

Presentation to American Trails Symposium

Creating Sign Standards for Bikeways

Karen Votava: Chair, Working Group for Signing Bicycle Facilities

Donald Meeker: Principal, Meeker & Associates, Inc.

November 15, 2010, Chattanooga, Tennessee

NYC Greenways & Bike Routes



East Coast Greenway



Working Group Membership in 2008

The Alliance for Biking & Walking

The Adventure Cycling Association

Alta Planning + Design

Corps of Engineers

The East Coast Greenway Alliance

The League of American Bicyclists

Meeker & Associates, Inc.

National Park Service National Trails Program

The Rails to Trails Conservancy





Initiative for Change

- Began around *signing bike routes*
- Realized 1979 MUTCD *tired and incomplete*
- Late to *MUTCD schedule*
- Important, *can't wait 10 years*
- *Evolution* of a standard *needs broad involvement from cycling community*



American Trails Symposium 2008

Create *consistent visual thread*

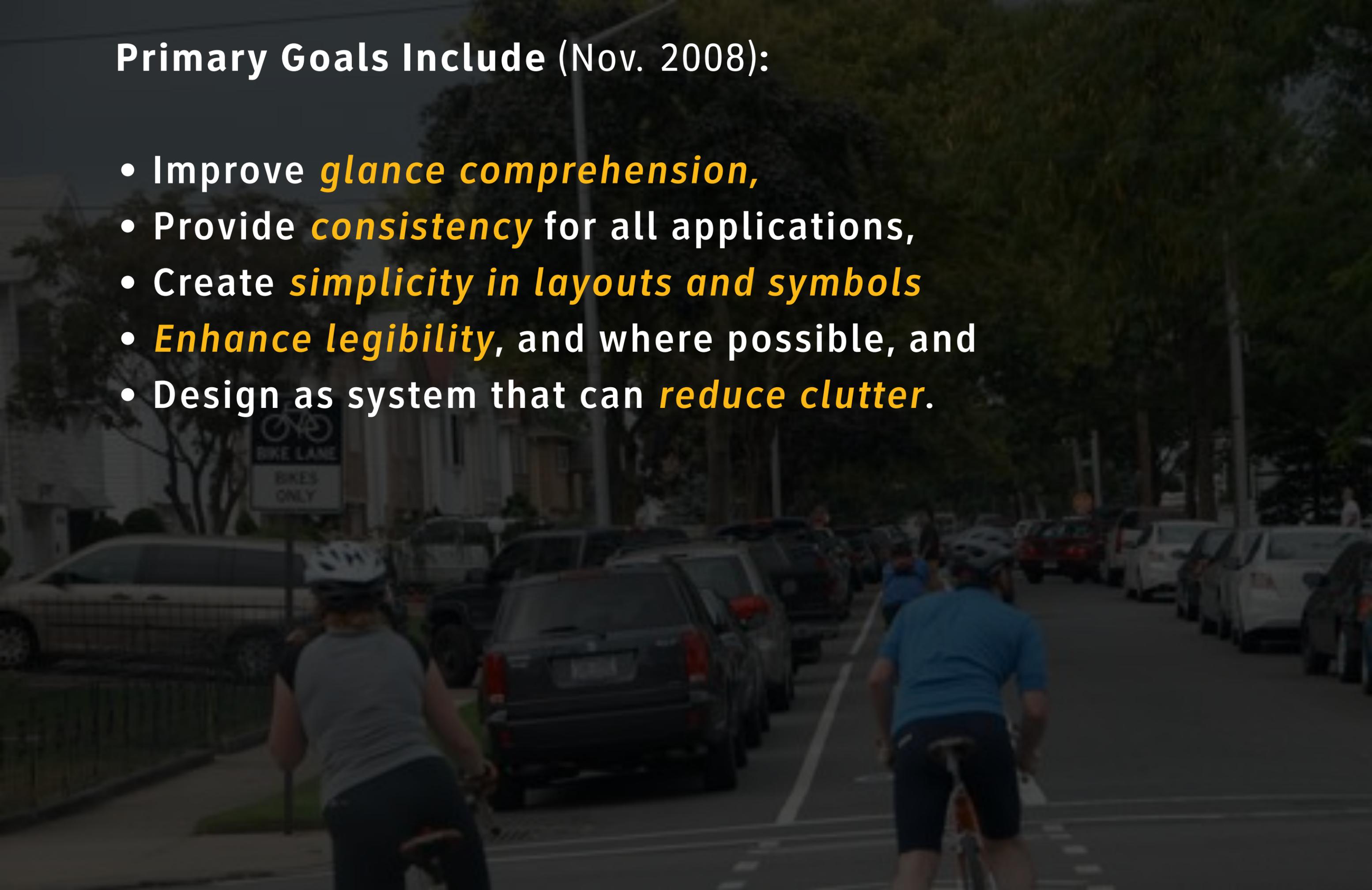
- on city streets
- on highways (designated routes)
- on shared-use paths
- on the linkages between them
- accommodate other information

The members of the working group also suggested:

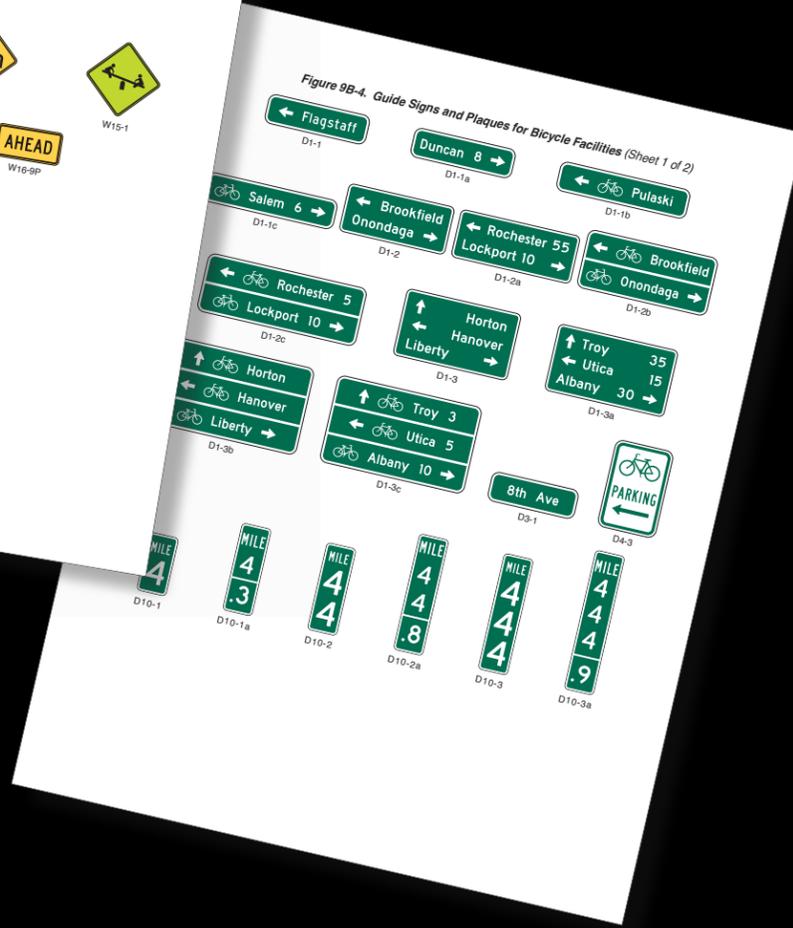
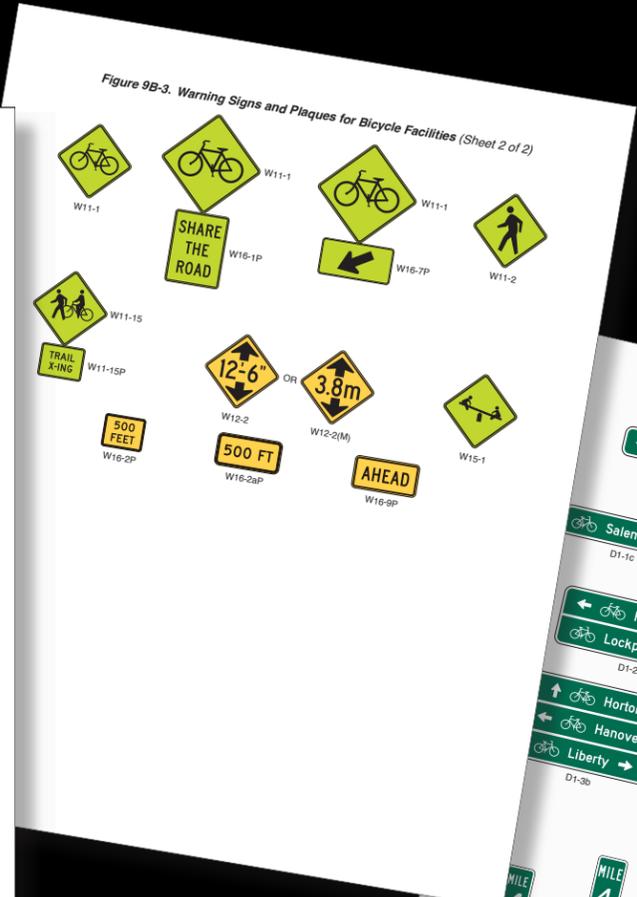
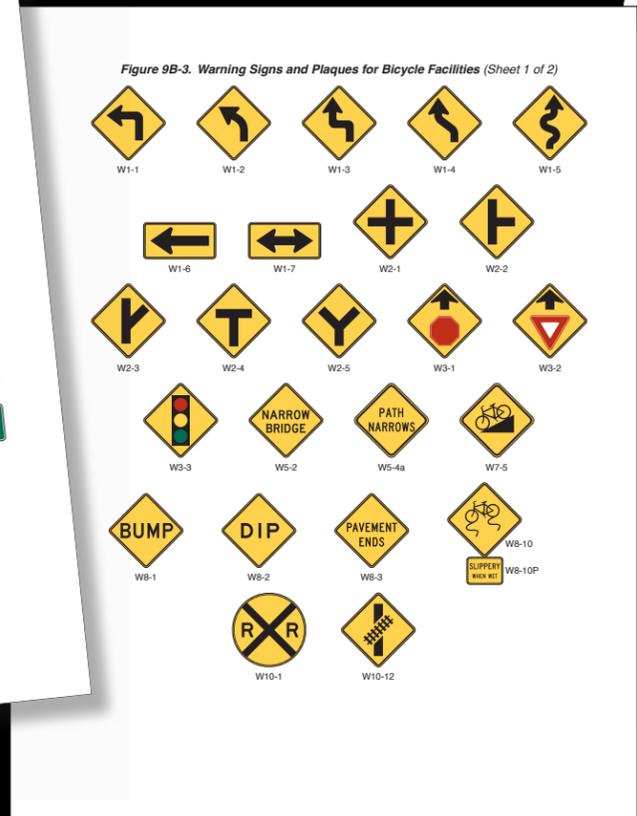
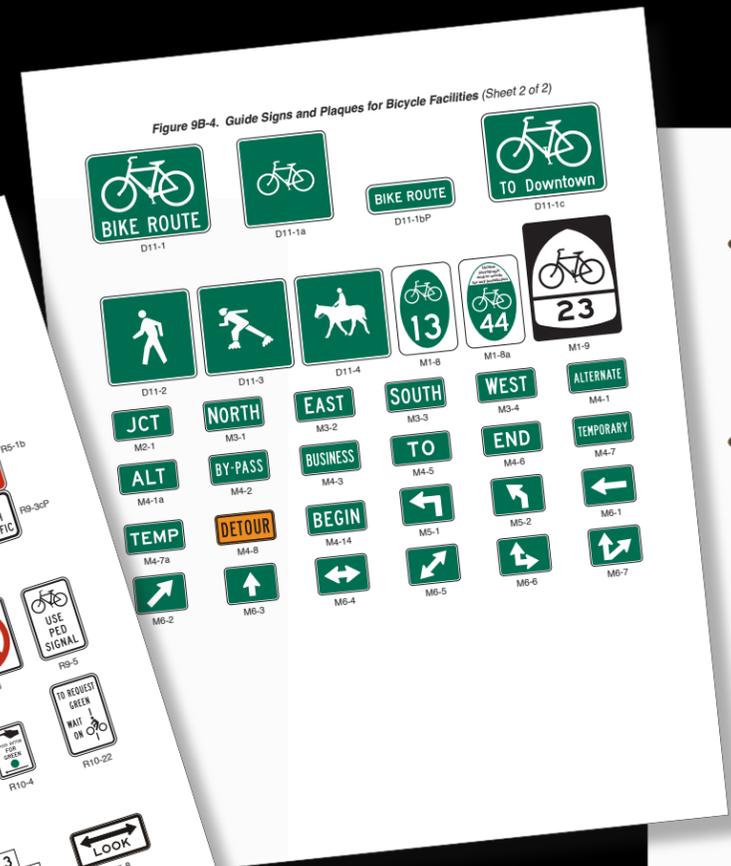
- *Recognition:*
promote positive awareness of alternative transportation
- *Helmet*

Primary Goals Include (Nov. 2008):

- Improve *glance comprehension*,
- Provide *consistency* for all applications,
- Create *simplicity in layouts and symbols*
- *Enhance legibility*, and where possible, and
- Design as system that can *reduce clutter*.



Current Proposed (2008) MUTCD: Signs for Bicycle Facilities



Westchester County, NY



Trail Signs: Hierarchy of Signs

Identification Basic Rules



Orientation



Guidance

Resource Protection/ Education



Site Specific Rules

Resource Protection



Mile Markers



Trail Etiquette



Regulatory

STOP Crossing Instructions Prohibitions Warnings



Trail Sign Hierarchy

1. Identification
2. Basic Rules (Pets, Trash, Hours, Alcohol)
3. Orientation Maps
4. Guidance (Directional Signs)
5. Mile Markers (Non Highway)
6. Resource Education (Ticks, Leave no Trace, Pets, Poison Ivy)
7. Interpretation (History, Natural Science)

8. *Specific Rules: Stay Right Pass Left*
- 9: *Traffic Regulatory (more instructive than a stop sign)*
10. *Warning: Yellow Diamond*
11. *Motor Vehicle Prohibitions*

Existing Inanimate Symbol



Bike Related Symbols for Road Signs (Proposed)



Pavement Marking



Bike Use Related Symbols (Symbols tested by Virginia Tech in Comparison to Current FHWA Standards)



MUTCD standard



original



less aggressive w/
bike details



less aggressive w/o
bike details



less aggressive w/o
bike details



walk your bike
across intersection



steep grade ahead



slippery surface ahead



Research: Legibility/Understanding

Basic Legibility

20%-30% improvement



Warning

Slippery road (bikes): 77% to 23%
Steep grade (bikes): 86% to 14%
Cross walk: 71% to 28%



Blue vs Green

Significant Preference for blue



Understand/Prefer

20%-30% preferred
(viewed above threshold)



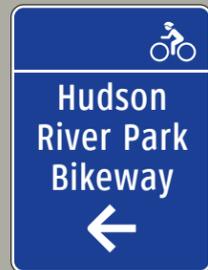
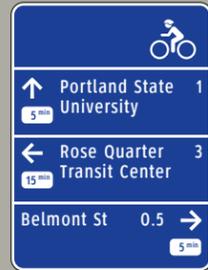
Source: Virginia Tech:
Department of Industrial and
Systems Engineering (2009)

Proposed System Overview

Identification



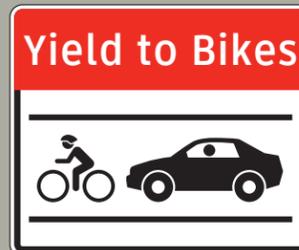
Guidance



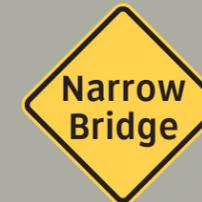
Regulation Lane Identification



Regulation Lane Management



Warning



Trail



Color Study

Color Study (Option 1): Specified Green with Black on Regulated Identification (see page B.2)



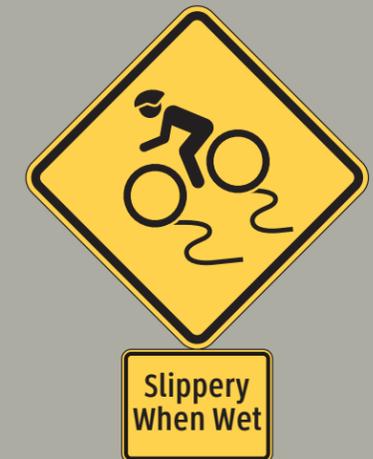
Color Study (Option 2): Specified Green with Green on Regulated Identification (see page B.3)



Color Study (Option 3): Recommended Blue with Black on Regulated Identification (see page B.4)



Color Study (Option 4): Recommended Blue with Blue on Regulated Identification (see page B.5)



Route Markers: Generic Marker, U.S. Bike Routes, State Routes and Local Named Routes

Existing MUTCD



M3-2 12" x 6"
D11-1 24" x 18"
M6-3 12" x 9"



D11-1 24" x 18"
M6-3 12" x 9"

Current US Bike Route



M3-4 12" x 6"
M1-9 18" x 24"
M6-3 12" x 9"



G11 12" x 18"

Current State Bike Route



M3-1 12" x 6"
M1-8 12" x 18"
M6-3 12" x 9"



M1-8a 12" x 18"
M6-1 12" x 9"



M1-8 12" x 18"
M6-1 12" x 9"

Suggested Route Markers Based on Bicycle and Rider Symbol Sign: Integrated Panel System with Arrow and Cardinal Direction



24" x 24"
18" x 18"
12" x 12"



18" x 28"



18" x 27"
12" x 18"



18" x 27"
12" x 18"



18" x 36"
12" x 24"



18" x 27"
12" x 18"



24" x 36"
18" x 27"
12" x 18"



18" x 36"



18" x 36"
12" x 24"



18" x 36"
12" x 24"

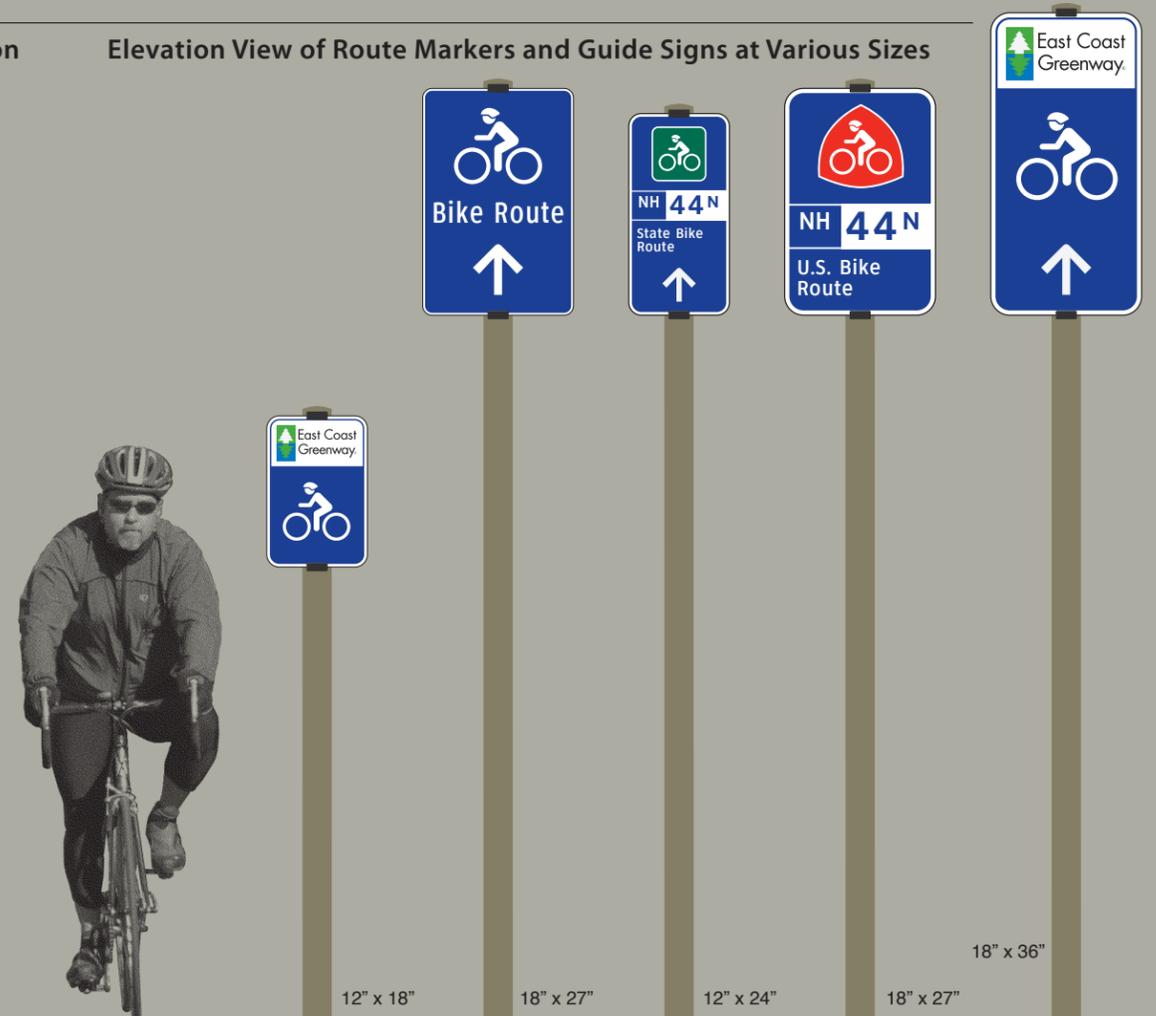


18" x 45"
12" x 30"



18" x 36"
12" x 24"

Elevation View of Route Markers and Guide Signs at Various Sizes



12" x 18"

18" x 27"

12" x 24"

18" x 27"

18" x 36"

Guide Signs: Destination Information for Designated Routes

Current Portland, OR/ODOT



Current MNDOT



Current NYC



24" x 36"

Current MUTCD: Guide Signs for Bicycle Facilities (Figure 9B-4), and Current Chicago DOT



D1-1b



D1-2b



D1-3b



D1-1c



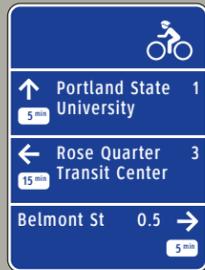
D1-2c



D1-3c

Suggested Route Guide Sign Panel Developed Based on Review of Directional Signing for Cyclists Used in Various Cities

Elevation View of Route Markers and Guide Signs at Various Sizes



24" x 32"
18" x 24"
12" x 16"



24" x 32"
18" x 24"
12" x 16"



24" x 32"
18" x 24"
12" x 16"



24" x 32"
18" x 24"
12" x 16"



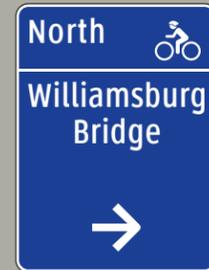
24" x 32"
18" x 24"
12" x 16"



24" x 24"
18" x 18"
12" x 12"



24" x 20"
18" x 15"
12" x 10"



24" x 32"
18" x 24"
12" x 16"



24" x 32"
18" x 24"
12" x 16"



24" x 32"
18" x 24"
12" x 16"



24" x 16"
18" x 12"
12" x 8"



24" x 16"
18" x 12"
12" x 8"



24" x 20"
18" x 15"
12" x 10"



12" x 16"



18" x 24"



24" x 32"



24" x 32"

A National and Regional Web: A System of Route Markers and Guide Signs

Identification

U.S. Route



State Route



Local Route



Sponsored Route

Guidance



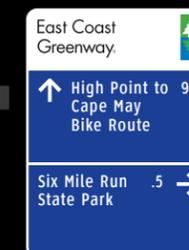
U.S. Route



State Route



Local Route



Sponsored Route

U.S. Route Shield with Number



A = 30.3%
B = 29.1%
C = 40.6%

Identification: State Bike Route-Existing (New York State)



Regulatory: Urban Lane Identification



Guidance: Portland Case Study



Guidance with Cardinal Direction



Guidance with Greenway Identification



Regulatory Signs: Panels for Route Identification

Existing MUTCD: Route Identification (Regulatory)



R3-17
30" x 24"



R3-17aP
30" x 12"



R3-17bP
30" x 12"



Not in MUTCD
(NYC)



R8-3a
18" x 18"

Suggested Route Identification (Regulatory)



30" x 30" Legend: 4"
24" x 24" Legend: 3.2"



30" x 30" Legend: 4"
24" x 24" Legend: 3.2"



30" x 32"
Legend: 3.5"



30" x 32"
Upper Legend: 4"
Lower Legend: 1.5"

Bike Path

Bike Route

Lane Ends

Lane Ahead

Bike Path



Bike Route



Narrow Profile Panel 37% Smaller, Same Size Graphics



18" x 28"
Legend: 3.5"



18" x 28"
Legend: 3.5"



18" x 36"
Legend: 3.5"



18" x 48"
Legend: 3"



12" x 32"
Legend: 2"

Bike Path

Bike Route

Lane Ends

Lane Ahead

Bike Path



Bike Route



* Suggested, Not in MUTCD, Use of red panel based on the concept of YIELD with message grouped or "chunked."

Regulatory Signs: Panels for Qualifying Use of Lanes and Paths

Existing: Regulatory Signs



Not in MUTCD (NYC)



Not in MUTCD (NYC)



Not in MUTCD (MNDOT)



Not in MUTCD (MNDOT)



Not in MUTCD (MNDOT)



Not in MUTCD (NYC)



R4-11
30" x 30"



Not in MUTCD (NYC)

Suggested Lane Regulation Panels



30" x 30"
Legend: 3.5"
"Shoulder Lane" Legend: 2.5"

Right Lane

Left Lane

Only



30" x 36"
Legend: 3.5"

Only



30" x 30"
Legend: 4"



30" x 48"
Legend: 4"

Bike Path

Bike Route



18" x 48"
Legend: 3.5"

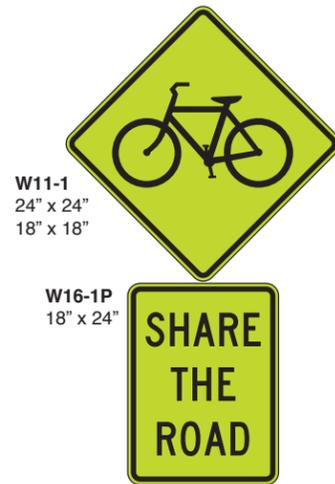
* Suggested, Not in MUTCD, Use of red panel based on the concept of YIELD with message grouped or "chunked."

Regulatory Signs: Shared Use and Lane Management for On-road Bikeways

Existing



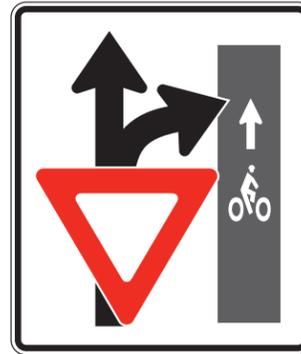
Not in MUTCD (NYC)



W11-1
24" x 24"
18" x 18"

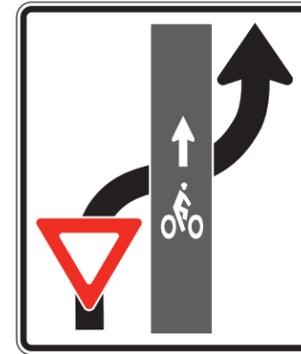
W16-1P
18" x 24"

Recommendations below do not assume replacement of updated W11-1 & W16-1P if applicable. Recommendation provides an alternative that completes the thought relative to both motorist and cyclist and uses the visual language proposed for a systems approach.



Not in MUTCD (Portland Oregon)

36" x 42"



Not in MUTCD (Portland Oregon)

36" x 42"

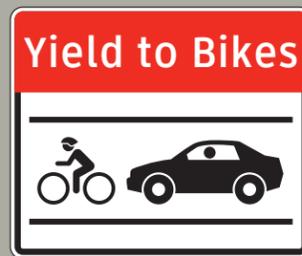


R10-6
24" x 36"

Suggested Regulatory Signs For Lane Management as Used in Portland, Oregon and Other Cities



30" x 30" Legend: 3.5" 36" x 36" Legend: 4"



36" x 30" Legend: 3.5"



Concept: Used in conjunction with pavement markings of same design.

See Attachment B page 2
24" x 30"
Legend: 2.5"



18" x 24" Legend: 1.75"



18" x 24" Legend: 1.75"



36" x 36" Legend: 3.5"



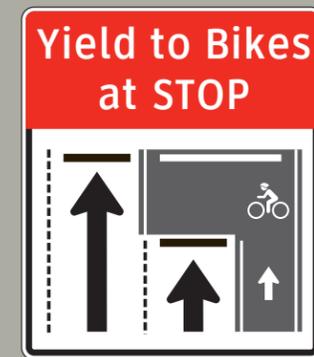
36" x 36" Legend: 3.5"



24" x 36" Legend: 3.5"



30" X 24" Legend: 3.5"



36" x 42" Legend: 3.5"

Right Lane

Bike Route

Shared Lane

Shared Road

Shared Lane

Regulatory Signs: Panels to Identify Right-of-Way and Turning Conditions for Motorists

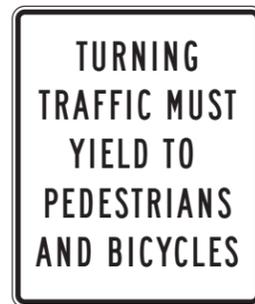
Existing MUTCD: Regulatory Signs



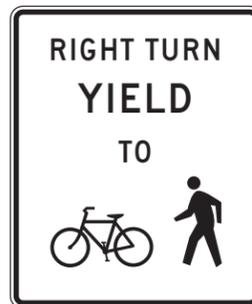
R4-4
36" x 30"



Not in MUTCD
(NYC)



Not in MUTCD
(Portland Oregon)



Not in MUTCD
(NYC)



Not in MUTCD
(NYC)



R3-7R
30" x 30"



Not in MUTCD
(Portland Oregon)



Suggested Regulatory Signs Based on Review of Bike Lane Signage Used in Portland, Oregon



36" x 30"
Legend: 3.5"



36" x 36"
Legend: 3.5"



36" x 36"
Legend: 4"



30" x 30"
Legend: 3.5"



30" x 24"
Legend: 3.5"



30" x 24"
Legend: 3.5"



Alternate
36" x 30"
Legend: 3.5"



24" x 30"
Legend: 3.5"

* Suggested, Not in MUTCD, Use of red panel based on the concept of YIELD with message grouped or "chunked."

Trail Signs: Regulatory

Existing MUTCD: Signs Placed on Shared-Use Path



R4-1a
12" x 18"
18" x 24"



R4-2
12" x 18"
18" x 24"



R4-3
12" x 18"
18" x 24"



R4-7
18" x 24"



R5-3
24" x 24"



R9-7
12" x 18"



R1-1
18" x 18"
30" x 30"



R10-24
9" x 15"



R10-26
9" x 15"



D10-1
6" x 12"
10" x 18"



D10-1a
6" x 18"
10" x 27"



D10-2
6" x 18"
10" x 27"



D10-2a
6" x 24"
10" x 36"



D10-3
6" x 24"
10" x 36"



D10-3a
6" x 30"
10" x 48"

Existing MUTCD Distance Markers on Highways as Used for Motorists

Suggested Signs for Placement on Shared-Use Path (Elective)



12" x 12"
Legend: 2"



12" x 12"
Legend: 2"



12" x 12"
Legend: 1.5"



12" x 12"



18" x 18"
Legend: 2"



12" x 12"
Upper Legend: 1.5"
Lower Legend: 1"



24" x 24" Legend: 8"
18" x 18" Legend: 6"



8" x 12"
Upper Legend: .6875"
Lower Legend: .5"



8" x 12"
Upper Legend: .6875"
Lower Legend: .5"



18" x 24"
STOP Legend: 6"
Upper Legend: .875"
Lower Legend: .625"



6" x 9"
Legend: 1"



6" x 9"
Legend: 1"



6" x 9"
Legend: 1"

Recommended Distance Markers on Shared-Use Bike Routes



12" x 18" Legend: 1.25" Number: 3"
6" x 9" Legend: .625" Number: 1.5"



12" x 18" Legend: 1.25" Number: 3"
6" x 9" Legend: .625" Number: 1.5"



12" x 18" Legend: 1.25" Number: 3"
6" x 9" Legend: .625" Number: 1.5"



12" x 18" Legend: 1.25" Number: 3"
6" x 9" Legend: .625" Number: 1.5"



12" x 18" Legend: 1.25" Number: 3"
6" x 9" Legend: .625" Number: 1.5"

Additional Signs



12" x 12" Legend: 1"
18" x 18" Legend: 1.5"



12" x 12" Legend: 1"
18" x 18" Legend: 1.5"



12" x 12" Legend: .75"
18" x 18" Legend: 1.125"



12" x 12" Legend: .75"
18" x 18" Legend: 1.125"



12" x 12" Legend: .75"
18" x 18" Legend: 1.125"



12" x 18"
Upper Legend: 3"
Lower Legend: 1"

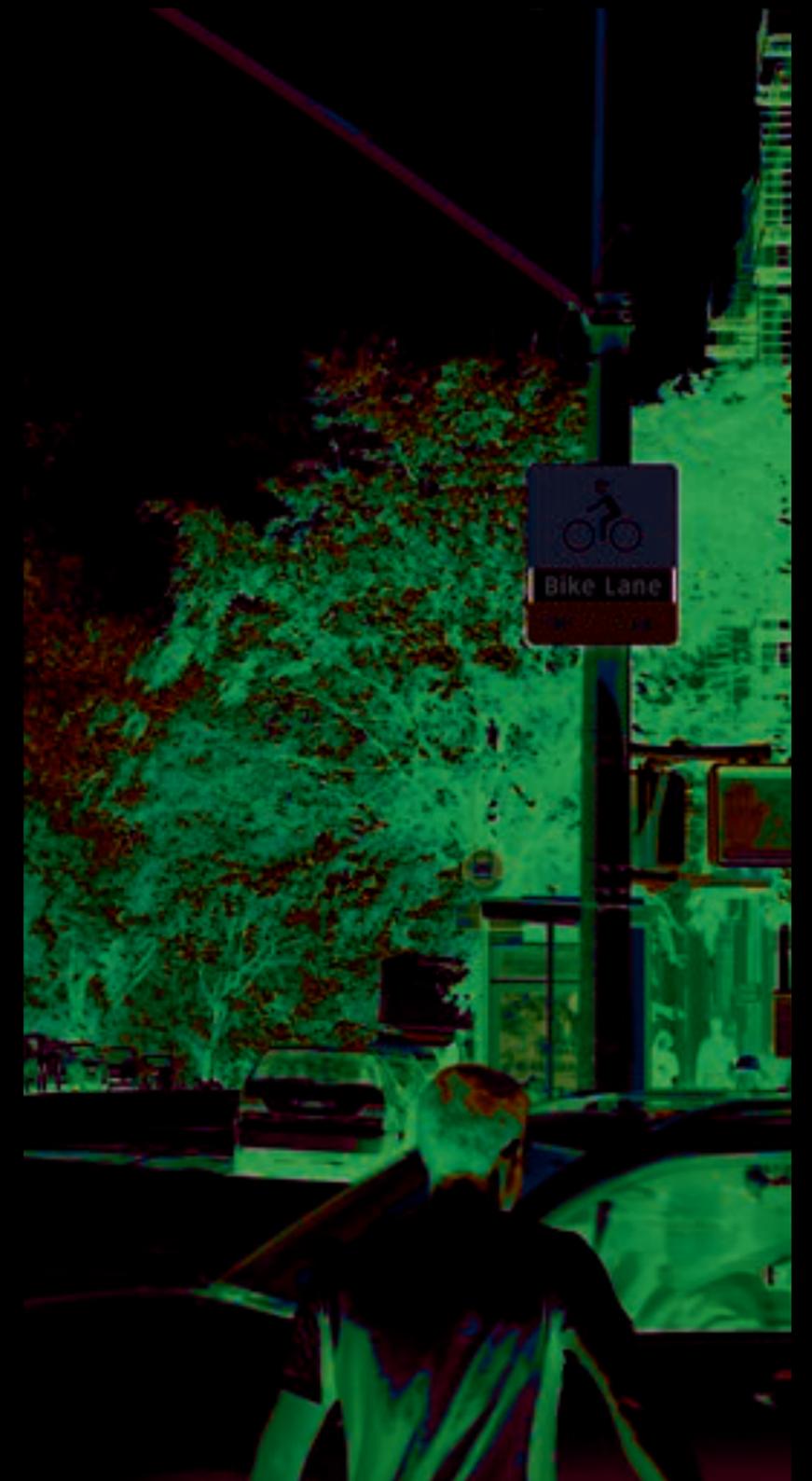


24" x 32"
Legend: 1.5"



8" x 12"
Upper Legend: .6875"
Lower Legend: .5"

Regulatory: Urban Lane Identification



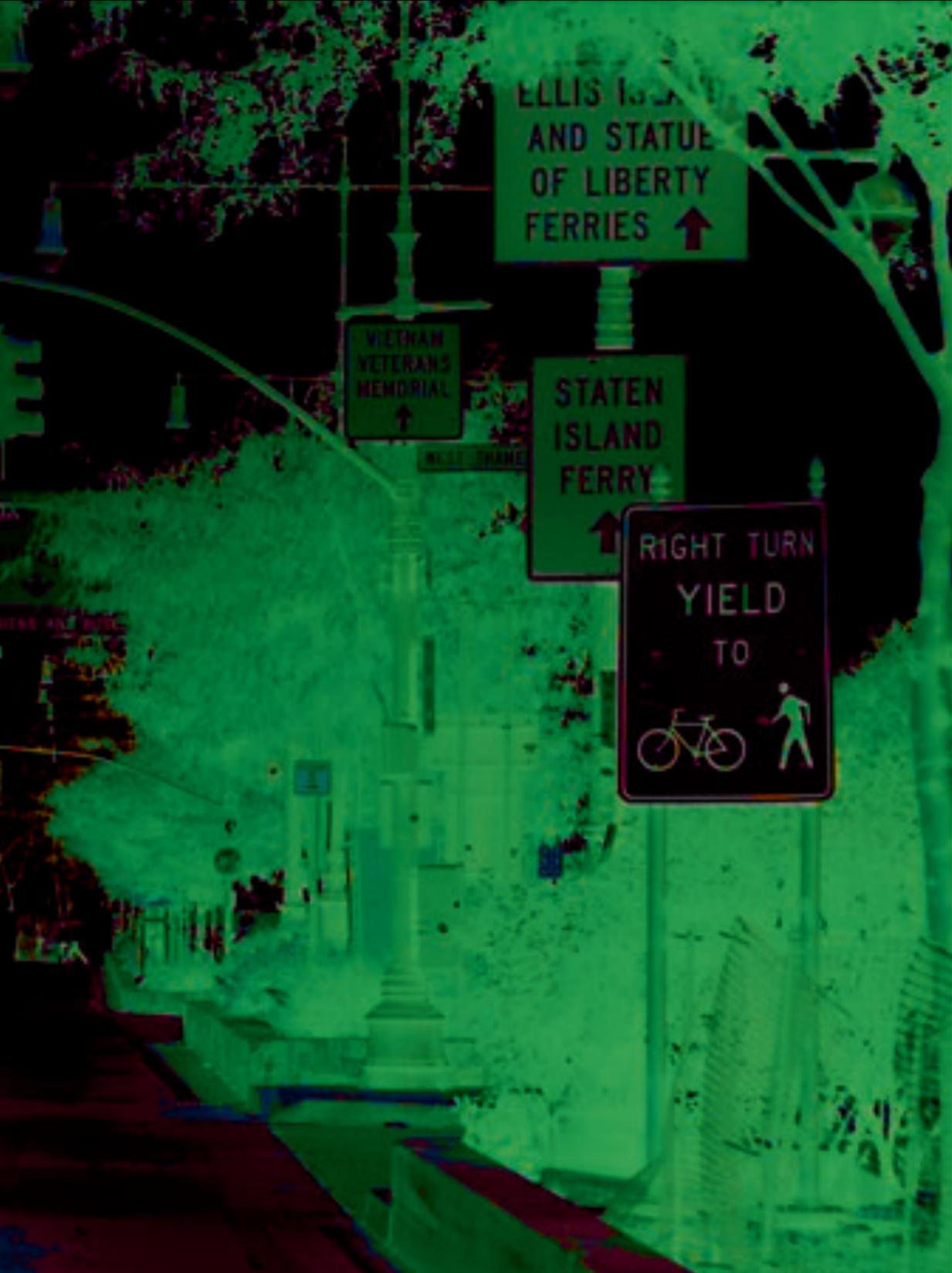
Regulation: Urban Lane Management



Regulation: Vehicular Turning Management



Regulation: Vehicular Turning Management



Regulation: Shared Use



Regulatory: Lane Identification (Portland)



Process

- Field studies of *existing conditions*
- *Design, analysis* and *refinement* with respect to MUTCD
- Human factors *research on animate symbols*
- *Simulate* relative to specific locations and applications
- *Receive comments* from our Working Group



Collective Scope

250

Cities with populations
100,000 to 8,500,000

18,750

Cities, town and villages
population 100 to 100,000

Every state and all large cities have cycling coordinators within their DOTs

19,000

Miles of rail trails and growing

U.S. Bike Route System
AASHTO / Adventure Cycling



Working Group for Signing Bicycle Facilities

The Alliance for Biking & Walking

The Adventure Cycling Association

Alta Planning + Design

American Trails

Association of Pedestrian and Bicycle Professionals

Bikes Belong Foundation

Corps of Engineers

The East Coast Greenway Alliance

The League of American Bicyclists

Meeker & Associates, Inc.

The Rails to Trails Conservancy

The Society for Environmental Graphic Design

Toole Design Group

Penn State University: The Larson Institute

Portland Bureau of Transportation

Virginia Tech: Grado Dept. of Industrial Engineering

NACTO Member Cities



★ NACTO Member Cities

- Atlanta
- Baltimore
- Boston
- Chicago
- Detroit
- Houston
- Los Angeles
- Minneapolis
- New York
- Philadelphia
- Phoenix
- Portland
- San Francisco
- Seattle
- Washington, D.C.

Focused lab studies comparing component parts

- 1) Color: *blue or green*, conspicuity, brightness, visual thread
- 2) Regulatory understanding: *black or blue*
- 3) Mixed case *readability* for regulatory: *legibility, understanding*
- 4) *Lane management* concepts
- 5) *Symbol refinement* for various application
- 6) Comparative analysis of *blaze and guide panel system*

What we have learned. Where do we go from here?

- Process has been ***well received***: planners, engineers, cities
- ***Designed as a system***, not disparate parts. Aggregate statement, not individual signs
- The ***NACTO support*** has been ***critically important*** (small community)
- ***Research drives the next steps*** – but only small studies to sell leadership
- ***Cities*** will ***carry the torch*** on large (lineal) studies if concepts validated
- ***Developing strategies*** to advance program; ***capture the opportunity***
- **Cycling has come into its own**, the players are energized, cities want the system to work, and they have pride in what they are doing.

Thank You