

City of Northfield Pedestrian, Bike, and Trail System

Final Report | April 2019

Contents

Section 1: Existing Plan and Policy Review Memorandum

Section 2: Community Engagement Report

Section 3: Mill Towns State Trail: Planned Route Through Northfield

Section 4: Northfield High School & Arcadia Charter School: Walking and Bicycling Issues Maps

Section 5: Northfield High School & Arcadia Charter School: Walking and Bicycling Recommendation Maps

Section 6: Street Type Table Update

Section 7: Northfield Planned Sidewalk Network Map

Section 8: Northfield Planned Walking and Bicycling Network Map

MEMORANDUM

December 2018

To: Tim Behrendt, Streets and Parks Manager, City of Northfield

From: Connor Cox, Adam Wood, Evan Moorman, Toole Design

Project: Pedestrian, Bicycle, and Trail System Update

Re: Existing Plan and Policy Review

The purpose of this memorandum is to summarize the content of several existing City of Northfield plans and policies and develop recommendations for policy revisions. The memo also includes a summary of the *Minnesota DNR Trail Planning, Design, and Development Guidelines*. The plan and policy review focuses on the role and context that each document plays in contributing to the development of the City of Northfield's trail, bicycle, and sidewalk network.

Each plan or policy reviewed includes an overview of the plan or policy content, a summary of the recommendations made by each plan or policy, and a list of recommended revisions that could be made to help improve the safety, connectivity, and comfort of the pedestrian and bicycle network in Northfield. Table 1 lists the plans and policies reviewed and indicates the topics addressed in each.

Table 1: Reviewed Plans or Policies with Referenced Topics

Topics	Plan or Policy					
	Comprehensive Plan	Complete Streets Policy	Comprehensive Transportation Plan Update	Land Development Code & Street Chart Table	Safe Routes to School Plan	MN DNR Trail Planning, Design, and Development Guidelines
Street Design	X	X		X		
Sidewalks	X	X	X	X	X	
Street Crossings	X	X			X	X
Curb Ramps		X		X	X	X
On-street Bikeways	X	X	X		X	X

Topics	Plan or Policy					
	Comprehensive Plan	Complete Streets Policy	Comprehensive Transportation Plan Update	Land Development Code & Street Chart Table	Safe Routes to School Plan	MN DNR Trail Planning, Design, and Development Guidelines
Trails	X	X	X	X	X	X
ADA		X				
Wayfinding & Amenities		X				X
Maintenance		X		X		X
Street Types	X		X	X		

City of Northfield Comprehensive Plan (2008)

The source of most bicycling and walking policies in Northfield is the City's *Comprehensive Plan*, adopted in 2008. The plan sets a goal to “facilitate the movement of people, goods, and services within and through the city on a safe, convenient, coordinated, and fiscally responsible network of routes using a variety of modes.” Chapter 7: Transportation of the *Comprehensive Plan* is a summary chapter of the *Comprehensive Transportation Plan* described above. In general, the plan encourages alternative forms of transportation (Chapter 7: Transportation) and “building inwards and making more efficient use of land” (Chapter 4: Land Use).

Summary of Plan Recommendations

Specific strategies relating to pedestrian, bicycle, and trail infrastructure policies from Chapter 7: Transportation (TR) are listed below:

- TR 1.1 – Develop and implement corridor design guidelines that enable safe and efficient travel for all modes of transportation within the context of the natural and developed environment.
- TR 1.2 – Ensure adequate access into the downtown area for vehicles, pedestrians, and bicycles to support public activities and events, private business uses and residences.
- TR 1.4 – Promote multimodal transportation uses and principles throughout the city.
- TR 1.5 – Establish bicycling as a sustainable, safe, and convenient, year-round mode of transportation in Northfield.
- TR 1.7 – Require local street and trail connectivity between adjacent residential neighborhoods and other land uses for newly developing areas.
- TR 1.8 – Create opportunities to improve existing local street and trail connectivity between adjacent residential neighborhoods and other land uses.
- TR 2.1 – Provide a transportation system for vehicles, bicycles, and pedestrians, balancing safety and fiscal resources.
- TR 2.4 – Establish a pedestrian walkway system connecting residential, educational, commercial/retail, employment and recreational destinations throughout the city.

- TR 2.5 – Establish trails and on-street routes for the use of bicycles as a year-round mode of transportation.
- TR 3.1 – Establish a transportation system vision to provide the necessary transportation network to support the density and type of existing and future land uses.
- TR 3.2 – Enhance the small-town character of the city through multimodal transportation choice and context-sensitive corridor design.

Specific strategies relating to pedestrian, bicycle, and trail infrastructure policies from Chapter 4: Land Use (LR) are listed below:

- LU 2.4 – Encourage pedestrian paths and trail connections from commercial uses to adjoining residential developments and places of employment.
- LU 4.1 – Require major subdivisions to complete a master plan, which incorporates the principles of traditional neighborhood design and addresses the environment, transportation system, park and open space system, and provision of municipal utilities.
- LU 4.4 – Create regulations that require high-quality pedestrian streets with sidewalks, street trees, and adequate lighting, where appropriate.
- LU 4.7 – Encourage connections among neighborhoods via roads, sidewalks and multi-use paths.
- LU 7.4 – Encourage the use of conservation easements as a means to preserve productive agricultural land, greenways, and environmentally significant areas.
- LU 9.2 – Expand the multi-use path system to connect neighborhoods, districts and corridors.
- LU 9.3 – Require site design principles that encourage the use of public transit (i.e., on street sidewalks and trails, parking lots at side or rear of buildings, sidewalk connections from the street to the building entrances). Sources of public transit include bus or vanpools from colleges, nearby towns, a possible future commuter rail station, taxi service, or the Northfield Transit service.
- LU 9.4 – Improve walking and biking travel patterns through improving connections to the Northfield trail system, improved street crossings and foot-bridges.

Recommended Plan Revisions

The table below includes recommended revisions to the Northfield Comprehensive Plan.

Table 2: Recommended revisions to the Northfield Comprehensive Plan Update (2008)

Section	Issue	Recommendation
Chapter 7: Transportation (TR), 1.1 and 1.4	While these sections discuss the accommodation of all modes, it was developed before the <i>Complete Streets Policy</i> and is therefore out of date.	Update TR 1.1 and TR 1.4 to reflect the goals and directives defined in the <i>Complete Streets Policy</i> (which was adopted after the Comprehensive Plan's adoption).
Chapter 7: Transportation (TR)	The Plan does not include a discussion for how to increase accessibility in Northfield for those with mobility limitations.	Add a section on achieving greater accessibility for those with mobility limitations, visual impairments, and other disabilities.

Chapter 7: Transportation (TR), 1.5	The Plan mentions the importance of establishing bicycling as a “sustainable, safe, and convenient mode of transportation,” but doesn’t acknowledge that different types of bicyclists require different facility types to achieve this goal.	Revise section to note that people that have a lower comfort level bicycling may require greater degrees of separation from traffic. Additionally, higher traffic speeds and traffic volumes should merit greater separation between bicycle facilities motor vehicles.
Chapter 7: Transportation (TR), p. 7.2	Northfields transportation system is classified using functional classification system, which defines a roadway (and its recommended design) based on estimated motor vehicle traffic volumes. Designing streets based on estimated motor vehicle demand often has negative impacts on the walking and bicycling environment of those streets.	Transition the street classification system from the functional classification system currently used to a classification system that defines street typologies based on land use context. Defining streets based on the land use context helps achieve street designs that are better suited to the character of the street, and typically results in streets that are more walkable and bicycle-friendly.

Complete Streets Policy (2012)

The City’s *Complete Streets Policy* was adopted in 2012 with a vision “to ensure all streets within the City are planned, funded, designed, constructed, operated and maintained to safely accommodate users of all ages and abilities.” The purpose of this Policy is to “design surface transportation corridors that balance the needs of all users while implementing the principles of the *Comprehensive Plan* (enhancing Northfield’s sense of place and creating a highly connected multi-modal transportation network”). The *Complete Streets Policy* established four goals and eight policy directives, which have implications for all of the City of Northfield’s plans and policies. Relevant policy directives are noted below.

Summary of Policy Recommendations

- Use the latest Complete Streets standards along the transportation network unless one of the following apply:
 - The cost of adhering to such standards is disproportionate to anticipated use;
 - Topography or natural resource issues prohibit construction;
 - The anticipated facility lies outside of the City’s jurisdiction (e.g. a proposed bicycle facility along a state highway). However, the policy does state that the City should work with and encourage these other jurisdictions and agencies to ensure compliance with the policy to the extent possible.
- Where separated facilities cannot be provided for pedestrians and cyclists, accommodate pedestrians and cyclists through slower vehicular speeds and shared-space principles.
- Design, construct, and operate pedestrian and bicycle infrastructure to limit maintenance, while ensuring that all users of the surface transportation network can travel safely, reliably, and independently.

- Implement this policy by evaluating and revising City plans, programs, rules, and regulations and ensuring consistency with the *Complete Streets Policy*.
- Develop a set of performance measures to help track policy implementation.
- Review the *Complete Street Policy* at least every five years to gauge successes and determine potential revisions.

Recommended Policy Revisions

Table 3: Recommended revisions to the Complete Streets Policy (2012)

Section	Issue	Suggestion
Directive 1(a)	Cost “disproportionate to anticipated use” is vague and does not offer guidance on the percent of project cost that can be used on bicycle or pedestrian projects.	Revise Directive 1(a) to specifically describe what constitutes “disproportionate cost.” The typical threshold is 20% of the total budget, according to local Complete Streets policies and guidance from the FHWA. • Add the following text to the Directive: “Excessively disproportionate is defined as exceeding twenty percent of the cost of the larger transportation project.” This change will encourage a more objective, fair, and efficient process.
Directive 1(a)	Future “need or probability of use” is unclear and vague.	Elaborate on measurement tools and time frames that define anticipated use. • In an additional bullet or sub-bullet, add the following text to clarify what is meant by low need or probability of use” in Directive 1(a): “Where there is a demonstrated absence of future need as determined by factors including current and future land use, current and projected user volumes, population density, and crash data.” • Also, add the following text to clarify time horizons: “For design and construction, the time horizon considered for future need shall be defined as one-half of the operational lifespan of the transportation facility for pedestrian accommodations and the entire operational lifespan for bicycle accommodations.”
Directive 2	The text describes the importance of shared space, and of calming vehicular traffic, but does not describe maximum speeds of roadways with calm traffic.	Add specificity on maximum speeds corresponding to “shared space” roads. • Modify Directive 2 in the following way: “Where segregated facilities cannot be provided for pedestrians and cyclists, the constructed roadway shall reflect the character of shared space, with appropriate mechanisms to calm vehicular traffic to

		speeds of 25 miles per hour or lower and provide a safe, reliable, integrated, and interconnected surface transportation network.”
NA	The <i>Complete Streets Policy</i> does not include guidance on what types of bicycle facilities are appropriate, depending upon road geometry, vehicle speeds, and vehicle volumes.	Develop and adopt as policy a bicycle facility selection matrix which identifies appropriate facility types in order to ensure that adequate, low-stress accommodations are provided.
Directive 4	Specific guidance is lacking on year-round bicycle and pedestrian facility maintenance.	Include policy recommendations on year-round bicycle and pedestrian facility maintenance, including pavement preservation and snow and ice clearing strategies.
Directive 7	While the document calls for the use of performance measures to track success, no performance measures were adopted and no performance measures could be found on the City's website (the City Council Meeting on July 17, 2012 offers possible examples that could be used).	Define specific performance measures to track the success of Complete Streets projects and ensure that these measures are periodically reviewed. Performance measures should include a set of metrics that are measurable and objective.

City of Northfield Comprehensive Transportation Plan Update (2008)

This comprehensive transportation planning document serves as the more expansive basis of the summary transportation chapter within the *City of Northfield Comprehensive Plan*. Two very short subsections of the *Comprehensive Transportation Plan Update* that pertain to the City's bicycle, pedestrian, and trail network were reviewed - Section 4.1.2: On-Road Bikeways, and Section 4.1.3: Off-Street Trails and Sidewalks. The sections do not get into a lot of detail on planned facilities, but instead reference the *Northfield Parks, Open Space, and Trail System Plan* and the *Minnesota DNR Trail Planning, Design, and Development Guidelines*.

Section 4.1.2: On-Road Bikeways describes two different on-road bicycle facilities, bike lanes and bike routes, and identifies the primary users of both as transportation and fitness users. The section also describes the planned bike lane and bike route network. During this time, seven miles of bike lanes and ten miles of bike routes were envisioned.

Section 4.1.3: Off-Street Trails and Sidewalks describes the function of four types of trails – destination trails, linking trails, sidewalks, and natural trails. Each provides a description of the trail and the typical users of the facility but does not provide specific design guidance or facility selection guidelines.

Summary of Plan Recommendations

- Create a comprehensive bicycle network of on-street facilities and off-street trails, as shown in Figure 1.

NORTHFIELD PARKS, OPEN SPACE, AND TRAIL SYSTEM PLAN

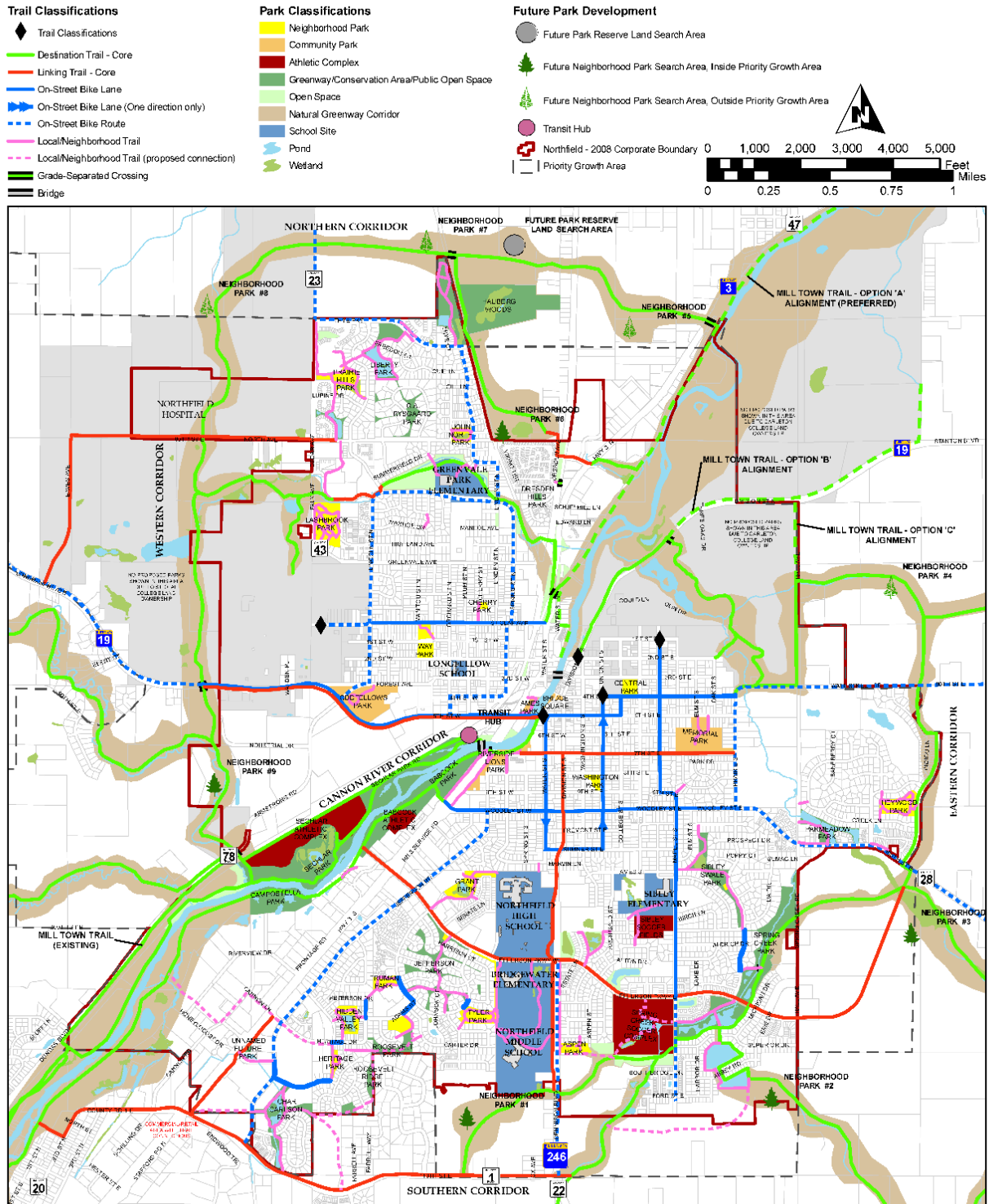


Figure 1: Current and Recommended Bicycle and Pedestrian Facilities

Recommended Plan Revisions

Table 4: Recommended revisions to the Northfield Comprehensive Plan Update (2008)

Section	Issue	Suggestion
Section 4.1.2	“On-road bikeways” in this Plan are defined as including “bike lanes” and “bike routes.”	Update Section 4.1.2 with more information and guidance on the various types of on-street bike lanes, including standard bike lanes, buffered bike lanes, protected bike lanes, and bicycle boulevards.
Section 4.1.2	Bicycle routes are designed for transportation and fitness users, as well as “highly skilled” recreationalists.	On-street bicycle routes should be designed so that they are comfortable for people that have less experience bicycling. Add a sentence specifically noting this and insert a chart or image describing various bicycle user types and their different comfort levels by facility type.
Section 4.1.3	The function of sidewalks are mentioned, but the Plan does not include a description or map of sidewalk coverage.	Include a map showing the existing sidewalk network and describe plans and strategies to expand and improve the sidewalk network.
Section 4.1.3	Guidance is lacking for connecting on-street bicycle lanes or routes to trails and paths.	Add a section about transitions between on-street bicycle facilities and off-street trails or paths and include wayfinding guidance for these transitions.

Land Development Code (2015)

The purpose of the City of Northfield's *Land Development Code (LDC)* is to carry out the policies of the comprehensive plan by classifying and regulating the uses of land and structures within the city. *Section 3.7: Pedestrian Access and Circulation* describes requirements for sidewalks, pedestrian access and circulation, and site design to ensure effective pedestrian connections and other means of non-motorized transportation through proper site design and land development improvements.

Summary of Plan Recommendations and Requirements

Significant plan recommendations/mandates in the *LDC* are noted below. At subdivision, the *LDC* mandates the following for pedestrian access and circulation (Section 3.7):

- Construct internal pedestrian connections at least 8 feet wide from all principles buildings on a lot to the right of way (and provide a continuous pedestrian or multi-use path from primary building entrances to adjacent streets).
- Install sidewalks or trails along all arterial and collector streets. A sidewalk shall be installed on both sides of local streets unless waived by the City Council and when an alternative is proposed that better meets objectives from the *Parks, Open Space, and Trail System Plan*, or when topography disallows grading.
 - Sidewalks along streets must be at least 5 feet wide and trails must be at least 8 feet wide.
 - The City Engineer may require dedicated and improved trails outside of street frontages to improve access to a public facility (e.g. parks or schools).

- Sidewalks must be located at least 7 feet from the back of the curb to allow snow build-up.
- Install mid-block multiuse trails perpendicular to long blocks that exceed the length specified in Section 5.2.2. This allows pedestrians to take more direct routes.
- Install required multiuse trails (minimum width of 8 feet) in new subdivisions where necessary cul-de-sacs are planned (Figure 2).

The *LDC* mandates the following for street design and circulation (Section 5.2.3):

- Section 5.2.3 (Table 5) describes street standards required at subdivision. This section classifies streets by functional classification and street type. The table provides guidance for street design based on street type and functional classification, including right-of-way widths, bike lane provision, sidewalk or trail provision, travel lane widths, parking allocation, and more. This table will be updated as part of this project.

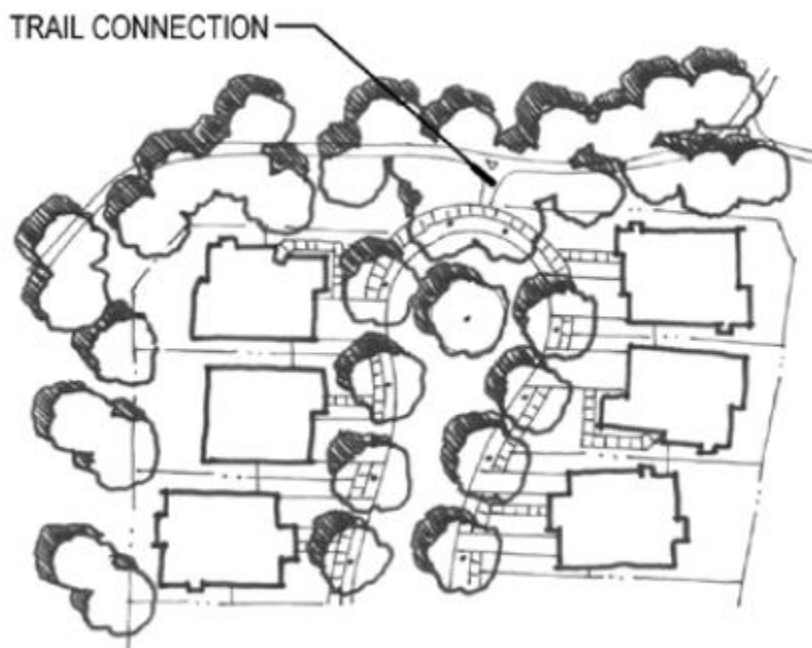


Figure 2: Required Trail Connection through Cul-de-Sacs in the LCD

Table 5.2-3: Street Types and Requirements

ATTACHMENT 2

Street Type ^a	Functional Classification	Right of Way Width	Road Section Type	Reaction Space	Sidewalk/Trail	Boulevard	Shoulder/Parking	Bike Lane ^b	Travel Lane(s)	Shoulder	Median	Shoulder	Travel Lane(s)	Bike Lane ^b	Shoulder/Parking	Boulevard	Sidewalk/Trail	Reaction Space	Parking	Where Allowed
All Measurements in Feet																				
Parkway	Major Collector	100-120	Rural	2	10	20	6-8	[c]	11	2	18	2	11	[c]	6-8	20	10	2	No On-Street Parking	May be applied across any of the zoning districts at the discretion of the city based on the Comprehensive Transportation Plan Update.
Avenue	Minor Arterial	140-180	Rural	2	10	16-20	8	[c]	24	2	18-30	2	24	[c]	8	16-20	10	2	No On-Street Parking	
	Major Collector	100-110	Urban	2	10	10-20	6-8	[c]	11	2	18	2	11	[c]	[c]	6-8	10	2	No On-Street Parking	
Drive	Minor Arterial	130-150	Urban	2	10	7-10	8	[c]	24	2	18	2	24	[c]	8	7-10	10	2	No On-Street Parking	
	Major Collector	80-110	Combination	2	6	10-12	8	[c]	11-12	[c]	[c]	[c]	11-12	[c]	5-8	20-30	[c]	[c]	One Side of Street	Collector streets in the R1-B, BR-2, BR-3, BR-4, N1-B, and P1-S districts. NC-F district.
Road	Local	60-66	Combination	2	5-6	10	8	[c]	10	[c]	[c]	[c]	10	[c]	5-8	20-30	[c]	[c]	One Side of Street	
	Major Collector	80-90	Rural	2	5	13-17	8	[c]	11-12	[c]	[c]	[c]	11-12	[c]	8	13-17	5	2	No On-Street Parking	AH-S, FI-S, and ED-F districts
Street	Minor Collector	60-66	Rural	[c]	[c]	18-21	[c]	[c]	12	[c]	[c]	[c]	12	[c]	[c]	18-21	[c]	[c]	No On-Street Parking	
	Local	60-66	Rural	[c]	[c]	18-21	[c]	[c]	12	[c]	[c]	[c]	12	[c]	[c]	18-21	[c]	[c]	No On-Street Parking	New local streets in the R1-B, BR-2, BR-3, BR-4, N1-B, and P1-S districts
	Local (residential)	60-66	Urban	1	5-6	7+	[c]	[c]	10	[c]	[c]	[c]	10	[c]	8	7+	5-6	1	One Side of Street	
	Local (residential)	60-66	Urban	1	5-6	7+	8	[c]	10	[c]	[c]	[c]	10	[c]	8	7+	5-6	1	Two Sides of Street	C2-B, T1-B, and ED-F districts
	Local (non-residential)	66	Urban	1	5	7	8	[c]	12	[c]	[c]	[c]	12	[c]	8	7	5	1	Two Sides of Street	
	Minor Collector	60-66	Urban	1	5-6	7+	8	[c]	10	[c]	[c]	[c]	10	[c]	8	7+	5-6	1	Two Sides of Street	Reconstructed local streets in the R1-B, BR-2, BR-3, and BR-4 districts. Streets in CD-S and P1-S districts.
Main Street	Major Collector	80-90	Urban	1	5-6	7-10	8-10	4-6	11-12	[c]	[c]	[c]	11-12	4-6	8-10	7-10	5-6	1	Two Sides of Street	Collector streets in the R1-B, BR-2, BR-3, BR-4, N1-B, and P1-S districts
	Major & Minor Collector	80	Urban	[c]	14	[c]	19	[c]	12	[c]	[c]	[c]	11	[c]	10	[c]	4	[c]	One side angled, One side parallel	C1-B, and ED-F districts
Alley	None	20	Rural	[c]	[c]	[c]	[c]	[c]	[c]	[c]	[c]	[c]	14	[c]	[c]			[c]	None	

Figure 3: Street Standards in the LCD

Recommended Plan Revisions

- Increase minimum width of future multi-use trails from 8 to 10 feet. Eight-foot trails should only be allowed in constrained areas.
- Pedestrian access requirements and subdivision design standards should be revised to refer to the *Complete Streets Policy* and provide flexibility and context-sensitive planning for new streets.

Table 5: Recommended revisions to the Land Development Code (2015)

Section	Issue	Suggestion
N.A.	The Plan allows the City Council to waive sidewalk installation on local streets. However, there are no objective metrics stated in the document that guide when the waiver can take place.	Describe and formalize the sidewalk installation waiver process.

N.A.	The <i>Street Types and Requirements</i> table doesn't correspond to the goals of the <i>Complete Streets Policy</i> .	Revise the <i>Street Types and Requirements</i> table to more accurately reflect the goals and directives of the <i>Complete Streets Policy</i> and incorporate current standards and practices for bicycle and pedestrian infrastructure.

Safe Routes to School Plan (2009)

The objective of the City of Northfield's *Safe Routes to School Plan* is to increase safety and convenience for students walking and biking to school. The Plan was completed in 2009 and includes analysis and infrastructure improvement recommendations for four schools in Northfield: Sibley Elementary School, Greenvale Elementary School, Bridgewater Elementary School, and Northfield Middle School. For each of the four schools, key issues were identified, walk audits were completed, walking area/issues maps were developed, surveys were sent out to school staff and parents, and infrastructure and non-infrastructure recommendations (education, enforcement, encouragement, and evaluation) were developed.

Summary of Plan Recommendations

- At strategic locations around schools, install bike lanes, curb extensions, pedestrian refuge islands, and/or additional signage and striping.
- Improve safety at the intersection of TH 246 and Jefferson Parkway for people bicycling and walking (the plan sketches out interventions, and the impacts and costs of those interventions, but other schools lack this).
- Continue monitoring pedestrian volumes, safety levels, and conditions near schools.

Recommended Plan Revisions

Table 6: Recommended revisions to Northfield's Safe Routes to School Plan

Section	Issue	Suggestion
<i>Recommended Infrastructure Improvements</i> (pages 15-25).	While treatments, costs, impacts on nearby property, and consistency with local planning documents are placed into a chart for the intersection of TH 246 and Jefferson Parkway, treatments in the other locations are not assessed in this more objective way.	Develop a prioritized list of infrastructure improvements for each school to identify and rank project importance and then identify funding sources for SRTS projects and programs.

<i>Recommended Infrastructure Improvements</i> (page 15).	When mixed-use trails and sidewalks are recommended, the plan assumes a width of 6 to 8 feet, which is inadequate for facilities shared by people bicycling and walking.	Change trail width requirements to 10 feet (the minimum standard for continuous shared-use paths).
N.A.	No mention is given to connecting proposed on-street bicycle facilities to regional bicycle trails (when this plan was written, the network may have been less developed).	Develop connections to existing and planned facilities in the regional trails system (as well existing and planned on-street facilities).

MnDNR Trail Planning, Design, and Development Guidelines (2007)

The Minnesota Department of Natural Resources developed the *Trail Planning, Design, and Development Guidelines* in 2007 with the goal of creating a consistent set of guidelines and common language for developing motorized and non-motorized trails at the local, county, regional, and state level. The document provides principles for designing recreational trails and shared-use paved trails, and has some information about on-street bikeways. Similar to the *Northfield Comprehensive Transportation Plan Update*, the document only describes two types of on-street bikeway classifications: bike lanes and bike routes.

Summary of Plan Recommendations

Recommendation and standards for different types of shared-use paved trails are shown in Table 7.

Table 7: MNDNR Trail Standards

<i>Road Type</i>	<i>Use</i>	<i>Widths and Striping</i>	<i>Required Side Space</i>
<i>Neighborhood Trail</i>	Connects local residential areas to the citywide trail system	Minimum width of 8 feet for two-way traffic, although widths of 10 feet should be used when higher use is expected (such as within a higher-density development). No center striping.	
<i>City Trail</i>	Used to create the core system of trails that connect a city through greenways, open	Generally, use a minimum width of 10 feet for two-way traffic. For lower-volume	

	space, trail corridors, or road rights-of-way.	trails that don't comprise the backbone of a network, 8 feet is sometimes acceptable. Widths of 12 feet are recommended for important routes in or near the center of urban areas. Center striping is common, but not mandatory.	
<i>County Trail</i>	Similar in nature to a city trail, but at a wider (county) scale.		For all types of shared-use paved trails, shoulder width should ideally be a minimum of 3 feet, with 2 feet being the minimum on each side of the trail. Where the trail is characterized by sideslopes and other dangers, a minimum shoulder width of 5 feet should be used. For all types of shared-use paved trails, a 10-foot vertical clear area is recommended, with the minimum height being 8 feet.
<i>Regional Trail</i>	Connects one or more cities, townships, or counties as part of a regional network., These trails follow greenways, open space, and designated trail corridors. These often link regional parks	Minimum width of 10 feet, irrespective of use. Major trails with heavy use can be 12 feet wide. Two-way traffic is the standard for regional/state trails, although in urban areas, one-way trails can be used.	
<i>State Trail</i>	Connects one or more counties in the state. These trails follow abandoned rail corridors, greenways, and large parks and forests. Usually, these trails are less focused on utilitarian users; instead, they are designed to be a destination themselves.		

Figure 4 schematically shows recommended cross-sections of shared-use paved trails. Generally, greater volumes and variety of users necessitate greater widths and separation of modes.

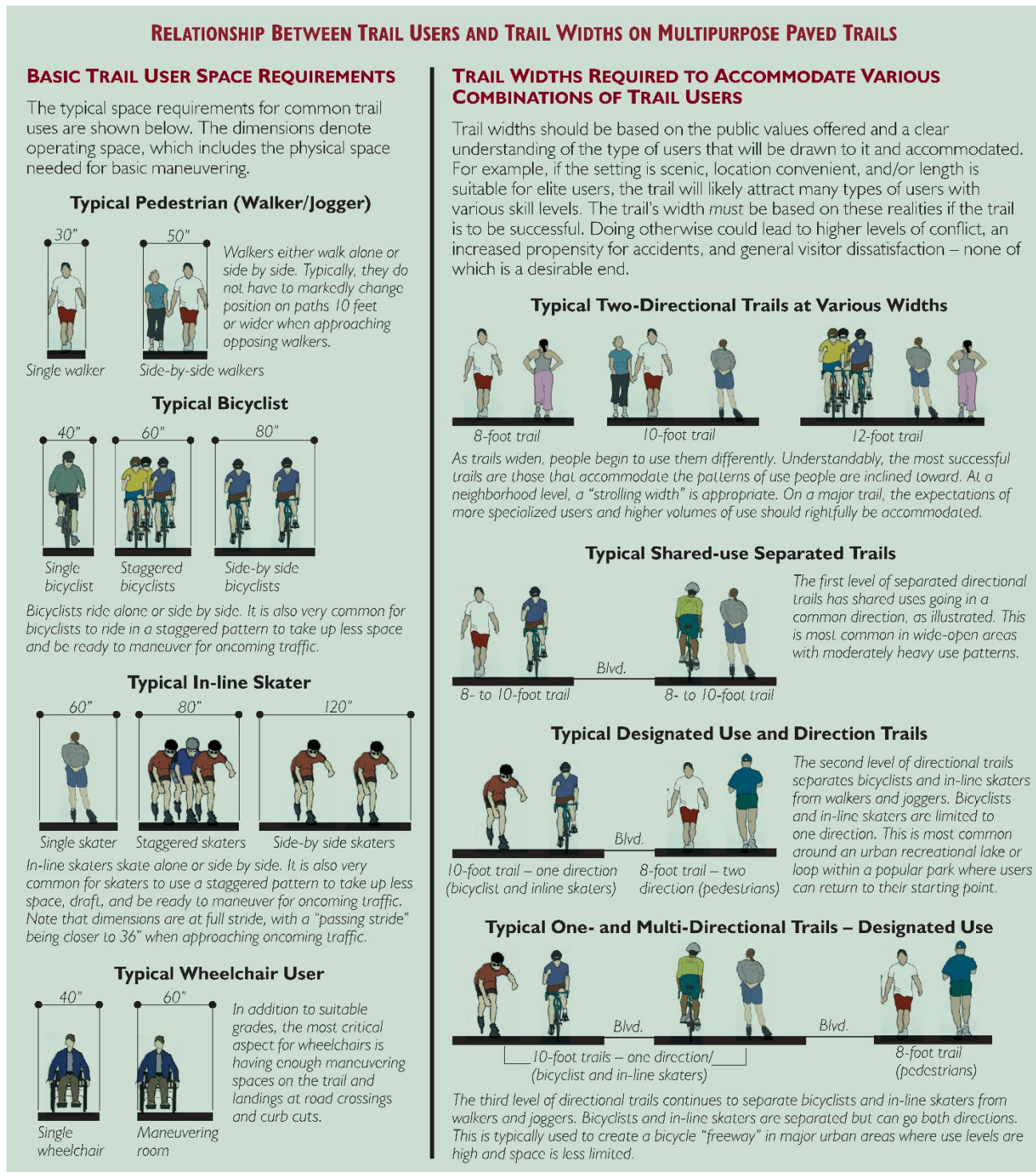


Figure 4: Schematic Cross-Sections of Multipurpose Paved Trails

The document also offers guidance on treatments necessary for safe active transport roadway crossings (Table 8). Higher traffic speeds necessitate greater amounts of separation (for example pedestrian median islands, high-visibility crosswalks).

Table 8: Recommended Crossing Treatments by Road Characteristics

GUIDELINES FOR DETERMINING ROADWAY CROSSING TREATMENT

The following table provides general guidelines for roadway crossings at intersections based on speeds, and vehicular volume. The "good" standard is recommended when the trail is used by a large number of children, seniors, or disabled people. Good is also recommended if the trail crossing is heavily used and if the trail is a main recreational corridor. Source: Mn/DOT's *Bikeway Facility Design Manual* (2006).

Posted Speed	Standard	Type of Crossing Depending on Speed and Volume of Traffic			
50+ mph		Grade Separated			
45 mph	Good	Grade Separated			
	Satisfactory	Traffic Signals			
40 mph	Good	Traffic Signals		Grade Separated	
	Satisfactory	Crosswalk + Median Refuge Island		Traffic Signals	
30 mph	Good	Crosswalk + Median Refuge Island	Traffic Signals		Grade Separated
	Satisfactory	Crosswalk	Crosswalk + Median Refuge Island	Traffic Signals	

Vehicular Volume
(Average Daily Traffic)

2,000 4,000 6,000 8,000 10,000 12,000

Notes:

- The type of crossing selected at an intersection between a main and secondary road is usually the same as for the main road.
- If more than three lanes are to be crossed, the intersection should have a refuge or median island. Where pedestrians or bicyclists wait at an island, a push button or bicycle-sensitive traffic detection device may be desirable.
- At large intersections of very busy roads, pedestrian and bicycle traffic should be separated by grade from both the main and secondary road, instead of using signals.
- Along main roads, crossings should be at intersections. If a midblock crossing is unavoidable, there must be good sight distances. If the speed limit is over 40 mph, consider lowering the speed limit through the crossing area to 40 mph.

MNDNR's *Trail Planning, Design, and Development Guidelines* also detail on-street bikeway standards.

- Use bike lanes on fast-moving and more heavily-utilized arterial and collector roads (those with average vehicular speeds greater than 30 mph and daily traffic greater than 10,000). If speeds and volumes increase further—to 35 mph or higher, and 15,000 AADT, for example—even bicycle lanes would be considered high-stress.
- Ensure that bike lanes are 5 feet wide at minimum (with 6 feet being the ideal width). If the bicycle lane is adjacent to parking, ensure that the parking lane is 8 to 10 feet wide.

This guide defines bicycle routes as a shared portion of the roadway that provides some degree of bicycle-auto separation. It notes that in Minnesota, bike routes usually take the form of a paved shoulder with signage.

- Use a minimum roadway shoulder width of four feet where bicycles are expected. Where speeds and volumes are higher, use a wider shoulder.

Table 9: Recommended bicycle facility type by street volume, and configuration

BIKEWAY DESIGN OPTIONS FOR ROADWAYS

The following tables provide recommended bikeway design options for various roadways. The tables relate to urban section (with curb and gutter) and rural section (no curb and gutter) roadways. Note that *wide curb lane* refers to a right through-traffic lane is wider than 12 feet. *Shared lane* relates to travel lanes that can be legally used by bicyclists, but are less than 12 feet. ADT relates to average daily motor vehicle traffic.

Urban Section Guidelines	ADT (2 lane)		< 500	500–1,000	1,000–2,000	2,000–5,000	5,000–10,000	>10,000
	ADT (4 lane)		N/A	N/A	2,000–4,000	4,000–10,000	10,000–20,000	>20,000
	Posted Speed	≤ 30 mph	Shared lane	Wide curb line	Wide curb lane	Bike lane	Bike lane	Bike lane
		30 mph	Shared lane	Wide curb lane	Bike lane	Bike lane	Bike lane	Bike lane
		35–40 mph	Wide curb lane	Bike lane	Bike lane	Bike lane	Bike lane	Bike lane
		> 40 mph	Bike lane	Bike lane	Bike lane	Bike lane	Bike lane	Bike lane

Rural Section Guidelines	ADT/Lane		< 1000*	1,000–2,500	2,500–5,000	5,000–10,000	>10,000
	Posted Speed	≤ 30 mph	4' paved shoulder	4' paved shoulder	4' paved shoulder	4' paved shoulder	6' paved shoulder
		30–35 mph	4' paved shoulder	6' paved shoulder	6' paved shoulder	6' paved shoulder	8' paved shoulder
		35–45 mph	6' paved shoulder	6' paved shoulder	6' paved shoulder	8' paved shoulder	10' paved shoulder
		> 45 mph	6' paved shoulder	6' paved shoulder	8' paved shoulder	10' paved shoulder	10' paved shoulder

* Shoulders are not necessary when the ADT is less than 500, unless the roadway is heavily used by truck or heavy commercial vehicles. In these situations, bicyclists should be accommodated with a shared lane.

Other plan recommendations are described below:

- Ensure that when adjacent to each other, trails and roadways should be separated by width as much as possible.
 - The *Guidelines* recommend the following for rural areas:
 - 10 feet (20 feet preferred) for speeds under 40 mph;
 - 24 feet (higher widths preferred) for speeds over 40 mph;
 - The *Guidelines* recommend the following for urban areas:
 - 3 feet (5 feet preferred) for speeds under 30 mph if parking is allowed;
 - 5 feet for speeds 30 to 45 mph; 10 feet for speeds over 45 mph;
 - 10 feet (minimum) for plantings
- When trails cross streets or intersections:
 - Utilize a pedestrian median island if crossing distances are greater than 75 feet.
 - Ensure minimum crosswalk and curb cut widths of 10 feet at minimum.

General Strategies to Improve Northfield's Pedestrian, Bicycle, and Trail Network

The following general strategies are recommended to help the City of Northfield develop a more comfortable, safe, and connected network of trails, bikeways, and walkways throughout the city. These strategies are in addition to the recommended revisions specific to each plan or policy and will supplement the other tasks completed for this project.

Strategy 1: Design Streets Based on Land Use Context

Streets should be designed to reflect the context and character of their environment. Streets designed based on the functional classification system may not appropriately reflect the land uses adjacent to them, and they may favor motor vehicle throughout over access and connectivity for people walking and bicycling. The City should transition from the current functional classification-based system to a system based on land use context that prioritizes accessibility and connectivity for all modes.

Strategy 2: Implement Separated Bicycle Lanes in Select Locations

Separated bicycle lanes feature some form of vertical separation between the bicycle facility and the motor vehicle lane. Vertical separation could be achieved with concrete curbs, flexible delineators/flex posts, planter boxes, and other materials. Separated bicycle lanes can be located at street level or sidewalk level, and typically provide a more comfortable environment for bicycling than other on-street bicycle facilities such as bicycle lanes or buffered bicycle lanes. Separated bicycle lanes should only be implemented in select locations where there is a high demand for bicycle infrastructure and/or where the current facility does not provide a comfortable bicycling environment for people of all ages and abilities, such as roadways with high motor vehicle traffic volumes and speeds.

Strategy 3: Improve Accessibility for People with Disabilities

The City recently developed a [Draft ADA Transition Plan](#) that will help the City ensure that all walking and bicycling facilities are accessible for people with disabilities. Once completed, the City should actively implement the recommendations in the Plan and all relevant planning documents should reference this Plan.

Strategy 4: Develop a bicycle and pedestrian count data program

Collecting bicycle and pedestrian counts help analyze the volumes of people walking and bicycling and identify locations with the highest demand for people walking and bicycling. Comparing bicycle and pedestrian counts with existing facilities can help Northfield identify areas with the greatest need for improvements. Bicycle and pedestrian counts can be collected at specific locations and collect the data through volunteers or with automated counting equipment. The MnDOT [Pedestrian and Bicyclist Counting Program](#) allows agencies across Minnesota to borrow portable counting equipment to collect local and regional bicycling data.

Strategy 5: Develop a Bicycle Facility Selection Matrix

A bicycle facility selection matrix would provide guidance for selecting a bicycle facility that is most appropriate to a specific street context. Table 5.2-3: *Street Types and Requirements* in the Land Development Code provides direction on when a street should include a bicycle lane or sidewalk, but it does not provide any direction on what type of on-street bicycle facility should be provided.

Strategy 6: Improve and Expand Wayfinding for People Bicycling and Walking

Developing a comprehensive wayfinding system for people bicycling and walking will make it easier to navigate the city by foot or bicycle and will encourage more people to walk and bicycle. The City should begin by evaluating and improving the existing wayfinding signs in downtown Northfield.

COMMUNITY ENGAGEMENT REPORT

December 2018 | *City of Northfield Pedestrian, Bike, and Trail System Update*

PROJECT OVERVIEW

As part of the *2017 Strategic Plan*, the City of Northfield identified a strategic initiative to update its pedestrian, bike, and trail system map. As a result, the City hired Toole Design to lead the Pedestrian, Bike, and Trail System Update project. The goal of this update is to plan, build, and maintain a network of safe and connected trails and on-street bicycle facilities for people of all ages. The update includes:

- Identifying bicycling and walking system gaps;
- Identifying a planned route for the Mills Towns State Trail within the city;
- Developing Safe Routes to School infrastructure recommendations for Northfield High School and Arcadia Charter School;
- Updating the City's Street Chart Table, which guides the design of sidewalks, bike lanes, and other street elements; and
- Planning a network of walking and bicycling facilities.

COMMUNITY ENGAGEMENT OVERVIEW

As part of the *Pedestrian, Bike, and Trail System Update* project, the City of Northfield hosted community meetings and an online survey to gather feedback on the walking and bicycling network in Northfield from a broad cross-section of the community. In September 2018, City of Northfield staff and the consultant team hosted four community meetings in which an estimated **100+ people participated**. Participants included residents of Northfield and neighboring communities, members of advocacy groups, elected and appointed officials from the City, and members of the City's planning commission. During these meetings, participants identified existing walking and bicycling routes and destinations, and walking and bicycling gaps and opportunities. Additionally, City Staff attended the Mayor's Youth Council at Northfield High School on September 19 to discuss the existing bicycle and pedestrian routes that students use (and the routes that they would like to use).

Community Meetings (City Staff and consultant team)

- Sat. 9/15 at Riverwalk Market Fair, 9am-12pm
- Weds. 9/19 at Greenvale Park Elementary, 6:30-8:30pm
- Tues. 9/25 at NCRC/Fifty North, 9-11am
- Tues. 9/25 at Northfield City Hall, 6-8pm

DESTINATION PRIORITIES

At the four meetings, respondents were asked to note priority walking and bicycling destinations (Table 1). Downtown Northfield was the single greatest destination for people walking and bicycling, but schools and existing trails also scored highly.

Table 1: Priority walking and bicycling destinations.

Parks	0
Downtown	12
Existing Trails	5
K-12 Schools	6
College Campuses	1
Other (write-in)	4*

* Write-in responses included the co-op, farmers market, arboretum, Downtown Northfield, and senior center.

WALKING AND BICYCLING GAPS

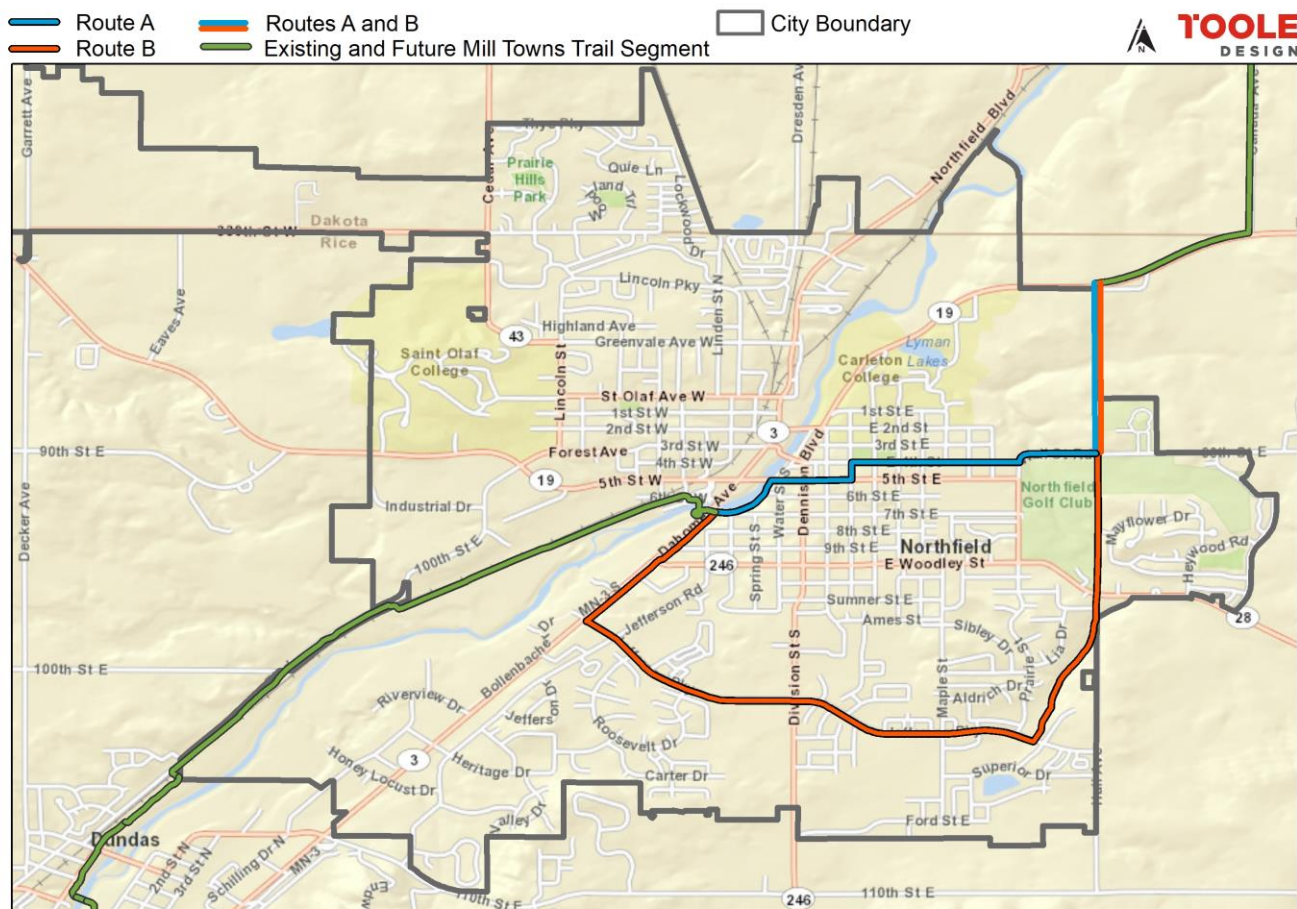
Meeting participants were asked to identify walking and bicycling gaps by drawing routes and problem areas on provided maps. Responses from meeting attendees were merged with results from the online interactive mapping tool (discussed on the following page) and analyzed with those responses. All responses regarding pedestrian and bike gaps and problem areas are discussed later in this memo.

MILL TOWNS STATE TRAIL

Community meeting attendees were also asked about where the future Mill Towns State Trail should be routed through Northfield. Once completed, the Mill Towns State Trail will link two major regional trails: the Cannon Valley Trail, which runs between Cannon Falls and Red Wing; and the Sakatah Singing Hills Trail, which runs between Faribault and Mankato.

Meeting participants were given the opportunity to vote on two possible routes alignments (Figure 1). Option A would travel through Downtown Northfield via Fifth Street and Fourth Street, while Option B runs along the southern half of the city along Jefferson Parkway and then on Spring Creek Road. A clear majority of respondents (44 of 61) favored Option B, while a minority (17 of 61) favored Option A.

Figure 1: Possible routes for the Mill Towns State Trail through Northfield.



Respondents were asked to describe why they chose either option.

Participants that chose **Option A** stated the following reasons:

- It is the most direct
- It would serve the most people and the most businesses
- It would connect important cultural centers in the city (such as Carleton College)

Participants that chose **Option B** stated the following reasons:

- It has fewer negative impacts on Downtown Northfield
- If Route A were selected, people anticipate a loss of business in the central core during construction and a permanent decrease in the number of parking spaces.
- Serves more recreational uses
- Connects to more parks and schools
- Construction impact would be less disruptive
- Provides a far safer bicycling option on Jefferson Parkway
- Allows the existing on-street bicycle lanes to be maintained on Fourth Street and Fifth Street

ONLINE INTERACTIVE MAPPING TOOL

The project team developed an online interactive map as a tool to gather additional community member feedback from people who did not attend one of the community meetings. Respondents were asked to identify problem areas for bicycling and walking, as well as gaps in the bicycling and walking network. Over 130 respondents provided input on the interactive map between September 7 and October 15, 2018.

RESPONDENT BACKGROUND

An introductory survey asked participants about their gender (Figure 2) and race (Figure 3). Respondents were also asked how often they walk and bike (Figure 4).

Figure 2: Respondents gender.

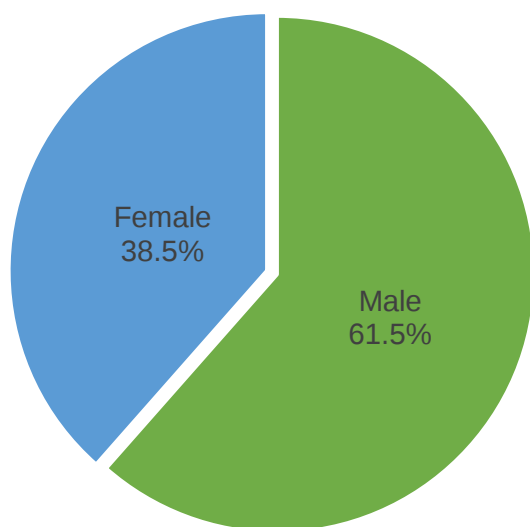


Figure 3: Respondents race and ethnicity.

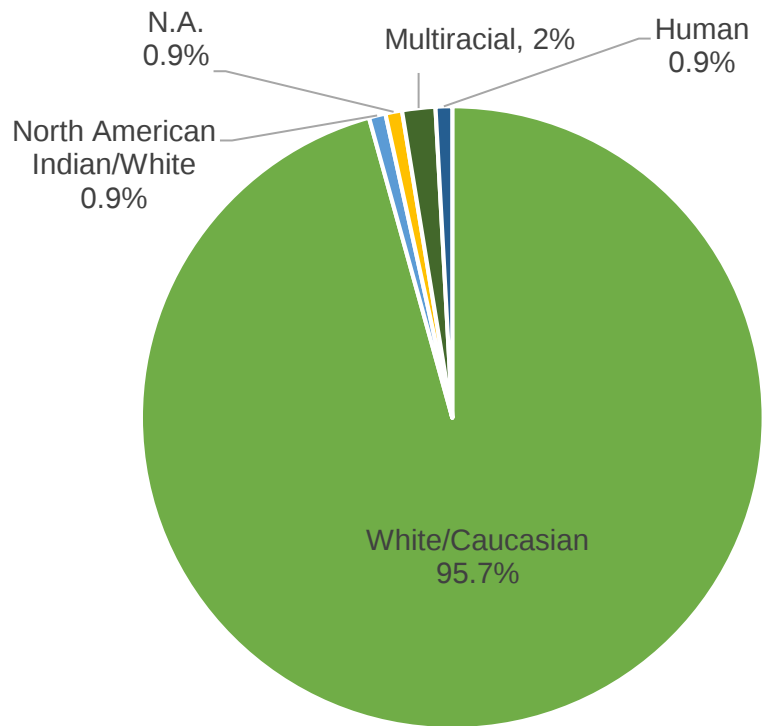
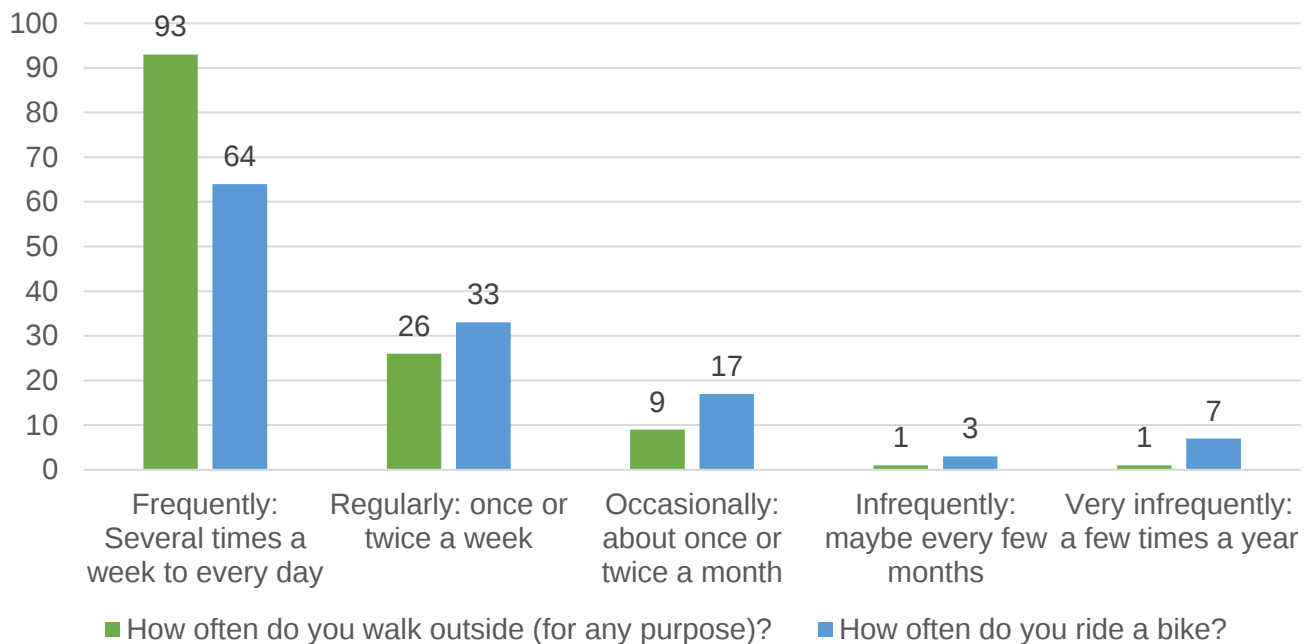


Figure 4: Number of respondents walking and bicycling by frequency.



BICYCLING AND WALKING NETWORK ANALYSIS

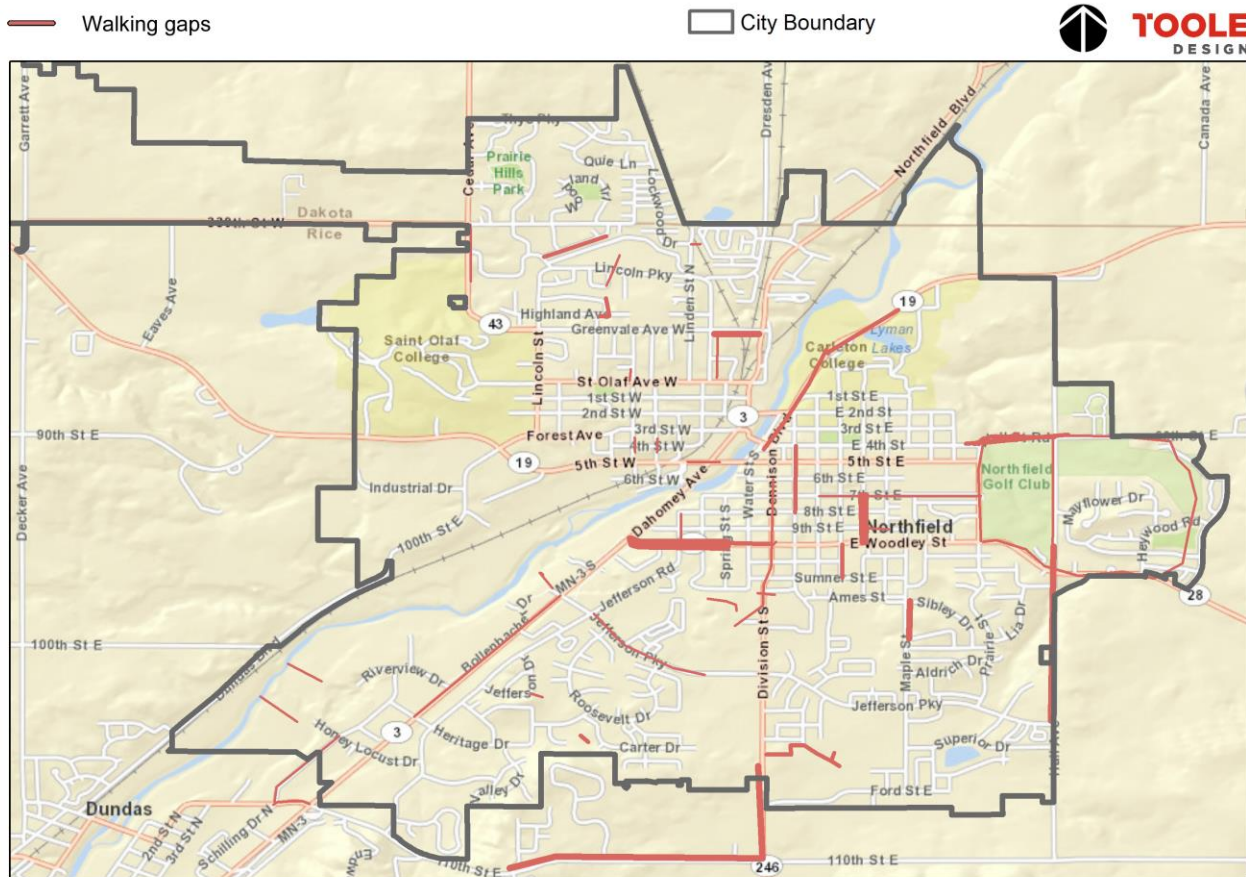
Online map respondents were asked to identify gaps for walking and bicycling in Northfield. Far more participants provided comments concerning the bicycling network than the pedestrian network.

WALKING GAPS

Generally, the gaps identified for walking are concentrated in the center of the city. The most commonly-noted pedestrian network gaps are listed below and shown in Figure 5.

- Missing sidewalk along Woodley Street, which impedes access to businesses along State Highway 3;
- Missing sidewalk along Winona Street between East Woodley Street and 7th Street;
- No way for pedestrians to easily access the southern part of the city (along Division Street);
- Missing sidewalk along the southern portion of Division Street;
- Missing sidewalk along the south side of Greenvale Avenue;
- Missing sidewalk on Maple Avenue south of Sibley Drive;
- Dangerous mid-block crossings along Jefferson Parkway;
- Missing sidewalk and dangerous mid-block crossings along Highway 19 near Carleton College;
- Missing sidewalk, high pedestrian demand, and high-speed traffic along Wall Street Road; and
- Two intersections are perceived as particularly dangerous where cars either do not stop or commonly speed: the intersection of East Woodley Street and Division Street; and the intersections of State Highway 3 and 2nd Street.

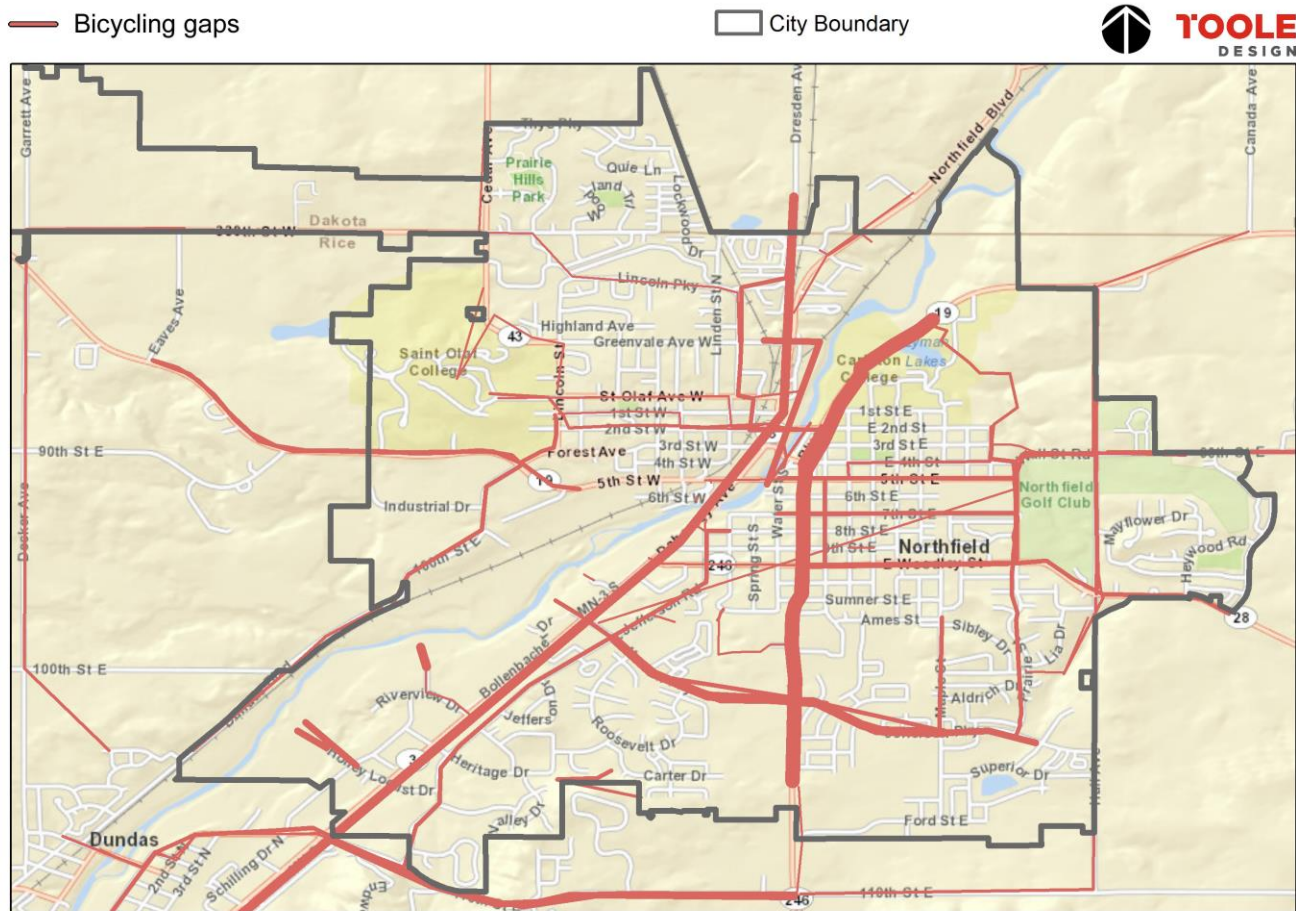
Figure 5: Walking gaps in Northfield that were identified by online map respondent. Thicker lines indicate that more people identified a walking gap in this location.



Bicycling gaps identified by participants are more numerous and more widespread throughout the city. The most commonly-noted bicycling network gaps are listed below and shown in Figure 6.

- No high-quality north-south bike route through Downtown Northfield;
- No high-quality north-south bike route on the east side of the city (near the golf club and arboretum);
- Few east-east-west connections from Saint Olaf College to Downtown Northfield;
- Few east-west connections connecting the east side of the city to Downtown Northfield (Woodley Avenue and 7th Street are both called out specifically as being dangerous);
- No safe way to bicycle along Jefferson Parkway (the street is too narrow for both bikes and cars); and
- No high-quality bike path paralleling State Highway 3 all through the city (while there is a parallel bike path for some of the route, there are an inadequate number of connections people bicycling can make to and from east-west streets). Crossing Highway 3 was also noted as being dangerous.

Figure 6: Bicycling gaps in Northfield that were identified by online map respondents. Thicker lines indicate that more people identified a bicycling gap in this location.



PROBLEM AREAS

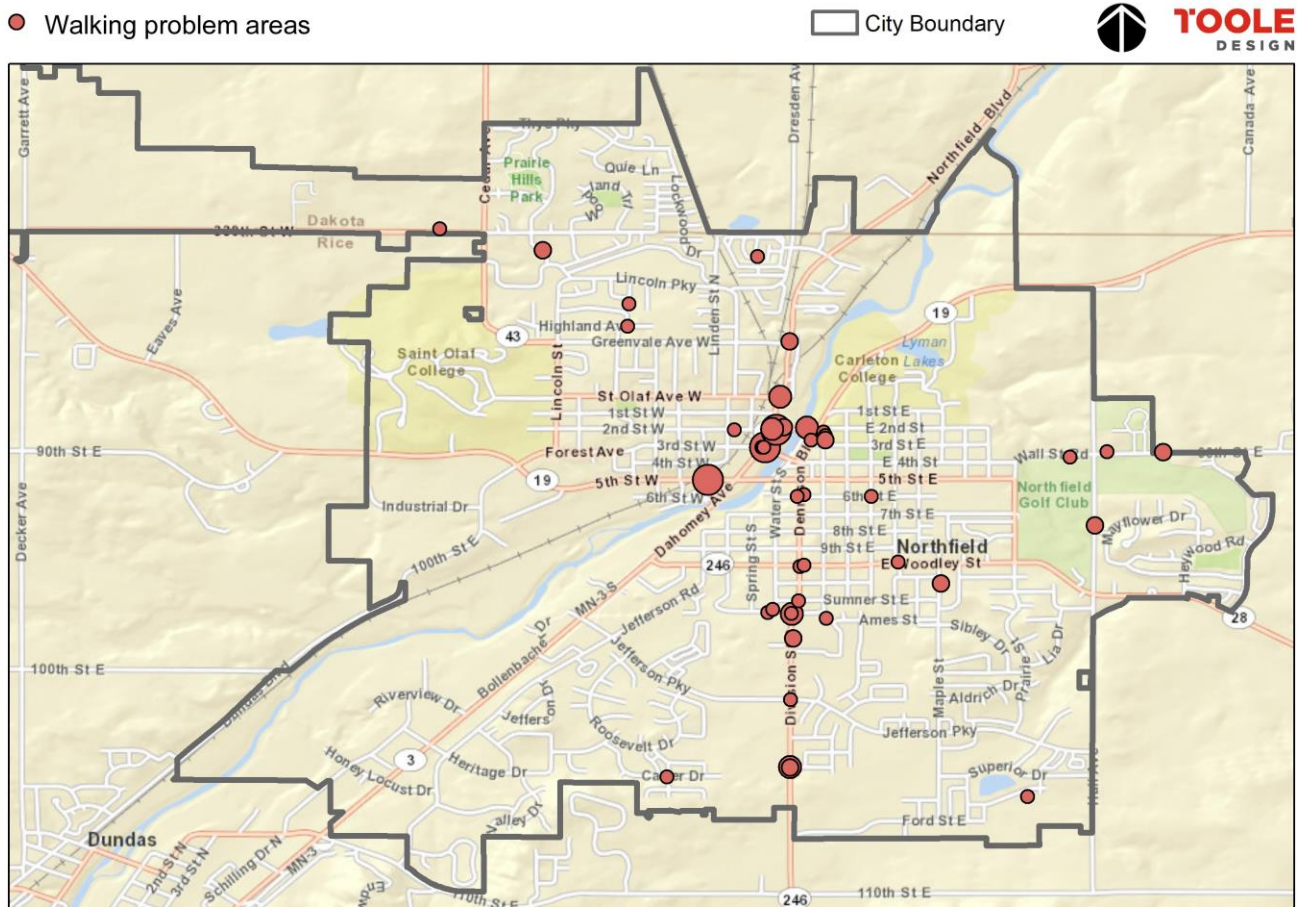
Respondents were also asked to identify problem areas for walking (Figure 7) and problem areas for bicycling (Figure 8) in Northfield. The size of the circles indicates the number of respondents identifying that area as being a problem area.

Generally, pedestrian problem areas are clustered around the following corridors: Dahomey Avenue / State Highway 3 north of 5th Street; Division Street from Carleton College all the way to the city's southern boundary (especially around Northfield High School); and to a lesser extent, Woodley Street.

Common concerns in these areas include the following:

- Limited pedestrian visibility and protection when crossing;
- Fast-moving traffic, with drivers often failing to yield;
- A lack of protection for pedestrians, particularly around schools such as Northfield High School, Northfield Middle School, and Bridgewater Elementary School; and
- A lack of sidewalks (several people mentioned that Division Street lacks a sidewalk near the above-mentioned schools).

Figure 7: Walking problem areas in Northfield that were identified by online map respondents. Larger circles indicate that more people identified a walking problem in this area.

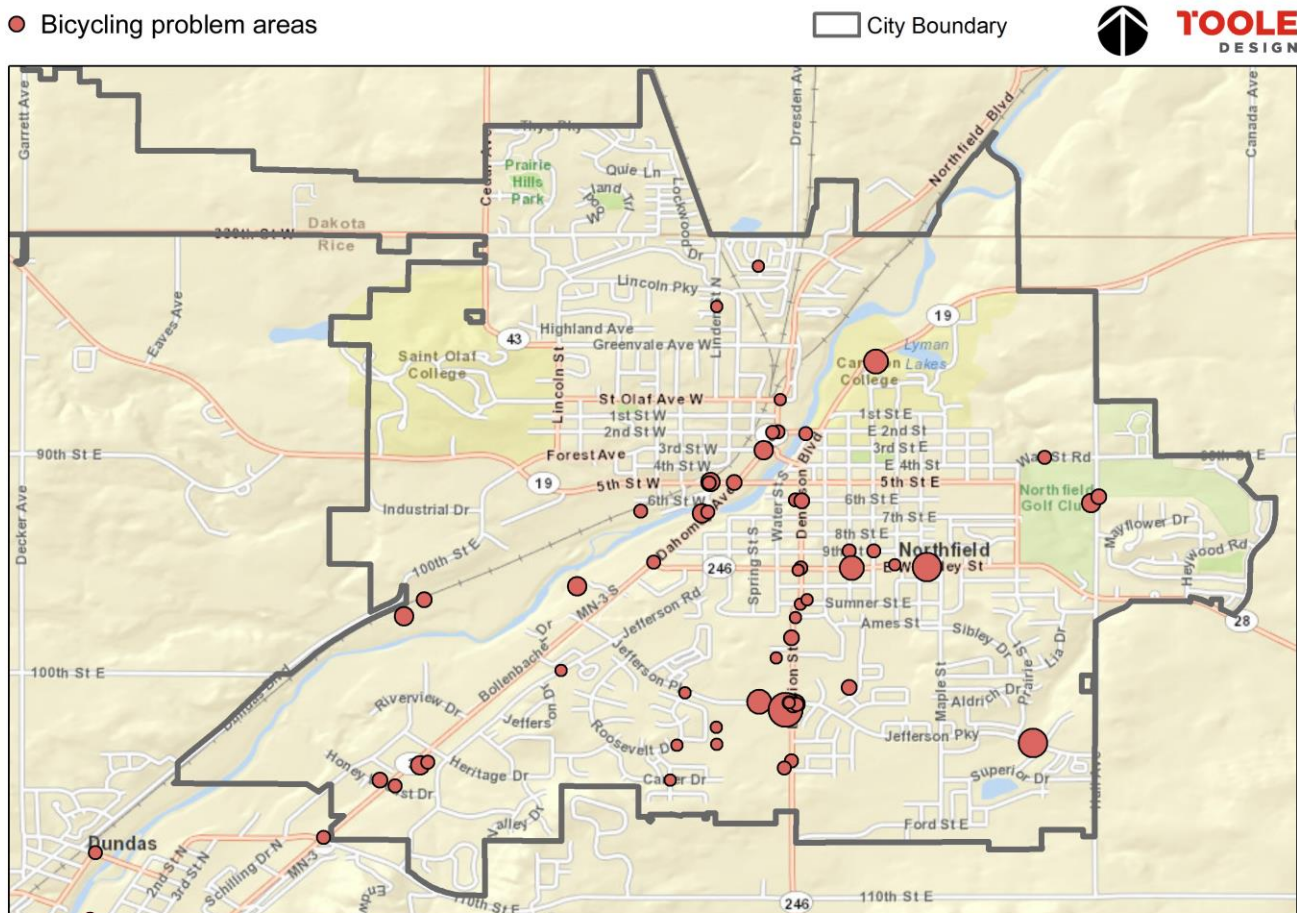


Bicycling problem areas are shown in Figure 8 and are clustered along similar corridors as the pedestrian problem areas. Additional problem areas include the southern section of State Highway 3, Woodley Avenue (east of Division Street), and Jefferson Parkway.

Common concerns in these areas (and others) include the following:

- A lack of safe crossing areas;
- Fast-moving traffic, especially along major thoroughfares;
- Existing routes are indirect, with poor maintenance and signage.

Figure 8: Bicycling problem areas in Northfield that were identified by online map respondents. Larger circles indicate that more people identified a bicycling problem in this area.



SUMMARY OF KEY FINDINGS FROM COMMUNITY MEETINGS AND ONLINE INTERACTIVE MAP

- Improvements are needed for walking and bicycling along and across both Highway 3 and Division Street/Gates Avenue/Dennison Boulevard
- Safer and more accessible bicycling and walking facilities around K-12 schools is a priority
- Most respondents walk and bike to and from Downtown Northfield, schools, and local trails
- There is limited protection at dangerous intersections for people walking and bicycling
- Many streets in the city lack sidewalks, especially in the fast-growing area in the southeast of the city
- Connections to off-street trails need improvement, both through physical trail connections to streets and improved wayfinding signage
- Option B for the Mill Towns State Trail is preferred by 72% of people (44 of 61 surveyed)
- Drivers often do not stop for people walking and bicycling, which is particularly challenging when trying to cross wide streets

Mill Towns State Trail: Planned Route Through Northfield

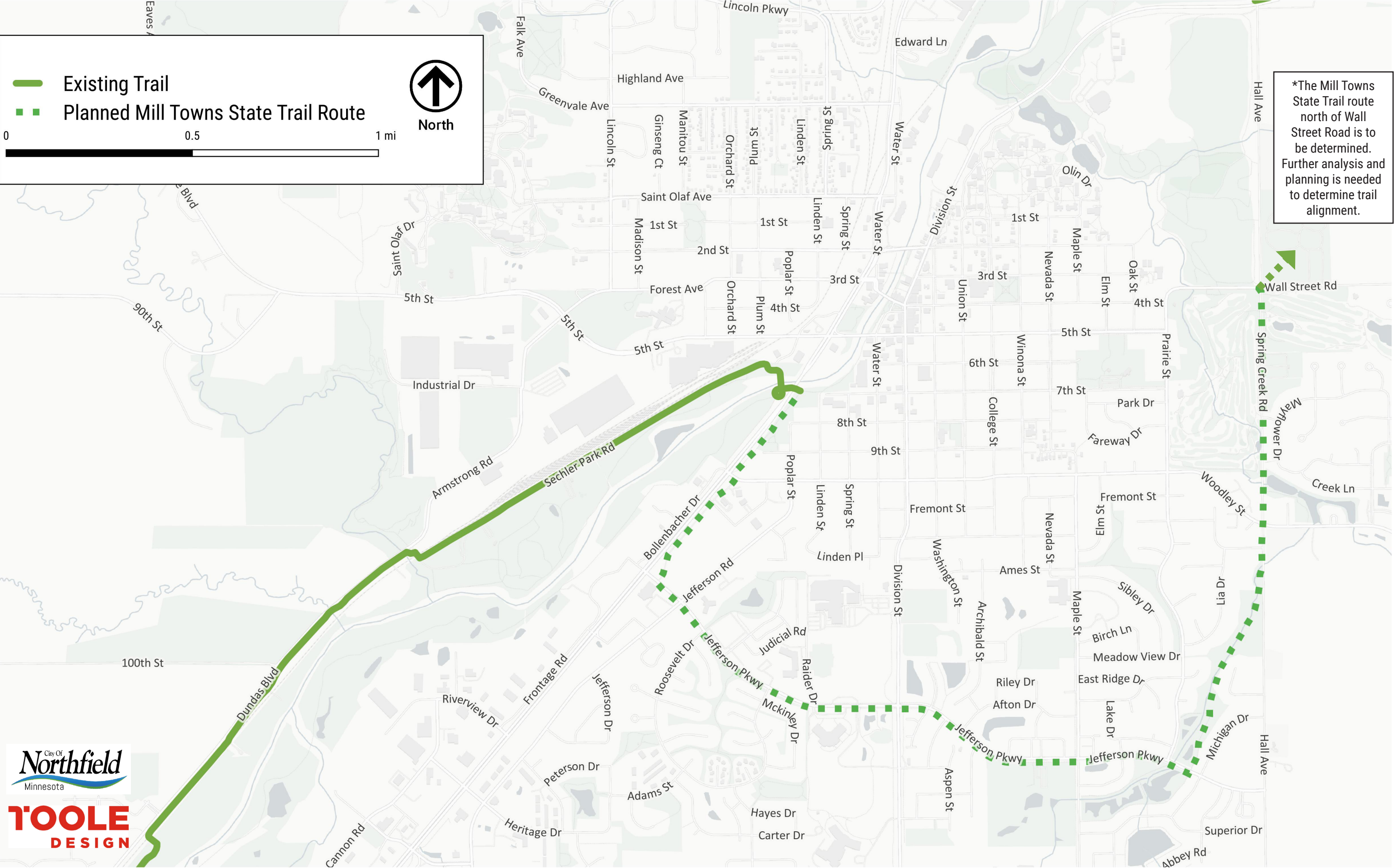
Existing Trail

Planned Mill Towns State Trail Route

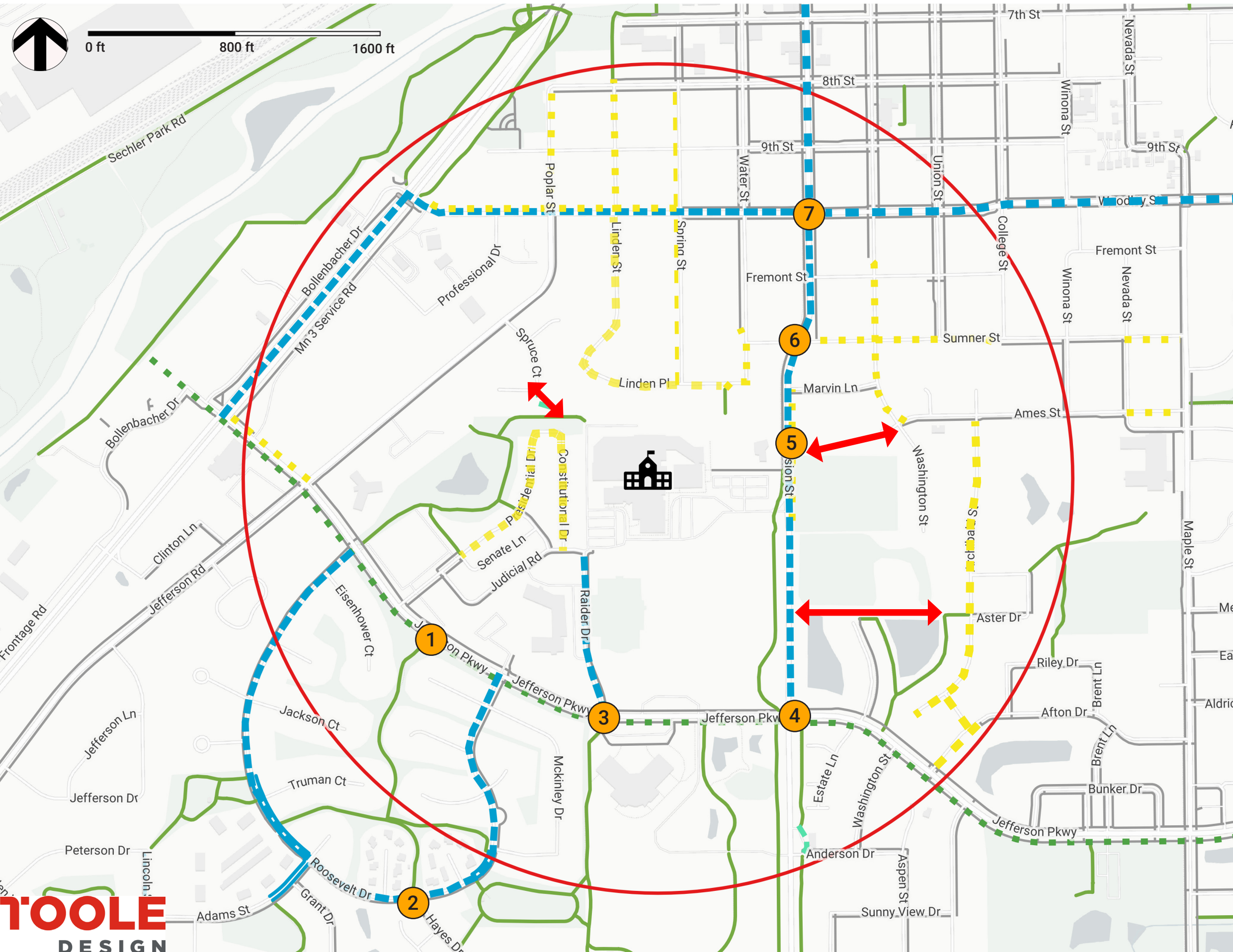
00.51 mi

North

*The Mill Towns State Trail route north of Wall Street Road is to be determined. Further analysis and planning is needed to determine trail alignment.



Northfield High School: Walking and Bicycling Issues Map



Legend

-  Northfield High School
-  Half-mile radius
-  Mill Towns State Trail:
Planned Route

Existing Network

-  Off-street trail / path
-  On-street bikeway
-  Sidewalk

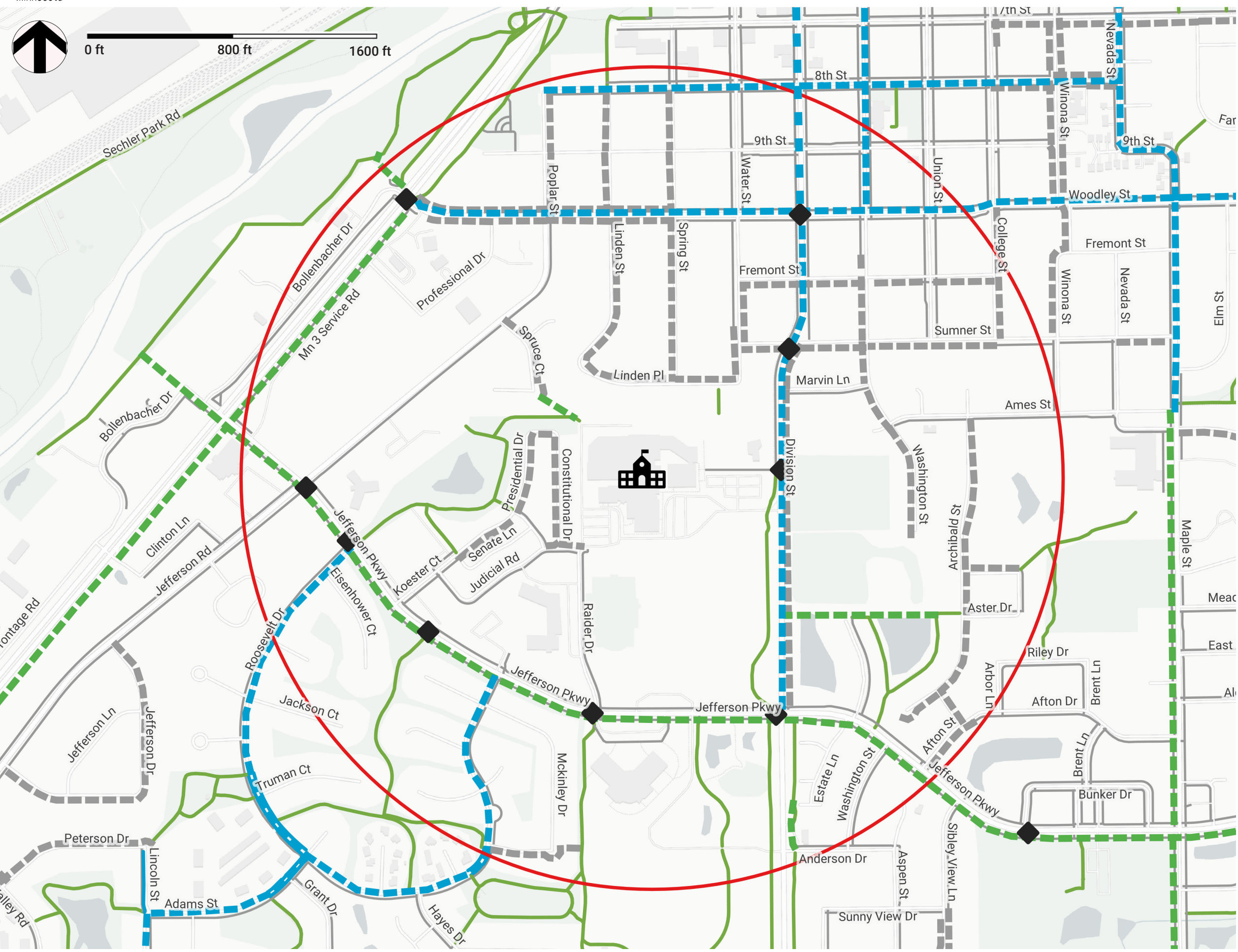
Walking and Bicycling Issues

-  Sidewalk gap
-  No bicycle facility
-  Poor connectivity
-  # Street crossing issue

Notes

-  1 No crossing to connect to trail in Jefferson Park
-  2 No crosswalk connecting trail and sidewalk
-  3 Important crossing for both Bridgewater Elementary and Northfield High School
-  4 Dangerous intersection; trails along Division St do not align
-  5 No crossings between Woodley St and Jefferson Pkwy;
-  6 Students crossing from high school to church parking lot
-  7 Students feel unsafe crossing Woodley St

Northfield High School: Walking and Bicycling Recommendations Map



Legend

 Northfield High School

 Half-mile radius

Existing Network

 Off-street trail / path

 On-street bikeway

 Sidewalk

Planned Network

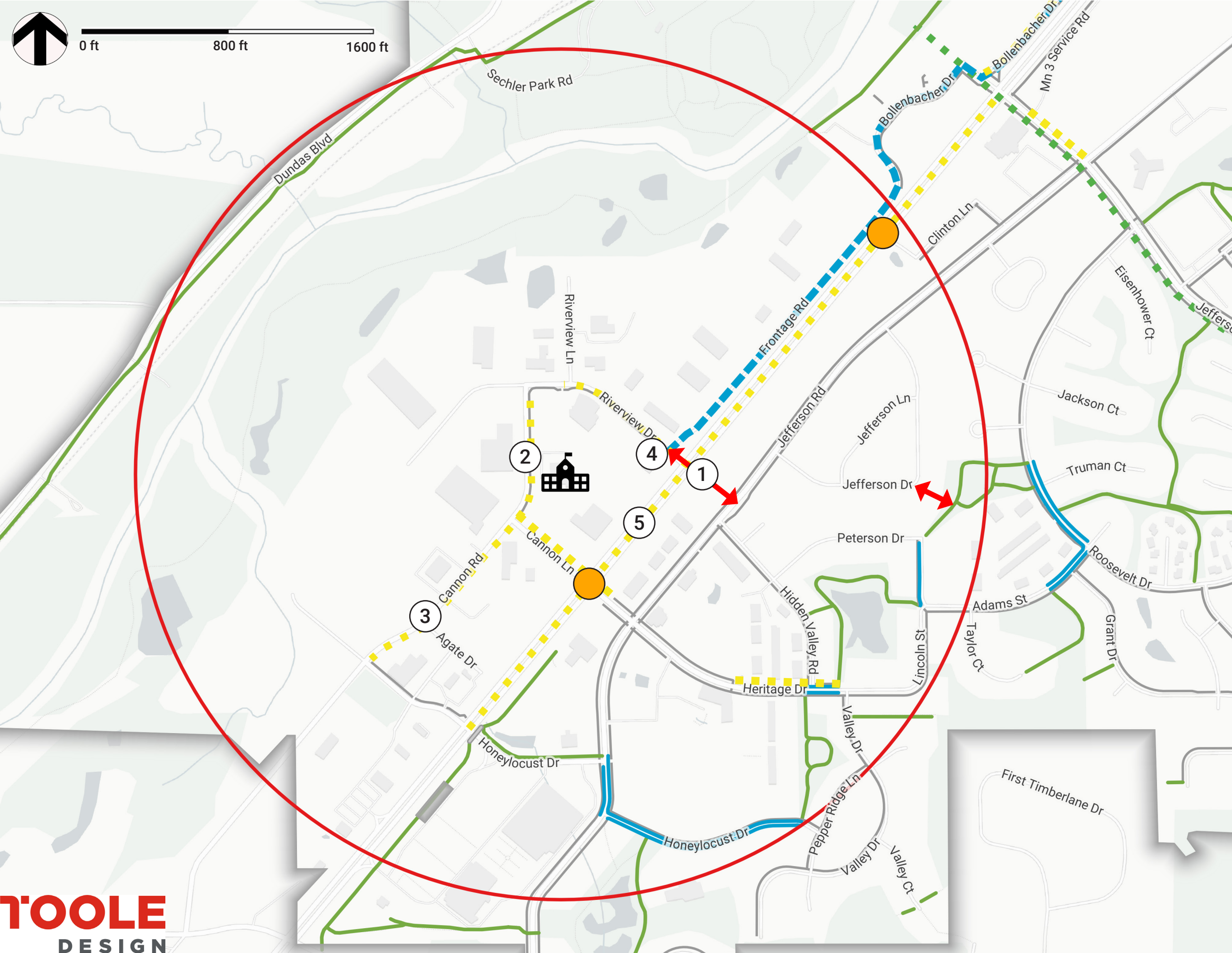
 Sidewalk

 On-street bikeway

 Off-street trail / path

 Enhanced crossing

Arcadia Charter School: Walking and Bicycling Issues Map



Legend

-  Arcadia Charter School
-  Half-mile radius
-  City border
-  Mill Towns State Trail: Planned Route

Existing Network

-  Off-street trail / path
-  On-street bikeway
-  Sidewalk

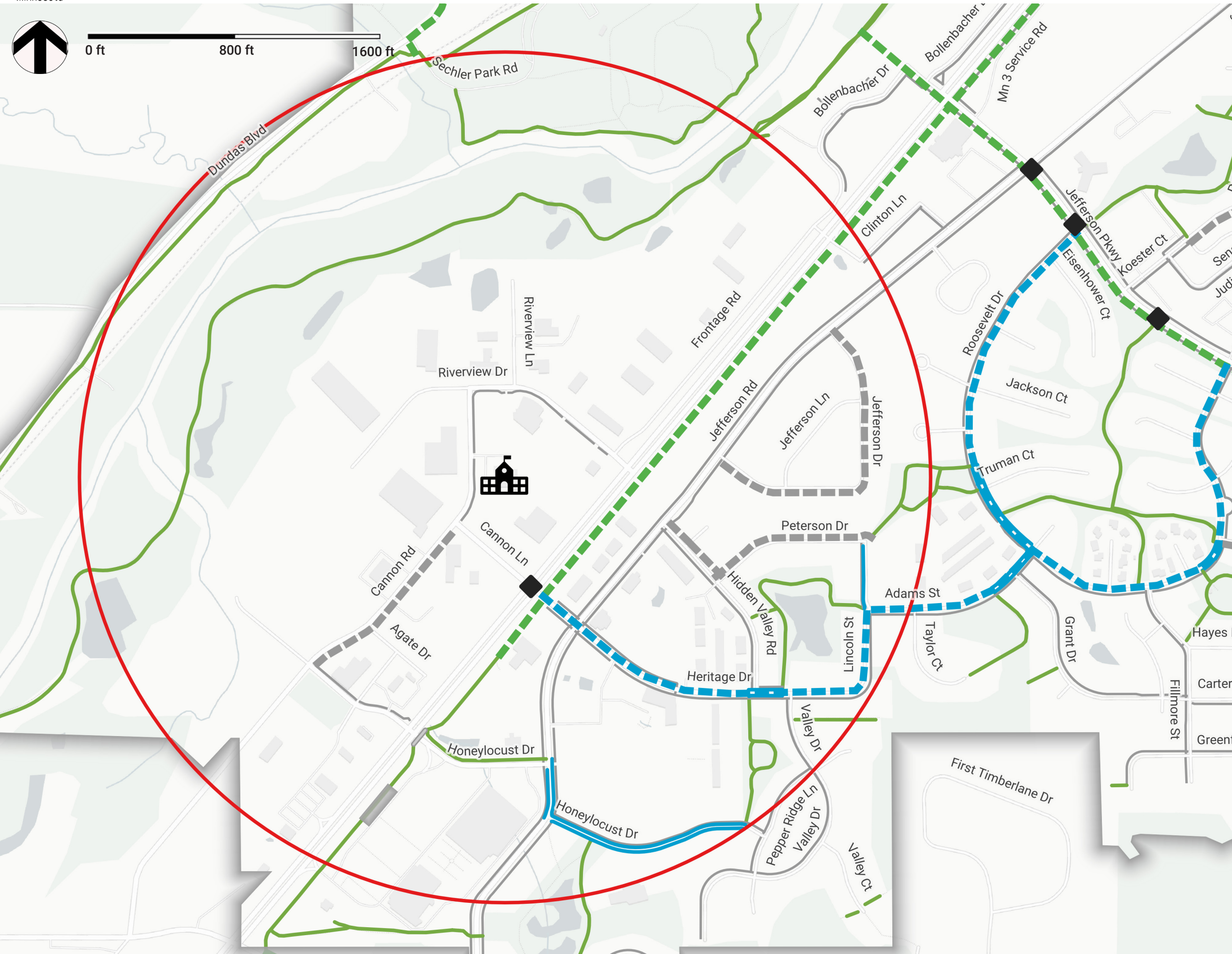
Walking and Bicycling Issues

-  Sidewalk gap
-  No bicycle facility
-  Poor connectivity
-  Street crossing issue

Notes

- ① No direct walking route from school to neighborhoods across Highway 3 to the east
- ② Sidewalk is flush with street and people park on it
- ③ Important walking route to Highway 3 crossing at Honeylocust Dr
- ④ Narrow sidewalk between Highway 3 and trail spur that connects to school
- ⑤ No biking or walking facility along Highway 3 between Jefferson Parkway and Honeylocust Drive

Arcadia Charter School: Walking and Bicycling Recommendations Map



Legend

-  Northfield High School
-  Half-mile radius
-  City border
- Existing Network**
 -  Off-street trail / path
 -  On-street bikeway
 -  Sidewalk
- Planned Network**
 -  Sidewalk
 -  On-street bikeway
 -  Off-street trail / path
 -  Enhanced crossing

STREET TYPE TABLE UPDATE

March 2019 | *City of Northfield Pedestrian, Bike, and Trail System Update*

OVERVIEW

Toole Design was asked to review and update the Street Type Table in the City of Northfield's Land Development Code (LDC). The purpose of this update is to:

- A) Incorporate Complete Streets principles into the table, and
- B) Simplify the table and add clarity to its application.

In developing this update, Toole Design coordinated with the City of Northfield Public Works Director, Streets and Parks Manager, City Planner, Planning Commission members, and Park Board members. The decision was collectively made to simplify the table by reducing the influence of functional classification (arterial, collector, local roads) and increasing the influence of place type and land use context of each street.

The updated street type table consolidates several functional classification variations of each street type that were included in the previous table. The update contains two components:

1. Updated street type table that includes ranges of appropriate values that can apply to multiple functional classifications and variations in context.
2. Individual street type profiles to provide additional guidance on street design.

APPROACH

The approach to updating the street types and values shown on the table was to consider the context and design of existing streets in Northfield, and to consider the probable development context and patterns that might occur in the next 10 to 20 years. It is likely that the City will restripe, repave, reconstruct, or widen more miles of existing streets in the next few decades than it will build completely new roadways. The street types were therefore refined to reflect the various ways that existing street corridors can and should be reconfigured, enhanced, or redeveloped in the future, while also being flexible enough to apply to new roadways.

The greatest change between the original street type table and this update is that the Drive street type is fundamentally different in the updated street type table. Whereas before it appeared to be used in situations where one side of the roadway was urbanized and the other was rural, in this update it is a two-lane street that falls between the major streets (Parkway and Avenue) and minor streets (Street and Main Street) that are appropriate in developed portions of the city. The updated street type table also includes a 'target speed' for each street type. Target speed is the speed that people are expected to drive, it does not necessarily refer to the speed limit of the roadway. Achieving target speed depends on the selected design speed of the roadway and the posted speed limit.

UPDATED STREET TYPE TABLE

Street Type	Compatible Contexts	Function	Candidate Streets	Functional Classification	Typical Traffic Volume	Target Speed ¹	Typical Right-of-Way Widths ²	Reaction Space ³	Sidewalk / Off-street path	Boulevard	Shoulder / Parking	On-Street Bikeway ⁴	Travel Lanes	Median / Center Turn Lanes
Parkway	Rural Urban/Rural Transition Park & Open Space Locations with deep setbacks	Throughput-focused	2 nd Ave NW, Hwy 19 (5 th Street West), Hwy 3	Principal & Minor Arterial	4,000+ AADT	35 mph or higher	100'-180'	2'	10'-12' off-street path (one or both sides)	16'-20'	6'-8' shoulder	n/a (shoulder)	10'-12' lanes (1 or 2 per direction)	18'-30' Median (with 2' curb offset on each side)
Avenue	Commercial Residential Downtown	Throughput/access balanced	Water Street/Hwy 3 (North of Hwy 19), Jefferson Pkwy	Principal & Minor Arterial, Major Collector	4,000+ AADT	25-30 mph	100'-150'	2'	6'-8' sidewalk (both sides)	7'-12'	n/a	6'-8' Bike lanes ⁵	10'-11' lanes (1 or 2 per direction)	16'-18' Median (with 1' curb offset on each side) or 12'-13' CTL
Drive	Commercial Residential	Throughput/access balanced	Woodley Street, Greenville Ave	Minor Arterial, Major Collector	Up to 6,000 AADT	25 ⁸ mph	60'-90'	1'	6' sidewalk (both sides)	7'-10'	7'-8' parallel parking	6'-8' Bike lanes	10'-11' lanes	Not typical (10'-13' CTL optional)
Road	Rural Urban/Rural Transition Park & Open Space Locations with deep setbacks	Throughput-focused	Dresden Ave, Spring Creek Rd	Minor Arterial, Major & Minor Collector, Local	Up to 4,000 AADT	30-35 mph	60'-90'	1' ⁶	10'-12' off-street path (one side)	6'-20' ⁷	Not typical (4'-6' optional)	n/a (optional shoulder)	12' lanes	Not typical (12'-15' optional)
Street	Commercial Residential	Access-focused	Water St South, St Olaf Ave	Major & Minor Collector, Local	Up to 1,000 AADT	25 ⁸ mph	50'-66'	1'	5'-6' sidewalk (both sides)	7'-10'	7' un-delineated parallel parking (one or both sides)	n/a	16'-20' feet total ⁹	n/a
Main Street	Downtown Mixed Use	Access-focused	Downtown streets	Major & Minor Collector, Local	Up to 2,000 AADT	25 ⁸ mph	70'-80'	0'	8'-10' sidewalk (both sides)	5'-10' ¹⁰	7'-8' parallel parking (16' reverse angle optional on one side)	Shared lane markings	20'-22' feet total	n/a

¹ Target speed is the speed that people are expected to drive. Achieving target speed depends on the selected design speed of the roadway and the posted speed limit.

² Right-of-way width ranges represent typical widths; widths may vary.

³ Reaction space may be provided as a setback outside of the roadway right-of-way.

⁴ On-street bikeways may include bicycle lanes, buffered bicycle lanes, advisory bicycle lanes, separated bicycle lanes, and bicycle boulevards. Bikeway facility type should be determined on a case by case basis. Generally, if the on-street bikeway width is greater than 6 feet, the portion over 6 feet should be a striped buffer or vertical separation.

⁵ Separated bike lanes or off-street paths are recommended; facility type selected depends on available right-of-way space and other design considerations.

⁶ Reaction space is only required on the side of the street that a sidewalk or off-street path is provided.

⁷ Boulevards on Roads should only be narrower than 12 feet when between the roadway and a 10-foot wide off-street path.

⁸ The default speed limit in Minnesota is 30 mph. Adopting a lower target speed does not require lowering the speed limit. Rather, street design characteristics can be incorporated to encourage people to drive closer to 25 mph.

⁹ Streets and Main Streets do not have marked lane lines. The width shown is the total width of the portion of the roadway dedicated to two-way travel. The total pavement width of a Street in residential areas should not exceed 30 feet.

¹⁰ Furnishing area to include street trees, street lights, benches, bicycle parking, trash/recycling cans, etc. At least 8 feet is needed for café seating. These amenities can also be placed in curb extensions that replace one or more on-street parking spaces.

PARKWAY



	Reaction	Off-street path / Sidewalk	Boulevard	Shoulder	Travel Lanes ³	Median	Travel Lanes ³	Shoulder	Boulevard	Off-street path / Sidewalk	Reaction
Default Layout	2'	10' – 12'	16' – 20'	6 – 8'	10'-12' each (1 or 2 lanes)	18' – 30' (with 2' curb offsets)	10'-12' each (1 or 2 lanes)	6 – 8'	16' – 20'	10' – 12'	2'
Alternative Layout	"	12'	" "	" "	" "	" "	" "	8'	" "	6'	"

DESCRIPTION

Parkways extend through or along natural areas or large parks where there is a desire to maintain or create a park-like feel to the street. Elements often include wide planted medians, and shared use paths alongside the road instead of sidewalks. Parkway design should focus on minimizing impacts to the adjacent natural areas and maintaining the park-like character.

STREET DESIGN NOTES

- The number of lanes should be determined based on traffic volume and intersection capacity. One travel lane in each direction with a median or center turn lane can easily accommodate 15,000 ADT or more.
- Off-street paths are recommended on both sides of the street. If an off-street path is only provided on one side, the side selected should be based on connectivity to existing bicycle network and destinations in the area.
- Default minimum width for a shared use path is 10'. A width of 8' is acceptable in constrained situations.
- Left and right turn lanes at intersections may result in narrower median and boulevard space to accommodate extra lane width. If left and right turn lanes are present, consider pedestrian refuge islands between the right turn lanes and through lanes to minimize crossing distances for people walking.
- On-street bicycle lanes and/or parking lanes may be included in limited situations.

STREET FEATURES

- Adjacent to parks and other natural areas
- Shared use paths instead of sidewalks
- Wide, planted medians
- Target speed: 35 mph or higher

CANDIDATE STREETS IN NORTHFIELD

- 2nd Ave NW
- Highway 19 (5th Street West)
- Highway 3
- Jefferson Parkway

AVENUE



	Reaction	Sidewalk	Boulevard	Bike Lane	Travel Lanes ³	Median	Travel Lanes ³	Bike Lane	Boulevard	Sidewalk	Reaction
Default Layout	2'	6'	7' – 12'	6 – 8'	10'-11' each (1 or 2 lanes)	16' – 18' (with 1' curb offsets)	10'-11' each (1 or 2 lanes)	6 – 8'	7' – 12'	6'	2'
Example Alternative Layout	"	8'	" "	" "	" "	12' – 13' Center Turn Lane	" "	" "	" "	8'	"

DESCRIPTION

Avenues are streets that balance access and throughput and often traverse commercial areas and neighborhoods. They have high volumes of motor vehicles and moderate to high volumes of people walking. While they are essential to the flow of people across the city, the needs of people passing through must be balanced with the needs of those who live and work along the street.

STREET DESIGN NOTES

- The number of lanes should be determined based on traffic volume and intersection capacity. One travel lane in each direction with a median or center turn lane can easily accommodate 15,000 ADT or more.
- Left and right turn lanes at intersections may result in narrower median and boulevard space to accommodate extra lane width. If left and right turn lanes are present, consider pedestrian refuge islands between the right turn lanes and through lanes to minimize crossing distances for people walking.
- Wider sidewalks (e.g., 8 feet) should be provided where retail abuts the right-of-way.
- Bicycle lanes with physical separation recommended. Standard or buffered bike lanes may be appropriate at speeds up to 35 mph. Bike lanes should be continuous through all intersections. At right turn lanes, use protected intersection designs or provide high-visibility mixing zones.
- Bike lane widths do not include the gutter pan; the widths shown are in addition to the street gutter.

STREET FEATURES

- Mix of commercial and residential land use
- Median or center turn lane
- Sidewalks on both sides of the street
- On-street bikeways
- Target speed: 25-30 mph

CANDIDATE STREETS IN NORTHFIELD

- Water Street/Highway 3 (North of Hwy 19)

DRIVE



	Reaction	Sidewalk	Boulevard	Parking	Bike Lane	Travel Lanes ³	Bike Lane	Parking	Boulevard	Sidewalk	Reaction
Default Layout	1'	6'	7' – 10'	7' – 8'	6' – 8'	11' – 12' each (one lane in each direction)	6' – 8'	7' – 8'	7' – 10'	6'	1'
Example Alternative Layout	"	" "	" "	None	" "	11' – 12' each (one lane in each direction) Plus 10-13' center turn lane	" "	None	" "	" "	"

DESCRIPTION

Drives are streets that balance access and throughput and typically traverse neighborhoods while providing access to commercial areas and downtown. They provide continuous walking and bicycling routes. While they are essential to the flow of people across the city, the needs of people passing through must be balanced with the needs of those who live and work along the street.

STREET DESIGN NOTES

- Continuous center turn lanes or left turn lanes at higher-volume intersections may be provided. In these cases, it may be necessary to remove on-street parking.
- Minimize crossing distances for walking across intersections. If left and right turn lanes are present, consider pedestrian refuge islands between the right turn lanes and through lanes.
- Bike lane widths do not include the gutter pan; the widths shown are in addition to the street gutter. Bike lanes should be continuous through all intersections. At right turn lanes, provide high-visibility mixing zones.
- Bicycle lanes with physical separation (separated bicycle lanes) may be appropriate depending on the context.

STREET FEATURES

- Primarily in residential areas, but often connecting to commercial
- On-street parking
- Sidewalks on both sides of the street
- On-street bikeways
- Target speed: 25 mph

CANDIDATE STREETS IN NORTHFIELD

- Woodley Ave
- Greenville Ave

ROAD



	Reaction	Off-street path	Boulevard	Travel Lanes ³	Boulevard	Reaction
Default Layout	1'	10' – 12'	6' – 10'	12' each (one lane in each direction)	12' – 20'	0'
Example Alternative Layout	"	" "	" "	12' each (one lane in each direction)	6' – 10' Boulevard 10' Off-street path	1'
Example Alternative Layout	"	" "	" "	12' each (one lane in each direction) with 4' – 6' shoulders	12' – 20'	0'

DESCRIPTION

Roads have rural cross sections and run through agricultural, low-density residential, open space, and other contexts with deep development setbacks from the roadway. They emphasize throughput but still provide access to neighborhoods and parks.

STREET FEATURES

- Adjacent to parks and other natural areas
- An off-street path instead of a sidewalk on one or both sides
- Do not have paved shoulders
- Wide boulevards that provide open drainage
- Target speed: 30-35 mph

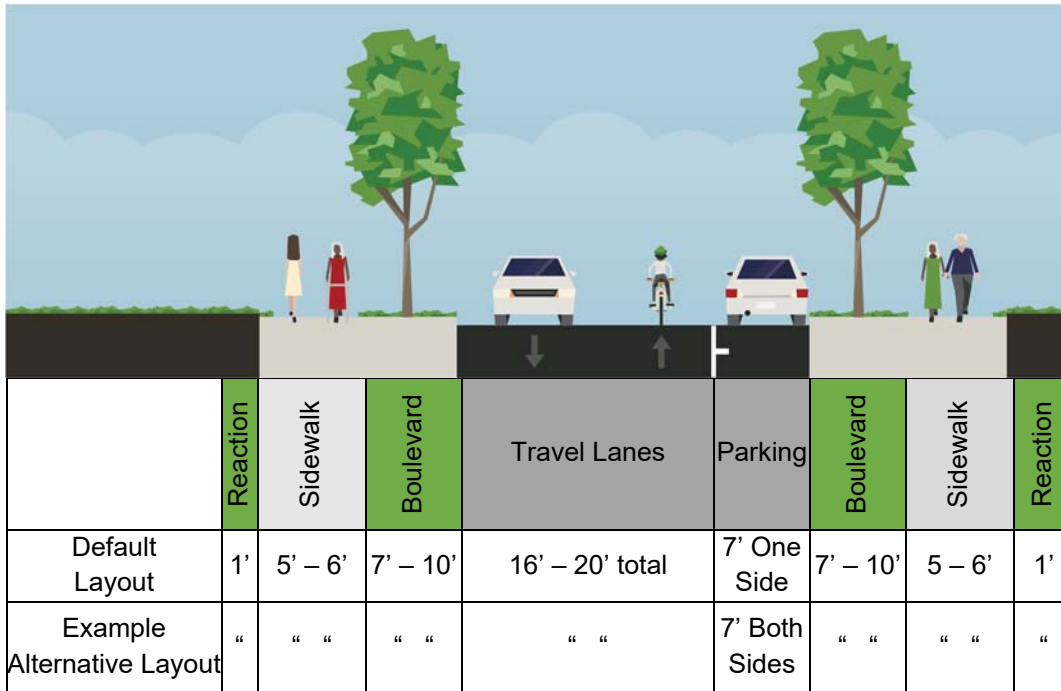
STREET DESIGN NOTES

- The side of the road the off-street path is located on should be planned based on connectivity to existing bicycle network and destinations in the area.
- Default minimum width for a shared use path is 10'. A width of 8' is acceptable in constrained situations.
- Street trees are typically not provided in the boulevard since this is an area dedicated to open drainage. However, street trees can be provided if width allows and/or if storm sewer is present.

CANDIDATE STREETS IN NORTHFIELD

- Dresden Avenue
- Spring Creek Road

STREET



DESCRIPTION

Streets serve mostly residential areas and some commercial areas with low levels of motor vehicle traffic and moderate to high levels of walking and bicycling. Most, but not all, 'Streets' in Northfield have sidewalks and offer on-street parking. Most 'Streets' have parking on only one side of the street, and some have parking on both sides. Design for 'Streets' should focus on encouraging slow speeds, safety for people walking, healthy street trees, and well-defined routes to nearby parks, transit, and schools.

STREET DESIGN NOTES

- No painted centerline. Widths shown in the table under "travel lanes" is the combined width of the two bi-directional lanes.
- The default 'Street' only provides parking on one side of the street. Parking should only be provided on both sides if both sides are regularly occupied.
- Streets may be designed to be bicycle boulevards, with traffic calming elements, pavement markings, and signage indicating the bicycle boulevards.
- May include curb extensions (at intersections or midblock) in place of one or two on-street parking spaces in order to calm traffic. Curb extensions should be designed to ensure that they do not interfere with on-street bikeways.
- Other traffic calming treatments such as mini traffic circles and speed humps can be considered.

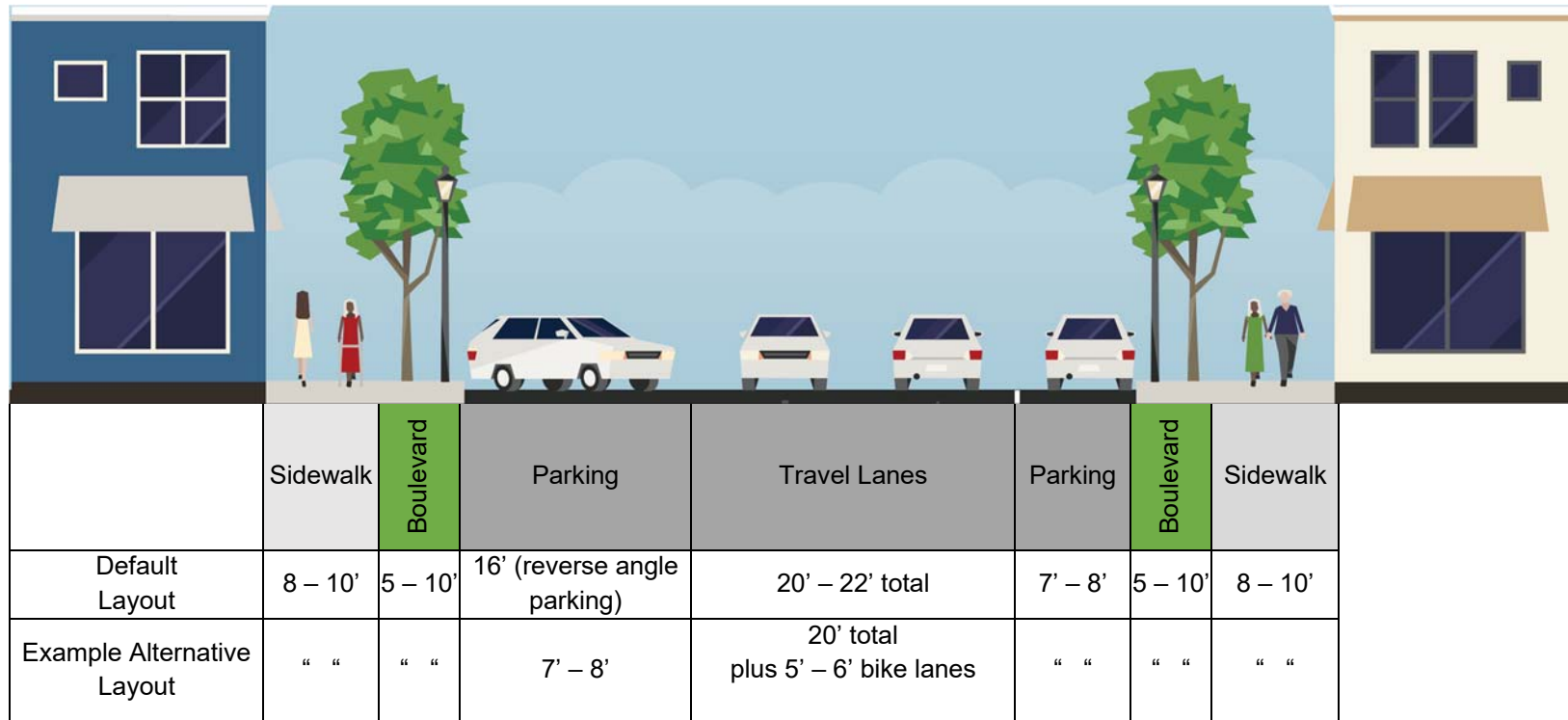
STREET FEATURES

- Residential land uses; some commercial
- On-street parking (unstriped/undelineated)
- Low motor vehicle speeds and volumes
- Medium to heavy walking and bicycling, especially during weekends and in evenings
- Target speed: 25 mph

CANDIDATE STREETS IN NORTHFIELD

- Water Street S
- St Olaf Ave

MAIN STREET



DESCRIPTION

Main Streets are located in the downtown core. In addition to conveying traffic, they are popular destinations. They have moderate motor vehicle volumes and high volumes of people walking. These streets may host a variety of uses such as farmers' markets, street fairs, and community gatherings. Typically, Main Streets have angled parking, parallel parking, or a mix. Reverse angle parking is safer, especially for people bicycling.

STREET DESIGN NOTES

- No painted centerline. The width shown under "travel lanes" in the table is the total width of the bidirectional travelway.
- On Main Streets, the boulevard is a furnishing area, which includes street trees, street lights, benches, bicycle parking, trash/recycling cans, etc. At least 8 feet is needed for café seating. These amenities can also be placed in curb extensions that replace one or more on-street parking spaces.
- Due to the low speeds and traffic volumes, shared bicycle lanes may be appropriate. Alternatively, bike lanes can be provided, though this may reduce on-street parking capacity.

STREET FEATURES

- Wide sidewalks and high volumes of people walking
- On-street parking is common
- Enhanced streetscapes with street trees and street furniture
- Medium to high density; buildings located close to the street
- Access-focused
- Target speed: 25 mph

CANDIDATE STREETS IN NORTHFIELD

- All streets in downtown core

LEGEND

 City Boundary

 Natural Greenway Corridors

 Parks

 Water body

Existing Network

 Sidewalk

Planned Network

 Sidewalk

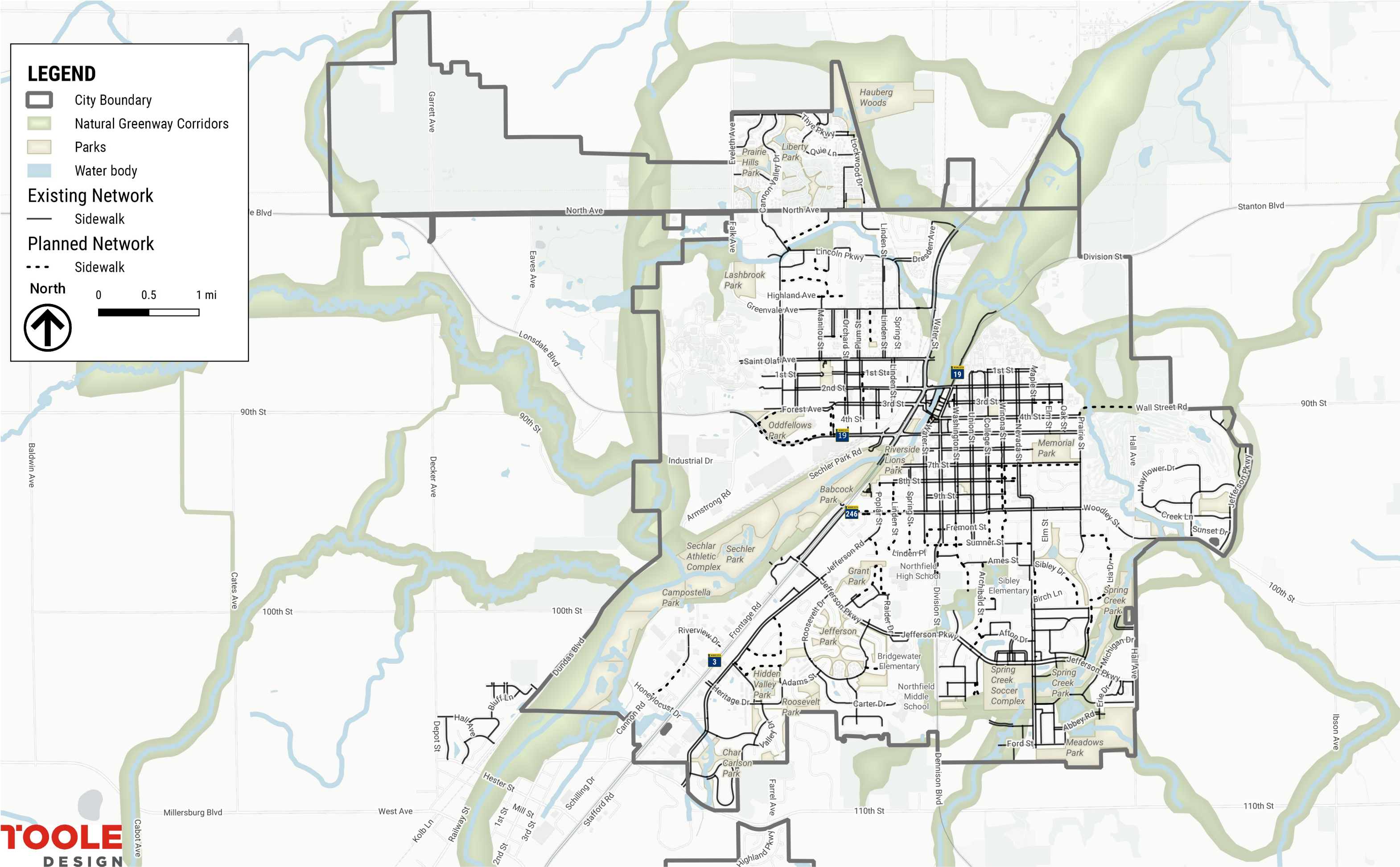
North



0

0.5

1 mi



LEGEND

-  City Boundary
-  Natural Greenway Corridors
-  Parks
-  Water body

Existing Network

-  Sidewalk
-  On-Street Bikeway
-  Off-Street Trail / Path
-  Existing Mill Towns State Trail Segment

Planned Network

-  Sidewalk
-  * On-Street Bikeway
-  Off-Street Trail / Path
-  Planned Mill Towns State Trail Segment

* Planned on-street bikeways could take the form of a standard bicycle lane, buffered bicycle lane, advisory bicycle lane, separated bicycle lane, or bicycle boulevard. The exact facility type for each on-street bikeway should be determined through each project development process. Several factors should be considered while identifying the facility type, such as community member preferences, right-of-way availability, implementation cost, motor vehicle traffic volumes, and speed limit.

North



0 0.5 1 mi

* The Mill Towns State Trail route north of Wall Street Road is to be determined. Further analysis and planning is needed to determine trail alignment.