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This document provides links to research, resources, and guidance on designing for pedestrians and bicycles. National and Ohio Department of Transportation (ODOT) standards allow a range of flexibility in the design of facilities for walking and bicycling. The resources presented here provide an abundance of design guidance for how to develop safe, accessible, comfortable, and convenient nonmotorized transportation networks. Many of the suggested treatments within these resources can be designed within ODOT standards.

**National Resources**

**Achieving Multimodal Networks: Applying Design Flexibility and Reducing Conflicts**

FHWA | September 2016

This publication is a resource for practitioners seeking to build multimodal transportation networks. The publication highlights ways that planners and designers can apply the design flexibility found in current national design guidance to address common roadway design challenges and barriers. It focuses on reducing multimodal conflicts and achieving connected networks so that walking and bicycling are safe, comfortable, and attractive options for people of all ages and abilities. This resource includes 24 design topics, organized into two themes. The 12 design topics in Part 1 focus on flexibilities in existing design guidelines. The 12 topics in Part 2 focus on measures to reduce conflicts between modes. Each design topic includes case studies and references to appropriate design guidelines.
Memorandum

FHWA Memorandum: Bicycle and Pedestrian Facility Design Flexibility
FHWA | August 2013

This memorandum expresses the Federal Highway Administration’s (FHWA) support for taking a flexible approach to bicycle and pedestrian facility design. It also states that FHWA supports the use of AASHTO’s Guide for the Planning, Design, and Operation of Pedestrian Facilities and Guide for the Development of Bicycle Facilities; NACTO’s Urban Bikeway Design Guide; and ITE’s Designing Urban Walkable Thoroughfares. It concludes by saying that “DOT encourages transportation agencies to go beyond the minimum requirements, and proactively provide convenient, safe, and context-sensitive facilities that foster increased use by bicyclists and pedestrians of all ages and abilities, and utilize universal design characteristics when appropriate”.

Pursuing Equity in Pedestrian and Bicycle Planning
FHWA | May 2016

This paper, intended for transportation practitioners and decision-makers, addresses the following topics:

- Defines transportation equity-related terms in the context of planning for bicycle and pedestrian facilities and programs;
- Synthesizes and highlights recent research findings related to the travel needs of traditionally underserved populations and the role of pedestrian and bicycle planning in addressing equity concerns; and
- Shares strategies, practices and resources to address bicycle and pedestrian planning inequities.

Strategic Agenda for Pedestrian and Bicycle Transportation
FHWA | September 2016

This Strategic Agenda will guide the Federal Highway Administration’s (FHWA) pedestrian and bicycle activities in the next three to five years and is being organized around four goals: (1) Networks, (2) Safety, (3) Equity, and (4) Trips. Each goal includes actions relating to (a) Capacity Building, (b) Policy, (c) Data, and (d) Research. The Strategic Agenda will steer future investments, policies, and partnerships, and serves as the update to USDOT’s 1994 National Bicycling and Walking Study.
FHWA Guidance: Bicycle and Pedestrian Provisions of Federal Transportation Legislation
FHWA | December 2015

This webpage describes federal legislative and policy direction related to safety and the accommodation of people bicycling and walking. From the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 to the Moving Ahead for Progress in the 21st Century Act (MAP-21) of 2012, this webpage highlights the program changes regarding consideration and eligibility for bicycling and walking per federal transportation legislation. The statutory provisions affecting bicycling and walking are codified in titles 23 and 49 of the United States Code (U.S.C.). This document describes the range of opportunities to improve conditions for bicycling and walking. As of the date of the preparation of this document, the website did not include information on the FAST Act.

Highway Capacity Manual
Transportation Research Board (TRB) | 2010

The Highway Capacity Manual (HCM) is a publication of the Transportation Research Board of the National Academies of Science in the United States. It contains concepts, guidelines, and computational procedures for determining the capacity and quality of service of various facilities, including freeways, highways, arterial roads, roundabouts, signalized and unsignalized intersections, rural highways, and the effects of mass transit, pedestrians, and bicycles on the performance of these systems. With regards to designing for pedestrians and bicycles, the most relevant elements are its multimodal tools, including Pedestrian and Bicycle Level of Service to help determine pedestrian/bicycle comfort level based on traffic volumes and different built environment factors.

Case Studies in Delivering Safe, Comfortable, and Connected Pedestrian and Bicycle Networks
FHWA | December 2015

This report provides an overview of pedestrian and bicycle network principles and highlights examples from communities across the country. The Appendix provides a complete list of projects highlighted in the report and additional projects that were identified in the study process.
Designing Walkable Urban Thoroughfares: A Context Sensitive Approach
ITE | 2010

This report was developed in response to widespread interest in improving both mobility choice and community character through a commitment to creating and enhancing walkable communities. This report, from the engineer’s point of view, provides detail about bicycle lanes, curb extensions, and treatments for both pedestrians and cyclists at intersections.

FHWA Memorandum: Proven Safety Countermeasures
FHWA | January 2015

This document presents countermeasures that have been documented to improve safety. Three of these countermeasures improve safety for bicyclists and pedestrians. They are: medians and pedestrian crossing islands in urban and suburban areas; High-Intensity Activated crossWalK (HAWK)s; and, road diets.

This website presents information and detail on these safety countermeasures.

Guidebook for Developing Pedestrian and Bicycle Performance Measures
FHWA | March 2016

This guidebook highlights resources for developing measures to facilitate high-quality performance-based planning. It is intended to help communities develop performance measures that can fully integrate pedestrian and bicycle planning in ongoing performance management activities. It highlights a broad range of ways that walking and bicycling investments, activity, and impacts can be measured and documents how these measures relate to goals identified in a community’s planning process. It discusses how the measures can be tracked and what data are required, while also identifying examples of communities that are currently using these measures in their planning process.
Road Diet Informational Guide

FHWA | 2014

This document explains the benefits of road diets, how to determine if a road is a good candidate for a road diet, how to design a road diet, and how to evaluate a road diet’s safety/operational performance after installation.

Pedestrian and Bicycle Funding Opportunities

FHWA | August 2016

This online table/webpage provides funding opportunities through the US Department of Transportation for pedestrian and bicycle projects including acquisition, design and construction.

Bicycle and Pedestrian Funding, Design, and Environmental Review: Addressing Common Misconceptions

FHWA | August 2015

The US Department of Transportation, through numerous discussions, noted misconceptions about the use of federal funding, street design, and the Environmental Review process that has caused confusion in the implementation of pedestrian and bicycle projects and has resulted in project delay.

This website addresses common misconceptions and distinguishes between federal standards and state and local practice. Where possible, the webpage provides links identifying resources that provide more detail on each topic. This document focuses on three policy areas: Funding, Design, and Environmental Review.
The Transit Street Design Guide provides guidance for the development of transit facilities on city streets, and for the design and engineering of city streets to prioritize transit, improve transit service quality, and support other goals related to transit. The guide has been developed based on other design guidance, as well as city case studies, best practices in urban environments, research and evaluation of existing designs, and professional consensus. This guide goes into detail about how bicycles, pedestrians and transit should interact. This book also mentions how to design a bus-bicycle lane.
Public Rights-of-Way Accessibility Guidelines (PROWAG)
U.S. Access Board | 2011

The U.S. Access Board is developing new guidelines for public rights-of-way that will address various issues including access for blind pedestrians at street crossings and various constraints posed by space limitations, roadway design practices, slope, and terrain.

These guidelines ensure that sidewalks, pedestrian street crossings, pedestrian signals, and other facilities for pedestrian circulation and use constructed or altered in the public right-of-way by state and local governments are readily accessible to and usable by pedestrians with disabilities.

Once these guidelines are adopted by the Department of Justice, they will become enforceable standards under title II of the ADA.

Supplemental Notice of Proposed Rulemaking (SNPRM) on Accessibility Guidelines for Shared Use Paths
U.S. Access Board | 2013

This proposed rulemaking establishes accessibility guidelines for shared use paths to ensure pedestrians with disabilities can access these transportation facilities.
Guide for the Planning, Design, and Operation of Pedestrian Facilities
AASHTO | July 2004

This document provides guidance on the planning, design, and operation of pedestrian facilities along streets and highways. Specifically, the guide focuses on identifying effective measures for accommodating pedestrians on public right of ways. Appropriate methods for accommodating pedestrians, which vary among roadway and facility types, are described. The primary audiences for this manual are planners, roadway designers, and transportation engineers, whether at the state or local levels, the majority of whom make decisions on a daily basis that affect pedestrians. This guide also recognizes the profound effect that land use planning and site design have on pedestrian mobility and addresses these topics as well.

Urban Street Design Guide
NACTO | October 2013

The Urban Street Design Guide charts the principles and practices of engineers, planners, and designers working in cities today; provides case-sensitive design ideas; and unveils the tools and the tactics cities need to make streets safer, more livable, and more economically vibrant.
Guide for the Development of Bicycle Facilities
AASHTO | 2012

This guide provides information on how to accommodate bicycle travel and operations. It presents sound guidelines that result in facilities that meet the needs of bicyclists while providing sufficient flexibility to permit designs that are sensitive to local context.

Separated Bike Lane Planning and Design Guide
FHWA | May 2015

This document provides guidance on planning and designing separated bike lanes. This report has five chapters that go into detail about the process: 1) What are separated bike lanes, 2) Overview for the guide and planning process, 3) Why choose separated bike lanes, 4) Planning separated bike lanes, and 5) Menu of design recommendations.

Urban Bikeway Design Guide
NACTO | March 2014

This guide provides cities with state-of-the-practice solutions that can help create complete streets that are safe and enjoyable for bicyclists.

Most of the designs in the guide are not referenced in the AASHTO Guide for the Development of Bicycle Facilities, although they are virtually all (with two exceptions) permitted under the Manual on Uniform Traffic Control Devices (MUTCD). The Federal Highway Administration has posted information regarding MUTCD approval status of most of the bicycle-related treatments in this guide and in August 2013 issued a memorandum officially supporting use of the document. Most of the NACTO Urban Bikeway Design Guide treatments are in use in cities around the United States.
Bicycle Facilities and the Manual on Uniform Traffic Control Devices
FHWA | December 2015

The Federal Highway Administration (FHWA) receives occasional inquiries about what new and innovative bicycle facilities, signals, and markings are permitted per the Manual on Uniform Traffic Control Devices (MUTCD). This online table/webpage lists various bicycle-related signs, markings, signals, and other treatments and identifies their status (e.g., can be implemented, currently experimental, disallowed) per the 2009 version of the MUTCD and subsequent interim approvals and interpretations.

Incorporating On-Road Bicycle Networks into Resurfacing Projects
FHWA | March 2016

This report provides guidance on incorporating bicycle infrastructure into roadway resurfacing projects. It provides an overview of typical resurfacing processes and timelines, the methods for including bikeways, and cost and material considerations.

Separated Bike Lane Design Guide
MassDOT | 2015

While this is a document from Massachusetts, it is being used as a design resource throughout the United States by project planners and designers for considering, evaluating and designing separated bike lanes as part of a complete streets approach for transportation networks. Since its publication, its guidance has been cited in many non-Massachusetts jurisdictions, and its explanatory tables and graphics make different aspects of separated bikeway design easier to understand for engineers and laypeople alike.
This report explores similarities and differences in the approach to bicycle network planning and facility design between the Netherlands and the United States. A brief historical overview is provided as context for a discussion about planning and design approaches and physical infrastructure as observed during a visit to the Netherlands in August 2015. This report highlights four specific themes (Prioritize Seamless and Efficient Bicycle Movement, Trust in Users in the Adaptability of the Transportation System, Design for the Behavior You Want to See, and Prioritize Network Connectivity) observed in practice in the Netherlands that are applicable to transportation practice in the United States.
Ohio Location and Design Manual

ODOT

This manual establishes Ohio-based roadway guidelines per key national guidelines, standards, and recommendations.

The purpose of the manual is to focus the selection of design alternatives to those most appropriate for the State of Ohio, to document Ohio’s interpretation of various geometric policies, and to include design criteria which may be unique to the State of Ohio.

The manual is neither a textbook nor a substitute for engineering knowledge, experience or judgment. It is intended to provide uniform procedures for implementing design decisions, assure quality and continuity in design of highways in Ohio, and assure compliance with Federal criteria.

Ohio Manual on Uniform Traffic Control Devices (MUTCD)

ODOT

The Ohio MUTCD establishes statewide standards for the design and use of traffic control devices on streets, highways, bikeways and private roads open to public travel in Ohio.
Ohio Traffic Engineering Manual

ODOT

This manual is a consolidation of ODOT traffic engineering policies, guidelines, standards and best practices. It is intended that all ODOT traffic engineering information is found in this manual, or is cross-referenced from it. Information from several previous publications and documents have been incorporated, including the Traffic Control Application Standards Manual, the Traffic Control Design Information Manual and the Construction Guidelines Manual for Traffic Control Devices.

Pavement Design Manual

ODOT

This manual establishes engineering concepts intended for use with all roadway new or reconstruction projects, major and minor rehabilitation projects, and surface treatment projects which are under the jurisdiction of the Ohio Department of Transportation (ODOT).

The purpose of this manual is to focus the selection of design variables to those most appropriate for the State of Ohio, document Ohio’s interpretation of various policies and to include design criteria which may be unique to Ohio.

Ohio Temporary Traffic Control Manual

ODOT

The Ohio Manual of Uniform Traffic Control Devices (OMUTCD) establishes statewide standards for the design and use of traffic control devices on any street, highway, bikeway or private road open to public travel in Ohio.

The portion of the OMUTCD that deals with Temporary Traffic Control, Parts 1 (General), 5 (Low-Volume Roads), and 6 (Temporary Traffic Control), have also been reproduced together in a separate publication titled the Temporary Traffic Control Manual. This separate publication is also often referred to as the “orange book” because of its orange cover.
Standard Construction Drawings
ODOT

This document provides standard detail drawings of traffic control devices used in ODOT plans. They have been reviewed and approved by FHWA for use on ODOT projects. Current and archived versions of the drawings are available in both .pdf and MicroStation (.dgn) formats.

Sign Designs and Markings Manual
ODOT

This manual contains Standard Sign Designs for traffic control signs addressed in the Ohio Manual of Uniform Traffic Control Devices (OMUTCD) and the ODOT Traffic Engineering Manual (TEM), as well as some signs not yet specifically addressed in either of these manuals. The SDMM has been incorporated by reference into both the OMUTCD and the TEM. Pedestrian and bicycle-related signs are located throughout the manual and school area signs are included in Chapter 7.

Roadway Standards Approved Products
ODOT

This webpage describes products that are approved for use on Ohio roadways including detectable warnings.