



Note (dated June 24, 2016):

Due to recent modifications to State Statute 84.01(35) as part of the 2015-2017 Wisconsin budget bill Act 55, FDM 11-46 will need to be modified to reflect current law. This note is a brief overview and does not include specific details, as they are continuing to be developed. Forthcoming transmittal(s) will address bicycle and pedestrian project implementation including the elements of “due consideration” based on these recent modifications. The Department will also revise the design processes based on the current law. Until then, the Department is providing the best available information in this procedure. A brief summary of highlights is listed below.

While there is still a statute requiring ‘due consideration’ to providing bicycle and pedestrian accommodations, Administrative Code Trans 75 was repealed as part of the 2015-2017 budget bill Act 55. Designers will notice that the Trans 75 worksheet and exception format has been removed from this procedure. The Trans75 worksheet is no longer required. However the evaluation process, analysis, and criteria that projects have been previously using to determine the omission of facilities has been retained. Projects should continue to use these criteria in evaluations and analyses in giving ‘due consideration’ to establishing bikeways and pedestrian ways. This will assist projects in documenting design decisions in the interim. Some additional design flexibility will be realized through the Trans 75 repeal, and further guidance will be captured in future FDM updates.

A frequently asked questions (FAQs) document has been developed with regards to the modifications to the Bicycle and Pedestrian State Statute 84.01(35). The purpose of this document is to provide consistent direction to Department staff as well as our consultants and local partners. There is no prescribed process yet developed for establishing bicycle and pedestrian facilities for projects with federal funding and for projects on the National Highway System (NHS). The Department and FHWA have been working for a while and continue to work on a process that coordinates both state and federal requirements. In the meantime, Central Office staff can provide assistance on an individual project-by-project basis. Coordinate this request with the Regional Oversight Engineer and the Bike/ Pedestrian Coordinator for Central Office assistance.

The FAQs may be found on the multimodal projects and studies web site under complete streets:

<http://wisconsin.gov/Pages/projects/multimodal/ped.aspx>

1.1 Introduction, Purpose, Definitions, Overview

“Complete streets” are broadly defined as roadways designed and operated to enable safe, convenient, and comfortable access and travel for all users. Pedestrians, bicyclists, motorists, and public transport users of all ages and abilities can move along and across a complete street with safety and comfort.

Federal policy for providing bicycle and pedestrian accommodation - per the 2010 “US DOT Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations” (Memorandum) (1) - is as follows:

“The DOT policy is to incorporate safe and convenient walking and bicycling facilities into transportation projects. Every transportation agency, including DOT, has the responsibility to improve conditions and opportunities for walking and bicycling and to integrate walking and bicycling into their transportation systems. Because of the numerous individual and community benefits that walking and bicycling provide — including health, safety, environmental, transportation, and quality of life — transportation agencies are encouraged to go beyond minimum standards to provide safe and convenient facilities for these modes.”

Historically, federal legislation¹ has required the *consideration* of bicyclists and pedestrians on all projects using federal funding since 1991. Federal policy issued in 2001 – and re-emphasized by the above cited March 2010 US DOT policy statement - requires the inclusion of bicycle and pedestrian accommodations on new construction and reconstruction projects, with three exceptions:

1. Bicyclists and pedestrians are prohibited by law from using the roadway.
2. The cost of establishing bikeways would be excessively disproportionate to the need or probable use. Excessively disproportionate is defined by FHWA and state statutes as bicycle and pedestrian facilities together exceeding 20 percent of the cost of the larger transportation project.
3. Sparsity of population or other factors indicate an absence of need.

The FHWA Wisconsin Division Office directs that the Department shall follow federal policy on all projects on the national highway system, and should follow federal policy on all federally funded projects off that system.

Department policy, in conformance with Federal laws and policy, Wis Stats. Section 84.01(35),

<https://docs.legis.wisconsin.gov/statutes/statutes/84/01/35>

and Connections 2030 (2) (3), requires that projects must give due consideration to establishing bicycle accommodations and pedestrian facilities on all new construction and reconstruction highway projects funded in whole or in part from state or federal funds. After giving due consideration, if WisDOT determines that bike and pedestrian facilities are required on a project funded in whole or in part from state funds, then WisDOT is authorized to include those facilities only if each municipality² in which the project is located adopts a resolution authorizing WisDOT to establish a bikeway or pedestrian way. The state statute also states that the need for WisDOT to obtain a municipal resolution(s) does not apply if FHWA provides written notice that establishment of a bikeway or pedestrian way, as part of a project, is a condition of the use of federal funds for that project (s.84.01(35)(d)(2), Wis. Stats.).

FHWA has indicated that when the results of due consideration show that bicycle and pedestrian facilities are to be provided, the signed final National Environmental Policy Act (NEPA) decision document is FHWA’s written notice to WisDOT that establishment of a bikeway or pedestrian way as part of the project, is a condition of the use of FHWA funds, consistent with Wisconsin Statute 84.01(35)(d). Therefore, for projects with any federal funding and those on the NHS, WisDOT’s compliance with the FHWA written notice provision are satisfied by receipt of a completed environmental document from FHWA. However, even if the project does not require a resolution, the planning and design processes will still provide opportunities for public input and to evaluate environmental impacts of project alternatives that may include bike and pedestrian facilities. Municipalities may adopt resolutions that authorize the inclusion of facilities on NHS or federal funded projects where WisDOT does not need to obtain them. These resolutions will be included in the environmental document.

Department policy for other project types, such as resurfacing or reconditioning, requires an evaluation to include bicycle and pedestrian accommodations where possible/practical within the scope of the project. In addition, certain bicycle and pedestrian design practices are required when applicable, e.g., curb ramps and bicycle-acceptable grates.

The purpose of this procedure is to explain the requirements and applications of the state statute, department

¹ FHWA Guidance: Bicycle and Pedestrian Provisions of Federal Transportation Legislation, September 10, 2015 http://www.fhwa.dot.gov/environment/bicycle_pedestrian/guidance/guidance_2015.cfm

² Municipality is defined as a city, village, or town (Wis. Stats. Section 990.01(22)).

policy and federal laws and policies as they pertain to highway projects in Wisconsin.

1.1.1 State Statute

State Statute 84.01(35) was originally created in 2009 and was modified in 2014. The modifications to the state statute became effective on July 14, 2015. In order to avoid potential delay of existing projects, WisDOT has determined that the statutory changes do not apply to projects already underway, meaning those that have an approved environmental document as of July 14, 2015. Projects with approved environmental documents as of July 14, 2015 will follow through on the commitments identified during the public involvement and environmental processes including bike and pedestrian commitments. The statute requires the Department shall give due consideration to establishing bikeways, as defined in s.84.60(1)(a), and pedestrian ways, as defined in s.346.02(8)(a), on new highway construction and reconstruction projects funded in whole or in part from state funds or federal funds. The statute also states that the Department may not establish bicycle and pedestrian ways if any of the following apply:

1. Bicycles and pedestrians are prohibited by law from using the highway; or
2. The project is wholly or partially funded with state funds, unless the governing body of each municipality within the project has adopted a resolution authorizing the department to establish the bikeway or pedestrian way. This subdivision does not apply if the federal government provides written notice to the department that establishment of a bikeway or pedestrian way as a part of a project is a condition of the use of federal funds for that project.

If after giving due consideration it is determined that establishment of bicycle and pedestrian facilities are proposed on a reconstruction (including pavement replacement) or new construction improvement project that is not part of the NHS system and has no federal funding, then WisDOT cannot establish those facilities unless each municipality³ involved in the new construction or reconstruction project adopts an official resolution authorizing the establishment of those facilities as part of the improvement project. This requires consensus amongst all the governing bodies in which a portion of the project will occur. For this situation, WisDOT will not finalize an environmental document that recommends providing a bike or pedestrian accommodation unless the aforementioned resolutions have been adopted.

As stated previously in [FDM 11-46-1](#), for projects with any federal funding and those on the NHS, WisDOT's compliance with the FHWA written notice provision are satisfied above by receipt of a completed environmental document from FHWA. Therefore WisDOT will not seek municipal resolutions on these types of projects (NHS or federal funded).

Further, a resolution is not required when bicycle and pedestrian facilities already exist and are to be replaced as part of the reconstruction or new construction improvement project.

For stand-alone bike and pedestrian projects funded using federal or state funding programs it is presumed that bike and pedestrian facilities are incorporated on the project and geometric design standards applied accordingly.

1.1.2 Construction Definition

As stated in above, State Statute 84.01(35) apply to NEW CONSTRUCTION projects and RECONSTRUCTION projects, this includes PAVEMENT REPLACEMENT projects which have a design life of 15 years or more, on the STH and on local roads⁴. Department policy for other project types, such as resurfacing or reconditioning, requires an evaluation to include bicycle and pedestrian accommodations where possible/practical within the scope of the project. In addition, certain bicycle and pedestrian design practices are required when applicable, e.g., curb ramps and bicycle-acceptable grates.

The highway improvement types, as defined in [FDM 3-5-2](#), that are subject to state statute include:

- Pavement Replacement ([FDM 3-5-2.3](#) and [FDM 14-15-1](#))
- Reconstruction ([FDM 3-5-2.4](#))
- Expansion ([FDM 3-5-2.5](#))
- Bridge Replacement ([FDM 3-5-2.7](#))
- Bridge Rehabilitation - Re-Decking Only ([FDM 3-5-2.6](#))

³ Municipality is defined as a city, village, or town (Wis. Stats. Section 990.01(22)).

⁴ Historically, Local Program pavement treatments have generally been one of three types:

(1) reconstruction, (2) total pavement layer removal and replacement, (3) a thin (less than half the pavement thickness) mill and overlay. Trans 75 applies to both reconstruction projects and total pavement layer removal and replacement projects whether the design is based on local experience and knowledge, or is based on a pavement structural design.

FIIPS Improvement project concepts that correspond to the above improvement types, and are therefore subject to state statute, include:

- Bridge Elimination (BRELIM)
- Bridge Rehabilitation (BRRHB) (Re-Decking Only)
- Bridge Replacement Expansion (BRRPLE)
- Bridge Replacement Preservation (BRRPL)
- New Bridge (BRNEW)
- Pavement Replacement (PVRPLA)
- Reconstruction Expansion (RECSTE)
- Reconstruction Preservation (RECST)

1.2 Bikeways and Sidewalks

The state statute requires the Department shall give due consideration to establishing bikeways, as defined in s.84.60(1)(a), and pedestrian ways, as defined in s.346.02(8)(a), on new highway construction and reconstruction projects funded in whole or in part from state funds or federal funds.

See the following references for guidance on bikeways:

- FDM chapter 11 - primarily [FDM 11-46-15](#), but also other procedures, including [FDM 11-15-1](#) and [FDM 11-20-1](#)
- Wisconsin Bicycle Facility Design Handbook (4)
- WisDOT Rural Bicycle Planning Guidelines (5)

Sidewalks are a common feature for urban and suburban roadways and recognized as pedestrian ways. The main issues associated with providing sidewalks in an urban environment are:

- Placement on one side or both sides of the roadway,
- Sponsorship and maintenance of the sidewalks,
- Expected usage
- Trade-offs with bicycle accommodations and other roadway features when funding and/or space is limited

See the following references for guidance on sidewalks:

- FDM chapter 11 - primarily [FDM 11-46-5](#) and [FDM 11-46-10](#), but also other procedures, including [FDM 11-20-1](#)
- Wisconsin Guide to Pedestrian Best Practices (6)
- Wisconsin Bicycle Facility Design Handbook, Chapter 4, Shared-use Path (4)

1.2.1 Prioritization between Bikeways and Sidewalks

It is Department policy to provide both sidewalks and bikeways on all new construction and reconstruction projects, to the geometric standards described in the FDM and associated design manuals. In locations where space is limited, provide the maximum extent of accommodations possible. Before omitting any accommodation for either bicyclists or pedestrians, reduce the width of travel lanes, medians, terraces and gutter sections - to minimums, if needed. Then consider the following measures, in order of priority:

1. Reduce the width of bikeways to the minimal level, i.e., 14-foot-wide outside lanes instead of bike lanes.
2. Place a 6-foot minimum sidewalk directly behind the curb, i.e., eliminate the terrace.

This is only acceptable for very short distances because a terrace serves many important functions (Consult with region maintenance or the local government).

3. Omit bicycle accommodations.

It is acceptable to prioritize sidewalks over bicycle facilities if a choice must be made between these two modes.

4. Provide a sidewalk on only one side, - especially if meeting any of the criteria in Table 4.1, "WisDOT Guidelines for Sidewalk Placement" of the February 2011 Wisconsin Guide to Pedestrian Best Practices (6).

These strategies can be used in combination. For example, it may be possible to provide wide outside lanes for a section of a project as well as a short stretch of sidewalk placed behind the curb.

1.2.2 Shared-use Paths

Bicyclists are legal users of roadways, and the first responsibility is to provide on-road accommodations for bicycles where appropriate. Shared-use paths should only replace on-road bicycle accommodations in exceptional situations (e.g. bicyclists and pedestrians prohibited). In certain situations, shared-use paths can supplement on-road bicycle accommodations, or be used in place of a sidewalk (on a given side of the road) as a pedestrian facility.

The decision to use shared-use paths along roadways must meet the guidelines found in [FDM 11-46-15](#) and in the “Wisconsin Bicycle Facility Design Handbook (4).

The Bureau of Project Development Project Services Section Chief must approve a shared-use path proposed as the sole form of bicycle accommodation (i.e., there is no on-road bicycle accommodation).

1.3 Project Development / Scoping Process

Due consideration shall be given to establishing bikeways and pedestrian ways in all new construction and reconstruction highway projects, consistent with state law, beginning with the first scoping meeting. WisDOT Regional Bicycle and Pedestrian Coordinators shall be involved in evaluating all projects for compliance with the state law and provide guidance in planning and design processes related to biking and walking.

Include the Regional Bicycle/Pedestrian Coordinator in all phases of project development and in all project review meetings (scoping, 30%, 60%, 90% (pre-PSE), TMP, etc.). The need for input from the Regional Bicycle/Pedestrian Coordinator will continue through construction.

1.3.1 Evaluation Criteria

The Department and FHWA are working to better define what due consideration means for project planning and design processes. In the interim, the following are criteria that may be useful in due consideration evaluations. See below for a more detailed explanation of each criteria.

1. Bicycles or Pedestrians Prohibited (see [FDM 11-46-1.3.1.1](#))
2. Excessively Disproportionate Costs (see [FDM 11-46-1.3.1.2](#))
3. Constrained Environments (see [FDM 11-46-1.3.1.3](#))
4. Absence of Need (see [FDM 11-46-1.3.1.4](#))
5. Refusal to Maintain (see [FDM 11-46-1.3.1.5](#))

1.3.1.1 Bicycles or Pedestrians Prohibited

Bicyclists and pedestrians are prohibited on freeways and sometimes expressways in Wisconsin. Where a new prohibition is put into effect, it is critical to maintain connectivity by defining an alternative route that will accommodate bicyclists and pedestrians within the same corridor. In some cases, a shared-use path in the freeway right-of-way is a viable solution for short distances as a matter of providing basic access; however, care must be taken to ensure that the shared-use path is well-separated or partitioned off from the freeway or expressway traffic. The alternative facility and the type of bicycle accommodation thereon must be identified in the documentation.

It is also important to maintain connectivity across freeway and expressway corridors so that freeways and expressways do not create a barrier to bicyclists and pedestrians. Provide bicycle and pedestrian accommodations on a road underpassing or overpassing a freeway or expressway (including the non-freeway and expressway roads running through interchanges) unless other criteria applies or that road prohibits bicyclists or pedestrians.

Documentation of each existing and proposed crossing is needed for every crossing of the facility that prohibits bikes and pedestrians.

1.3.1.2 Excessively Disproportionate Cost

Cost is excessively disproportionate when it exceeds 20 percent of the estimated total project cost. Implementation of bicycle and pedestrian facilities up to 20 percent of project costs *is expected and required*. Therefore, this portion of the rule functions as a limit of how much must be spent on bicycle and pedestrian facilities.

Neither WisDOT nor FHWA policy limits the percentage of state or federal funds used on a project for bicycle and pedestrian facilities. It is acceptable to spend more than 20 percent if it is not reasonable to limit bicycle and pedestrian facilities, either in length or in type, within a project.

If pedestrian and bicycle accommodations cannot both be provided for 20 percent or less of the total project

cost, and it is not possible to allocate more than 20 percent of total project cost for bicycle and pedestrian facilities, then priority can (and in most cases should) be given to pedestrian facilities.

Document if it is not possible to provide bicycle and pedestrian facilities to WisDOT standards for 20 percent or less of a project's costs and it is not possible to allocate more than 20 percent.

The documentation of decisions should include at a minimum the following four sections:

1. Location and Type of Project

Provide the existing typical section as well as the type of project considered (new construction, reconstruction or pavement replacement). Provide sheets that illustrate the roadway section; existing right-of-way; pertinent mapping features such as building and driveway locations, retaining walls, utility and light poles; and affected landscaping such as street trees. Provide average current and projected traffic volumes on the roadway. If certain roadway features/characteristics contribute to the high cost of implementing bicycle or pedestrian facilities, include photographs of those features.

2. Alternatives Considered for Bicycle and Pedestrian Facilities

Develop and analyze bicycle and pedestrian alternative(s) that have the greatest potential to satisfy the state statute while staying within 20 percent of total project costs. Engage the Regional Bicycle/Pedestrian Coordinator and project manager to aid in establishing reasonable, viable alternatives that are sensitive to the context of the corridor. When circumstances apply regarding disproportionate cost for limiting total expenditures on bicycle or pedestrian facilities, it is expected that reasonable alternatives include lower-level accommodations instead of high-level accommodations. For example, while a 12-foot travel lane and 5-foot bike lane may exceed 20 percent of total project costs, a 14-foot-wide outside lane may fall under the 20 percent threshold. The alternatives should also consider shifting the existing centerline when there are constraints or excessive costs on one side of the project corridor that may not exist on the other side.

Costs Calculations for Each Alternative

- Estimate the total project cost as described in [FDM 11-46-1.3.1.2.1.1](#).
- Estimate the marginal construction cost of establishing new/expanded sidewalks or bikeways as described in [FDM 11-46-1.3.1.2.1.2](#).
- Estimate the marginal real estate cost of establishing new/expanded sidewalks or bikeways as described in [FDM 11-46-1.3.1.2.1.3](#).
- Perform the 20 percent disproportionate cost calculation using the formula:

$$\frac{(\text{marginal construction cost} + \text{marginal real estate cost})}{\text{total project cost}}$$

3. Bicycle and Pedestrian Measures Incorporated up to the 20 Percent Limit

Make the determination in consultation with the Regional Bicycle/Pedestrian Coordinator, project manager, and/or management consultant (for projects on the local system). The report should show which pedestrian and bicycle facilities are being provided for 20 percent of the project cost, with the intent of providing the most accommodation within this budget, with a priority given to pedestrian facilities.

1.3.1.2.1 Cost Calculations

Not all costs can be attributed to bicycle/pedestrian facilities. The following sections describe how costs are calculated.

1.3.1.2.1.1 Calculation of Total Project Cost

The total project cost includes estimated construction cost (including the estimated cost of bikeway and sidewalk construction) and real estate cost (including compensable utilities).

1.3.1.2.1.2 Calculation of Marginal Costs for Bikeway/Sidewalk Construction

The cost of establishing a bikeway or sidewalk shall consider only the marginal cost of establishing any new or expanded bikeway or sidewalk and may not include any cost to reestablish any existing bikeway or sidewalk. Costs shall include only construction costs and the cost to acquire any real estate needed for a bikeway or sidewalk. See example #1 and [Figure 1.1](#), and example #2, and [Figure 1.2](#) for examples of calculating marginal costs for bikeway/sidewalk construction.

1.3.1.2.1.3 Calculation of Marginal Real Estate Costs for Bikeway/Sidewalk Construction

Case 1 Real Estate Costs - Only 20 percent of the cost to acquire real estate needed for a bikeway or sidewalk

shall be considered a cost of the bikeway or sidewalk if all of the following apply:

- Existing right of way is sufficiently wide to establish the bikeway and sidewalk were the highway construction or reconstruction project to occur without any additional travel lane.
- Additional real estate is needed to accommodate all needed travel lanes, bikeways and sidewalks.

See example #3 and [Figure 1.3](#) for an example of Case 1 real estate costs.

Case 2 Real Estate Costs - If bicycle or pedestrian facilities currently do not exist on a highway, and right-of-way must be acquired solely for the provision of bicycle and pedestrian facilities, then 100 percent of the right-of-way acquisition costs can be attributed to the 20 percent disproportionate cost calculation. See example #4 and [Figure 1.4](#) for an example of Case 2 real estate costs.

Handle compensable utility costs the same way as right-of-way costs. If utility relocation is needed solely for the provision of bicycle and pedestrian facilities and there currently is not room for these facilities within the existing right-of-way, 100 percent of the relocation cost can be allocated toward the 20 percent disproportionate cost calculation. If utility relocation is part of the whole right-of-way acquisition package needed to construct the roadway, only 20 percent of the utility relocation costs can be counted toward the 20 percent disproportionate cost calculation. Non-compensable utility costs are not included in the 20 percent calculation.

Handle the cost to acquire temporary and permanent limited easement the same way as right-of-way costs. If the easement is needed solely for the provision of bicycle or pedestrian facilities and there is not enough room in the existing right-of-way for these facilities, 100 percent of the cost can be allocated toward the 20 percent disproportionate cost calculation. Otherwise, only 20 percent of the easement cost can be included in the 20 percent disproportionate cost calculation.

1.3.1.2.2 Examples

Example #1: Calculation of Marginal Construction Costs for New Bikeways– Rural Paved Shoulder

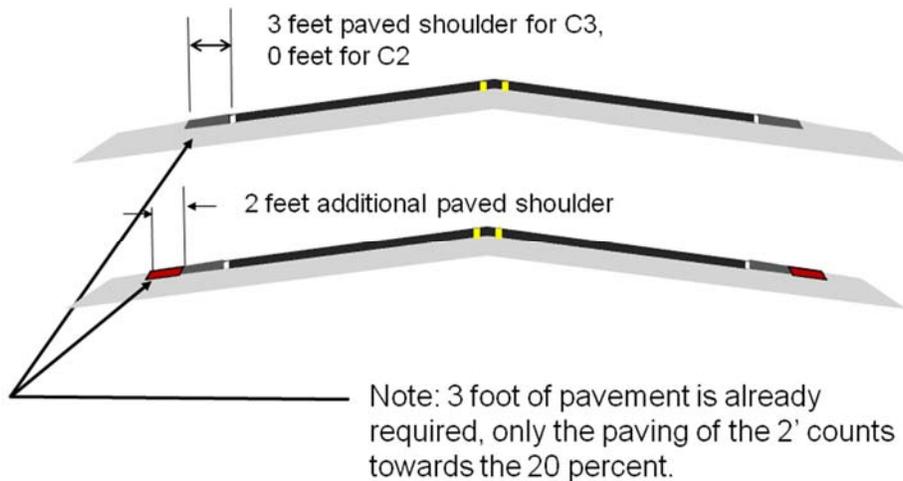


Figure 1.1 Example 1: New Bikeways - Rural Paved Shoulder

A rural state trunk highway carries 1500 vpd and has two 12-foot lanes and two 3-foot aggregate shoulders. The highway will be reconstructed to a C-3 classification with 5-foot paved shoulders to accommodate bikes. The C-3 classification already requires a 6-foot shoulder of which 3 feet is paved. Therefore, the cost attributable to bicycle and pedestrian facilities is limited to the cost of the asphalt for 2 feet of each shoulder. The earthwork cost for widening of the shoulder to 6 feet, aggregate cost of the 6-foot shoulder, traffic control costs, and seeding costs cannot be included in the 20 percent disproportionate cost calculation because those costs would have been incurred even if no bicycle facility were provided.

Example #2: Calculation of Marginal Construction Costs for New Bikeways– Urban Street Widening

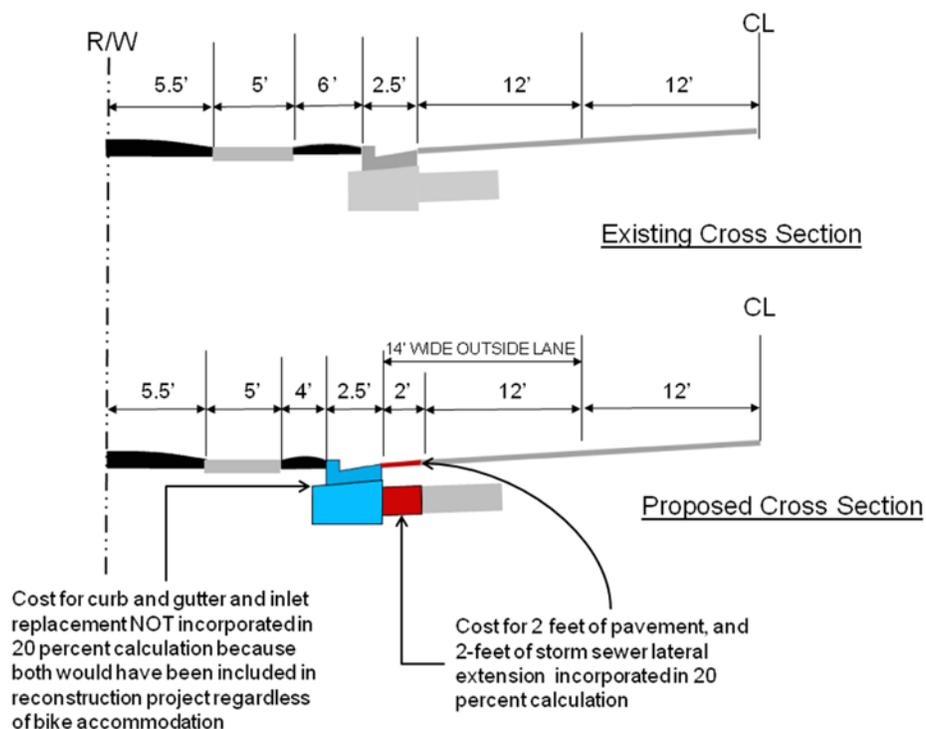


Figure 1.2 Example 2: New Bikeways - Urban Street Widening

An urban 4-lane undivided state highway carrying 10,000 vpd currently has four 12-foot lanes, 2-foot gutters, 6-foot terraces, and 5-foot sidewalks. The project will reconstruct the roadway with two 12-foot inside lanes and two 14-foot outside lanes, while the terrace will be reduced from 6 feet to 4 feet. To accommodate bicycles, the curblines are moved, inlets are moved, and an additional 2 feet of pavement is provided. In this example, the cost for the 2-feet of pavement to create a wide outside lane, plus 2-feet of storm sewer lateral extensions associated with moving storm sewers are incorporated in the 20 percent disproportionate cost calculation since they are all required solely for the provision of bicycle facilities.

Example #3: Calculation of Marginal Construction & Real Estate Costs for Reestablishing Existing Sidewalks and Establishing New Bikeways– Urban Street Widening (Case 1 Real Estate Costs)

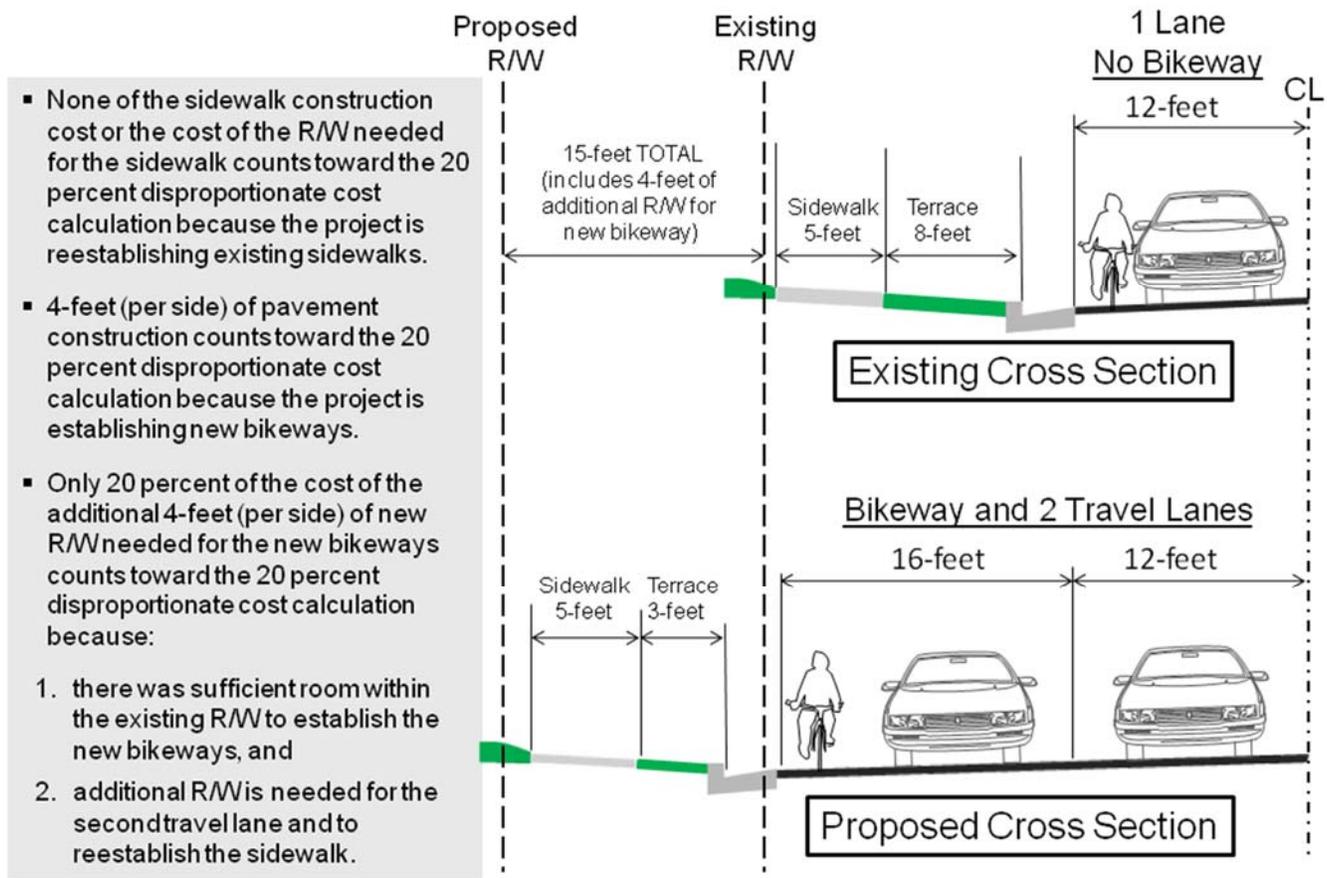


Figure 1.3 Example 3: Reestablishing Existing Sidewalks and Establishing New Bikeways - Urban Street Widening (Case 1 Real Estate Costs)

An existing 2-lane urban highway with sidewalks, but no bikeways, is expanded to four lanes with bikeways. The larger cross-section requires additional right-of-way, which needs to be wide enough to reestablish the existing sidewalks and to establish the new bikeways.

None of the sidewalk construction costs or sidewalk real estate costs counts toward the 20 percent disproportionate cost calculation because the project is reestablishing existing sidewalk.

Four feet of pavement are being added on both sides of the road for new bikeways. The construction cost for this additional pavement counts toward the 20 percent disproportionate cost calculation. An additional four feet of right-of-way is needed on both sides of the road to accommodate the new bikeways. Only 20 percent of the cost for this additional real estate counts toward the 20 percent disproportionate cost calculation because the project meets the Case 1 real estate criteria described in [FDM 11-46-1.3.1.2.1.3](#).

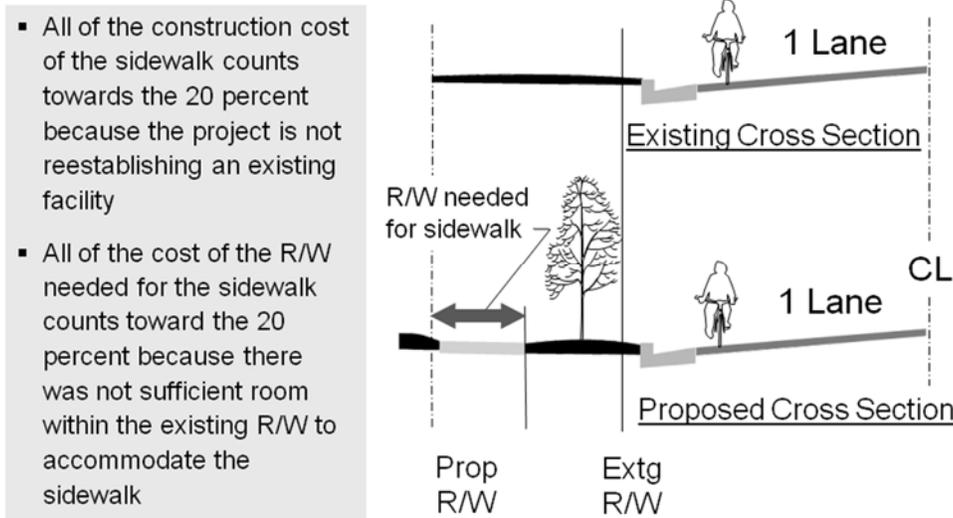
Example #4: Calculation of Marginal Construction & Real Estate Costs for New Sidewalk (Case 2 Real Estate Costs)

Figure 1.4 Example 4: Establishing New Sidewalk (Case 2 Real Estate Costs)

An existing two-lane urban highway without sidewalk is reconstructed to include a sidewalk and an 8-foot terrace. There is not enough existing right-of-way to accommodate either the sidewalk or terrace. The purchase cost of the right-of-way needed for the sidewalk counts fully toward the 20 percent disproportionate cost calculation because the project meets the Case 2 real estate criteria described in [FDM 11-46-1.3.1.2.1.3](#). In addition, all of the sidewalk construction cost counts toward the 20 percent disproportionate cost calculation because the project is establishing new sidewalk.

The purchase cost of the right-of-way needed for the terrace does not count toward the 20 percent disproportionate cost because the terrace supports the roadway by providing room for snow storage, signage, and lighting.

1.3.1.3 Constrained Environments

Constrained environments may be used in due consideration evaluations. A May 21, 2010 letter (see [Attachment 1.1](#)) explains FHWA Wisconsin Division's position on this criteria.

Until further guidance is developed, projects should consider this definition of constrained environment. A "constrained environment" is any area in which structures, improvements, natural resources, or historical or archaeological sites adjacent to the highway do not allow construction of all of the following on each side of the roadway unless the obstruction is eliminated:

- (a) A terrace at least 3 feet wide, including the width of the curb, and having no sidewalk.
- (b) A sidewalk that is either of the following:
 1. Five feet wide, if adjacent to a terrace at least 3 feet wide.
 2. Six feet wide, if adjacent to a curb or a terrace less than 3 feet wide.
- (c) A bikeway.

Under certain situations it may not be possible to establish bikeways or sidewalks or both and they may be omitted from either or both sides of the roadway in a constrained environment where establishing them would have excessively negative impacts. However, those facilities shall be included to the greatest extent practicable and provide the highest level of accommodation while avoiding the constraint. This includes varying minimum widths, establishing bikeways or sidewalks using the amount of space remaining in the highway after the omission, considering the establishment of omitted facilities nearby.

Impacts are considered excessively negative if:

- Constructing a sidewalk and bikeway or just a sidewalk reduces the terrace width to less than 3 feet for more than 50 percent of total project length.
- Constructing a sidewalk or bikeway requires eliminating structures or improvements adjacent to the highway that would dramatically reduce the aesthetic value or functionality of the remaining area.
- The environmental documentation process shows that providing bike or pedestrian facilities would result in loss or degradation of natural resources or has an adverse impact on historical or

archaeological sites potentially eligible for the National Register of Historic Places (NRHP).

This circumstance is likely to be most applicable in urban situations.

Bicycle and pedestrian facilities must be designed with sensitivity to the adjacent context.

If bicycle or pedestrian facilities are not provided on a constrained corridor there would have to be substantial impacts on environmental resources, existing structures, or archaeological or historic sites potentially eligible for the NRHP. In most instances, this situation applies to traditional downtown districts where commercial buildings front the project roadway.

Because these locations often have existing sidewalks, this criteria most often applies to bicycle facilities. Figure 1.5 provides an example where providing bike accommodations would have a significant impact on both the outside use of the sidewalk and on the street trees. Explore a range of alternatives that have the greatest potential to satisfy the state statute and provide accommodations.



Figure 1.5 Constrained Environment

If possible, include sidewalks on both sides of the street. Consider installing a sidewalk on only one side of the street if limited by the constrained environment. See “WisDOT Guidelines for Sidewalk Placement” Table 4.1 of the February 2011 “Wisconsin Guide to Pedestrian Best Practices” (6).

<http://wisconsindot.gov/Documents/projects/multimodal/ped/guide-chap4.pdf>

Provide the highest level of accommodation while avoiding the constraint before omitting facilities. Evaluate various alternatives to create space for bicycle and pedestrian accommodations, including:

- Reduce the number of lanes and lane widths to the minimum necessary to accommodate projected traffic volumes
- Shift the alignment of the roadway.
- Utilize a ‘road diet’, which converts a 4-lane undivided roadway into a 3-lane roadway with bike lanes
- Accommodate parking* needs in another fashion
- Eliminate parking* from one or both sides of the street
- Eliminate parking* in areas requiring a turn lane
- Eliminate the terrace for a short distance to avoid a particular constraint
- Reduce the terrace width to less than 3-feet for not more than 25 percent of the overall project length in order to establish a bikeway
- Include a narrower bikeway

Note: It is acceptable to consider keeping parking on an urban section when evaluating a location for a “constrained environment” exception. However, it is necessary to consider the trade-offs and to explore all options for providing bikeways and sidewalks in a “constrained environment”. See [FDM 11-46-15.3.1.2](#) for additional guidance.

Documentation of decisions that omit facilities due to a constrained environment should include:

1. Location and Type of Project

Provide the existing typical section(s), the type of project considered (new construction, reconstruction or pavement replacement), and the average traffic volumes for the roadway. Provide drawings that illustrate the proposed roadway section(s); existing right-of-way; pertinent mapping features such as

building and driveway locations, retaining walls, utility and light poles; and affected landscaping such as street trees. Include pictures showing the resource(s) or structure(s) that must be avoided.

2. Alternatives Considered for Bicycle and Pedestrian Facilities

As stated in the “excessive cost” text, the alternative development process is the most critical aspect of providing bicycle and pedestrian facilities. Some creativity may be necessary in developing reasonable bicycle and pedestrian alternatives that are sensitive to the corridor and that avoid buildings/resources to the extent possible. Review the bicycle and pedestrian alternatives considered with the Regional Bicycle/Pedestrian Coordinator and BPD Project Oversight Engineer. For example, using a single typical section may not be reasonable if it is necessary to avoid a structure on a corridor. It may be appropriate to eliminate the terrace and use a 6-foot sidewalk for 100 feet to preserve the structure and maintain continuous bicycle and pedestrian facilities.

In an effort to accommodate bicycle and pedestrian facilities, minimum widths for travel lanes, medians, terraces, and gutters should be explored and incorporated when needed. For example, a 1-foot gutter pan with other lane width reductions may allow enough room for a bikeway to be added to the adjacent travel lane.

3. Type of Resource Being Avoided

Describe the type of resource being avoided and the impact and magnitude that provision of bicycle (or pedestrian) facilities would cause. For example, eliminating 3 parking spaces from an 18-space parking lot is significantly different than eliminating 3 parking spaces from a 5-space parking lot. Similarly, removing three street trees is different than removing all trees from a half-mile corridor. Provide a cross section of the roadway with the minimum bikeway and pedestrian facility clearly showing how even the minimum cross section adversely impacts the resource and/or structure being preserved.

4. Bicycle and Pedestrian Measures Being Incorporated

Describe the type of bicycle and pedestrian facilities being incorporated in the constrained environment. The project should include bicycle and pedestrian facilities to the greatest extent practicable. However, in a constrained environment, omitting a sidewalk or bikeway, or both, from either or both sides of the roadway, or varying the minimum widths may be necessary. If it is necessary to omit a bikeway or sidewalk for a portion of the project, state how bikeways and/or sidewalks are established after the omission for the remainder of the project. Consider establishing those omitted facilities nearby the constrained environment, such as along a parallel corridor, and document the details of this analysis.

1.3.1.4 Absence of Need

For the purposes of evaluating this condition, both bikeway and sidewalk needs are associated with current and expected future residential / commercial land uses and land use densities. Bikeway needs are also associated with current and expected future traffic volumes. Criteria for this will vary depending on whether an area is an “Outlying District”, “Rural Area”, “Semi Urban District” or “Urban Area”. Definitions for these areas are:

- (b) “*Outlying District*” means the territory contiguous to and including any highway within the corporate limits of a city or village where on each side of the highway within any 1,000 feet along such highway the buildings in use for business, industrial or residential purposes fronting thereon average more than 200 feet apart.”
- (c) “*Rural area*” means any area that is not an urban area or a semi urban district.
- (d) “*Semi urban district*” means the territory contiguous to and including any highway where on either side of the highway within any 1,000 feet along such highway the buildings in use for business, industrial or residential purposes fronting thereon average not more than 200 feet apart or where the buildings in use for such purposes fronting on both sides of the highway considered collectively average not more than 200 feet apart.”⁵
- (e) “*Urban area*” means any area which is an urbanized area or urban place, as determined by the department under 23 USC 101 (a) and regulations adopted under 23 USC 101 (a) and approved by the appropriate federal authority.”⁶

⁵ “Fronting thereon” or “fronting on” will include any portion of a property line that abuts the highway in question.

⁶ 23 USC 101 (a):

“(36) URBAN AREA.-The term “urban area” means an urbanized area or, in the case of an urbanized area encompassing more than one State, that part of the urbanized area in each such State, or urban place as designated by the Bureau of the Census having a population of 5,000 or more and not within any urbanized

See [FDM 11-46-1.3.1.4.1](#) for “Absence of Need” criteria for sidewalks. See section [FDM 11-46-1.3.1.4.2](#) for “Absence of Need” criteria for bikeways.

Documentation of decisions where sidewalks and bikeways are not provided for, should include:

Location, type of Project, and facility being excluded. Provide the existing typical section as well as the type of project considered (new construction, reconstruction or pavement replacement). Describe the bicycle and/or pedestrian facility that would not be established.

Basis for not establishing Reasons for not establishing a facility will vary. One of the most common reasons for not providing a bikeway is a low volume roadway (under 750 for rural areas and under 1500 for urban and semi urban areas). Similarly, sidewalks will rarely be built within rural areas.

Definition of the Area. Identify areas as either urban, semi urban, outlying, or rural. If the highway or street project involves a town center or an outlying district include map or aerial photo that supports the low-density definition (on average, more than 200 feet between buildings over a length of 1,000 feet).

Attach pertinent portions of the community, county and regional land use plans and long-range transportation plans for projects within 3 miles of a community.

Mitigation. Describe the conditions that will remain for bicyclists and pedestrians. For example, a low volume roadway without paved shoulders may still be acceptable for the area given the types of cyclists that will be using the roadway. A short segment of wide paved shoulder may be acceptable for a town center with only eight homes spread over 2,000 feet. Discuss any mitigation efforts that will improve conditions for bicyclists or pedestrians short of complying with the standards in this procedure or in the FDM.

1.3.1.4.1 Sidewalks

For sidewalks, adjacent land use and density determines “Absence of Need”, not actual pedestrian counts or projected pedestrians. Conditions in which sidewalks should be established will vary depending on whether an area is an “urban area”, “semi-urban district”, “outlying district” or “rural area”.

- Urban Area & Semi-Urban District: Sidewalks should be established in any urban area or semi urban district. There are few areas within a city or village where it is not appropriate to include sidewalks.
- Outlying District & Rural Area: The usual practice is to omit sidewalks in an outlying district or rural area because the presumption is that sidewalk use will be too sparse to justify their inclusion. However, establishing sidewalks should be considered in any outlying district or rural area if, based on an official land use plan, there will be significant development within the outlying district within the next 10 years (i.e., the area will become a “Semi Urban District” or an “Urban Area”).

Also, if land use is expected to change over the design life⁷ of a project such that sidewalk would likely be needed by the end of a project’s design life then give greater weight to the land use projected for the second half of the design life than for the first half. This does not necessarily mean constructing sidewalk as part of the project. It could mean designing the project to make it easier to install sidewalk in the future.

For example, on a structure project:

- If planned growth will affect the need for sidewalk in a 0-10 year period, add sidewalk to both sides of the structure and on the approaches.
- If planned growth will affect the need for sidewalk in a 10-20 year period, add sidewalk to one side of the structure and approaches. Design the other side of the structure and approaches to facilitate adding sidewalk in the future (e.g., construct a wider substructure for the bridge).
- If planned growth will not affect the need for sidewalk for over 20 years, do not add sidewalk but

area, within boundaries to be fixed by responsible State and local officials in cooperation with each other, subject to approval by the Secretary. Such boundaries shall encompass, at a minimum, the entire urban place designated by the Bureau of the Census, except in the case of cities in the State of Maine and in the State of New Hampshire.

(37) URBANIZED AREA.-The term “urbanized area” means an area with a population of 50,000 or more designated by the Bureau of the Census, within boundaries to be fixed by responsible State and local officials in cooperation with each other, subject to approval by the Secretary. Such boundaries shall encompass, at a minimum, the entire urbanized area within a State as designated by the Bureau of the Census.”

<http://www.gpo.gov/fdsys/pkg/USCODE-2010-title23/pdf/USCODE-2010-title23-chap1-sec101.pdf> (Accessed 9-8-2011)

⁷ For purposes of this evaluation, use a “design life” of 20 years for a roadway, and 75 years for a bridge

consider designing the structure and approaches to facilitate adding sidewalk in the future (e.g., construct a wider substructure for the bridge).

1.3.1.4.2 Bikeways

For bicycle accommodations, often few improvements are needed on low-volume roadways where a bicyclist is able to use a full travel lane or adequate roadway width already exists for a motorist to safely pass a bicyclist. Evaluating establishing a bikeway may be more involved and will vary depending on whether an area is an “urban area”, “semi-urban district”, “outlying district” or “rural area”.

- **Urban Area & Semi-Urban District:** Bikeways are generally needed on highways with a design year ADT \geq 1,500 within “Urban Areas” and “Semi Urban Districts”.
- **Outlying District & Rural Area:** It may not be necessary to provide additional roadway improvements in an outlying district or rural area if the highway that is the subject of the construction or reconstruction project has, or upon completion will have, less than 750 ADT and any of the following applies:
 - (a) *The average bicycle traffic volume⁸ on the highway is or is expected to be less than 25 per day during the 10 most traveled days for bicycling of the year.*
 - (b) *The highway is not identified in part of a government bike transportation plan, in the Wisconsin Bicycle Transportation Plan or in any other bicycle plan endorsed by or supported by the department. The Wisconsin Bicycle Transportation Plan is available at:*
<https://wisconsin.gov/Pages/projects/multimodal/bikeplan2020.aspx>
 - (c) *The highway does not provide a connection of one mile or less between any existing or planned bike route, as defined in s. 340.01 (5m), Stats.*
 - (d) *The highway is not a short connection of one mile or less needed to connect an existing bikeway to the nearest local road.”*

Consider a bikeway on a highway with a design year ADT $<$ 750 if, based on an official land use plan, there will be significant development within the outlying district within the next 10 years, and establishing a bikeway will do any of the following:

- Complete a gap of one mile or less in an otherwise continuous bike route.
- Make a connection of not more than 3 miles from communities or urban areas to a town or county roadway network, excluding any dead end roadway.

Also, if land use is expected to change over the design life⁹ of a project such that a bikeway should be provided by the end of a project’s design life then give greater weight to the land use projected for the second half of the design life than for the first half. This does not necessarily mean constructing a bikeway as part of the project. It could mean designing the project to make it easier to install a bikeway in the future.

1.3.1.5 Refusal to Maintain Sidewalks

In the past FHWA has indicated that it does not allow facilities to be omitted based solely on the lack of community support for the maintenance of sidewalks for urban and suburban sections of the National Highway System (NHS) (see May 21, 2010 letter from FHWA Wisconsin Division office in [Attachment 1.1](#)). At this time, it is recommended to continue this approach on NHS roadways.

Often, one of the biggest issues related to the inclusion of sidewalks relates to their maintenance. Most municipalities in Wisconsin have passed ordinances that require landowners to clear snow, ice, and debris from sidewalks that are adjacent to their property. Even though, according to s. 66.0907(5) Wis. Stats,

<https://docs.legis.wisconsin.gov/statutes/statutes/66/IX/0907/5>

maintenance is ultimately the municipality’s responsibility, the initial burden falls on the adjacent landowners.¹⁰

⁸ Volumes shown are two-way bicycle traffic. With respect to the criteria of 25 bicyclists per day, it may not be necessary to actually count the current number of bicyclists using a highway or to go through an involved methodology to project the anticipated number of bicyclists. For example, if a bicycle club uses the highway as an informal bicycle route, there are likely to be 25 cyclists using the roadway. Also, certain land uses on or near the highway can be used to estimate usage. For example, subdivisions, parks, schools and major businesses can all generate at least light to moderate numbers of bicyclists (on average, during the summer approximately 2 to 3 percent of all trips in the state are by bicycle). Assume that all roadways within 2 miles of an incorporated area meet these criteria unless counts specifically prove otherwise.

⁹ For purposes of this evaluation, use a “design life” of 20 years for a roadway, and 75 years for a bridge

¹⁰ Section 66.0907 (5), Wis. Stats.: Snow and ice. The board of public works shall keep the sidewalks of the city clear of snow and ice in all cases where the owners or occupants of abutting lots fail to do so, and the expense

Often objections to the placement of new sidewalks on a project stems from property owners' concerns regarding the future maintenance of the sidewalks.

If a community considers not to provide sidewalks it should be based on their inability to maintain them. Conditions for which a local unit of government (city, village, town, or county) can document their inability to maintain sidewalks on non-National Highway System (non-NHS) highways, should include all of the following:

1. There are no existing sidewalks on the highway system¹¹ under the local unit of government's jurisdiction.
2. The local unit of government has no ordinance that requires the installation of sidewalks or that requires the removal of snow and ice from sidewalks.
3. The local unit of government lacks sufficient equipment for the efficient removal of snow and ice from sidewalks.

If it is determined to establish sidewalks as part of the roadway improvement project the local unit of government must agree in writing to maintain any sidewalks added to a project when federal or state funds are used. Work with the local unit of government, to develop and execute a State-Municipal Agreement (Project Agreement) and, for STH projects, a Maintenance Agreement early in the planning and design process. This allows a local unit of government to decide early in a local road project whether to accept the maintenance of sidewalks or to forego the use of state or federal funds on the local road project. Similarly, the Department will put a STH project on hold until the local unit of government decides to accept the maintenance of sidewalks. Alternatively, for STH projects, the Department may decide to substitute a lower-order project type, such as resurfacing, if pavement condition or other deficiencies require more immediate attention.

1.4 References

Refer to [FDM 11-46-99](#) for list of references.

LIST OF ATTACHMENTS

[Attachment 1.1](#) FHWA letter

FDM 11-46-5 Pedestrian Facilities

October 3, 2016

Revise 11-46-5 (Pedestrian Facilities) to include additional guidance for considerations of right-of-way acquisition to accommodate curb ramp improvements.

5.1 Introduction

In conformance with federal law and policy and pursuant to Wisconsin State Statute 84.01(35)

<https://docs.legis.wisconsin.gov/statutes/statutes/84/01/35>

shall give due consideration to establishing bikeways and pedestrian ways. on all new construction and reconstruction highway projects funded in whole or in part from state or federal funds. See [FDM 11-46-1](#) for guidance.

Department policy for other project types, such as resurfacing or reconditioning, requires an evaluation to include bicycle and pedestrian accommodations where possible/practical within the scope of the project. In addition, certain bicycle and pedestrian design practices are required when applicable, e.g., curb ramps and bicycle-acceptable grates.

Pedestrian facilities on roadways typically include sidewalks, shared-use paths, curb ramps and crosswalks. See the following FDM sections for guidance on pedestrian facilities:

- [FDM 11-46-1](#) (Statutory requirements and policy)

of clearing in front of any lot or parcel of land shall be included in the statement to the comptroller required by sub. (3) (f), in the comptroller's statement to the city clerk and in the special tax to be levied. The city may also impose a fine or penalty for neglecting to keep sidewalks clear of snow and ice.

¹¹ Section 340.01 (22) Wis Stats.: "Highway" means all public ways and thoroughfares and bridges on the same. It includes the entire width between the boundary lines of every way open to the use of the public as a matter of right for the purposes of vehicular travel. It includes those roads or driveways in the state, county or municipal parks and in state forests which have been opened to the use of the public for the purpose of vehicular travel and roads or driveways upon the grounds of public schools, as defined in s. 115.01 (1), and institutions under the jurisdiction of the county board of supervisors, but does not include private roads or driveways as defined in sub. (46).

- [FDM 11-46-5.1](#) (Urban borders, sidewalks and terraces)
- [FDM 11-46-10](#) (Curb Ramps and Crosswalks)
- [FDM 11-46-15.6](#) (Shared-use paths and Roundabout Sidepaths)
- [FDM 11-46-20](#) (Publicly owned trail crossings of rural highways)
- [FDM 11-20-1](#) (Urban cross sections)

Many of the guidelines in this procedure were developed using AASHTO, U.S. Access Board (7), FHWA guides and design standards (20) and WisDOTs *Wisconsin Guide to Pedestrian Best Practices* (6). Collectively, these WisDOT guidelines and standards are the most applicable for the design of pedestrian accommodations on state and federally funded projects.

Recently, 2013 FHWA memos (19)(19a) encourage agencies to use other guides and resources that builds upon the flexibilities provided in the AASHTO guides, as appropriate. These other guides and resources can be useful information in project planning and development when used in context with AASHTO, U.S. Access Board, FHWA, and WisDOT design guidance and expertise. If a project proposes a pedestrian facility treatment(s) outside of Wisconsin guidelines approval is required, contact WisDOT regional bike and pedestrian coordinators to initiate this process. Use the WisDOT regional bike and pedestrian coordinators as a resource for planning and designing bike and pedestrian facilities on state and federally funded projects. Also, see the “references” section for additional documents and resource information.

When pedestrian facilities are provided, they are required to be accessible to people with disabilities.¹² Furthermore, there are American Disabilities Act (ADA) design guidelines and standards that must be applied in roadway improvement projects with regards to pedestrian facilities within the public right-of-way. Roadway improvement projects that are considered alterations are defined in [FDM 3-1 Attachment 5.2](#) and 5.3. Preventative maintenance projects that are considered alterations are defined in [FDM 3-1 Exhibit 5.1](#).

Newly constructed and altered facilities must be ADA-compliant. New construction is to provide the highest level of accessibility and meet current standards. For altered facilities, there is some flexibility to work within existing conditions. The flexibility is provided to recognize that retrofits are different from new construction. When existing conditions alters portions of facilities and if it's technically infeasible to meet new construction standards, the facilities must meet current standards to the maximum extent feasible and document design decisions. Alterations must not decrease the accessibility of a facility.

Technically infeasible is when there are existing physical or site constraints¹³ that limit or restrict the ability to meet current minimum ADA standards to the full extent for new construction and which are necessary to provide accessibility. Examples of existing physical or site constraints that may make it technically infeasible to make an altered facility fully compliant include, but are not limited to, the following:

- Right-of-way availability - **If sufficient right-of-way is not owned, land acquisition should be sought and accommodated** in order to achieve full ADA compliance **whenever possible. Acquisition is not mandatory. However, reasonable effort(s) to obtain the necessary right-of-way are to be documented, and improvements within the existing right-of-way must incorporate the ADA accessibility standards to the maximum extent feasible.**
- Underground structures that cannot be moved without significantly expanding the project scope.
- Adjacent developed facilities, including buildings that would have to be removed or relocated to achieve accessibility.
- Drainage cannot be maintained if the feature is made accessible.
- Significant natural or historic features that would have to be altered in a way that lessens their aesthetic or historic value.
- Underlying terrain that would require a significant expansion of the project scope to achieve accessibility.
- Street grades within the crosswalk exceeding the maximum cross slopes for pedestrian access route, provided an engineering analysis has concluded that it cannot be done without significantly expanding the project scope (for example, changing from resurfacing an intersection to reconstructing that

¹² Title II of the Americans with Disabilities Act (ADA) Accessibility Guidelines (ADAAG) and Section 504 of the Rehabilitation Act (49 CFR, Part 27) Act (49 CFR, Part 27).

¹³ Existing physical constraints include, but are not limited to, underlying terrain, right-of-way availability, underground structures, adjacent developed facilities, drainage, or the presence of a notable natural or historic feature (i.e. aesthetic features such as stone walls, statues, or items with historical value or significance) or facility (generally a structure or something created to serve a certain function). Where existing physical constraints make it impractical for altered elements, spaces, or facilities to fully comply with new construction requirements, compliance is required to the maximum extent practicable/feasible within the scope of the project.

intersection).

Technically infeasible may also apply based on the project scope. That is, the scope of an alteration project is determined by the extent the alteration project directly changes or affects the public right-of-way within the project limits. The public agency or municipality must improve the accessibility, to the maximum extent feasible, of only that portion of the public right-of-way changed or affected by the alteration. For example, if a project resurfaces the street, for accessibility purposes the curb ramps and pavement at the pedestrian crosswalk are in the scope of the project, but the sidewalk between intersections may not. Any of the features disturbed by construction must be replaced so that they are accessible. All remaining access improvements within the public right-of-way shall occur within the schedule provided in the public agency/municipality's planning process (FHWA Q&A about ADA, question 20. (25) Unaltered, non-compliant facilities will then be improved to standards or the maximum extent feasible with a stand-alone or future project. Implementation of WisDOT's transition plan may be used to prioritize, schedule and rectify the non-compliant facilities. At scoping, include any evaluation of the condition of existing sidewalks, shared use paths or other pedestrian facilities.

The Department looks to meet the needs of all disabled users. In order to ensure that a project is able to meet accessibility requirements a thorough scoping of accessibility needs is required. During scoping, evaluate the existing right-of-way adequacy for bike and pedestrian facilities, particularly for accommodating full ADA-compliant curb ramp improvements. At a minimum for ADA compliance, consider acquiring temporary limited easements if construction operations and final sloping requires access onto adjacent private property. Best practices may include working jointly with local units of governments in order to meet full curb ramp ADA requirements during an alteration-type project versus performing several partial curb ramp improvements with future projects, as this is the most cost-effective approach. Again, if a public entity does not control sufficient right-of-way, it should seek to acquire the necessary right-of-way and document those efforts. If a complaint is filed, public entities will likely need to demonstrate that it made reasonable efforts to obtain access to the necessary right-of-way. Improvements must incorporate the ADA accessibility standards to the maximum extent feasible within the existing right-of-way.

Document technically infeasible design decisions in the DSR. Describe these decisions under the "Design Criteria Outside of Desirable Standards" sub-section, [FDM 3-15-25.4.3.4.3](#). Tables summarizing the analysis may be used as a DSR attachment to supplement conclusions. **This documentation will serve to demonstrate the situation was evaluated and curb ramps improved to the maximum extent feasible. The documentation will also help address future concerns should they arise.**

For new construction and reconstruction projects, technically infeasible should rarely be a factor in a facilities design. In alteration projects, curb ramps are required to be installed or updated¹⁴ within the project scope to the maximum extent feasible. Cost is not a reason to exclude improvements. At a minimum, if other pedestrian facilities that are altered as part of the project, then these altered facilities must be improved or upgraded to meet current design standards. Although additional work beyond curb ramp improvements may not be required, FHWA and WisDOT recommended policy is to take the opportunity to evaluate and consider additional improvements to unaltered facilities where possible within the project scope in order to improve pedestrian access. It may be more efficient and beneficial to include improvements as part of the existing project.

5.2 Urban Borders and Zone System

An urban border is the area adjacent to a street, measured from the face of curb to the right-of-way line, and is described using a zone system, as shown in [Figure 5.1](#). The zone system helps to better define the usage of space between the curb and the property line, and consists of four distinct areas:

1. Curb zone
2. Planter/furniture zone
3. Pedestrian or sidewalk zone
4. Frontage or sidewalk clearance zone

¹⁴ Department of Justice/Department of Transportation Joint Technical Assistance on the Title II of the Americans with Disabilities Act Requirements to Provide Curb Ramps when Streets, Roads, or Highways are Altered through Resurfacing", and its associated Glossary of Terms. Refer to [FDM 3-1 Attachment 5.2](#) and Attachment 5.3

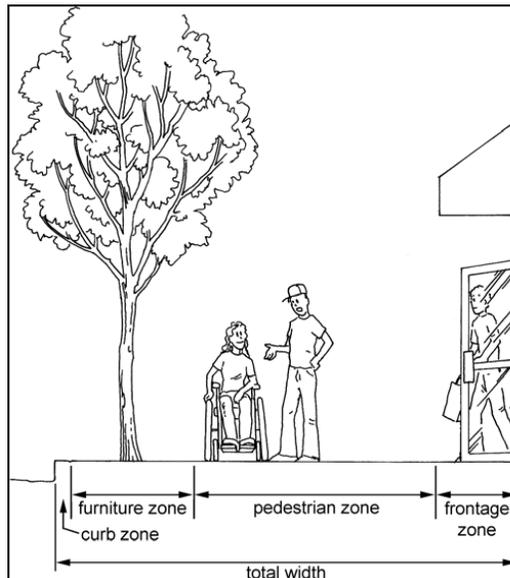


Figure 5.1 Zone System (7)(23)

See [Attachment 5.1](#) for illustrations and descriptions of various scenarios for incorporating sidewalks into the project:

- Protruding objects and vertical clearance
- Elevation difference between street and building
- Sidewalk cross slope
- Constructing a sidewalk through a driveway apron

Many municipalities have developed their own design standards and policies that may vary somewhat from those indicated in this procedure. Use the municipality's standards, when practical and when not in conflict with WisDOT policy. Desirably, design an urban project from the outside toward the center so as first to assure that sidewalks, curbs, driveway grades etc., have the best possible fit to the abutting property.

On urban projects, problems such as steep driveways and sidewalk ramp grades, poor drainage designs and poor blending of roadways and border areas are due to inadequate design of urban profiles and cross sections. When laying out an urban profile it may be helpful to develop point profiles of critical grades at intersections, sidewalks, adjacent buildings or properties, driveways and other features in order to visualize key profile elevations and features. Use these key feature profiles and existing curb profiles to develop centerline and traffic lane profiles.

Roadways at some locations are on or along a natural ridge causing elevations to be high on one side and low on the other side of the roadway. This also affects and complicates the design of the border area. In order to better fit site conditions at these locations, cross section designs may need to incorporate elements such as special warping of the parking lanes and possibly travel lanes, and steeper slopes and possibly retaining walls within the border area. Make sure that pavement cross-slope transitions are not too abrupt and that cross slope rollover does not exceed the maximum allowed (see [FDM 11-10-5.3.3](#)). Pavement Cross slopes that are less than minimum or greater than maximum require an exception to standards (see [FDM 11-20-1.1](#) for urban cross slope requirements). Other design challenges at these locations include:

- Adequate drainage to prevent ponding of water and creation of ice patches due to snow melt.
- Designing sidewalks and curb ramps to comply with ADA requirements.
- Driveway grades and break-over angles.

5.2.1 Sidewalks

Sidewalks on both sides of urban cross-section streets are standard treatments on all federal or state-funded projects (on the state highway system and local road system). It is most practical and cost-effective to incorporate sidewalks when the street is newly constructed or reconstructed.

Generally, sidewalks are placed higher than the curb top and sloped to drain toward the street. Changes in level are vertical elevation differences between adjacent surfaces and are generally not to exceed 0.5 inches (i.e. gutter flow line to top of curb cut for curb ramp installation). Changes in level are important in the sidewalk environment, especially to impaired users.

Minimum sidewalk width is 5 feet if adjacent to a terrace that is at least 3-feet wide.

Minimum sidewalk width is 6 feet if adjacent to a terrace that is less than 3-feet wide. In this case, there will not be enough room within the terrace to place signs, utility poles, light poles, hydrants, or other fixed objects.

Provide wider sidewalk if any of the following conditions apply:

- Higher pedestrian traffic is anticipated such as in a town center area or central business district.
- There are signs, utility poles, light poles, hydrants, or other fixed objects that intrude into the pedestrian zone.
- Angle parking is used and the vehicle overhang intrudes into the pedestrian zone (note: angle parking is not allowed except in certain limited situations – see [FDM 11-20-1.6.1](#)).

The sidewalk running slope maximum recommended grade is 5 percent to meet the American with Disabilities Act Accessibility Guidelines (ADAAG) where terrain conditions permit. As the running slope of the sidewalk changes, level landings may be required as follows:

- Sidewalk has a running slope from zero to 5 percent - no level landing is required.
- Sidewalk has a running slope greater than 5 percent up to 8.33 percent - provide a 5-foot by 5-foot level landing at each 2.5 feet of vertical change in grade. Do not exceed a 2 percent slope in any direction on the landing.
- When the street grade exceeds 8.33 percent slope, the sidewalk running slope should match the street grade with no level landings. Consider providing flat landing/rest strips at regular intervals in this situation.

For the construction of new sidewalk routes, avoid constructing only stairs or steps for primary access, since they are difficult or impossible to negotiate by pedestrians with mobility impairments and are not part of an accessible route. Where stairs currently exist, evaluate designs that remove stairs and provide an accessible route.

The sidewalk cross slope shall be 1.5 percent with a construction tolerance of ± 0.5 percent, as stated on [SDD 8D5](#). The maximum sidewalk cross slope according to ADA is 2.0 percent and the minimum cross slope to achieve drainage is 1.0 percent. If this cross slope with this construction tolerance cannot be built then constructability is “technically infeasible”. Document this condition in the DSR.

There may be locations, as determined by the field engineer, where a sidewalk may be constructed with less than 1.0 percent cross slope if there is greater than 1 percent longitudinal slope and it has been determined that there will be no standing water or ponding.

Transitional sections of sidewalks will connect between unaltered sections of existing sidewalk and new curb ramp/sidewalk and must comply with the ADA technical requirements to the maximum extent feasible. Modifications must not decrease or have the effect of decreasing the accessibility of a facility. Typically, one or two sections of sidewalk (typical length 5 to 10 feet) may be all that is needed for this transition. Document design decisions in the DSR when complying with ADA requirements to the maximum extent feasible.

Curb ramps and detectable warning fields are required in areas with curb and sidewalks. Information on curb ramps is provided in [FDM 11-46-10](#) and [SDD 8D5](#).

See Chapter 5, “Designing Pedestrian Facilities”, of the Wisconsin Guide for Pedestrian Best Practices (9) for more detailed information regarding sidewalk design, including guidance on:

- 5.3.1.1. The purpose of sidewalks and general considerations
- 5.3.1.2. Specific design parameters for sidewalk corridors
 - 5.3.1.2.1. Corridor widths
 - 5.3.1.2.2. Cross slope
 - 5.3.1.2.3. Grade/running slope
 - 5.3.1.2.4. Surface material
 - 5.3.1.2.5. Driveways and sidewalks
 - 5.3.1.2.6. Side slopes and vertical drops
 - 5.3.1.2.7. Obstructions and other pedestrian obstacles
 - 5.3.1.2.8. Street trees and planting strips
 - 5.3.1.2.9. Streetscape
 - 5.3.1.2.10. Lighting for sidewalks

The website for this pedestrian design reference may be found at:

<http://wisconsin.gov/Pages/projects/multimodal/default.aspx>

Also see the “NACTO Urban Street Design Guide” (23)

5.2.1.1 Walkway/Sidewalks in Areas with a Rural Cross Section

Like sidewalks in urban areas, sidewalks in rural areas must be adequately separated from vehicular travel lanes. Often, rural areas lack sidewalks. Where sidewalks do not exist, pedestrians use shoulders as walkways. Walkways are defined as the continuous portion of the pedestrian access route that is connected to street crossings by curb ramps or blended transitions¹⁵ (*PROWAG, Chapter R1*) (26). However, Wisconsin State Statute 340.01(54) and 340.01(58) does not define roadway shoulders as legal sidewalks or pedestrian facilities. Even though roadway shoulders are not legal pedestrian facilities and cannot legally be designated as pedestrian access routes, the occasional pedestrian that uses a shoulder as a walkway benefits from a wide paved shoulder. Evaluate the options described under this subsection below when encountering the following conditions:

- Along places where pedestrians are commonly using the shoulders
- Where footpaths indicate that a separate walking facility is needed
- Along a transitional area where residential and commercial development creates a demand for pedestrian facilities

Sidewalks should be designed and constructed along the outside of the ditch on top of the backslope within the right-of-way. It is important to review the constraints that may or may not be present to provide a sidewalk at this location. If the entire distance of the proposed project isn't able to accommodate the sidewalk outside the ditch area then perhaps a majority of it can be.

The next best alternative to installing a sidewalk outside the ditch would be to install a sidewalk at least 5 feet from the edge of where the standard shoulder would be located even if the existing shoulder does not meet current standards. This provides room for the shoulder to be updated to the standard and shouldn't require moving the walkway in the future. Provide a minimum of five feet of separation between the shoulder and the sidewalk. The minimum 5-foot separation needs to be constructed with different material than the shoulder material. In other words if the inside portion part of a shoulder, say 3 to 5 feet or so, is paved and the outside portion is aggregate then provide a minimum 5-foot grass separation strip between the outside edge of aggregate shoulder and the inside edge of sidewalk. This is similar to the development of a shared use path with a separation between the shoulder and the path.

When planning for a walkway adjacent to a rural cross section, always consider final sidewalk location with respect to clear zone or lateral clearance requirements for both existing and ultimate cross section for the roadway's design classification. Additional drainage features may be needed, such as a swale, inlets and storm sewer between shoulder and sidewalk. Consider sloping sidewalk toward the right-of-way and away from roadway if ditching exists. Coordinate with the municipality to address snow removal and minimize freeze/thaw potential on the sidewalk. Document roadside design decisions in the DSR.

5.2.1.2 Sidewalks on Rural Bridges

Consider sidewalks on rural bridges at the following locations:

1. In growth areas around cities, villages, and urban areas where the need for sidewalks may not be readily apparent, but will be necessary for future growth as documented in community and regional land use and long range transportation plans.
2. In town centers where sidewalks are being considered or included on the rest of the roadway because adjacent land use densities.

Bridges are designed to last up to 75 years. By comparison, reconstructed rural roadways may have useful lives of up to 20 years. While retrofitting sidewalks onto roadways is usually relatively easy, retrofitting sidewalks onto existing bridges is not. Consult with the Bureau of Structures (BOS) if a structure design needs to accommodate future sidewalk.

See [FDM 11-35-1.6](#), [FDM 11-35 Attachment 1.1](#), and [FDM 11-46-15.6](#) for additional guidance.

5.2.2 Terraces

A terrace is the area between the front face of the curb and the edge of the sidewalk, i.e., the curb zone and the furniture/planting zone in [Figure 5.1](#). The terrace area (outside of the curb) usually consists of grass, but paved terraces are common in areas with heavy pedestrian usage, such as central business districts.

Terrace width varies but it is generally best to provide 6-feet or more to accommodate snow storage, signing,

¹⁵ WisDOT does not construct blended transition curb ramps.

utilities, plantings and other uses while still maintaining the required lateral clearance from the face of curb (refer to [FDM 11-15-1](#) and [FDM 11-20-1](#) for guidance on appropriate lateral clearances). Generally provide at least a 3-foot clearance from trees to curb, and at least 3-foot clearance from trees to sidewalk (at least 6-foot total width). Grass terraces have a minimum transverse slope of 4%; paved terraces have a minimum transverse slope of 2%.

See [FDM 11-20-1, Attachment 1.2](#), 1.3, and 1.6 for typical urban street cross sections.

See Chapter 5, “Designing Pedestrian Facilities”, of the Wisconsin Guide for Pedestrian Best Practices (9) for more information on terrace design. Also, see the “NACTO Urban Street Design Guide” (23).

5.3 References

Refer to [FDM 11-46-99](#) for list of references.

LIST OF ATTACHMENTS

[Attachment 5.1](#) Sidewalk Design Considerations

FDM 11-46-10 Curb Ramps

October 3, 2016

Revise 11-46-10 (Curb Ramps) to clarify technical infeasibility application for 3R projects and detectable warning field placement at curb ramps with skewed intersections and narrow terraces.

10.1 General

The US DOT has adopted the Americans with Disabilities Act (ADA) Accessibility Guidelines (ADAAG) as a standard for complying with ADA and Section 504 of the Rehabilitation Act (49 CFR, Part 27)¹⁶. Currently, there are design guidance conflicts between Wisconsin Statutes and the ADA requirements. The design guidance in this procedure and associated Standard Detail Drawings ([SDD 8D5](#)) have been developed to provide the designer with criteria that is consistent with ADAAG guidance. ADAAG requires detectable warnings fields on curb ramps at all legal crossings, sidewalk and shared-use paths independent of funding source. Detectable warnings are a distinctive surface pattern of truncated domes detectable by cane or underfoot. They indicate to people with vision impairments of a change from the pedestrian way/sidewalk to vehicular way, that is the entering into a street, railroad, or hazardous drop-off at transit platforms.

Curb ramps are required by ADA and Section 504 and are separate from Wisconsin law pertaining to complete streets and State Statutes 84.01(35).

When a curb ramp is constructed on one side of a street, then companion curb ramp(s) are required on the opposite side if there is either existing sidewalk on the opposite side or sidewalks are being constructed on the opposite side as part of the project. When a project terminates adjacent to or in the middle of an intersection, curb ramps and landings must be constructed, where sidewalk is present, on the street corners beyond the project limits, even though no other construction may be necessary at those corners.

At intersections, including “Tee” intersections, where the side road has sidewalks on one or both sides of the street and the through street has sidewalk on the opposite side of the street from the side road, this condition establishes a legal crosswalk whether the crosswalk is pavement marked or not per ss 340.01(10)(b).

The standard curb ramp width for newly constructed curb ramp is 5 feet, or the width of the sidewalk or shared use path area leading to the crossing. This measurement does not include the width of the flared sides. The width of a median cut-through is the same as the crosswalk width, typically 6 feet or wider.

Curb ramps should not be offset more than 10 feet from a sidewalk continuation without the approval of the Regional bike/pedestrian coordinator. The 10 foot offset distance is measured from the back side of the sidewalk to the crosswalk. See [Attachment 10.1](#), Figure 2.

Curb ramps shall be provided for each sidewalk extended across the through street crosswalks as shown in [Attachment 10.1](#), Figure 1, except as noted in [FDM 11-46-10.1.1](#), “Crosswalk Closure”. It is generally undesirable to close the crosswalk on one side and direct pedestrians to the other side of the side road before crossing the through street since this requires pedestrians to avoid using what was once a legal crosswalk. Often pedestrians will not detour out of their way when they face an obvious crossing in front of them. However,

¹⁶ For more information on ADAAG detectable warnings and accessible design requirements go to www.access-board.gov. Also, each WisDOT district pedestrian/bicycle coordinator has a copy of (7) Designing Sidewalks and Trails for Access / Part II of II: Best Practices Design Guide. U.S. Access Board; U.S. DOT, 2001. <http://www.fhwa.dot.gov/environment/sidewalk2/pdf.htm>, which is the primary reference for designing curb ramps and other accessibility considerations.

especially for safety reasons, it may be necessary to close a crosswalk. There should be sound reason documented for a closure. There are also some locations where curb ramp installation may be desirable, but is not required. For example, if there is a “foot path” that indicates pedestrian traffic within the intersection right-of-way or if there is a future local project that will provide a sidewalk to the intersection in the immediate future. Also, there may be a safety reason to justify a free-standing curb ramp, for example the distance between crossing locations, land uses, and destinations may indicate the need, or to provide a space for pedestrians to move temporarily out of the intersection or to access a pedestrian push button. Coordinate with the local community to ensure that the curb ramp is properly sited and maintained.

Provide ADA-compliant curb ramps at intersections (including traffic islands and medians) and mid-block crossings where a sidewalk or other pedestrian walkway crosses the curb at locations where crosswalks (either marked or unmarked) are present on alteration improvement project types. Alteration roadway project types are defined in [FDM 3-1 Attachment 5.2](#), [FDM 3-1 Attachment 5.3](#) and [FDM 3-1 Exhibit 5.1](#). Alteration project types include reconstruction, pavement replacement, rehabilitation, open-graded surface course, micro surfacing, thin lift overlays, cape seals, and in-place asphalt recycling. Treatments that are considered maintenance of the road surface do not require curb ramp installation or updating. However, curb ramps may be installed/updated on maintenance project types as well for other reasons and needs.

For an alteration such as a resurfacing improvement project that does not have scoped right-of-way acquisition, curb ramps need to be improved to the maximum extent feasible to meet current ADA requirements within the existing right-of-way. Refer to [FDM 11-46-5.1](#) for further discussion and application of technically infeasible with respect to curb ramp improvements for alteration projects.

For more information regarding curb ramp design and ADA compliance, see the “Wisconsin Guide to Pedestrian Best Practices” (6).

10.1.1 Crosswalks

Crosswalks are defined as pedestrian crossings where motorists must legally yield the right-of-way to crossing pedestrians. As stated in Wisconsin State Statute 340.10(10), crosswalks exist at all intersections where sidewalks are present, even if the crosswalks are unmarked. Intersection crosswalks are legally considered prolongations of their contiguous sidewalks. Crosswalks can also exist at mid-block locations. However, unlike crosswalks at intersections, mid-block crosswalks must be marked.

Crosswalk cross slope is important for pedestrian and impaired user navigation.

Side roads that are controlled by a stop sign, yield sign, or signal must provide a 1.5 percent (2% maximum) cross slope on the crosswalk and extend the 1.5 percent side road profile back to a point beyond the stop bar, yield bar or control location, whichever is greater. If any technically infeasible conditions cited under [FDM 11-46-5.1](#) are satisfied, develop side road profile to the maximum extent feasible. Provide documentation in the DSR.

Mainline roads (through traffic movement) that are signal controlled, not controlled at an intersection, or for mid block crossings the crosswalk may have a cross slope equal to the profile slope of the mainline roadway. An example may be where the mainline roadway has a 5 percent grade then the crosswalk cross slope may also be 5 percent.

10.1.2 Crosswalk Closure

Site conditions, safety concerns, and ss 349.185(2) regulate the prohibition of pedestrian crossings and shall be evaluated prior to closing a crossing.

When a crosswalk is closed the crossing must be signed as closed and a barrier must be installed to alert blind or low vision pedestrians and other users that a crossing at this location is not permitted.

The standard signs used to close a crossing are shown below in [Attachment 10.1](#), Figure 2. The arrow on the sign may be oriented to the right or to the left, whichever is appropriate for the location. The sign post location must meet lateral clearance requirements as shown in [FDM 11-20, Table 1.5](#) (typically 4 feet from the travel lane, assuming a 2 foot gutter and 2 feet behind the face of curb). A formal exception to standards is required, per [FDM 11-1-2](#), if lateral clearance requirements are not met.

There are several options for closing a crosswalk where there is a through street terrace width of 3 feet or more. Identified,

- One option is a 4-inch to 6-inch curb, with tapered ends, across the end of the side road sidewalk extended, or a raised planter with perimeter curbing, and install the standard signs on a post in back of the Concrete Pedestrian Curb as shown in [Attachment 10.1](#), Figure 4.
- Another option is low growth plantings (18-inch maximum height at maturity) or terrace mound with WisDOT approval. The terrace mound is approximately 6 inches high and across the end of the side road sidewalk extended. The mounding option is acceptable providing the curb, planters, plantings or

railing identified above is determined by WisDOT to be unacceptable. Install the standard signs on a post as shown in [Attachment 10.1](#), Figure 5.

Evaluate the conditions and context when selecting a preferred design. Barrier options may include a planter, concrete pedestrian curb, plantings and terrace berm.

If there is less than a 3 foot terrace, or the sidewalk is adjacent to the back of curb, then close the crosswalk by first moving the sidewalk back and away from the through street back of curb as it approaches the intersection (as shown in [Attachment 10.1](#), Figure 6), and then using one of the options explained above. This option may require right-of-way purchase, depending on available space. If right-of-way is not available and the sidewalk and furniture area is narrow then it may be acceptable, with WisDOT approval, to install a raised curb along with a “pedestrian crossing closed” sign.

10.2 Curb Ramps and Detectable Warning Fields

Curb ramps with detectable warnings shall be installed on all state or federally funded projects with sidewalks including resurfacing and Preventative Maintenance¹⁷ projects where curb ramps do not exist or they are not ADA compliant. This shall be done whether or not new or replacement sidewalk is programmed as part of the project.

All state or federally funded projects that include new sidewalk and new curb ramps shall include detectable warnings.

Use curb ramp Type 2 that is in line with the crosswalk (perpendicular ramp) because the crossing distance is shorter and it helps to align blind or low vision people to the opposite side of the street. Where the Type 2 curb ramp is not technically feasible, a parallel ramp (two ramps both parallel to the direction of travel) is the next preferred ramp type. Lastly, a diagonal ramp may be constructed as a single ramp centered on the curb return (Type 1 or 1A). Other curb ramp types are provided in [SDD 8D5](#) to illustrate the various configurations that require detectable warning fields and may occur on a project (i.e. railroad crossing, median crossing, and island crossing). Per guidance under [FDM 11-46-5.1](#), document any technically infeasible design decisions in the DSR relative to curb ramp selection and hierarchy (Type 2, parallel ramp, Type 1/1A).

Refer to sub-sections 5.3.3.1 (design specifications for curb ramps) and 5.3.3.2 (types of curb ramps) of the “Wisconsin Guide to Pedestrian Best Practices” (6) for further detail guidance:

<http://wisconsindot.gov/Documents/projects/multimodal/ped/guide-chap5.pdf>

Also refer to reference “Designing Sidewalks and Trails for Access/Part II of II: Best Practices Design Guide” (14) for further design guidance:

http://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/sidewalk2/pdf/08chapter7.pdf

Additional information on the planning and design evaluation on curb ramp solutions and examples may be found in Special Report: Accessible Public Rights of Way Planning and Design for Alterations by the U.S. Access Board (29):

<http://www.access-board.gov/guidelines-and-standards/streets-sidewalks/public-rights-of-way/guidance-and-research/accessible-public-rights-of-way-planning-and-design-for-alterations>

The Standard Detail Drawings are developed to address a majority of curb ramp installations. However, there are locations where SDD’s do not work because of site-specific conditions. Develop construction details for these locations showing elevations and curb ramp alignments that meet the site conditions. For example, inclusion of construction details with final plans will be common for replacement of existing curb ramps or for curb ramp construction within urban environments. Additional scenarios for including curb ramp details in the final plans are cited below.

Numerous design elements are considered essential for a well-constructed curb ramp (refer to [Figure 10.1](#)). In a majority of projects, field survey is needed to facilitate curb ramp design. Site or terrain conditions may dictate the need for developing further plan details, particularly with retrofit projects. Where curb ramp details are inserted in the final plans, include various point locations (x, y coordinates) along the curb ramps and sidewalk as well as elevations of that point (z), independent of roadway alteration project type. Curb ramp and sidewalk slope labeling may be designer-preferred and may be used independently or to supplement plan elevations.

¹⁷ Preventative Maintenance Eligible Work Types are identified in the Preventative Maintenance Agreement in [FDM 3-1 Exhibit 5.1](#). In Exhibit 5.1 under the column “Eligible Work Types” there are Group 1, Group 2, and Group 3 Pavement Strategies. After various Pavement Strategies, there are notes 1 through 8. An alteration is identified by note 8 and requires a curb ramp installation per the guidance in [FDM 11-46-10](#). FDM 3-1 Attachment 5.1 and 5.2 is a copy of the requirement and glossary from the US Department of Justice and FHWA. Eligible Work types identified as maintenance do not require additional work related to curb ramps.

Construction details must comply with ADA cross slopes, running slopes and other design criteria as defined in [FDM 11-46-5](#) and [FDM 11-46-10](#). Note that WisDOT doesn't allow blended transitions (long radius curb and gutter applications). Following are some scenarios that require construction details for proper curb ramp design:

- Where the terrace is less than 6' wide, or the sidewalk is at the back of curb, or the terrace is all concrete
- At skewed intersections or wider curb ramp openings;
- In pork chop islands or uniquely shaped median refuge areas;
- Where there are inlets, manholes, utility boxes, poles and other obstructions close to the proposed curb ramps avoid all of these obstructions or other maintenance obstructions within the curb ramps and gutter in front of curb ramp.
- Where concrete pedestrian curb is provided include construction details of the concrete pedestrian curb, such as length, alignment and taper details.
- At locations with flat longitudinal gradient along curb flow line.

See [FDM 11-46-10.3](#) for further description of curb ramp design considerations for development and inclusion as project construction details.

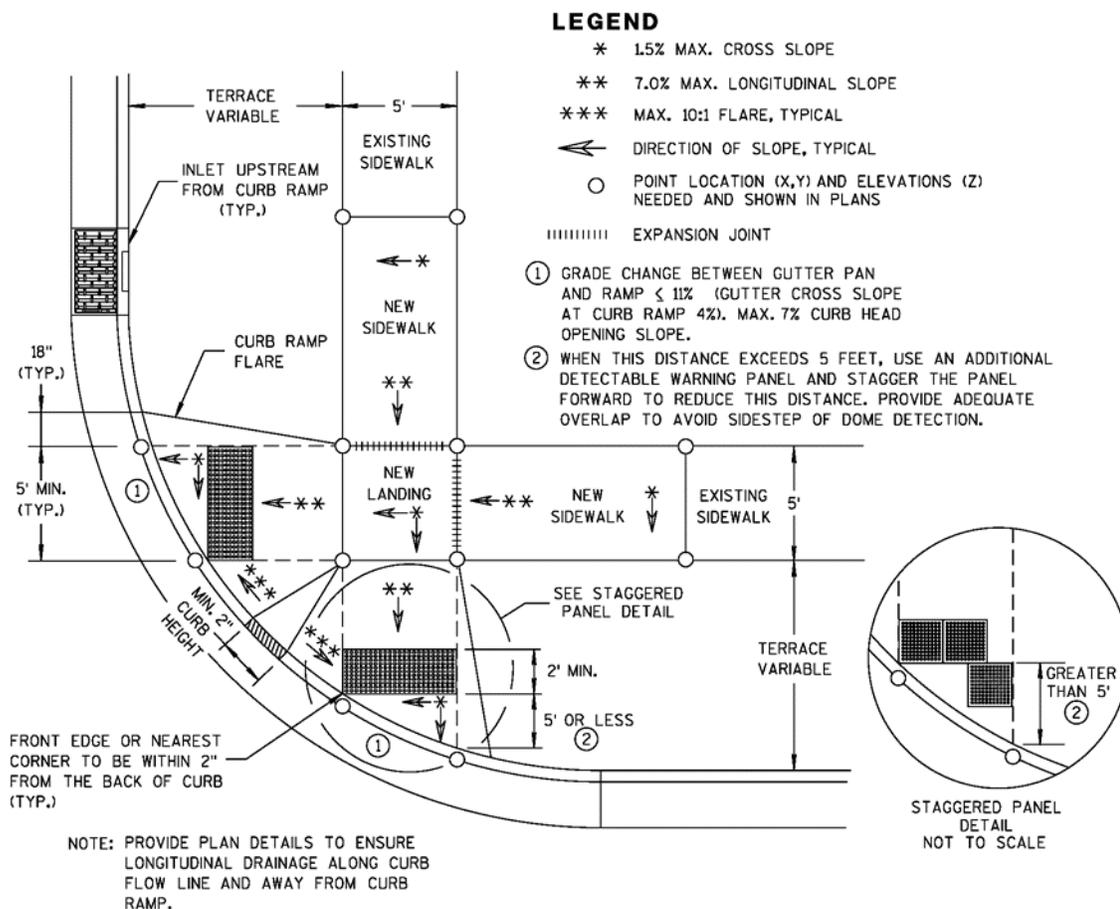


Figure 10.1 Typical Type 2 Curb Ramp Installation with Recommended Plan Details

On Type 2 ramps it may be necessary to reduce the curb height between the ramps down to 2 inches minimum in the triangular area as shown on the Type 2 ramp, [SDD 8D5](#). Use maximum 10:1 flare slopes within this triangular area since this area is walkable surface. Attain a minimum 1 to 2-foot curb length with the reduced-height curb between the flares. When the terrace is less than 6 feet wide it will most likely be necessary to lower the sidewalk elevation prior to the ramp intersection. The designer may have to show sidewalk grades on a special detail. The offset distance is a maximum of 10 feet measured from the backside of a side road sidewalk extended to the closest side of the crosswalk.

If Type 2 (perpendicular) and parallel ramps are technically not feasible and a Type 1 (diagonal) curb ramps is to be used, provide maximum 10:1 flares slopes since the level portion of the flanking sidewalk apron is considered walkable surface.

Detectable warnings are a distinctive surface pattern of truncated domes detectable by cane or underfoot. They are used to alert people with vision impairments of their approach to streets or hazardous drop-offs. Truncated domes will replace the previously accepted practice of placing an expanded mesh pattern at the bottom of a curb ramp.

If the existing curb ramp does not have a detectable warning field (i.e. truncated domes) or the current condition does not comply with ADA requirements or the ramp area is severely cracked, or has cracks/joints with a change in level that produces a lip greater than 1/4-inch then replace the curb ramp and install a detectable warning field. Install detectable warnings on paved shared-use paths at roadway crossings. Curb ramps with wire mesh imprint warning field, any warning field other than truncated domes, or with missing warning fields are not ADA compliant and need to be replaced. Existing non-cast iron truncated domes, if in good condition, may remain in place if the curb ramp meets ADA standards.

If a paved shared-use path crosses a roadway that has curb then provide a concrete pad adjacent to the back of the curb and install the detectable warning fields into the plastic concrete. If a paved shared-use path crosses a roadway that has a paved or aggregate shoulder then provide a concrete pad at the outside edge of the shoulder and install the detectable warning fields into the plastic concrete. See [Figure 10.2](#) for an example detectable warning field installation of a shared-use path crossing a non-curbed roadway. Continue the paved shared-use path across any unpaved portion of the shoulder. If a shared-use path is not paved then the detectable warning field is not required at the roadway crossing.

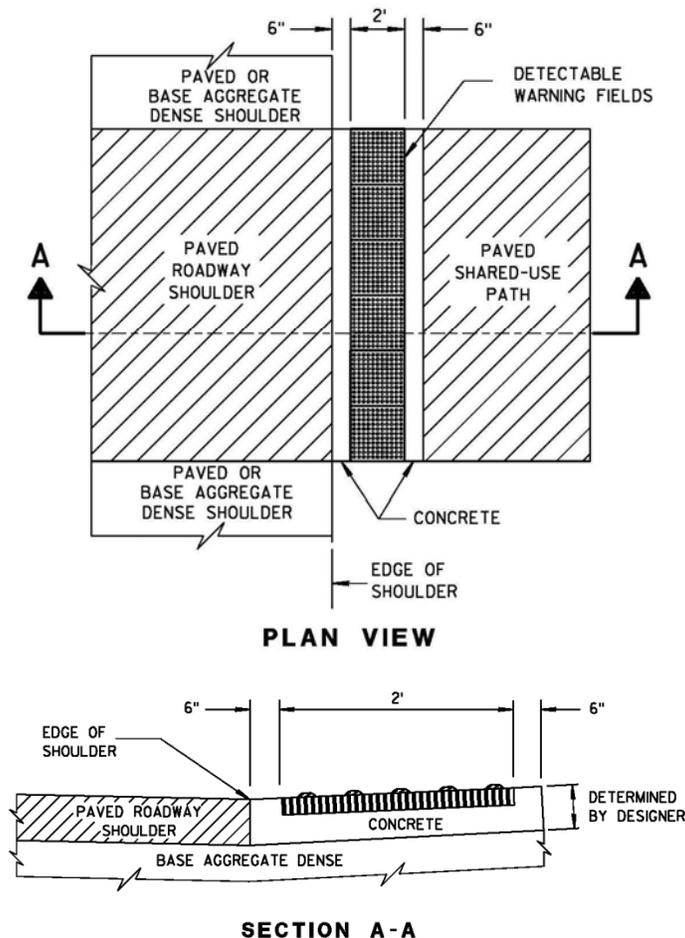


Figure 10.2 Example of Detectable Warning Field Installation for Shared-Use Path Crossing a Non-Curbed Roadway

According to ADA the detectable warning field should be located 6 to 8 inches in back of the gutter flow line. When a sidewalk approaches a curb radius this may not be possible while keeping the truncated domes in alignment with the longitudinal path of the wheelchair. Install the leading edge of the detectable warning field

within an inch of the back of the curb and allow the other edge to be greater than 6 or 8 inches from the flow line where appropriate. It is most important that the detectable warning domes, and spaces between the domes, line up with the longitudinal path of the wheelchair. Therefore, the line of domes should be parallel to the direction of travel or edge of sidewalk.

Evaluate each curb ramp for the most effective placement of the detectable warning fields, as conditions may vary. For example, along skewed intersections with narrow terraces, aligning the domes parallel to the direction of pedestrian travel may result in the detectable warning field panels propagating into the adjacent sidewalk. This may result in pedestrians bypassing the warning fields when entering the curb ramp openings. For these situations, ensure the domes are placed as close to back of curb as possible. Orientation of the domes is less critical where detectable warning surfaces are provided on a surface with a slope that is less than 5 percent (PROWAG) (28).

The cast iron detectable warning panel standard size is 2-foot by 2-foot. Other sizes are also available such as 2' x 1', 2' x 1.5', 2' x 2.5' and 2' x 3'. Align detectable warning fields at the back of the gutter flow line and the full width of the ramp (as measured perpendicular to the pedestrian direction of travel) and have a minimum length of two feet (as measured parallel to the pedestrian direction of travel). The warning field closest to the back of curb is installed 6 inches to 8 inches from the gutter flow line, or typically about 1 inch from the back of curb.

For Type 2 curb ramps with a larger intersection radius, for example, placing detectable warning fields at full width of the ramp may become further offset behind the back of curb along one edge of the curb ramp. Do not exceed a 5-foot distance along the furthest curb ramp edge between front edge of detectable warning panel and back of curb. Refer to [SDD 8D5](#). Also refer to inset under [Figure 10.1](#). In certain circumstances, it may be necessary to longitudinally stagger the panels when exceeding 5 feet. To comply with this maximum distance, stagger an additional warning field panel to reduce this distance. Provide adequate row overlap to avoid sidestep of dome detection. An adult walking stride length is considered 2 feet FHWA (27) and may pass over staggered warning fields without the row overlap. Align domes in direction of pedestrian travel.

Staggered detectable warning field panels for wide directional curb ramps may be necessary, particularly in combination with narrow terraces and/or large intersection radii. Several staggered rows of panels may be needed to ensure the last curb ramp panel, measured along the most distant curb ramp edge, will not exceed 5 feet to back of curb opening. Ensure that a corner of each row of panels is within a maximum 2 inches from back of curb. Do not introduce a row of detectable warning field panels across the entire directional curb ramp for these multi-row applications. Refer to [Figure 10.3](#) for an example application. Place combinations of standard and variable-width panels to provide adequate row overlap toward ensuring that an adult's 2-foot stride will not sidestep any panel dome detection. The designer should identify the panel sizes in the final plan details. Due to the nature of the staggered detectable warning field panels and its ramp constructability, provide a level landing (i.e. 1.5% longitudinal slope) within the panel limits.

While detectable warning fields can be adequately staggered in several rows for these wide directional ramp applications, designers should minimize the effects of these larger, skewed curb openings whenever possible by evaluating alternative options during the design process. Reduced intersection radii, increased terrace width and/or sidewalk/shared-use path 'bulb-out' intersection realignment may be viable options to reduce the skewed curb opening width. Evaluate intersection vehicular turning per [FDM 11-25-2](#).

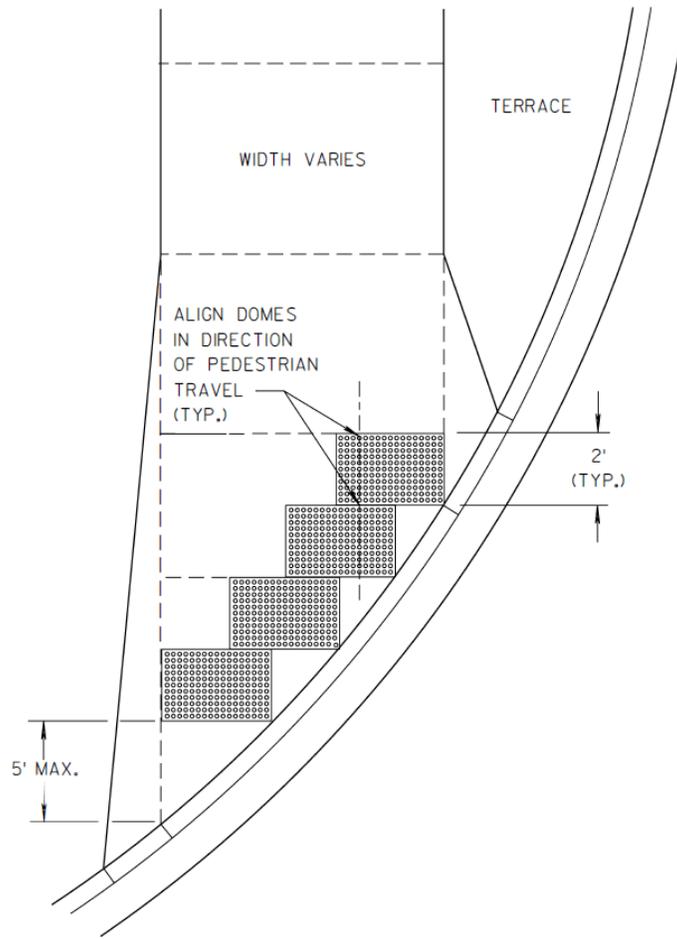


Figure 10.3 Example of Detectable Warning Field Application for Wide Directional Curb Ramp

Detectable warning fields are not required at cut-through pedestrian refuge islands that are less than 6 feet in width (measured between back of curbs). These islands typically occur at medians. See Type 5 curb ramp, [SDD 8D5-16e](#) for further details. Detectable warning fields must extend 2 feet minimum on each side of the island and be separated by minimum 2 feet width without detectable warning field. Installing detectable warning surfaces at cut-through pedestrian islands less than 6 feet wide compromises the detectable warning field effectiveness. Where a cut-through pedestrian refuge island is less than 6 feet wide and the pedestrian street crossing is signalized, the signal should be timed for a complete crossing of the street (*PROWAG, U.S. Access Board*) (28)

10.2.1 Truncated Domes

Truncated domes are the only curb ramp detectable warning field meeting Americans with Disabilities Act (ADA) requirements and the Access Board's draft Public Right of Way Guidelines. These requirements and guidelines apply to all projects involving new or altered pedestrian facilities, not just projects funded by state or federal sources.

Each truncated dome has an acceptable range of values for bottom diameter, top diameter, height and center to center spacing (see [SDD 8D5](#) last sheet for a drawing of the detectable warning field with truncated domes). Domes should be arranged in straight lines and not offset with each other.

The quality of detectable warning field products (10),(11),(12),(28) is important to the overall performance of the transportation facility. As shown in [Table 10.1](#), curb ramp detectable warning fields must be on the WisDOT "Approved Products List" (APL) prior to bidding in order to be eligible for state or federal funding. The WisDOT "Approved Products List" (APL) shows the various approved product names, acceptable colors, manufacturer, and distributor information. Click on "curb ramp detectable warning fields" under "roadway appurtenances" on the Approved Products List" page:

<http://wisconsindot.gov/Pages/doing-bus/eng-consultants/cnslt-rsrcs/tools/appr-prod/default.aspx>

Local units of government are encouraged to use yellow, white, or natural patina as the curb ramp detectable warning field color. However, as shown in [Table 10.1](#), local units of government may choose another color that

meets national standards and ADA requirements. Therefore, local governments must submit desired products that are not already on the WisDOT APL, several months ahead of the scheduled bidding to allow for product review and/or testing. If time is not available to evaluate or there is current knowledge about the product that it is deemed unacceptable, then it will not be added to the APL.

Per FHWA’s “Visual Detection of Detectable Warning Materials by Pedestrians with Visual Impairments (Final Report)” (13), the detectable warning field color is a functional part of the product (not aesthetic) for people who are blind or low vision. Based on previous field reviews with people who are blind or low vision, yellow was the most discernible color. White color also ranked very high in the field review. The natural patina (or rust) of the cast iron product is also acceptable. Therefore, yellow, white, or natural patina are the required colors on WisDOT facilities, including state trunk highways and connecting highways. The designer may choose to coordinate yellow, white, or natural patina with the community on projects where new curb ramps will be installed. The bid item number(s) dictate the color of the detectable warning field to be used and are provided on the backside of [SDD 8D5](#) along with other associated bid items.

Table 10.1 Curb Ramp Detectable Warning Field Policy

Location	Funding for warning field bid item	Product	Color
STH System (STH or Connecting Highway)	Participating Item	Must be on WisDOT APL prior to bid	Yellow, White, or natural patina
Local System	Participating Item (eligible for state or federal funds)	Must be on WisDOT APL prior to bid	Yellow, white, or natural patina recommended. If color is not yellow, white, or natural patina a letter to WisDOT is required stating that ADA requirements are met.
Local System	Non-participating Item (not eligible for state or federal funds)	APL products are recommended. If product is not on the APL a letter to WisDOT is required stating that ADA requirements are met.	Yellow, white, or natural patina recommended. If color is not yellow, white, or natural patina a letter to WisDOT is required stating that ADA requirements are met.

10.3 Curb Ramp Design Considerations

Surface water runoff from the roadway can flood the lower end of a curb ramp. Determine the grades along the curb line and provide catch basins or inlets to prevent flooding of the ramps. Verify that the drainage structure will not be in the path of a wheelchair user or pedestrian.

Grade change between the gutter flag slope and the curb ramp slope is not to exceed 11%. ADA requires curb ramps have a running slope no steeper than 12H:1V or 8.33% and a cross slope of 2% (construct at 1.5% for construction tolerance) unless a greater cross slope is needed to transition into the back of the curb slope. Gutters have a common cross slope of 3/4 inch/foot or 6.25%. Adjust the curb ramp running slope and the gutter slope to comply with the 11% grade change requirement. Therefore, use a maximum design curb ramp slope of 7% in combination with a maximum 4% gutter flag slope. Refer to [Figure 10.4](#) for schematic diagram of allowable algebraic differences between gutter cross slope and curb ramp profile.

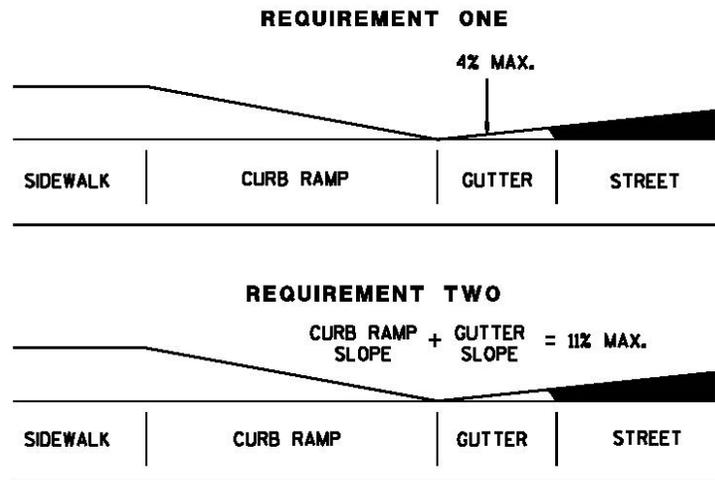


Figure 10.4 Algebraic Difference in Slope Between the Gutter and the Adjacent Curb Ramp

Designers may have challenges attaining curb ramp slopes at 7% or less for retrofit projects due to tight site conditions or other constraints. Curb ramps may be designed and constructed at an absolute maximum 12H:1V (8.33%) in these situations. If the designer elects to design the curb ramp with this absolute maximum 12H:1V slope, then the gutter flag slope must be designed to 2.67% or flatter to maintain a 11% maximum grade change. Refer to [Figure 10.4](#). Under these circumstances, it is imperative that the designer gather field survey and provide curb ramp plan details to ensure the ramps are built as planned.

Refer to sub-section 5.3.3.1 (design specifications for curb ramps) of the “Wisconsin Guide to Pedestrian Best Practices” for retrofit curb ramp conditions when attaining a maximum 8.33% ramp slope is technically infeasible. The guide is at:

<http://wisconsindot.gov/Documents/projects/multimodal/ped/guide-chap5.pdf>

Justify and document in the DSR if this technically infeasible option needs to be exercised for an improvement project.

A flattened gutter in front of a curb ramp, such as a 4% cross slope or flatter, may require the installation of an inlet or other drainage structure on the upstream side of the curb ramp to avoid gutter ponding, particularly in flat conditions. If the intersection quadrant is a low area, an inlet just upstream from each curb ramp may be required. The inlet on the upstream side of a curb ramp will preclude water from crossing at the curb ramp. Drainage structures shall not be in the path of a wheelchair user or pedestrian. Additionally, flat conditions with limited opportunity to install an upstream inlet (e.g. constraints such as utilities) may require installation of a relatively long length of curb and gutter with varying gutter cross slope in order to maintain positive drainage away from the curb ramp. Develop construction details for this gutter slope transition through the curb ramp. Provide minimum 0.5% longitudinal slope (absolute minimum 0.3%) along curb flow line.

Curb ramps at skewed intersections or along wider curb ramp openings may require additional attention during final plan development and subsequently require construction details. For these instances, gutter cross slopes and curb head opening slopes may vary when measured parallel to the direction of pedestrian travel and where measured along the curb ramp (e.g. center of curb ramp vs. edge of curb ramp). Maintain a maximum 7% curb head opening slope at any location along the entire width of a curb ramp opening. Consider flatter (e.g. <7%), consistent curb opening slopes within a project due to the effects of the skew and construction forming practices.

On mill and resurface type projects or other 3R projects it may be technically infeasible within the scope of the project to properly construct the sloping combination of curb ramps and gutters to current standards. If technically infeasible, the project team must then design the facilities meeting current ADA standards to the maximum extent feasible (see [FDM 11-46-5.1](#)). Document the technical infeasibility design decisions in the DSR. Describe these decisions under the “Design Criteria Outside of Desirable Standards” sub-section, [FDM 3-15-25.4.3.4.3](#). Tables summarizing the analysis may be used as a DSR attachment to supplement conclusions. This documentation will serve to demonstrate the situation was evaluated and curb ramps improved to the maximum extent feasible. The documentation will also help address future concerns should they arise.

The change in angle from the gutter slope to the ramp slope (including curb head) shall be flush and without a lip, raised joint, or gap. Lips or gaps between the curb ramp slope, curb head, and the gutter counter slope can

catch caster wheels or crutch tips and cause pedestrian injuries.

A landing is necessary to provide space for a person in a wheelchair to maneuver into position to use the ramp or to bypass it. In new construction, provide a five-foot square landing. A four-foot square landing is the minimum. If the landing is next to a vertical wall, a five-foot wide area is desirable to allow a person in a wheelchair more room to maneuver. In alterations of an existing roadway, where the curb ramps are being modified, the landing must be at least three feet square. Do not exceed 2% slope in any directions within the landing.

Consider the need for tie bars between the concrete pedestrian curb and the sidewalk.

Additional information relating to work types identified as preventative maintenance can be found in [FDM 3-1 Exhibit 5.1](#). A copy of the "DOJ/FHWA Joint Technical Assistance on the Type II of the Americans with Disabilities Act Requirements to Provide Curb Ramps when Streets, Roads, or Highways are Altered through Resurfacing" is found in [FDM 3-1 Attachments 5.2](#) and 5.3 or at

https://www.fhwa.dot.gov/civilrights/programs/doj_fhwa_ta.cfm

10.4 Other Considerations

Curb ramp installations at intersections may have various options to consider as shown in [Attachment 10.2](#), 10.3 and 10.4:

- Limited right-of-way near a crossing (14)
- Accessible Pedestrian signals and push-button locations (15)
- On-Street Parking for People with Mobility Impairments (16)

10.5 Curb Ramp Adjacent to Historically Significant Resources

Existing curb ramps or sidewalks adjacent to qualified historic facilities needs to be evaluated and ADA compliance is required to the maximum extent that does not threaten or diminish the historic significance. The element or facility that is altered must have the historic significance. Location of curb ramps or sidewalk within a historic district does not automatically qualify as a historic facility. The State Historic Preservation Officer or Advisory Council on Historic Preservation determines if compliance would threaten or destroy the historic significance of the element or facility. A qualified historic facility is a facility that is listed in or is eligible for listing in the National Register of Historic Places, or is designated as historic under state or local law. Reproductions or replications of historic facilities shall not qualify as historic facilities. If the existing sidewalk/curb ramp remains and does not meet ADA standards, document the evaluation and decision as technically infeasible in the DSR accordingly.

10.6 References

Refer to [FDM 11-46-99](#) for list of references.

LIST OF ATTACHMENTS

Attachment 10.1	Legal Crosswalk and Crosswalk Closure Figures
Attachment 10.2	Curb Ramp Options with Restricted Right-of-Way
Attachment 10.3	Accessible Pedestrian Signals & Push Button Locations
Attachment 10.4	On-Street Parking for People with Mobility Impairments

FDM 11-46-15 Bicycle Facilities

June 24, 2016

15.1 Introduction to Bicycle Facilities

Department policy, in conformance with Federal law and policy, Section 84.01(35) Wis. Stats.:

<https://docs.legis.wisconsin.gov/statutes/statutes/84/01/35>

and Connections 2030(2)(3), requires providing due consideration to establishing bikeways and pedestrian ways on all new construction and reconstruction highway projects funded in whole or in part from state or federal funds.

See [FDM 11-46-1](#) for guidance.

Department policy for other project types, such as resurfacing or reconditioning, requires an evaluation to include bicycle and pedestrian accommodations where possible/practical within the scope of the project. In addition, certain bicycle and pedestrian design practices are required when applicable, e.g., curb ramps and bicycle-acceptable grates.

The past three surface transportation bills placed increased importance on the use of the bicycle for transportation and calls on each state highway agency to encourage its use. Federal legislation provides the stimulus for planning, designing, and constructing a fully integrated transportation system benefiting the traveling public and the environment. According to federal legislation (23 USC Section 217(g)) transportation officials have to “consider” bicycle and pedestrian accommodations on projects. While this legislation stops short of requiring specific bicycle and pedestrian accommodation in every transportation project, FHWA intends for bicyclists and pedestrians to have safe, convenient access to the transportation system and sees nearly every transportation improvement as an opportunity to enhance the safety and convenience of the two modes. Thus they developed the a policy in 2001 for all projects that use federal funding in urban and suburban areas which requires the inclusion of bicycle and pedestrian facilities unless there are notable exceptions.

15.2 Design Guidelines and Basic Improvements

There are bicycle-acceptable design practices that must be applied regardless of the type of improvement being developed. The most important design principle is to provide adequate width within the roadway for bicycle travel. Information about minimum and desirable widths is contained elsewhere in this procedure. Other bicycle-acceptable design factors that require attention are drainage grates, railroad crossings, and signing and striping.

Many of the guidelines in this procedure are from the WisDOT Bicycle Facilities Design Handbook(4), which is the most applicable document for the design of bicycle accommodations on state and federally funded projects. The AASHTO "Guide for the Development of Bicycle Facilities(17) is the primary basis for the WisDOT Bicycle Facilities Design Handbook.

Further, 2013 FHWA memos(19) encourage agencies to use other guides and resources that builds upon the flexibilities provided in the AASHTO guides, as appropriate. These other guides and resources can be useful information in project planning and development when used in context with AASHTO and WisDOT design guidance and expertise. If a project proposes a bicycle facility treatment(s) outside of Wisconsin guidelines approval is required, contact WisDOT regional bike and pedestrian coordinators to initiate this process. Use the WisDOT regional bike and pedestrian coordinators as a resource for planning and designing bike and pedestrian facilities on state and federally funded projects. Also, see the “references” section for additional documents and resource information.

Use the WisDOT Bicycle Facilities Design Handbook if this procedure (or other FDM procedures) does not fully address a design issue.

Use the WisDOT regional bike and pedestrian coordinators as a resource for planning and designing bike and pedestrian facilities on state and federally funded projects.

15.3 Urban On-road Bicycle Accommodations

If streets and highways have higher traffic volumes, additional space is necessary to make it more convenient and safer for motorists to pass bicyclists. An urban on-road bicycle accommodation can be a bike lane, an urban paved shoulder, a wide outside lane or a combined parking/bike lane. A shared travel lane (see [FDM 11-46-15.5](#)) is not wide enough for motorist and bicyclists to operate side-by-side and is not a bicycle accommodation.

Requirements for on-road bicycle accommodation depend on whether there is parking or no parking as well as traffic volume and speed. Provide on-road bicycle accommodation on urban and suburban projects that use state or federal funding (see [FDM 11-46-1](#)).

[Figure 15.1](#) shows the sequential preference and dimensions needed for bicycle accommodations (bike lanes, urban paved shoulders or wide outside lanes) for urban roadways without parking (also see the Bicycle Facilities Development Handbook). Most cyclists will be most comfortable and feel safest when separation markings are used with wider bicycle accommodations, equating to higher use. Do not use minimum bikeway widths unless cost and/or land constraints prevent additional widths.

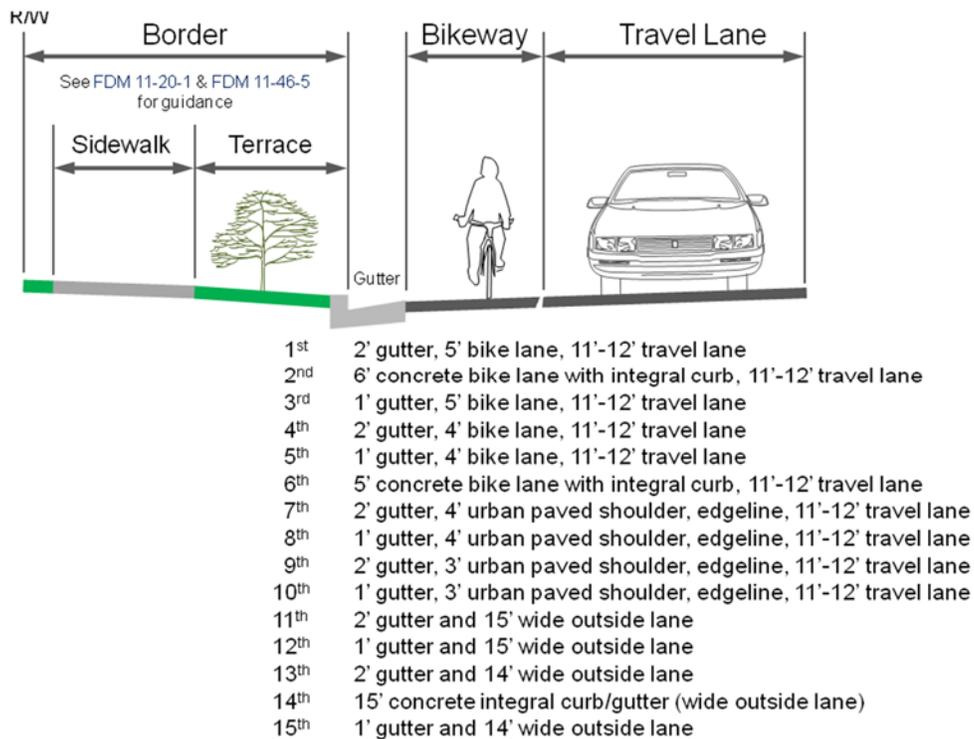


Figure 15.1 Urban Bicycle Accommodations without Parking (in order of preference)

Figure 15.2 shows the dimensions needed to accommodate bicyclists side by side with parked autos and adjacent traffic. The bicycle accommodation is always located between the parking lane and the motor vehicle lane. Using the maximum combined width of 28-feet for parking lane, bikeway and travel lane allows the conversion of the parking lane to a travel lane while still providing a bicycle accommodation.

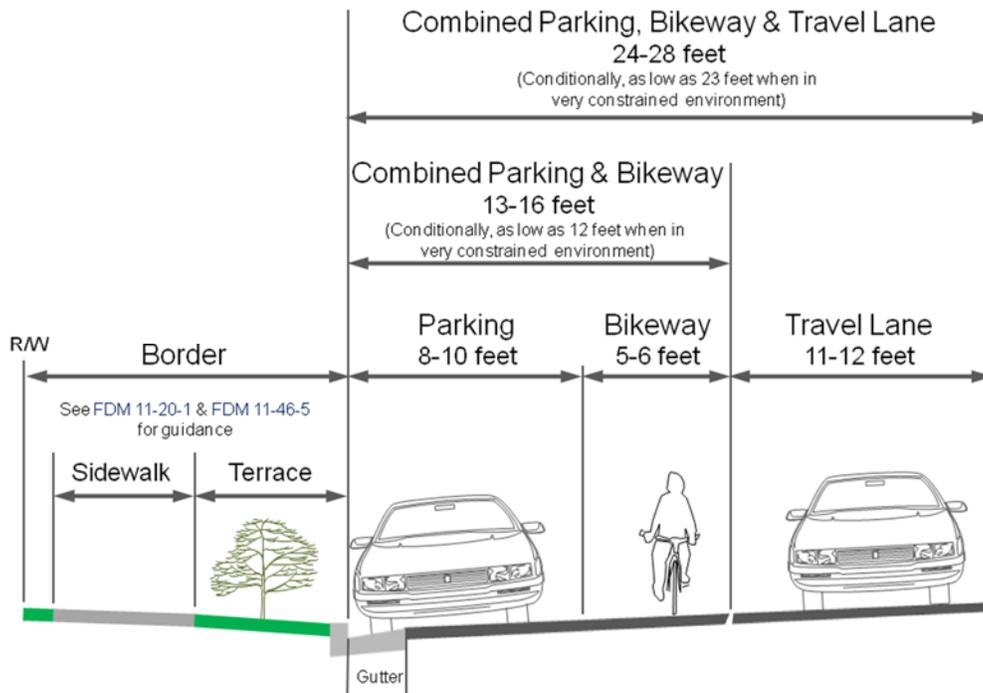


Figure 15.2 Urban Bicycle Accommodations with Parking

15.3.1 Bicycle Lanes

Bicycle lanes are usually the preferred form of bicycle accommodation on streets and have been shown to increase the comfort level of bicyclists using them. They are marked and designated as bike lanes, which

distinguishes them from other types of bicycle accommodation. Bicycle lanes are always one-way facilities and flow in the same direction as the adjacent motor vehicle traffic. Conventional bicycle lanes may be enhanced with buffer space separating the bicycle lane from the adjacent motor vehicle travel lane and/or parking lane, this is known as a buffered bike lane. Adequate width must be provided and MUTCD guidelines followed for buffered preferential lanes in (MUTCD section 3D-01). Other design guides (NATCO) (22) may be appropriate to use in planning and design of buffered bike lanes.

A separated bike lane is an exclusive facility for bicyclists located within or directly adjacent to the roadway and is physically separated from motor vehicle traffic with a vertical element. The vertical element is what differentiates separated bike lanes from standards and buffered bike lanes. They are different from shared-use paths by their proximity to the adjacent roadway and that they are bike-only facilities. The planning and designing for this type of facility needs to take into account other roadway design elements such as maintenance and drainage issues and roadside design. These facilities may be considered in designs with Bureau of Project Development approval. See FHWA's Separated Bike Lane Planning and Design Guide for more guidance (30).

Separated and marked bike lanes are not allowed within the circulatory roadway of a roundabout.

15.3.1.1 Bike Lane on Curbed Street without Parking

On curbed streets without parking, the bicycle lane is located next to the curb. The minimum width of the bike lane measured from the face of curb is 5 feet when the curb is integral with the pavement (see [Figure 15.3](#)). The minimum bike lane width is 4 feet as measured between a gutter/pavement longitudinal joint and an 11-foot minimum motor vehicle traffic lane (see [Figure 15.3](#)). The bike lane must be free of longitudinal joint lines.

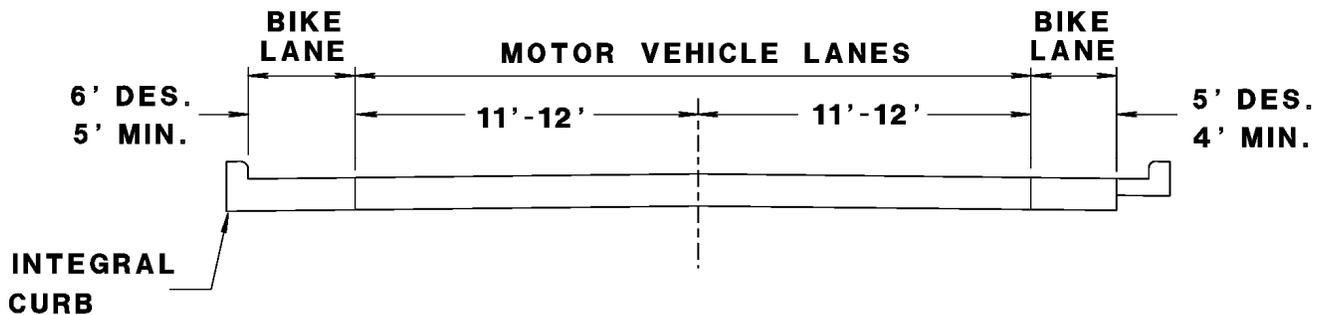


Figure 15.3 Bike Lane on Curbed Street without Parking

A concrete bike lane with integral curb that abuts asphalt pavement requires additional design consideration - including concrete thickness, dowel bar installation, straight edging, cross slope(s) and saw cutting - as well as finishing quality.

15.3.1.2 Bike Lane on Curbed Street with Parking

A bicycle lane is always located between the parking lane and the motor vehicle lane. The width of this combined bicycle and parking lane can vary from 13-feet to 16-feet depending on the width required for the parking lane (see [Figure 15.4](#)). The standard width provided for bicycle travel is 5 feet. Use the preferred width of 6-feet to provide safe bicycle operation where there is frequent parking turnover, parked vehicles are mostly commercial vehicles, or posted speed exceeds 40 mph.

See [FDM 11-46-15.3.3.2](#) for possible bike accommodations where site conditions and right of way restrictions preclude providing the minimum width for combined bicycle and parking lane.

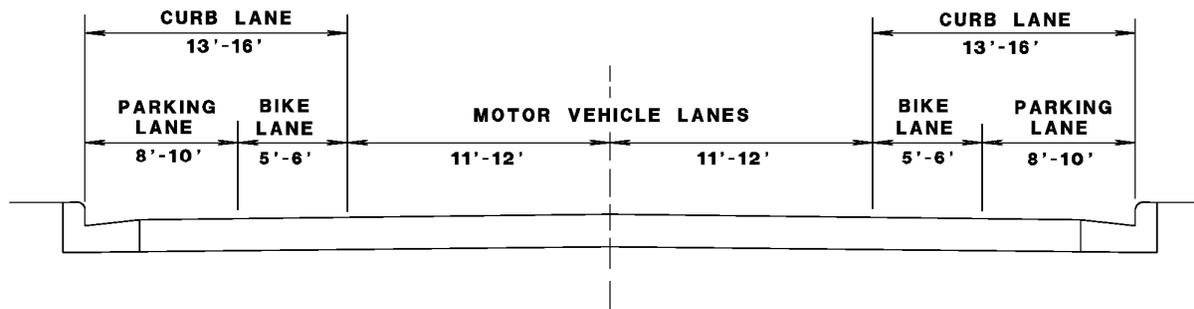


Figure-15.4 Combined Bike Lane and Parking Lane

At some locations, even after the above width adjustments are considered, there may not be enough room for accommodating bicycle travel between parked autos and traffic - and there may be no practical means of increasing the width of the roadway without impacting structures, improvements, natural resources, historical sites, or archaeological sites adjacent to the highway. It may be acceptable to consider keeping on-street parking when evaluating a location if *continuation* of on-street parking is warranted and supported by the community. This is particularly relevant in downtowns and neighborhood commercial areas where constraints are prevalent and parking is at a premium.

However, even in these situations, all options to accommodate bicyclists and pedestrians must be explored and shall be included to the greatest extent practicable. Even if parking is allowed, bicycling conditions can still be improved with methods such as limiting parking to only one side or creating limited parking bays for low parking demand situations (see [Figure 15.5](#)). When parking usage is low, these options are more viable.

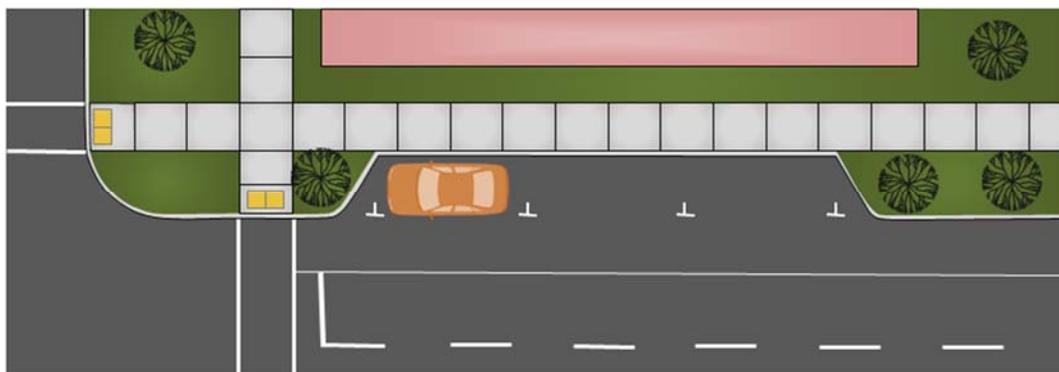


Figure 15.5 Parking Bay

The more important the route for bicycling, the more thoroughly options must be considered and documented.

Some municipalities use short-term parking restrictions, i.e., temporarily prohibit parking, on a combined parking lane/bike lane during the peak hour(s) to provide an additional travel lane on some of their urban streets. During this peak-hour time period, bicyclists use the travel lane and do not have their own space on the roadway. The continuation of short-term parking restrictions on a combined parking lane/bike lane in order to provide an additional travel lane during peak hours is acceptable as a bicycle accommodation under the following conditions:

- The parking restrictions are equal to or less than 2 hours per day in any one direction, and
- The WisDOT Regional Project Manager and the WisDOT Regional Bicycle/Pedestrian Coordinator concur with the continuation.

Otherwise, the width of the combined parking lane/bike lane must at least meet the requirement for a wide outside lane on a street with no parking, i.e., 14-foot minimum, not including gutter. This allows the operation of a temporary travel lane while still maintaining a bike accommodation.

15.3.2 Urban Paved Shoulders

An urban paved shoulder is the space between a travel lane and a curb/gutter section delineated with an edge line at the edge of travel lane. The minimum urban paved shoulder width to be a bicycle accommodation is 3-foot adjacent to an 11 or 12-foot travel lanes, and 4-foot adjacent to a 10-foot travel lane, not including gutter. In effect, a minimum width urban paved shoulder bicycle accommodation is a wide outside lane (see [FDM 11-46-](#)

[15.3.3](#)) delineated with an edgeline at the edge of travel lane. A minimum width urban paved shoulder bicycle accommodation is preferred over a wide outside lane bicycle accommodation because the edgeline better defines the separation between motorists and bicyclists.

An urban paved shoulder that meets the width requirements of a bike lane (see section 15.3.1) will have many of the same benefits as a bike lane, but it is not marked and designated as a bike lane. A bike lane is preferred over an urban paved shoulder bicycle accommodation because it increases motorists' awareness of bicyclists.

15.3.3 Wide Outside Lanes on Urban Streets

A wide outside lane (aka wide curb lanes or wide outside travel lane) is essentially a travel lane plus an urban paved shoulder (see [FDM 11-46-15.3.2](#)) without an edge line. A wide outside lane bicycle accommodation is wide enough for bicyclists and motorists to operate side-by-side. In fact, a wide outside lane bicycle accommodation allows most types of vehicles to pass a bicyclist with at least 3 feet of separation without encroaching into the adjacent travel lane. However, motorists and bicyclists might not recognize a wide outside lane as a bicycle accommodation because there is no pavement marking to define their respective space.

A bike lane is preferred over a wide outside lane bicycle accommodation, but wide outside lanes have application where physical constraints such as buildings or environmentally sensitive areas prevent widening a street to provide bike lanes. An urban paved shoulder bicycle accommodation is preferred over a wide outside lane bicycle accommodation because the edgeline better defines the separation between motorists and bicyclists.

On urban streets with no parking, the minimum width of a wide outside lane to be a bicycle accommodation is 14 feet not including the gutter. See [Figure 15.1](#) for various widths that constitute a wide outside lane bicycle accommodation on urban streets with no parking.

It is strongly recommended that 2-lane connecting highways and STHs have a minimum curb to curb width of 36 feet when no provision is made for parking (See [FDM 11-20-1](#)). This would provide useable lane widths of 16 feet from edge of gutter to the centerline.

On urban roadways with 4 or more lanes, consider widening the outside lane by narrowing the gutter and/or widening the street's footprint as part of a reconstruction project. Additionally, narrowing the inside lane to provide a 14-foot outside lane to accommodate bicyclists can work independently or in addition to the techniques above.

15.3.3.1 Wide Outside Lanes on Urban Streets - Wide Parking Lane

On urban streets with parking, (see [Figure 15.2](#)), consider a minimum width of 23 feet, including gutter, for the combined travel lane/bicycle accommodation /parking lane where site conditions and right of way restrictions preclude a greater width and the following conditions are met:

- Posted speeds are low (less than or equal to 35 mph),
- There is low parking turnover or little on-street parking, and
- The traffic lane next to the bike accommodation is at least 11 feet wide.
- The combined width of bike accommodation and parking lane is at least 12 feet, including gutter.

Evaluate the location periodically to ensure that the assumed design conditions are still valid and that bicyclists are operating safely on the facility.

15.3.4 Adding Bike Lanes, Urban Paved Shoulders or Wide Outside Lanes to Existing Roadways

Use one or more of the following methods to retrofit bike lanes, urban paved shoulders or wide outside lanes into existing urban roadways:

1. Physically widen the roadway to add these facilities
2. Mark or remark the pavement to gain space for bicycle accommodations. For example:
 - Reduce the width of traffic lanes.
 - Remove parking.
 - Convert a 4-lane undivided two-way street to a 2-lane street with a center turn lane (TWLTL) (see [FDM 11-25-5](#) for guidance on TWLTLs) and bike lanes on each side (aka a "road diet"). Besides providing bike accommodations, this might also increase safety, decrease delay and improve overall operations.

See FHWA's *Incorporating On-Road Bicycle Networks into Resurfacing Projects* for guidance and strategies for installing and integrating bicycle facilities onto existing roadways(31).

15.4 Rural On-road Bicycle Accommodations

A paved shoulder is the most common on-road bicycle accommodation on rural highways.

A shared roadway is not a bicycle accommodation, but is appropriate on some low-volume rural roads. See [FDM 11-46-15.5](#) for guidance on shared roadways.

A shared-use path is an off-road bicycle accommodation, not an on-road bicycle accommodation. Shared-use paths, which typically parallel a rural divided highway or other high volume rural arterial, are much less common (see [FDM 11-46-15.6](#) for guidance).

A shared roadway is not a bicycle accommodation, but is appropriate on some low-volume rural roads. See [FDM 11-46-15.5](#) for guidance on shared roadways.

Table 15.1 Conditions Requiring Bicycle Accommodations

Condition Number	Condition
1	Identified in the Wisconsin Bicycle Transportation Plan or another WisDOT-endorsed or supported bicycle plan,
2	The two-way bicycle traffic volume is (or is expected to be) 25 per day or more during peak travel days for cycling (average of the 10 most traveled days for bicycling for the year)
3	To complete short gaps in an otherwise continuous bicycle route,
4	To make short connections from communities or urban areas of up to approximately 3 miles to the town or county roadway network (not to a dead-end roadway).
5	If bicycle accommodation projects were proposed and funded as bikeways under the Transportation Enhancement (TE), Congestion Mitigation & Air Quality (CMAQ), or Safe Routes to School (SRTS) programs, a minimum 5' shoulder shall be provided. For projects funded under these programs, 4' paved shoulders may be used only when ADTs are less than 1,500 in the design year or there are extenuating circumstances that will not permit 5' or wider paved shoulders. Appropriate justification and documentation of the extenuating circumstances must be developed and maintained in the project file.

15.4.1 Rural Paved Shoulders

Paved shoulders are a common feature on rural state highways and consist of at least a 3 foot paved area to the right of the edge line. Beginning in 2014, reconstruction, new construction and pavement replacement rural asphalt roadway projects having a total shoulder width of 6 feet or more will require a 5 foot paved shoulder. See [FDM 11-15-1.4](#) and [FDM 11-15-1.5](#) for more information on paved shoulder width and rumble strip installation. Also, see [FDM 11-15, Attachment 1.5](#) and [FDM 11-15-5.3.2](#).

Paved shoulders can provide:

- Additional width for OSOW vehicles to operate,
- Usable area for vehicles to pull onto during emergencies,
- Lateral support for the roadway, and
- Space for recovery and avoidance maneuvers
- On-road bicycle accommodation

[Table 15.2](#) shows minimum rural paved shoulder widths for on-road bicycle accommodations. If a wider paved shoulder is called for in [FDM 11-15-1](#) or [FDM 11-15-5](#), then use that width. Paved shoulders with shoulder rumble strips may require additional width.

Typically paved shoulders result in just a small marginal cost when part of reconstruction and some resurfacing projects. In some rare cases, it may be necessary to rebuild or widen the shoulder to provide the wider paved shoulders, which could result in adding substantial costs for the project. In these cases, it may be appropriate to widen the paved shoulders as much as possible even if falling short of the required width. However, local conditions and expected bicycle use must be thoroughly evaluated. Additionally, on some lower volume state and county highways, a 3' paved shoulder may be acceptable where the overall shoulder widths are currently not wide enough to support a wider paved shoulder and are not being widened as part of a project. See the WisDOT Rural Bicycle Planning Guidelines:

<http://wisconsindot.gov/Documents/projects/multimodal/bike/guidance.pdf>

as an aid to determine the suitability of roadways when 3' paved shoulders are the only feasible option. If these guidelines indicate a rating of "moderate conditions for bicycling" for the design year ADT, 3' paved shoulders are permitted under this procedure.

Table 15.2 Minimum Paved Shoulder Width for On-Road Bike Accommodation on Rural Roads

Design Year AADT	Conditions from Table 15.1	Adjacent Travel Lane Width (feet)	Paved Shoulder Width (feet)	
			without shoulder rumble strip*	with shoulder rumble strip
< 750	Meets 0 or more of conditions 1, 2, 3, or 4 AND DOES NOT meet condition 5 none of the conditions are met	10	4	5
		11 or 12	3	5
	Meets 0 or more of conditions 1, 2, 3, or 4 AND Meets condition 5	10, 11 or 12	4	5
≥ 750	DOES NOT meet ANY of conditions 1, 2, 3, 4, or 5	10	4	5
		11 or 12	3	5
750-1,499	Meets 1 or more of conditions 1, 2, 3, 4, or 5	10 or 11	4	5
	Meets 1 or more of conditions 1, 2, 3, or 4 AND DOES NOT meet condition 5	12	3	5
	Meets 0 or more of conditions 1, 2, 3, or 4 AND Meets condition 5	12	4	5
1,500-1,999	Meets 1 or more of conditions 1, 2, 3, 4, or 5	11	5	5
	Meets 1 or more of conditions 1, 2, 3, or 4 AND DOES NOT meet condition 5	12	4	5
	Meets 0 or more of conditions 1, 2, 3, or 4 AND Meets condition 5	12	5	5
≥ 2,000	Meets 1 or more of conditions 1, 2, 3, 4, or 5	11 or 12	5**	5**

* Width is OK if Rumble StripEs (see [SDD 13A10-b](#), “Type 2 Milled Rumble Strip”) used instead of shoulder Rumble Strips

** When AADT exceeds 4,500, a 6ft paved shoulder is advisable¹⁸

15.5 Shared Roadways

On a shared roadway, there is inadequate pavement width or paved shoulder width for motorists and bicyclists to operate side-by-side, i.e., bicyclists share the same travel lane with motorists.

Shared roadways do not comply with criteria for a bikeway and are not a bike accommodation. However, shared roadways are appropriate under certain conditions.

15.5.1 Shared Roadways on Urban Streets

Residential streets in communities that are not functionally classified almost always have low enough speeds and traffic volumes (design year <1,500 ADT) that bicyclists can use most of or the entire travel lane for bicycling. No special bicycle accommodations are necessary on these roadways. The low volume of traffic provides ample passing opportunities for motorists and increases the comfort level for bicyclists. Use the

¹⁸ Table 2.1 page 2-19 of reference (4) Wisconsin Bicycle Facility Design Handbook. Wisconsin DOT, 2004. <http://www.dot.wisconsin.gov/projects/state/docs/bike-facility.pdf>, Table 2.1 on p.2-19

“Pavement Marking for Shared Lanes” shown in [SDD 15c29](#) f to help increase motorists’ awareness of bicyclists.

Another application of a shared roadway on an urban street is providing a shared parking/bicycle lane of less than 12 feet. This is not a bicycle accommodation, but can be justified for short segments in highly constrained environments (e.g., through a two-block downtown segment or commercial zone where buildings are directly adjacent to the sidewalk).

Consider a shared parking / bicycle lane of less than 12 feet (next to 11-foot or wider travel lanes) if parking usage is 20% or less, even during peak parking periods, and the following thresholds are met for residential areas (these are based on the FHWA Bicycle Compatibility Index):

1. For street widths of 44 feet from curb face to curb face and posted speeds of 25 mph, design year AADTs of 5,000 or less
2. For street widths of 44 feet from curb face to curb face and posted speeds of 30 mph, design year AADTs of 4,000 or less
3. For street widths of 42 feet from curb face to curb face and posted speeds of 25 mph, design year AADTs of 4,000 or less
4. For street widths of 42 feet from curb face to curb face and posted speeds of 30 mph, design year AADTs of 2,500 or less

Use the following thresholds for commercial and industrial areas with 20 percent parking use or less:

1. For street widths of 44 feet from curb face to curb face and posted speeds of 25 mph, design year AADTs of 3,000 or less
2. For street widths of 44 feet from curb face to curb face and posted speeds of 30 mph, design year AADTs of 1500 or less

15.5.2 Shared Roadway on Rural Highways

A Rural highway is a shared roadway if it has no paved shoulder or it has a paved shoulder whose width is less than the minimum required width for a bicycle accommodation shown in [Table 15.2](#). A shared roadway on a rural highway is not a bike accommodation and does not comply with criteria for a bikeway. A shared roadway is not appropriate other than on very low volume roads - less than 750 ADT - and sometimes not on those. However, with very low volumes, motorists will generally have ample passing opportunities and additional features are usually not necessary for compatibility with bicycling.

15.6 Shared-use Paths

See chapter 4 of the Wisconsin Bicycle Facility Design Handbook (4) for guidance on shared-use path design.

According to FHWA website “Shared Use Paths Along or Near Freeways and Bicycles on Freeways” (18), “the term “shared-use path” means a multi-use trail or other path, physically separated from motorized vehicular traffic by an open space or barrier, either within a highway right-of-way or within an independent right-of-way, and usable for transportation purposes. Shared use paths may be used by pedestrians, bicyclists, skaters, equestrians¹⁹, and other nonmotorized²⁰ users.”

Bicyclists are legal users of roadways, and the first responsibility is to provide on-road accommodations for bicycles where appropriate. Shared-use paths shall only replace on-road bicycle accommodations in exceptional situations (e.g. bicyclists and pedestrians prohibited). In certain situations, shared-use paths can supplement on-road bicycle accommodations, or be used in place of a sidewalk (on a given side of the road) as a pedestrian facility.

The decision to use shared-use paths along roadways must meet the guidelines found in this procedure and in the “Wisconsin Bicycle Facility Design Handbook” (4).

Because it is a facility intended for pedestrian use, American with Disabilities Act (ADA) regulations and guidance shall also be followed in the design of these projects. The standard width of a shared-use path is 10 feet (see [Figure 15.6](#)). Use standard width unless there is justification for using a different width. See section 4.4 of the WisDOT Bicycle Facilities Handbook for guidance when considering a non-standard width.

A minimum 5-foot separation of a shared-use path from the roadway shoulder or curb is required and the separation should be as wide as practical (and preferably outside the clear zone) to prevent operational and

¹⁹ Equestrian use is not typical on shared-use paths.

²⁰ Although shared-use paths are usually non-motorized facilities, there are some state trails in Wisconsin that permit snowmobile use.

safety problems that may occur when two-way bike traffic operates adjacent to motor vehicle traffic.

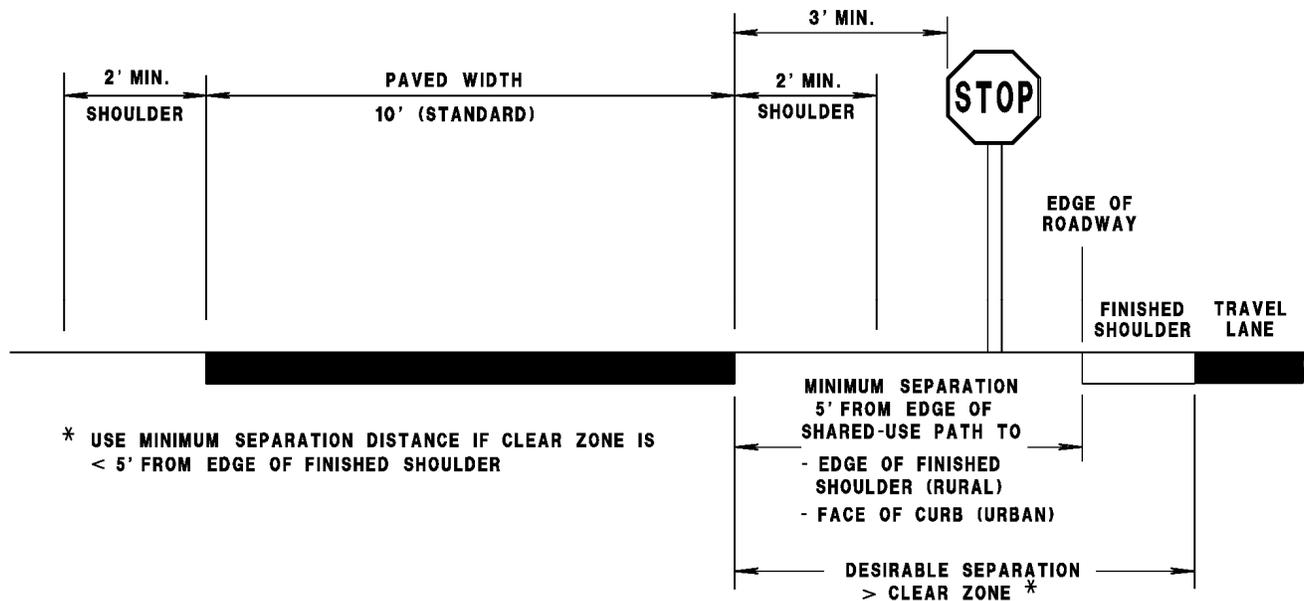


Figure 15.6 Shared-use Path Design

A shared-use path is generally more expensive to construct and maintain than bike lanes or paved shoulders. In addition, a shared-use path may be a less direct route for a bicyclist and safety is often a concern at street intersections or driveways when a shared-use path is located adjacent to a roadway. Nevertheless, under some circumstances, a shared-use path may be the best option, but does not substitute or preclude the need to provide on-street bicycle accommodations.

In a rural setting, there are fewer intersection and driveway crossings than in urban/suburban areas. This reduces potential hazards for bicyclists and helps make a shared-use path for bicyclists a viable option, particularly when 2-lane roadways are re-designed as expressways or freeways, typically with posted speed limits over 55 mph. The greatest opportunity to include a shared-use path presents itself when real estate is being purchased for the expansion of a roadway.

Consider a shared-use path on a rural highway if either of the following guidelines apply and right-of-way is either available or can be readily acquired through the real estate acquisition process associated with the larger highway project.

1. **Safety and Access.** When rural highways undergo changes that will cause restrictions for bicyclists and pedestrians and/or posted speeds increase to over 55 mph, a shared-use path is often a viable solution to provide a bike accommodation. This is especially relevant when there are no frontage roads or nearby parallel roadways (within one-half mile). When a new 4-lane roadway is built on the alignment of an existing 2-lane roadway, bicyclists and pedestrians still need to access the corridor. In other cases, bicyclists and pedestrians may be permitted, but high speeds (over 55 mph) on 4-lane highways make on-road bicycling difficult and undesirable. Though shared-use paths are generally more expensive to construct and maintain than paved shoulders, in certain situations they are the best way to provide connectivity for short to moderately long distances in this type of setting.
2. **Usage.** Usage is expected to be at least moderate (25 users per day). Good indicators of sufficient future path usage include connections between specific destinations (e.g., schools, major subdivisions, parks), or connections between two communities separated by 5 miles or less, or regional connections that may extend more than 5 miles. In urban or suburban areas, shared-use paths next to roadways can pose operational problems and often increase the hazards to bicyclists, particularly at intersections and driveways. For this reason, on-street bicycle accommodations are almost always the best choice.

Use the following guidelines to evaluate whether a shared-path is an appropriate choice in urban and suburban areas. Most of the conditions shall be met.

1. Considerable numbers of bicyclists and pedestrians are expected to use the facility on a daily basis.

2. The shared-use path is sited in a sound location for travel by bicyclists and pedestrians. This usually occurs where there are both high traffic volumes and vehicle speeds on the adjacent roadway and the shared-use path would not have to cross many roadways or driveways (especially commercial driveways). Only in rare cases would the path substitute for on-street bicycle accommodations.
3. There are no reasonable alternatives for bicycle accommodations on nearby parallel roadway routes.
4. The shared-use path connects to an existing or planned bicycle facility (shared-use path or other bikeway) or street/road where bicycle travel is accommodated. For instance, the shared-use path would be part of a larger bicycle transportation network that provides continuity for bicycle travel. As an alternative, a shorter shared-use path could provide direct access to a park, school, business district, etc. Where the shared-use path will be part of a planned bicycle facility that does not yet exist, the local government should provide a written commitment to complete the facility within a reasonable time frame.
5. The shared-use path is consistent with local, regional and state adopted land use/smart growth plans and current transportation plans for the area by an MPO, local or state government.
6. There is ample room for the shared-use path itself and for its separation from the roadway.
7. There is a reasonable expectation that the safety and service benefits derived from the shared-use path would be worth the total cost of the facility, including right of way, construction, marking and signing, and maintenance.

15.6.1 Roundabout Sidepaths

A roundabout sidepath is a variant of a shared-use path. “A “roundabout sidepath” is a sidepath around the perimeter of an isolated roundabout or a sidepath between two closely spaced roundabouts and around their perimeters. Bicyclists on the roadway enter and exit roundabout sidepaths via ramps upstream and downstream from the roundabout circular roadway. Bicycle traffic on roundabout sidepaths is assumed unidirectional. Roundabout sidepaths connect to sidewalks where there are sidewalks, and are standalone facilities where there are no sidewalks. Roundabout sidepaths do not connect to community/region shared-use paths. See [FDM 11-26-30.5.13](#) for additional information.

15.7 Bicycle Accommodations on Highway Structures

See [FDM 11-35-1.6](#), “Structures/ Sidewalks, Bicycle Accommodations, Shared Use Paths and Roundabout Sidepaths”, and [FDM 11-35 Attachments](#) for width requirements for sidewalks, shared-use paths and roundabout sidepaths, as well as criteria and height requirements for parapets and fences adjacent to bikeways, sidewalks, shared-use paths or roundabout sidepaths.

Also, See section 2.9, “Structures”, and section 4.16.4 “Separation on Combined Structures” of the Wisconsin Bicycle Facility Design Handbook (4) for guidance.

Generally, continue the bicycle accommodations provided (or planned) on the approaches to a structure across the structure. New highway structures need to be wide enough to accommodate required bikeways and sidewalks, shared-use paths or roundabout sidepaths. Width requirements vary depending on whether the bikeway is a wide outside lane, a continuation of a paved shoulder, a bike lane, a shared-use path, or roundabout sidepath; and whether there is a sidewalk.

In urban and suburban areas, the preferred design is a 6-foot striped area (unmarked or marked as bike lanes). The 6 foot shoulder on the structure is typically comprised of the width needed off the structure to accommodate a 2 foot gutter and a 4 foot bike lane. The next preferred design is a 4 or 5-foot striped area (not marked as a bike lane). If the bike accommodation on the approach roadway is a wide outside lane, the minimum accommodations is at least 14-ft lane, not including curb and gutter, or if next to a parapet or concrete barrier, provide a 4’ shy distance.

Current standards for clear roadway width of structures for most – but not all - rural highway design classes provide adequate width for bicycle accommodation (see [FDM 11-15 Attachments 1.1](#) thru 1.4 and [Attachments 1.16](#) thru 1.18). Also, see [FDM 11-35-1](#) and [FDM 11-26-30-5.13](#) for additional information on structure widths.

At some locations, it may be appropriate to provide a shielded shared-use path in addition to bike lanes, wide outside lanes or shoulders across the structure. This situation arises when a structure (or the roadway under a structure) provides continuity for a shared-use path serving a different corridor than the highway.

For example, a shared-use path could follow a river corridor and use the bridge to cross to the other side of the river where it will continue to follow the same river corridor. At the same time, the bridge and the highway leading to and from the bridge could serve an entirely different corridor. Having only a shared-use path facility would be especially problematic for cyclists who are traveling on the opposite side of the bridge who would have

to cross several lanes of traffic to get to and from the shared-use path. These cyclists are not likely to have an origin or destination served by the shared-use path.

15.7.1 Shared-use Path Grade Separations

Safety concerns may require providing a grade separation structure for a shared-use path rather than an at-grade crossing on rural highways (see [FDM 11-46-20](#), “Permanent Public Trails Crossing Rural Public Roads”).

Guidance is limited on design treatments for intersections involving shared-use paths and roadways in urbanized areas. Constrained environments are often an additional impediment to providing grade-separated facilities in urbanized areas. Use engineering judgment to decide when such safety measures are necessary and cost effective by considering traffic volumes, motor vehicle speeds, site conditions and the age and experience of typical bicyclists. One possibility is to consider bicyclist and pedestrian actuated traffic signals where shared-use paths intersect high speed/high volume highways or streets.

15.8 Inlet, Manhole and Utility Covers

Inlet, manhole and utility covers can be hazardous to bicyclists. The front wheel of a bicycle may drop into the openings of parallel bar drainage grates causing the bicyclist to crash. Likewise, grates and utility covers that are not flush with the pavement surface and located in bicyclists' expected path can cause the bicyclists to crash.

The grates for the following inlet cover Types A, H, B, B-A, F, HM, HM-GJ, S, and Z are considered bicycle acceptable. The inlet covers which are narrow and therefore encroach the least into a bicycle curb lane and that use the vane style grate are Types A, H, and HM. These inlet cover types should be used for new construction/reconstruction projects and also as replacement covers for 3R improvements providing they have the necessary hydraulic capacity.

Pavement overlays should be designed and constructed to taper into grates and covers to prevent an abrupt drop at the frame edge. As an alternative, the inlet grate or utility cover can be adjusted to be flush with the new surface.

15.9 At-Grade Railroad Crossings

Where possible, a bikeway should cross railroad tracks at or near a right angle to minimize the potential for trapping a bicyclist's front wheel in the flangeway and causing a loss of steering control.

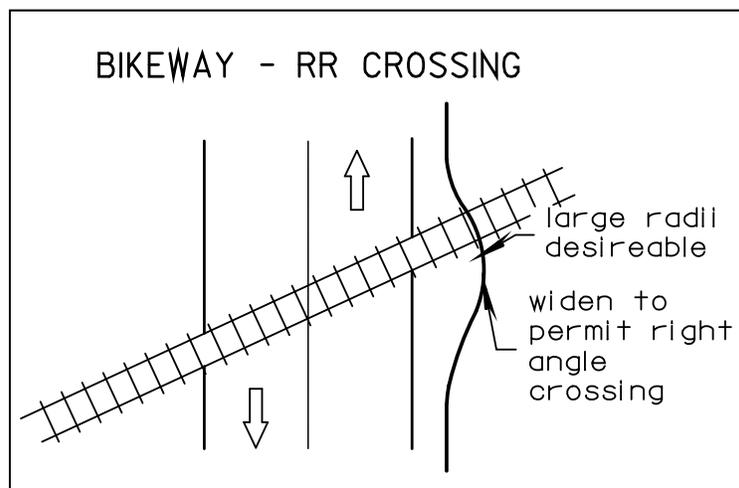


Figure 15.7 Bikeway – Railroad Crossing Detail

If the crossing angle is less than approximately 60 degrees, consider widening the outside lane, shoulder or bicycle lane to improve the angle of approach (see [Figure 15.7](#)). The desirable crossing angle is 60 ° to 90° (AASHTO) (17).

It is also important that the roadway surface be at the same elevation as the rails. The type of crossing surface is negotiated between WisDOT and the railroad company on state highway projects.

15.10 Signing and Marking

Marking and signing of bicycle accommodations and bikeways shall be in accordance with the Wisconsin Manual on Uniform Traffic Control Devices and applicable local ordinances. Additionally, use the WisDOT Traffic Guidelines Manual for state highway projects.

The Region Traffic Engineer determines marking and signing requirements for the state highway system. It is permissible and encouraged to provide a marked shoulder segment not only on rural cross-section highways, but also on urban cross-section streets.

Pavement marking and signing are especially important at the approaches to intersections and at the ends of a bike lane. At intersections, bicyclists proceeding straight through and motorists turning right must cross paths. Motorists/bicyclists should be encouraged to make these crossings in advance of the intersection if possible. When a marked bike lane exists at an intersection with an exclusive right-turn only lane, the bike lane must be located between the exclusive right-turn lane and the through travel lane. Two channelizing lines without bike symbols (although bike lanes symbols are recommended) or a wider through lane are standard in order provide adequate bike accommodations to the left of an exclusive right-turn lane and to the right of a through travel lane (see [SDD 15c29](#)).

Appropriate marking and signing is essential where a bike lane ends requiring bicyclists to merge with motor vehicle traffic.

15.11 References

Refer to [FDM 11-46-99](#) for list of references.

FDM 11-46-20 Permanent Public Trail Crossing Rural Public Roads

October 5, 2011

20.1 Introduction

A trail (path) is a travel way, physically separated from motor vehicle traffic by an open space or barrier. It can be either within a highway right-of-way or within an independent corridor, such as a former railroad right-of-way. On-road bikeways such as bike lanes, paved shoulders or signed bike routes are **not** considered trails.

The “Engineering Warrants for Trail-Highway Crossings”, along with the guidelines presented in this procedure, apply only to permanent public trails crossing rural public roads with posted speeds from 40 to 55 mph. They are meant to be a starting point in determining whether a crossing is to be grade separated or at-grade. Final determination of the appropriate crossing type requires the application of engineering judgment.

Safety is the primary factor determining whether a grade separation structure or an at-grade treatment will be needed for a crossing. Other important considerations include cost, cost sharing with the trail owner, maintenance, and maintenance responsibilities. A project agreement is needed in order to define the public trail owner’s cost sharing and maintenance responsibilities.

Crossings not covered in this procedure include:

- Permanent public trails crossing urban roadways. Trails in urban areas may require more flexibility.
- Temporary trails. Temporary trails, where land easements are established year-to-year, are to be handled through WisDOT’s right-of-way access permit process.
- Nonpublic trails. Private trails are often temporary in nature. To be eligible for cost sharing, a privately owned trail must be put into the hands of a public sponsor, who will ensure its long-term use

20.2 Engineering Warrants For Trail-Highway Crossings

Warrants for trail-highway crossings must take into account the potential users of the crossing. Trail users can be categorized into two types, motorized and non-motorized. Motorized users include snowmobilers and all-terrain vehicles (ATV) users. Non-motorized users include bicyclists and pedestrians, but can include equestrians as well.

The engineering warrants for trail-highway crossings shown in [Attachment 20.1](#) are based on gap analysis, similar to the method found in the Manual for Uniform Traffic Control Devices (MUTCD) for determining warrants for traffic signals. Gap analysis helps to identify whether there are sufficient gaps in traffic for users to safely and comfortably cross a roadway with little delay. Justification for using these warrants for trail-highway crossings is based on:

- Snowmobiles and ATV’s are motorized vehicles, and traffic signal warrants were developed for motorized vehicle crossings.
- Grade separations and traffic signals have similar purposes, i.e. reducing potential conflicts between opposing streams of traffic.

The MUTCD warrants most applicable to trail-highway crossings are those that address hourly, as opposed to daily, trail and highway volumes, namely the:

1. Fourth Highest Hourly Exposure Factor, and the

2. Highest or Peak Hourly Exposure Factor.

In addition, these warrants include special reduction factors for pedestrians and bicyclists. Because non-motorized trail users include pedestrians, the reduction factors recommended in the MUTCD for pedestrians are applied to all non-motorized users when applying the engineering warrants for trail-highway crossings.

20.2.1 Steps to Follow When Using the Engineering Guidelines

1. Determine the proposed posted speed of the roadway to be evaluated for a grade separation under this procedure. The road must have a posted speed limit between 40 and 55 mph, because urban conditions typically exist when the speed limit is less than 40 mph.

2. Obtain site information for crossing location, including existing crossing type, available sight distance, structure dimensions and condition, trail owner, etc.

3. Obtain current and design year traffic volumes for both highway and trail (both motorized and non-motorized) users.

4. Evaluate traffic counts:

Use current traffic counts for resurfacing, reconditioning or spot improvement roadway projects with trail crossings within the project limits, as they have a shorter user life. Use design year traffic counts (typically 20 years), for reconstruction or new construction roadway projects with trail crossings within the project limits. When determining design year trail counts, a 1-2% per year trail growth is recommended.

To be considered for a grade separation, the minimum highway Average Daily Traffic (ADT) is recommended to be 3500 or greater. (This threshold is a starting point, and does not preclude looking at highways with ADT's < 3500).

Determine if trail users are predominantly motorized or non-motorized (Use [Attachment 20.2](#) worksheet).

5. Calculate Exposure Factors:

Once the traffic counts for the trail and highway have been obtained, exposure factors need to be calculated for the entire counting period. An "Exposure Factor" is the product of the highway volume times the trail volume during the same hour that the count was taken. The result is then divided by 1000 to obtain an exposure factor that can be compared with those listed in [Attachment 20.1](#).

The "Fourth Highest Exposure Factor" represents the fourth highest product over the traffic counting period, and the "Highest Exposure Factor" is the highest product over the same traffic counting period.

[Attachment 20.3](#) shows examples of calculating exposure factors.

6. Using the Engineering Warrant Table

The engineering warrant table in [Attachment 20.1](#) has three columns to be used as a starting point for helping decide whether to build a grade separation or not. The numbers in each column are the exposure factors in thousands. They differ depending on whether the trail users are predominantly motorized or non-motorized. Find the cells that match the computed "Fourth Highest Exposure Factor" and the "Highest Exposure Factor". The value in the right-most column controls.

6.1 The first column "Does Not Meet Warrants" indicates that a grade separation is not warranted for traffic volumes. However, a grade separation might still be provided if site conditions would make an at-grade crossing unsafe.

6.2 The second column "May be Justified" indicates that a grade separation may be justified for traffic volumes. However, evaluate other alternatives because grade separations can present their own safety problems. Sight lines, available gaps in traffic and future trail plans are some of the factors to be considered. Alternatives to a grade separation may include:

- Improving the sight distance for the trail and highway user.
- Evaluating traffic signal alternatives in fringe/suburban areas to provide more gaps in traffic.
- Relocating the trail to a safer crossing area.
- Relocating the trail crossing to an existing grade separation.
- Enhanced signing and marking.

6.3 If the other alternatives for the site are found to be either inadequate or not appropriate, then a

grade separation is justified. The third column “Meets WisDOT Warrants” indicates that a grade separation is warranted for traffic volumes, unless circumstances such as poor site conditions require that other alternatives be considered.

7. Present alternative(s) to the trail owner, including cost estimates and cost sharing information. Accommodate trail owner’s request - even for a grade separation at a location where it is not warranted or justified - if it is possible to do so without compromising the safety of either motorists or trail users, and if the trail owner agrees to the required cost share and maintenance responsibilities.

20.3 Freeways and Expressways

20.3.1 Freeways

Freeways are multi-lane divided highways on which access is provided only at interchanges. Do not allow at-grade trail crossings on freeways.

20.3.2 Expressways

Expressways are non-freeway multi-lane divided highways where access is provided at interchanges and at at-grade intersections. Do not allow new at-grade trail crossings on expressways with posted speeds > 55 mph. Consider grade-separating existing at-grade crossings when they are within the limits of highway improvement projects on these routes. Work with the trail owner when making this determination. Look at such things as trail use and volume, crash history and the type of impending improvement project (reconstruction will offer a greater opportunity to incorporate a grade separation than a resurfacing project would).

Trail crossings on expressways with posted speeds of 55 mph, or less, can be evaluated with the procedures in this section. Warrant thresholds are adjusted per Note 1 of [Attachment 20.1](#).

20.4 At-Grade Treatments

- Design trails to cross roadways at right angles, and at relatively flat grades.
- Provide sufficient intersection and approach sight distances at crossings for both motorists and trail users (see [Attachment 20.4](#)). Improve sight distance by removing trees or brush, lowering highway profile or relocating a trail to a more visible area. Evaluate traffic signal options in suburban area to see if it is possible to provide more available gaps in traffic.
- Provide median refuge for trail users at wider crossings and at other crossings, if appropriate.
- Provide appropriate traffic control devices and markings for both roadway and trail. This includes advance warning, including, if necessary, flashing signals. Use signs that are large enough to meet the size requirements for trail speed on trails that allow motorized vehicles. Also, traffic signals may be appropriate at some suburban locations. Review signing and marking options with the region traffic engineer.

20.5 Grade Separation Structure Guidance

In addition to structural requirements, a grade separation structure for a trail-highway crossing must meet the following minimum requirements:

- Provide for the safety of both trail and highway users. Although a grade separation reduces potential conflicts between trail users and motorists, the structure itself can pose a hazard. In addition to being a fixed obstruction, structures can be more prone to icing.
- Build structures large enough to accommodate maintenance equipment, including snow-grooming equipment on trails where snowmobiles are allowed.
- Box culvert-type structures must have sufficient height and width to accommodate trail users.

Structures for trail crossings include box culverts, as well as bridge overpasses or underpasses. Also, as an alternative to building a new structure, consider relocating the trail crossing to a suitable nearby existing grade separation.

Consult with the Regional Bike and Pedestrian Coordinator as well as the Bureau of Structures if a grade separation for a permanent public trail is warranted.

20.5.1 Structures on a “Rails-to-Trails” Trail

“Rails to Trails” trails are railroad corridors that have been deeded to a public agency (usually the DNR), and converted to interim trail use. The corridors must be preserved for possible re-conversion to railroad use. If re-conversion is necessary, then the corridor is sold to the railroad company involved.

Existing structures on these corridors may be in use as grade separations at trail-highway crossings. If a “Rails to Trails” structure is included within the limits of a highway project, evaluate the crossing based on the

guidelines presented in this procedure. The possibility of re-conversion to railroad use presents additional factors to consider when making the final determination of crossing treatment, including:

- Whether to perpetuate a grade separation, even if it is not warranted and
- Whether to design a structure to accommodate railroad use, or to accommodate trail use only

Contact the Bureau of Railroads and Harbors for additional information on “rails-to-trails” corridors.

20.6 Financial and Cost Share Responsibilities

Cost share percentages for trail-highway crossings are in WisDOT’s Program Management Manual (PMM) Chapter 02-05-25. Apply these percentages to the Net Structure Cost:

$$\text{NET STRUCTURE COST} = \text{STRUCTURE COST} - \text{COST FOR AN AT-GRADE CROSSING}$$

These cost share percentages apply only when:

1. The trail crossing is included as part of a WisDOT highway improvement project: Projects will be given consideration based on safety needs and engineering warrant criteria. In cases where there is not a highway improvement project, communities may be able to find funding help from one of the programs listed in “Programs for Local Governments” website:

<http://wisconsindot.gov/Pages/doing-bus/local-gov/astnce-pgms/default.aspx>

2. The trail is publicly owned
3. A privately owned trail has been put into the hands of a public sponsor, who ensures its long-term use
4. The trail crosses existing highway alignment: In cases of new alignment where WisDOT’s highway impacts an existing trail, WisDOT would work with the trail owner to provide the appropriate crossing type and to negotiate a cost share.
5. The trail has no pre-existing agreements (including those with the former railroad): Existing agreements may take precedence. Contact the Bureau of Railroads and Harbors when a WisDOT project impacts a “rails-to-trails” crossing, because pre-existing agreements with the former railroad owner may take precedence.
6. The trail is a permanent facility. Temporary trails will be handled through WisDOT’s access permit approach process.

Contact WisDOT’s Region Planning Office or WisDOT’s Division of Transportation Investment Management for more information.

20.6.1 Maintenance Agreements

Maintenance Policy for trail-highway crossings are also in WisDOT’s Program Management Manual (PMM) Chapter 02-05-25. Include the following provisions in a signed maintenance agreement, unless over-ridden by a pre-existing agreement:

1. For at-grade crossings, trail owners would be responsible for the maintenance of trails on WisDOT right-of-way.
2. For grade separations, trail owners would be responsible for funding the maintenance cost of the structure. WisDOT would be responsible for inspection.

LIST OF ATTACHMENTS

Attachment 20.1	Grade Separation Warrants
Attachment 20.2	Grade Separation Warrant Worksheet
Attachment 20.3	Sample Grade Separation Warrant Determination
Attachment 20.4	Sight Distance for Trail Crossing

FDM 11-46-99 References

July 23, 2015

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