DESIGNING IN CONTEXT OF COMPLETE STREETS

DESIGN Module 2

Design for Nonmotorized Modes Along the Road

DESIGN FLEXIBILITY

Flexibility existing to design safe, comfortable, and convenient Complete Streets for all users. From the AASHTO Green Book 2011, p.xii

"The intent of this policy is to provide guidance to the designer by referencing a recommended range of values for critical dimensions. Good highway design involves balancing safety, mobility, and preservation of scenic, aesthetic, historic, cultural, and environmental resources.. This policy is therefore not intended to be a detailed deign manual that could supersede the need for the application of sound principles by the knowledgeable design professional. Sufficient flexibility is permitted to encourage independent designs tailored to particular situations."



Transect Zones, Smart Code

Source: Congress of New Urbanism

Design Flexibility:

Design in Context of the Land Use



Who are you accommodating? How will you accommodate them safely?

Design Flexibility:

Design in Context of the Modal Emphasis

Graphic Credit: FHWA Achieving Multimodal Net 2016

DESIGN FLEXIBILITY

MULTIMODAL ACCESS TO NEW TRANSIT STATIONS

COMMON USERS IN CONFLICT AND ACCESS HIERARCHY



GUIDING PRINCIPLES TO REDUCE CONFLICTS

SAFETY

Through site design at transit stations, the likelihood of crashes between transit vehicles, private vehicles, pedestrians, and bicyclists should be reduced.

ACCOMMODATION AND COMFORT

Station access should be comfortable and accommodate all travel modes.

COHERENCE

The station should have a clear path of travel to station entrances and exits.

PREDICTABILITY

Circulation facilities on the station site should have clear rightof-way assignments that create predictable behaviors for all users.

CONTEXT SENSITIVITY

The station should be consistent with and support adjacent land uses.

EXPERIMENTATION

Transit agencies should consider station access for all modes during the planning stages of new station.

ACHIEVING MULTIMODAL NETWORKS

APPLYING DESIGN FLEXIBILITY & REDUCING CONFLICTS



US. Department of Transportation Federal Highway Administration

STANDARDS

Official FHWA Guidance Memo-Flexible Design dated August 20, 2013

- Expressed <u>support</u> for taking a flexible approach to bicycle and pedestrian facility design
- Encourages agencies to go beyond the minimum requirements



This memorandum expresses the Federal Highway Administration's (FHWA) support for taking a flexible approach to bicycle and podestrian facility design. The American Association of State Highway and Transportation Officials (AASHTO) bleycle and pedestrian design guides are the primary national resources for planning, designing, and operating bicycle and pedestrian facilities. The National Association of City Transportation Officials (NACTO) (*Chan Bidewan Design Guide* and the Institute of Transportation Engineers (ITE) *Designing Lerban Walkable*. *Tharmelitare*, guide builds upon the flexibilities provided in the AASHTO guides, which can help communities plan and design safe and convenient facilities for pedestrian and bicyclists. FHWA supports the use of these resources to further develop nonmotorized transportation networks, particularly in urban areas.

AASHTO Guides

AASHTO publishes two guides that address pedestrian and bicycle facilities:

- Conde for the Plannine: Design and Operation of Pedestrian Facilities, July 2004, (AASHTO Pedestrian Guide) provides guidelines for the planning, design operation, and maintenance of pedestrian facilities, including signals and signing. The guide recommends methods for accommodating pedestrians, which vary among roadway and facility types, and addresses the effects of land use planning and site design on pedestrian mobility.
- Guide for the Development of Bicycle Facilities 2012. Fourth Edution (AASHTO Bike Guide) provides detailed planning and design guidelines on how to accommodate bicycle travel and operation in most riding environments. It covers the planning, design, operation.

PLANNING & DESIGN "STANDARDS"

- AASHTO "Green Book"
 2011/Local State Highway
 Design Manual
- MUTCD 2009 Edition
- AASHTO Pedestrian Guide, 2004
- AASHTO Bike Guide 2012 Edition



MUTCD

"The Manual on Uniform Traffic Control Devices (MUTCD) is incorporated by reference in the 23 CFR 655 and shall be recognized as the national standard for all traffic control devices installed on any street, highway, bikeway or private road open to public travel..." 2009 MUTCD.

Texas MUTCD

Manual on Uniform Traffic Control Devices Revision 2, October 2014



WHY NATIONAL STANDARD?

- Uniformity of design and placement of Traffic Control Devices is critical to safe operation for all roadway users.
- Consistency of TCD's with traffic code/rules of the road.
- The US UVC has not been updated since 2001 (ish)



HOW IS THE MUTCD CHANGED?

- Technical Committees develop proposals
- Council approves (or not)
- Sponsors review and comment (AASHTO et al)
- Technical Committees resolve comments and revise proposals
- Council final approval
- Forward to FHWA for "rule making process" and incorporation into MUTCD

HOW IS THE MUTCD CHANGED?

- Changes require "rule change" process including public notice in the Federal Register and public comment period.
- Process handled through the Federal OMB. Executive Branch and OMB responsible for prioritization of rule changes. No schedule for new MUTCD. <u>Not expected until 2020.</u>
- FHWA considering Interim Approvals to fill the gap.

WHAT IS AN INTERIM APPROVAL (IA)?

- Interim approval allows interim use, pending official rulemaking, of a new traffic control device, a revision to the application or manner of use of an existing traffic control device, or a provision not specifically described in this Manual.
- The issuance by FHWA of an interim approval will typically result in the traffic control device or application being placed into the next scheduled rulemaking process for revisions to this Manual."

MUTCD-FHWA INTERIM APPROVALS (IA'S)

IA-11 RRFB

- IA 2004 Use of Clearview font for Guide Signs
 - This IA has been discontinued
- IA-12 Traffic signal photo enforced sign 11/2010
- IA-13 Electric vehicle charging station sign 04/2011
- IA-14 Green colored pavement for bike lanes 04/2011
- IA -15 Alt Design for US Bike Route Sign M1-9 06/2012
- IA-16 Bicycle Signal Face 12/2013
- IA-17 3-Section Flashing Yellow Arrow Signal Face
- IA-18 Bicycle Box

AASHTO PEDESTRIAN GUIDE

Last updated in 2004
 Update/revision currently in preparation
 More info available offered at www.bikepedinfo.org

Guide for the Planning, Design, and Operation of Pedestrian Facilities



AASHTO BICYCLE GUIDE

Updated in 2012

- Expanded from 75 to over 200 pages
- 3 chapters to 7 chapters
- Expanded information on intersection treatments
- PDF'S of webinars available offered at <u>www.bikepedinfo.org</u>
- Revisions underway





NACTO GUIDE

- The NACTO Urban Bikeway Design Guide, 2011 builds upon the flexibilities provided in the AASHTO Guides.
- The vast majority of NACTO Guide is either allowed or not precluded.
- Non-compliant TCD's may be piloted through the MUTCD experiment process.

Urban Bikeway Design Guide

0.0

National Association of City Transportation Officials

Second Edition

ITE / CNU GUIDE

The ITE and CNU
 Designing Urban Walkable
 Thoroughfares, 2010
 builds upon the
 flexibilities provided in
 the AASHTO Guides.





Designing Walkable Urban Thoroughfares: A Context Sensitive Approach





Institute of Transportation Engineers

OTHER GUIDES

FPARATED

PLANNING & DESIGN GUIDE

2015

- FHWA Separated Bike Lane Planning and Design Guide, 2015
- MassDOT, 2015

 Frequently
 referenced
- NACTO Urban Street Design Guide

Federal Highway Administration SEPARATED BIKE LANE PLANNING AND DESIGN GUIDE

stration

DESIGN FLEXIBILITY

ACHIEVING MULTIMODAL NETWORKS APPLYING DESIGN FLEXIBILITY



and safety performance of highways on the National Highway System (NHS). As of May 2016, these criteria have been revised. There are now 10 controlling criteria for high-speed roads. On non-freeways with design speeds under 50 mph on the NHS, only the following two controlling criteria apply: Design Loading Structural Capacity and Design Speed. Refer to FHWA's website for current information. (Federal Register, Revision of Thirteen Controlling Criteria for Design and Documentation of Design Exceptions, 2016 and National Cooperative Highway Research Program, Report 783: Evaluation of the 13 Controlling Criteria for Geometric Design, 2015)

Setting Design Criteria:

- The AASHTO Green Book allows for flexibility by providing a range of values.
- Functional classification alone may not take into account the local context and design impacts beyond traffic service.
- FHWA controlling criteria revised on May 5, 2016.
 - Only two criteria for "low speed" roadways.

LANE WIDTH - AASHTO GREEN BOOK, 2011

- Design
 Flexibility:
 Design Criteria
 and Lane Width:
- Range 9 12 feet depending on speed capacity, and context.
- Allow 10-foot lanes in low speed environments (<45 mph)</p>



Source: FHWA Achieving Multimodal Networks, 2016



Design Flexibility: Design Speed

Speed Matters

Source: FHWA Achieving Multimodal Networks, 2016

Statistics are Clear! We have to change the way we are designing and operating our transportation system.



Design Flexibility: Design Speed

Speed Matters

Source:SmartGrowthAmerica.org/dangerous-by-design-2016







Road Diet Informational Guide



FHWA Safety Program

US. Department of Transportation Federal Highway Administration



Road Diets/Lane Elimination

Common Elements

- Utilize Existing Footprint
- Rebalance/reallocate street space to add features such as:
 - Two-way Left-turn Lane (TWLTL)
 - Bike Lanes
 - On-street Parking
 - Buffer Zones
 - Landscaping
 - Etc

Road Diets/Lane Elimination

Reference: Mark Doctor, PE, Road Diet





3 CRASH TYPES CAN BE REDUCED BY GOING FROM 4 TO 3 LANES: WHICH ONES?



3 CRASH TYPES CAN BE REDUCED BY GOING FROM 4 TO 3 LANES: 1 – REAR ENDERS



3 CRASH TYPES CAN BE REDUCED BY GOING FROM 4 TO 3 LANES: 2 – SIDE SWIPES



3 CRASH TYPES CAN BE REDUCED BY GOING FROM 4 TO 3 LANES: 3 – LEFT TURN/BROADSIDE







Before



ATNO

Pottstown, PA

Fewer travel lanes; added bike lanes; parallel to back-in-angled parking on one side; new pavement

After

Benefits of Road Diets for Pedestrians

- Reduce crossing distance
- Eliminate or reduce "multiple threat" crash types
- Install crossing island to cross in 2 simple steps
- Reduce top end travel speeds
- Buffer sidewalk from travel lanes (parking or bike lane)
- Reclaim street space for "higher and better use" than moving peak hour traffic



ON-STREET PARKING

ON-STREET PARKING

Advantages of On-street Parking

- Supports local economic activity
- Increases pedestrian comfort by buffering to sidewalk
- Slows traffic, making the roadway safer
- Provides short distance to building entrances
- Increases pedestrian activity of the street
- Makes storefronts more visible
- Reducing on-site parking demand
- Requires less land per parking space
- Provides space for freight and delivery service

DESIGN FLEXIBILITY – LET'S RECAP

 Design Flexibility
 What are the standards?

 Texas MUTCD
 Texas Roadway Design Manual / AASHTO Green Book

DESIGN FLEXIBILITY – LET'S RECAP

1. What organizations have guides that can help you make decisions?

- **1. AASHTO**
- 2. NACTO
- **3. ITE**
- 4. FHWA