

Make your town safe for walking and bicycling



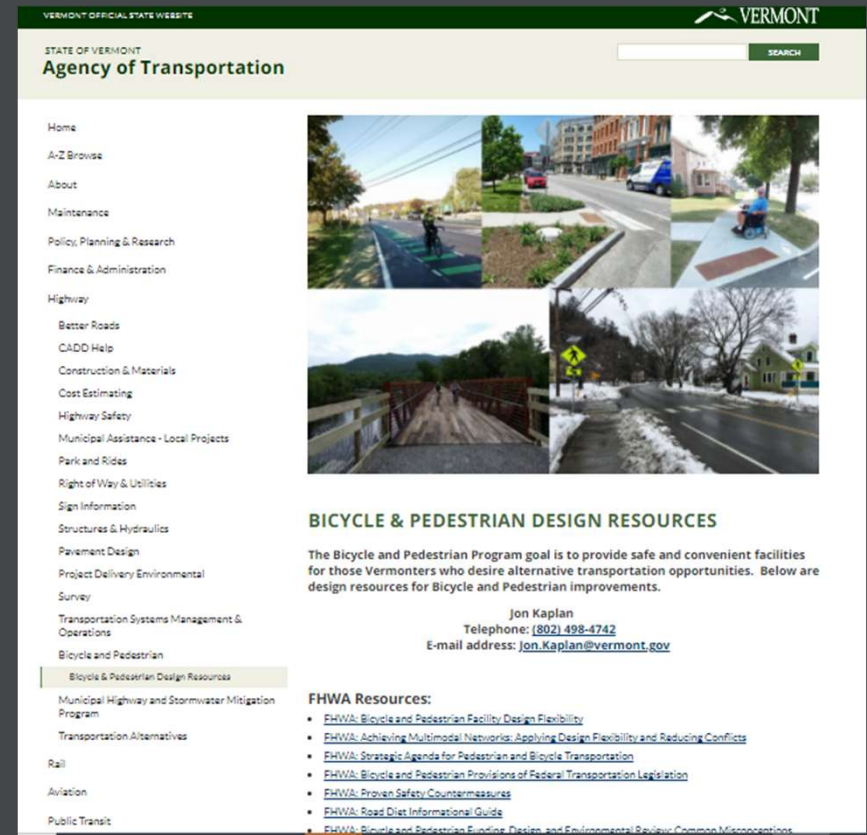
Vermont Local Roads – 2/3/21

Agenda

- An overview of design resources for street improvements to result in safer bicycling and walking.
- Sidewalk design basics including a primer on how to make them accessible to people with disabilities.
- What does Complete Streets really mean and how can you take steps to “complete” local roads.
- Top 10 low-cost improvements to make streets safe for walking and bicycling.

Overview of Design Resources Web page

- VTrans Bike/Ped Design Resources page is at <https://vtrans.vermont.gov/highway/local-projects/bike-ped/resources>



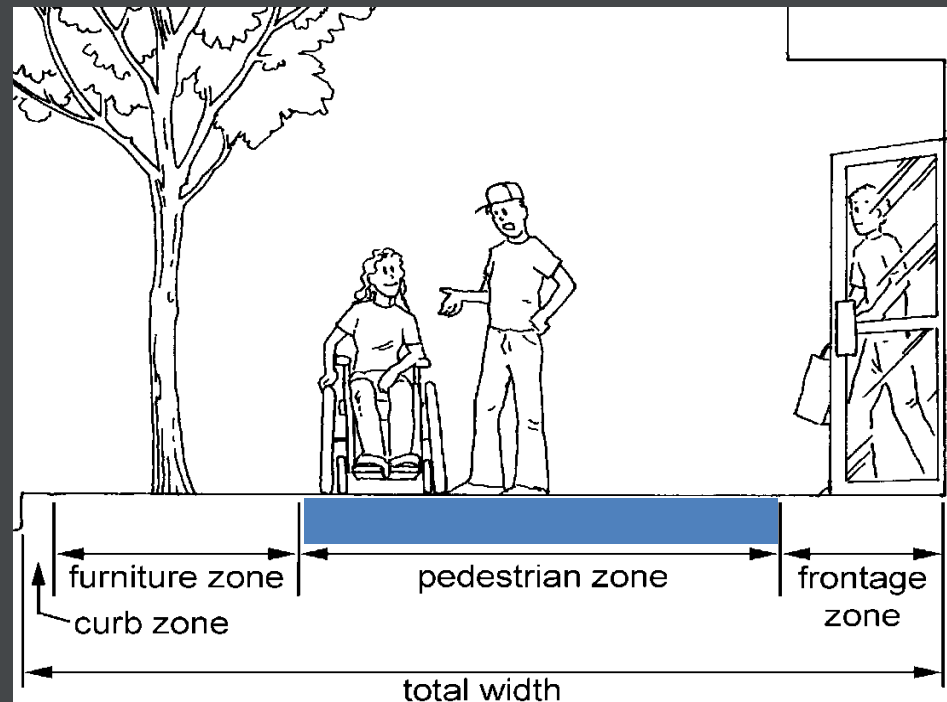
The screenshot displays the Vermont Agency of Transportation website. The header includes the Vermont state logo and the text "VERMONT OFFICIAL STATE WEBSITE" and "STATE OF VERMONT Agency of Transportation". A search bar is located in the top right corner. The left sidebar contains a navigation menu with the following items: Home, A-Z Browse, About, Maintenance, Policy, Planning & Research, Finance & Administration, Highway, Better Roads, CADD Help, Construction & Materials, Cost Estimating, Highway Safety, Municipal Assistance - Local Projects, Park and Rides, Rights of Way & Utilities, Sign Information, Structures & Hydraulics, Pavement Design, Project Delivery/Environmental, Survey, Transportation Systems Management & Operations, Bicycle and Pedestrian, and Public Transit. The "Bicycle and Pedestrian" link is highlighted. The main content area features a collage of images showing various transportation scenes: a person on a bicycle on a path, a person on a wheelchair on a path, a person on a bicycle on a road, a person on a wheelchair on a road, a person on a bicycle on a road, and a person on a wheelchair on a road. Below the images is the section "BICYCLE & PEDESTRIAN DESIGN RESOURCES" with the text: "The Bicycle and Pedestrian Program goal is to provide safe and convenient facilities for those Vermonters who desire alternative transportation opportunities. Below are design resources for Bicycle and Pedestrian improvements." Contact information for Jon Kaplan is provided: Telephone: (802) 498-4742, E-mail address: Jon.Kaplan@vermont.gov. Below this is the "FHWA Resources:" section with a list of links: FHWA: Bicycle and Pedestrian Facility Design Flexibility, FHWA: Achieving Multimodal Networks: Applying Design Flexibility and Reducing Conflicts, FHWA: Strategic Agenda for Pedestrian and Bicycle Transportation, FHWA: Bicycle and Pedestrian Provisions of Federal Transportation Legislation, FHWA: Proven Safety Countermeasures, FHWA: Road Diet Informational Guide, and FHWA: Bicycle and Pedestrian Funding, Design, and Environmental Review: Common Misconceptions.

Designing Pedestrian Facilities for Accessibility

Sidewalk Design

Pedestrian Zone

- Area reserved for pedestrian travel
- Includes “pedestrian access route” (PAR)
- Must be free of obstacles and protruding objects
- Width varies based on pedestrian volume



Zone System Summary - Residential



Street

Parking

Curb Zone

Green Strip

Pedestrian Zone

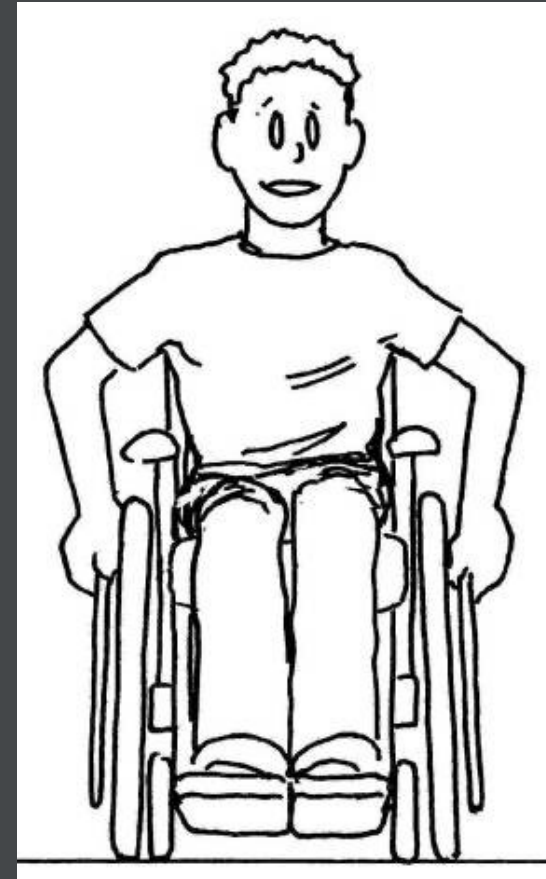
Frontage Zone

Zone System Summary - Commercial



Sidewalk Width Minimums

- 5x5 ft. passing area required every 200 ft. (ADAAG and PROWAG) results in min 5 ft. wide pedestrian zone
- 4 ft. minimum pedestrian access route width in right-of-way (PROWAG)
- 3 ft. minimum accessible route width on sites (ADAAG)





4 ft. for user with
dog guide or sighted
guide



5 ft. for turning
a wheelchair

Obstacles in Pedestrian Zone

Three alternative ways to provide access:

1. Plan/design to limit objects in pedestrian zone
2. Eliminate or move objects
(Poles, utility boxes, signal cabinets)
3. Provide access route around objects





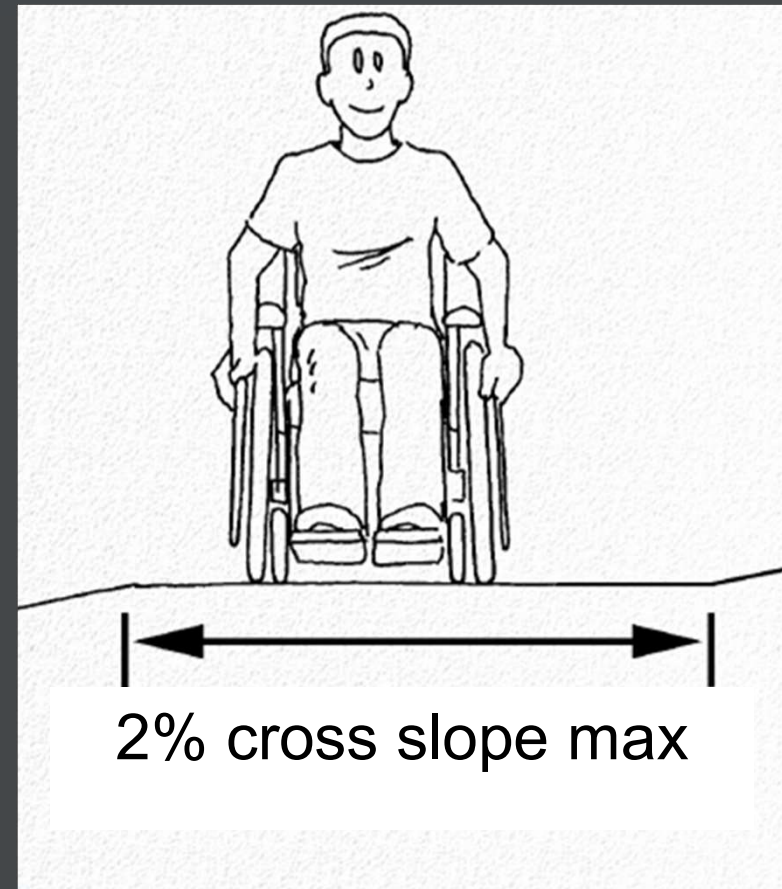
Sidewalk alignment
adjusted around tree

Running Slope Guidelines

- **R302.5.1 Within Street or Highway Right-of-Way.** Except as provided in R302.5.3, where pedestrian access routes are contained within a street or highway right-of-way, the grade of pedestrian access routes **shall not exceed the general grade established for the adjacent street or highway.**
- **R302.5.2 Not Within Street or Highway Right-of-Way.** Where pedestrian access routes are not contained within a street or highway right-of-way, the grade of pedestrian access **routes shall be 5 percent maximum (but...)**

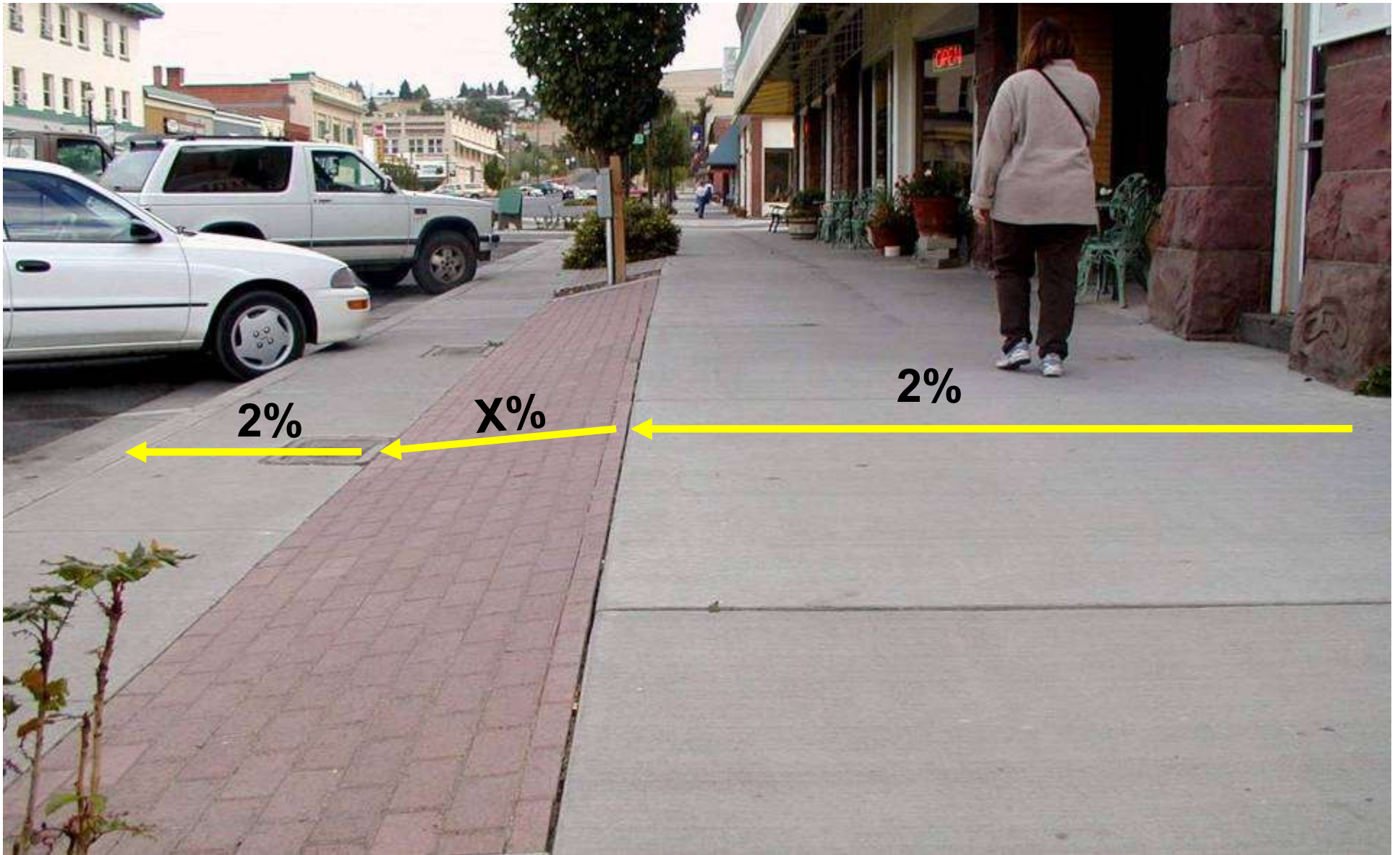
Cross Slope Guidelines

- 0% best for wheelchair users
- Some slope needed for drainage
- Max cross slope 2%
- “Level” means 2% max





Sidewalk splits, ramps up to building doorways -
Vergennes

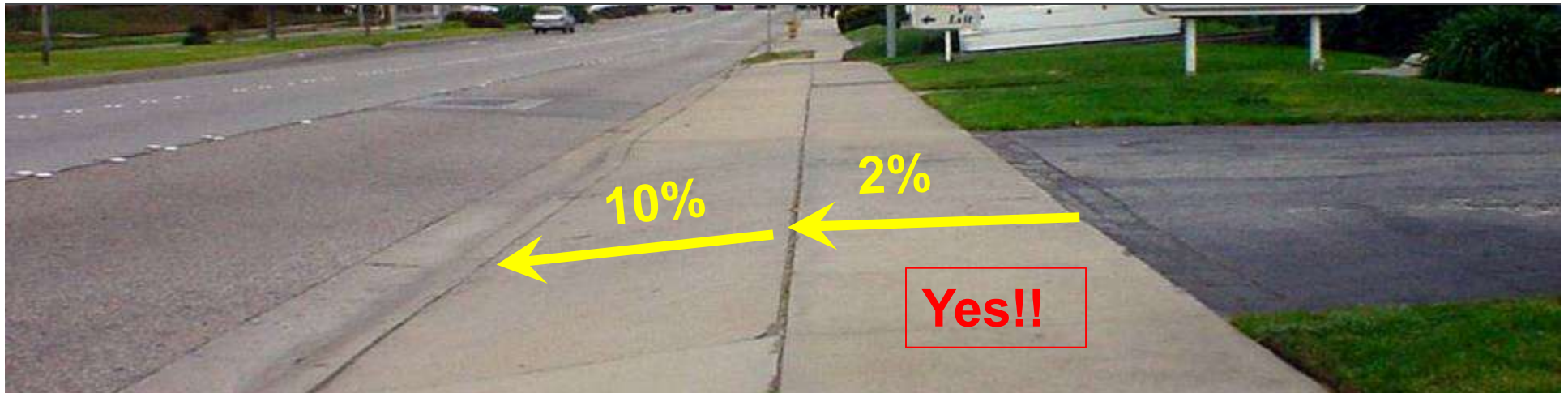


Elevation change occurs in furniture zone

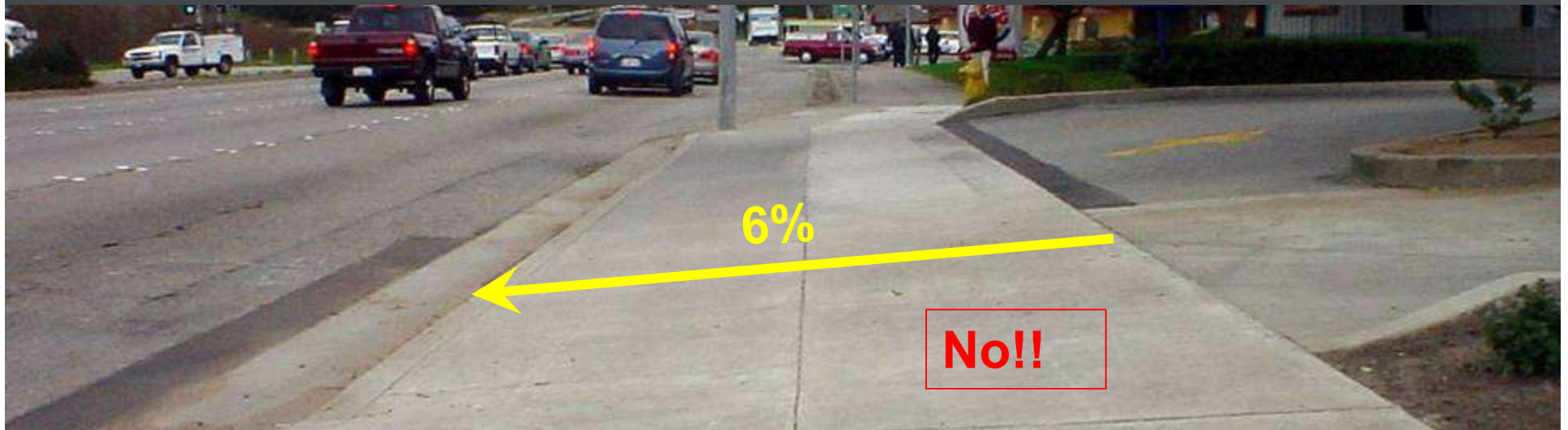
Design Solutions for Driveways

- Accessible driveway requires level pedestrian access route:
 - Cross slope: 2% maximum
 - Width: 4 ft. minimum (PROWAG)
- Factors to consider when choosing accessible driveway option:
 - Sidewalk width
 - Planter strip width
 - Curb height
 - Available right-of-way





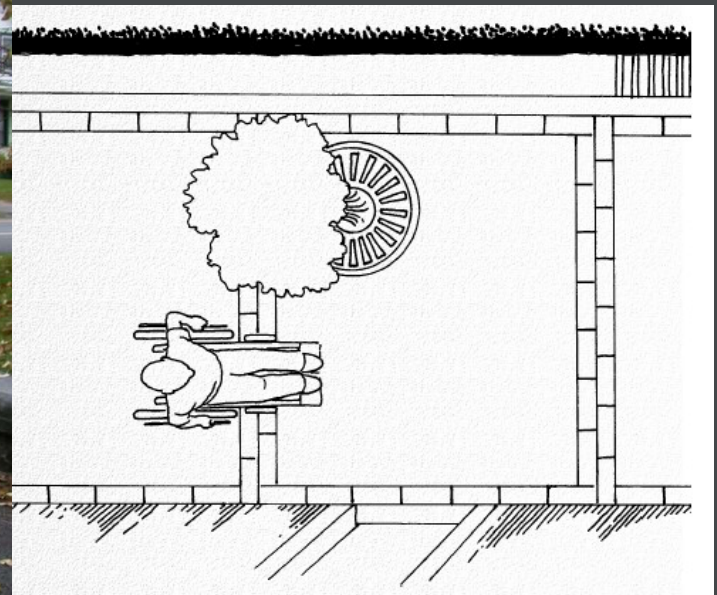
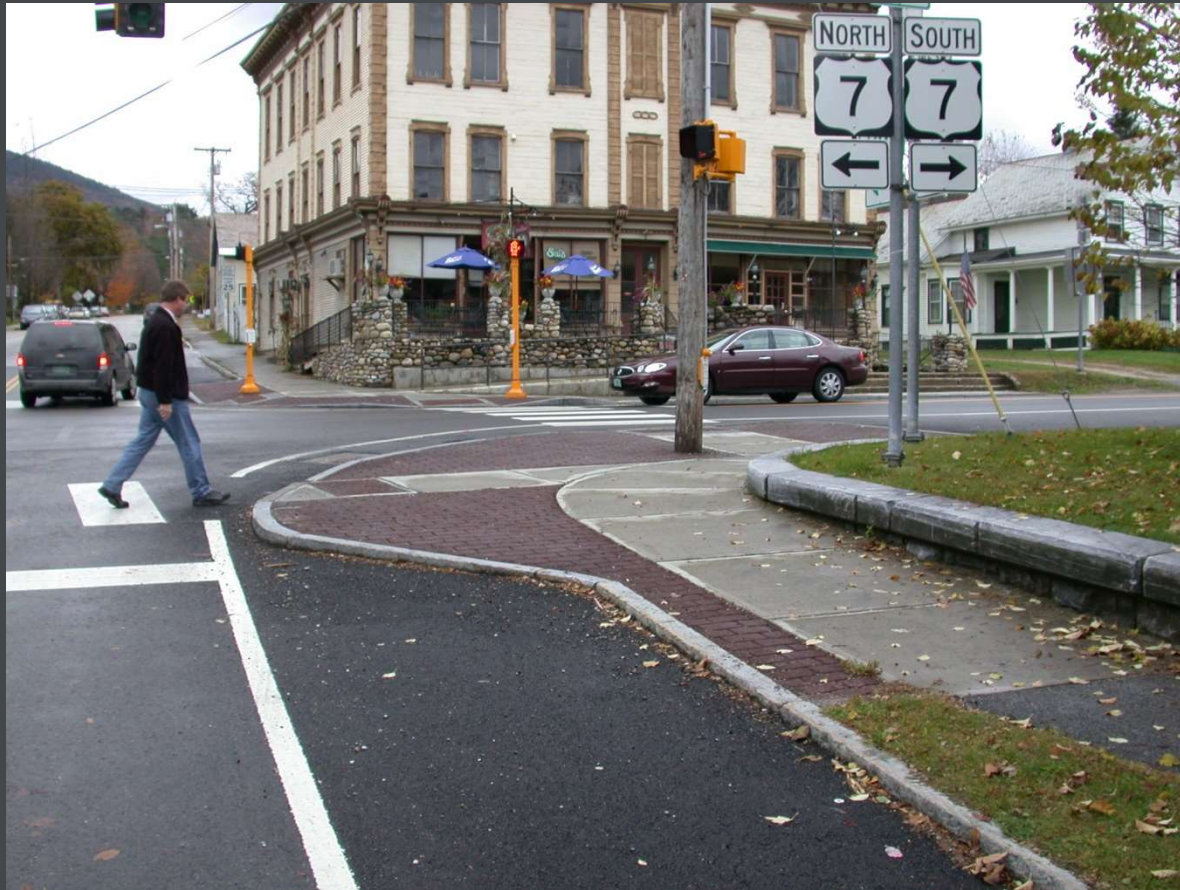
Maintaining cross-slope across driveways



Single grade across driveway results in inaccessible cross-slope

Solutions for Decorative Surfaces

- Concrete sidewalks with brick trim
- Colored asphalt or concrete



Curb Ramp Width

- PROWAG minimum: 4 feet
- Wider ramps are better: full crosswalk or sidewalk width avoids need to jockey for position or space
- Reduce concrete area by using returned curbs



Detectable Warning Requirements

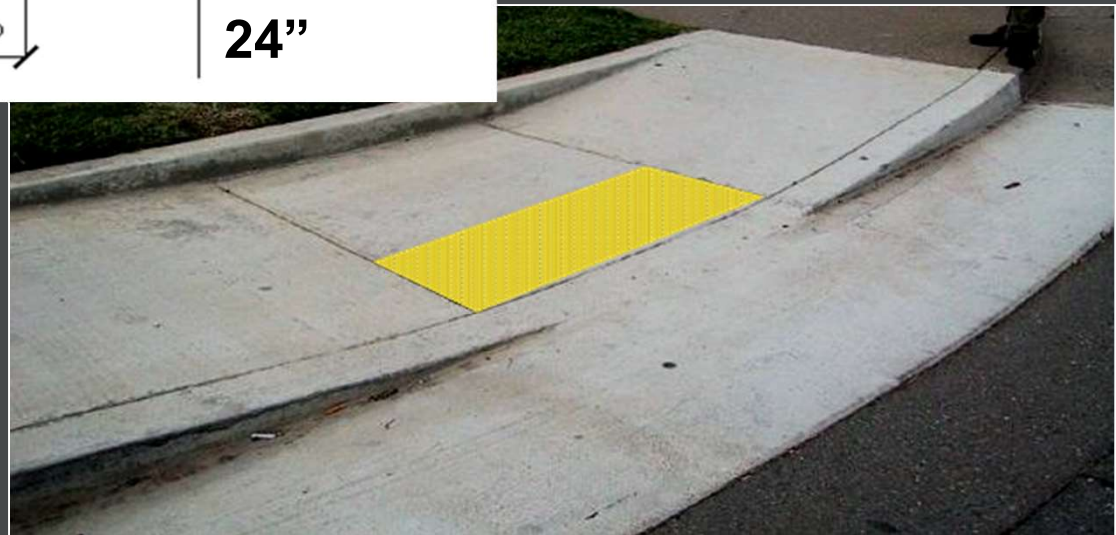
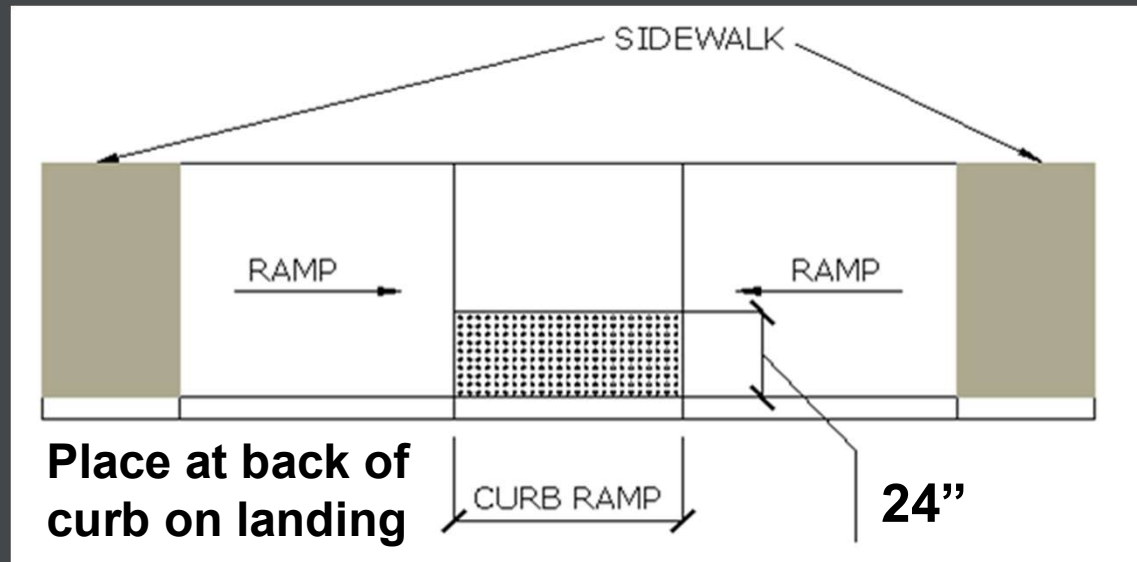
- Wherever a walkway crosses a vehicular way (except unsignalized driveways)
 - Intersections
 - Other pedestrian crossings
 - rail crossings
- Transit platforms



Det. Warning placement



DW Placement at Parallel Ramp



ADA Summary

- Sidewalk width – 5 ft (can reduce to 4 ft for up to 200 ft)
- No obstacles in, or protruding into, the sidewalk
- Smooth, stable surface – no textures within walkway
- Cross-slope – 2% max., especially at driveways
- Running slope – 5% max., but can be the same as the street
- Curb ramps – 8.33% (1:12) max. slope and need detectable warning at streets

Understanding and implementing Complete Streets

What are Complete Streets?



Complete Streets are streets for everyone, no matter who they are or how they travel.

Some streets are unsafe for walking



- No sidewalks
- Too dangerous to cross on foot

Some streets are unsafe for bicycling



- No space on the roadway

Complete Streets:

Is a high-level policy direction

Changes the everyday decision-making processes and systems

Represents an incremental approach

Has long-term results



Complete Streets is not:

- One “special” street project
- A design prescription
- A mandate for immediate retrofit
- A silver bullet; other issues must be addressed:
 - Land use (proximity, mixed-use)
 - Environmental concerns
 - Transportation Demand Management

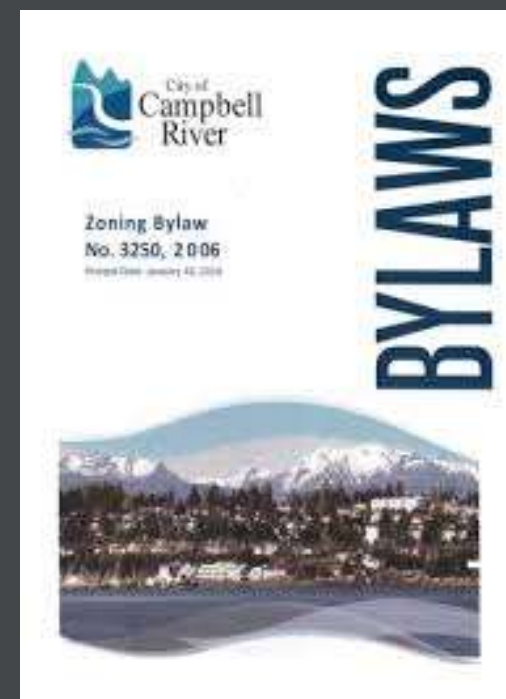
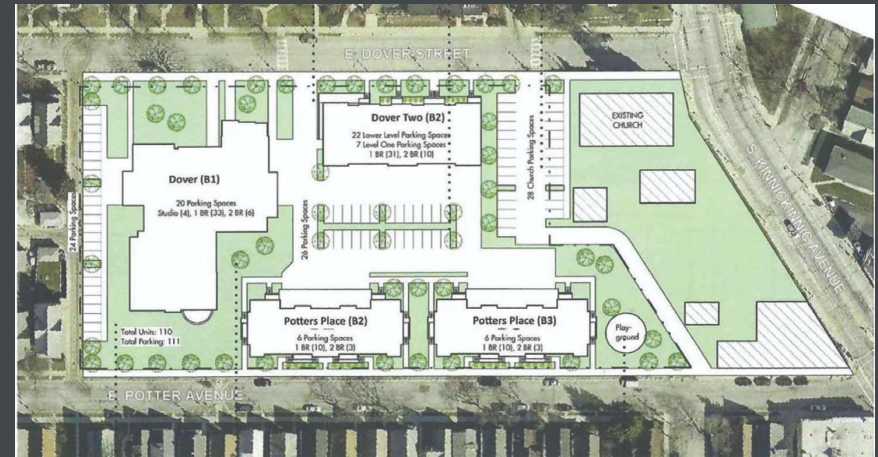
Look for opportunities to make incremental improvements

- Water and sewer line work
- Repaving
- Line striping
- Redevelopment
- Bridge work
- New development



May require developers to provide infrastructure

- Sidewalk connections
- Bike parking
- Pedestrian access within site
- Transit stops

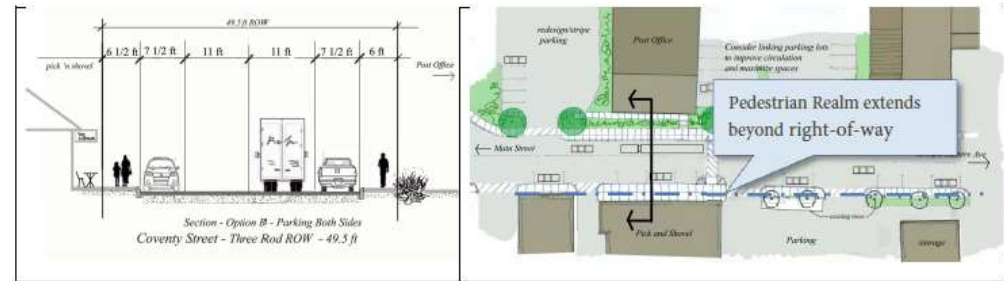


How to create Complete Streets?

Complete Streets a guide for Vermont communities



Complete Streets: A Guide for Vermont Communities



Complete Streets: A Guide for Vermont Communities



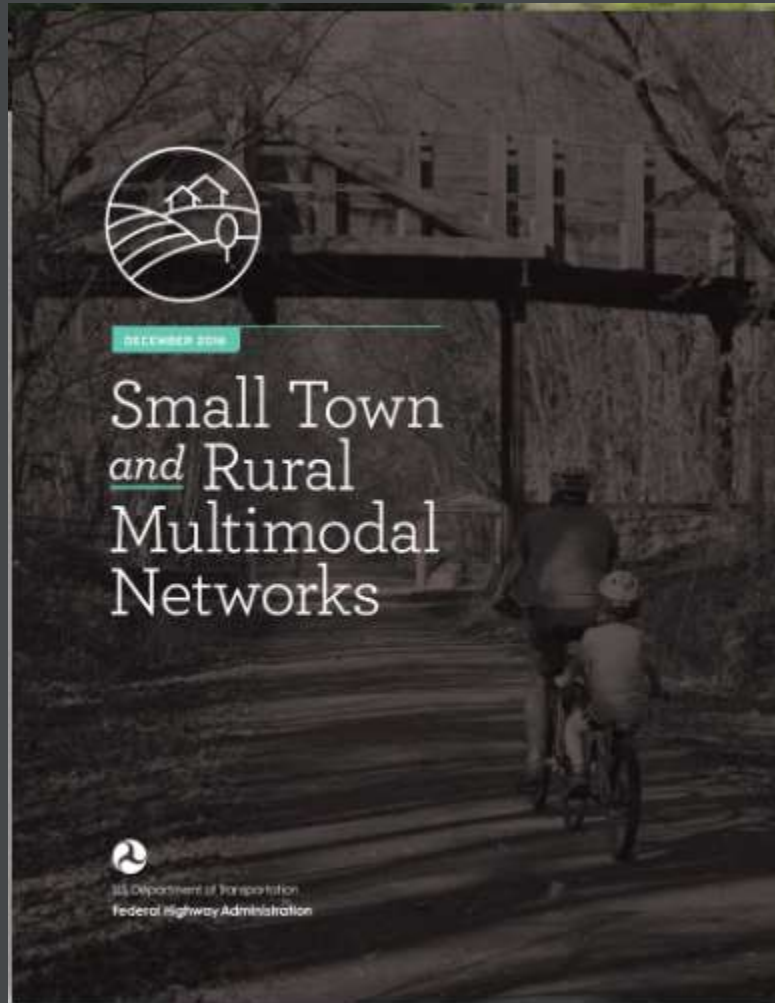
Cycletrack in Montreal



Bicycle Lane in Montpelier

VT Guide funded by VT Department of Health

How to create Complete Streets?



FHWA "STAR" Guide

Signs

Pedestrian Warning Sign (W11-2) paired with an "ON ROADWAY" legend plaque may be used to indicate to drivers to expect pedestrians within the paved road surface.



RB-1



Intersections

Configure pedestrian lanes with treatments to provide for a safe, clear, and accessible passage at street crossings.

- Define the corner at intersections with a double solid white line to reduce motor vehicle encroachment into the pedestrian areas. Use flexible delineators where a more robust treatment is desired.

- Place stop lines or yield lines outside of the crosswalk area.
- Crosswalks may be marked to clearly delineate the crossing paths of pedestrians.
- Provide detectable warnings in advance crosswalks, even in the absence of a curb ramp transition.

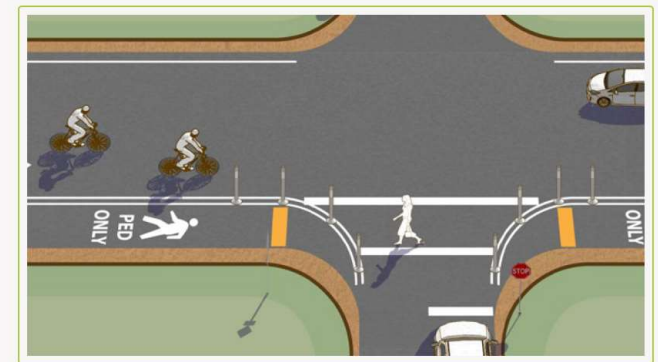
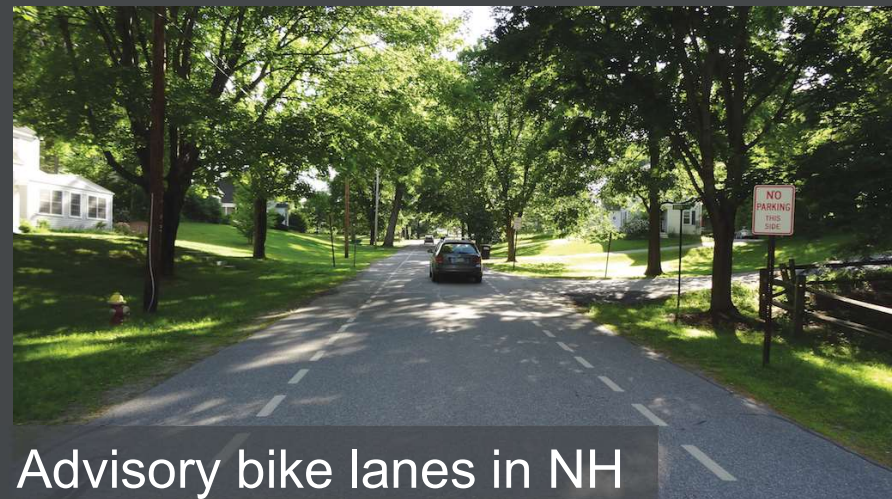


Figure 3-14. Where clarity of street crossings for persons with vision impairments are a concern, detectable warning strips may be used in advance of the intersection area. This transition can indicate a crosswalk, or a transition out of the pedestrian



Advisory bike lanes in NH

VTrans Bike/Ped Grant Program

- **3 Categories of grants**
 - Large-scale construction – Federal Aid - 80% Federal/20% Local
 - Scoping (feasibility study) - 80% Federal/20% Local
 - Small-scale construction – State funds – 50% State/50% Local
- **Timeline**
 - **April** - Application materials available
 - **June** – Applications due
 - **August** – Project selection complete
 - **Fall 2021** – Grant Agreement
 - **Early 2022** – Start project work

Small-scale Grants

- Eligible projects include:
 - crosswalk enhancements
 - bicycle lane markings/signs
 - edgeline markings
 - addressing ADA compliance issues
 - critical small gaps in sidewalk networks

Benefits of Pop-up Projects

- Try out a design before making it permanent
- Quick implementation
- Can be seasonal
- Low Cost
- Gather data
- Public input



Pop-up Projects in VT



- Center St. Rutland



Top 10 (or so) Low Cost Ideas

Narrow Travel Lanes

- When roads are re-striped, mark travel lanes at 10 or 11 feet to gain shoulder width. Research shows that 10 or 11 foot lanes are the safest width (for all users) on roads posted at 40 MPH or less.
- Cost - \$0 (assuming that an edgeline would be marked anyway)

Moving the edgeline in creates more shoulder for other uses



Mark shoulders as bike lanes

- Mark shoulders as bike lanes where appropriate – 4 foot minimum width, 5 foot adjacent to parking
- Cost - \$65 - \$100 per bike symbol. Approximately 10 per mile
- 35% Reduction in crashes



Maintain existing shoulders

- Sweep shoulders so they are useable



Gravel forces bicyclist into travel lane

Enhance Sign Visibility

- Use fluorescent yellow-green (FYG) for pedestrian warning and crossing signs (required for School-related signs)
- Minimal added cost



Enhance Sign Visibility

- Add appropriate color strip to sign posts to enhance visibility (same as sign background)
- Cost - \$25 per sign post treated



Enhance Sign Visibility

- Make sure signs are visible by clearing brush, tree limbs, etc. that may be obscuring them



Provide Crosswalks

- Mark crosswalks using the block pattern – highest visibility
- Cost - \$500 for typical two lane crossing
- 40% reduction in pedestrian crashes



Make Crosswalks Visible

- Locate parking relative to crosswalks, driveways and intersections to provide clear sight lines. State statute prohibits parking within 20 feet of crosswalks at intersections. This is good guidance for mid-block crosswalks.



Enhance Crosswalks

- Add an in-street pedestrian sign at existing crosswalks
- Cost –
Approximately \$300 per sign
- Need a permit to install on state highways



Enhance Crosswalks

- Provide pedestrian refuges at crossings
- Especially useful for multi-lane or excessively long crossings
- Cost - \$1500 to \$2500 depending on size
- 46% reduction in crashes



Enhance Crosswalks

- Add bulbouts to existing crosswalks to make them more visible (can do a trial with hay wattles, temporary paint or other materials)
- Benefit – Better sight lines for pedestrians and drivers. Shorter crossing distance
- Cost - \$13,000 per corner



Northfield, VT

Enhance Crosswalks

- Install Rectangular Rapid Flashing Beacons (RRFB)
- Use for vulnerable pedestrian populations or high ped volume crossings or at crossings with known compliance problems
- Cost - \$10,000 to \$15,000 per crosswalk



Provide Sidewalks

- Fill in small gaps in the sidewalk network.
- Address “goat trails” by providing sidewalks
- Cost - \$35/FT uncurbed to \$150/FT curbed



Winter Maintenance

- Have a policy about clearing sidewalks of snow in the winter – Prioritize access to schools, transit stops, public buildings
- Winter maintenance is an accessibility (ADA) issue
- Cost - varies



Provide Secure Bicycle Parking

- Provide bike racks at key locations – schools, public buildings, shopping destinations, large employers
- Covered parking for long-term locations
- Cost - \$160 per rack



THANK YOU!!

Questions?

- Contact Jon Kaplan, P.E.

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