 7.2: Sidewalk conditions and gaps near the Lincoln Park Middle School.....	85
Map 7.3: Sidewalk conditions in and around the Lincoln Park Central Business District.....	86
Map 7.4: Sidewalk conditions and gaps in the SW portion of the Lincoln Park neighborhood.....	87
Map 7.5: Comparison of designated bike routes and count locations with pedestrian demand model	88
Map 7.6: City of Duluth’s planned bikeway system.....	90

Map 7.7: City of Duluth’s planned bikeway connections within Lincoln Park.....	90
Map 7.8: Conceptual pedestrian spaces at 26th Avenue W and 28th Avenue W	96
<i>Figures – Chapter 7</i>	
Figure 7.1: Cyclist using the Cross City Trail along Superior Street.....	81
Figure 7.2: Sidewalk priority areas identified in the 2011 Pedestrian Demand model and sidewalk conditions	83
Figure 7.3: Condition of sidewalks in the Lincoln Park neighborhood.....	84
Figure 7.4: Sidewalk in poor condition along 21st Avenue W.....	84
Figure 7.5: Devonshire Trail	85
Figure 7.6: Non-ADA compliant sidewalk at Piedmont Avenue & W 2nd Street.....	86
Figure 7.7: Pedestrian activity in the 27th Avenue W commercial node	86
Figure 7.8: Cyclists on 24th Avenue W in the Lincoln Park neighborhood.....	87
Figure 7.9: Comparison of east– and westbound bike and pedestrian traffic on W 3rd Street at Carlton Street (Sept. 9, 2012).....	88
Figure 7.10: Comparison of east– and westbound bike and pedestrian traffic on Superior Street at 27th Avenue W (Sept. 17, 2014).....	88
Figure 7.11: Comparison of east– and westbound bike and pedestrian traffic on Michigan Street at Superior Street (July. 9, 2013).....	88
Figure 7.12: Cyclist at the intersection of Superior Street & Lower Michigan Street.....	89
Figure 7.13: Street views of Skyline Parkway above the Lincoln Park neighborhood	91
Figure 7.14: Example of a sharrow marking	91
Figure 7.15: The Cross City Trail in Lincoln Park.....	93
Figure 7.16: 26th Avenue W connection between the Cross City Trail and Lincoln Park Drive	94
Figure 7.17: Street enhancement examples.....	94
Figure 7.18: Conceptual corridor for a possible extension of the Cross City Trail along Merritt Creek.....	95
Figure 7.19: Conceptual corridor for a possible future connection to the waterfront in the Lincoln Park neighborhood.....	95

Figure 7.20: Conceptual pedestrian spaces at 26th Avenue W and 28th Avenue W	96
--	----

Tables – Chapter 7

Table 7.1: Bike parking at key activity centers	91
---	----

Chapter 8: INTEGRATION & SAFETY

Maps – Chapter 8

Map 8.1: Key multimodal corridors and key intersections in the Lincoln Park study area	100
Map 8.2: Intersections with crash rates or severity rates that exceed statewide averages (2009 - 2013)	104
Map 8.3: Locations of heavy truck crashes (2009 - 2013).....	104
Map 8.4: Pedestrian related crashes (2009 - 2013).....	106
Map 8.5: Bike related crashes (2009 - 2013).....	107

Figures – Chapter 8

Figure 8.1: 1st Avenue, New York City	99
Figure 8.2: Screen image of MnCMAT coverage of the Lincoln Park study area	103
Figure 8.3: Current characteristics of the 27th Avenue W corridor	108
Figure 8.4: Cross City Trail at 27th Avenue W	109
Figure 8.5: Bike-specific signal head	109
Figure 8.6: NACTO recommendations for bikeway crossings at signalized intersections	109
Figure 8.7: Bus stop at 27th Avenue W.....	110
Figure 8.8: Curbed terminus of spur trail.....	110
Figure 8.9: Lack of curb cuts along Lower Michigan Street.....	110
Figure 8.10: Bike racks on DTA buses.....	111
Figure 8.11: Bike parking at a bus stop.....	111

Figure 8.12: Pairing bus and bike facilities	111
--	-----

Tables – Chapter 8

Table 8.1: Multimodal level of service (mmLOS) scores for locations shown in Map 8.1	101
--	-----

Table 8.2: Intersections with high crash or severity rates (2009-2013).....	105
---	-----

Table 8.3: Locations with multiple indicators of poor integration.....	105
--	-----

Chapter 9: RECOMMENDATIONS

Maps – Chapter 9

Map 9.1: Recommended short-range (2016-2019) improvements for motor vehicles	116
--	-----

Map 9.2: Recommended mid-range (2020 –2029) improvements for motor vehicles	116
---	-----

Map 9.3: Recommended transit improvements.....	118
--	-----

Map 9.4: Recommended sidewalk improvements	118
--	-----

Map 9.5: Recommended short-range (2016-2019) improvements for cyclists.....	121
---	-----

Map 9.6: Recommended improvements to help mitigate safety risks at 27th Avenue W & Superior Street.....	121
---	-----

Map 9.7: Recommended connections to the Cross City Trail	123
--	-----

Map 9.8: Recommended future trails and greenways	123
--	-----

Figures – Chapter 9

Figure 9.1: Improving multimodal integration.....	114
---	-----

Figure 9.2: Range of cost estimates for recommended improvements.....	103
---	-----

Tables – Chapter 9

Table 9.1: Recommendations focused on improvements for motor vehicles and heavy trucks.....	117
---	-----

Table 9.2: Recommendations focused on improvements for regular-route transit service	119
--	-----

Table 9.3: Recommendations focused on improving priority sidewalk segments	120
--	-----

Table 9.4: Recommended short-range improvements for cyclists 122

Table 9.5: Recommendations focused on reducing risks along 27th Avenue W between Superior Street and Michigan Street..... 122

Table 9.6: Recommendations focused on creating improved connections between neighborhood activity centers..... 124

Appendix B: Methodologies

The following pages contain descriptions of various assessments in this study that were not explained in detail in the main body of the document. Explanations are provided for how or where the various data were collected and what processes were used for deriving results from those data.

TRANSIT SCORES (Chapter 6)

To help assess the characteristics and quality of public transit service within the Lincoln Park neighborhood, an indexing method was to derive two scores: a “transit service” score for each route, and a “transit demand” score for each of the neighborhood sub-areas defined in the study. The first was used to compare levels of service among the routes within the neighborhood, the later to compare the relative levels of demand for transit service. In both cases, values were indexed to each other (using the lowest and highest values to create a bounded range) and combined to create composite scores. How those scores were generated is described below.

Service Scores:

There are two priority factors that determine the service quality of public transit from the rider’s perspective: 1) the hours of service and 2) the frequency of buses. Using these parameters, the seven routes were indexed and compared against each other. The results of this approach are shown in Table A.1.

Routes 1,2, and 3 were also assessed as one route because they share the same street segments in the Lincoln Park study area and essentially act as a combined service in those corridors.

Table A.1 | Indexing tables used for deriving “transit service” scores

The different transit routes in the study area were compared according to the indexed value (from 0 to 10) of their average frequency and hours of service.

Weekday Service					
Route	Avg frequency	I	Hours of service	I	CI
1,2,3	0:16	10	18:00	9	19
1	0:41	4	16:20	7	11
2	0:53	2	18:21	10	12
3	0:52	2	15:30	6	7
4	0:46	3	13:00	2	5
5	1:00	0	12:00	0	0
9	0:46	3	14:00	3	6
16	0:41	4	13:00	2	6

Saturday Service					
Route	Avg frequency*	I	Hours of service	I	CI
1,2,3	0:33	10	17:00	10	20
1	2:00	0	0:00	0	0
2	0:59	7	17:15	10	17
3	1:00	7	12:42	7	14
4	2:00	0	8:00	5	5
5	1:00	7	8:00	5	12
9	1:00	7	10:00	6	13
16	1:00	7	11:00	6	13

Sunday Service					
Route	Avg frequency*	I	Hours of service	I	CI
1,2,3	0:36	10	15:00	10	20
1	2:00	0	0:00	0	0
2	0:58	7	15:00	10	17
3	1:00	7	8:45	6	13
4	2:00	0	0	0	0
5	2:00	0	0	0	0
9	1:00	7	9:00	6	13
16	0:59	7	8:00	5	13

When done this way, the combination of Routes 1, 2, and 3 stand out as having a high level of service compared to the others in the neighborhood. This process of comparing the routes was done for the weekday, Saturday, and Sunday route schedules. In situations where a route was not running on a Sunday, for example, an arbitrary max 2-hour frequency was applied for simple indexing purposes (which turned into a zero value in the final summation). The resulting “service” score was entered into a geographic information system (GIS) in order to do conduct the overlay analysis shown in Map 6.2 in Chapter 6 of the study document.

Demand Scores:

A similar indexing method was applied to the demand-side of the transit equation in the study area. As shown in Table A.2, the

Table A.2 | Indexing table used for deriving “transit demand” scores

Six metrics were indexed across the 13 geographical sub-areas analyzed for this study. The indexed values were combined in a single score to determine the relative degree of potential demand for transit service within those sub-areas.

Sub-area	NoCar Density	Index Score	Seniors Density	Index Score	Pop_Dense	Index Score	MED_INC	Index Score	AMB_DENSE	Index Score	SLOPE_AVG	Index Score	area	Composite Score	RANK
1	0.05	36	29	0	232	0	24,138	65	10	0	2.0	3	460,490.83	103	12
2	0.13	100	40	3	749	8	22,474	69	13	2	1.6	0	450,834.05	182	11
3	0.13	100	40	3	749	8	22,474	69	13	2	1.6	0	430,714.63	183	10
4	0.13	100	403	98	6,416	100	29,514	52	13	2	1.7	1	268,720.76	353	1
5	0.13	100	38	2	371	2	9,375	100	13	2	6.1	30	260,291.67	237	7
6	0.05	36	413	100	3,841	58	51,563	0	10	0	4.1	17	464,623.99	211	8
7	0.03	22	394	95	5,690	88	31,964	47	71	44	5.7	27	508,416.36	324	3
8	0.03	22	403	98	6,416	100	29,514	52	13	2	6.5	33	248,774.88	307	4
9	0.13	100	38	2	371	2	9,375	100	13	2	16.5	100	242,327.59	307	4
10	0.03	22	159	34	1,732	24	35,245	39	31	15	9.9	56	1,145,460.53	190	9
11	0.03	22	394	95	5,690	88	31,964	47	71	44	8.2	44	263,426.07	341	2
12	0.00	0	283	66	3,538	53	51,667	0	148	100	7.3	38	320,377.59	258	6
13	0.00	0	283	66	3,538	53	51,667	0	148	100	9.2	51	474,003.43	271	5

thirteen neighborhood sub-areas were assessed using six metrics that were indexed to a scale of 0 to 100. Those metrics are identified in Table A.3 below. The sub-areas were then ranked according to the combined index scores, and the ranking was used to help evaluate how well matched the “service” scores of the previous assessment matched the “demand” scores of the sub-areas (as illustrated in Map 6.4 in Chapter 6).

Table A.3 | Metrics used for deriving “transit demand” scores

The metrics used in deriving the “demand” scores included a mix of demographic characteristics, as well as a measure of difficulty to pedestrian travel in the area (i.e. slope).

Field ID	Metric	Data Source
NoCarDensity	Percent households with no vehicle ownership	2013 American Community Survey
SeniorDensity	Percentage of population age 65 or older	2010 Census 100SF
Pop_Dense	Population per square mile	2010 Census 100SF
MED_NC	Median household income	2013 American Community Survey
AMB_DENSE	Percent population with ambulatory difficulties	2013 American Community Survey
SLOPE_AVG	Average slope of the streets	MIC generated: 2011 MN Lidar data; 2013 St. Louis Co. centerline road file.

Table A.4 | Factors influencing LOS scores

Measures of the following factors were used in calculating the four individual modal LOS scores, which were then used collectively as an assessment of a multimodal Level of service (mmLOS).

<p>Auto LOS</p> <ul style="list-style-type: none"> • Demand (volumes) and available capacity • Number of lanes • Posted speed • Number of stops per mile • Interference from other users (modes)
<p>Transit LOS</p> <ul style="list-style-type: none"> • Frequency of service • Average wait time • Pedestrian LOS scores • Passenger load • Number of bus stops per mile
<p>Pedestrian LOS</p> <ul style="list-style-type: none"> • Traffic volume and speed • Buffer separation • Presence and width of sidewalk • Crossing difficulty • <i>Pedestrian density</i>
<p>Bicycle LOS</p> <ul style="list-style-type: none"> • Traffic volume and speed • Lateral separation • Percent of traffic that is heavy trucks • Pavement quality • Number of driveways per mile

TRANSIT SCORES (Chapter 6)

In transportation planning, level of service (LOS) has traditionally been a measure of the vehicle capacity of a roadway. However, with the increasing understanding that roadway environments serve the movements of a variety of different users, the 2010 Highway Capacity Manual (HCM) was expanded to include a collection of LOS measures for cyclists, pedestrians, and transit riders. These new measures go beyond the notion of capacity to also reflect the safety, ease, and comfort of using a roadway from the perspectives of these other user groups. They are meant to be combined as a measure of multimodal level of service (mmLOS) to help evaluate “complete streets” or context sensitive design alternatives for a particular roadway.

For this study specifically, the mmLOS methodology developed from the NCHRP 03-07 research effort and outlined in NCHRP Report No. 616: *Multimodal Level of Service Analysis for Urban Streets* was used to derive individual LOS scores representative of conditions found in each of the six context zones being studied. These measures are identified in Table A.4.

Six locations were selected within the key multimodal corridors identified in this study for which mmLOS “samples” were calculated for those corridors. To help calculate these scores, a spreadsheet template developed by Richard Dowling Associates was used to calculate LOS scores per one half of the roadway. Therefore, each of the six locations were first evaluated qualitatively in order to determine which side of the corridor would be most representative in terms of a single mmLOS evaluation. Generally, if sidewalk was present on just one side of

the corridor, that side was chosen for evaluation. Figure A.1 shows an example template for Location 1 (24th Avenue W - between W 7th Street and W 6th Street).

CRASH RATES and SEVERITY RATES (Chapter 8)

Crash rates and severity rates were used to help evaluate areas of poor multimodal integration within the Lincoln Park study area. To do this, MnDOT’s Crash Mapping Analysis Tool (MnCMAT) was used to help identify areas of high-crash locations and segments in the study area. Once identified, crash- and severity rates were calculated for those locations and segments using the Equation A.1 and Equation A.2 on the following page.

Figure A.1 | Template for mmLOS calculations

The methodology outlined in NCHRP Report No. 616: *Multimodal Level of Service Analysis for Urban Streets* was used to generate mmLOS scores, and the spreadsheet template developed by Richard Dowling Associates based off of the NCHRP report was used to calculate LOS scores for the six locations assessed for mmLOS.

NCHRP 3-70 Multimodal LOS																																											
Range Check		Ped LOS	LOS																																								
ADT	2,700 (>=0 vpd) OK Yes	Presg	C 3.86																																								
% HW	7% (<=100%) OK No	Plan	B 2.82																																								
Busess/hr	7 (>=0 bph) OK No	Model 1	D 9.70																																								
Peds/hr	8 (>=0 pph) OK If Vary High	Model 2	D 4.17																																								
		RCDF 1	A 1.20																																								
		RCDF 2	A 1.20																																								
		Mode	LOS																																								
		Auto	C 2.87 0.9747																																								
		Transit	B 2.45																																								
		Bicycle	D 3.39																																								
		Pedestrian	D 3.79																																								
<table border="1"> <thead> <tr> <th>SideWalk</th> <th>Buffer</th> <th>Parking</th> <th>Bike Ln</th> <th>Trav. Lane</th> <th>Trav. Lane</th> <th>Median</th> <th>Trav. Lane</th> <th>Trav. Lane</th> <th>Bike Ln</th> <th>Parking</th> <th>Buffer</th> <th>SideWalk</th> </tr> </thead> <tbody> <tr> <td>4</td> <td>8</td> <td>9</td> <td>0</td> <td>12</td> <td>0</td> <td>0</td> <td>0</td> <td>12</td> <td>0</td> <td>9</td> <td>8</td> <td>4</td> </tr> </tbody> </table>				SideWalk	Buffer	Parking	Bike Ln	Trav. Lane	Trav. Lane	Median	Trav. Lane	Trav. Lane	Bike Ln	Parking	Buffer	SideWalk	4	8	9	0	12	0	0	0	12	0	9	8	4														
SideWalk	Buffer	Parking	Bike Ln	Trav. Lane	Trav. Lane	Median	Trav. Lane	Trav. Lane	Bike Ln	Parking	Buffer	SideWalk																															
4	8	9	0	12	0	0	0	12	0	9	8	4																															
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The rates were calculated by using all crashes that occurred within a segment in the years 2009 through 2013, or any crash within a 50-foot radius of an intersection in those years. Those three years represented to most recent years of data available at the time of the study, and were also likely to be the most indicative of transportation patterns that reflected existing conditions, infrastructure, and development patterns. Three years of data were used in order to compare the crash calculated with averages for MnDOT District 1 reported on the 2011 “green sheets” found at:

http://www.dot.state.mn.us/stateaid/sa_traffic_safety.html.

Equation A.1 | Intersection crash rate

The following equation measures the number of crashes per 1 million vehicles entering the intersection. It is used as an expectation for future crashes at a location if all other factors remained the same.

$$\text{Crash rate} = \frac{1,000,000 \times \text{number of crashes}}{\text{years} \times 365 \times \text{AADT} [x \text{ miles}]}$$

AADT = average annual daily traffic

[x miles] = modifier used to calculate rates for a highway segment

Equation A.2 | Intersection crash severity rate

Weighted values can be attributed to crashes based on the severity of resulting injuries, which can then be summed up and used in the crash

$$\text{Severity rate} = \frac{1,000,000 \times [(10)K + (8)A + (6)B + (3)C + PD]}{\text{years} \times 365 \times \text{AADT} [x \text{ miles}]}$$

K = total number of fatality crashes

A = total number of incapacitating injury crashes

B = total number of non-incapacitating injury crashes

C = total number of possible injury crashes

PD = total number of property damage only crashes

AADT = average annual daily traffic

Appendix C: Summary notes from open house meetings

COMMUNITY INPUT

LICOLN PARK SMALL AREA PLAN OPEN HOUSE

September 17, 2014: 5:00PM-8:00PM

Harrison Community Center

Comments received at the “Multi-Modal Transportation” table

General:

Trash accumulation is a big issue in Lincoln Park. It is especially bad in the areas around and underneath the freeway ramps. Interest in seeing a more coordinated clean-up effort between the City of Duluth and the neighborhood associations, such as the Seaway Tenants Assoc.

DTA service is great in the Lincoln Park neighborhood, but there should be garbage cans and benches at major bus stops.

Take a look at the quantity and quality of street lighting in the neighborhood - along main roads, especially 3rd Street.

Take a look at the City’s current sidewalk-use permit policies and procedures. Are they designed in a way that impedes or disincentivizes the installation of benches and bike racks?

The City should inventory and prioritize the cul-de-sacs in Lincoln Park. They should look for opportunities to remove some for the purpose of better circulation and access, especially for emergency response vehicles.

There needs to be stronger political efforts to get the Sault Ste Marie Locks widened in order to allow for larger ships and help revitalize the shipping industry in Duluth-Superior, especially some of the lands along the water front in Lincoln Park.

The City should look explore opportunities to re-use the vacant ore dock for recreation and historical-education in the area.

Cross City Trail:

The new trail is great. I’ve changed my walking route just so I can use it.

The City should seek ways to connect the trail to the waterfront in Lincoln Park.

Superior St:

There is poor sidewalk on Superior St. between 27th Ave W and 30th Ave W. This is a bus route (Rt No. 9) and is a path that people walk along between the commercial area at Michigan St. and 27th Ave W. and the neighborhoods above Superior St.

Vegetation or streetscaping treatments should be considered along the south side of Superior Street – especially along the few blocks approaching 27th Ave W. This would help buffer pedestrians from the “industrial” character of the uses in that area. This is a bus route. Benches for waiting transit riders should be placed along this corridor.

Michigan St:

Adequate snow removal is a BIG problem on Michigan St. between 21st Ave W and 23rd Ave W (underneath the freeway). There is a lot of pedestrian movement in that area. And now with the Cross City Trail...

There is poor sidewalk on Michigan St between 18th Ave W and 22nd Ave W.

W 3rd St:

Should improve lighting along 3rd Street.

W 4th St:

Snow removal is difficult on W 4th St. Parking used to be on the north side only, but it was changed to alternate-side parking. This has created more problems than it solved.

W 10th St:

The City should consider extending W 10th St to Anson Ave to create a more direct link to the new middle school from Piedmont Ave.

Skyline Pkwy:

Vegetation has become so overgrown that it is impacting many of the views from the road. Some of that stuff should be cut back in places.

Hwy 53 / Piedmont Ave:

There are a lot of intersections with poor visibility along Hwy 53. These are very dangerous, especially after the speed limit was raised from 30mph to 40mph on Hwy 53. The intersection of W 7th St. is particularly hazardous.

The center medians on Hwy 53 are not wide enough to allow for sufficient refuge for vehicles trying to make left turns. These vehicles have to enter the spaces in the medians at an angle, which creates sight-distance challenges for those drivers.

The intersection of Piedmont Ave & 24th Ave W needs a traffic signal. Take a look at the crash data for this intersection - I bet you will see a lot of weather-related crashes... slush, ice.

Atlantic Ave:

Sidewalks are in poor condition. The school was in discussions about sharing snow removal responsibilities with the City, if the City would address the sidewalk conditions. The City should really pursue this.

20th Ave W:

There is a blind pedestrian area on 20th Ave W at the off ramp. This spot could use some safety improvements to make it more visible. It could use better lighting.

20th Ave W is probably one of the major pedestrian corridors in Lincoln Park because of its direct connection between the Little Store at 19th Ave W and the residential areas further up the hill. The sidewalk is in poor condition along this avenue.

21st Ave W:

The street and sidewalk along 21st Ave W are in rough shape up the hill, which gets pretty steep. 21st Ave E gets a lot of pedestrian traffic because of its connection to the bus stops/shelters between W 3rd St and Superior St.

The pavement condition on 21st Ave W between W 3rd St and Superior St is so bad that you can't even snow plow it. It should be redone and, when it is, the sidewalks should be brought to the curb.

24th Ave W:

They removed an LED crossing for pedestrians on 24th Ave W (at the corner of 5th St) when the middle school moved. However, there is still the park, the Boys and Girls Club, and services for seniors in the area. They shouldn't have taken that safety device away from there.

24th Ave W:

26th Ave W has some significant gaps in sidewalk. It is a street that could provide easy, direct access to Lincoln Park from Superior Street.

There might be some opportunities to consolidate lots along 26th Ave W for the purpose of creating an enhanced pedestrian corridor between Lincoln Park and Superior St (or even to the waterfront).

The short segment of 26th Ave W between Superior St and Michigan St is not paved. It gets a lot of pedestrians cutting through there, many of whom are using it to avoid having to cross the busy intersections at 27th Ave W. This small segment is owned by the city. The City should enhance it as a pedestrian corridor, possibly even daylight the creek here and create access to the waterfront.

27th Ave W:

Parking on 27th Ave W can be a problem during winter months (when snow piles up) because it is narrow, and the residents don't have off-street parking. Creative solutions to parking should be sought for this corridor because it is a major artery up and down the hill.

There are narrow sidewalks at the intersection of 27th Ave W and Superior St. The sidewalks are also in poor condition. This is a busy intersection both in terms of cars and pedestrians. Things should be done to make pedestrian crossings safer and more comfortable here.

37th Ave W:

Parking on 27th Ave W can be a problem during winter months (when snow piles up) because it is narrow, and the residents don't have off-street parking. Creative solutions to parking should be sought for this corridor because it is a major artery up and down the hill in Lincoln Park.

COMMUNITY INPUT

LICOLN PARK SMALL AREA PLAN OPEN HOUSE

March 26th, 2015: 6:00PM-8:00PM

Harrison Community Center

Comments received at the "Multi-Modal Transportation" table

Requests for increased DTA service:

Could the DTA provide even just one trip per day up to the Lincoln Park Middle School? The school is discovering that a number of parents are

having difficulty getting to the school for meetings and other things. If the DTA could provide just one trip a day, the school could work to schedule things around that trip.

Is there any way the DTA could increase the frequency of service in the neighborhood?

Response to the Devonshire Trail Recommendation:

Is the recommendation to pave the Devonshire Trail feasible? There is an exposed rock bed there, and it goes really close to a house.

Grievance regarding the intersection near the M&H gas station:

The intersection of Superior Street, Michigan St, and Lower Michigan is a mess. It's dangerous and the design of it isn't achieving its intended purpose: to move the traffic to Lower Michigan. All the vehicles are going up onto Superior St regardless. When MnDOT was re-routing traffic during the reconstruction of I-35, they installed temporary traffic signals at the intersection and it worked better than it does now under typical conditions. They should put those traffic signals back.

Response to the Recommendation for repaving/repairing 27th Ave W:

27th Ave W has, and will continue to, experience increases in traffic. The last time it was redone, its width was shortened, making everything tighter. Drivers are flying up and down it, and it's not a good situation. They really should re-widen to better fit the traffic volumes there.

There is parking on only one side of the street, and don't I think you could widen it by removing the parking because there are some residences on the street that don't have off-street parking. I think that the residences along 27th Ave W should be surveyed about what types of improvements are needed there.

Could more stop signs be put along 27th Ave W, wouldn't that slow traffic down and make it safer?

Regarding the recommendation to repave/repair Wellington Ave:

That street does need to be redone, and it makes sense that it should be a secondary access to the Middle School. But its narrow, and is there even enough room to get two buses passing through there?

Regarding the recommendation to convert W 1st St back to 2-Way:

This street was narrowed (from 27th Ave W to 30th Ave W) when last reconstructed. This was done at the neighborhood's request in order to dissuade heavy trucks from using it. The recommendation to turn it back to a two-way street won't work because there is not enough room for two lanes of travel on it.

Regarding the recommendation for a paved trail connection between Anson Ave and 27th Ave W:

Part of this proposed alignment is where the Superior Hiking Trail goes through. You don't want to pave over that, do you?

Reported concern about the intersection of 27th Ave W & W 3rd St:

This is a bad intersection, very dangerous for pedestrians. It is now a 4-way stop, but drivers are tending not to fully respect them. The intersection could really use a traffic signal instead. I would argue that it has as much traffic as the intersection of Superior St & 27th Ave W does.