Legistar: 130285

To:	Chairperson and Transportation and Safety Committee
From:	Frank Kalisik, Civil Engineer II
Through:	Carl S. Goldsmith, Director of Public Works
Date:	August 8, 2013
Subject:	Maple Street Traffic Speeds

130285; Maple Street Traffic Speed Reduction Measures

During the June 10, 2013 Transportation and Safety Committee Meeting, the subject was discussed and tabled, requesting staff to present additional information for consideration. Attached are information on various traffic calming measures from the Federal Highway Administration (FHWA), the Institute of Transportation Engineers (ITE), and TrafficCalming.org. This information provides an overview of the objectives, types, and effectiveness of various traffic calming measures studied and deployed in other areas of the country. After reviewing this information, considering the geometry of the intersections of Maple and Edgewood, and Maple and Lodge (Maple Street has 14.5 foot traffic lanes), the following traffic calming measures are viable candidates for deployment on Maple Street that would likely have a reduction in overall traffic speeds while minimizing impacts on traffic volume. These traffic calming measures, mentioned from least to most expensive, are:

1. Allow parking one side of Maple Street. Sign and stripe accordingly. (11.5 foot traffic lanes.)
2. Allow a bike lane on both sides of Maple Street. Sign and stipe accordingly. (12.5 foot traffic lanes.)
3. Reconfigure select intersections with choker/narrowing/bulbout curb extensions. Sign and stripe accordingly. (12 foot traffic lanes.)
4. Reconfigure select intersections with center islands. Sign and stripe accordingly. (12 foot traffic lanes with slight horizontal deviations.)
5. Reconfigure select intersections with traffic circles/roundabouts. Sign and stripe accordingly. (12 foot traffic lanes with aggressive horizontal deviations.)

Though the "reconfigure" options may seem to be more effective and do not place bicyclists/private vehicles in precarious locations, they will require extensively more funding and time to implement, including experienced professional design assistance, construction contracts, and funding mechanisms. If the objective is to modify the overall character of Maple Street from a collector route to a neighborhood street staff would recommend pursuing a one of the long term permanent construction solutions. If the objective is to reduce traffic speeds while maintaining the mobility of the residents, staff would recommend one of the pavement narrowing options.

CC: Laura Fitzpatrick, District 5

Maple Street from Grace to Westmore-Meyers

Environment

Traffic Calming

General Objectives of Traffic Calming

This is an archived document. For current information on Traffic Calming, visit the FHWA Office of Safety.

- To encourage citizen involvement in the traffic calming process by incorporating the preferences and requirements of the citizens,
- To reduce vehicular speeds,
- To promote safe and pleasant conditions for motorists, bicyclists, pedestrians, and residents,
- To improve the environment and livability of neighborhood streets
- To improve real and perceived safety for nonmotorized users of the streets,
- To discourage use of residential streets by non-citizens cut through vehicular traffic.

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Traffic Calming

Traffic Calming Measures

This is an archived document. For current information on Traffic Calming, visit the FHWA Office of Safety.

Descriptions and Pictures of

Traffic Calming Devices and Techniques

Devices and Techniques	Descriptions	Pictures
Bike Lanes	A portion of a roadway which has been designated by striping, signing, and pavement markings for the preferential or exclusive use of bicyclists.	
Bulbouts/Neckdowns/ Chokers	Curb extensions at intersections that reduce curb-to-curb roadway travel lane widths.	
Center Islands	Raised islands located along the centerline of a roadway that narrow the width at that location.	
Chicanes/Lateral Shifts	Curb extensions that alternate from one side of the roadway to the other, forming s-shaped curves.	
Closures (Cul-de-sacs)	Barriers placed across roadways to completely close through vehicle traffic.	

Diverters	Barriers placed diagaonally across an intersection, blocking certain movements.	
Education	Instructions given to the residents on safe on-street vehicle travel.	
Forced Turn Lanes	Raised islands located on approaches to an intersection that block certain movements.	
Median Barriers	Raised islands located along the centerline of a roadway and continuing through an intersection to block cross traffic.	
Police Enforcement	Involve employing the services of law enforcement agencies to impose the local safe vehicle laws, including those for posted speeds and traffic signal/signs.	
Realigned Intersections	Changes in alignments that convert T-intersections with straight approaches into curving roadways meeting at right angles.	
Roundabouts	Barriers placed in the middle of an intersection, directing all traffic in the same direction.	
Speed Humps	Rounded raised pavement devices placed across roadways to slow and/or discourage traffic	

Speed Tables/ Textured Pavement/ Raised Crossings	Flat-topped speed humps often constructed with a brick or other textured material to slow traffic	
Traffic Circles	Barriers placed in the middle of an intersection, directing all traffic in the same direction. Usually larger than roundabouts.	

Sources: Traffic Calming, Selected Practices, Lessons Learned and Reed Ewing, Rutgers University, Center for Urban Policy Research.

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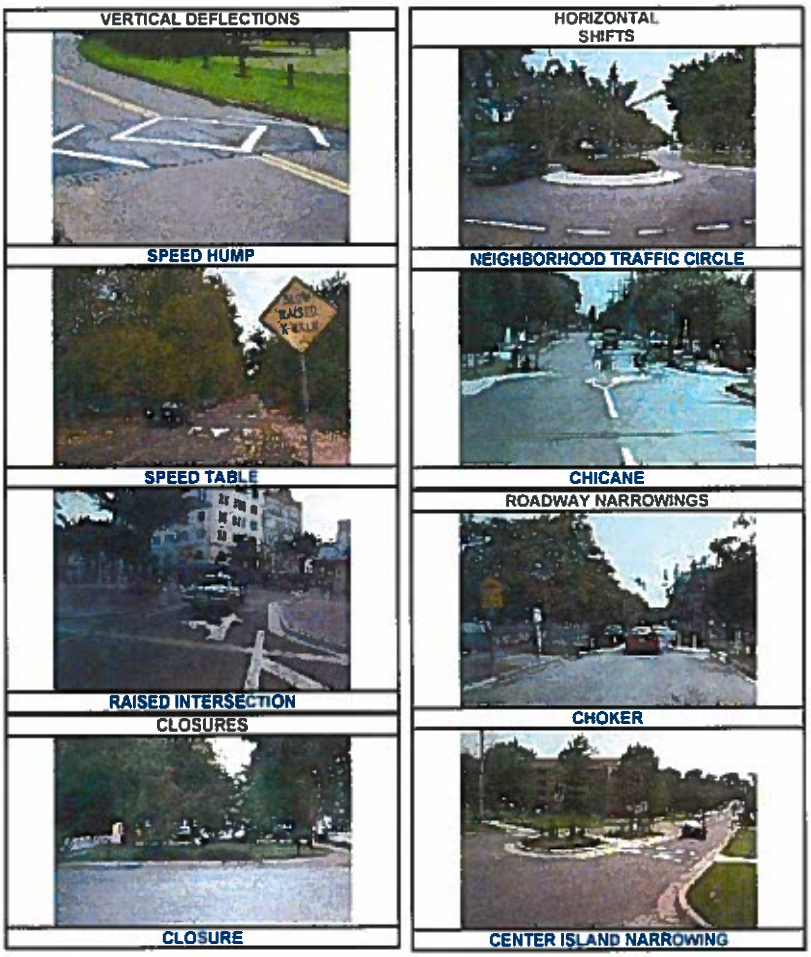
Traffic Calming Measures

A series of fact sheets providing an overview of several traffic calming measures are available from this Web page. A photograph of a typical application as well as a plan-view sketch adapted from the Boulder, Colorado *Neighborhood Traffic Mitigation Program Toolkit* are included within each fact sheet.

Four types of measures are summarized:

- **Vertical deflections, horizontal shifts, and roadway narrowings** are intended to reduce speed and enhance the street environment for non-motorists.
- **Closures** (diagonal diverters, half closures, full closures, and median barriers) are intended to reduce cut-through traffic by obstructing traffic movements in one or more directions.



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For each traffic calming measure, information has been compiled from a variety of sources, including:

Traffic Calming: State of the Practice (ITE/FHWA)

Canadian Guide to Neighbourhood Traffic Calming (TAC and CITE)

Traffic Calming Primer (Pat Noyes & Associates)

Guidelines for the Design and Application of Speed Humps (ITE)

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The information provided on these fact sheets has been obtained from the research and experience of transportation engineering and planning professionals. The information is intended for informational purposes only and does not include ITE or FHWA recommendations on the best course of action.

Photos of traffic calming devices were provided by Reid Ewing.

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Effectiveness

Speed Impacts of Traffic Calming Measures

(standard deviations in parentheses)

	Sample Size	85th Percenile Speed Afterward	Average Change in 85th Percentile Speed	Average % Change
12' Speed Hump	179	27.4 mph (4.0 mph)	-7.6 mph (3.5mph)	-22% (9%)
14' Speed Hump	15	25.6 (2.1)	-7.7 (2.1 mph)	-23 (6)
22' Speed Table	58	30.1 (2.7)	-6.6 (3.2)	-18 (8)
Longer Table (>22')	10	31.6 (2.8)	-3.2 (2.4)	-9 (7)
Raised Intersection	3	34.3 (6.0)	-0.3 (3.8)	-1 (10)
Traffic Circle	45	30.3 (4.3)	-3.9 (3.2)	-11 (10)
Narrowing	7	32.3 (2.8)	-2.6 (5.5)	-7 (22)
Choker	5	28.6 (3.1)	-2.6 (1.3)	-14 (4)
Half Closure	16	26.3 (5.2)	-6.0 (3.6)	-19 (11)
Diagonal Diverter	7	27.9 (5.2)	-1.4 (4.7)	0 (17)

Note: speeds are measured at midpoints between measures

Volume Impacts of Traffic Calming Measures

(standard deviations in parentheses)

	Sample Size	Average Change in Volume	Average % Change
Choker	5	-392 vehicles per day (384 vehicles per day)	-20% (19%)
Full Closure	19	-671 vehicles per day (786 vehicles per day)	-44% (36%)

Half Closure	53	-1611 vehicles per day (2444 vehicles per day)	-42% (41%)
Diagonal Diverter	27	-501 vehicles per day (622 vehicles per day)	-35% (46%)
Other Volume Control	10	-1167 vehicles per day (1781 vehicles per day)	-31% (36%)

Safety Impacts of Traffic Calming Measures

(U.S. Experience)

	# of Observations	Average # of Collisions Without Measure	Average # of Collisions With Measure	% Change in Collisions
12' Speed Hump	49	2.7	2.4	-11%
14' Speed Hump	5	4.4	2.6	-41%
22' Speed Table	8	6.7	3.7	-45%
Traffic Circle (w/o Seattle)	17	5.9	4.2	-29%
Traffic Circle (w/Seattle)	130	2.2	0.6	-73%
All Measures				
w/o Adjustments	192	2.6	1.3	-50%*
w/Adjustments	42	3.8	3.0	-21%**

* Significant at 0.001 probablity level
** Significant at 0.04 probability level

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Traffic Circles

Traffic circles are raised islands, placed in intersections, around which traffic circulates. They are good for calming intersections, especially within neighborhoods, where large vehicle traffic is not a major concern but speeds, volumes, and safety are problems.

Advantages:

- Traffic Circles are very effective in moderating speeds and improving safety
- If designed well, they can have positive aesthetic value
- Placed at an intersection, they can calm two streets at once

Disadvantages:

- They are difficult for large vehicles (such as fire trucks) to circumnavigate
- They must be designed so that the circulating lane does not encroach on the crosswalks
- They may require the elimination of some on-street parking
- Landscaping must be maintained, either by the residents or by the municipality

Effectiveness:

- Average of 11% decrease in the 85th percentile travel speeds, or from an average of 34.1 to 30.2 miles per hour (from a sample of 45 sites)
- Including a large sample from Seattle, an average of 73% decrease in accidents, or from an average of 2.2 to 0.6 accidents per year (from a sample of 130 sites)
- Excluding the large sample from Seattle, an average of 29% decrease in accidents, or from an average of 5.9 to 4.2 accidents per year (from a sample of 17 sites)

Similar Measures:

- By placing a raised island in a midblock location, you have a Center Island Narrowing
- By enlarging the intersection and the center island, inserting splitter islands at each approach, setting back the crosswalks away from the circulating lane, and implementing yield control at all approaches, you have a Roundabout

Cost Estimate(s):

- Varies by materials used and the amount of area covered

Boulder, CO – This traffic circle is combined with textured crosswalks. The center island uses low-maintenance landscaping.

Eugene, OR – This traffic circle is controlled by all-way stop control.

Seattle, WA – This traffic circle is located at a T-intersection. A truck apron is included that allows trucks to make a left-turn, while passenger vehicles are discouraged from using the truck apron by the short lip at its edge.

Ft. Lauderdale , FL – This traffic circle has a larger truck apron. Splitter islands and yield lines have been striped at each approach.

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Chokers

Chokers are curb extensions at midblock locations that narrow a street by widing the widewalk or planting strip. If marked as crosswalks, they are also known as safe crosses. Two-lane chokers leave the street cross section with two lanes that are narrower than the normal cross section. One-lane chokers narrow the width to allow travel in only one direction at a time, operating similarly to one-lane bridges. They are good for areas with substantial speed problems and no on-street parking shortage.

Advantages:

- Chokers are easily negotiable by large vehicles (such as fire trucks)
- If designed well, they can have positive aesthetic value
- They reduce both speeds and volumes

Disadvantages:

- Their effect on vehicle speeds is limited by the absence of any vertical or horizontal deflection
- They may require bicyclists to briefly merge with vehicular traffic
- They may require the elimination of some on-street parking

Effectiveness:

- Average of 7% decrease in the 85th percentile travel speeds, or from an average of 34.9 to 32.3 miles per hour (combined average for various narrowing measures, taken from a sample of 7 sites)

Similar Measures:

- If a roadway is narrowed at an intersection, you have a Neckdown
- If a roadway is narrowed from the centerline, rather than from the curbs (i.e. using a raised island), you have a Center Island Narrowing

Cost Estimate(s):

- $7,000 – 10,000 (Portland, OR)

Winter Park, FL – This choker is combined with a crosswalk, creating a safe cross .

Montgomery County, MD – This choker uses slightly offset curb extensions to accommodate the residential driveways.

Howard County, MD – With one-lane chokers, vehicles on one side yield to vehicles from the other side until the queue is cleared, just as on one-lane bridges.

Sarasota, FL – This choker includes a yield line to alert approaching vehicles.

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