Bicycle Facility Design Manual

• Resource for MnDOT planners and designers to plan for and implement context-appropriate bicycle facilities on MnDOT right-of-way.

• Other agencies and advocates for bicycling may find the manual a useful reference.

• Expected release date: December 2019
MnDOT’s vision for bicycle transportation: “bicycling is safe, comfortable and convenient for all people.”

Bicycle Facility Design Manual Chapters

1. Introduction
2. Scoping, Planning, and Project Coordination
3. Facility Selection
4. Operational Characteristics & Elements of Design
5. Bicycle Facilities
6. Maintenance
7. Special Design Elements
In addition to federal laws and policies, state laws encourage MnDOT to support bicycling as part of Minnesota’s complete and multimodal transportation system.

By state law, MnDOT has substantial authority and responsibility to provide for and encourage safe bicycling.

One stop shop for bicycle related statutes 160, 169, and 174
Policy, Planning, and Project Development

- Minnesota GO
- Statewide Multimodal Transportation Plan (SMTP)
- Statewide Bicycle System Plan
- District Bicycle Plans
- Complete Streets Policy
- Performance Based Practical Design
- Project Development and Scoping
- Public and Stakeholder Engagement

Transportation Equity and Planning for Vulnerable Users

- Transportation contributes to many broad societal outcomes, such as employment, wealth and health.
- Bicycle facilities may address transportation equity challenges in Minnesota communities.
Chapter 3: Facility Selection

Types of Bicyclists

- 51-56% of total population: Interested but Concerned
- 5-9% of total population: Somewhat Confident
- 4-7% of total population: Highly Confident
Selecting a Bicycle Facility - Urban

- Bicycle facility selection is a context-sensitive decision
- The type of bicycle facility selected will impact the level of comfort and, by extension, the amount of people in the community who will use it and benefit from it.

Selecting a Bicycle Facility - Rural

- In natural and rural contexts, designing for Interested but concerned users may not be feasible.
- Due to long distances between land uses bicycle commuting or utilitarian trips are also less likely.
- Shoulder width is an important factor that affects bicyclists’ comfort.
Chapter 4: Operational Characteristics & Elements of Design

Common Design Elements

- Bicyclist Characteristics
- Facility Transitions
- Pavement Markings
- Signs & Signals
- Drainage
- Lighting
- General Intersection Design Principles
Guidance on Six Types of Bicycle Facilities

From Most Separated to Least Separated:
- Shared Use Path
- Sidpath
- Separated Bike Lane
- Bike Lane
- Paved Shoulder
- Shared Roadway
Design Overview

Shared use paths are bicycle facilities physically separated from motor vehicle traffic by an open space or barrier. They are designed for two-way travel and can serve a variety of nonmotorized users. They may be located within roadway right-of-way or an independent right-of-way. Shared use paths are sometimes referred to as bike lanes or greenways. In Minnesota, both are facilities that are allowed as a variety of surface materials, widths and other standards. For, while a shared use path might be called a bike lane, and at times are shared use paths.

The DOT is the state agency responsible for roads. In this document, the term “bike” is now characterized with shared use paths and follows different design guidelines. Bike paths are another form of a shared use path. They are designed to be immediately adjacent and parallel to a roadway, and are covered in the following section.
• Design Overview
  
  • A sidepath is a type of shared use path that is parallel to a roadway but is physically separated from vehicle traffic.
  
  • Most sidepaths are designed for two-way travel and can serve a variety of nonmotorized users.
  
  • Bicyclists may legally ride on a road even if a sidepath is present and may choose to do so for a variety of reasons.

• With offset geometry, also known as “bend out” design, a driver turning from the parallel roadway more directly faces a bicyclist in the crossing. This offset distance
  
  • improves bicyclist visibility
  
  • improves motorist reaction time
  
  • creates space for a right-turning driver to yield and wait for a through-moving bicyclist.
• Design Overview

• Separated bike lanes are exclusive facilities for bicyclists that are located within or directly adjacent to a roadway.

• Physically separated from motor vehicle traffic by a vertical element such as
  • flexible post delineators
  • raised medians
  • landscaping

• MnDOT has adopted the FHWA’s Separated Bike Lane Planning and Design Guide as its guidance for separated bike lane design.
Separated Bike Lane – Intersections

• Design Overview
  • On-street bike lanes designate a preferential space for bicyclists through the use of pavement markings and signs.
  • Bike lanes are for one-way travel and are normally provided in both directions on two-way streets and/or on one side of a one-way street.
Bike Lane

EXHIBIT 5-38: Bike Lane Dimensions

EXHIBIT 5-39: Buffered Bike Lanes

Bike Lane – Intersections

EXHIBIT 5-52: Two-Stage Left Turn Queue Box Placement
Paved Shoulder

- Design Overview
  - Paved shoulders serve as nonmotorized space where no other bicycle facilities are present, such as on rural roads.
  - They allow bicycles, a lower-speed vehicle, to separate from higher-speed vehicles in lieu of sharing the travel lane.
• Design Overview

- By MN Statute, bicycles are considered vehicles, and therefore may operate on all streets except where expressly prohibited (i.e., limited access roadways).

- Two types of shared roadways
  - bicycle boulevards that have been designed specifically to favor bicycle travel
  - shared lanes on motor vehicle-oriented roadways.
Chapters 6 & 7: Maintenance and Special Design Elements

Chapter 7 Design Elements:

- Vehicle Bridges & Underpasses
- Ped/Bike Bridges & Underpasses
- Interchanges
- Roundabouts
- Alternative & Innovative Intersections
- Median Refuge Islands
- Continuous Raised Medians
- Channelized Right Turn Islands
- Curb Extensions
- Speed Tables, Raised Crossings and Raised Intersections
- Mountable Truck Aprons
- Rails & Railroad Grade Crossings
- Bike Parking

Thank you!

Hannah Pritchard, P.E. PTOE
Hannah.pritchard@state.mn.us
651-366-4168

Colin Harris, P.E.
colinharris@altaplanning.com
612-400-9856