## Amherst Bicycle/Pedestrian Advisory Committee

Listening Session March 22, 2018

### **Agencies/Design Guidance**

- Federal Highway Administration (FHWA)
- American Association of Highway and Transportation Officials (AASHTO) – Green Book, MUTCD
- National Association of City Transportation Officials (NACTO)
- Institute of Transportation Engineers (ITE)



## FHWA Policy Statement (2010)

"Walking and bicycling foster safer, more livable, family-friendly communities; promote physical activity and health; and reduce vehicle emissions and fuel use. "

### "... 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*..."

FHWA. United States Department of Transportation Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations. 2010. United States Department of Transportation Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations

#### Signed on March 11, 2010 and announced March 15, 2010

#### Purpose

The United States Department of Transportation (DOT) is providing this Policy Statement to reflect the Department's support for the development of fully integrated active transportation networks. The establishment of well-connected walking and bicycling networks is an important component for livable communities, and their design should be a part of Federal-aid project developments. Walking and bicycling foster safer, more livable, family-friendly communities; promote physical activity and health; and reduce vehicle emissions and fuel use. Legislation and regulations exist that require inclusion of bicycle and pedestrian policies and projects into transportation plans and project development. Accordingly, transportation agencies should plan, fund, and implement improvements to their walking and bicycling networks, including linkages to transit. In addition, 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. Transportation programs and facilities should accommodate people of all ages and abilities, including people too young to drive, people who cannot drive, and people who choose not to drive.

#### **Policy Statement**

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.

#### Authority

This policy is based on various sections in the United States Code (U.S.C.) and the Code of Federal Regulations (CFR) in Title 23—Highways, Title 49—Transportation, and Title 42—The Public Health and Welfare. These sections, provided in the Appendix, describe how bicyclists and pedestrians of all abilities should be involved throughout the planning process, should not be adversely affected by other transportation projects, and should be able to track annual obligations and expenditures on nonmotorized transportation facilities.

### FHWA Design Flexibility Memo (2013)

FHWA supports "taking a flexible approach to bicycle and pedestrian facility design. ... The National Association of City Transportation Officials (NACTO) Urban Bikeway Design Guide, [the Urban Street Design Guide,] and the Institute of Transportation Engineers (ITE) Designing Walkable Urban Thoroughfares 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."



This memorandum expresses the Federal Highway Administration's (FHWA) support for taking a flexible approach to bicycle and pedestrian facility design. The American Association of State Highway and Transportation Officials (AASHTO) bicycle 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) <u>Urban Bikeway</u> <u>Design Guide</u> and the Institute of Transportation Engineers (ITE) <u>Designing Urban Walkable</u> <u>Thoroughfares</u> 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.

### **Small Town/Rural Needs**

#### ONE SIZE DOES NOT FIT ALL.









LONGER NON-LOCAL TRIP DISTANCES HEALTH DISPARITIES HIGHER CRASH RATES

INCOME DISPARITIES Small Town and Rural Multimodal Networks (2016-17)

The multimodal design guidelines for the rest of us.

Small Town and Rural Multimodal Networks



### **Amherst Project Context**

- The purpose of this effort is to define and develop a multi-modal transportation *network* .
- The focus is on *all* modes of transportation, not just automobiles.
- Multimodal *Networks* are interconnected pedestrian and/or bicycle transportation facilities that allow people of *all ages and abilities* to safely and conveniently get to where they want to go.

# Focus on Complete Networks of Facilities

Networks are interconnected pedestrian and/or bicycle transportation facilities that allow people of all ages and abilities to safely and conveniently get where they want to go.

- Facility Categories:
- Mixed Traffic
- Visually Separated
- Physically Separated



![](_page_7_Picture_7.jpeg)

### **Traffic Volumes**

- High volume roadways are barriers to mobility, and are challenging to ride and walk.
- <1,000 VPD is a very low volume roadway.
- 1,000 to 3,000 VPD is a low volume roadway.
- 3,000 to 6,000 VPD is a medium volume roadway.
- >6,000 VPD is a high volume roadway.

![](_page_8_Figure_6.jpeg)

### **Levels of Traffic Stress**

- LTS 1: Strong separation from all except low speed, low volume traffic. Simple crossings. *Suitable for children*.
- LTS 2: Interested but Concerned Except in low speed / low volume traffic situations, cyclists have their own place to ride that keeps them from having to interact with traffic except at formal crossings. Physical separation from higher speed and multilane traffic. Crossings that are easy for an adult to negotiate.
- LTS 3: *Enthused and Confident* Involves interaction with moderate speed or multilane traffic, or close proximity to higher speed traffic.
- LTS 4: <u>Strong and Fearless</u> Involves interaction with higher speed traffic or close proximity to high speed traffic.

## **Applications**

![](_page_10_Picture_1.jpeg)

Mixed Traffic

Visually Separated

Physically Separated

## **Mixed Traffic**

Yield Roadway Advisory Shoulder

![](_page_11_Picture_2.jpeg)

![](_page_12_Figure_0.jpeg)

### Yield Roadway

![](_page_12_Figure_2.jpeg)

PREFERRED

MOTOR VEHICLE OPERATING SPEED (MI/H)

50

40

## Yield Roadway – Geometric Design

#### Two-way Travel Lane

- Total traveled way width may vary from 12 ft (3.6 m)–20 ft (6.0 m).
- When < 15 ft (4.5 m) provide pullout areas every 200-300 ft.
- Refer to AASHTO Low Volume Roads 2001

#### Roadside

- Parking may be located outside of the paved roadway, and/or serve as a pull-out area while yielding.
- Trees may be planted within the roadside area at regular intervals

![](_page_13_Figure_8.jpeg)

#### Sisters, OR Population: 2,170

- 110

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50123

Mar ()

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### Advisory Shoulder/Yield Roadway

![](_page_15_Figure_1.jpeg)

![](_page_16_Figure_0.jpeg)

## dvisory Shoulder

#### Two-way Center Travel Lane

• Establishes a shoulder on an otherwise too narrow road

- Delineated by pavement markings
- Colored pavement optional
- Must exit shoulder to overtake bicyclists
- Must enter shoulder when yielding to oncoming traffic

Yield to Bicyclists

Permissive — broken lane line

Contrasting Paving Materials

![](_page_17_Figure_10.jpeg)

PREFERRED POTENTIAL

### **Advisory Shoulder- Benefits**

#### Benefits

- May reduce motor vehicle travel speeds.
- Increases predictability and clarifies desired lateral positioning of users.
- Functions well within a rural and small town traffic and land use context.

- Provides a delineated space on a roadway otherwise too narrow for dedicated shoulders.
- Minimizes potential impacts to visual or natural resources.
- May function as an interim measure where plans include shoulder widening or traffic calming in the future.

### **Advisory Shoulder- Geometric Design**

#### Advisory Shoulder

- The preferred width of the advisory shoulder space is 6 ft (2.0 m). Absolute minimum width is 4 ft (1.2 m) when no curb and gutter is present.
- No center line (assumes AADT is <6,000)

#### Two-way Center Travel Lane

 Preferred two-way center travel lane width is 13.5–16 ft (4.1–4.9 m) although may function with widths of 10–18 ft (3.0–5.5 m).

![](_page_19_Figure_6.jpeg)

### Advisory Shoulders on Constrained Bridges

![](_page_20_Picture_1.jpeg)

![](_page_20_Picture_2.jpeg)

![](_page_20_Figure_3.jpeg)

![](_page_20_Figure_4.jpeg)

Hanover, NH Population: 11,000

Edina, MN Population: 49,300

416×14P

NERVATION

CONFERENCE & NOTETHIC INSULATION SPECIALITY

![](_page_22_Picture_1.jpeg)

ALC: NOT

HILL\* ELECTRICAL \* PLUMBING \* FIRE PROTECTION

MYSENKE + BUILDING AUTOMATION: SYSTEMS

Wessian a

finime.

**Gilbert Mech Gilbert Elect** 

952-835-381 www.gilbertn

Cambridge, MA Population: 110,000

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100

VEHICLES SHA CENTER LAN

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- 35 E.

## Visually Separated

Paved Shoulder

![](_page_24_Picture_2.jpeg)

![](_page_25_Figure_0.jpeg)

## Paved Shoulder – Geometric Design

#### Shoulder

- To accommodate bicyclists and pedestrian use of the shoulder, <u>provide a minimum</u> <u>width of 4 ft (1.2 m)</u> adjacent to a road edge or curb, exclusive of any buffer or rumble strip.
- Where possible, provide greater width for added comfort, user passing, and side-by-side riding.

#### **Rumble Strips**

- Rumble strips are an FHWA Proven Safety Countermeasure for reducing roadway departure crashes.
- Installing rumble strips can reduce severe crashes but may negatively impact bicycle travel if they are poorly constructed.

![](_page_26_Figure_7.jpeg)

## Paved Shoulder – Design

#### **Rumble Strips**

- 12 inch spacing center-tocenter
- 6–8 inches long, perpendicular to roadway
- 6 inch wide, measured parallel to roadway
- 3/8 inch deep
- Provide a "Bicycle gap pattern"
- Apply as rumble "stripes"

![](_page_27_Picture_8.jpeg)

#### Rt. 103, NH

1

**Townsend, MT** Population: 7,700 and the second state of th

## Physically Separated

Shared Use Path Sidepath Sidewalks

![](_page_30_Picture_2.jpeg)

![](_page_31_Figure_0.jpeg)

### Sidewalk – Geometric Design

#### Pedestrian Zone

The pedestrian through zone is the clear width needed for pedestrian travel activity

 The pedestrian through zone should be at least 5 ft (1.5 m) wide. This permits side-by-side walking and meets accessibility guidelines for turning and maneuvering.

#### **Furnishing Zone**

- The furnishing zone is closest to the street
- A furnishing zone of 4–6 ft (1.2–1.8 m) is preferred for comfort and aesthetics. This width allows for trees, benches, and other large furnishing items.

![](_page_33_Picture_0.jpeg)

## Sidepath – Geometric Design

#### Pathway

- Minimum recommended pathway width is 10 ft (3.0 m).
- In low-volume situations and constrained conditions, the absolute minimum sidepath width is 8 ft (2.4 m)
- Provide a minimum of 2 ft (0.6 m) clearance to signposts or vertical elements.

#### **Roadway Separation**

- Preferred minimum separation width is 6.5 ft (2.0 m). Minimum separation distance is 5 ft (1.5 m).
- Separation narrower than 5 ft is not recommended, although may be accommodated with the use of a physical barrier between the sidepath and the roadway.

### Sidepath – Geometric Design Options

![](_page_35_Picture_1.jpeg)

![](_page_35_Picture_2.jpeg)

![](_page_35_Picture_3.jpeg)

East Bay Bike Path East Providence RI

### **Shared Use Path**

Separate from the Roadway system.

![](_page_37_Picture_2.jpeg)

Jackson Hole, WY Population: 9,600 GUI

STE

23

## www.ruraldesignguide.com

![](_page_39_Picture_1.jpeg)

Welcome to the **Small Town and Rural Design Guide** — an online design resource and idea book, intended to help small towns and rural communities support safe, comfortable, and active travel for people of all ages and abilities.

Small Town and Rural Design Guide

![](_page_40_Picture_0.jpeg)

BICYCLE BOULEVARD

![](_page_40_Picture_3.jpeg)

ADVISIONY SHOULDER

![](_page_40_Picture_5.jpeg)

A yield roadway is designed to serve pedestrians, bicyclists, and motor vehicle traffic in the same slow-speed travel area. Yield roadways serve bidirectional motor vehicle traffic without lane markings in the roadway travel area.

Mixed Traffic | Visually Separated | Physically Separated

![](_page_40_Picture_7.jpeg)

APPLICATION

![](_page_40_Figure_9.jpeg)

Speed and Volume Most appropriate on streets with low volumes (+) and low speed.

Network Local residential roadways. Not for through motor vehicle travel.

- LOCAL

- COLLECTOR - HIGHWAY

![](_page_40_Picture_12.jpeg)

#### Land Use

Within built up areas, particularly near residential land uses where most traffic is familiar with prevailing road conditions.

#### Geometric Design

#### Two-Way Travel Lane

The paved two-way travel lane should be narrow to encourage slow travel speeds and require courtesy yielding when vehicles traveling in opposite directions meet.

- Total traveled way\_width may vary from 12 ft (3.6) m)-20 ft (6.0 m). 📀
- Traveled way width below 15 ft (4.5 m) or below function as a two-way singlelane roadway and should follow the guidance of the AASHTO Low Volume Roads 2001.
- When width is 15 ft (4.5 m) or narrower, provide pull-out areas every 200-300 ft to allow for infrequent meeting and passing events between motor vehicles. Pull-out areas may be established in the parking lane or roadside area. (+)
- Access for emergency vehicles should be provided. (+) There is no single fire code standard for local roads; however, a range of clear widths for parking and deploying fire department apparatus is between 16-20 ft (5.0-6.0 m). Designers should provide an opening of this width every 200–300 ft (600–91 m). 📀

#### Markings

No markings are necessary to implement a yield roadway.

 Do not mark a center line within the travel area. The single two-way lane introduces helpful traffic friction and ambiguity, contributing to a slowspeed operating environment. (+)

#### Signs

Use signs to warn road users of the special characteristics of the street. Potential signs include:

- A PEDESTRIAN (W11-2) warning sign with ON ROADWAY legend plaque. See Figure 2-3. (+)
  - Use a Two-Way Traffic warning sign (W6-3) to clarify two-way operation of the road if any confusion exists. See Figure 2-3.

#### Roadside

If desired, parking may be located on the paved roadway surface or on gravel or soil shoulders outside of the paved roadway. The parking lane may also serve as a pull-out area while yielding.

- When possible, the parking lane should be constructed with a contrasting material to differentiate the lane from the travel area. Bituminous, crushed stone, gravel, and turf shoulders can be used as contrasting materials to the travel area (AASHTO Green Book 2011, p. 4-13).
- Trees may be planted within the roadside area at regular intervals to visually and physically narrow the corridor, add to the aesthetic environment, and encourage slow speeds.

#### Intersections

At uncontrolled crossings of local streets, no special treatment is necessary. The additional space within the intersection area offers queuing opportunities when vehicles traveling in opposite directions meet.

- Consider parking prohibitions of 20-50 ft (6.0-15.0 m) in advance of intersections. This is particularly helpful to accommodate large vehicle turning movements.
- Provide adequate stopping sight distance around curves and at uncontrolled intersections. Values of stopping sight distance for two-way single-lane roads should be twice the stopping sight distance for a comparable two-lane road.

![](_page_40_Picture_37.jpeg)

Figure 2-3. Pair a W11-1, W1-2, or W11-15 warning sign with a custom legend plaque to inform road users that shared use by pedestrians and/or bicyclists might occu

![](_page_40_Picture_39.jpeg)

W11-2

Figure 2-2. A travel area width of 16-18 ft (4.8-5.5 m) is appropriate for low volumes of twoway traffic and may require

lane, pull-out, or driveway area to let the other proceed.

slowing when vehicles traveling in opposite directions meet. A

travel area of 12-15 ft (3.6-4.5 m) is too narrow for two motor

vehicles to pass, and one vehicle may need to pull into a parking