PART TWO

PRINCIPLES

TOOLS

PROCESS

TOPICS

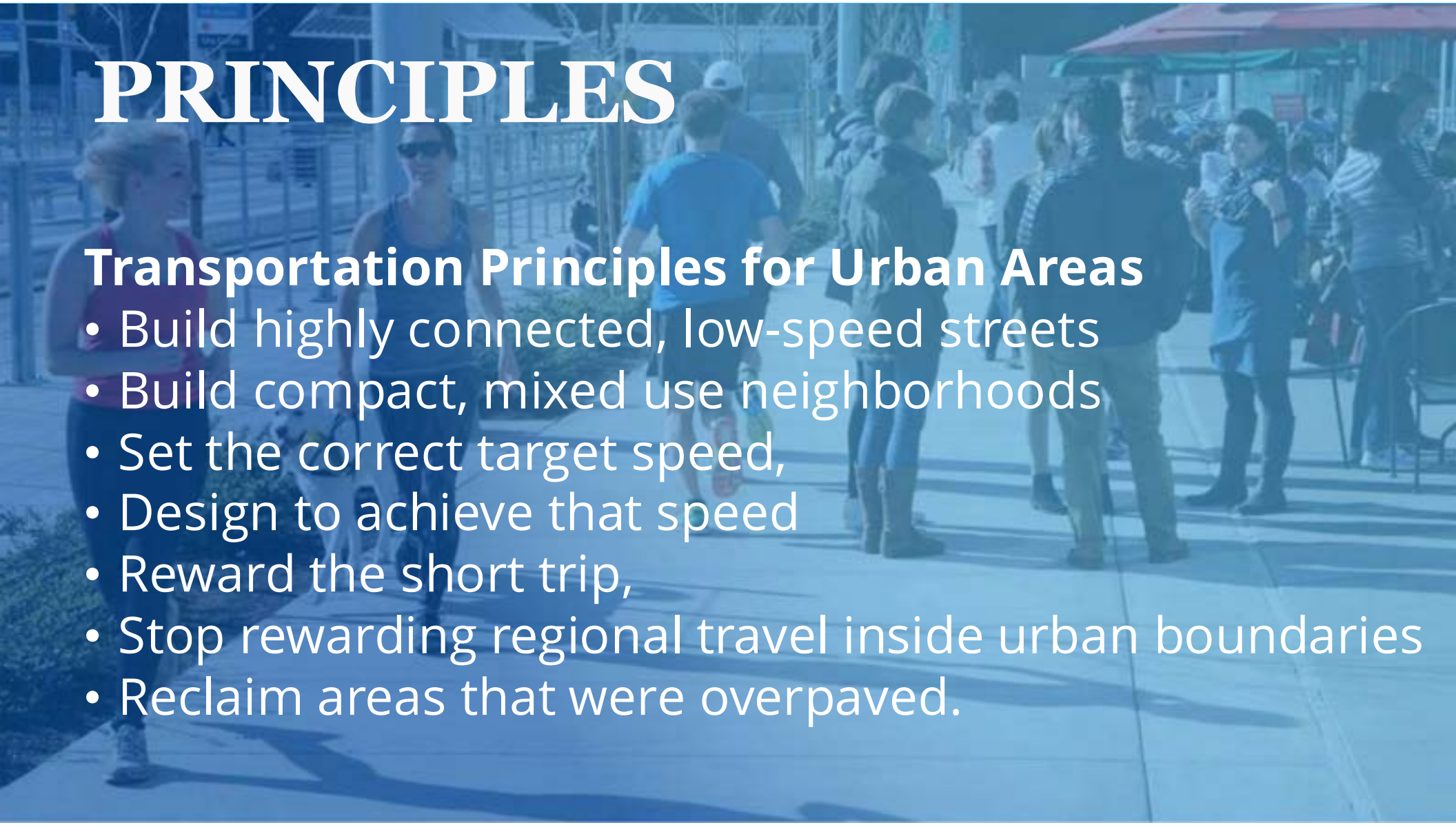
TOOLS

- SIDEWALKS,
- TRAILS
- TARGET SPEED AND SPEED CONTROL
- CROSSINGS
- INTERSECTIONS

PROCESS

- AGENCY COORDINATION
- ENGAGING THE PUBLIC
- MEASURING OUR SUCCESS


PRINCIPLES



PRINCIPLES

Transportation Principles for Urban Areas

- Build highly connected, low-speed streets
- Build compact, mixed use neighborhoods
- Set the correct target speed,
- Design to achieve that speed
- Reward the short trip,
- Stop rewarding regional travel inside urban boundaries
- Reclaim areas that were overpaved.

Walkability

CONNECTIVITY
DENSITY
DIVERSITY (MIX OF USES)
DESIGN

Design for a Mix of Land Uses

Centers include denser housing, a square, civic uses, and neighborhood- oriented retail.

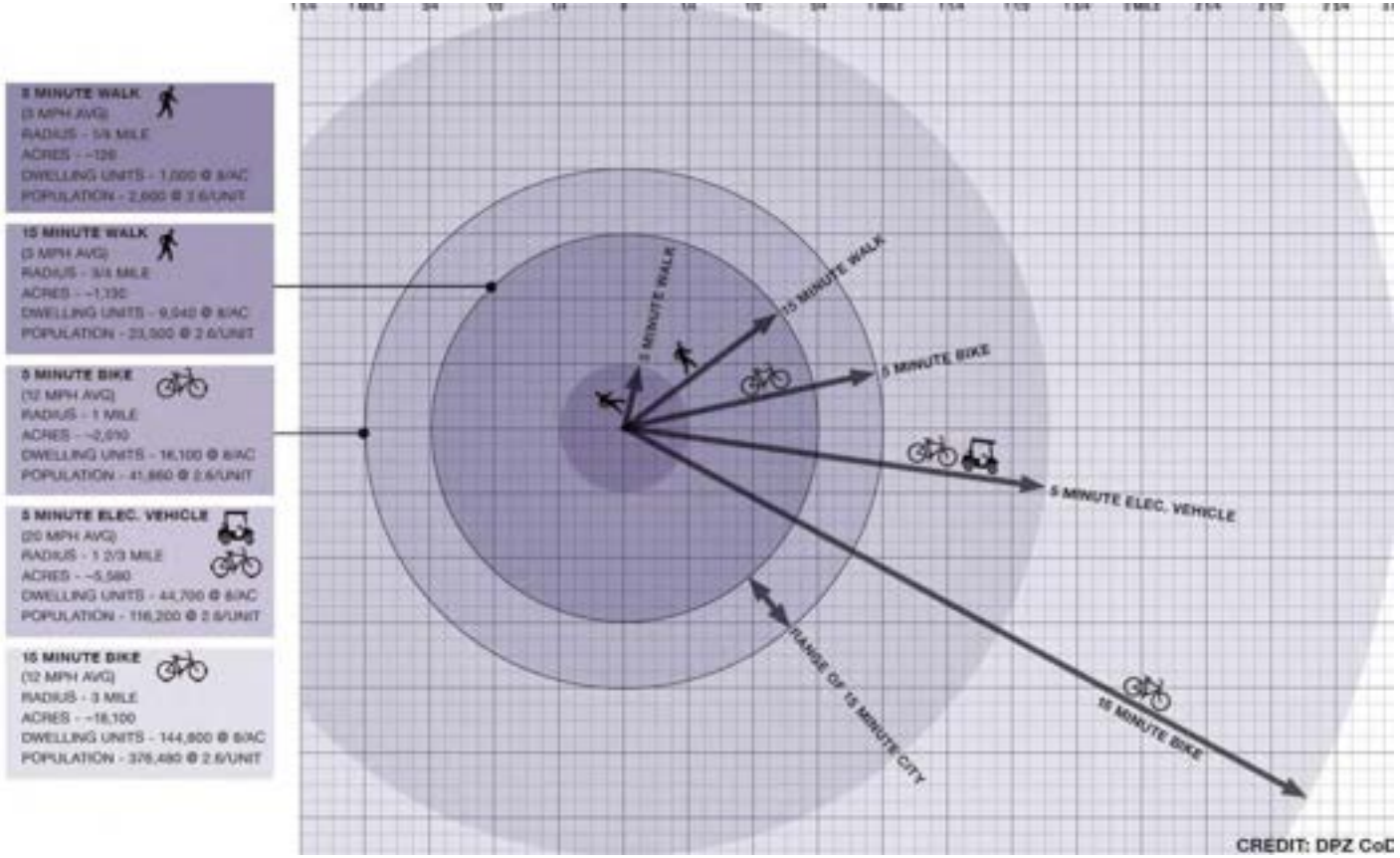
CONNECTIVITY

Nord Avenue in Chico, California (Confluence)

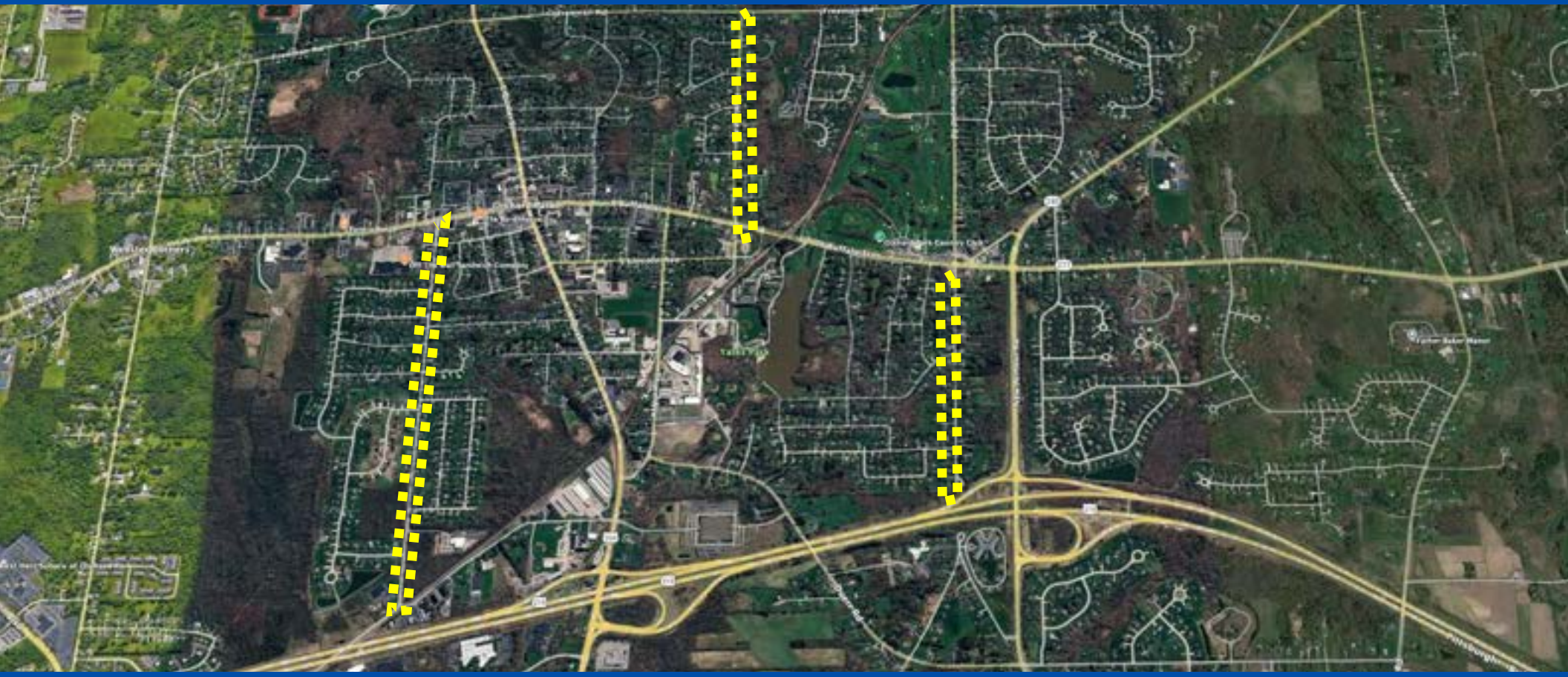
CONNECTIVITY

15-Minute City

The 15-minute city shows planners where to locate facilities that serve multiple neighborhoods. It employs conceptual radii drawn on plans in a similar way to urbanists' familiar quarter-mile "pedestrian shed." The 15-minute city is defined by its ability to provide access to all human needs by walking or bicycling for a quarter hour or less.

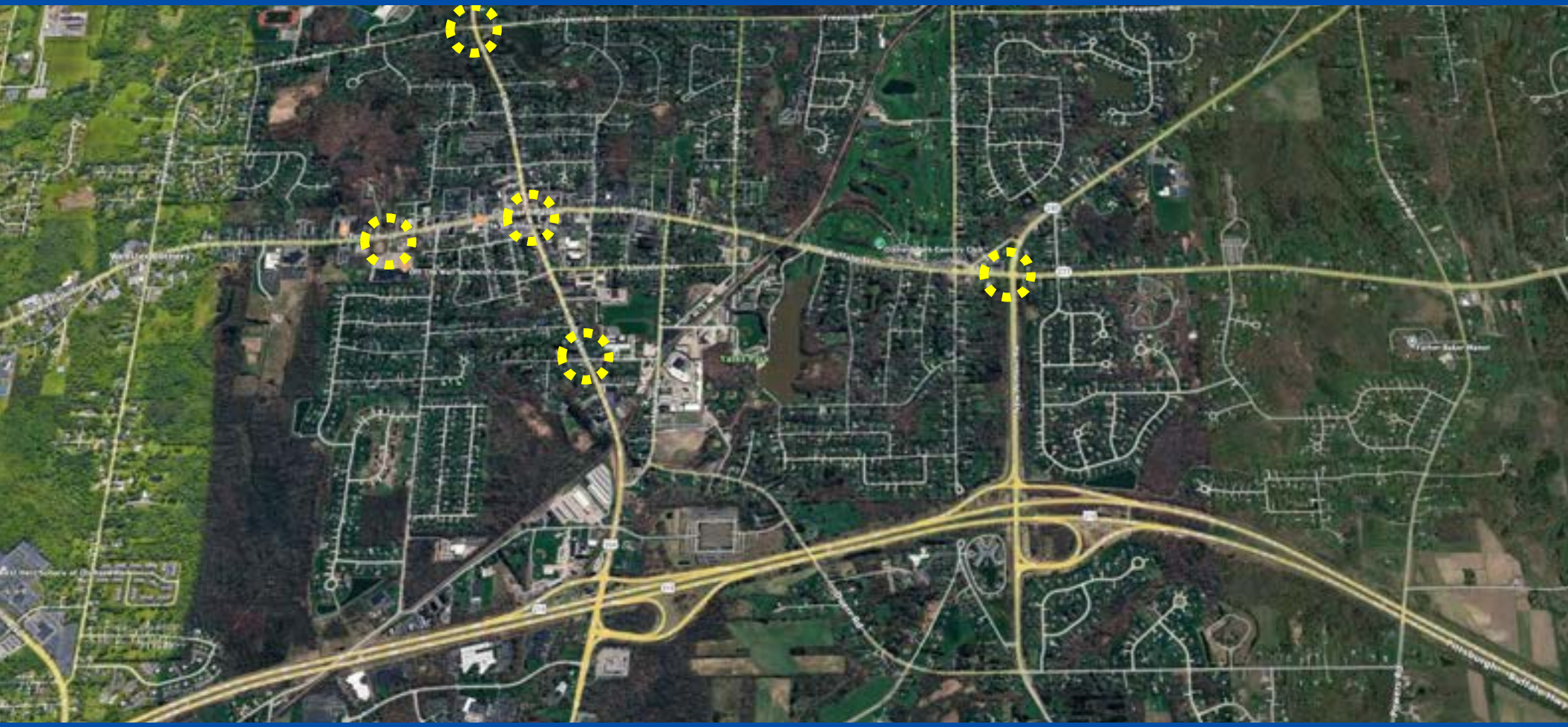


The Problem Starts Here



The Village of Orchard Park has limited internal grid and street connectivity. The overall street pattern forces pedestrians and cyclists onto principal streets like Quaker Street and Buffalo Street. This broken street pattern requires the transformation of Quaker and Buffalo streets into Complete Streets that work for all.

The Solutions Start Here



This study places a special emphasis on key gateways and crossing points which need additional design and operational effort

The Solutions Start Here

North and South Buffalo Street are key commercial and public life focus areas for the Village. The length of South Buffalo Street, from New Armour Road, through Quaker Street, and on to the Rite Aid Plaza entry with North Buffalo intersection is of special interest. Gateway treatments at either end of Buffalo can help inform and transition motorist speeds to safer levels.

PDH Credit Question #5

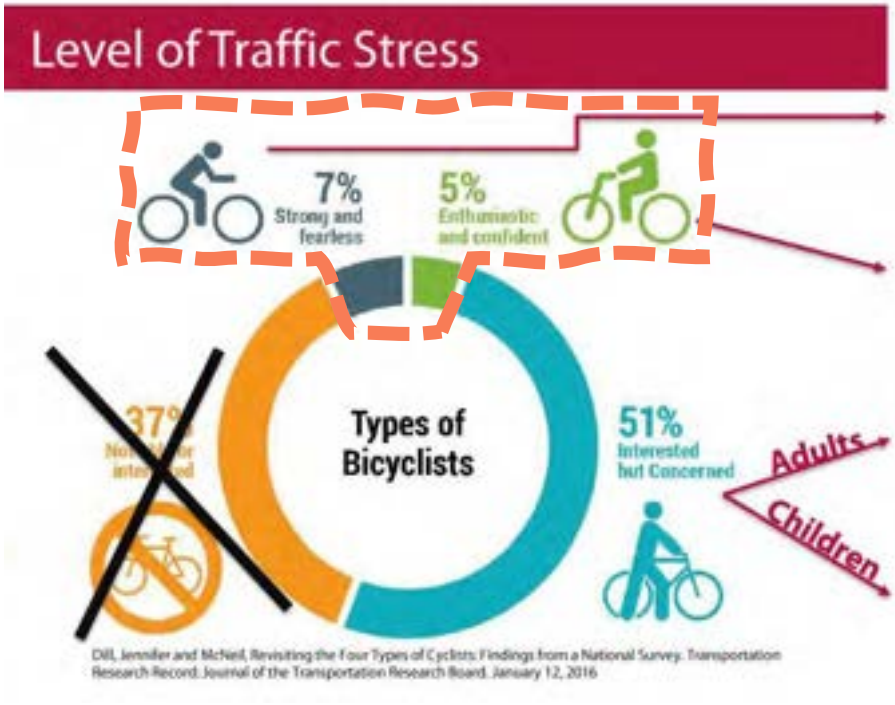
What is meant by a “15-minute city,” and how can land use, transportation, and public space planning work together to support everyday access and social connection?

Answer:

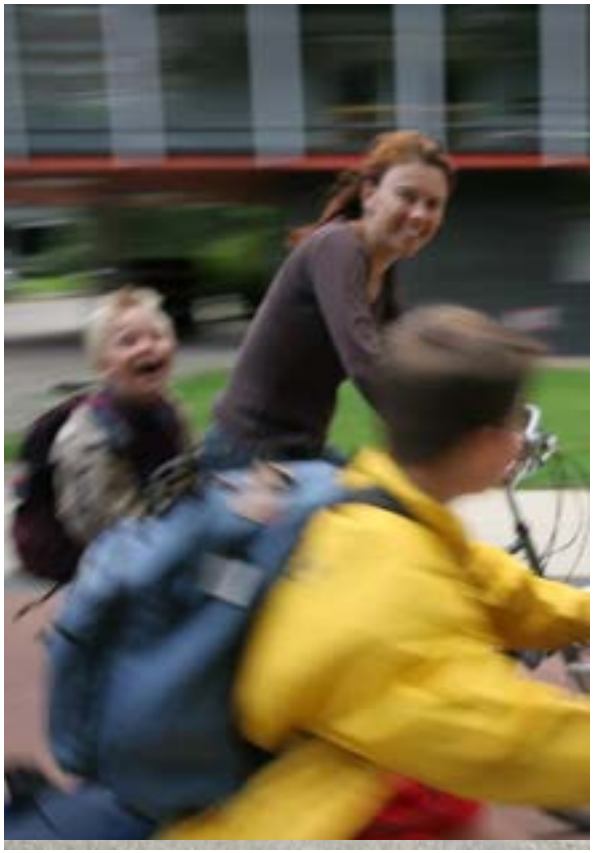
A 15-minute city is a community where most daily needs, like schools, shops, parks, food, and services, can be reached within a 15-minute walk or bike ride. This is supported through mixed-use development, connected streets and trails, safe walking and biking infrastructure, transit access, and welcoming public spaces.

BICYCLING FACILITIES

Level of Traffic Stress



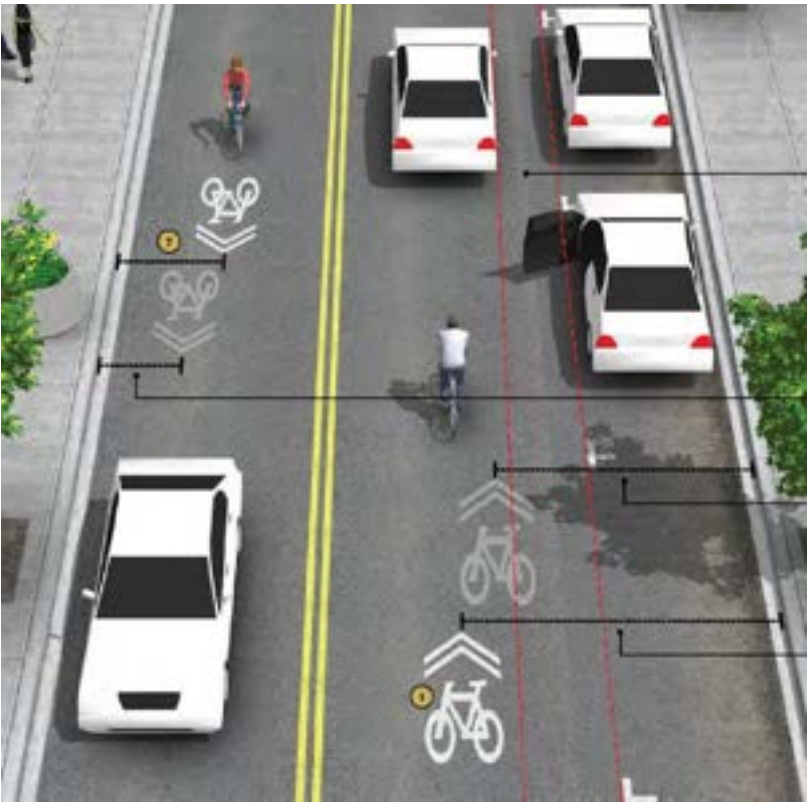
Level of Traffic Stress	
LTS 4	Fast, high volume, wide streets, no separation
LTS 3	Climbing lanes, 30mph streets, High volume streets
LTS 2	Bike lanes, moderate speed/volume streets
LTS 1	Greenways, Separated bike lanes, Low speed/volume streets



Thirty-seven percent of the public self rate their interest to bike at zero. This leaves sixty-three percent who are looking for more active transportation supports than we are providing today. The Strong and Fearless and Enthusiastic and Confident crowds are being served.

Infrastructure investments should support the 51% who are Interested but Concerned.

Sharrows



NACTO Urban Bikeway Design Guide

Sharrows provide the lowest level of support, and they provide the lowest ”lift” in getting people to bicycle. As communities allocate more roadway space for bike lanes and other enhancements, sharrow use should be reduced. In terms of their use:

- Never use sharrows as a substitute for higher levels of support, such as a bike lane;
- Sharrows are useful in designating movement and the positioning of bicycles through intersections;
- Used in the street alongside separated bikeway facilities such as cycle tracks, they indicate that cyclists are permit to ride in the street if they prefer;
- They are best utilized on local streets, and streets posted at 25mph or less;
- Their placement can guide cyclists to the safest position in the roadway and away from car doors;
- Sharrows can aid cyclists in finding bike routes and avoiding wrong-way riding;
- Passing drivers tend to give cyclists more than two extra feet of space when sharrows are present.

Bicycle Facilities Why Design Matters

Buffered & Protected Bike Lanes

Buffered Bike Lane
Columbus, OH

Buffered Bike Lane
Venice, FL

Protected Bike Lane
Cambridge, MA

Multi-Use Trail
Davis, CA

Cycle Tracks (Protected Bike Lanes)

CAMBRIDGE, MA

WINTER PARK, FL

TORONTO, ONTARIO

CAMBRIDGE, MA

STREETS FOR ALL USERS

- Focus is on **flexible design** approach.
- "Context sensitive" solutions . . .
  - Type of road & users
  - Speeds, volumes
  - Land uses
  - Local plans & priorities

Principles for Incentivizing Active Transportation

Separate motorized from non-motorized traffic: This is especially easy to achieve on new streets. Pathways of 10-12 feet are often adequate for the trail portion of the right-of-way. Location: Vancouver, British Columbia

Separate by applying new ways to use a road: A former two way beach street was converted to a two-way walking and bicycling trail. The new trail is placed next to the water, and a 10 mph vehicular access lane is kept next to driveways. Location: Kauai, Hawaii

Separate wheels from heels: As active transportation volumes increase, separating heels from wheels is important. Always place heels next to water or key attractions. Note the use of contrasting materials. Location: Minneapolis, Minnesota

Protected Bike Lanes (Intersection Treatment)

CAMBRIDGE, MA

Protected Bike Lanes provide benefits , including:

- Fully separating bicyclists from moving traffic
- Offering a defined space for people on bikes which reduces sidewalk riding
- Promoting an orderly flow of traffic and reducing conflict points
- Increasing the sight distance for motorists entering the roadway from driveways and side streets
- Improving the turning radius for larger vehicles

Protected Bike Lanes (Intersection Treatment)

Missoula, MT

Bike Lanes

Gainesville, FL

Best Practice:
- 6’ minimum width bike lane
- Two contrasting materials are used in this example

Bike Lanes provide benefits for all road users, including:
- Offering a defined space for people on bikes which reduces sidewalk riding;
- Promoting an orderly flow of traffic and reducing conflict points;
- Increasing the sight distance for motorists entering the roadway from driveways and side streets;
- Improving the turning radius for larger vehicles;
- Allocating space for motorists to pull out of the travel lane when emergency responders must pass.

Buffered & Protected Bike Lanes

Protected bike lanes were first used in Boulder, Colorado, and Eugene, Oregon, in the 1980s and 1990s, and were later adopted widely in New York City early in 2010.

As many as 60% of Americans say they will bike if protected bike lanes are offered, up from 12% who will cycle if bike lanes are present. Protected bike lanes can be one directional or bi-directional.

Top Photo: Calgary, Alberta, Canada, is taking back numerous lanes in the downtown, converting them to protected bike lanes. Despite challenging biking seasons, Calgary has applied a series of strategies to reduce single occupant trip into the downtown, reducing them to 40% of all trips.

Lower Photo: One of the oldest protected bike lanes in North America in Boulder, Colorado.

Buffered Bike Lanes

Venice, FL

Buffered Bike Lanes provide further benefits for all road users, including:

- Offering a better defined space for people on bikes which reduces sidewalk riding;
- Increasing the buffer between bicyclists and motorists, and motorists and pedestrians;
- Promoting an orderly flow of traffic and reducing conflict points;
- Increasing the sight distance for motorists entering the roadway from driveways and side streets;
- Improving the turning radius for larger vehicles.
- Allocating space for motorists to pull out of the travel lane when emergency responders must pass


THE TOOLBOX

The Parts of the Street #1

The functions of a street are spelled out in its various parts. This street has two high quality walkways (one on each side). Note the “attached” and the more comfortable “detached” sidewalks. Why is the detached sidewalk more comfortable?

This Central Avenue, Sequim, Washington, street also has a quality planter strip on each side, bike lanes, travel lanes and a center set of medians and turn lanes.

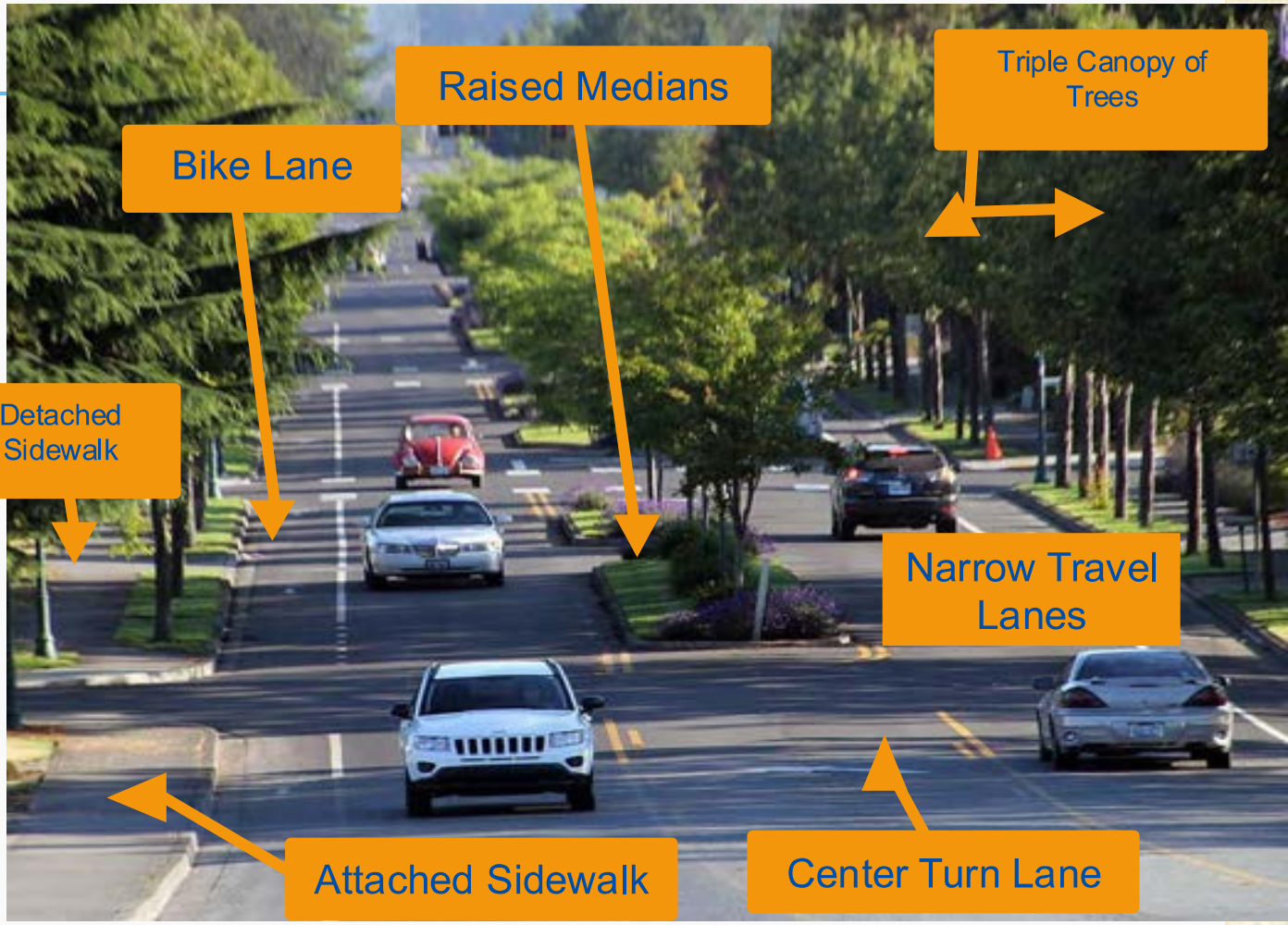
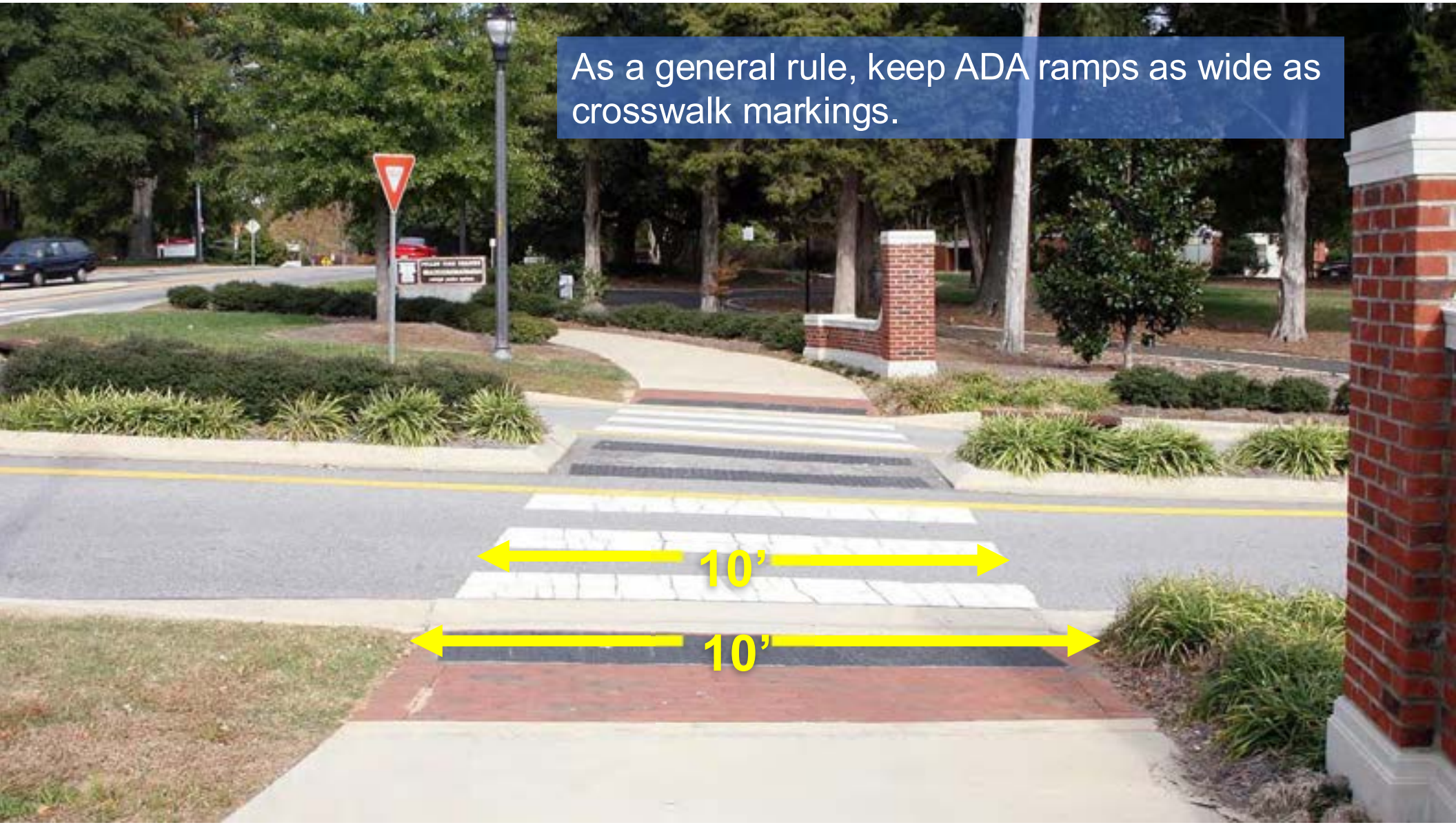


Image location: Central Avenue, Sequim, Washington

The Parts of the Street #2


As a general rule, keep ADA ramps as wide as crosswalk markings.
10’
10’

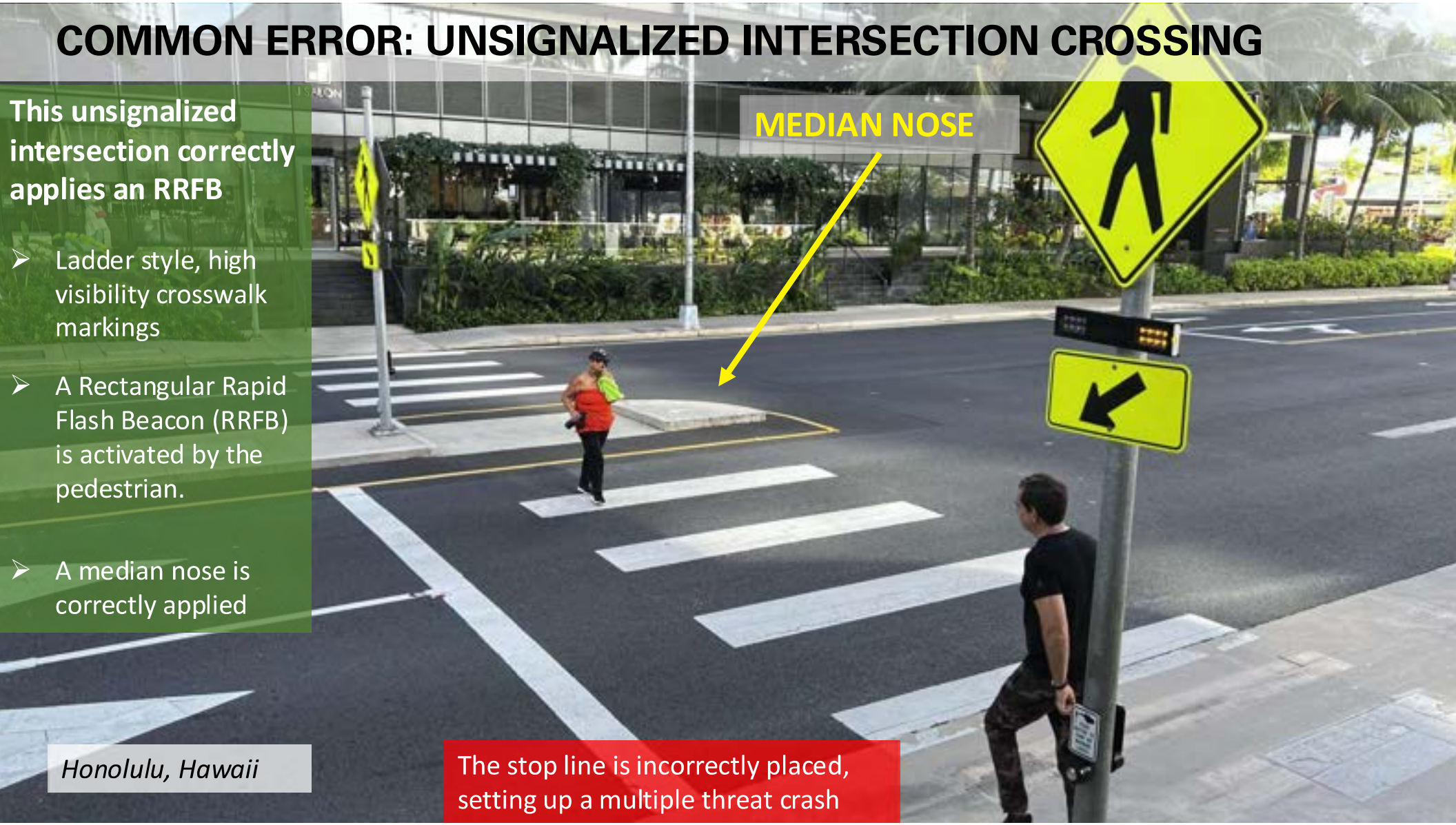
Crossing Multiple Lanes of Traffic

Multiple lane roadways pose extra risk to pedestrians, and extra care is needed:

- Consider a road diet when volumes permit;
- Slow motorists to 25mph or use signals;
- Use curb extensions (not shown);
- Place stop or yield lines back 30-50 feet (critical to reducing the risk of a multiple threat crash);
- Use crossing medians to separate conflicts in time and place;
- Provide adequate lighting;
- Consider raised crossings and other traffic calming tools;
- Use high emphasis markings;
- Double face crossing signs;
- Ideally, use ground cover and other landscaping to make crossing locations obvious from 800-1,000 feet away

Image Location: Chicago, Illinois

COMMON ERROR: UNSIGNALIZED INTERSECTION CROSSING



This unsignalized intersection correctly applies an RRFB

- Ladder style, high visibility crosswalk markings
- A Rectangular Rapid Flash Beacon (RRFB) is activated by the pedestrian.
- A median nose is correctly applied

Honolulu, Hawaii

The stop line is incorrectly placed, setting up a multiple threat crash

SAFE STREET

TOOLS

SIDEWALKS

People report that they would not walk in the lower photo unless forced to by circumstance

People report that they would walk in the above photo. What are the differences?


A benefit to a road diet is the creation of a wider buffer between motorists and pedestrians


Four Foot Maximum Height Fence
Five Foot Minimum Width Sidewalk
Planter and Furniture Zone
Add Buffer For Shy Distance
Baldwin Park, Orlando, Florida

Sidewalk Parts

By breaking sidewalks into three distinct parts (Shy Zone, Furniture Zone and Walk/Talk Zone it is easier to see and protect each function. The Walk/Talk Zone should NEVER have intruding parts, such as sandwich boards, trash cans or other interrupting features.


MORA
Shy Zone
Walk/Talk Zone
Furniture Zone

Enclosure

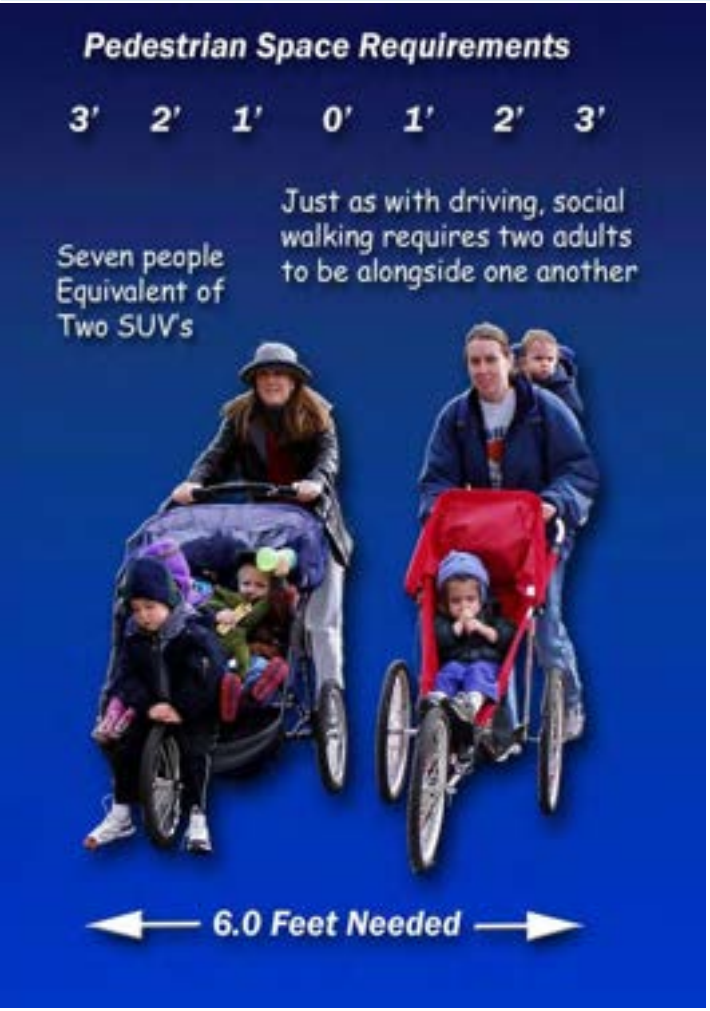
ENCLOSURE Is the quality added by enclosing the sidewalk or street with trees, lamps, awnings, benches, and buildings.

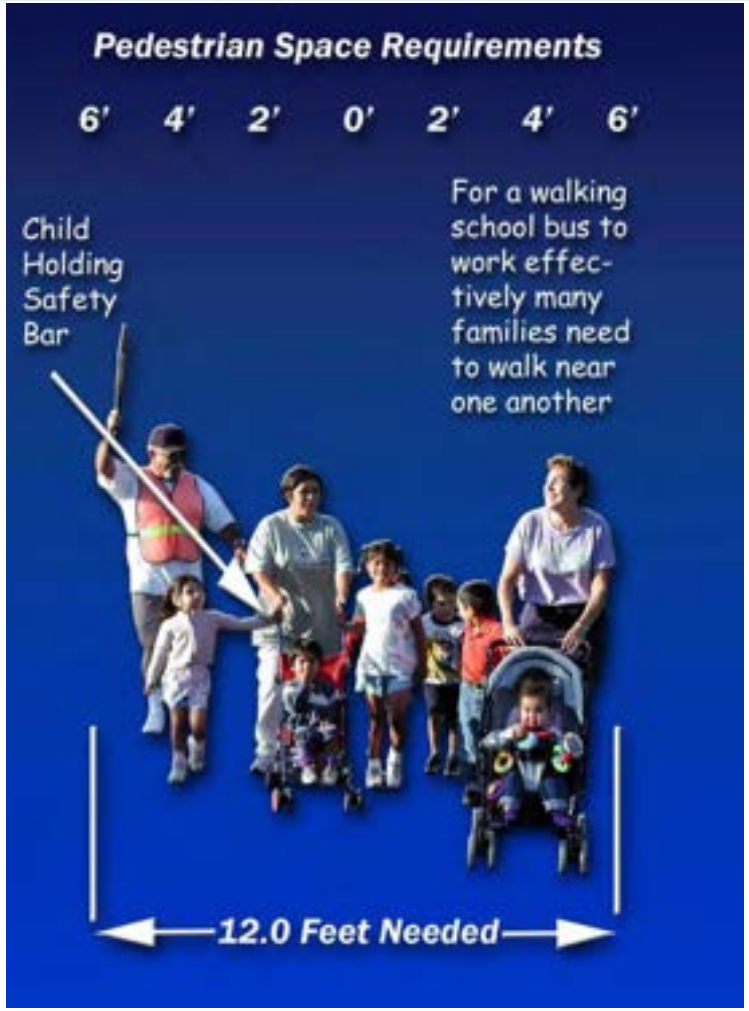

Sidewalks

Transparency

TRANSPARENCY Is the quality added by being watched over. The buildings hold the street, the window and door glazing are 70% or more. There are no missing teeth (buildings).

Widen Sidewalks and Crossings Near Schools

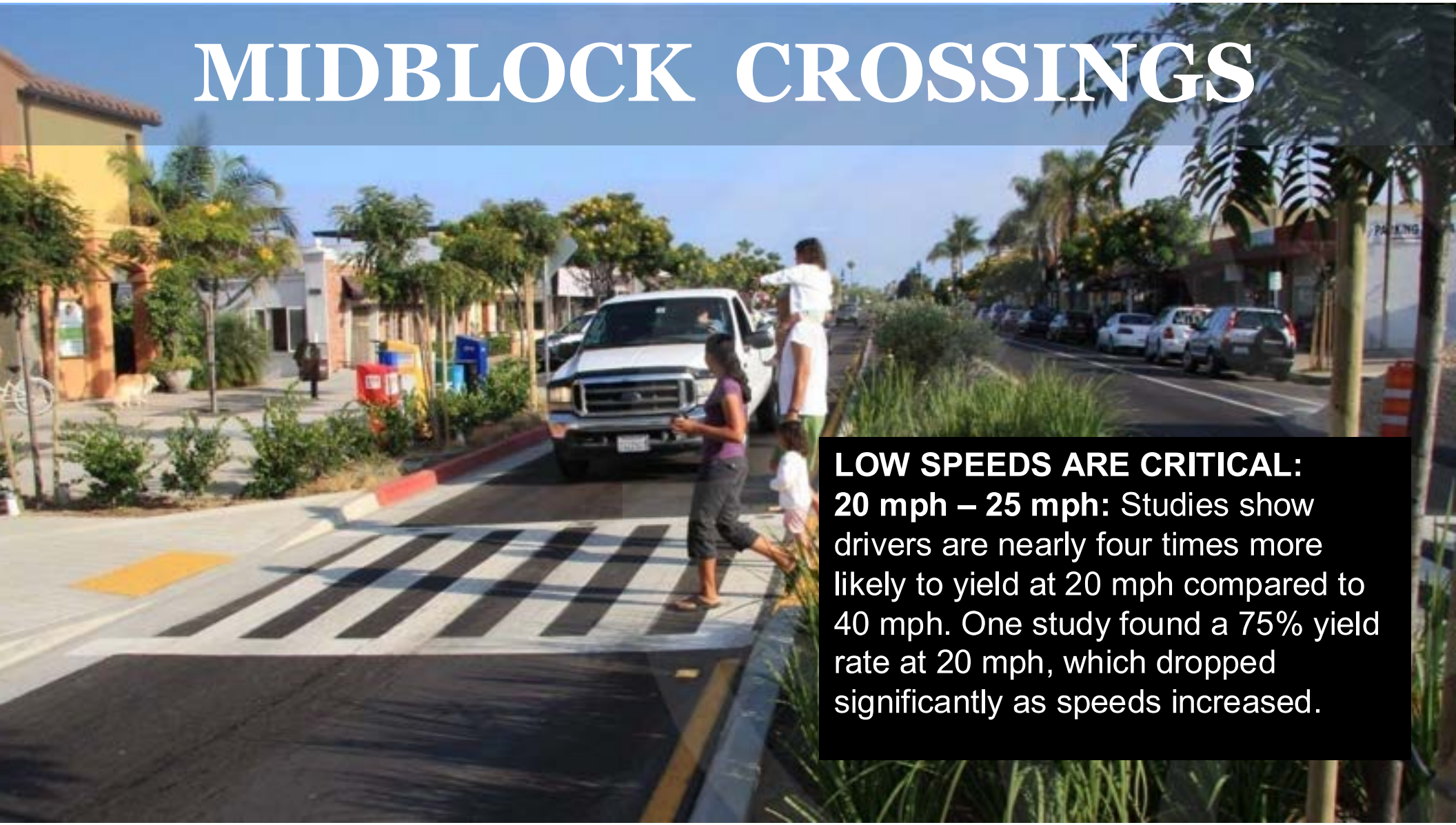




In pedestrian-rich areas, sidewalks and crosswalks should accommodate parents and children walking side-by-side and using strollers or other wheeled devices.

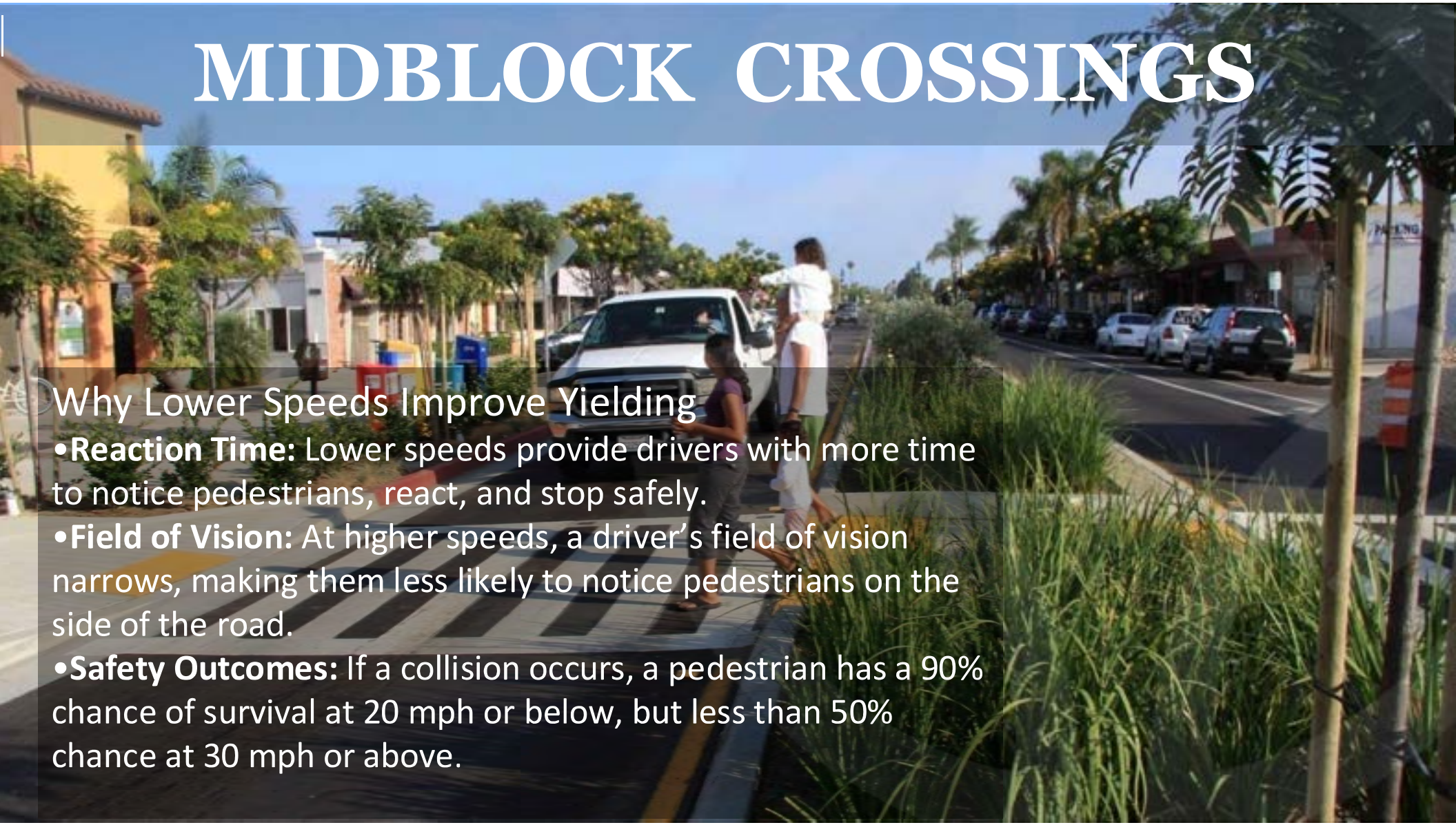
MIDBLOCK CROSSINGS

MIDBLOCK CROSSINGS



LOW SPEEDS ARE CRITICAL:
20 mph – 25 mph: Studies show drivers are nearly four times more likely to yield at 20 mph compared to 40 mph. One study found a 75% yield rate at 20 mph, which dropped significantly as speeds increased.

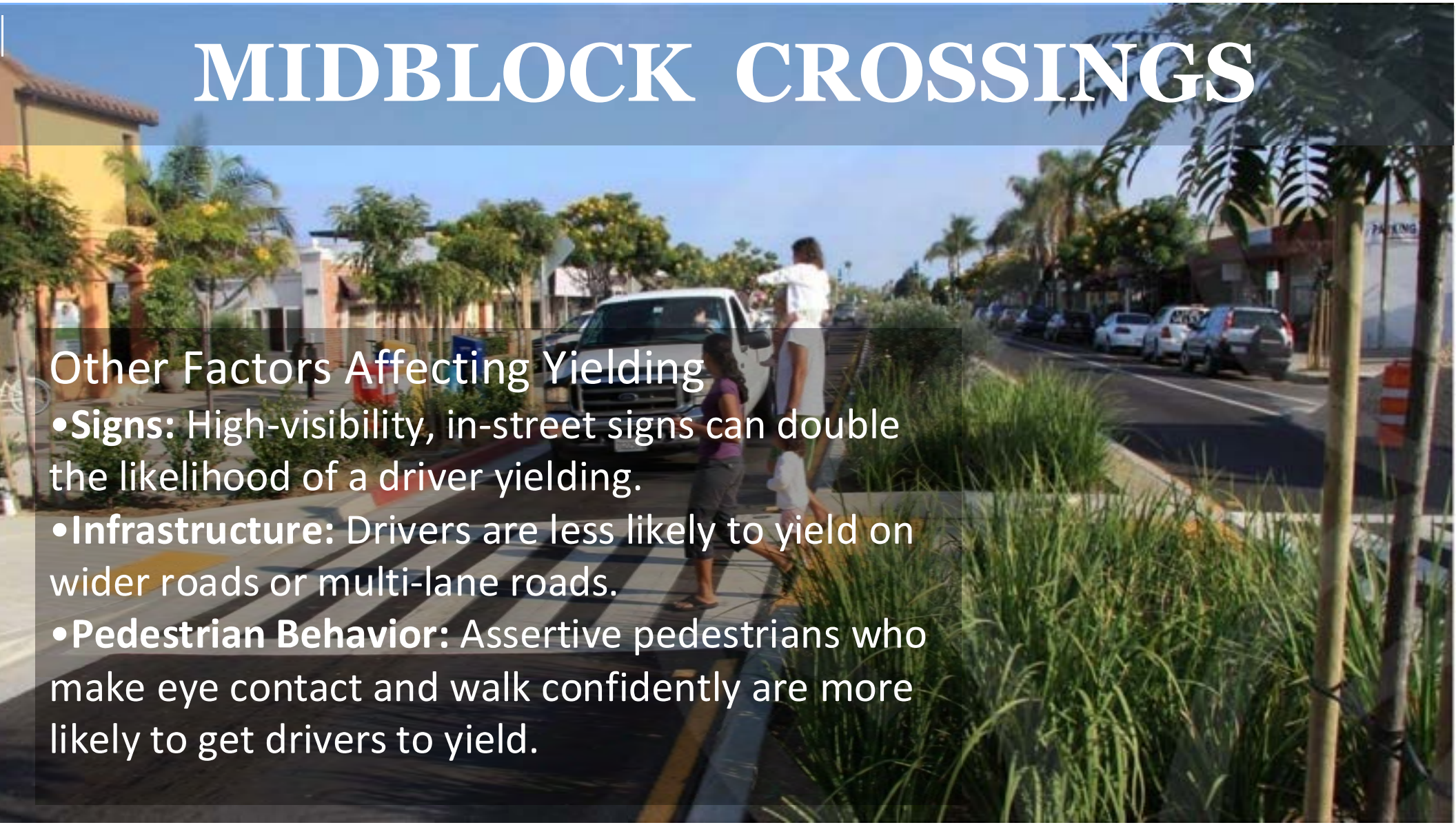
MIDBLOCK CROSSINGS



Why Lower Speeds Improve Yielding

- **Reaction Time:** Lower speeds provide drivers with more time to notice pedestrians, react, and stop safely.
- **Field of Vision:** At higher speeds, a driver's field of vision narrows, making them less likely to notice pedestrians on the side of the road.
- **Safety Outcomes:** If a collision occurs, a pedestrian has a 90% chance of survival at 20 mph or below, but less than 50% chance at 30 mph or above.

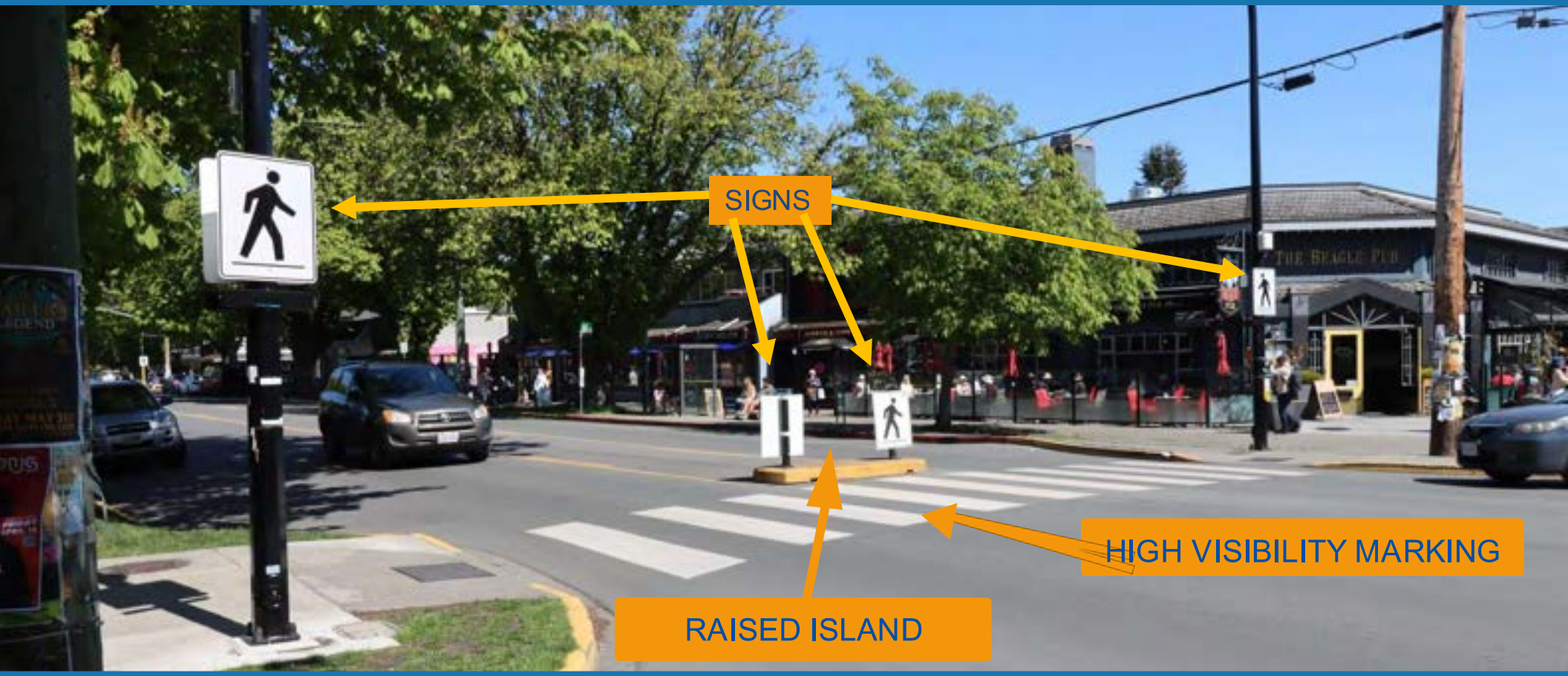
MIDBLOCK CROSSINGS



Other Factors Affecting Yielding

- **Signs:** High-visibility, in-street signs can double the likelihood of a driver yielding.
- **Infrastructure:** Drivers are less likely to yield on wider roads or multi-lane roads.
- **Pedestrian Behavior:** Assertive pedestrians who make eye contact and walk confidently are more likely to get drivers to yield.

The Parts of a 25 mph Street



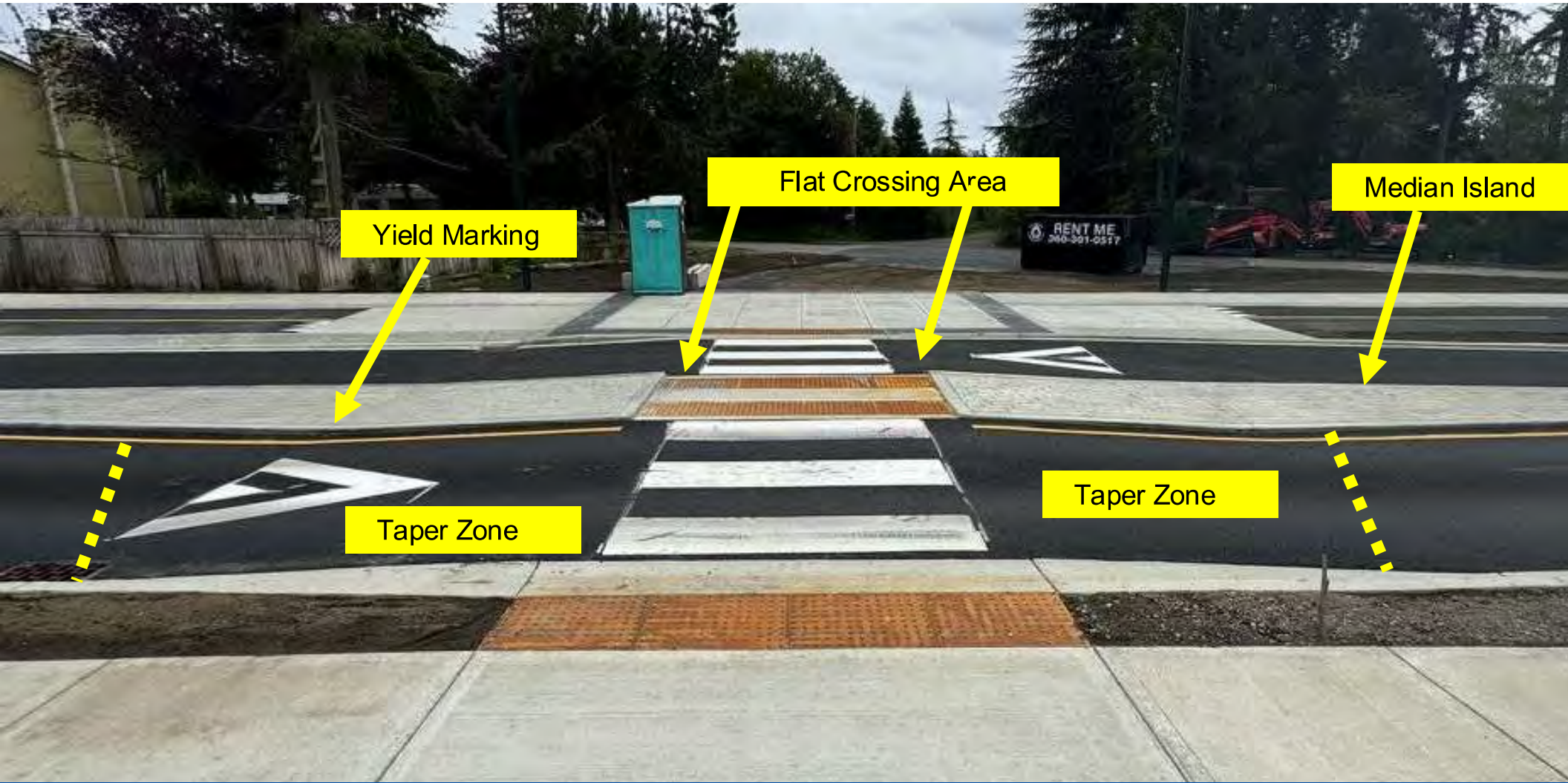
This low-cost traffic calmed intersection supports walking, bicycling and safe driving and the success of main street

Single Lane Midblock Median Crossing

Crossings –Elements: People cross one lane at a time, high emphasis markings, wide Z-crossing island, curb extensions . Note, there are 2 closely spac
crossings, keeping the speeds low. Pedestrians cross from a parking lot to the county municipal building. (Asheville, NC)

The Parts of A 25 mph Street

Discovery Road, Port Townsend, WA --Target speed 25 mph. Once landscaped this vision for design will bring about 25 mph speeds by 95% of all motorists (Port Townsend, Washington)



An ideal midblock crossing is raised, has a median island, and narrow lanes. Speeds are controlled within the Quar
commercial radius to not exceed 20-25 mph.

The Parts of a 30 mph Street

This unsignalized intersection correctly applies an RRFB

- High visibility crosswalk markings
- A Rectangular Rapid Flash Beacon (RRFB) is activated by the pedestrian.
- A median nose is correctly applied
- 10-foot lanes are applied

Tallahassee, Florida

GOOD PRACTICE: CROSSING

This Golden Gate, Colorado, crossing uses a curb extension on each side plus a crossing island. This low-cost treatment does not interrupt drainage, while the landscaping allows the islands to be seen over 1000-foot on approach. The asphalt portion is only 8-foot wide, while the curb-to-curb opening is 14-foot.

Bicycle Path / Trail Crossings – ADD AN RRFB

- Note the double-faced signage for motorists;
- Rectangular Rapid Flash Beacons achieve up to an 80% compliance rate;
- Rectangular Rapid Flash Beacons are solar powered;
- Ensure adequate lighting;
- Consider a raised crossing or other traffic calming tool;
- When possible, slow the motorist's approach to 20mph.

Image Location:
Kirkland, Washington

NEIGHBORHOOD MINI-CIRCLES

What is a Neighborhood Mini-Circle?

Photo Vision: Fort Worth, TX

- Mini-circles are raised circular islands constructed in the center of residential street intersections, often used in place of stop signs.
- They encourage reduced vehicle speeds and have been found to reduce motor vehicle crashes in some locations, such as Seattle, WA.
- Abundant public space on a street system can be found at intersections. It is here where low-cost circles slow traffic and reinforce neighborhood character.

How Does It Work?

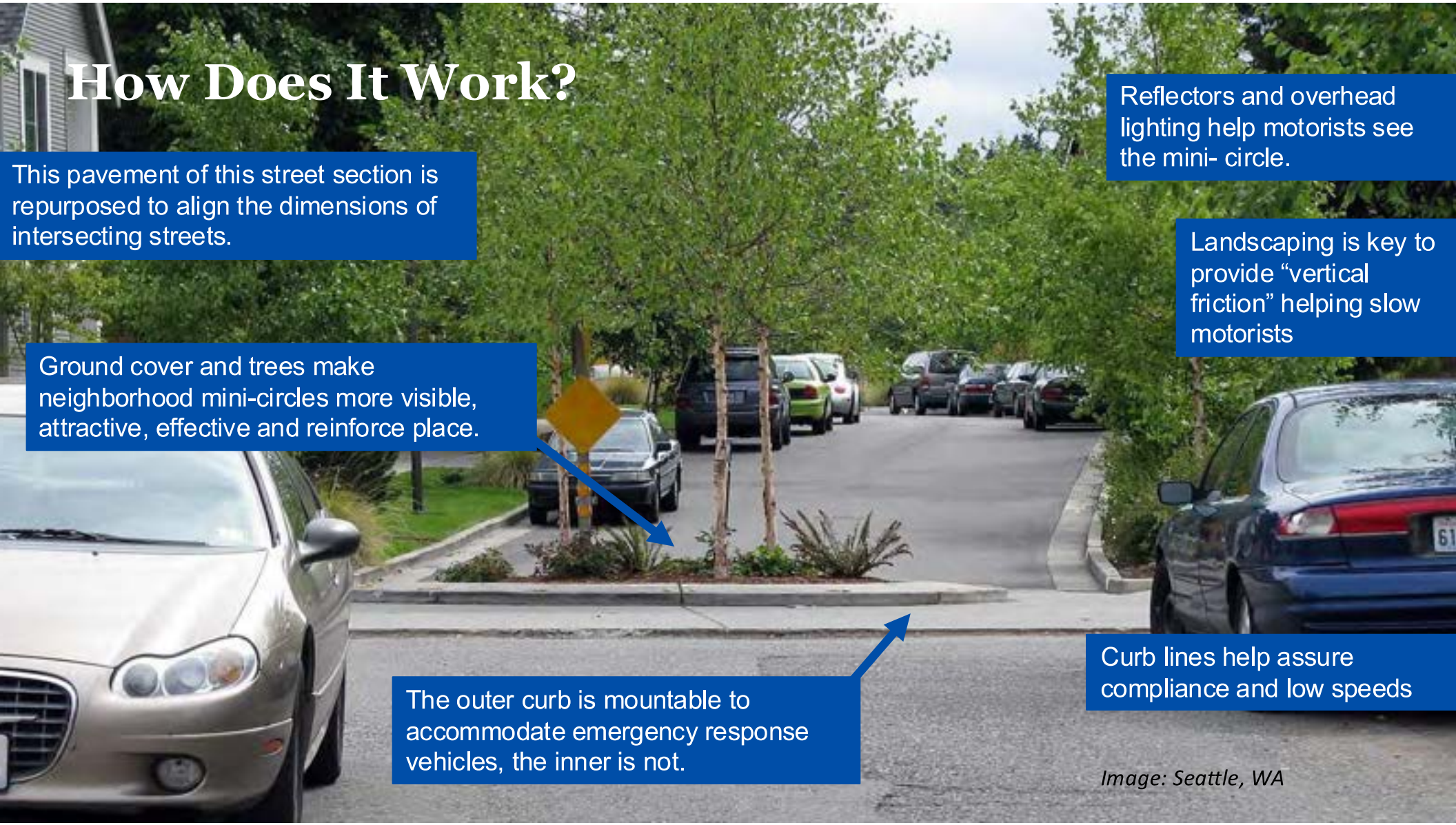


Image: Seattle, WA

Good Practice: Neighborhood Mini-Circles

Although it is possible to forgo landscaping, neighborhood mini-circles work best by adding attractive ground cover, lighting and trees. These features help motorists in detecting, responding, and slowing their travel. Seattle keeps almost all local streets to 18-20 mph through a regular series of attractive neighborhood mini-circles. For neighborhood acceptance, favor landscaping over signs and designs that reinforce neighborhood beauty and pride.

Images: Seattle, WA

Good Practice: Lower-Cost Designs

The design and construction of neighborhood mini-circles are generally low cost. Seattle produces their average size mini-circle for $15,000-25,000. Meanwhile, effective mini-circles can be quite narrow when streets are narrow, such as the example (left) in Port Townsend, WA, which cost less than $100 to construct. Features can include rural gardens when neighbors agree to converting pavement to parks.

Image Left: Port Townsend, WA. Image Right: Pittsford, NY

Neighborhood Mini-Circle: Summary of Benefits

Image: Seattle, WA

- ✓ Low-cost option to slow traffic
- ✓ Can be applied on different street widths
- ✓ Helps green the neighborhood
- ✓ Accommodates all types of vehicles
- ✓ Works in rural type communities, but needs curbing at the intersection

CHICANES


22 DOWNTOWN SB
710
MTD

How Does It Work?

- Chicanes create a horizontal deflection that shifts the travel lane. When designed correctly, the shift reduces speeds.
- An ideal design achieves speeds of 14-18 mph. Lighting, signage and greenery features are used to improve visibility and contribute to lower speeds.
- Chicanes are used midblock on blocks generally more than 500 feet where speeding is a documented problem but can also be used at intersections and serve as gateways.

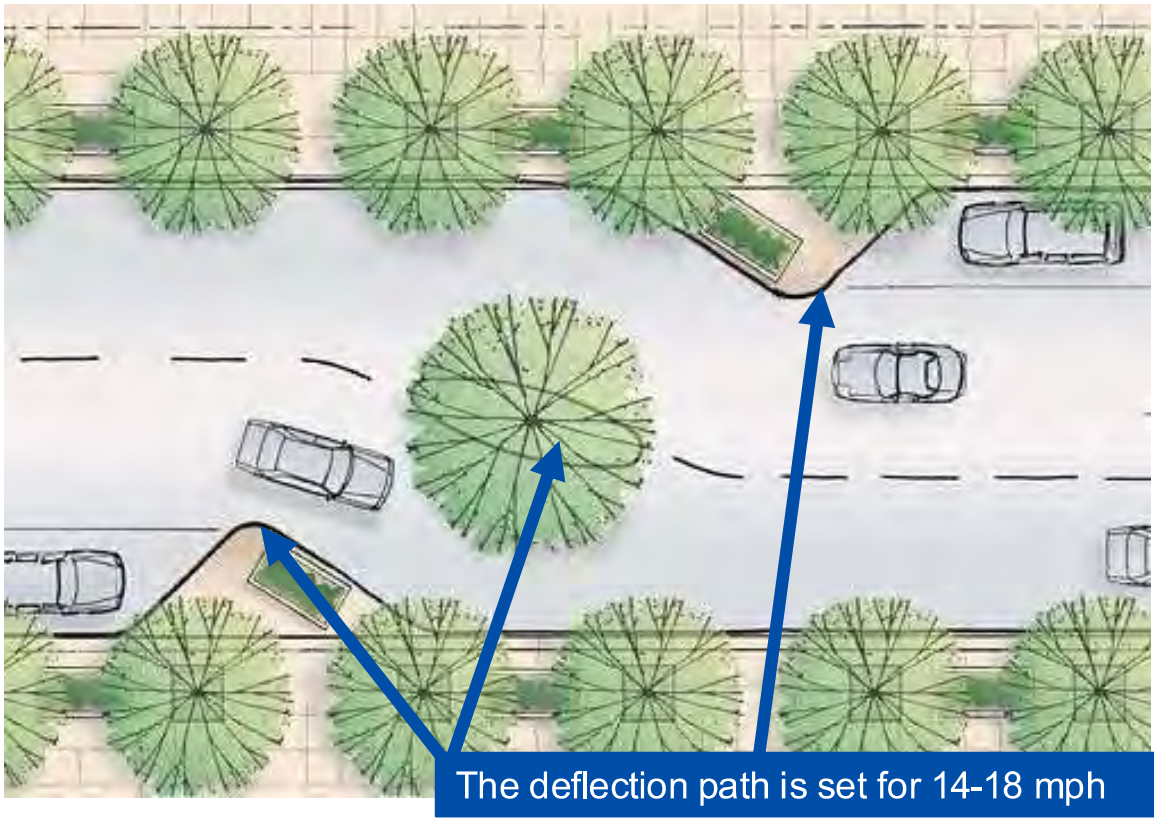
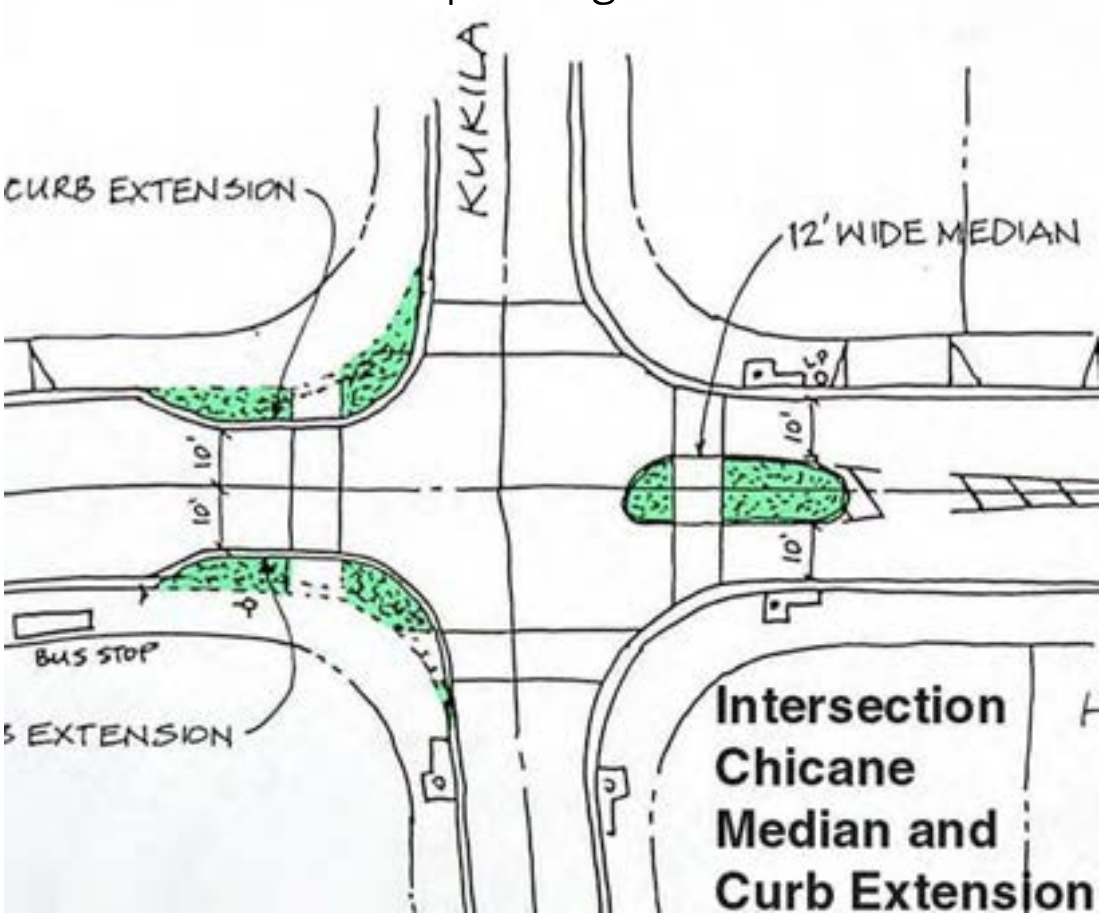


Image: San Francisco, CA

Horizontal Traffic Calming -- CHICANE

sets up deflection paths to bring speeds into the 15-20 mph range



What is a Chicane?

- A chicane uses a combination of street elements – such as curb extensions and medians – to form curves that do not allow for a motorist to drive in a straight line.
- These narrow, curving sections of roadway slow vehicular speeds and require more attentive driving by motorists.
- Low ground cover and plantings, as well as rain gardens, can be used to green streets and create gateway features.

The curb extension and median create a deflection path helping reduce speeds

Image: Honolulu, Hawaii

Good Practice: Speed on Residential Streets

- Where blocks are long, speeding is encouraged. Traffic calming measures, like chicanes, help keep speeds at safer levels by setting expectations for driver behavior.
- Typically, traffic calming treatments are implemented as a system and spaced every 400-500 feet for best speed control.
- The goal is to encourage consistent speeds of 14-18mph rather than high speeds or frequent stopping.

Image: Seattle, WA

Good Practice: Deflection Path

Image: Santa Barbara, CA

- In the image to the left, tire wear shows how well the desired deflection path has reduced speeds.
- Note the curb extension sets up the first deflection point, moving motorists outward.
- Next, the island sets the second chicane deflection point.
- In tandem, these two features require motorists to slow, thereby controlling speeds.
- Landscaping makes both features more attractive and visible.

Good Practice: Demonstration Project

- Chicanes can be built as a temporary measure at low cost, then later enhanced as attractive islands.
- Motorists slowed and changed their behavior after this chicane was painted with raised delineators added.
- If paint alone is not enough, the test period allows residents to observe then vote for a lasting, attractive set features.
- After a trial period of no less than 6 months, the design can be implemented as a durable solution.

Image: New York
Credit: Roy Smith

Good Practice: On-Street Parking

Image: Monterey, CA

Staggering on-street parking from one side of the street to the other produces a traffic calming effect, similar to a chicane, by creating gentle S-curves that slow speeds.

Chicanes: Summary of Benefits

- ✓ Can add greening and neighborhood beautification.
- ✓ Are highly effective tools for slowing traffic speeds when blocks exceed 500 feet in length.
- ✓ No impact to drainage if curb extensions are not attached to the curbs.

What is a Parklet?

Image: Kirkland, WA

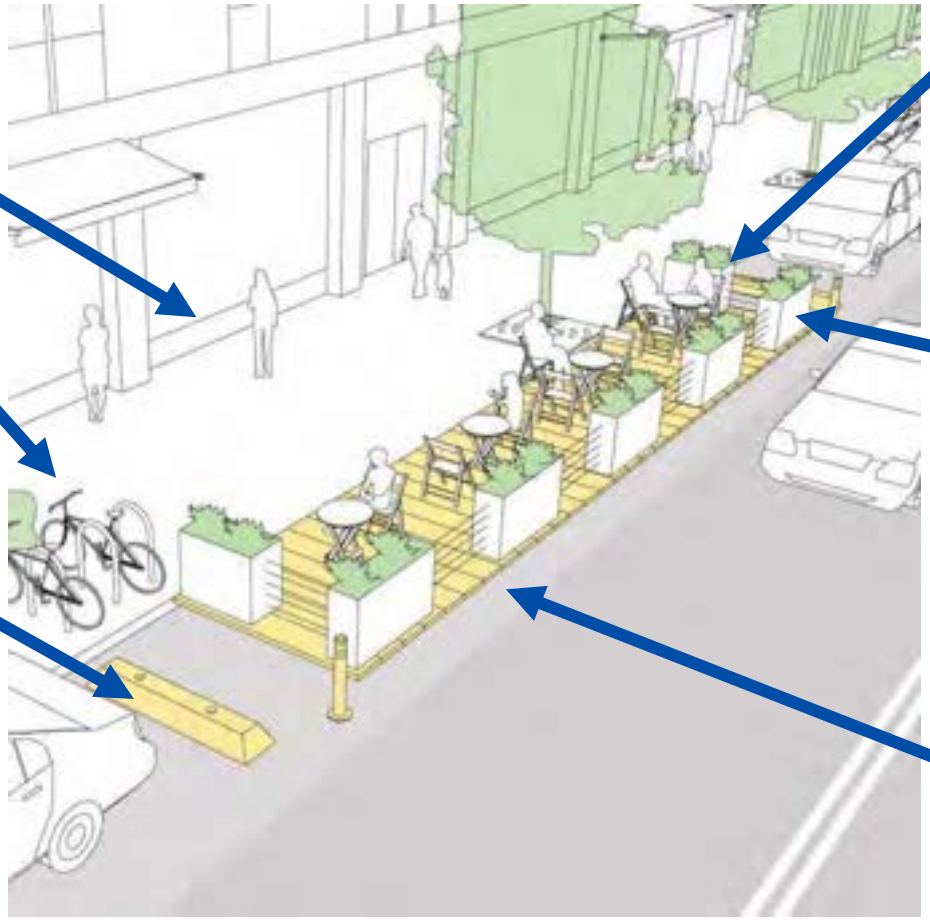
- Reassigning non-essential street pavement or on-street parking to create functional parks, bicycle parking, outdoor dining area or retail space is proving to be popular.
- A primary purpose of streets is to support the social and retail life of core commercial areas. Encouraging foot traffic and providing welcoming public spaces gives an area its soul.
- A parklet is typically a sidewalk extension into the street adjacent to the curb to prioritize the pavement for people.
- Parklets often start as temporary treatments, or places where people are naturally congregating that can later be made into long-term, attractive public space.

How Does it Work?

Parklets allow sidewalk space to be freed up, making walking and lingering more comfortable.

Bicycle parking may be incorporated into the space.

Curb stops and bollards are placed 4-feet back on both ends. This area can also be used for bike parking.



Minimum width of 6 feet, and wider if angled parking is converted.

Landscaping and vertical treatments are key and help slow motorists and create helpful buffers.

A positive curb line helps assure compliance and low speeds.

Credit: NACTO

Good Practice: Demonstration Project

Seattle has initiated a Pavement-to-Parks program. After a temporary trial period using planters, seating and paint, many areas are turned into permanent parks.

What is a Bike Corral?

- Bike corrals transform street pavement assigned to cars into functional bicycle parking. Ten or more bikes can fit into ~20 feet of pavement or the average sized parking space for one car.
- Retail research shows that bicyclists and pedestrians spend more than motorists.[1]

Image: Los Angeles, CA

1. Source: https://doi.org/10.1080/01441647.2021.1912849

How Does It Work?

Image: Portland, OR

- Note how bike corrals and parklets, used in combination, add to the safety of this Portland, OR, street by narrowing the visual width of the street, and sending the message to motorists to slow down.
- The use of planter boxes and delineators provide lower-cost conversion tools that can be customized for local charm.

Parklets & Bike Corrals: Summary of Benefits

- ✓ Creates visual narrowing of roads, especially at intersections
- ✓ Frees space on sidewalks for improved walking experience
- ✓ Creates streets for people and place
- ✓ Repurposes pavement to provide uncluttered space to park bikes and other mobility devices

Source: Better Streets


GATEWAYS

Good Practice: Use Chicanes As Gateways

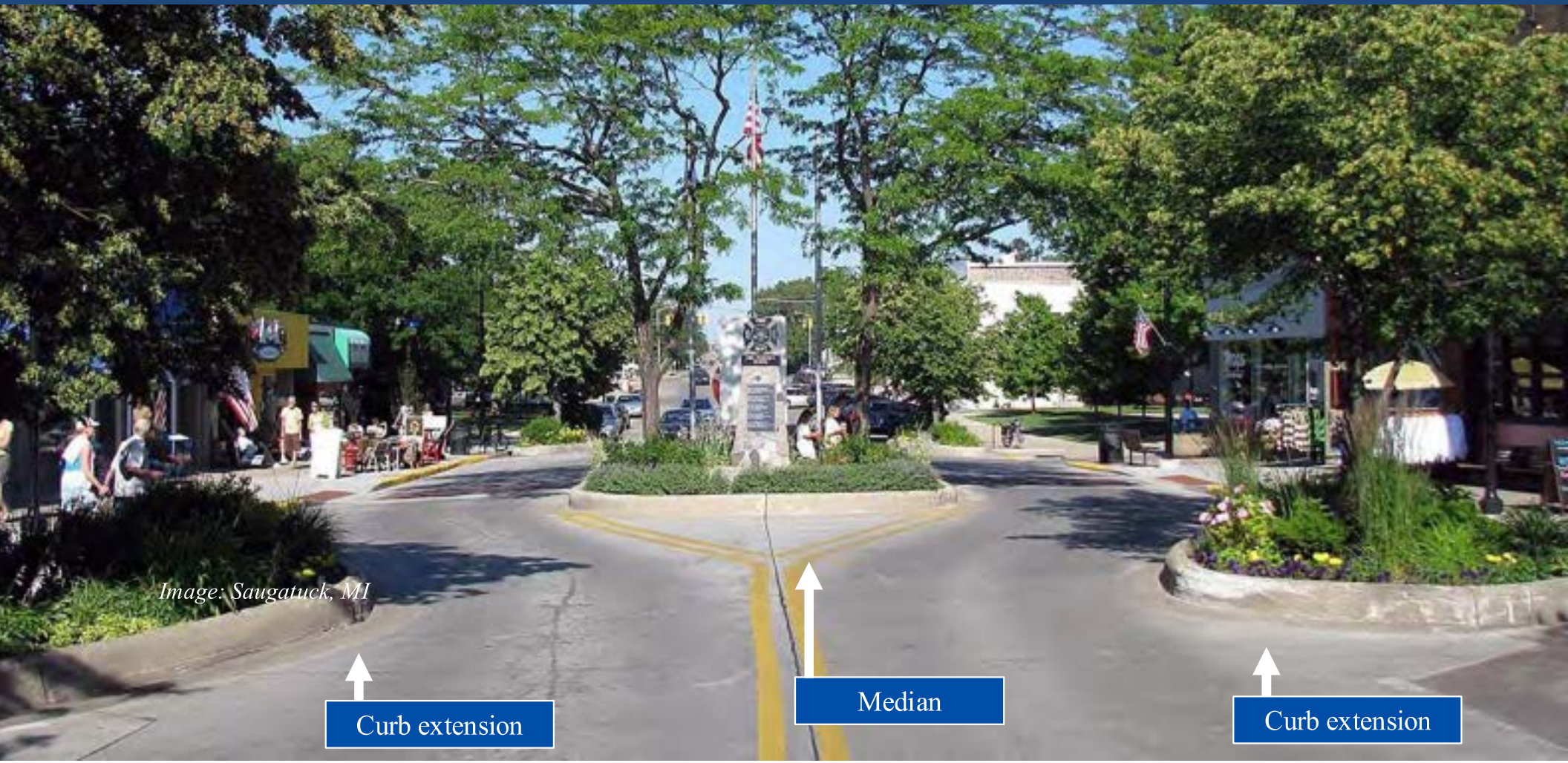


Image: Saugatuck, MI

The Parts of a 20 mph Street

The Parts of a 20 mph Street

The Parts of a 25 mph Street

Target speed 25 mph. This landscaped vision for design achieves 25 mph speeds by 95% of all motorists. A triple canopy of vertical walls of green, and on-street parking keep speeds low

Hamburg, NY altered all 3 of its principal roads, all primary truck routes, to slow traffic. The red pigmented buffer lanes are too narrow for bike lanes, but they slow traffic and make it easier and safer to get in and out of cars.

Hamburg, New York, narrowed travel lanes on US Route 62 to 10 feet and saw injury crashes decline by 60 percent and serious injuries fall by 90 percent on the corridor. Photo by Dan Burden.

West Palm Beach's Olive Avenue is a Federal road. By taking its former 3-lane, 36 foot wide intersection down to two lanes, traffic moved slower and better. Why, pedestrian could cross in half of the time.


This former 4-lane road was reconfigured to 3 lanes, adding bike lanes plus the turn lane. Note right turning motorists now have greater sight distances and turning radii at all driveways and intersections.
Ocean East
1530
Ft Lauderdale By-The-Sea, FL


CLEMATIS
20
Feet
Olive Avenue, West Palm Beach, FL
Former 3-lane, One-Way
Ten-foot travel lanes
West Palm Beach, FL

After a road reconfiguration, the curb-to-curb distance remains the same, so the bus operator benefits from a greater turning radii.
A buffer to the bike lane would be helpful to the operator. The space needed for the buffers would come from the overly wide turn lane.

Narrow Lanes, Olympia, WA

Buffered Bike Lane

Castle Rock, Colorado
built a 4-lane entry to a community, but immediately painted the outer lane as a wide buffered bike lane.

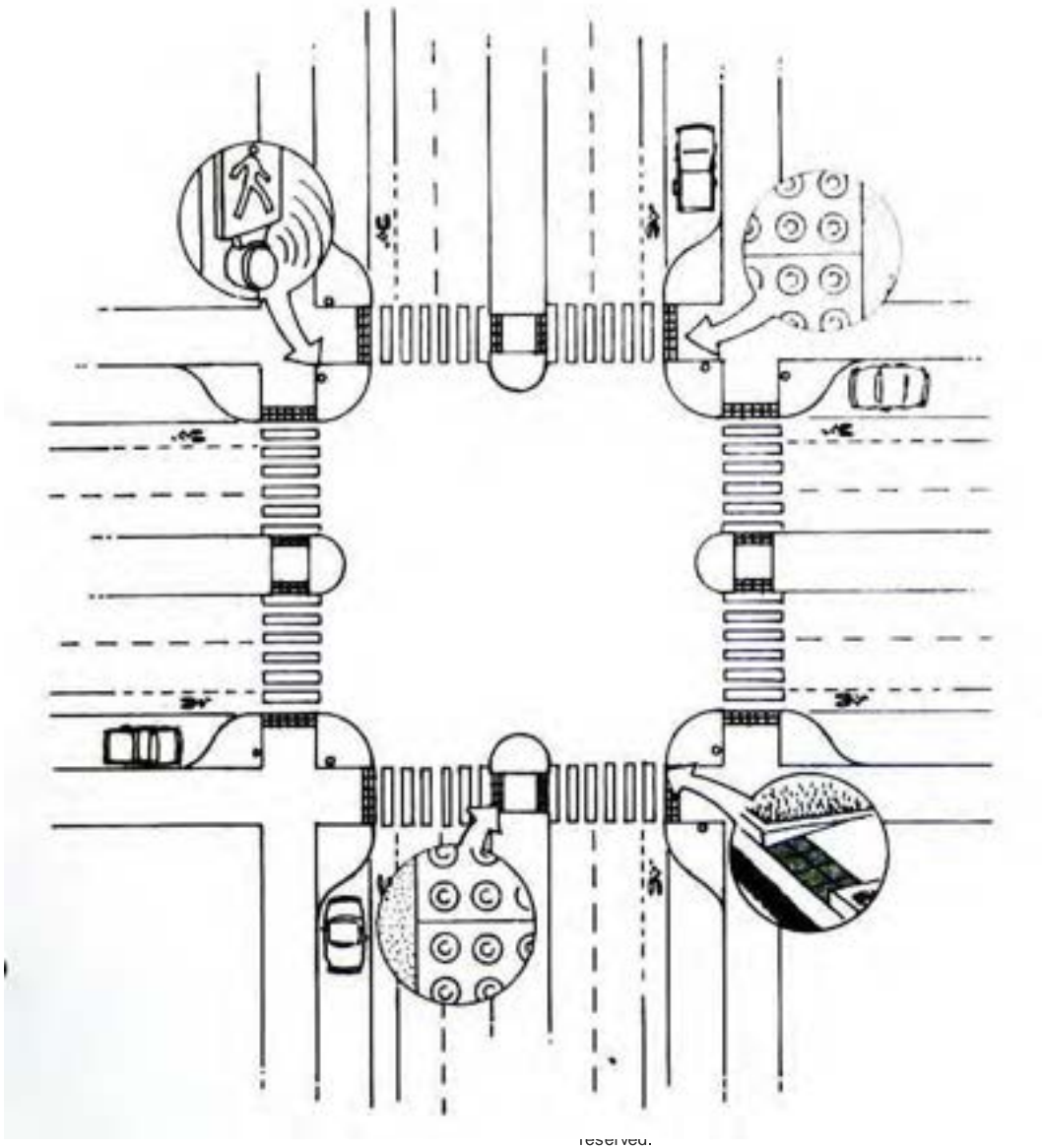
Possibly the road will remain as a safer 2-lane road (20-60% fewer crashes) for decades, or throughout the life of the development.


INTERSECTIONS

Good Practice for Intersections

- Provide Pedestrian Lead Intervals
- Apply two ramps per corner
- Maximize the use of curb extensions
- Use high-visibility crosswalks
- Use curbing in ramps
- Keep travel and turn lanes narrow
- Use bike lanes and buffers
- Use medians with a median nose

Source: Scott Lewendon



MAXIMIZE CROSSING WIDTH For schools and downtowns use 12-foot width on principal streets for crosswalks, and try to keep openings wide, as well. When practicable, use two ramps per corner.

Consider a median nose to shelter pedestrians. A median nose separates in time and place, and reduces running across streets


STOP

COLORIZED RAISED INTERSECTION

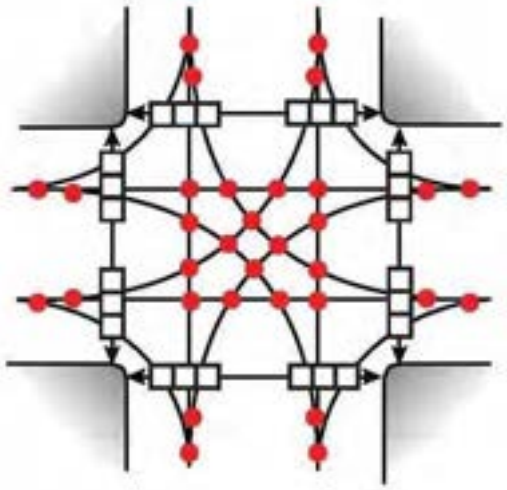
Exeter, Virginia

Photomorph: Todd Clements

ROUNDABOUTS

Choose a ‘Roundabouts First’ Intersection Policy

Policy Opportunity



Conflicts at a conventional intersection with single lanes in each direction

- 32 vehicle-to-vehicle conflicts
- 24 vehicle-to-person conflicts

Conflicts at a single-lane, modern roundabout

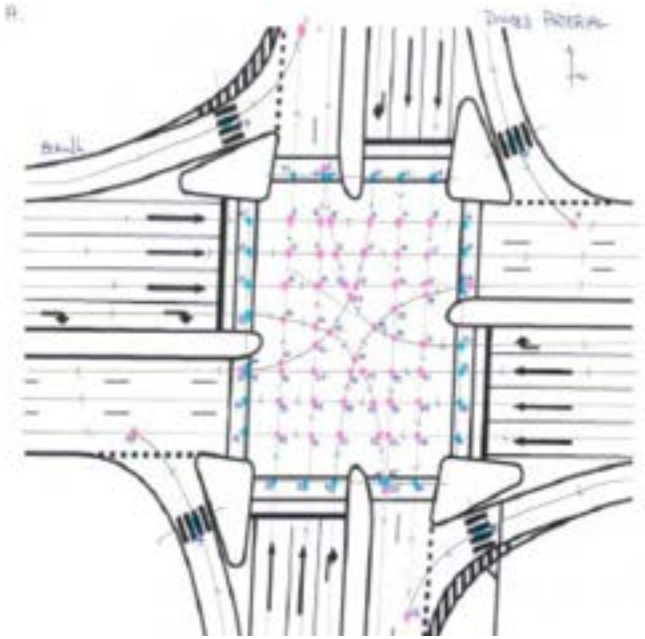
- 8 vehicle-to-vehicle conflicts
- 8 vehicle-to-person conflicts

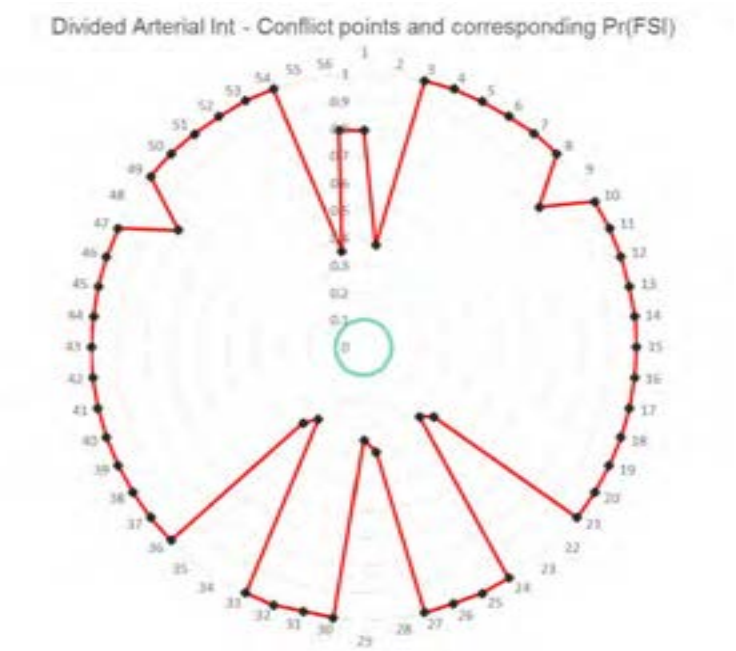
- A roundabout has ¼ of the number of potential conflicts compared to signalized intersections.
- These conflicts are at low speed since vehicles enter the intersection at lower speeds and softer angles.
- Roundabouts reduce personal injury crashes by 90% and have been recognized as a proven safety countermeasure by the U.S. Department of Transportation Federal Highway Administration and the National Insurance Institute, with each encouraging communities to choose a ‘roundabouts first’ approach to intersection design.

Reduce intersection energy

Divided arterial signals - 80 km/h x 60 km/h

$K = \frac{1}{2} mv^2$

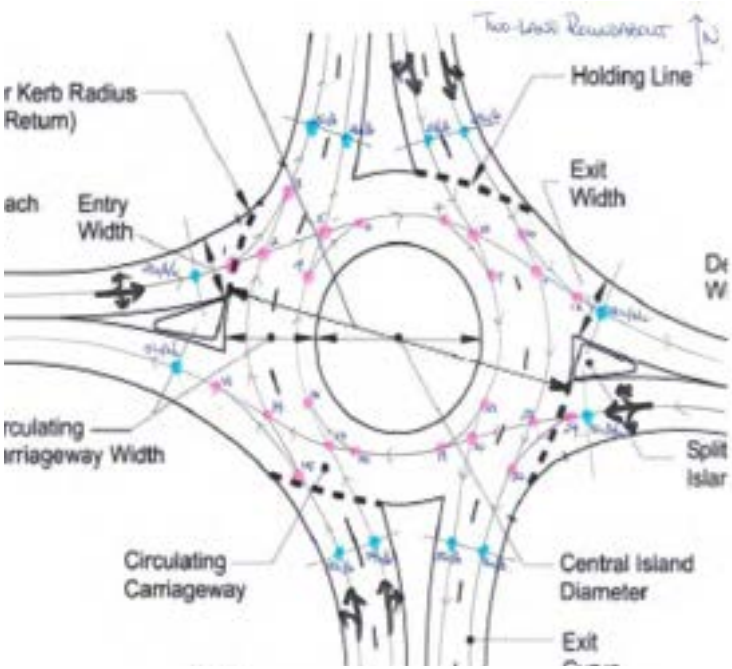


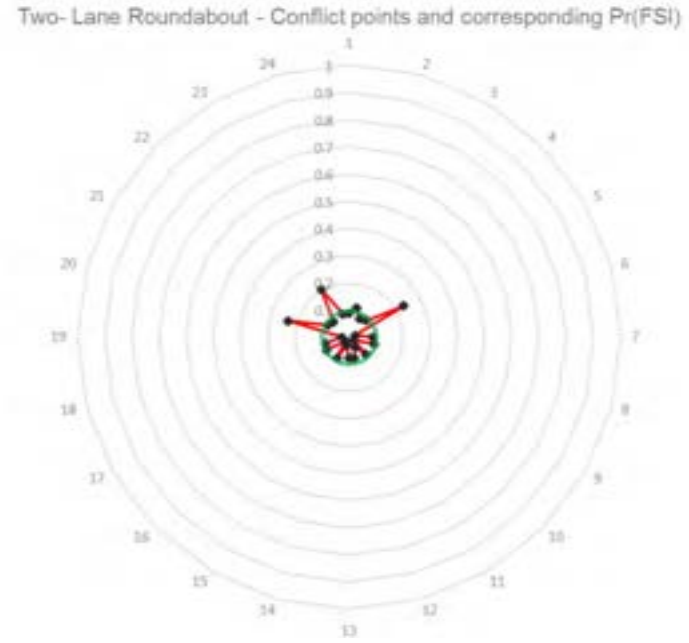


Source: Blair Turner

Reduce intersection energy

Divided arterial roundabout - 80 km/h x 60 km/h



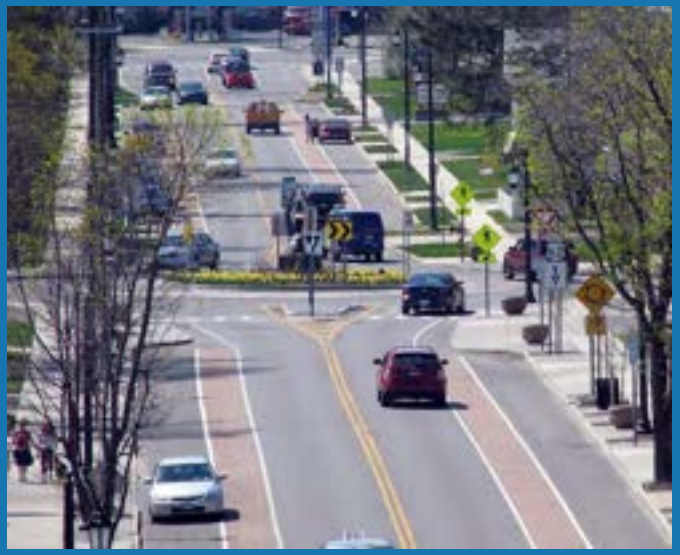


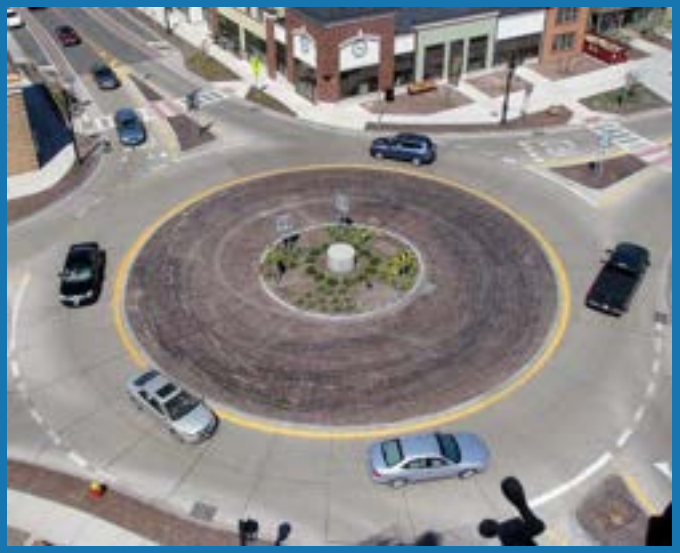
Source: Blair Turner

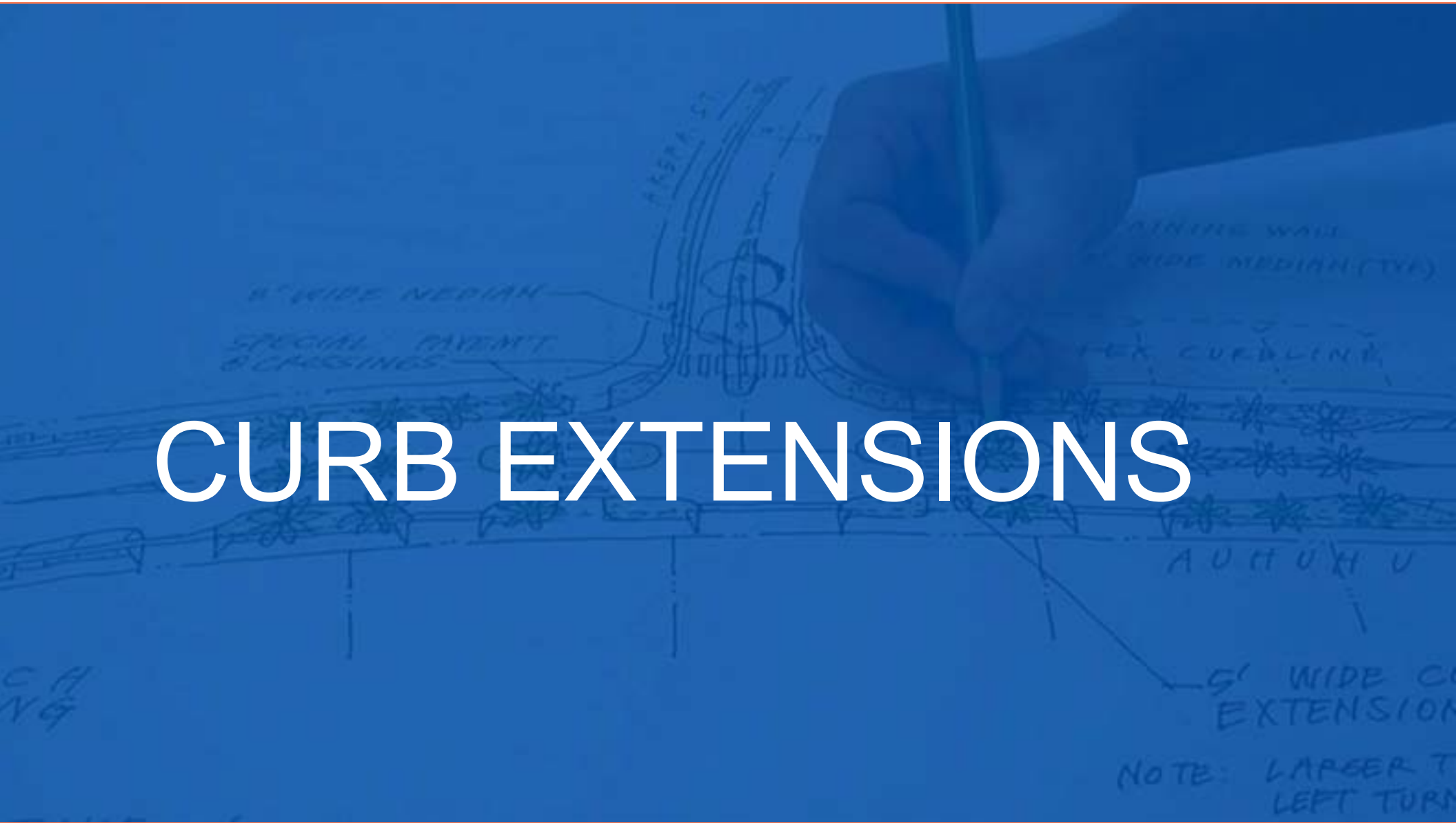
Hamburg, New York

Faced with the need to rebuild all principal streets, Hamburg asked the NYDOT to retain or add additional parking, keep the travel lanes to 10 feet, remove all signals and apply roundabouts to keep traffic moving. This is a major U.S. truck route.

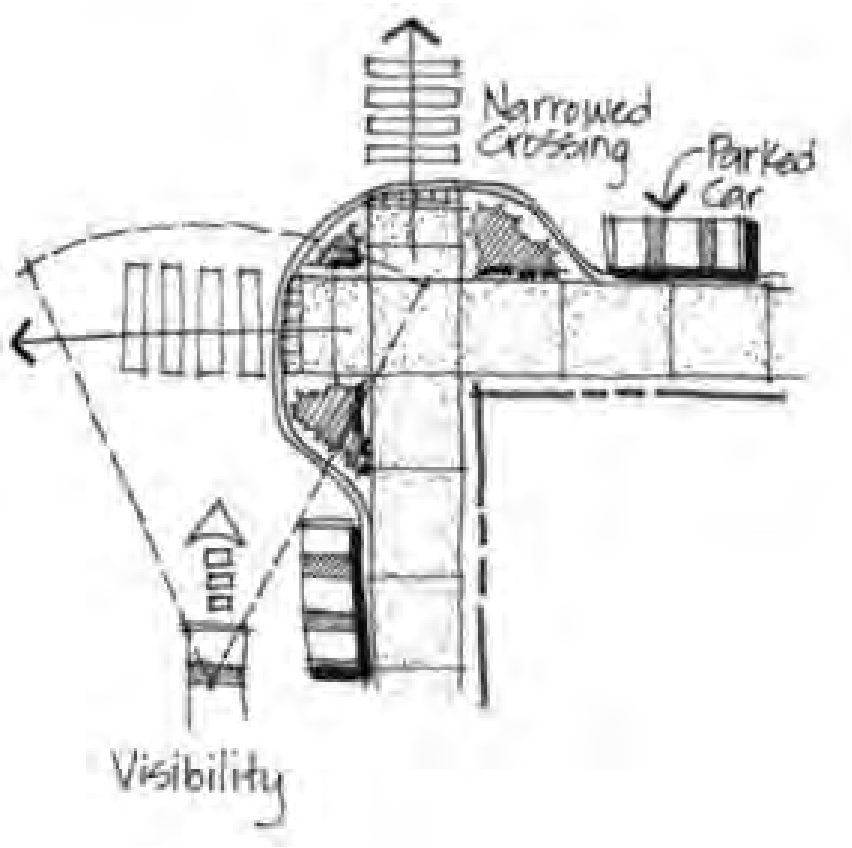
The approach worked. The downtown is now thriving, much safer, and the novel designs are winning national street design awards.






CURB EXTENSIONS

Curb Extensions (Bump Outs)



- Motorists no longer block sight lines;
- Ground cover is kept trimmed to 24 inches;
- Trees are undercut to seven feet;
- Motorists can pull forward to see past parked cars;
- Motorists are able to see pedestrians;
- Keeps speeds under control, especially on turns;
- Creates a new public space;
- Slows traffic in important areas.

Curb Extensions (Bump Outs)

Curb extensions, or bumb-outs, place pedestrians out from behind parked cars, improving sightlines and reducing crossing distances. Curb extensions create compact intersections that promote walking and make the intersection operate more efficiently. They reduce vehicle turning speeds by physically and visually narrowing the roadway. They also provide increased pedestrian waiting space.

Curb extensions reduce the crossing distance for pedestrians by 44 feet at this intersection in Venice, Florida

Include ramps and curb extensions for accessibility

OJECT

BENEFITS

- Keeps sight lines open
- Eliminates parking where motorists would block sight lines
- Shortens crossing times and exposure
- Keeps lanes and streets narrow
- Reduces speeding

What is a Curb Extension?

- A curb extension physically narrows the roadway, creating safer and shorter crossings for pedestrians, while increasing the available space for street furniture, benches, plantings, ground cover and street trees.

- Curb extensions encourage safer speeds, tighten corner radii to slow down turning movements, and make pedestrians and motorists more noticeable to each other.

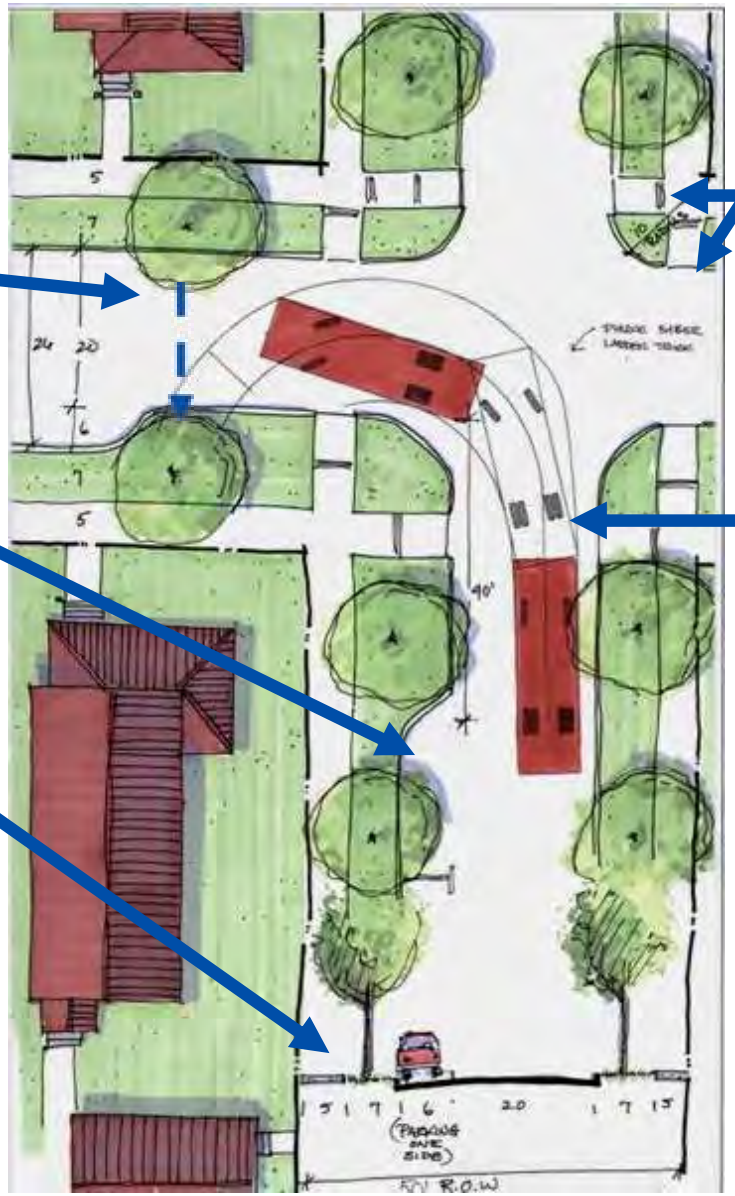
Upper Left Image: Edmonton, Alberta, Canada
Upper Right Image: Eugene, OR
Lower Left Image: Davis, CA
Lower Right Image: Jackson Hole, WY

How Does It Work?

Maximum width for two travel lanes: 20 feet

Preserve sight lines and keep parked cars at least 20 feet from the intersection

Use ground cover and under-cut trees to make curb extensions more visible, careful not to use plantings that obstruct pedestrian visibility



Provide two ramps per corner, keeping openings as wide as the crosswalks, no less than 8 feet wide

If needed for compact intersections, allow oversized vehicles to cross the entry centerline

Use adequate lighting so curb extensions are seen

Source: Scott Lewendon

Good Practice: Midblock Curb Extensions

- Protected midblock crossings are safer and easier for pedestrians. These crossings should be considered in key areas, such as in business districts, heavy used transit routes, near schools and parks, or where crossings can be challenging to connect people to places.
- Curb extensions are typically part of a traffic slowing package, and may include medians, landscaping materials, and artwork.
- Landscaping, signage and lighting helps motorists see the treatment on the approach and react appropriately.

Top Image: Rodeo Drive, Beverly Hills, CA, creates well placed crossings on multi-lane roads, applying mid-block curb extensions that inset parking, opening sight lines.

Bottom Image: Curb extensions in Charlotte, NC, are combined with a median to keep speeds low and make the crossing easier for pedestrians.

Good Practice: Demonstration Project

- Many communities begin with low-cost, temporary painted curb extensions. After a trial period of no less than six months, a permanent installation can be installed as a durable solution with any needed adjustments.
- Residents in Hamilton, Ontario, painted and marked this intersection with delineator, as a low-cost solution.
- If paint and raised delineators are not enough, the test period allows residents to observe then vote for a lasting, attractive curb extension design.

Good Practice: Drainage

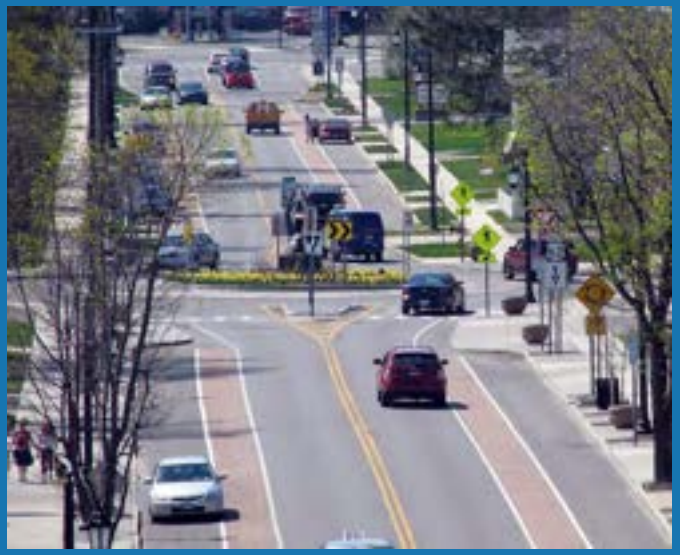
To reduce costs, use paint first to start a transition, adding asphalt, concrete or durable landscaping, when able. Setting curb extensions out 14-16 inches allows water to flow and cuts costs significantly.

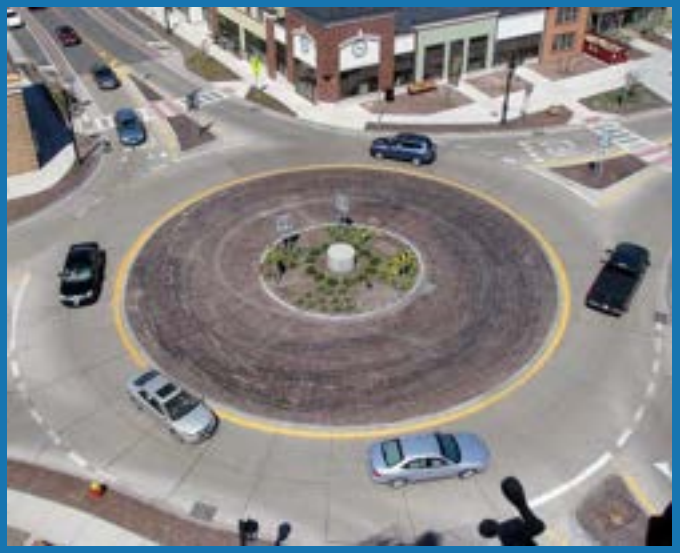
Images: Honolulu, HI (left and center) and Carpentaria, CA (right)

Hamburg, New York

Faced with the need to rebuild all principal streets, Hamburg asked the NYDOT to retain or add additional parking, keep the travel lanes to 10 feet, remove all signals and apply roundabouts to keep traffic moving. This is a major U.S. truck route.

The approach worked. The downtown is now thriving, much safer, and the novel designs are winning national street design awards.





Asheville, NC had numerous serious crashes, especially to pedestrians. The solution required narrowing this street, which was only made possible by building a roundabout to keep traffic moving.

Before

After

Asheville NC

Properly designed roundabouts bring vehicle speeds to 15-20. At this speed motorists have a high (nearly 100%) desire to yield

GOOD PRACTICE: INTERSECTIONS

- Apply two ramps per corner
- Maximize the use of curb extensions
- Use high visibility crosswalks
- Use curbing in ramps
- Keep lanes narrow
- Use bike lanes and buffers
- Use medians with a median nose

Source: Scott Lewendon

Before

After

LaJolla Boulevard, Birdrock, San Diego, CA

Before

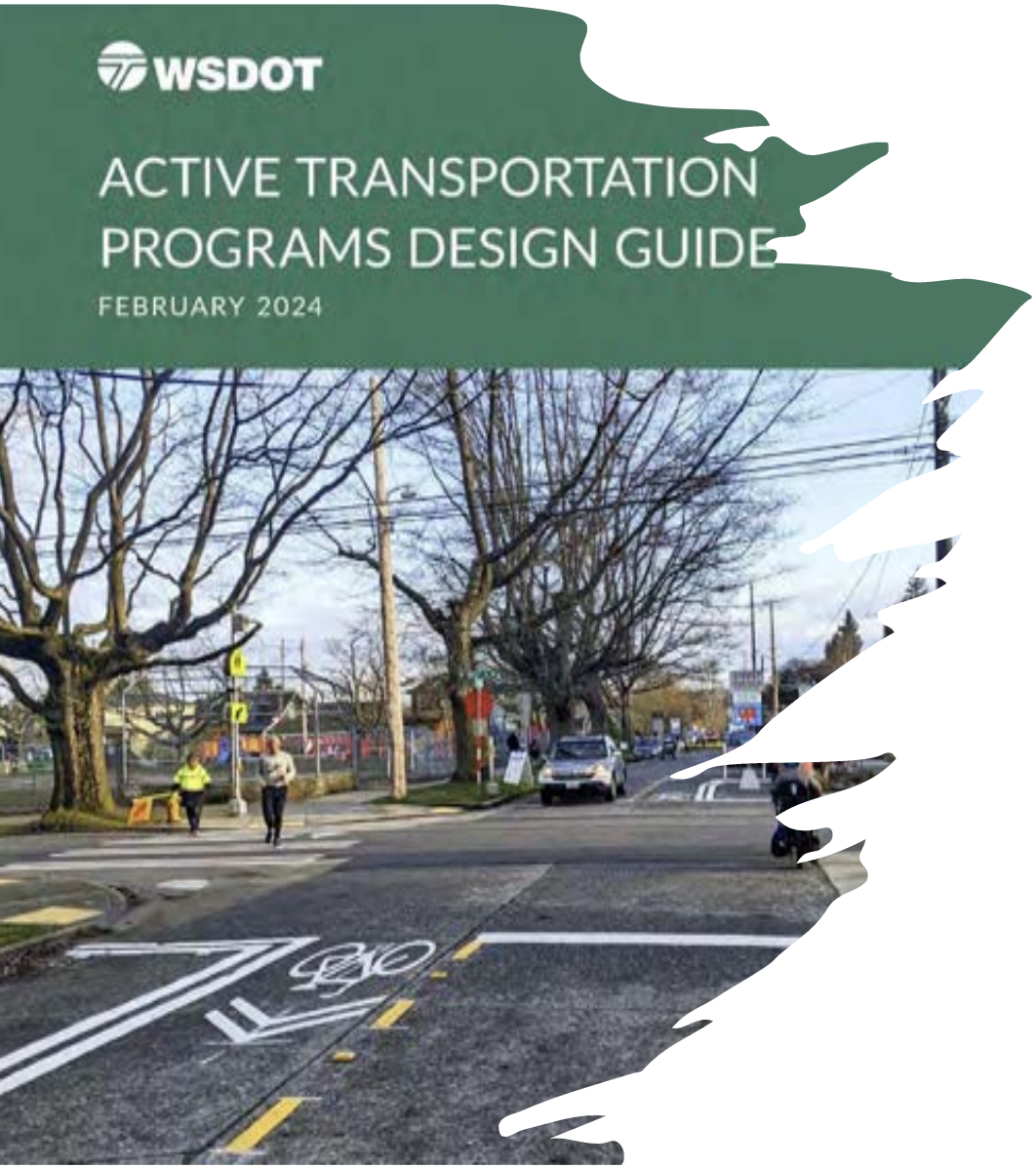
After

LaJolla Boulevard, Bird Rock, San Diego, CA

Often a single intersection keeps people away. Farmington, NM converted two of their travel lanes to added parking and bike lanes, made possible by designing this skewed intersection into a roundabout. After the rebuild, the road became the heart and center for a prosperous people and business-friendly downtown.

Farmington, NM

Why roundabouts work. Pedestrians cross with no delay. Motorists do not have to wait for pedestrians to cross, since they are in and out of their lane in 3-4 seconds



High Visibility Crosswalks

- High- visibility crosswalk markings make it easier for drivers to see the crosswalk, not just the pedestrian, and emphasizes that pedestrians have the right of way. Crosswalk visibility enhancements can reduce crashes by 23-48 percent

- At least **10-foot**-wide high visibility crosswalk markings such as ladder style or continental markings.
- Striped or physical barrier to restrict parking at least **20 feet** from the crossing

CROSSINGS

Your community can benefit from applying a more consistent and higher visual level of its street crossings. These international style markings are 10 times more visible than two parallel lines. A minimum width of 10 feet is recommended for side and interior streets, while a 12 foot wide minimum is recommended for main street and at trail crossings.

SEATTLE, WA

HALF SIGNALS

SEATTLE Has been building half-signals for over 20 years. They are cheaper, easier to interpret, more effective than HAWK signals. But the MUTCD does not

MODIFIED INTERSECTIONS

Modified Intersection

Many of Emerson's Streets have dangerous skewed intersections. Transforming them with Modified Intersections will bring down speeds, shorten crossing distances and boost walking

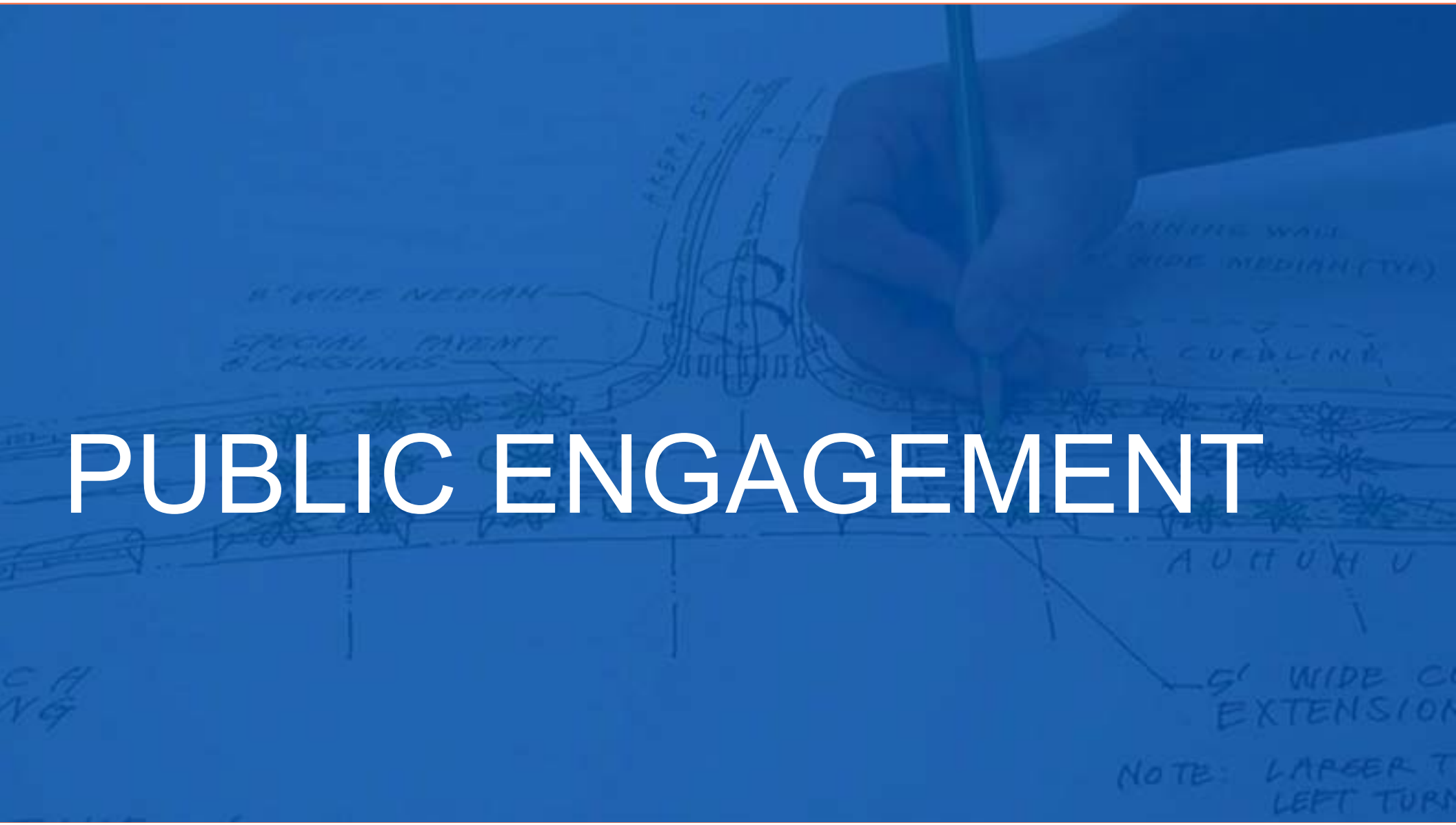
Many of Emerson's Streets have dangerous skewed intersections. Transforming them with Modified Intersections will bring down speeds, shorten crossing distances and boost walking


EDGE LANE ROADS


Edge Lane Roads
A website providing information on an exciting new roadway configuration


Port Townsend, WA

Port Townsend, WA


PUBLIC ENGAGEMENT

Interim/Demonstration Projects

Neighbors in the Pogo Park area of the Iron Triangle in Richmond, CA came together and created a "Living Preview" of traffic calming tools (mini circles and curb extensions) to demonstrate safer, age-friendly, inclusive streets.

Activity: Walking Audit

Starting in 1985 Dan Burden applied walking audits to get people exciting about overcoming change.


GILFORD

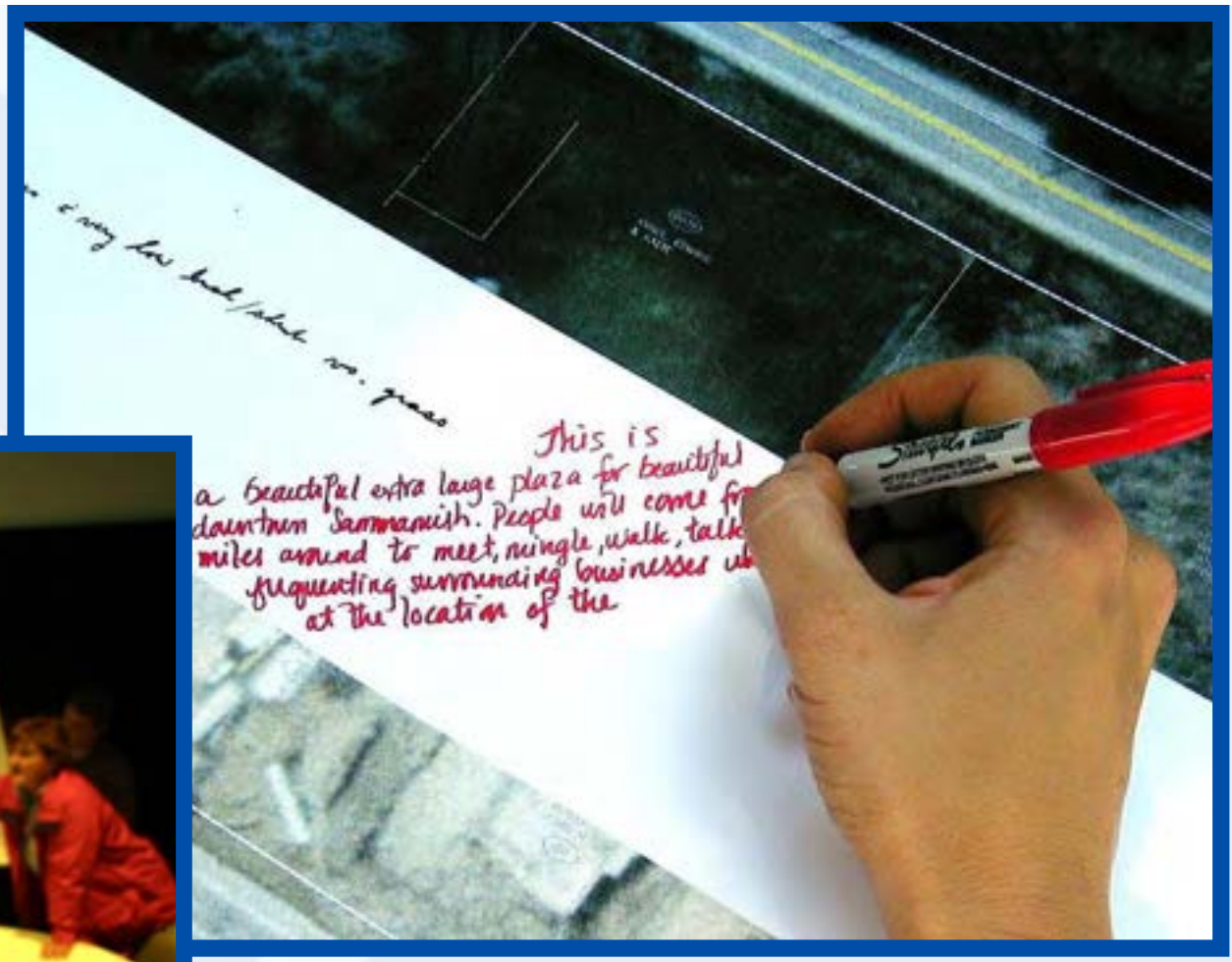
Walking Audit Feedback, Include Children's Insights

Cotati, CA

Overcoming NIMBY-ism

In University Place, Washington, Terry came to oppose the rebuilding of Bridgeport Way. He wanted to give a speech against the project. Using *an Informed Consent* process it was suggested he join a working table instead. He did so, and his neighbors convinced him that it was a good project

Draw it … See if it works!


This is
a beautiful extra large plaza for beautiful
downtown Sammamish. People will come fr
miles around to meet, mingle, walk, talk
frequenting surrounding businesses wh
at the location of the

Keys To Success

- ✓ Inform and involve neighbors in a public process and ensure they pick the tools.
- ✓ Use native and pollinator-friendly landscaping, where possible.
- ✓ Design should dictate driver behaviors, not signage.
- ✓ An attractive design encourages future traffic calming.
- ✓ Take the time to build great quality model projects with meaningful public input.
- ✓ The goal is to design the street to reduce speeds to 14-20 mph, and 20-25 mph between each device.
- ✓ Measure your success, fine tune as needed and share the outcomes publicly via multiple platforms.
- ✓ Traffic calming is most successful when a system-wide approach is used.

Image: Sacramento, CA

CONCLUDING THOUGHTS

City built environments will prioritize walking, cycling and transit use. Active Transportation should feel not just acceptable, but be the most natural, easy and chosen way to get around for most travel. This focus is truly the only way to celebrate your history and unique sense of place while honoring the unparalleled beauty of the natural environment. Each new project is an example of good practice and a model for the future, not a carry over of auto intimidation practices from the recent past.


ALTERA
ALTERA
www.karenbandy.com
Karen Bandy
STUDIO
OPEN
Ground Floor

Don't forget that your role as an elected leader or top community official – you are the custodian of the past, and the builder of the future. This calls for a unique blend of an observer, problem solver, and a change agent."

Make a Difference!

For More Information:

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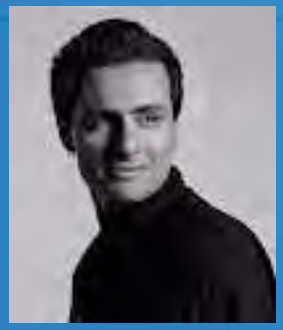

Enea Senesi
Visual Design

Michael Wallwork
Roundabout Designer