City of Santa Cruz Neighborhood Traffic Calming Toolkit

September 6, 2023

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 and is a resources that provides:

- A description of the identified traffic calming measures
- Summary of key advantages and disadvantages
- Approximate construction cost
- Summary of relative effectiveness related to addressing speed, volume, and safety concerns

As the state of the practice for traffic calming evolves, and institutions such as National Association of Transportation Officials (NACTO) and Institute of Traffic Engineers (ITE) update design considerations and introduce new traffic calming measures; these should also be considered.

This neighborhood traffic calming plan, currently does not include potential threshold for implementation. We also recommend that the City consider a prioritization process for implementation of traffic calming measures.

Traffic Circles

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.

Approximate Cost: $10,000 - $25,000

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

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

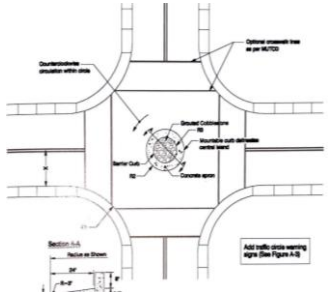

Photo Source: U.S. Traffic Calming Manual By Reid Ewing and Steven J. Brown

Photo Source: https://nacto.org/

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

Measured Impacts		
Speed Impacts	Reduction in 85th Percentile Speeds between Slow Points	Medium
Volume Impacts	Reduction in Vehicles per Day	Low
Safety Impacts	Reduction in Average Annual Number of Collisions	High

Notes:
Low: less than 10% change; Medium: 10% to 30% change, High: greater than 30% change
Data Source: Traffic Calming: State of the Practice, 2000.

Speed Humps

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.

Approximate Cost: $3,000 - $5,000

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

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

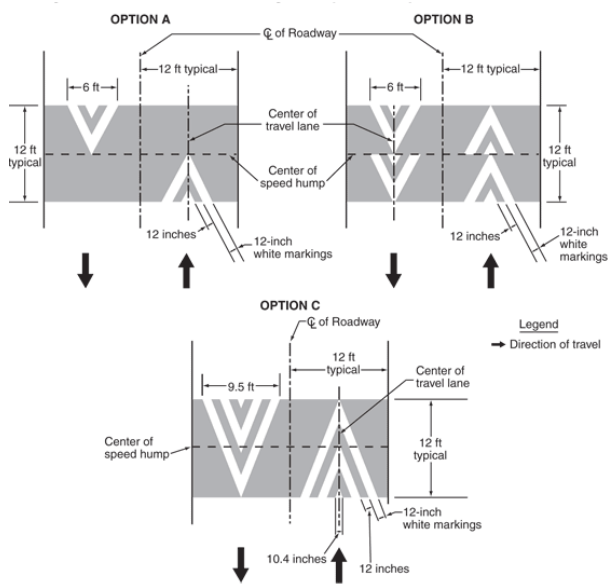

Photo Source: U.S. DOT -MUTCD

ADVANTAGES

Effective in reducing speeds

DISADVANTAGES

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

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

Notes:
Low: less than 10% change; Medium: 10% to 30% change, High: greater than 30% change
Data Source: Traffic Calming: State of the Practice, 2000.

Slow Turn Wedges

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.

Approximate Cost: $1,000 - $3,000

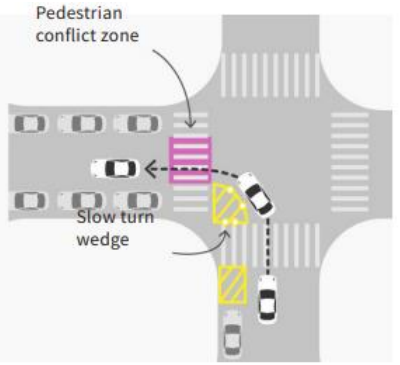

Photo Source: Left Turn Traffic Calming mwcog.org

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

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

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

Notes:
Low: less than 10% change; Medium: 10% to 30% change, High: greater than 30% change
Data Source: Evaluation Report Left turn calming pilot project City of Portland 2020

Bulb-Out/Curb Extension

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

Approximate Cost: $20,000 - $100,000

Photo Source: Fehr & Peers

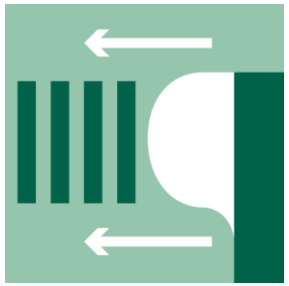

Photo Source: https://nacto.org/

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 rightturning vehicles)

DISADVANTAGES

- Effectiveness is limited by the absence of deflection
- May slow right-turning emergency vehicles
- Potential loss of on-street parking

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

Notes:
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Data Source: Evaluation Report Left turn calming pilot project City of Portland 2020

Two Lane Pinchpoints

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.

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

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

Photo Source: https://nacto.org/

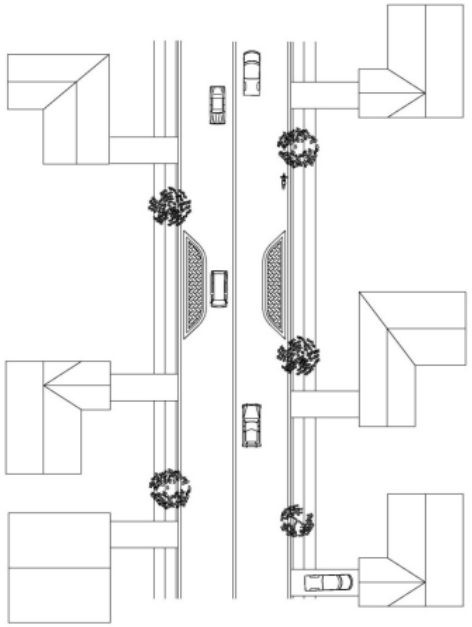

Photo Source: https://nacto.org/

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

Measured Impacts

Speed Impacts	Reduction in 85th Percentile Speeds between Slow Points	Low
Volume Impacts	Reduction in Vehicles per Day	Medium
Safety Impacts	Reduction in Average Annual Number of Collisions	N/A

Notes:
Low: less than 10% change; Medium: 10% to 30% change, High: greater than 30% change
Data Source: Evaluation Report Left turn calming pilot project City of Portland 2020

Medians

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.

Approximate Cost: $10,000 - $25,000


Median without horizontal deflection


Median with horizontal deflection

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

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

Notes:
Low: less than 10% change; Medium: 10% to 30% change, High: greater than 30% change
Data Source: Evaluation Report Left turn calming pilot project City of Portland 2020

Half Closure

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..

Approximate Cost: t: $10,000 - $200,000 depending on the materials used

Photo Sourcehttps://gettingaroundsac.blog/tag/stop-signs/

Photo Source: http://www.pedbikesafe.org/

Photo Source: https://nacto.org/

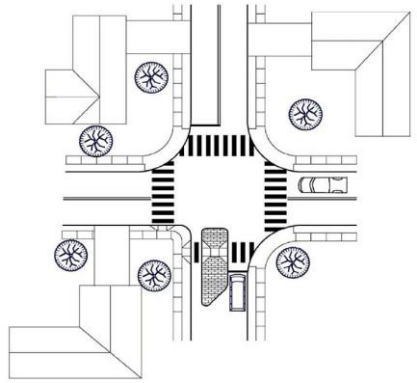

Photo Source: U.S. Traffic Calming Manual By Reid Ewing and Steven J. Brown

ADVANTAGES

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

DISADVANTAGES

- Causes circuitous routes for residents
- May limit access to businesses
- Drivers can bypass the barrier
- Diverts traffic to another street

Measured Impacts

Speed Impacts	Reduction in 85th Percentile Speeds between Slow Points	Medium
Volume Impacts	Reduction in Vehicles per Day	High
Safety Impacts	Reduction in Average Annual Number of Collisions	N/A

Notes:
Low: less than 10% change; Medium: 10% to 30% change, High: greater than 30% change
Data Source: Evaluation Report Left turn calming pilot project City of Portland 2020

Full Closure/ Cul - de Sacs

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.

Approximate Cost: $10,000 - $300,000 depending on the materials used.

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

Photo Sourcehttps://www.metrosiliconvalley.com/endless-summer-wine-stroll-at-santana-row/

Photo Source: https://nacto.org/

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

Photo Source: Santana Row, Santana Clara- Google Maps

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

Notes:
Low: less than 10% change; Medium: 10% to 30% change, High: greater than 30% change
Data Source: Evaluation Report Left turn calming pilot project City of Portland 2020

City of Santa Cruz Traffic Calming Toolkit: Ranking and Eligibility

Issue	Point Definitions	Points
Travel Speeds	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
Traffic 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	5 per collision
	Automobile	1 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 any score does not mandate that measures will be initiated

Traffic Calming Feature	Eligibility		
	Local Road	Collector	Arterial
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.

*These treatments require additional consideration and review, including Engineering discretion, consultation with emergency response and transit

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