Complete Streets

Meridian, Idaho
April 15, 2019

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Outline

- What is a Complete Street?
- Users and their Needs
- A Complete Network
- Elements of a Complete Streets Policy

What is a Complete Street?

A Complete Street is safe, comfortable & convenient for travel via automobile, commercial vehicle, foot, bicycle, & transit.
What is a Complete Streets policy?

Complete Streets policies provide for all users.

What is a Complete Streets policy?

Ensures that the entire right-of-way is designed for all users.

Make the needs of all users the default:
- No need to prove ped, bike, transit, & freight facilities are needed
- Rather, it’s assumed they’re needed unless proven otherwise

Why have a Complete Streets policy?

- To shift transportation investments
- Create better streets opportunistically
  - Planning
  - Construction
  - Operations, and
  - Maintenance activities

Planning, Construction, Operations, and Maintenance activities
What does a Complete Street look like?

One size doesn’t fit all

The Many Types of Complete Streets

Shoulders on Rural Roads

The Many Types of Complete Streets

A Slow-Speed Shared Street

The Many Types of Complete Streets

Commercial Neighborhood with Mid-Block Crossing
The Many Types of Complete Streets

High Density Neighborhood with Mid-Block Crossing

The Many Types of Complete Streets

Historic Main Street

The Many Types of Complete Streets

Transit Route on an Urban Arterial

The Many Types of Complete Streets

High Density Neighborhood with One-way Protected Bike Lane, Parking, and Sidewalk
The Many Types of Complete Streets

A Two-Way Protected Bike Lane Through Downtown

The Many Types of Complete Streets

A Roundabout with Space for Over-size Trucks

The Many Types of Complete Streets

A Natural Drainage System as Part of a Complete Street

“Complete” for Context
“Complete” for Context

“Complete” Facility for Context

Users and their Needs
- Motorists
- Pedestrians
- Bicyclists
- Transit
- Freight
- ADA
- Law enforcement
- Maintenance
- Emerging technology

People Who Walk
- Condition of sidewalk
- Comfort level – how close to traffic
- Crossing opportunities
- Delay at signals
- Conflict points
  - Driveways
  - Intersections
- High speed roadways
People Who Bicycle

- Pavement condition
- Proximity to traffic
- Conflict points
- Visibility/sight distance
- Bike network / connectivity
- Traffic speed and volume
- Size of intersections

People Who Ride Transit

- Crossing the roadway
- Shelters
- How long of a wait
- Personal safety
- How far to transit stop
- How many transfers

People with Disabilities

- Curbs
- Slope
- Cross slope
- Accessible signals
- Detectable warnings
- Roundabouts
- Electric or hybrid cars

People Who Drive

- Delay
- Roadway conditions
- Direct route
- Conflicts
People Who Driver Commercial Vehicles
- Starting and stopping
- Turning corners
- Being able to see all road users
- Delay
- Parking
- Curb and building access for deliveries
- Service hour restrictions

People Who Drive Transit
- Getting back into traffic
- Staying on schedule
- Seeing all road users

People Who Provide Emergency Services
- Maneuvering
- Roundabouts
- Traffic calming treatments
- Making turns
- Access
- Time to respond
- Save lives
- Enforcement activities

People Who Provide Street Maintenance
- Snow plowing
- Street sweeping
- Vegetation
- Pavement markings
- Signs
- Work zones
Emerging Technologies

- Sharing economy
  - Parking
  - Availability
- Self-driving cars
  - Legible pavement markings
  - Legible signs
  - Predictability of behavior
  - Visibility of pedestrians and bicyclists

Why do we have cities?

To minimize travel and maximize exchange

How have we built our cities?

To facilitate longer travel distances
Connectivity creates a walkable street system by:
- Reducing travel distances;
- Offering more route choices on quiet local streets;
- Dispersing traffic – reducing reliance on arterials for all trips.

Reducing Travel Demand Through Land Use

- The problem:
  - Commercial activities concentrated in auto-dominated corridors.
  - Segregated land uses
  - Result: long travel distances, not conducive to walking

Potential solutions?
1. Allow small-scale retail in neighborhoods
2. Create neighborhood parks
3. Site school closer to residences & parks

High Connectivity

Moderate Connectivity

Low Connectivity

Travel Lanes Required

Designing for Pedestrian Safety

Reducing Travel Demand Through Land Use

Neo-traditional Development

Destinations are close to residential area
Manufacturing District

- Prevent encroachment of incompatible land uses
- Buffer sub-zones
- Performance criteria for each zone

Source: City of Chicago.

Complete Network

- Network for each mode
- Not all users are prioritized on all corridors
- Always provide access:
  - Across low-comfort corridors
  - Along key links

Source: METRANS Transportation Center

What is Multimodal Connectivity?

- Networks are accessible, interconnected transportation facilities that allow all users to safely and conveniently get where they want to go.
- Connectivity is the extent to which users can make comfortable trips from beginning to end when traveling to destinations throughout a community.

As motor vehicle speeds increase, the risk of serious injury or fatality for a pedestrian also increases (AAARP report speed and a Pedestrian’s Risk of Severe Injury or Death 2011, p. 1). Also, driver visual field and peripheral vision is reduced at higher speeds.
**Sidewalk Zones**

The sidewalk corridor extends from the edge of roadway to the right-of-way and is divided into four zones:
- Curb zone
- Furniture zone
- Pedestrian zone
- Frontage zone

**Level of Traffic Stress**

- Comfortable for children
- Comfortable for most adults
- Typical of most U.S. facilities
- “Strong and fearless” or those who absolutely have to

**Level of Traffic Stress**

- Increased bicyclist comfort leads to increased ridership

**EDC4 STEP’s Spectacular Six**

- Crosswalk Visibility Enhancements
- Raised Crosswalks
- Pedestrian Refuge Islands
- Rectangular Rapid Flashing Beacon
- Pedestrian Hybrid Beacon (PHB)
- Road Diets

Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations

Marked vs. Unmarked Crosswalks at Uncontrolled Locations

Marked vs. Unmarked Analysis

Speeds < or = to 40 mph

- Two-lane roads: No significant difference in crash rate
- Multilane roads (3 or more lanes)
  - Under 12,000 ADT: no significant difference in crash rate
  - Over 12,000 ADT w/ no median: crashes marked > crashes unmarked
  - Over 15,000 ADT & w/ median: crashes marked > crashes unmarked

https://www.fhwa.dot.gov/research/safety/04100/

Crosswalk Visibility Enhancements

Raised Crosswalks

Pedestrian Refuge Islands
**Rectangular Rapid Flashing Beacon**

**Pedestrian Hybrid Beacons (PHB)**

1. Blank for drivers
2. Flashing yellow
3. Steady yellow
4. Steady red
5. Wig-Wag

**EDC5 STEP's Spectacular Seven**

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- Raised Crosswalks
- Pedestrian Refuge Islands
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- Road Diets
- Leading Pedestrian Interval

**Road Diet:**

*Before*

*After*
Leading Pedestrian Interval

59% Reduction in Pedestrian Crashes

Freight Network: City of Seattle

Major Truck Street
- Arterial street that has significant truck traffic
- Also includes some State and US Routes
- Criterion for
  - Design
  - Traffic management
  - Pavement
  - Repairs

City of Seattle

Policies to manage freight operations:
- Reserve some on-street parking for commercial vehicles
- Require permits for over-size trucks
- Require new developments to provide off-street truck loading areas
- Retain alleys for truck delivers and garbage/recycling collection
- Provide signage for truck drivers to identify appropriate routes and note prohibitions
- Provide businesses with information regarding route closures and detours early enough for them to adjust routes or delivery schedules if requires
- Provide real-time information about incidents that will disrupt traffic operations

Access to Transit

Connections to transit routes

Access to transit stop

Access at transit stop
Catchment Area

- The catchment area is defined as the area served by transit
- Transit access considers elements within catchment area
- In general, people are willing to:
  - Walk ¼ mile to access local bus
  - Walk ½ mile to BRT or rail transit
  - Bike 1-3 miles
  - Drive 15 miles

Site Design

- Set-backs
- Walkable access to store front
- Driveways
- Parking (cars, bikes, & sharing economy)
- Commuter services
  - Repair stations
  - Showers
- Off-street transit stops
- Off-street loading

Local Example

- Context cues for motorists
- Pedestrian access from sidewalk
- Bike rack
- Parking on side
- Curb ramps at driveways

Local Example

Advantages
- Pedestrian island
- RRFB
- High visibility cross-walk
- Buffered bike lanes
- Turning space
Local Example

Opportunities
• Ped signal resting on green
• Truck apron
• Ped access to businesses
• Two stage turn boxes for bicyclists
• Pedestrian-scale lighting

Questions
• What is a Complete Street?
• Users and their Needs
• A Complete Network
• Features of a Complete Street