Complete Streets

a guide for Vermont communities

Vermont Department of Health

H. 198/Act 34

- Effort to pass H. 198 was led by AARP and many other state organizations.
- Act 34 went into effect July 1, 2011
- ". . . purpose . . . is to ensure that the needs of all users of Vermont's transportation system—including motorists, bicyclists, public transportation users, and pedestrians of all ages and abilities—are considered in all . . . transportation projects and project phases, including planning, development, construction, and maintenance."

Complete Streets Principles

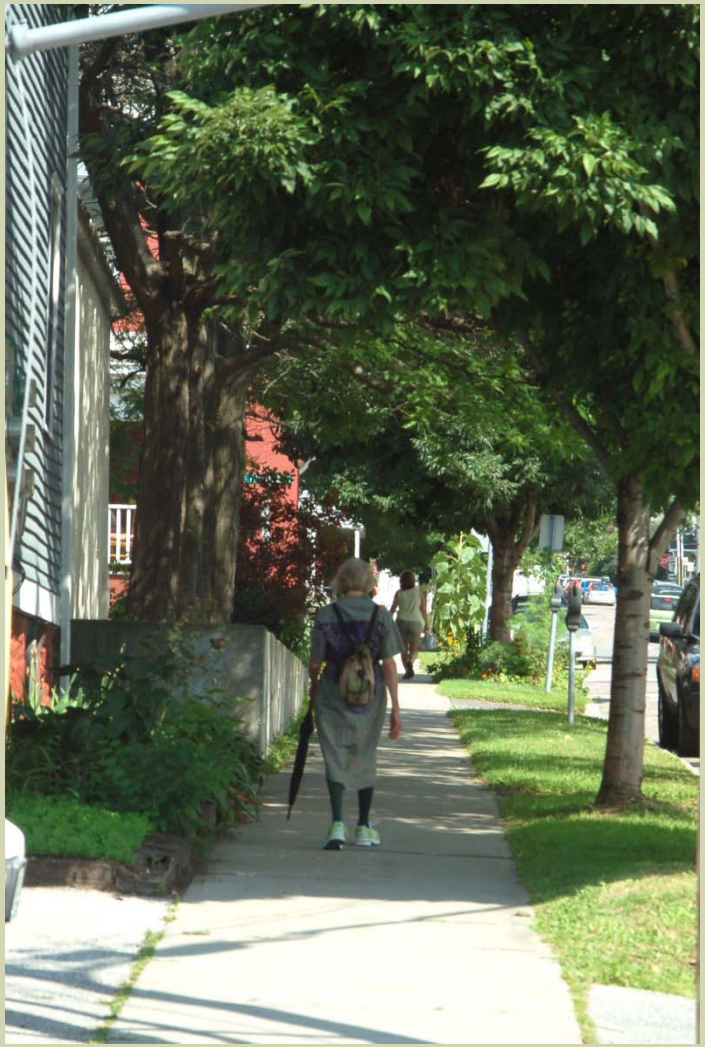
“safety and accommodation of all transportation system users, regardless of age, ability, or modal preference”

Why Complete Streets?

- Streets that accommodate all users are safer for everyone, including automobile drivers and passengers.

Why Complete Streets?

- Provide greater mobility, accessibility and opportunity to those without a car.
- Offer a choice for less costly and environmentally sound modes of transportation.
- Active travel (walking and bicycling) can improve health and provide needed daily exercise.



Why Complete Streets?

- It is more efficient to accommodate all modes at the planning and design stage, rather than retrofit after the fact, and correct safety issues for non-automobile road users.

We are already building them

Exemptions from the law

- Unpaved roads
- Where pedestrians and bicyclists are prohibited by law (e.g. interstate highways)
- When the cost is disproportionate with the need or probable use

Exemptions from the law

Outside the scope by the project nature:

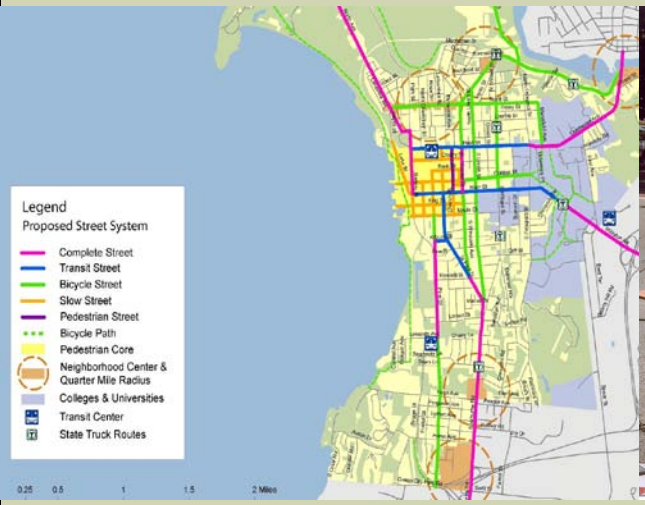
- Crack Sealing
- Culvert Replacement
- Guardrail Replacement
- Pothole Repairs
- Grant-funded projects
- Roadside mowing
- High Risk Rural Road Projects
- Ledge or slope repairs
- Preventative Maintenance
- Shim/Leveling Projects
- Sign Replacement
- Traffic Signal Upgrades

The written determination required in subsection (a) of this section shall be final and shall not be subject to appeal or further review

Opportunities to Build Complete Streets

- **Transportation projects**, including resurfacing, reconstruction, safety
- **Utility projects** that involve digging up a roadway.
- **Development projects** that require mitigation for impacts to vehicular traffic or pedestrians or bicyclists.

How to build complete streets



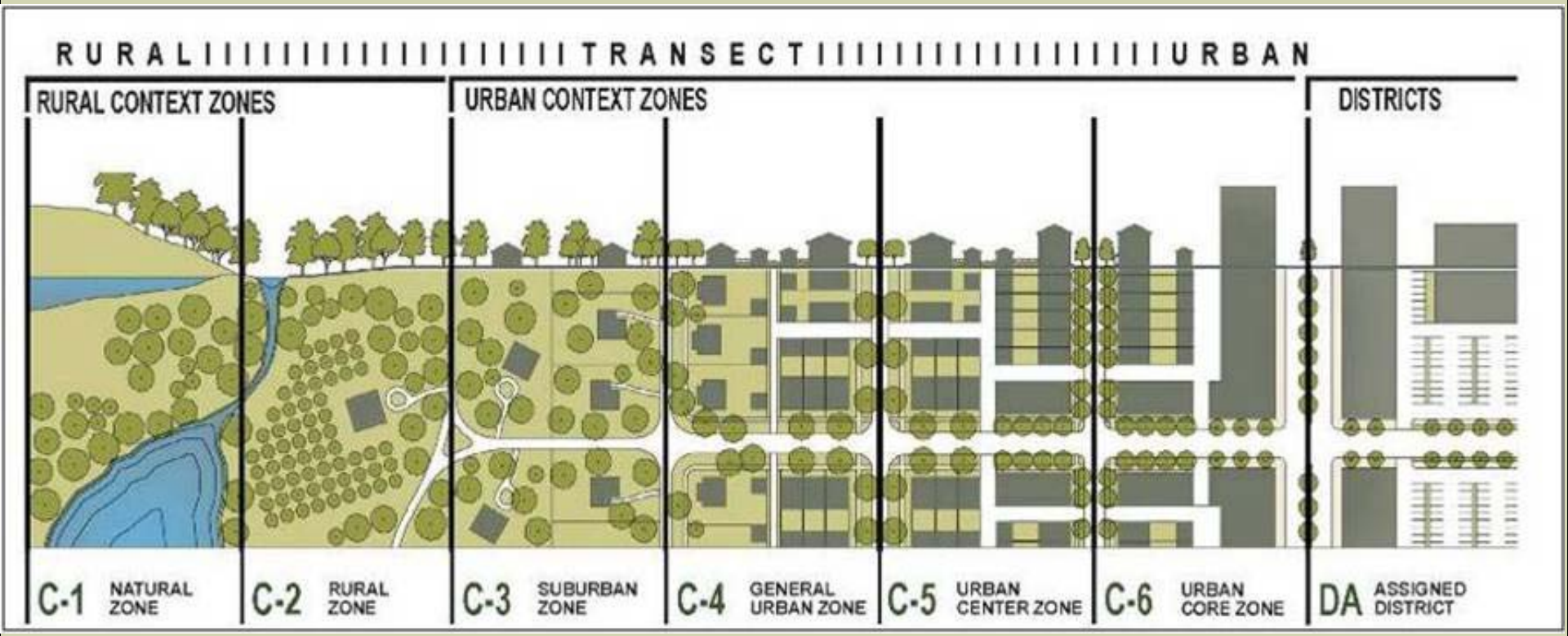
Seven Step Planning Process

1) Consider the Context
2) Determine Potential Users
3) Assess the Transportation Facilities
4) Consider Other Factors
5) Select Complete Street Tools
6) Consider Need versus Probable Cost
7) Document Decision and Report

Beyond Urban and Rural

CONSIDER THE CONTEXT

The Rural-Urban Transect



The Context in Vermont







Relation to the Vermont State Design Standards

Context Zone	VSDS Description	Examples
C1 / C2	Rural	Most of Vermont (by area)
C3	Suburban or Transitional	Fringes of villages or downtowns, suburban areas
C4	Hamlet or Village	Centers of Barnard, Jericho, Arlington, Putney, fringes of larger towns
C5	Downtown	Centers of Wilmington, Randolph, Middlebury, St. Johnsbury
C6	City Center	Centers of Burlington, Rutland

Of All Modes and Abilities

CONSIDER POTENTIAL USERS

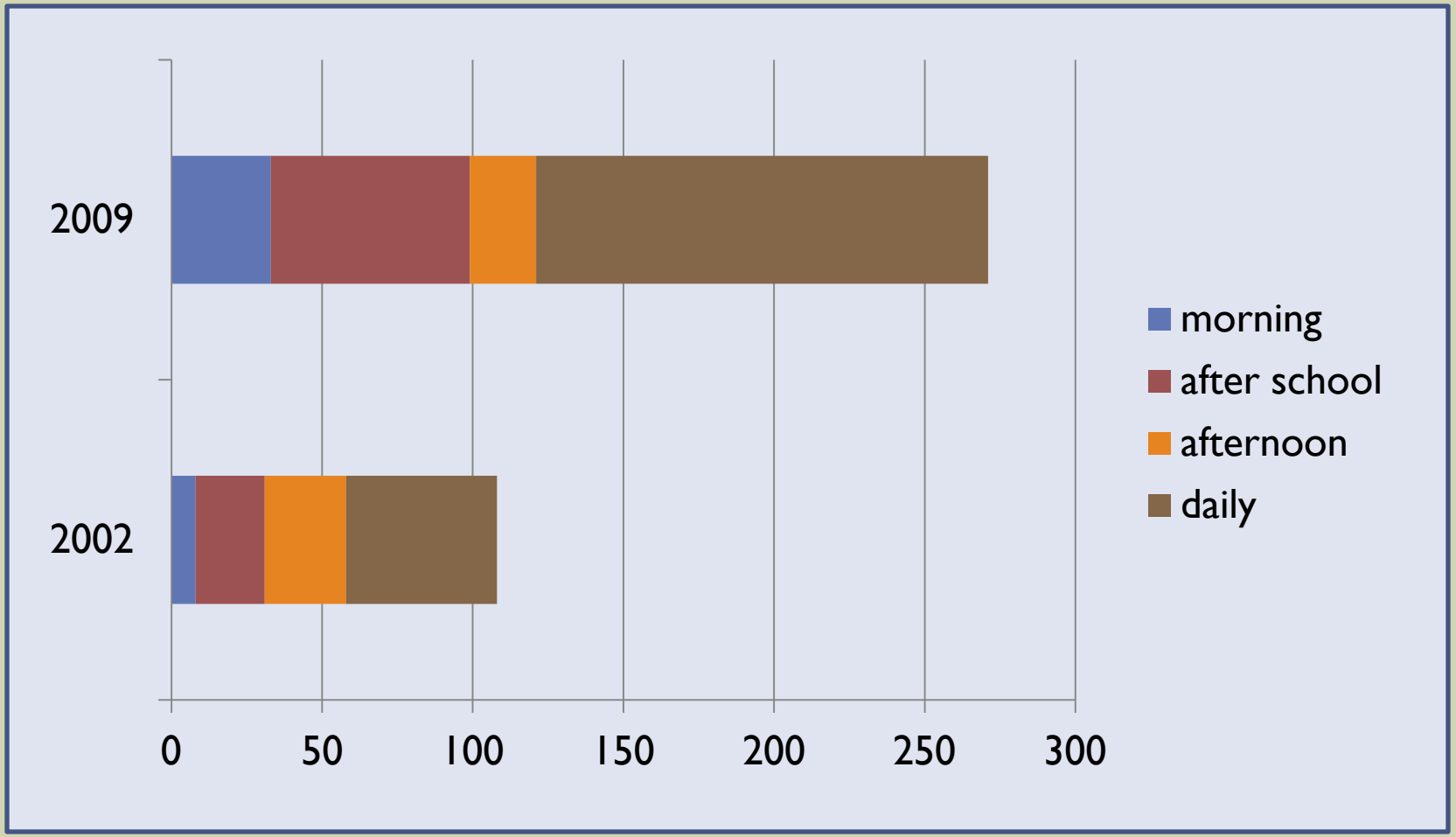
Pedestrians

User Type	C1	C2	C3	C4	C5	C6
Pedestrians						
▪ Strollers/Lingerers						
▪ Utilitarian Walkers						
▪ Ramblers/Fitness Walkers						

- A lack of pedestrians or bicyclists using a street does not equate to a lack of demand.

If You Build It They Will Come

Pedestrian Counts in Shelburne Before and After Sidewalk Extension

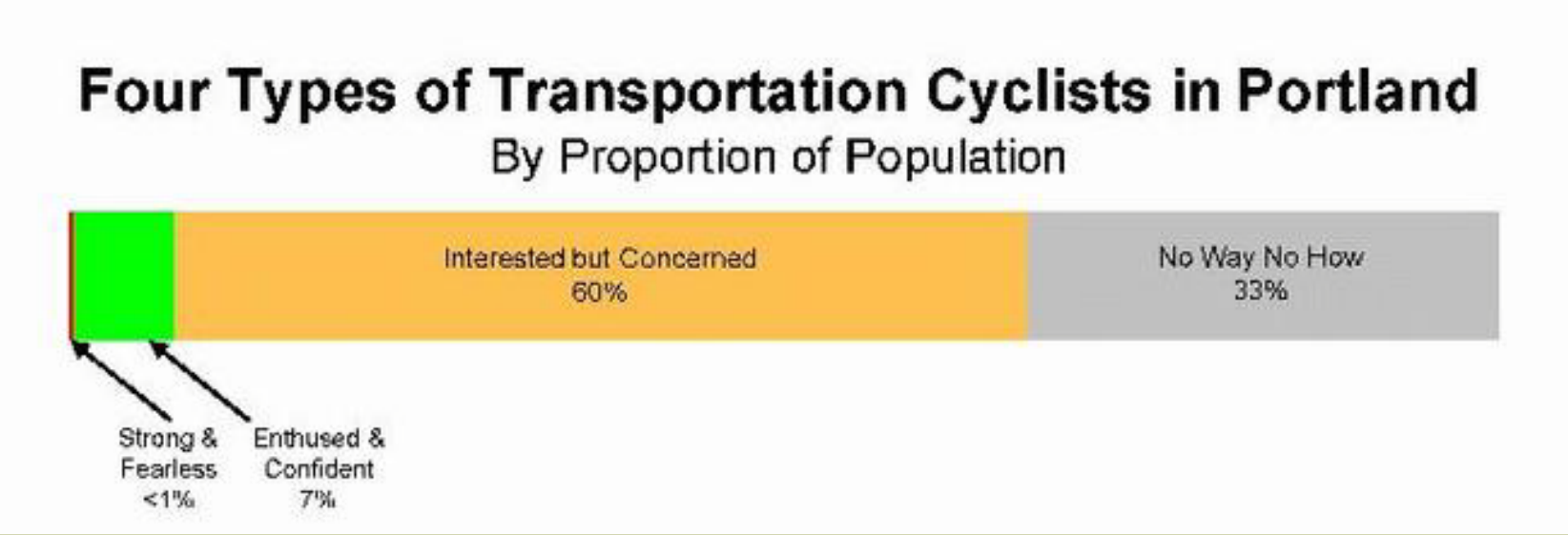


Bicyclists

User Type	C1	C2	C3	C4	C5	C6
Utilitarian Bicyclists						
▪ Type A: Fearless						
▪ Type B: Confident						
▪ Type C: Interested/concerned						
Recreational Users						
▪ Recreational Road Bikers						
▪ Mountain Bikers						
▪ Dirt Bikers/ATV riders						

Bicyclists of All Stripes

- Bicyclists vary by abilities and confidence so learn the characteristics of the potential bicycling population.



Vehicles

User Type	C1	C2	C3	C4	C5	C6
Transit						
▪ Van Shuttles						
▪ City Buses						
▪ School Buses						
Other Vehicles						
▪ Tractor Trailers						
▪ Delivery Trucks						
▪ Emergency Vehicles						
▪ Agricultural Vehicles						

- **Control vehicle**—infrequent use of a facility must be accommodated, but encroachment into the opposing traffic lanes, multiple-point turns, or minor encroachment into the streetside is acceptable.

Consider Potential Users

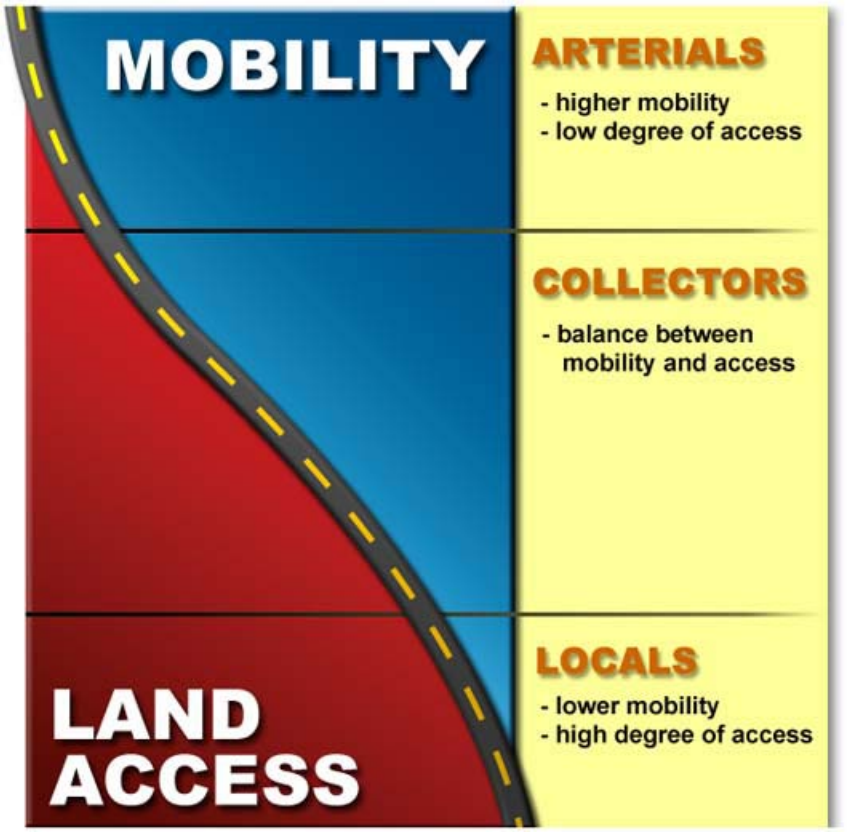
- Multimodal transportation activity is more intense in the more urban context zones (C4-C6).
- Rural areas (C1-C2) may have fewer walkers, bicyclists and transit users, and more recreational travel.
- Vulnerable populations including schools, senior housing and other facilities serving the elderly or young.
- Transit Riders are pedestrians at either end of their bus trip.

TRANSPORTATION FACILITIES

Roadway Characteristics

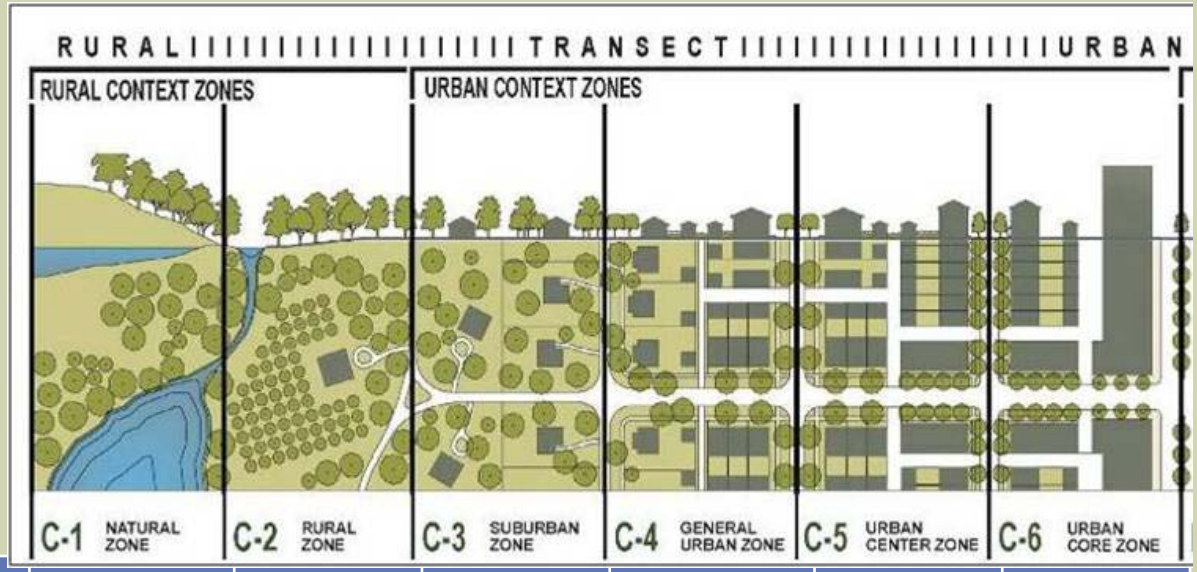
- Functional Classification
- Cross Section Dimensions and Elements
- Volume
- Right-of-Way Width
- Speed
- Accident History

Functional Class



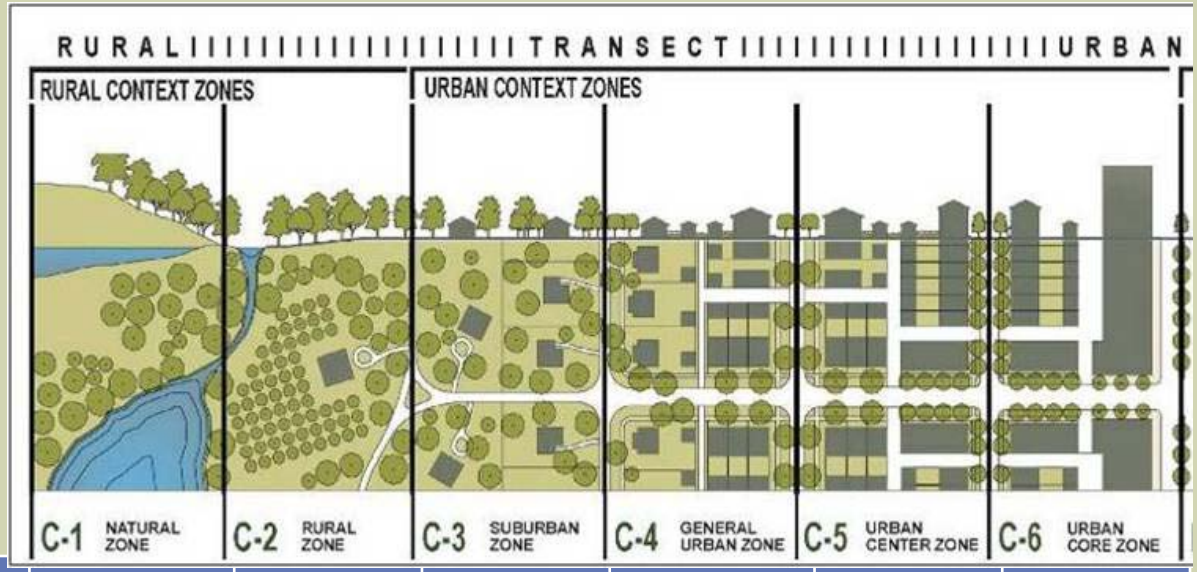
- Mobility: Importance of Movement
- Access: (driveways, land uses, social and economic activity)- Importance of Place
- Implies that arterials do not go through important places.

Functional Class x Context Zones



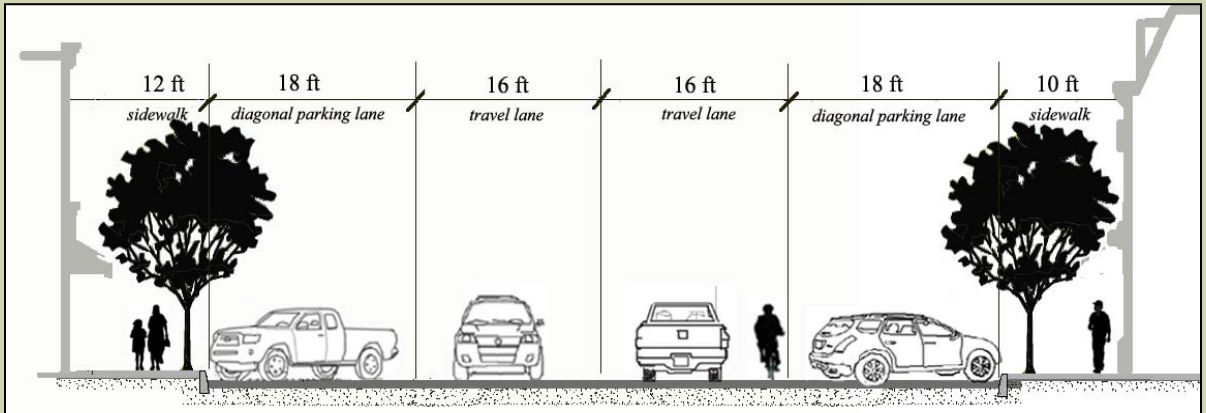
Functional Class	C1	C2	C3	C4	C5	C6
Principal Arterials						
Minor Arterials						
Major Collectors						
Minor Collectors						
Local Roads						

Functional Class x Context Zones



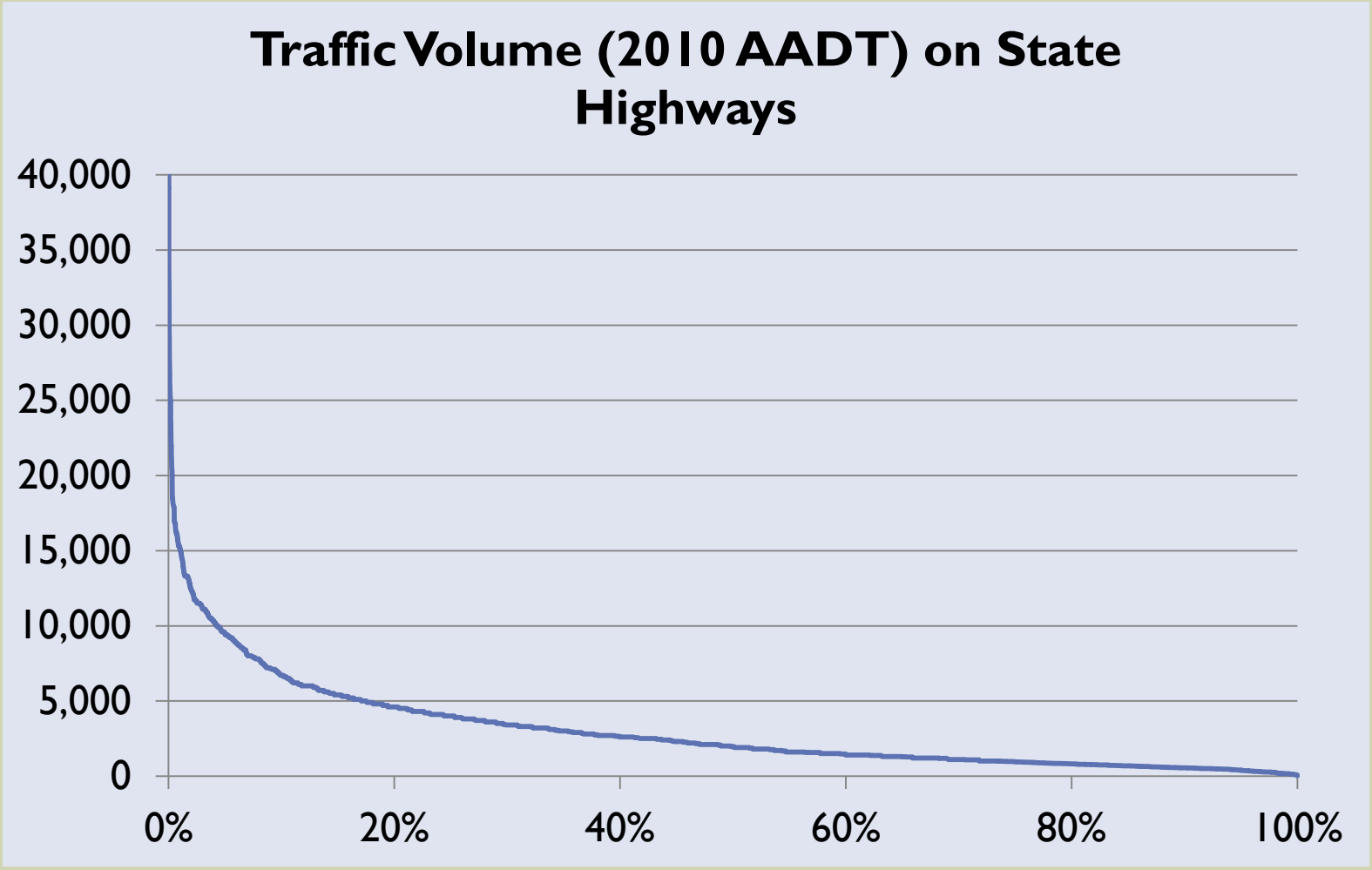
Functional Class	C1	C2	C3	C4	C5	C6
Principal Arterials				Route 7 Shelburne	Route 4 Woodstock	Main Street Burlington
Minor Arterials					Route 100 Stowe	
Major Collectors				Route 5 Hartland	Route 12 Randolph	
Minor Collectors		Route 132 Sharon				
Local Roads	Unpaved Roads					

Street Cross Sections



Main Street - Staint Albans

Volumes


Traffic Volume (2010 AADT) on State Highways
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
0%
20%
40%
60%
80%
100%

Affect Costs, Impacts and Benefits

OTHER CONSIDERATIONS

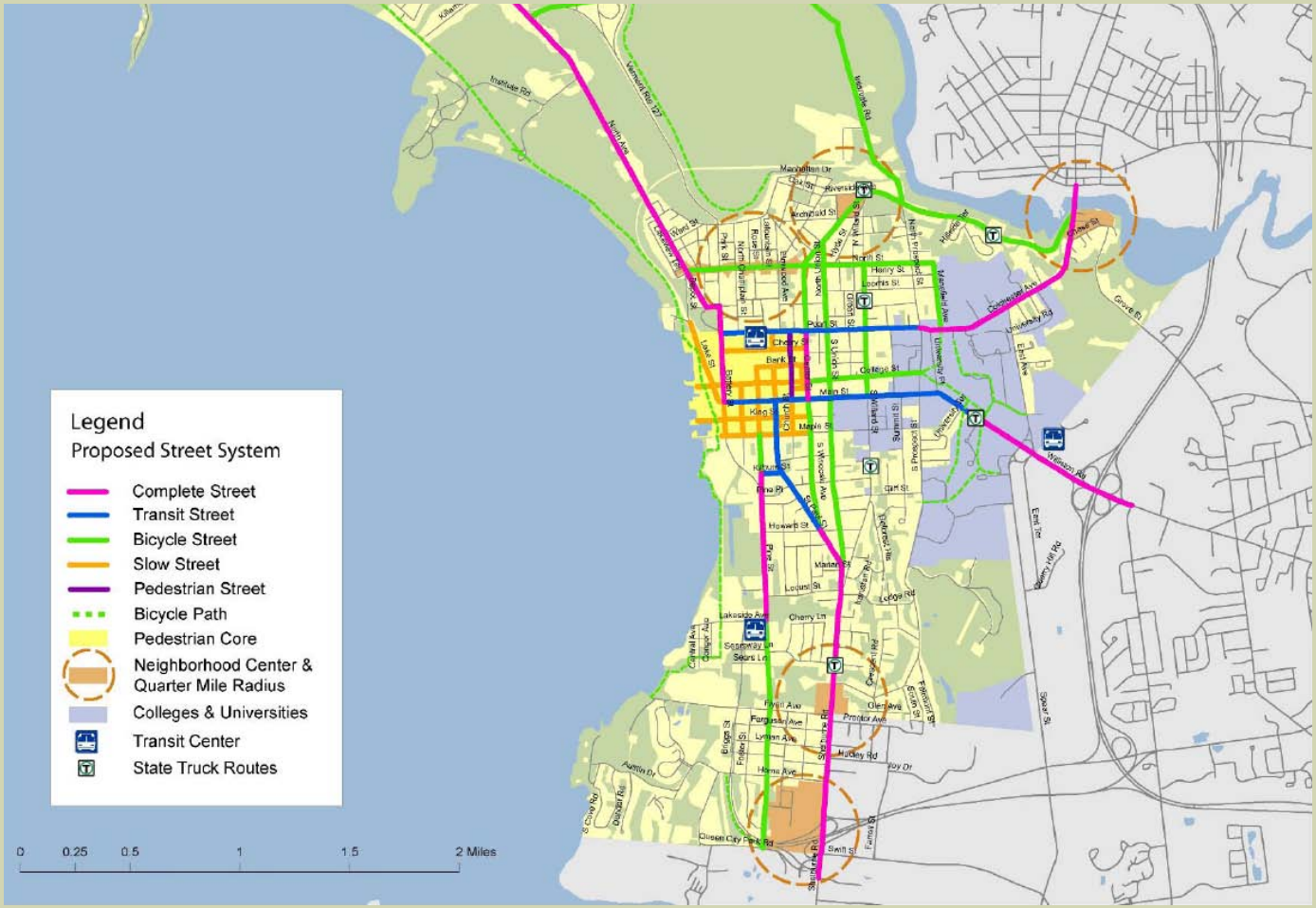
- Environment
- Economic Development
- Aesthetics
- Historic Resources

Managing Complete Streets

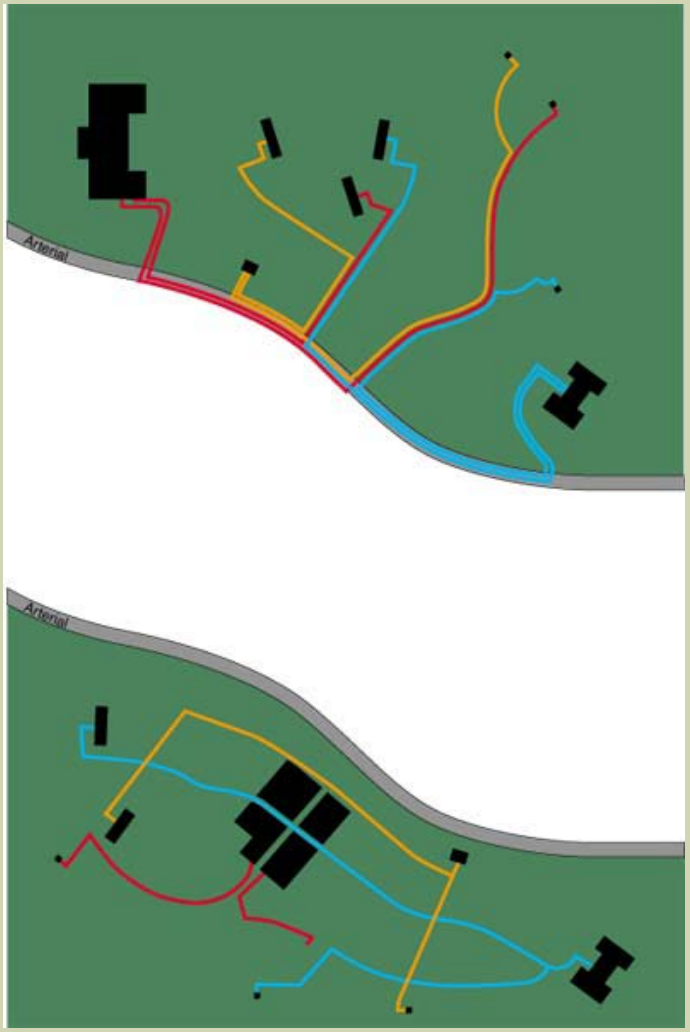
- Maintenance
- Enforcement

COMPLETE STREET PLANNING

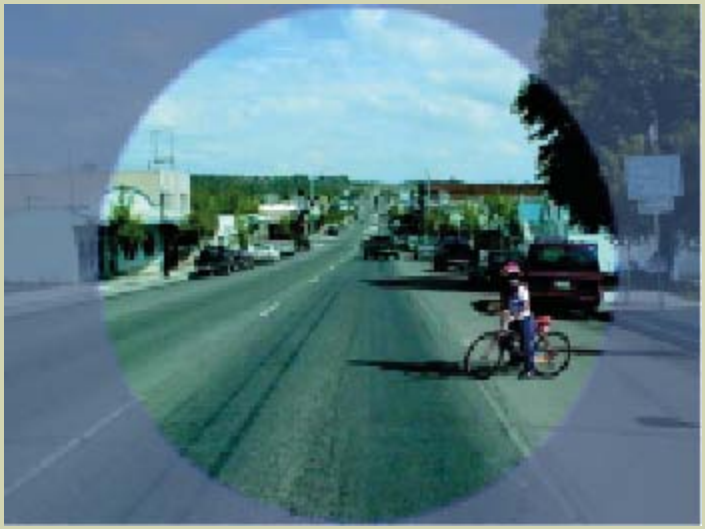
Community Transportation Planning



Plan the Network, Not the Street



Slow Down



Practice Context Sensitive Design

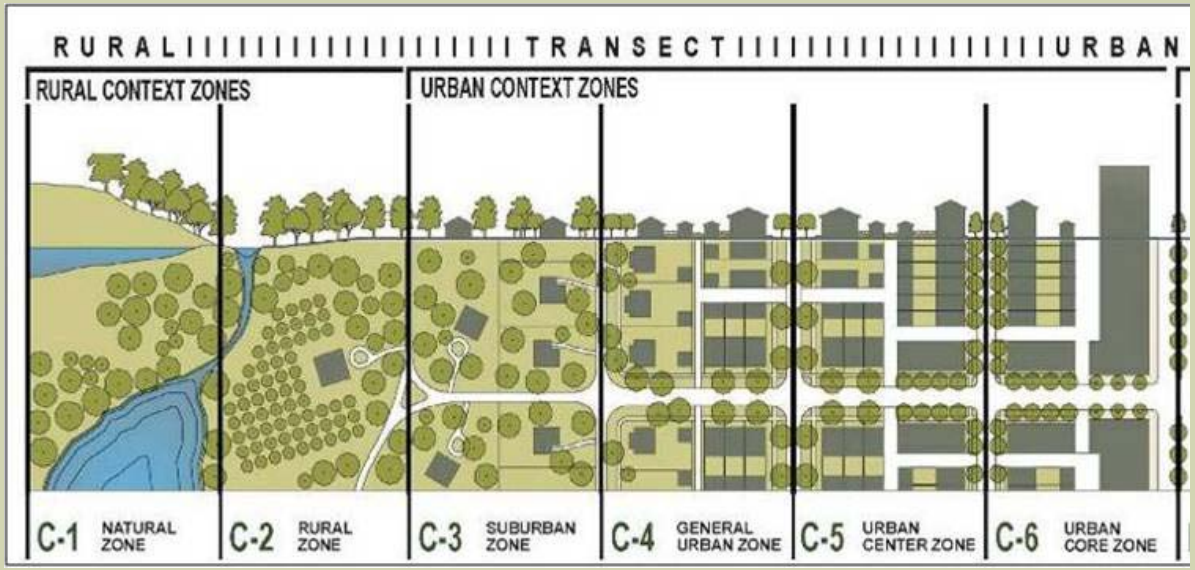
Context Zone	Typical Pedestrian Treatments	Typical Bicycle Treatments	Typical Target Speed
C1 / C2	• Shoulder • Uncurbed sidewalk to specific pedestrian destination (i.e. school)	• Shoulder • Bicycle lane	40+
C3	• Uncurbed sidewalk • Sidewalk with curb and green strip	• Shoulder • Bicycle Lanes • Parallel Multiuse Path	30 to 40
C4	• Uncurbed sidewalk • Sidewalk with curb and greenbelt • Urban sidewalk with tree wells	• Shared Lane on slow street • Bicycle Lanes • Parallel Multiuse Path	25 to 30
C5	• Wide sidewalk with curb and greenbelt • Wide urban sidewalk with tree wells	• Bicycle Lanes • Shared Lane on slow street	25 or less
C6	• Wide urban sidewalk with tree wells	• Shared Lane on slow street	25 or less

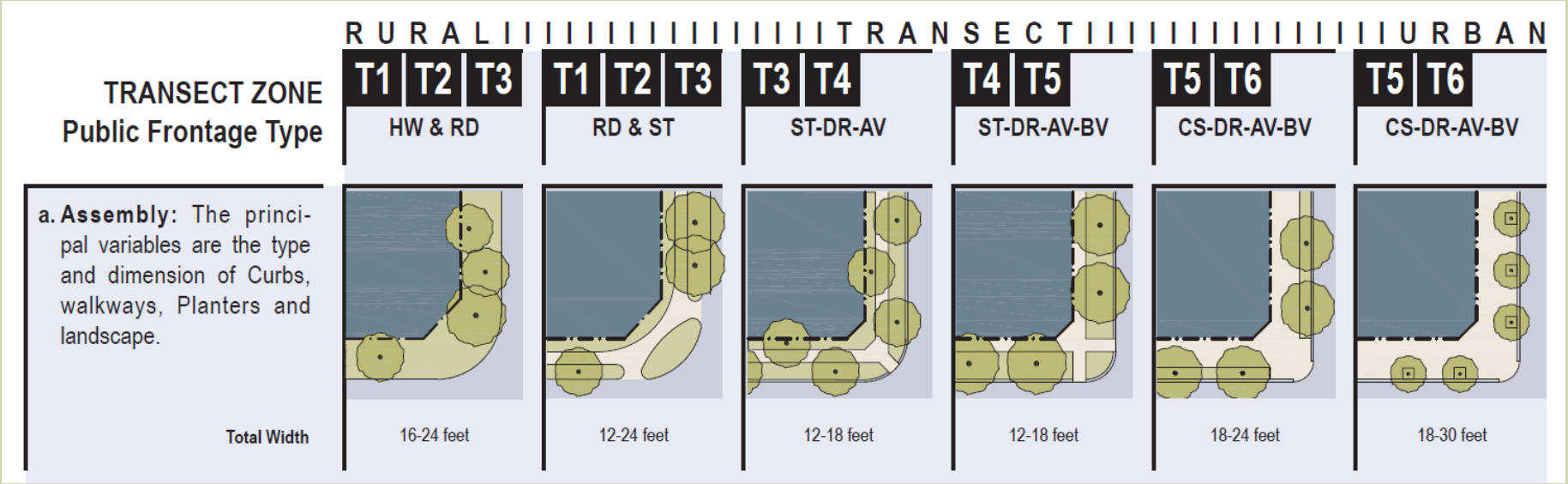
PEDESTRIAN FACILITIES

Sidewalk Width

Width	Context
6-8 ft	For local streets outside the central business district (C3)
6-10 ft	For commercial areas outside the central business district (C3-C4)
8-10 ft	For central business areas including downtowns and village centers (C5-C6)
5 ft	Constrained situations, or rural areas with lower activity (C1-C3); ADAAG minimum width

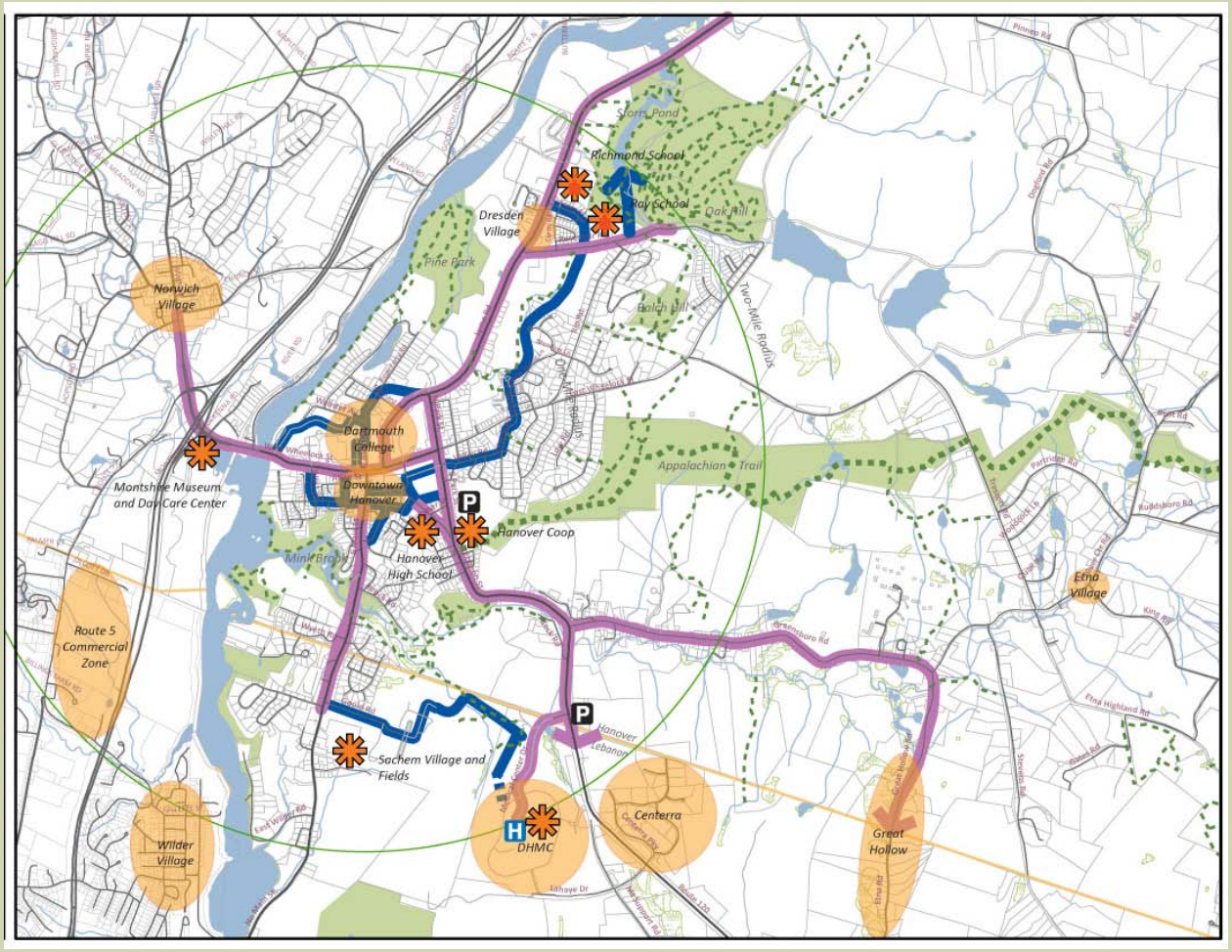
Practice Context Sensitive Design





Bicycle Facilities

Bicycle Network Planning



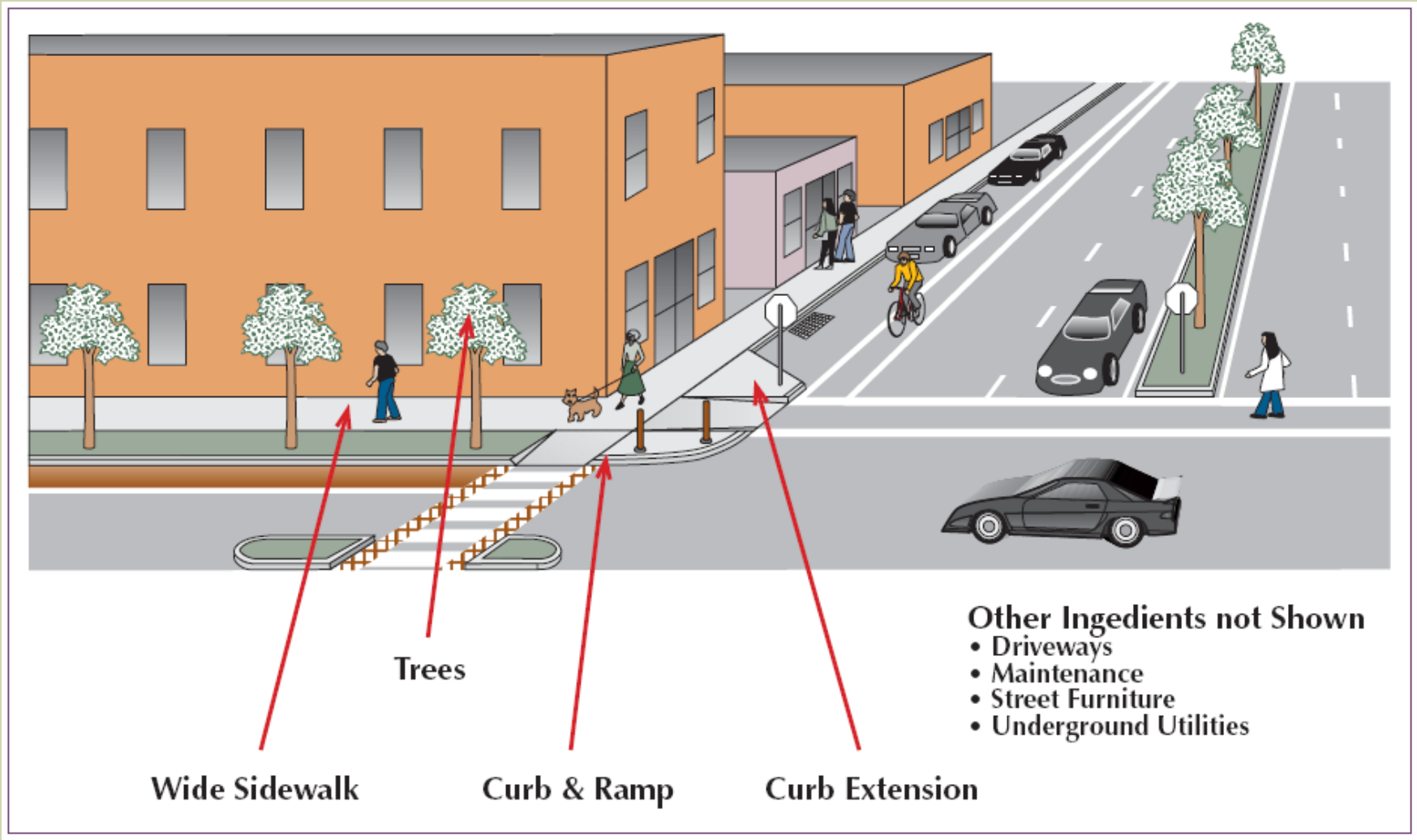
Bicycle Facilities

Type	Applicability	Width
Multi-use path	Special cases when off road connection is appropriate	10’-14’
Shared lane/street	Low speed/low volume streets	11' min 20' w/ parking
Wide curb lane	Lower speed streets with curb/gutter and limited width	12’-15’
Bicycle lane	Streets with curb and gutter	4’-7’
Paved shoulder	Rural roads with no curb/gutter	1’-10’

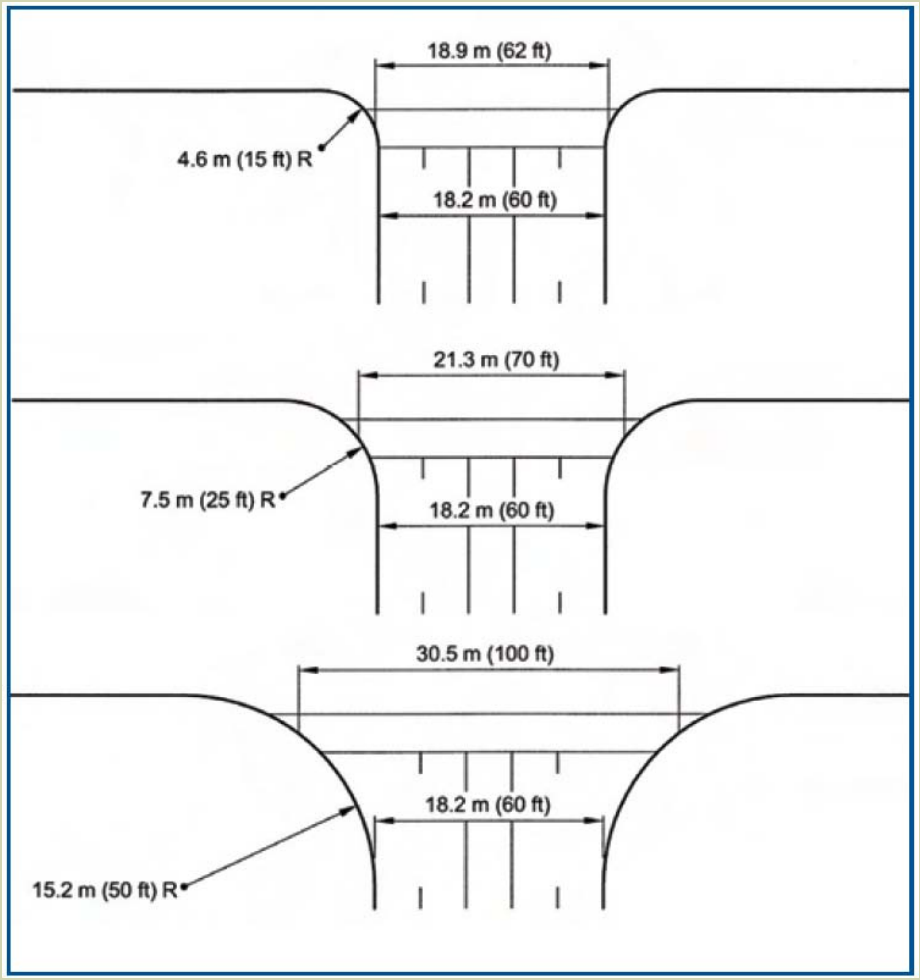
Transit Facilities

Type	Applicability
Stop	Minimum for all transit routes. Should include appropriate signage and be located on a fat, dry surface with safe clearance from moving vehicles.
Bench	Minimum at locations serving multiple passengers throughout the day.
Shelter	Preferred at locations serving multiple passengers throughout the day.

Anatomy of an Intersection



Curb Radii



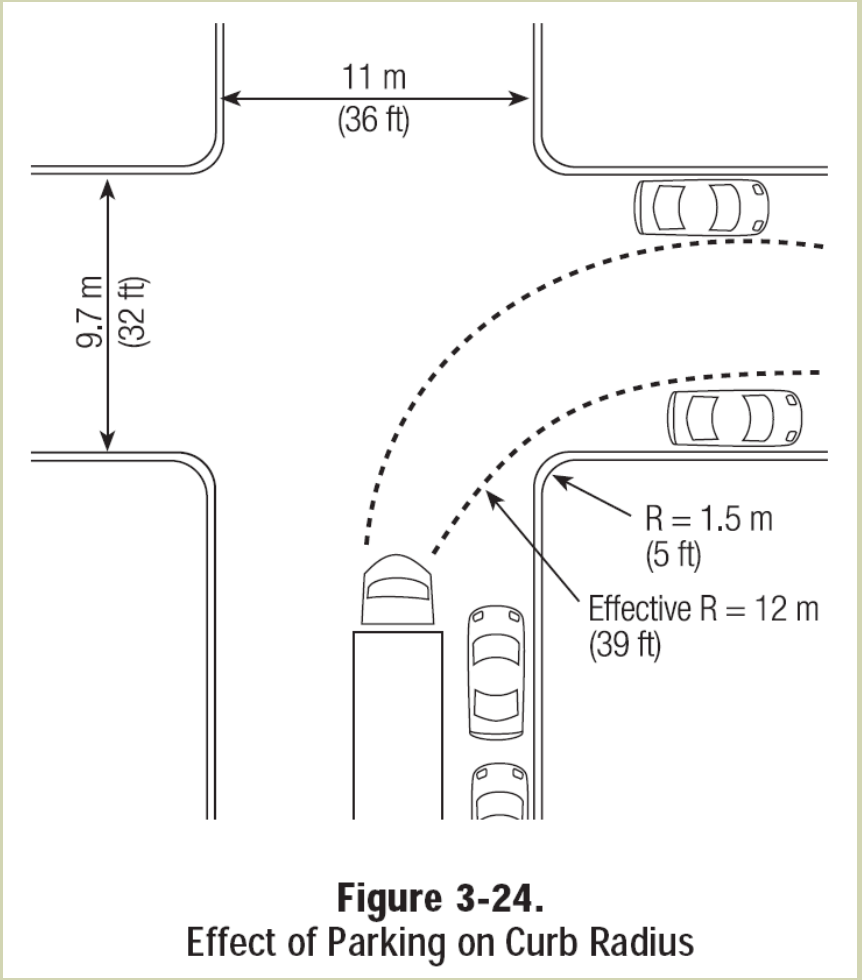
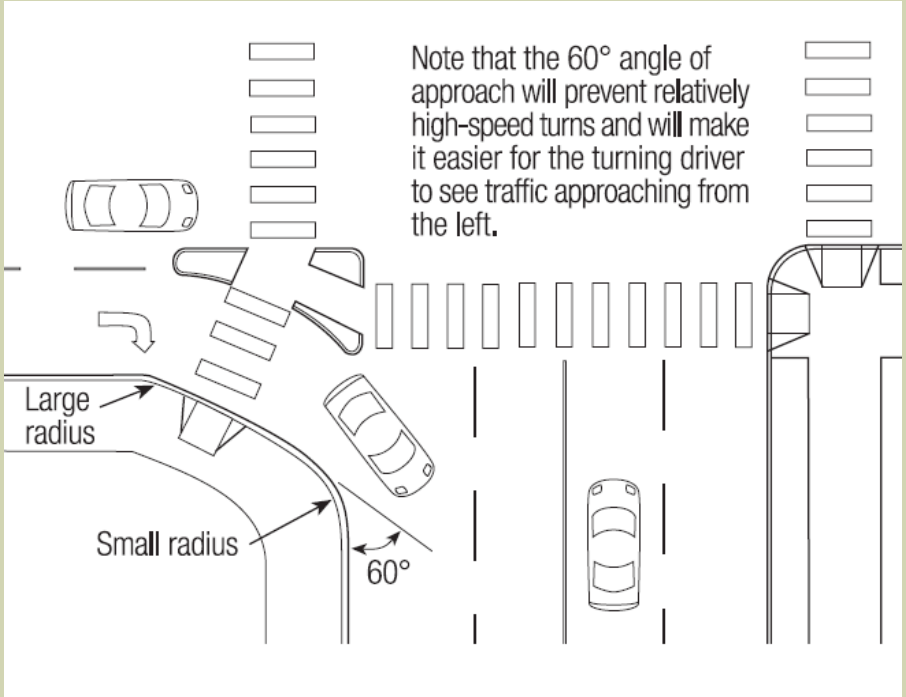
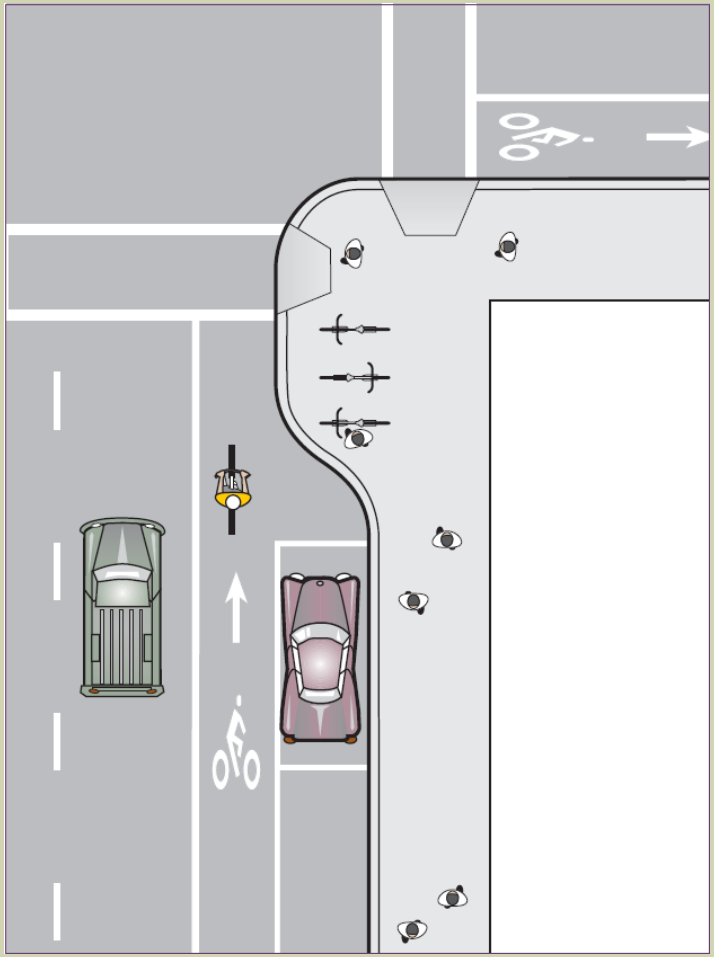


Figure 3-24.
Effect of Parking on Curb Radius

Crosswalks

Intersection Geometry

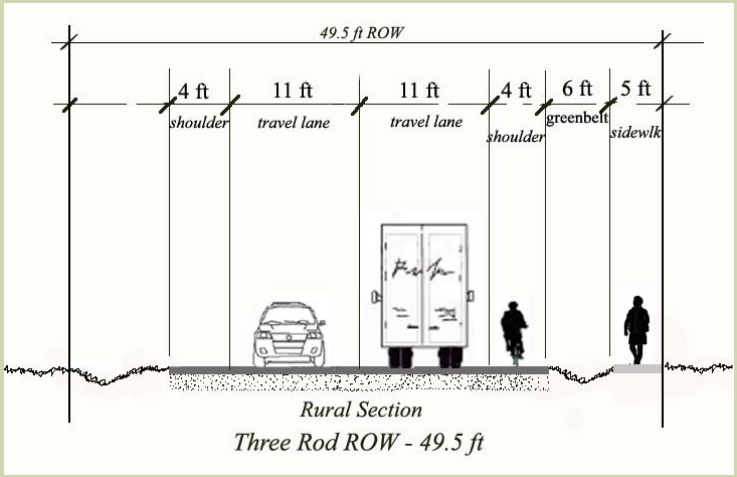


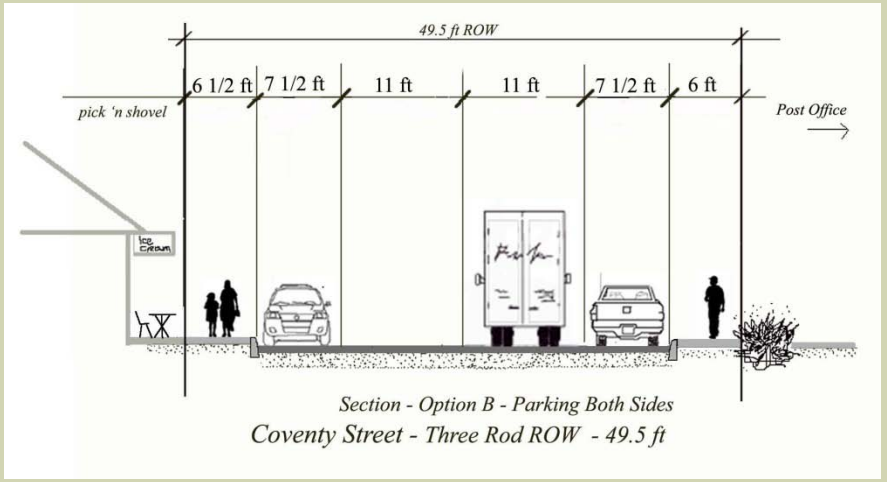


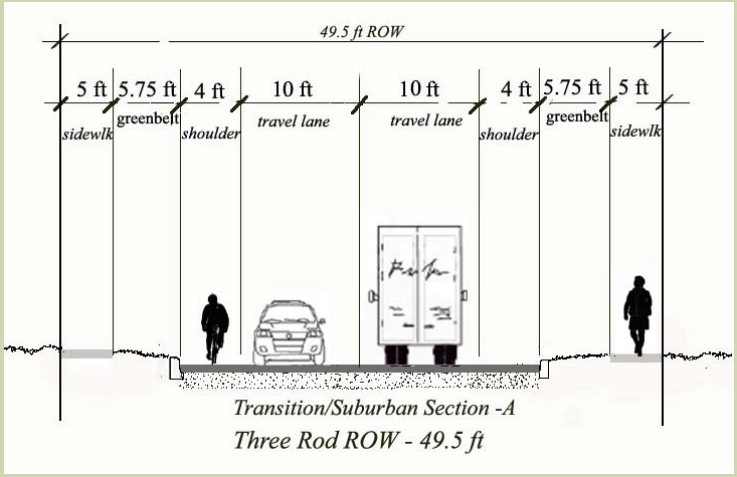
Street Trees

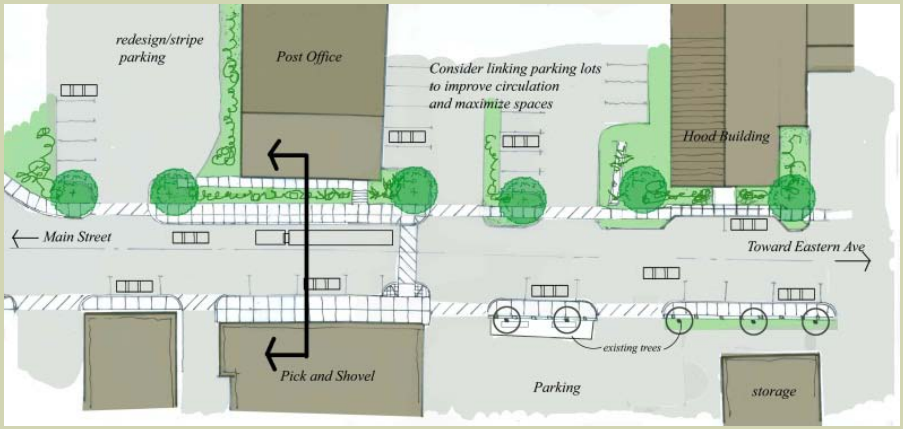
Lighting/Streetscape

The Three Rod Road









CONSIDER PROBABLE USE v COST

Probable Use

- Urban Context Zones (C4-C6)
- Schools
- High density areas
- Attractions:
  - Park,
  - playground,
  - bikepath
  - cultural or tourist
- College/university
- Places for elderly, young children, or low income
- Look to the Future: Consult Municipal Plan

Benefits

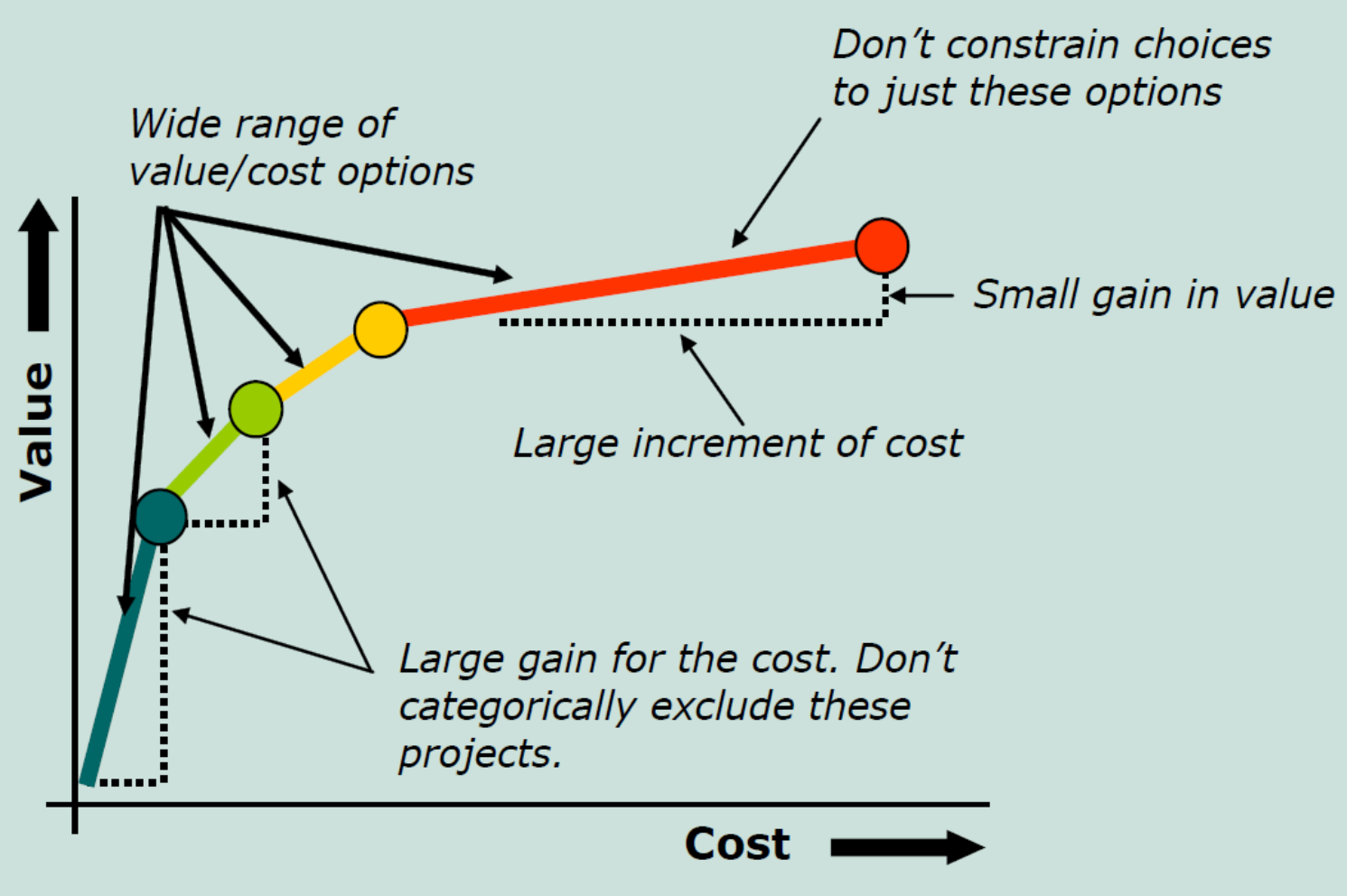
Benefit	Description
Accessibility	Degree that non-auto transport provides mobility options, particularly for people who are transportation disadvantaged.
Consumer cost savings	Degree to which non-auto transport provides consumer transportation cost savings, eg private vehicle ownership and operating cost, parking
Public cost savings	Degree that non-auto transport substitutes for vehicle travel and reduces negative impacts, including externalities (eg air pollution, crashes, etc).
Efficient land use	Degree that non-auto transport helps reduce the amount of land used for roadway and parking facilities, and helps create more accessible, clustered land use.
Livability	Degree that non-auto transport improves the local environment, including property values, business activity, etc.
Public fitness and health	Degree that non-auto transport provides physical exercise to people who are otherwise sedentary.
Economic development	Degree to which non-auto transport makes commercial areas more attractive and shifts consumer expenditures to goods that provide more regional economic activity and employment (see discussion under "other considerations" above).
Equity	Degree that non-auto transport helps achieve equity among various user groups, especially the elderly, young, disabled and disadvantaged.

Probable Cost

Category	Action	Cost
Vehicular Way	restripe lanes within existing constructed roadway	$
	reconstruct roadway: narrow curb-to-curb width or add facilities (eg parking, bike lanes)	$$$
	reconstruct roadway: add median	$$$
	road diets	$-$$$
	add paved shoulder to rural roadway sections to support bicycle and/or pedestrian traffic	$$-$$$
Sidewalks	Construct new sidewalk/reconstruct (& widen) existing	$$-$$$
	pedestrian amenities (eg benches, wayfinding)	$$
Crosswalks and Pedestrian Indications (intersection or mid-block)	Stripe and sign crosswalk	$
	enhanced warning (eg RRFB-Rapid Rectangular Flashing Beacon)	$
	Full signal control (eg HAWK – High Intensity Activated Crosswalk Beacon)	$$
	Add pedestrian refuge island	$$-$$$
Bicycle Facilities	define bicycle route with shared lane marking and signage	$
	define bicycle lanes with striping, markings and signage	$-$$
	construct multi-use path	$$$
	add bicycle amenities (eg racks, lockers) at key destinations	$$

Category	Action	Cost
Transit	transit stop with sign	$
	transit stop with shelter, access pad(s), etc	$$
	transit stop with pull-out or bulb-out	$$
	add maps & schedules to stops	$
	active arrival system	$$$
	add bicycle racks to buses	$
Intersections	Reconstruct intersection with tighter curb return radii	$$ - $$$
	Reconstruct slip lane with better angle for pedestrians	$$-$$$
	Reconstruct intersection with curb extensions	$$$
	Signalize	$$-$$$
	Retime signal with Leading Pedestrian Interval (LPI)	$
	Reconstruct intersection with modern roundabout	$$$
On-street Parking	stripe on-street parking within existing roadway	$
	add metering or point pay metered parking	$$-$$$
Streetscape Improvements	Street Trees and Street Furniture, Lighting	$$-$$$
Access Management	reconstruct roadway to consolidate accesses, define driveway(s)	$$$
	reconstruct driveway(s) to improve sidewalk functionality	$$
	add median to primary roadway to control left turns	$$$

Alternatives and Cost



DOCUMENT AND REPORT

Documentation and Reporting

Act 34: written determination, supported by documentation and available for public inspection at the office of the municipal clerk and at the agency of transportation

Waterbury: Route 2/Main Street Reconstruction

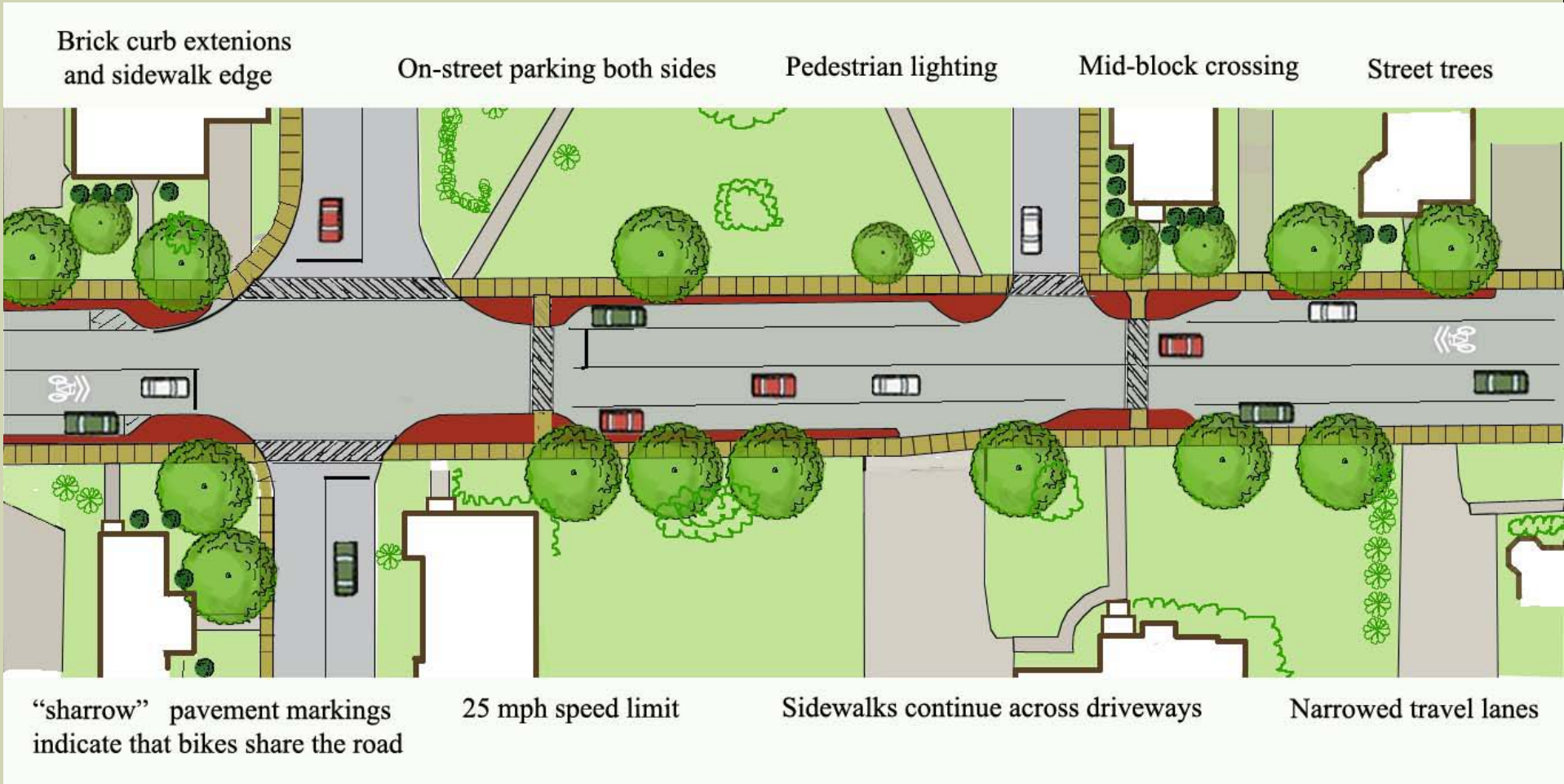
Norwich: Rightsizing Route 10A

Westfield: Pedestrian Safety Alternatives

CASE STUDIES

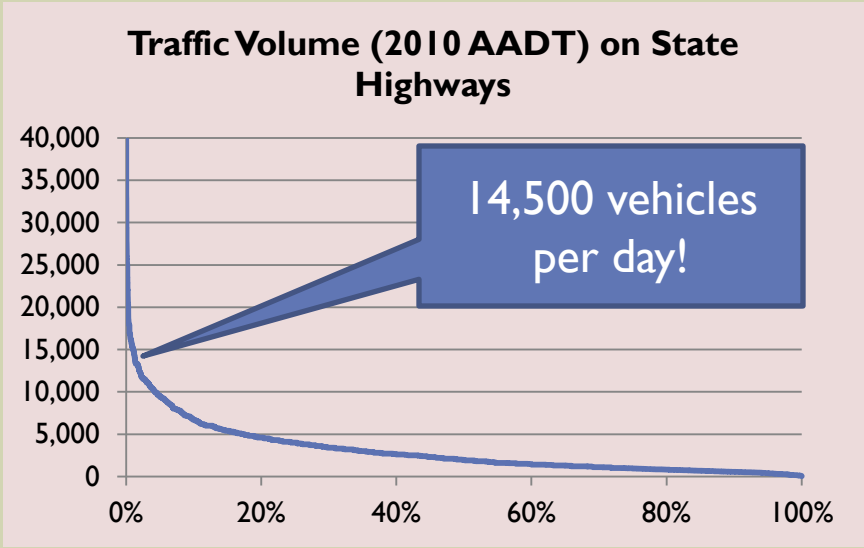
Waterbury's Main Street Today

Waterbury's Main Street Transformed



Norwich-Route 10A

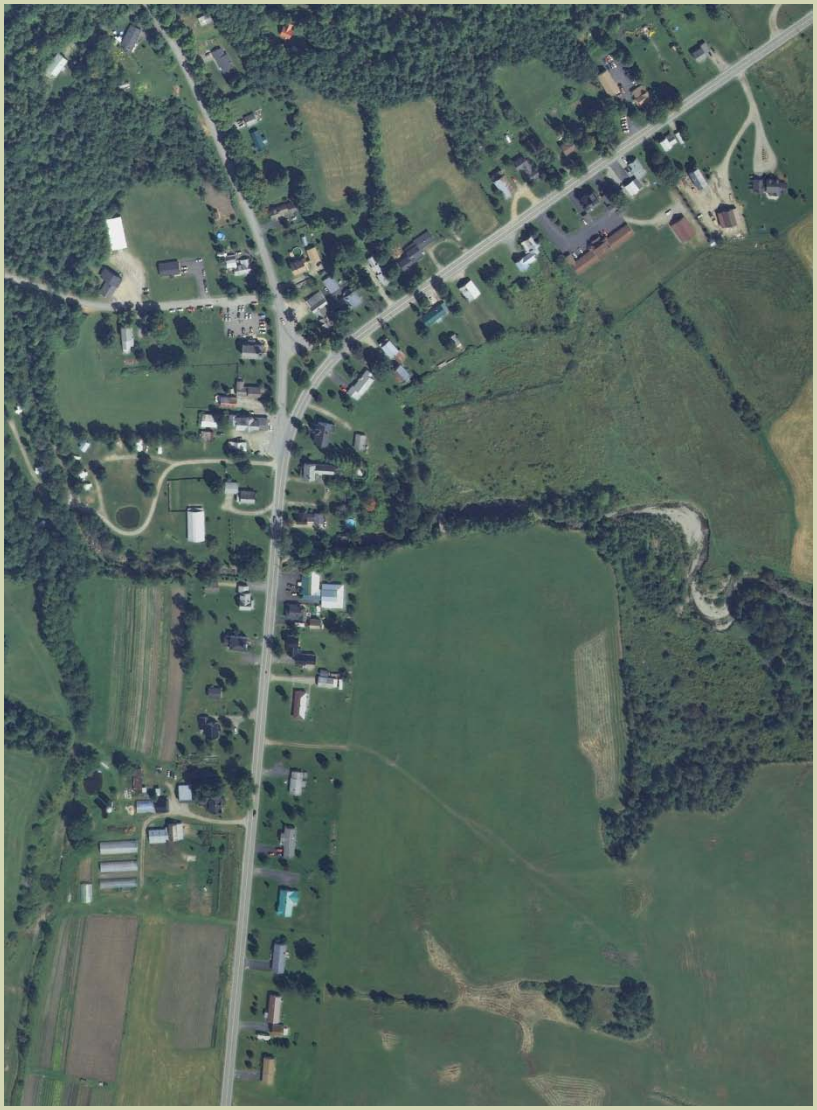
- High Volumes
- High Speeds
- Unsafe for bicycles

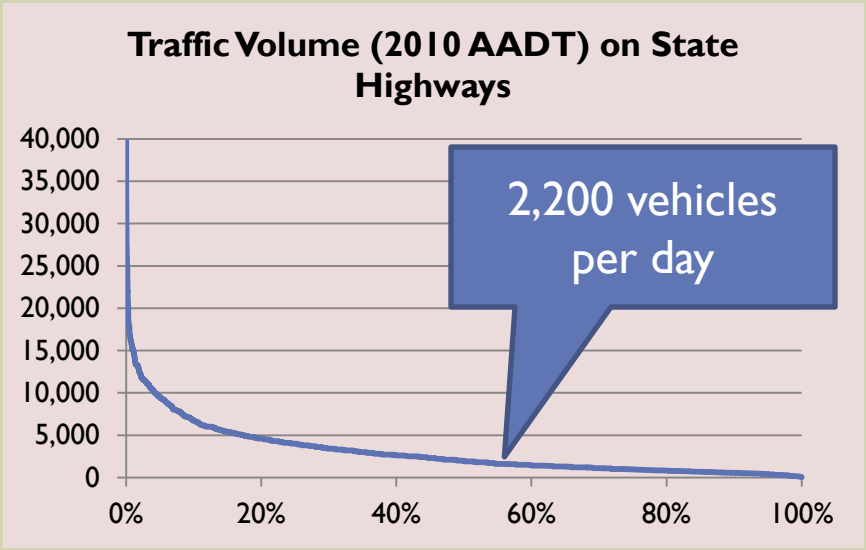


Experimental Bike Lane

Success – A Complete Street

Westfield



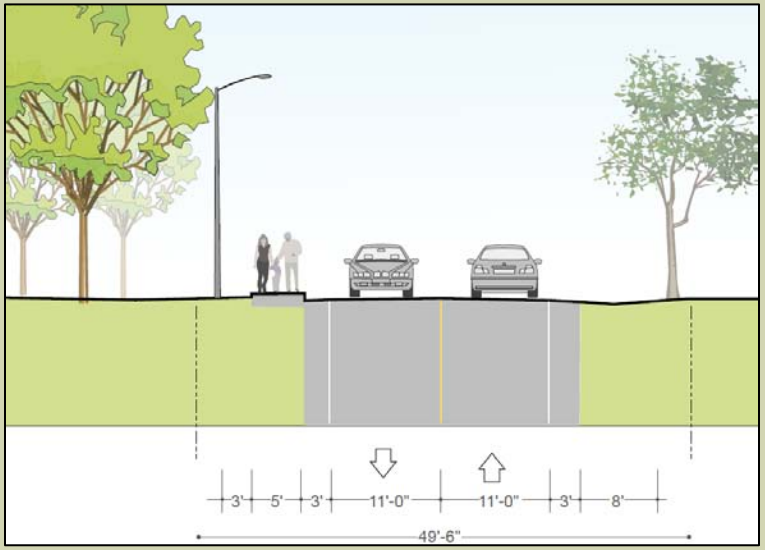

Traffic Volume (2010 AADT) on State Highways
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
0%
20%
40%
60%
80%
100%
2,200 vehicles per day


WGS

Consider the Alternatives

Sidewalk

- Cost about $500,000
- ($100,000 local share)



Wider Shoulders and Lower Speeds

- 4 or 5 feet shoulders
- Reinforce lower speeds through signage, shoulder color, narrower lanes, and gateway.

THE CHALLENGES

Common Challenges

- Community Acceptance
- Cost is to high compared to perceived needs
- Inadequate right-of-way for the facilities needed
- Some VTrans Policies make complete street projects challenging

Dare to Experiment

Whose Right of Way?

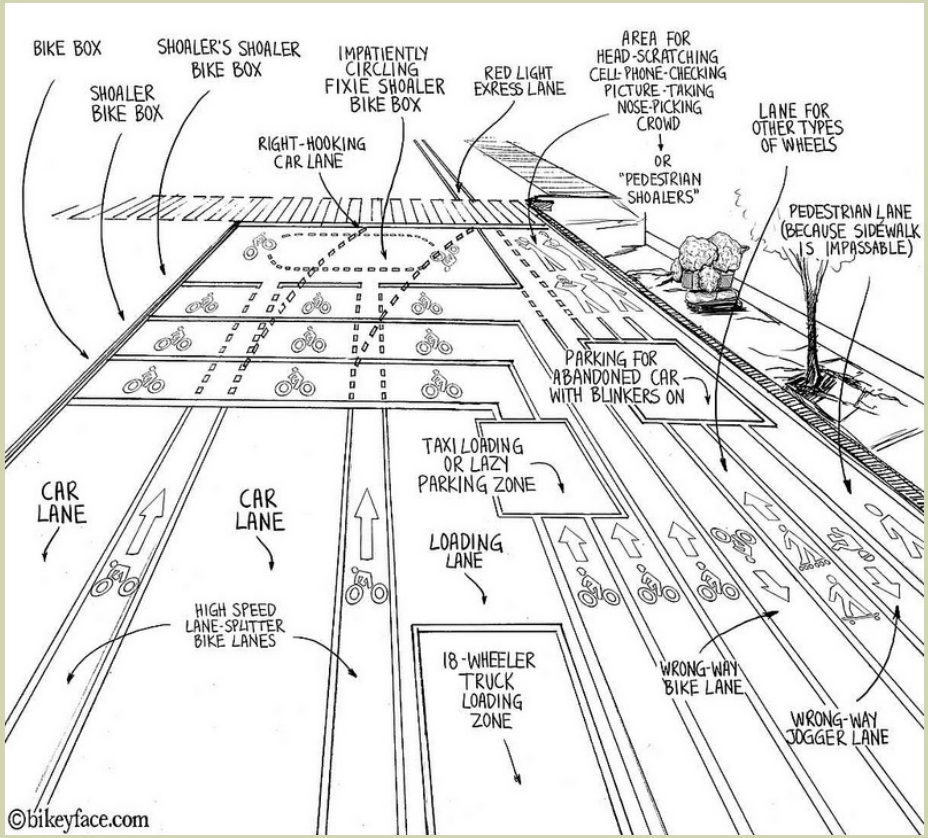
VTrans Policies

- Requires 14 feet between center and any roadside obstacle (including on-street parking)
  - means wider lanes,
  - reduced traffic calming affect, and
  - higher speeds.
- Road to Affordability Enhancement Policy
  - Need to define primary project purpose to include complete streets needs.
- Speed Limit and Crosswalk Policies

Review

- About Act 34 and Complete Streets
- How to Build Complete Streets in Vermont
  - Consider the Context
  - Consider Potential Users
  - Assess the Transportation Facilities and Other Factors
  - Planning and Design Tools
  - Consider Need versus Probable Cost
  - Reporting
- Challenges you might face

Thank you!



Questions?