

Bicycle Facility Design Guidelines

Chapter 1—Introduction

Overview

Organization—This document is organized into the following sections for simplicity. Topics are arranged alphabetically in each category.

- **Chapter 1—Introduction:** This chapter explains how the document is organized in addition to discussing its purpose, listing references, and explaining how to use the document. Definitions are also introduced.
- **Chapter 2—Design Factors:** This chapter looks at a number of design factors including user considerations and bicycle facility networks.
- **Chapter 3—Off-Street Facilities:** This section examines off-street facility types, trail support facilities, geometric design considerations, intersections, and trail specifications.
- **Chapter 4—On-Street Facilities:** This chapter discusses bikeway types, on-street design, intersections, road/bridge design, roadway configurations/considerations, and traffic calming.
- **Chapter 5—Bicycle Parking:** The bicycle parking chapter deals with types of bicycle parking, bicycle parking guidelines, and bike parking specifications.
- **Chapter 6—Bicycle Support Facilities:** There are a number of support facilities that accommodate bicyclists needs.
- **Chapter 7—Bicycles and Transit:** Transit integration facilities are important elements of a successful bicycle system and are discussed in this chapter.
- **Chapter 8—Maintenance:** This chapter looks at maintenance guidelines and maintenance techniques.
- **Chapter 9—Innovation:** This section considers all types of innovative facilities and solving unique problems.



Above: Bicycle Box along 1st Avenue North



Above: Bicycle Parking at Lucy Laney School



Above: 10th street bike lane plowed under

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Purpose—The purpose of the Minneapolis Bicycle Facility Design Guidelines is to provide residents, community groups, bicyclists, and staff professionals with clear and consistent information about how to plan and design bicycle facilities. Much of this document is based on existing published standards and guidelines and is designed to be specific to the City of Minneapolis.



Above: West River Parkway Trail at I-35W

References—The City of Minneapolis uses a number of documents as design standards when planning and designing bicycle facilities. These documents include:

- The 2005 Minnesota Manual on Uniform Traffic Control Devices
- The 1999 AASHTO Guide for the Development of Bicycle Facilities
- The February 2010 AASHTO Guide for the Planning, Design, and Operation of Bicycle Facilities
- The 2009 FHWA Approved Manual on Uniform Traffic Control Devices
- The 2005 Minnesota Manual on Uniform Traffic Control Devices
- The March 2007 MnDOT Bicycle Facility Design Manual
- The 2006 Minnesota DNR Trail Planning, Design, and Development Guidelines
- The Access Minneapolis Street and Sidewalk Design Guidelines

The Minneapolis Bicycle Facility Design Guidelines should supplement these documents. Local standards and guidelines may be more restrictive than state or federal standards and guidelines, but can not be less restrictive. When a more stringent standard or guideline is presented in this document it should be considered to take precedence over the documents listed above. This document is not a substitute for engineering judgment and should be used as a best practices manual in addition to a reference manual. For the convenience of the reader, there are numerous tables, graphs, and charts that have been directly imported into this document from the list above for easy reference and for discussion purposes. Photo credits and references are listed at the end of this document. This is an active document that will need to be revised from time to time to reflect changes in local, state, and national standards/guidelines.

How to Use This Document—This document should be used as a reference when considering a bicycle improvement. This document is intended to be used like an encyclopedia, with easy to find bicycle topics, which contains advice and best practices in addition to the formal standards and codes found in other texts. Due to the wide range of readers, efforts have been made to simplify technical details and to provide easy to understand criteria and explanations. In most cases, photos/diagrams have been provided to demonstrate a point or to show a various treatment or method. It is also important to note that the document has been prepared with consideration to the seasonal weather extremes experienced in Minnesota.

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The Design Process—There are a number of steps that should be followed when designing bicycle facilities. Although the Bicycle Master Plan lists all of the candidate bicycle facilities it does not provide much guidance in how to implement them. This process should be used for both on-street and off-street facilities.



Above: Midtown Greenway in early winter

Design Process: After a project has been identified and funded as part of the capital budget, the design process begins. Trails tend to be stand alone projects that require a considerable amount of preparation. On-street bicycle improvements are typically part of a much larger street project and bicycle parking is often installed without much planning at all. Support facilities and transit integration can often be done as part of other initiatives or can be stand alone projects.

Step 1: Project managers and planners should consult regional and local plans. The Minneapolis Bicycle Master Plan map should generally show bikeway location. Project termini should be at logical locations where existing or future bikeway connections can be made (project termini are typically determined in the planning process). Regional and other local plans should also be consulted. A project rationale and overview report is then drafted, which states the purpose and need for the project.

Step 2: The project team will need to determine the type of user and types of trips that will occur on the facility. The best way to find out who will use the project is to ask the community. Surveys, open houses, and newsletters are good ways to gather information. Based on this information a more separated or more integrated facility may be recommended. The primary goal of a project should be to improve bicycle safety, and to increase the number of bicyclists.

Step 3: Look at the appropriate design chapter for design guidance.

Off-Street Routes: Refer to Chapter 2 (Design Factors), Chapter 3 (Off-Street Routes), and Chapter 8 (Maintenance). Off-Street facilities include grade separated crossings, mountain biking trails, multi-use trails, separated trails, and unpaved trails.

On-Street Routes: Refer to Chapter 2 (Design Factors), Chapter 4 (On-Street Routes), and Chapter 8 (Maintenance). On-Street facilities include bicycle lanes, paved shoulders, shared lanes, shared lanes with signage, and wide outside lanes. Road and Bridge design in addition to traffic calming is covered here.

Bicycle Parking: Refer to Chapter 5 to find guidance on Class I, Class II, and Class III bicycle parking guidelines and specifications.

Support Facilities: Refer to Chapter 6

Bicycles and Transit: Refer to Chapter 7

Innovation: Refer to Chapter 9. Innovation is used to solve a problem that traditional treatments can't solve.

Step 4: The project team needs to prepare a layout. Based on the guidance provided in this document in addition to the Access Minneapolis Street and Sidewalk Design Guidelines, a project layout may be developed. AASHTO, MUTCD, and ITE guidelines should be followed in combination with engineering judgment. The layout must consider community needs, maintenance requirements, and must satisfy the purpose or need for the project.

Step 5: Develop a project plan set for construction. A plan set is a formal document that is used to construct a project. The plan set includes the project alignment, a project layout, typical sections, project quantities, geometric changes, and signage/stripping sheets. A plan set for a trail will look slightly different than a plan set for bicycle lanes or for a support facility.

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Definitions—It is important to distinguish the difference between standards and guidelines, as this document mentions both. Standards allow for uniformity and consistency in the transportation system and are rigid. Standards are typically recognized by a “shall” condition whereas guidelines use “should” and “may” conditions. For example, the Minnesota Manual of Uniform Traffic Control Devices (MMUTCD) has created a national standard for stop signs. All stop signs shall be white lettering on a red background with an octagonal shape. The MUTCD also provides guidance as to the placement of stop signs, which often requires an engineering study and engineering judgment. In some cases, stop signs should or may be added to an intersection if certain criteria are met. Another example of standards include roadway widths on Municipal State Aid roadways. Varying from these standards would require a variance. Variances are typically granted when there is no other feasible alternative to meeting a standard.

This document is intended to provide both standards and guidelines, however many of the standards can be found in other publications. Many of the guidelines mentioned in this document are unique to Minneapolis and are intended to help planners, engineers, developers, elected officials, community groups, and residents work together to come up with the best possible design treatments given the local built environment.

The Minneapolis Bicycle Facility Design Guidelines in intended to be companion document to the Minneapolis Bicycle Master Plan. The Bicycle Master Plan has defined policies, goals, objectives and benchmarks that support bicycling in Minneapolis



Above: LRT Trail at dusk

Shall— A mandatory condition. This term requires a specific design or action.

Should—An advisory condition. This term recommends a specific design or action.

May—A permissive condition. This term only suggests a possible design or action.



Above: A tractor brushing snow Downtown

Standard: A standard is defined as a mandatory design condition in which a technical detail must be adhered. A standard often defines extreme values (maximums or minimums) and can only be altered with a variance.

Guidance: A recommended design condition that reflects best practices in an urban setting.

Variance: A formal process in which a substandard design is considered due to unforeseen conditions or technical challenges that are too difficult or costly to resolve. A variance board made up of professional peers often examine variance requests.

Specifications: Specifications are intended to be unique to the City of Minneapolis based on approved citywide practices and policies. Specifications are often used in plan sets and in bid packages to denote a preferred method, product, or treatment.