CITY OF SANTA CRUZ

Neighborhood Traffic Calming Toolkit

January 2024

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City of Santa Cruz

Introduction

Managing safe and efficient streets is an ongoing concern within many communities. **Traffic Calming** measures provide tools for agencies to implement physical measures that allow agencies to manage vehicle traffic on neighborhood streets. Traffic calming plans includes measures which plays crucial role in creating safer, more livable, and sustainable communities. By implementing appropriate traffic calming measures, the City can create more people-friendly spaces that prioritize the needs and safety of all road users. The aim is to create a safer and more pleasant environment for everyone in the community. The following toolkit will enable the city to be able to execute an appropriate “Neighborhood Traffic Calming Plan”.

The traffic calming toolkit includes eight physical traffic calming measures. It is a resource that provides a description of the identified traffic calming measures. Additionally, it offers a summary of key advantages and disadvantages for each measure. The toolkit includes information on the approximate construction cost of these measures. Furthermore, it offers a summary of the relative effectiveness of these measures in addressing speed, volume, and safety concerns.

As the state of the practice for traffic calming evolves updated design considerations and introduction of new traffic calming measures should also be considered. This includes updated guidance from institutions such as National Association of City Transportation Officials (NACTO) and Institute of Transportation Engineers (ITE).

The neighborhood traffic calming plan also incorporates a threshold for implementation and a prioritization process in Attachment A, while Attachment B offers standardized designs.

Traffic Circles*

ADVANTAGES

- Very effective in moderating speeds and improving safety
- Can have positive aesthetic value

DISADVANTAGES

- If not designed properly, difficult for emergency vehicles or large trucks to travel around
- Must be designed so that the circulating traffic does not encroach on crosswalks
- Potential loss of on-street parking

**Roundabouts are similar but distinct from traffic circles. Like traffic circles, roundabouts require traffic to circulate counterclockwise around a center island. But unlike circles, roundabouts are used on higher volume streets to allocate right-of-way among competing movements.*

Photo Source: https://nacto.org

APPROXIMATE COST: $10,000 - $25,000

Traffic circles are raised islands, placed in intersections, around which traffic circulates. Stop signs or yield signs can be used as traffic controls at the approaches of the traffic circle. Circles prevent drivers from speeding through intersections by impeding the straight-through movement and forcing drivers to slow down to yield. Depending upon the size of the intersection and circle, trucks may be permitted to turn left in front of the circle, and the agency can use mountable curbs if turn radii are a concern for emergency vehicles and/or trucks.

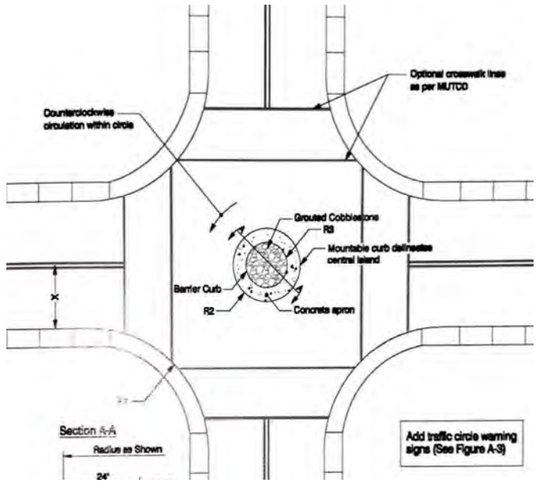

Photo Source: U.S. Traffic Calming Manual By Reid Ewing and Steven J. Brown

Low
Medium
High

Measured Speed Impacts	Measured Safety Impacts	Measured Volume Impacts
●●○	●●●	●○○
Reduction in **85th Percentile Speeds*** between Slow Points.	Reduction in Average Annual Number of Collisions.	Reduction in Vehicles per Day.

** **85th Percentile Speeds:** the speed at which or blow 85% of vehicles are traveling, which is is a common threshold used to evaluate vehicle speeds.*
Low: less than 10% change; Medium: 10% to 30% change, High: greater than 30% change
Data Source: Traffic Calming: State of the Practice, 2000.

Photo Source: https://pgadesign.com/projects/oakland-slow-streets

Photo Source: https://www.restreets.org/case-studies/traffic-circles

Speed Humps

ADVANTAGES

- Effective in reducing speeds

DISADVANTAGES

- Considerations for emergency vehicles and buses
- Maintenance can be challenging
- Increased noise
- Difficult for bicyclists to cross

**Speed lumps are rounded raised areas placed across the road with two wheel cutouts designed to allow large vehicles, such as emergency vehicles and buses, to pass with minimal slowing. The design limits passenger cars and mid-size SUVs from fully passing through the cut-outs and requires travel over the lump. They are slightly less than four inches high, typically parabolic in shape, and have a design speed of 15 to 20 MPH.*

APPROXIMATE COST: $3,000 - $10,000

Speed humps are rounded raised areas placed across the road, but unlike speed lumps*, they do not have cut-outs for large vehicles and bicycles. They are typically 3-3.5 inches high, typically parabolic in shape, and have a design speed of 15 to 20 MPH. A series of speed humps are often needed to retain slower speeds over a longer distance. Speed humps are typically not used on transit routes due to their effect on transit operations and passenger comfort.

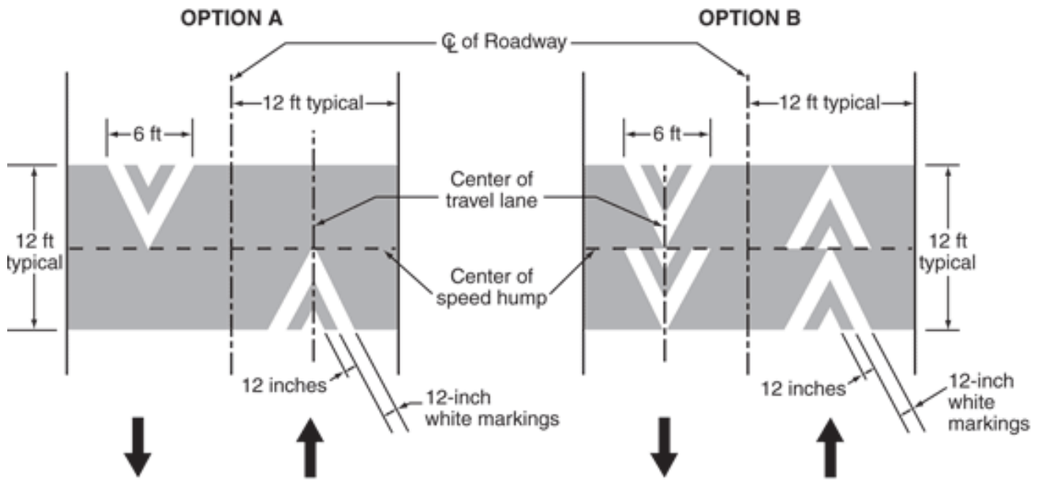

Photo Source: U.S. DOT -MUTCD

Low
Medium
High

Measured Speed Impacts	Measured Safety Impacts	Measured Volume Impacts
●●○	●●○	N/A
Reduction in **85th Percentile Speeds*** between Slow Points.	Reduction in Average Annual Number of Collisions.	Reduction in Vehicles per Day.

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Data Source: Traffic Calming: State of the Practice, 2000.

Photo Source: https://www.fresno.gov/publicworks/traffic-engineering

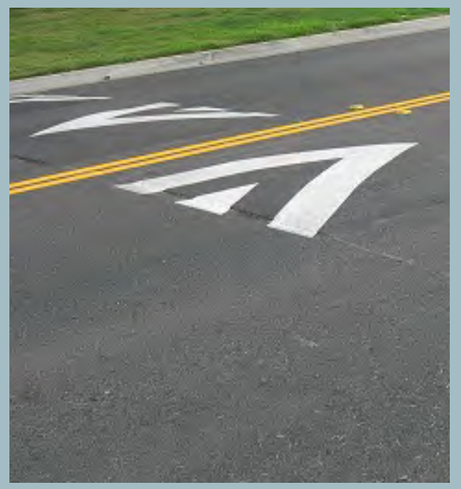


Photo Source: https://www.cityofsanrafael.org/traffic/speedhump

Slow Turn Wedges

ADVANTAGES

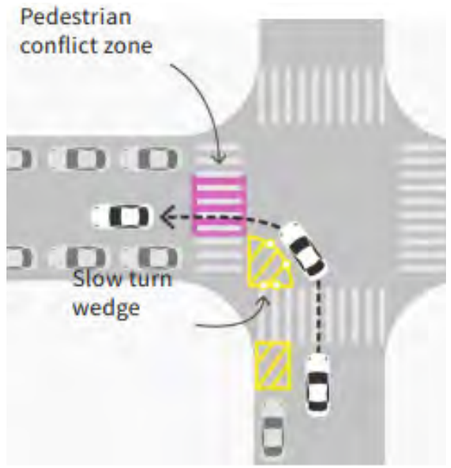
- Effective in reducing speeds and conflicts with pedestrians/ bicyclists
- Discourages drivers from cutting corners and encourages following the proper path when making left turns
- Low cost

DISADVANTAGES

- Potentially limited to one-way streets
- Less durable than raised concrete islands

APPROXIMATE COST: $3,000 - $10,000

Slow turn wedges use markings and flexible plastic posts to buffer pedestrians from traffic and shrink the area where they could get hit by a car.



PhotoLeft Turn Traffic Calming mwcog.org

Photo Source: :https://www.nyc.gov/html/dot/html/pedestrians/turn-calming.shtml

Low
Medium
High

Measured Speed Impacts	Measured Safety Impacts	Measured Volume Impacts
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Data Source: Traffic Calming: State of the Practice, 2000.

Photo Source: https://www.barcoproducts.com/safe-right-turn-wedge-kit

Bulb-Out / Curb Extension

ADVANTAGES

- Reduces pedestrian crossing distance and exposure to vehicles
- Through and left-turn movements are easily negotiable by large vehicles
- Creates protected on-street parking bays
- Reduces speeds (especially right turning vehicles)

DISADVANTAGES

- If not designed properly, difficult for emergency vehicles or large trucks to travel around
- Must be designed so that the circulating traffic does not encroach on crosswalks
- Potential loss of on-street parking

APPROXIMATE COST: $20,000 - $100,000 per corner

Bulb-outs and curb extensions extend the sidewalk into the parking lane to narrow the roadway at intersections. Their effectiveness in calming traffic is limited by the absence of vertical or horizontal deflection, but they can still be beneficial. Bulbouts can make intersections more pedestrian friendly by shortening the crossing distance and decreasing the curb radii, thus reducing turning vehicle speeds. Both of these effects increase pedestrian comfort and safety at the intersection. Cost will vary depending on the amount of drainage and grading work. They can be constructed without blocking existing gutter.

Photo Source: https://nacto.org/

Low
Medium
High

Measured Speed Impacts	Measured Safety Impacts	Measured Volume Impacts
●●○	N/A	N/A
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Data Source: Traffic Calming: State of the Practice, 2000.

Photo Source: https://nacto.org/

Two Lane Pinchpoints

ADVANTAGES

- Easily negotiable by emergency vehicles and buses
- Can have positive aesthetic value
- Reduces speeds

DISADVANTAGES

- Effect on vehicle speeds is limited by the absence of vertical or horizontal deflection
- May require bicyclists to briefly merge with vehicular traffic
- Loss of on-street parking
- Build-up of debris in gutter

APPROXIMATE COST:

$20,000 - $60,000 *depending on the amount of drainage and grading work. Can be constructed without blocking existing gutter*

Pinchpoints are curb extensions at midblock that narrow a street. Pinchpoints leave the street cross section with two lanes that are narrower than the normal cross section. Their effectiveness in calming traffic is limited by the absence of vertical or horizontal deflection, but they can still be beneficial.

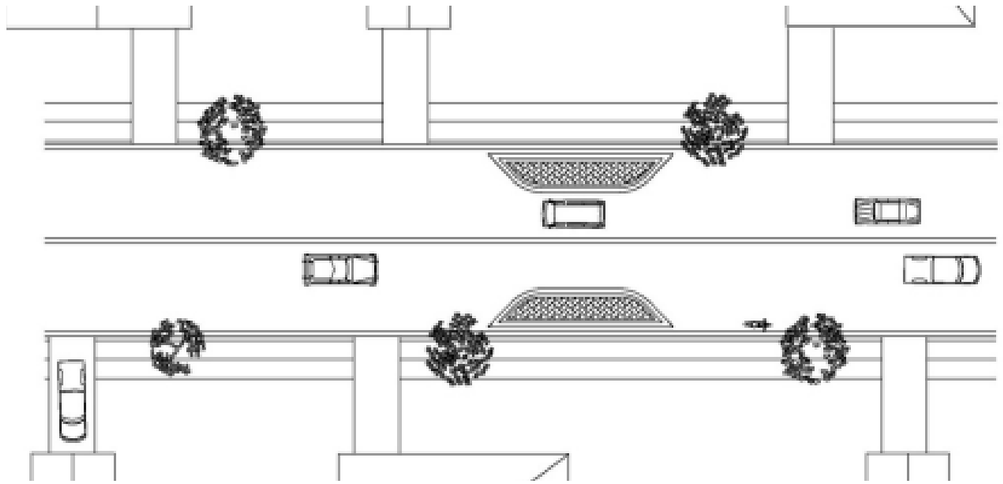

Photo Source: : https://nacto.org/

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High

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Data Source: Traffic Calming: State of the Practice, 2000.

Photo Source: https://nacto.org/

Photo Source: http://www.stocktonca.gov/government/departments/publicWorks/tCalmChoiceFull.html

Medians

ADVANTAGES

- Where pedestrian crossing activity is expected, can provide two-stage crossing opportunities
- Can have positive aesthetic value
- Reduces speeds

DISADVANTAGES

- Effect on vehicle speeds is limited by the absence of vertical or horizontal deflection
- Can increase potential for fixed object collisions
- Potential loss of on-street parking
- Build-up of debris in gutter

APPROXIMATE COST: $10,000 - $25,000

Medians are raised islands placed in the middle of the roadway around which traffic circulates. Medians without horizontal deflection do not extend into the travel lane, maintaining a straight-line path for drivers. They can act as pedestrian refuges, increasing pedestrian safety, and provide aesthetic benefits. Medians with horizontal deflection extend into the travel lane to eliminate the straight-line path and force drivers to slow down to navigate the curve.

Median without horizontal deflection

Low
Medium
High

Measured Speed Impacts	Measured Safety Impacts	Measured Volume Impacts
●●○	N/A	N/A
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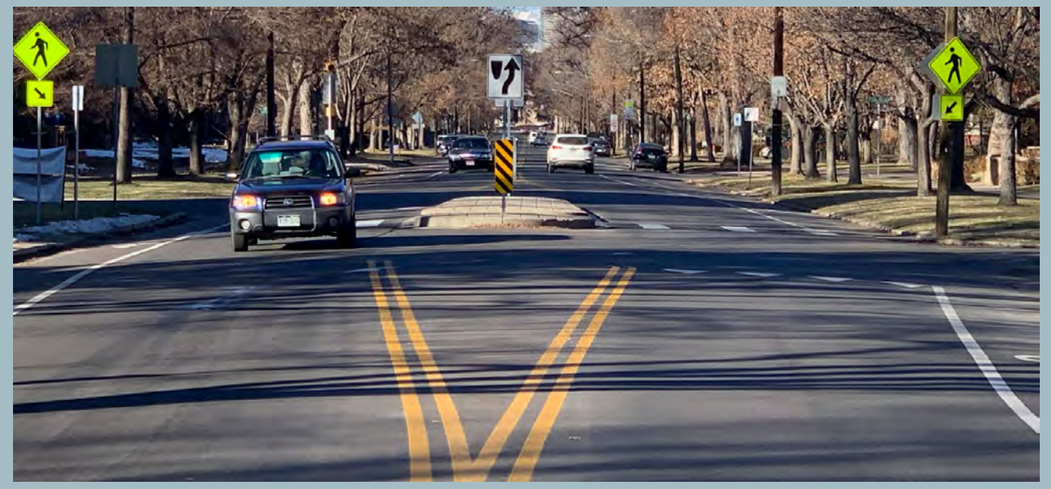

Median with horizontal deflection

Half Closure

ADVANTAGES

- Able to maintain two-way bicycle access
- Effective in reducing traffic volumes

DISADVANTAGES

- Induces circuitous routes for residents
- May restrict access to businesses
- Allows drivers to bypass the barrier
- Redirects traffic to alternate streets

APPROXIMATE COST:
$10,000 - $200,000 *depending on the materials used*

Half closures (or partial street closures) are barriers that block travel in one direction for a short distance on otherwise two-way streets. Partial closures are often used in sets to make travel through neighborhoods with “gridded” streets circuitous rather than direct.

Photo Source: https://nacto.org

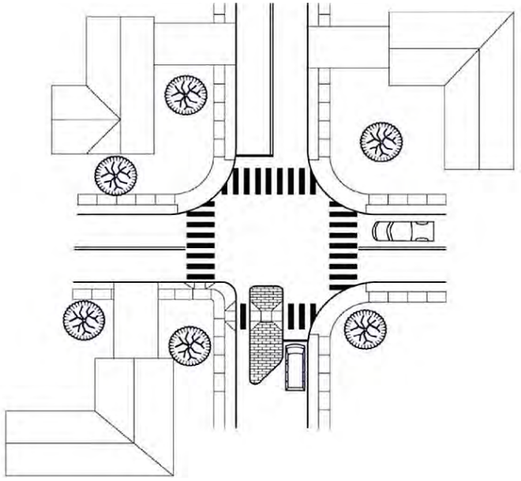

Photo Source: U.S. Traffic Calming Manual By Reid Ewing and Steven J. Brown

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Photo Source: https://pgadesign.com/projects/oakland-slow-streets

Photo Source: https://www.restreets.org/case-studies/traffic-circles

Full Closures / Cul-De-Sacs

ADVANTAGES

- Very effective in reducing cut-through traffic volumes
- Able to maintain pedestrian and bicycle connectivity
- Can be designed to maintain access for emergency vehicles

DISADVANTAGES

- Causes circuitous routes for residents
- Diverts traffic to another street

APPROXIMATE COST:
$10,000 - $300,000 *depending on the materials used*

Full street closures are barriers placed across a street to close the street completely to through traffic, usually leaving only sidewalks or bicycle paths open. The barriers may consist of landscaped islands, walls, gates, side-by-side bollards, or any other obstructions that leave an opening smaller than the width of a passenger car. Emergency vehicles are accommodated via removable bollards or similar devices.

Photo Source: https://nacto.org

Photo Source: Santana Row, Santa Clara- Google Maps

Low
Medium
High

Measured Speed Impacts	Measured Safety Impacts	Measured Volume Impacts
N/A	N/A	●●●
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Photo Source: https://www.metrosiliconvalley.com/endless-summer-wine-stroll-at-santana-row/

Photo Source: https://downtownventura.org/moves/

Project Scoring

Each project will be scored based on the criteria below to establish priority ranking for implementation of traffic calming.

Issue	Point Definitions	Points
Travel Speed	85th percentile speed for streets with pedestrian generators (ie schools, parks, senior and community centers, libraries, etc):	
	+1mph over adopted speed	1
	+3mph over adopted speed	5
	+5mph over adopted speed	10
	85th percentile speed for streets without pedestrian generators:	
	+3mph over adopted speed	1
	+5mph over adopted speed	5
	+7mph over adopted speed	10
Travel Volumes	Fewer than 500 vehicles per day	0
	500-1,500 vehicles per day	1
	1,501-3,000 vehicles per day	3
	Greater than 3,000 vehicles per day	5
Reported Collisions in prior 5-year period	Pedestrian or Bicyclist	10 per collision
	Automobile	5 per collision
Sidewalk Network	Complete	0
	Incomplete	3
Inclusion in Planning Document	Active Transportation Plan/ Local Roadway Safety Plan/ Other Council approved document.	3

Note: Achieving a high score does not mandate that measures will be initiated. Other factors include funding, design, implementation constraints, and engineering discretion must also be considered.

Attachment A

Project Eligibility

Traffic Calming Feature	Local Road Eligibility	Collector Eligibility	Arterial Eligibility
Traffic Circles Or Roundabouts	Y	Y	Y
Speed Humps, Speed Cushions, Or Similar	Y	Y*	N
Turn Wedges Or Turn Hardening	Y	Y	Y
Pinchpoint	Y	Y*	Y*
Roadway Closures (Single Or Both Directions)	Y*[1]	N	N
Daylighting, Curb Extensions, Bulbouts	Y	Y	Y
Median	Y	Y	Y
NACTO And ITE Adopted Features	Transportation Manager Approval		

Notes: In every case, engineering discretion is reserved.

Local, collector, and arterial roadway classifications as defined in City of Satna Cruz General Plan.

*These treatments require additional consideration and review, including engineering discretion, consultation withemergency response and transit.

[1] Full or single direction closures require a larger network analysis of neighborhood impacts.