






Complete Streets Institute: Towards Complete Streets in Michigan

Webinar Series
 September 7-September 28, 2011



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Webinar Logistics

- Webinar is being recorded
- Webinar, PDFs of presentations, and associated exercises will be made available after today’s webinar
- Type presentation-related questions to presenters in the chat box
- Questions will be pooled and held to end. We will try to get to as many as we can.
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Healthy Kids, Healthy Michigan

Mission:
 Reduce childhood obesity in Michigan through strategic policy initiatives

www.healthykidshealthymich.com



Community Policy Action Team

- Crim Fitness Foundation
- Detroit Food & Fitness Initiative
- League of Michigan Bicyclists
- Michigan Association of Planning
- Michigan Department of Community Health
- Michigan Department of Transportation
- Michigan Environmental Council
- Michigan Fitness Foundation
- Michigan Recreation and Park Association
- Michigan State Housing Development Authority
- Michigan Trails and Greenways Alliance
- Washtenaw County Public Health
- AARP
- Michigan Association of Counties
- Michigan Municipal League
- Safe Routes to School National Partnership




Why Complete Streets?

Transportation networks that include amenities such as sidewalks and bike lanes can increase the number of people who walk or bike by 30% and schools can see a 15% increase in students who walk or bike to school.

(Active Living Research, RWJF 2007)




Community design impacts physical activity levels

Project Partners

Module Overview

- 1 Introduction to Complete Streets**
 Defines Complete Streets and explains its importance, history, and benefits, as well as its relationship to other associated topics.
- 2 Stakeholder Engagement**
 Introduces the various stakeholders of Complete Streets, explains how to work through a coalition to effect policy and projects, and provides messaging and communication tools and tips.
- 3 Influencing Policy**
 Provides the tools needed to assess a community's readiness for Complete Streets policies and the steps a community would take to implement them. Defines and explains the policy-making processes, stakeholders, and Complete Streets laws.
- 4 Planning and Regulations**
 Explains policy implementation tools, such as planning processes, policies, and regulations.
- 5 Application and Design**
 Explains the design elements and various treatments/applications used to accomplish Complete Streets policy implementation (sidewalks, bike paths, transit stops, road diets, etc.) through project design.

Today's Speakers

Holly Madill
 Complete Streets Project Coordinator
 MI Department of Community Health



Norm Cox, LL.A, ASLA
 President
 The Greenway Collaborative, Inc.



Please Tell Us About Yourself

- If you are viewing the presentation as a group, please pick the most representative answer
- We will share the results when the poll has closed
- How will you will be promoting complete streets?
- Your background
- Have you attended any other Complete Street trainings?

Module 5: Design & Applications

Complete Streets Institute Training Plan

1. An Overview
2. Influencing Policy
3. Stakeholder Engagement
4. Planning & Regulations
- 5. Design & Applications**



Photo: The Greenway Collaborative, Inc.

Best practices in complete street design

Presentation Overview

- Understanding The Users
- Key Principals
- Travel Along The Roadway
- Travel Across The Roadway
- Special Cases
 - Transit
 - Roundabouts
 - Interchanges
 - Downtowns
 - Commercial Strip Development
 - Trails
 - Bike Parking



Photo: The Greenway Collaborative, Inc.

Training Objective:
 Provide a basic understanding of important complete street design elements and their application

Complete Streets in a Nutshell

A system of streets...
 “planned, designed, and constructed to provide appropriate access to all legal users in a manner that promotes safe and efficient movement of people, and goods whether by car, truck, transit, assistive device, foot or bicycle.”
 PA 135 of 2010



Photo: The Greenway Collaborative, Inc.

All users include:

- Pedestrians
- Bicyclists
- Transit users
- Motorists
- Trucks

All users include:

- Children
- Elderly
- People of various abilities

No “Typical” Bicyclist or Pedestrian




Photo: The Greenway Collaborative, Inc.

Wide Range of:

- Ages
- Education
- Skills
- Temporary and long-term physical and cognitive abilities
- Travel speeds
- Vehicle characteristics (for bicyclists and mobility assistance devices)

It is challenging to plan and design for the variety of non-motorized user types

Importance of Direct Travel Routes

- Most walking trips for personal business are about ¼ to ½ mile (5 to 10 minute walk)
- Think of out of direction travel as a percentage of the total trip distance and walking time
- Thus a 10% detour for a ½ mile walking trip is 264’ (less than a city block)





Photo: The Greenway Collaborative, Inc.

Signs and barriers have little impact on changing people’s behaviors

Types of Bicyclists



Developed by Roger Geller, Bicycle Coordinator, Portland Office of Transportation

There are other classification systems in use as well, but they all address the range of types of cyclists

- **Strong & fearless (<1%)**
 - Always biking
 - Any road regardless of condition
- **Enthused & confident (7%)**
 - Frequently bike
 - Like designated facilities such as bike lanes
- **Interested but concerned (60%)**
 - Occasional rider
 - Prefer local roads and trails
- **No way, no how (33%)**

Options for Travel Along Streets



Photo: The Greenway Collaborative, Inc.

Photo: The Greenway Collaborative, Inc.

Photo: The Greenway Collaborative, Inc.

Photo: The Greenway Collaborative, Inc.

- Bike Lanes & Sidewalks
- Shared Roadways
- Roadside Pathways
- Paved Shoulders
- Cycle Tracks & Sidewalks

Bike Lanes

- Designated travel lane for bicyclists
- Delineated by solid white stripe, bike icon pavement markings and signs.
- Bicyclists travel the same direction as motorized vehicles
- 5’ minimum width, increase width as speeds and traffic volumes increase




Photo: The Greenway Collaborative, Inc.

Target bicyclists: “Enthused and confident” bicyclists

Context: used on primary roads in urban and suburban areas

Sidewalks Quality of Service

Sidewalk Widths

- 5' minimum
- 6' along collectors
- 8' along arterials
- Even wider downtown

Photos: The Greenway Collaborative, Inc.

Bike Lanes and Sidewalks

- A typical 66' ROW is capable of supporting a multi-modal roadway
- Adding lanes to the roadway should not come at the expense of bicycle and pedestrian facilities
- Additional ROW required to accommodate additional motor vehicle lanes NOT the non-motorized facilities

Establish a “non-motorized zone” that can not be traded out when the road expands

Raised Bike Lanes

- Bike lane level is placed between that of the road and the sidewalk
- Easy to transverse lift from road to bike lane
- Provides a greater sense of separation from automobile traffic, yet maintains mobility benefits of bike lanes

Consider for roads with higher motor vehicle volumes and speeds where a roadside pathway or cycle track are not appropriate

Roadside Pathways

- A shared-use path separate from the road but still within a road ROW
- Issues include:
 - Conflicts with motorists at intersecting driveways and roadways
 - Pedestrian / bike conflicts
 - Getting to destinations on other side of the road
 - Transitions to on-road facilities

Target bicyclists: “Interested but concerned”
Context: used along primary roads in areas with limited vehicular conflict points

Roadside Pathway vs. Bike Lane

- Motorists are not looking for bicyclists on sidewalks or roadside paths especially when they are bicycling opposite the flow of traffic
- Bicycling on the sidewalk is generally slower and more inconvenient than bicycling on the roadway.
 - the presence of pedestrians
 - motorists that block the sidewalk or crosswalk.

Studies have shown that sidewalk riding is two to five times as dangerous as riding in the roadway

Cycle Tracks

- Defining feature is physical separation from roadway
- Placed to the right of on-street parking
- One-way and two-way cycle tracks
- Same issues as roadside pathways regarding conflicts at intersections
- Left turns mid-block and at intersections present challenges

Illustrations: National Association of City Transportation Officials (NACTO) Urban Bikeway Design Guide

Paved Shoulders

- In rural areas, constructing sidewalks may not be practical
- Bikes travel with traffic
- Pedestrians travel opposite direction of motor vehicles
- Paved shoulders have many benefits for motorized travel and road maintenance as well




Photo: The Greenway Collaborative, Inc.

Target bicyclist: "Interested but Concerned"

Context: used along primary roads in areas with limited vehicular conflict points

Shared Roadways

- Not all roads require special facilities
- In an urban context, most local residential roads can provide key links without special facilities
- In a rural context, scenic routes with moderate traffic volumes and speeds may not need a paved shoulder




Photo: The Greenway Collaborative, Inc.

When a road has below 3,500 vehicles per day, motorists can generally pass bicyclists without waiting for oncoming traffic to clear

Bike Routes

- Signs provide wayfinding to key destinations using routes appropriate for most bicyclists
- Often provide a low traffic alternate route to a major road
- Help to identify routes that may not be obvious





Photo: The Greenway Collaborative, Inc.


Target bicyclist: "Interested but concerned"

Context: generally used on local residential roads and rural routes with moderate speed and traffic volumes.



Neighborhood Connectors

- Also known as Bicycle & Pedestrian Boulevards
- Primarily on low speed, low traffic volume local roads with connecting pathways
- Provide traffic calming
- Often provide alternate route to a major road
- May have sustainable design elements, such as porous pavement and rain gardens




Photos and Illustrations: The Greenway Collaborative, Inc.

Target bicyclist: "Interested but Concerned"

Creating a Network

- Bike lanes and sidewalks along major roadways
- Bike routes and neighborhood connectors providing alternative routes on minor roads linking parks and schools
- Provide road crossing improvements where a bike route or neighborhood connector intersects a major roadway



Illustrations: The Greenway Collaborative, Inc.

Shared Lane Markings

- Used where a bike lane is not feasible and/or desirable
- Indicated to motorists to expect bicycles
- Indicates to bicyclists to:
 - Ride with traffic
 - Ride a safe distance away from car doors



Photo: The Greenway Collaborative, Inc.

Target Audience: "Enthusiast and Confident" Bicyclists

Context: lower speed roads typically in downtown areas with on-street parking

Shared Space

- Shared by pedestrians, bicyclists and low-speed motor vehicles.
- No designated lanes or areas
- Physical design such as narrow streets, strategically placed trees, planters and other amenities help to slow motorists



Shared spaces are typically found in very urbanized areas or college campuses

Travel Across Streets



- Directional Ramps
- Curb Extensions
- Intersections
- Mid-block Crosswalks
- Pedestrian Beacons

Curb Extensions

- Minimizes crossing distance
- Better for seniors
- Better visibility at corners
- Reduces illegal parking
- Shorter crosswalk equals longer "walk" signal time and reduces the clearance interval (flashing "don't walk" time)
 - Walking "pace" used to calculate signal timing being slowed from 4 feet per second to 3.5 feet per second

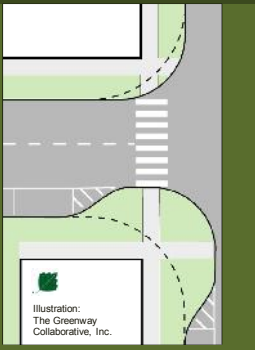


Illustration: The Greenway Collaborative, Inc.

Bike Lanes and Turning Radius

- Calculate based on actual turning radius from lane position not curb radius
- A tighter curb radius helps when positioning ramps to direct pedestrians towards the ramp on other side of street

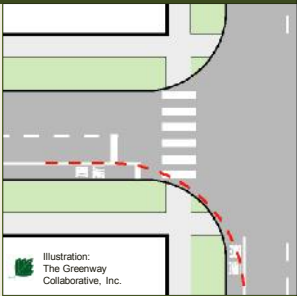


Illustration: The Greenway Collaborative, Inc.

Small Urban Intersections

- Curb extensions
- Tight curb radii
- Advance stop bars for bicycles improve bicyclist viability
- Wide, high visibility crosswalks
- Accessible "countdown" pedestrian signals

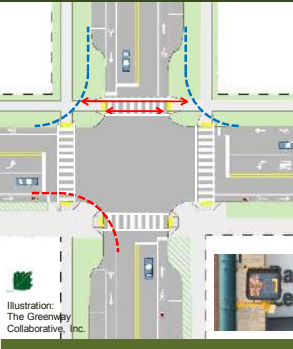


Illustration: The Greenway Collaborative, Inc.

Large Urban Intersections

- Crossing islands to humanize scale of intersection
- Advance stop bars for bicycles
- Small curb radius
- Directional ramps
- Traffic detectors capable of detecting bicycles
- Through bike lanes to the left of right only lanes

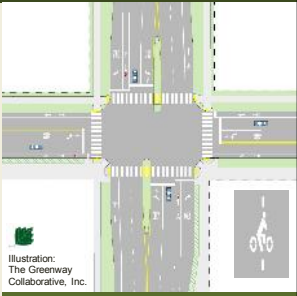


Illustration: The Greenway Collaborative, Inc.

When using actuated signals, they must be able to detect bicycles

New Bike Options for Intersections

- Some markings are experimental
- Two-stage turn queue box
 - Addresses turning issue with cycle tracks
 - Can be used with bike lanes
- Bike box
 - Calls attention to conflicts with right turning vehicles
 - Positions bicycle for left turn in high visibility area



Illustrations: National Association of City Transportation Officials (NACTO) Urban Bikeway Design Guide

Informal Crossings

- Raised medians accommodate dispersed informal crossings
- Landscaped medians are less expensive to maintain than pavement
 - No snow clearing
 - No resurfacing
 - No pavement markings




Photo: The Greenway Collaborative, Inc.

In some locations it is difficult, if not impossible, to channelize pedestrians to designated crosswalks

Basic Mid-block Crosswalk

- An approach to the crosswalk places a pedestrian such that their intent to cross the road is communicated to motorists
- Keep sightlines free of vegetation
- Yield markings set back from crosswalk




Illustration: The Greenway Collaborative, Inc.

Photo: The Greenway Collaborative, Inc.

Mid-block with On-Street Parking

- Curb extension places pedestrian into the sightlines on oncoming vehicles
- Reduces the potential of “dart-out” type crashes
- Areas simply marked off for no-parking often become default loading zones

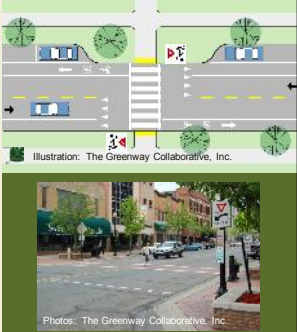


Illustration: The Greenway Collaborative, Inc.

Photos: The Greenway Collaborative, Inc.

Speed Table Crosswalks

- Generally used on relatively low-volume, low speed roads
- Reduce speed of motor vehicle so that if a crash occurs, the injuries to a pedestrian will be minimal
- 6' long approach ramp rising 4" to a level top with a crosswalk
- Must be design so that it may be driven at posted speed




Illustration: The Greenway Collaborative, Inc.

Photo: The Greenway Collaborative, Inc.

Crossing Islands

- Cross street in two stages
- Only requires a gap in traffic from one direction at a time
- Light crosswalk and side of pedestrian facing traffic
- Make island as long and prominent as possible

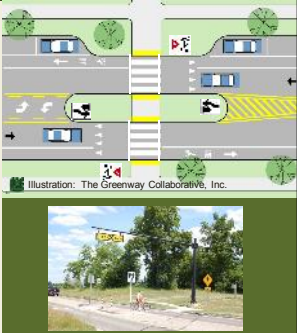



Illustration: The Greenway Collaborative, Inc.

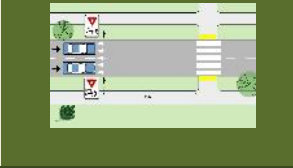
Photos: The Greenway Collaborative, Inc.

Addressing the Double Threat Crash

- An issue where there are two lanes of traffic going in the same direction
- The first car that stops for a pedestrian can hide the pedestrian from a car in the adjacent lane
- Solution is to pull the yield or stop bar back to open up views and/or stagger the stop bars





Illustrations: The Greenway Collaborative, Inc.




Zig-Zag Crossing Islands

- Pedestrians on island walk towards oncoming traffic
- Larger refuge area provides room for multiple users and longer vehicles such as tandems and bike trailers

Photos and Illustrations: The Greenway Collaborative, Inc.



Rectangular Rapid Flash Beacon

- High intensity LED flashers that are paired with crosswalk signs to get motorist attention when crosswalk is in use
- Push-button or passively activated (automatic detection)
- Can be linked to advanced warning signs with LED flashers
- Solar powered models available




Photo: The Greenway Collaborative, Inc.

Most important aspect is that the flashers are only on when someone is about to or is crossing the road

Pedestrian Hybrid Beacon

- Good for locations where crossing islands are not practical
- Evaluation of 21 locations found a 69% reduction in pedestrian crashes after installation
- Minimal delay to motorized vehicles





Photo: St. Clair County



Special Cases

- Transit
- Roundabouts
- Interchanges
- Commercial Strip Development
- Off-Road Trails
- Bike Parking




Photo: The Greenway Collaborative, Inc.

Transit Facilities

- Shelters and other amenities such as benches expand the draw area of a bus stop
- At a minimum there should be a paved pad at the stop and basic route information




Photo: The Greenway Collaborative, Inc.

Transit routes depend on a complete and convenient pedestrian network




Photo: The Greenway Collaborative, Inc.

Bus Stop and Crosswalks

- People will cross the road at a bus stop even if a crosswalk is not provided
- Coordinate bus stops with crosswalk locations




Photo: The Greenway Collaborative, Inc.

Generally best to locate crosswalk in front of bus stop

Buses and Bikes

- Bike racks on buses have proved to be very popular
- Expands the draw area of stops from walking distance to biking distance
- Provides an alternative way home for bicyclists in case of mechanical failure or inclement weather
- Bike racks at key bus stops can open up intermodal transportation opportunities


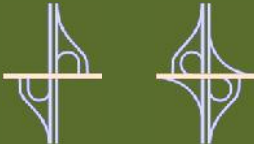


Photo: The Greenway Collaborative, Inc.

In many cities the racks have proven so popular that oftentimes bicyclists have to wait for a bus with available space on the bike rack

Freeway Interchanges

- Freeways present significant barriers to pedestrian and bicycle travel
- Generally, all modes must cross through interchanges
- Interchange areas are also often hubs of commercial development
- A full interchange can be 1/3 mile across




When ramps meet surface road at 90 degrees they may be treated like any other intersection

Free-flowing entrance and exit ramps provide significant challenges to bicyclists and pedestrians

Illustrations: Pbsub via Wikipedia

Freeway Interchanges

- Have ramps meet surface road at 90 degrees
- When there is a free-flowing right turn, keep the turning radius tight to slow down traffic at the crosswalk



Illustrations: Wisconsin Bicycle Facility Design Handbook

Freeway Overpass

- Provide barriers between motor vehicles and the street
 - The design should be such that it protects pedestrians from splashing
- Pedestrian scale lighting will help make the area feel more secure and add some design details

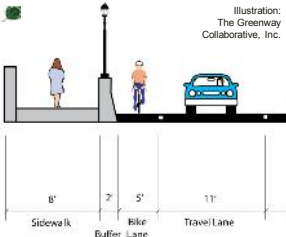


Illustration: The Greenway Collaborative, Inc.

Freeway overpasses are often quite long – provide design details and amenities to make the most of a challenging environment

New Types of Interchanges

- New interchange types such as the single point, diverging diamond and those using roundabouts
- May offer improvements over traditional interchanges for bicycles and pedestrians if done correctly







Photo: MCDOT

Google Earth

Roundabouts – Why So Many?


- Traditional intersection crashes account for more than 45% of all crashes nationwide
- Roundabouts eliminate high speed rear-end and side-impact crashes making them much safer than traditional intersections
 - 35 - 60% fewer total crashes
 - 70 - 80% fewer injury crashes
 - 90% fewer fatal or incapacitating injury crashes

Photo: The Greenway Collaborative, Inc.



Pedestrians are half as likely to be hit in a roundabout than a signalized intersection.

Lower speeds also result in less severe injuries



Roundabouts and Bicyclists

- Bicyclists have the choice to ride in the circular taking the lane as a motor vehicle would or to exist and use crosswalks
- Provide ramps for bicyclists to leave and enter the road
- Allow extra room on sidewalks where bicycles may be joining pedestrians

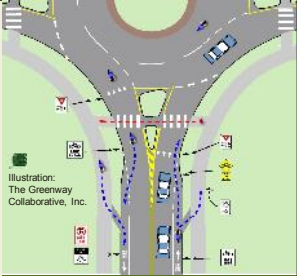
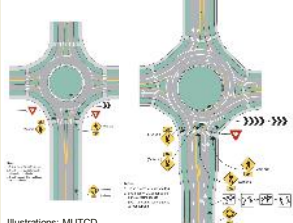


Illustration: The Greenway Collaborative, Inc.

Installation of roundabouts should be accompanied public education outreach effort

Not All Roundabouts Are The Same

- From a pedestrian standpoint, the most important factor is the number of lanes entering or exiting the roundabout
 - Similar issues to mid-block crossings
- From a road bicyclist standpoint, the number of lanes in the circular is the most important factor



Illustrations: MUTCD

Multi-lane roundabouts demand more of a motorists attention than a single lane roundabout – this may result in less attention to pedestrians and bicyclists

Roundabout Design

- Keep a buffer between sidewalk and circular
- Use zig-zag crossing islands
- Place crosswalks such that exiting and entering vehicles have a place to stop outside circular
- For entrance and exist lanes with multiple lanes consider:
 - Hybrid pedestrian signals
 - Raised crosswalks




Illustration: United States Access Board

Navigating through roundabouts, especially multi-lane roundabouts, is challenging for pedestrians with vision impairments. New guidelines are currently being developed

Shared Use Paths

- Generally located outside of a road ROW
- Complement, but do not replace on-road facilities
- Great place for inexperienced Bicyclists to Build Skills
- Trail surface influences user types


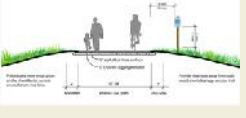


Photo: The Greenway Collaborative, Inc.

Target Audience: "Interested but Concerned" bicyclists

Context: generally in rural and suburban areas along rivers, abandoned railroad corridors, parks etc. where space is available



Separated Use Paths

- Trail is comprised of two separate but adjacent trails, one for bicycles and one for pedestrians
- Best used in urban and high use areas
- Minimizes conflicts between bicyclists and pedestrians
- Pedestrians should be accorded right-of-way at the intersections with walkways



Photos: The Greenway Collaborative, Inc.

Trail / Road Intersection Design

- Pathway should meet road at a 90 degree angle
- Even if path is unpaved, pave approaches to road to improve traction
- Pave gravel shoulder adjacent to path to avoid loose gravel on trail

Unsecured Bike Parking

- Intended for areas where people expect to park their bike for a few hours
- Locate on every city block where there is retail and near front door or outlying retail
- Place under cover where opportunity exists
- Variants of the inverted “U” with a cross bar are considered the best designs

Secured Bike Parking

- Intended for areas where people park for extended periods of time such as work or residential areas
- Provides security for helmets, bags, lights, etc. that are attached to a bicycle
- Typically rented to individuals with key or card access but short-term rental systems are commercially available

Moving Forward

- Transportation and planning staff training
 - Build a resource library
 - Take existing on-line courses
 - Attend webinars and specialized training events
- Revise design guidelines, standard plans and procedures
- Start with the easy projects
- Develop a comprehensive plan

Make sure that best practices are employed is not one person's or one department's responsibility.

Thank you!

Questions:
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Webinar, PDFs, Exercises:
www.greenwaycollab.com/completestreets.htm

Questions

For more information on the content of the presentation please contact:

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Thank You!