Traffic Calming Measures
CE 453 Lecture 41

Principal sources:
www.trafficcalming.org
http://www.trans.ci.portland.or.us/trafficcalming/default.htm

See: http://www.io.com/~bumper/ada.htm for anti-traffic calming page

Class Objectives

• What are “Traffic Calming” techniques?
• Are they effective?
• What do they look like?
• Are they compatible with other residential interests and issues?
Traffic calming is the combination of mainly physical measures that reduce the negative effects of motor vehicle use, alter driver behavior and improve conditions for non-motorized street users.
Citizen Demand YOU
“Do Something”

• Speed and number of cars
• Emergency services
• School zones
• Parks and recreational facilities
• etc
Improves Livability

• Donald Appleyard, “Livable Streets”
• Environmental capacity is
  – 500-800 vpd
  – 85% percentile speed 15-20 m.p.h.
Impacts

- Residential property values
- Crime reduction
- Reducing noise
- Speed reduction
- Improve safety
The Goal Is

- Finding the balance between
  - The need to slow traffic on residential streets
  - Increase neighborhood safety and livability
  - And, providing prompt emergency services
The Concerns Are

- Vehicle speeds
- Travel / response time
- Visibility of devices
- Aesthetics
- Maintenance practices

In a Portland study, residents stated that they considered solving traffic problems more important than maintaining the current level of emergency response!!
• Over 700 traffic circles have been installed in Seattle since 1973.

www.ci.seattle.wa.us/ti/ntcprept.asp
• Many traffic circles involve the surrounding neighborhoods by adding “neighborhood logos” or plaques recognizing donors.

www.ci.seattle.wa.us/td/ntcprept.asp
Figure 7.7. “Worst Thing that Ever Happened.” (Charlotte, NC)
<table>
<thead>
<tr>
<th>Community</th>
<th>Fire and Emergency Medical Service Departments</th>
<th>Police Department</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austin, TX</td>
<td>Escalated its opposition to traffic calming—agreed to 2 years of new hump installations</td>
<td>In favor of humps—receptive to other measures as yet untested</td>
</tr>
<tr>
<td>Bellevue, WA</td>
<td>Negotiating new emergency routes with limitations on measures permitted on each route—oppose use of humps and circles on slopes where emergency vehicles have trouble accelerating</td>
<td>Supportive generally—humps and other self-enforcing measures reduce manpower needs</td>
</tr>
<tr>
<td>Berkeley, CA</td>
<td>Forced moratorium on humps until program could be fully evaluated—evaluation ongoing—oppose diverters to lesser extent than humps</td>
<td>No stated position or neutral</td>
</tr>
<tr>
<td>Boulder, CO</td>
<td>Forced virtual moratorium on physical measures—opposed to humps, circles, and &quot;anything else that is effective&quot;—experimenting instead with emergency-response-neutral measures</td>
<td>No stated position or neutral</td>
</tr>
<tr>
<td>Charlotte, NC</td>
<td>Concerned about humps on collectors—fire chief publicly neutral despite opposition from firefighters</td>
<td>No stated position or neutral</td>
</tr>
<tr>
<td>Dayton, OH</td>
<td>Publicly neutral due to a supportive city administration—prefer circles to humps</td>
<td>Supportive generally—instrumental in street closures to fight crime</td>
</tr>
</tbody>
</table>
IN AN EFFORT TO ACCOMMODATE THE NEEDS OF EMERGENCY SERVICES, SPEED HUMPS ARE NO LONGER INSTALLED IN THE CITY OF AUSTIN.
Volume Control Measures
Full Closures
a.k.a. cul-de-sacs, dead ends

Full street closures are barriers placed across a street to completely close the street to through-traffic, usually leaving only sidewalks open.

Cost Estimate: $120,000 (Seattle, WA)
Half-Closures
a.k.a. partial closures, one-way closures
Half closures are barriers that block travel in one direction for a short distance on otherwise two-way streets.

Cost Estimates:
- $40,000 (Portland, OR)
- $35,000 (Seattle, WA)
- $20,500 (Austin, TX)

Phoenix, AZ
Half-Closures

ADVANTAGES:
• Restricts movements into a street while maintaining access and movement within the street block for residents.
• Reduces cut-through traffic.
• More self-enforcing and aesthetically pleasing than turn restriction signing.
• Reduces crossing distances for pedestrians.
• Aesthetically pleasing.
• In emergency situations, emergency vehicles can travel in the restricted direction.

DISADVANTAGES:
• May divert traffic to parallel streets without traffic calming measures.
• May increase trip length for some residents.
• Curbside parking must be prohibited adjacent to the device.
• May increase emergency response time as they maneuver around the semi-diverter.
• Maintenance responsibility.

OTHER CONSIDERATIONS:
• Bicycles are typically permitted to travel through a semi-diverter in both directions, including the restricted direction.
Diagonal Diverters
a.k.a. full diverters, diagonal road closures
Diagonal diverters are barriers placed diagonally across an intersection, blocking through movement.

Cost Estimate: $85,000 (Seattle, WA)
Median Barriers
*a.k.a. median diverters, island diverters*
Median barriers are islands located along the centerline of a street and continuing through an intersection so as to block through movement at a cross street.

Cost Estimate: $10,000 - $20,000 (Portland, OR)
Forced Turn Islands

a.k.a. forced turn channelizations, pork chops, right turn islands

Forced turn islands are islands on approaches to an intersection that block certain movements.
OTHER VOLUME CONTROL MEASURES

Star Diverter
Seattle, WA

One Way - Two Way
Boulder, CO

Truncated Diagonal Diverter
Seattle, WA

One Way - Two Way
Montgomery County, MD
Speed Control Measures
Speed Humps
a.k.a. road humps, undulations
Speed humps are rounded raised areas placed across the road.

Cost Estimates: $2000-2500 (Portland, OR)
$2000 (Sarasota, FL)
$2000 (Seattle, WA)
$6800 (Austin, TX)
Speed Humps

ADVANTAGES:
• Reduces vehicle speed. More effective if used in a series at 300’ to 500’ spacing or in conjunction with other traffic calming devices.
• Can reduce vehicular volumes.
• No restrictions to on-street parking.
• Requires minimum maintenance.

DISADVANTAGES:
• May divert traffic to parallel streets that do not have traffic calming measures.
• Increases emergency response times.
• Not esthetically pleasing.
Speed Tables
*a.k.a. trapezoidal humps, speed platforms*
Speed tables are flat-topped speed humps often constructed with a brick or other textured materials on the flat section.

Cost Estimate: $2,500 per speed table

40 → 37 mph, 13,000 → 10,300 vpd
Figure 2. Typical Speed Table (Traffic Calming for Communities, 2001)
<table>
<thead>
<tr>
<th>Jurisdiction</th>
<th>Guideline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fairfax, Virginia</td>
<td>200' from an intersection</td>
</tr>
<tr>
<td>Thousand Oaks, California</td>
<td>50' to 200' from intersections, STOP signs, and “tight turns”</td>
</tr>
<tr>
<td></td>
<td>5' to 10' from driveways</td>
</tr>
<tr>
<td>Fort Worth, Texas</td>
<td>300' from traffic signals, STOP signs, or YIELD signs</td>
</tr>
<tr>
<td></td>
<td>75' from uncontrolled intersections</td>
</tr>
<tr>
<td>Pennsylvania DOT</td>
<td>Prohibited on horizontal curves with radius less than 300'</td>
</tr>
<tr>
<td></td>
<td>Prohibited on grades greater than 8%</td>
</tr>
<tr>
<td></td>
<td>150' from unsignalized intersections</td>
</tr>
<tr>
<td></td>
<td>250' from signalized intersections</td>
</tr>
<tr>
<td>Gwinnet County, Georgia</td>
<td>Prohibited on grades greater than 8%</td>
</tr>
<tr>
<td></td>
<td>100' to 200' from STOP signs or “small” geometric curvatures</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Jurisdiction</th>
<th>Spacing (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fairfax, Virginia</td>
<td>No less than 500</td>
</tr>
<tr>
<td>Kuna, Idaho</td>
<td>600 minimum</td>
</tr>
<tr>
<td>Thousand Oaks, California</td>
<td>150 to 400</td>
</tr>
<tr>
<td>Fort Worth, Texas</td>
<td>300 to 1600</td>
</tr>
<tr>
<td>Pennsylvania DOT</td>
<td>250 to 600</td>
</tr>
<tr>
<td>Atlanta, Georgia</td>
<td>200 to 700</td>
</tr>
<tr>
<td>Cobb County, Georgia</td>
<td>300 to 500</td>
</tr>
<tr>
<td>Gwinnett County, Georgia</td>
<td>350 to 500</td>
</tr>
<tr>
<td>San Antonio, Texas</td>
<td>300 to 890</td>
</tr>
<tr>
<td>Seattle, Washington</td>
<td>326 to 553</td>
</tr>
<tr>
<td>Austin, Texas</td>
<td>300 to 500</td>
</tr>
<tr>
<td>Bellevue, Washington</td>
<td>200 to 300</td>
</tr>
<tr>
<td>Berkeley, California</td>
<td>150 to 400</td>
</tr>
<tr>
<td>Boulder, Colorado</td>
<td>150 to 800</td>
</tr>
<tr>
<td>Howard County, Maryland</td>
<td>400 to 600</td>
</tr>
<tr>
<td>Montgomery County, Maryland</td>
<td>400 to 600</td>
</tr>
<tr>
<td>Phoenix, Arizona</td>
<td>No more than 500</td>
</tr>
<tr>
<td>Portland, Oregon</td>
<td>300 to 600</td>
</tr>
</tbody>
</table>

Figure 3. Commonly Used Speed Hump Profiles (Ewing, 1999)
<table>
<thead>
<tr>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speed reduction</td>
<td>Emergency response delays</td>
</tr>
<tr>
<td>Volume reduction</td>
<td>Traffic diversion</td>
</tr>
<tr>
<td>Accident frequency reduction</td>
<td>Liability concerns</td>
</tr>
<tr>
<td>Accident severity reduction</td>
<td>Aesthetics</td>
</tr>
<tr>
<td>Crime reduction</td>
<td>Snow removal/maintenance difficulty</td>
</tr>
<tr>
<td></td>
<td>Noise</td>
</tr>
<tr>
<td>Jurisdiction</td>
<td>Speed Hump/Table Design</td>
</tr>
<tr>
<td>---------------------------</td>
<td>-------------------------</td>
</tr>
<tr>
<td>Portland, Oregon</td>
<td>14’ humps</td>
</tr>
<tr>
<td></td>
<td>22’ tables</td>
</tr>
<tr>
<td>Austin, Texas</td>
<td>12’ humps</td>
</tr>
<tr>
<td>Montgomery County, Maryland</td>
<td>12’ humps</td>
</tr>
<tr>
<td>Sarasota, Florida</td>
<td>12’ humps</td>
</tr>
<tr>
<td>Boulder, Colorado</td>
<td>12’ humps</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Jurisdiction</th>
<th>Design</th>
<th>Before (mph)</th>
<th>After (mph)</th>
<th>Difference (mph)</th>
<th>Change (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austin, Texas**</td>
<td>12' humps</td>
<td>36 to 40</td>
<td>26 to 31</td>
<td>-5 to -12</td>
<td>-14 to -32</td>
</tr>
<tr>
<td></td>
<td>22' tables</td>
<td>35 to 40</td>
<td>28 to 31</td>
<td>-6 to -9</td>
<td>-17 to -24</td>
</tr>
<tr>
<td>Bellevue, Washington**</td>
<td>12' humps</td>
<td>33 to 39</td>
<td>25 to 27</td>
<td>-6 to -12</td>
<td>-18 to -31</td>
</tr>
<tr>
<td></td>
<td>22' tables</td>
<td>34 to 35</td>
<td>29 to 31</td>
<td>-3 to -6</td>
<td>-9 to -17</td>
</tr>
<tr>
<td>Berkeley, California**</td>
<td>12' humps</td>
<td>25 to 36</td>
<td>20 to 28</td>
<td>-3 to -11</td>
<td>-12 to -34</td>
</tr>
<tr>
<td></td>
<td>22' tables</td>
<td>31</td>
<td>25</td>
<td>-6</td>
<td>-19</td>
</tr>
<tr>
<td>Boulder, Colorado**</td>
<td>12' humps</td>
<td>28 to 31</td>
<td>25</td>
<td>-3 to -8</td>
<td>-11 to -24</td>
</tr>
<tr>
<td>Charlotte, North Carolina**</td>
<td>22' tables</td>
<td>31 to 40</td>
<td>27 to 37</td>
<td>0 to -9</td>
<td>0 to -23</td>
</tr>
<tr>
<td>Dayton, Ohio**</td>
<td>12' humps</td>
<td>32 to 34</td>
<td>25 to 32</td>
<td>0 to -9</td>
<td>0 to -26</td>
</tr>
<tr>
<td>Eugene, Oregon**</td>
<td>14' humps</td>
<td>32 to 34</td>
<td>27</td>
<td>-5 to -7</td>
<td>-16 to -21</td>
</tr>
<tr>
<td>Ft. Lauderdale, Florida**</td>
<td>12' humps</td>
<td>35</td>
<td>25</td>
<td>-10</td>
<td>-29</td>
</tr>
<tr>
<td></td>
<td>22' tables</td>
<td>36 to 38</td>
<td>29 to 33</td>
<td>-4 to -9</td>
<td>-11 to -24</td>
</tr>
<tr>
<td>Gwinnett County, Georgia**</td>
<td>22' tables</td>
<td>35 to 47</td>
<td>26 to 34</td>
<td>-6 to -14</td>
<td>-15 to -32</td>
</tr>
<tr>
<td>Howard County, Maryland**</td>
<td>12' humps</td>
<td>38 to 40</td>
<td>28</td>
<td>-10 to -12</td>
<td>-26 to -30</td>
</tr>
<tr>
<td></td>
<td>22' tables</td>
<td>35 to 43</td>
<td>28 to 36</td>
<td>0 to -14</td>
<td>0 to -33</td>
</tr>
<tr>
<td>Montgomery County, Maryland**</td>
<td>12' humps</td>
<td>32 to 43</td>
<td>25 to 34</td>
<td>-3 to -12</td>
<td>-9 to -30</td>
</tr>
<tr>
<td></td>
<td>22' tables</td>
<td>33 to 40</td>
<td>29 to 34</td>
<td>-1 to -8</td>
<td>-3 to -22</td>
</tr>
<tr>
<td>Omaha, Nebraska**</td>
<td>12' humps</td>
<td>34 to 45</td>
<td>27 to 37</td>
<td>0 to -11</td>
<td>0 to -27</td>
</tr>
<tr>
<td>San Diego, California**</td>
<td>12' humps</td>
<td>34 to 38</td>
<td>25 to 30</td>
<td>-6 to -13</td>
<td>-17 to -34</td>
</tr>
<tr>
<td>San Jose, California**</td>
<td>12' humps</td>
<td>32 to 36</td>
<td>20 to 26</td>
<td>-10 to -13</td>
<td>-28 to -39</td>
</tr>
<tr>
<td>Sarasota, Florida**</td>
<td>12' humps</td>
<td>29 to 35</td>
<td>21 to 28</td>
<td>-5 to -9</td>
<td>-17 to -27</td>
</tr>
<tr>
<td></td>
<td>22' tables</td>
<td>42</td>
<td>25</td>
<td>-17</td>
<td>-41</td>
</tr>
</tbody>
</table>
Figure 12. Portland 14-Foot Speed Hump Speed Distribution
(Kittelson and Associates, Inc., 2000)
Table 8. Results of Resident Survey on Speed Humps/Tables*

<table>
<thead>
<tr>
<th>Jurisdiction</th>
<th>Response Rate</th>
<th>Favor</th>
<th>Disfavor</th>
<th>No Opinion</th>
</tr>
</thead>
<tbody>
<tr>
<td>San Antonio, Texas</td>
<td>40%</td>
<td>75%</td>
<td>21%</td>
<td>4%</td>
</tr>
<tr>
<td>Omaha, Nebraska</td>
<td>56%</td>
<td>82%</td>
<td>18%</td>
<td>0%</td>
</tr>
<tr>
<td>Iowa City, Iowa</td>
<td>63%</td>
<td>68%</td>
<td>32%</td>
<td>0%</td>
</tr>
</tbody>
</table>

* Sources: Ballard, 1998; Ripley and Klingaman, 1998; Gorman et al., 1989.
Figure 18. 18-Foot Temporary 30 mph Speed Table
(a) Before

(b) Speed Hump

(c) Speed Table

(d) After
Raised Crosswalks
a.k.a. raised crossings, sidewalk extensions

Raised Crosswalks are speed tables outfitted with crosswalk markings and signage to channelize pedestrian crossings, providing pedestrians with a level street crossing.
Raised Intersections
*a.k.a. raised junctions, intersection humps, plateaus*
Raised intersections are flat raised areas covering entire intersections, with ramps on all approaches and often with brick or other textured materials on the flat section.

Cost Estimate: $12,500 (Sarasota, FL)

37 → 35 mph, volumes not available
Textured Pavements

Textured Pavements, such as brick or stone surfaces, cause drivers to have a slightly bumpy ride over an extended distance, while improving the aesthetic quality of the street environment.

Seattle, WA
Traffic Circles

a.k.a. rotaries, intersection islands

Traffic circles are islands, placed in intersections, around which traffic circulates.

Cost Estimates:

- $10-15,000 (Portland, OR)
- $3,500 (Sarasota, FL)
- $6,000 (Seattle, WA)
- $20,000 (Berkeley)
- $3,000 to $15,000 (San Francisco);

25 → 23 mph, 561 → 583 vpd
Traffic Circles

ADVANTAGES:
- Reduces vehicle speed.
- Reduces vehicle conflicts at intersection.
- Provides equal access to intersection for all drivers.
- Does not restrict access to residents.
- When landscaped, traffic circles improve the appearance of a street.

DISADVANTAGES:
- A minimum of 40 feet of curbside parking must be prohibited at each corner of the intersection.
- May increase emergency response time. The construction of a mountable curb minimizes the impact to emergency vehicles.
- Can restrict access for large trucks and longer buses, and may require that these vehicles turn left in clockwise direction (in front of the circle, rather than around the circle).
- Maintenance responsibility, if landscaped.
- Requires additional traffic control signs (8-16 signs) and pavement markings.
- May increase conflicts with cyclist and pedestrians.
- May divert traffic to parallel streets.
Roundabouts
*a.k.a. rotaries*
Roundabouts require traffic to circulate counterclockwise around a center island. Unlike traffic circles, roundabouts are used on higher volume streets to allocate rights-of-way among competing movements.
Chicanes
*a.k.a. deviations, serpentine, reversing curves, twists*
Chicanes are curb extensions or islands that alternate from one side of the street to the other, forming S-shaped curves.

Cost Estimates:  
$14,000 (Sarasota, FL)  
$22,500 - $37,000 (Austin, TX)
Chicanes

ADVANTAGES:
• Reduces speed.
• Does not restrict access to residents.
• Minimal impact to emergency vehicles.
• Reduces crossing distance for pedestrians.
• Can be aesthetically pleasing, if landscaped.

DISADVANTAGES:
• Curbside parking must be prohibited.
• Maintenance responsibility, if landscaped.
• May divert traffic to parallel streets.
• May increase conflicts with cyclists and pedestrians.
Realigned Intersections
*a.k.a. modified intersections*
Realigned intersections are changes in alignment that convert T-intersections with straight approaches into curving streets meeting at right angles - a straight shot along the top of the T becomes a turning movement.
Neckdowns

a.k.a. nubs, bulbouts, knuckles, intersection narrowings, corner bulges, safe crosses

Neckdowns are curb extensions at intersections that reduce roadway width curb-to-curb.

Cost Estimate: $16,500 (Austin, TX)
Neckdowns

ADVANTAGES:
• Reduces crossing distance for pedestrians.
• May reduce cut-through traffic.
• Does not restrict access to residents.
• Minimal impact to emergency vehicles.
• Can be aesthetically pleasing, if landscaped.

DISADVANTAGES:
• Curbside parking must be prohibited to adjacent residents.
• Low impact to mid-block speeding.
• Maintenance responsibility, if landscaped.
Center Island Narrowings
a.k.a. midblock medians, median slowpoints, median chokers

Center island narrowings are islands located along the centerline of a street that narrow the street at that location.

Cost Estimates:
- $8,000-15,000 (Portland, OR)
- $60 per linear foot (Berkeley);
- $5,000 (Sarasota, FL)
Chokers
*a.k.a. pinch points, midblock narrowings, midblock yield points, constrictions*

Chokers are curb extensions or islands on one or both sides of the street that narrow the street at that location.

Cost Estimate: $7,000-10,000 (Portland, OR)
OTHER SPEED MEASURES

- Jiggle bumps
- Angle points
- Lateral shifts

- Deflector islands
- Median chokers
- Split medians

Figure 5.11. One-Lane Angled Slow Point. (128th Ave. NE—Bellevue, WA)
• Speed Hump with Choker
• Diverter-Closure
• Center Island with Neckdown
• Raised Intersection with Neckdown
• Center Island with Chokers
• Center Island with Tables
• Raised Crosswalk with Choker
• Center Island with Humps

34 → 30 mph, 1,500 → 1,390 vpd

Figure 5.14. Chicanes/22-foot Speed Tables. (Huntington Pkwy.—Montgomery County, MD)
Effectiveness ...
<table>
<thead>
<tr>
<th>Speed Impacts of Traffic Calming Measures (standard deviations in parentheses)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample Size</td>
</tr>
<tr>
<td>-------------</td>
</tr>
<tr>
<td>12’ Humps</td>
</tr>
<tr>
<td>14’ Humps</td>
</tr>
<tr>
<td>22’ Tables</td>
</tr>
<tr>
<td>Longer Tables</td>
</tr>
<tr>
<td>Raised Intersections</td>
</tr>
<tr>
<td>Circles</td>
</tr>
<tr>
<td>Narrowings</td>
</tr>
<tr>
<td>One-Lane Slow Points</td>
</tr>
<tr>
<td>Half Closures</td>
</tr>
<tr>
<td>Diagonal Diversers</td>
</tr>
</tbody>
</table>

www.trafficcalming.org
### Volume Impacts of Traffic Calming Measures

*(standard deviations in parentheses)*

<table>
<thead>
<tr>
<th></th>
<th>Sample Size</th>
<th>Average Change in Volume</th>
<th>Average % Change</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>One-Lane Slow Points</strong></td>
<td>5</td>
<td>-392 vehicles per day</td>
<td>-20% (19%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(384 vehicles per day)</td>
<td></td>
</tr>
<tr>
<td><strong>Full Closures</strong></td>
<td>19</td>
<td>-671 (786)</td>
<td>-44 (36)</td>
</tr>
<tr>
<td><strong>Half Closures</strong></td>
<td>53</td>
<td>-1611 (2444)</td>
<td>-42 (41)</td>
</tr>
<tr>
<td><strong>Diagonal Diverters</strong></td>
<td>27</td>
<td>-501 (622)</td>
<td>-35 (46)</td>
</tr>
<tr>
<td><strong>Other Volume Controls</strong></td>
<td>10</td>
<td>-1167 (1781)</td>
<td>-31 (36)</td>
</tr>
</tbody>
</table>

www.trafficcalming.org
Figure 5.29. Potential Conflicts Reduced by Traffic Circles.

<table>
<thead>
<tr>
<th>Safety Impacts of Traffic Calming Measures (U.S. Experience)</th>
</tr>
</thead>
<tbody>
<tr>
<td>**Number of Observations</td>
</tr>
<tr>
<td>---------------------------</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>12' Humps</strong></td>
</tr>
<tr>
<td><strong>14' Humps</strong></td>
</tr>
<tr>
<td><strong>22' Tables</strong></td>
</tr>
<tr>
<td><strong>Circles</strong> (w/o Seattle)</td>
</tr>
<tr>
<td><strong>Circles</strong> (w/ Seattle)</td>
</tr>
<tr>
<td><strong>All Measures</strong></td>
</tr>
<tr>
<td>w/o adjustments</td>
</tr>
<tr>
<td>w/ adjustments</td>
</tr>
</tbody>
</table>

* Significant at 0.001 probability level.
** Significant at 0.04 probability level.
Figure 5.51. Speed versus Pavement Width and Pavement Width Plus Setbacks.

Figure 5.32. Burglaries in the Riverside Park Neighborhood—Before and After Closures. (Ft. Lauderdale, FL)
<table>
<thead>
<tr>
<th>Location</th>
<th>Measure</th>
<th>Usual Level (decibels)</th>
<th>Peak Level (decibels)</th>
</tr>
</thead>
<tbody>
<tr>
<td>17th and Balsam</td>
<td>None</td>
<td>68–69</td>
<td>72</td>
</tr>
<tr>
<td>13th and Balsam</td>
<td>4-way stop</td>
<td>66–67</td>
<td>69</td>
</tr>
<tr>
<td>14th and Balsam</td>
<td>Traffic circle</td>
<td>60–64</td>
<td>70</td>
</tr>
<tr>
<td>Nicholl and Edgewood (extension of Balsam)</td>
<td>Raised crossing</td>
<td>60–62</td>
<td>64</td>
</tr>
</tbody>
</table>

Some Non-Engineered Examples

- Neighborhood traffic safety campaigns
- Neighborhood speed watch
- Speed trailers
- Public safety ad campaigns
Figure 5.42. Compliance with All-Way Stops. (Gwinnett County, GA)

Program Policies (see Iowa City policy)

- Use 3 E’s
- Accommodate emergency vehicles
- Direct through traffic to arterials
- Minimize impact on transit
- Enhance alternative transportation modes
- Balance parking needs and parking removal
- Limit re-routing and diversion impact on local streets
- Establish standard project procedures
Public Involvement

- **IS CRITICAL**
- Residents need to feel something is being done “for” them instead of “to” them
- Street is viewed as part of the property
- People become emotional
- Everyone feels strongly that they should have a say in what happens
Liability Issues

• Revolve around
  – Statutory authority
  – Constitutionality
  – Tort liability

• Managing risk
  – Well-designed devices
  – Good signing and markings
  – Well-lighted
  – Process documented
Traffic Calming Tools by Location

**Local**
1. Curb Extensions
2. Medians
3. Refuge Islands
4. Tree Wells
5. Inset Parking
6. Narrow Lanes
7. Midblock Crossings
8. Curb Radius Reductions
9. Bike Lanes
10. Roundabouts
11. Modified Intersections
12. Median Motes
13. Driveway Modifications
14. Lane Reductions
15. Mini-Circles
16. Speed Tables
17. Raised Intersections
18. Short Medians
19. Medians on Curves
20. Partial Closure
21. Chokers
22. Chicanes
23. Speed Humps

**School**
1. Curb Extensions
2. Medians
3. Refuge Islands
4. Tree Wells
5. Inset Parking
6. Narrow Lanes
7. Midblock Crossings
8. Curb Radius Reductions
9. Bike Lanes
10. Roundabouts
11. Modified Intersections
12. Median Motes
13. Driveway Modifications
14. Lane Reductions
15. Mini-Circles
16. Speed Tables
17. Raised Intersections
18. Short Medians
19. Medians on Curves
20. Partial Closure
21. Chokers
22. Chicanes
23. Speed Humps

**Arterial**
1. Curb Extensions
2. Medians
3. Refuge Islands
4. Tree Wells
5. Inset Parking
6. Narrow Lanes
7. Midblock Crossings
8. Curb Radius Reductions
9. Bike Lanes
10. Roundabouts
11. Modified Intersections
12. Median Motes
13. Driveway Modifications
14. Lane Reductions
<table>
<thead>
<tr>
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<th></th>
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</thead>
<tbody>
<tr>
<td>Speed Humps</td>
<td>Possible</td>
<td>Limited</td>
<td>Increase Noise</td>
<td>No Documented Problems</td>
<td>None</td>
<td>Minor Problems</td>
<td>None</td>
<td>Not Applicable</td>
<td>Low</td>
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<tr>
<td>STOPL Signs</td>
<td>Unlikely</td>
<td>None</td>
<td>Increase</td>
<td>Unclear</td>
<td>None</td>
<td>No Problems</td>
<td>None</td>
<td>Potentially High</td>
<td>Low</td>
</tr>
<tr>
<td>No LEFT/RIGHT TURN Signs</td>
<td>Yes</td>
<td>None</td>
<td>Decrease</td>
<td>Improved</td>
<td>No Turn(s)</td>
<td>One Direction</td>
<td>None</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>One-Way Street</td>
<td>Yes</td>
<td>None</td>
<td>Decrease</td>
<td>Improved</td>
<td>One Direction</td>
<td>One Direction</td>
<td>None</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>Chokers</td>
<td>Unlikely</td>
<td>Minor</td>
<td>No Change</td>
<td>Improved For Pedestrians</td>
<td>None</td>
<td>No Problems</td>
<td>Vandalism</td>
<td>Potentially High</td>
<td>Low</td>
</tr>
<tr>
<td>Traffic Circle</td>
<td>Possible</td>
<td>Likely</td>
<td>No Change</td>
<td>Unclear</td>
<td>None</td>
<td>Some Constraint</td>
<td>Vandalism</td>
<td>Moderate</td>
<td>Moderate</td>
</tr>
<tr>
<td>Median Barrier</td>
<td>Yes</td>
<td>None</td>
<td>Decrease</td>
<td>Improved</td>
<td>Right Turn Only</td>
<td>Minor Constraint</td>
<td>None</td>
<td>Low</td>
<td>Moderate</td>
</tr>
<tr>
<td>Forced Turn Channelization</td>
<td>Yes</td>
<td>Possible</td>
<td>Decrease</td>
<td>Improved</td>
<td>Some</td>
<td>Minor Constraint</td>
<td>Vandalism</td>
<td>Potentially High</td>
<td>Moderate</td>
</tr>
<tr>
<td>Semi-Divertor</td>
<td>Yes</td>
<td>Likely</td>
<td>Decrease</td>
<td>Improved</td>
<td>One Direction</td>
<td>Minor Constraint</td>
<td>Vandalism</td>
<td>Potentially High</td>
<td>Moderate</td>
</tr>
<tr>
<td>Diagonal Diverters</td>
<td>Yes</td>
<td>Likely</td>
<td>Decrease</td>
<td>Improved</td>
<td>Thru Traffic</td>
<td>Some Constraint</td>
<td>Vandalism</td>
<td>Low</td>
<td>Moderate</td>
</tr>
<tr>
<td>Cul-de-Sac</td>
<td>Yes</td>
<td>Likely</td>
<td>Decrease</td>
<td>Improved</td>
<td>Total</td>
<td>Some Constraint</td>
<td>Vandalism</td>
<td>Low</td>
<td>High</td>
</tr>
</tbody>
</table>

Source: Street Transportation Division, City of Phoenix, AZ.
Dear State Official:

Thanks for bringing this to our attention. I watched and taped the program and found it very interesting. I would like to put in my 2 cents worth on the traffic calming tactics like speed humps. If we put in one or two on a street we will have one every block on that street. When traffic moves to the next block over then we will install them on that street, and so on and so on until the entire city is one big speed hump. If we really look at the percentage of neighborhood speeding compared to the ADT, that percentage is in reality low. I question why those that abide by the traffic laws should be put through the inconvenience of speed humps to TRY to fix a speed problem. It is still my opinion that we are forced to use tactics as these to fix a behavior problem of a few to the detriment of all. As I see it, the State of Iowa needs to take a hard look at the speed problem on every street. I believe they need to look at taking the proper steps to change the behavior of those drivers creating the problem. It is not fair for those drivers who watch their speed closely when driving on any residential street whether in my own neighborhood or one of yours to have to drive over speed humps. We as a society need to suck it up and push for much higher speeding fines in residential neighborhoods or school zones as well have a sliding scale on the speed above the posted limit. We have a law where fines are doubled in work zones, why not in other areas? Speaking as one who worked on the interstate and freeway system in the Des Moines area for 7 years, I understand the need for the law. But as a trained operator I was also educated to keep an eye on traffic traveling through my work zone and to always leave myself an out-I jumped the guard rail more that once. Why do we not use this same concept in residential neighborhoods, where children can dart out into traffic without warning to drivers? It would be a good way to protect our children. I will end by saying it is all about respect for each other, of which there is a huge lack of in our society today, as the comment made in the show demonstrates drivers would be outraged if someone was speeding in their neighborhood but it is ok for them to do it in someone else's neighborhood. As you can tell this is a very sensitive issue for me. Again we are forced to fix speeding issues created by a few to the detriment of all. I thank you for your time.

Director of Public Works, City of xxx

Dear Director of Public Works, City of xxx:

We have one street and one alley in yyy City with speed humps, which were installed under very tight criteria that we have developed. It would be very difficult for the copy-cat phenomenon that you state to occur. I would also add that properly constructed speed humps will have a very mild sensation for a motorist obeying the speed limit, or even going 5 mph over.Once you get 5 mph over the posted speed limit or greater is where the sensation is enough to instinctively cause a motorist to slow down.

I was very hesitant to institute a traffic calming program in yyy City; we were basically forced to do it. Six years later, with the tight criteria we have developed, I am now a believer.

Traffic Engineering Planning, City of yyy

Dear Professor Souleyrette:

For the record I disagree with city xxx and align myself more with yyy City.

State Official
Dear State Official:

Sorry for the late response to your email you sent me awhile back regarding increasing traffic fines and I wanted to respectfully and constructively comment back. I disagree with your comment that our police officers have better things to do than give out speeding tickets. Part of a police officer's job is to enforce the traffic laws. I don't see a difference between a speeding vehicle and a person threatening someone with a loaded gun. Both actions can take lives. And there is by far more problems with speeders than there are people threatening others with guns. As was said at the beginning of the Date Line show, the biggest complaint that comes into the Police Departments is speeding motorists in residential neighborhoods. It is my opinion that higher fines would lessen the workload of our officers, not increase it. I believe it is apparent that our traffic fines as they relate to speeding and other related traffic violations are not stiff enough. How do we teach drivers not to speed? By punishing them when they do speed. And the punishment needs to be severe. I don't understand why society is willing to spend thousands of dollars on the installation of traffic calming devices in neighborhoods at the expense of all taxpayers but are not willing to try a financial traffic-calming device, a high priced speeding ticket, which only affects the violator.

A March 5, 2003 Des Moines Register story, "Budget forces speeders to pay up", discusses the use of speeding tickets to help minimize traffic deaths. The article quoted a representative from the Insurance Institute for Highway Safety who stated "Speeding tickets make the roads safer". The article also stated that law officers feel that "nothing else is so effective at getting drivers' attention".

Our police departments are already out there doing their job. In Clive we set out counters that gather speed/time/traffic count information to help our police department be more efficient in their enforcement efforts and they do a very good job.

We know that a majority of society wants the speeding problem fixed as indicated in the Date Line show, so we look at it with an engineering point of view by designing new physical controls. We spent years making our streets wider to give more visibility and more room to safely and efficiently travel. And now, we want to go back and install controls to narrow our streets and block the visibility of our intersections? We install little traffic circles and bumps or humps that create other hazards that weren't talked about in the Date Line show, again at the expense of the entire community. We haven't even discussed the new ongoing maintenance issues that are created; snow removal, additional signage, paint markings, etc. I would like to point out that in the Date Line show the street where the little boy lost his life was a one-way street with parking on both sides of the street. Did you notice how narrow the street was with cars parked on both sides? How much more traffic calming can you get? And the boy was still hit by a speeding car. I note what one of the witnesses said, "I yelled at him to slow down and he scowled at me and floored it". I believe a speed bump/hump has the same affect. I don't believe it can be considered traffic calming, I believe it heightens road rage. You and I both know that while a speed bump/hump will cause drivers to slow down while they drive over it, they merely drive faster between the bumps/humps. The only change made in the behavior of the speeder is that now he/she speeds down someone else's street. Again, I question the effectiveness of bumps/humps along an entire block. They work no differently than an unwarranted stop sign. The speed hump that was installed on the street in the Date Line show was installed in front of the home where the boy was hit. What about the rest of the street? Residents half a block away aren't getting the benefit of the newly installed control. Are we going to install one in front of their houses? How do you set and justify specific criteria for when and where to use traffic calming devices when the problem is on every street? Also, why can't the law be written so that the communities get a larger percentage of the fines to offset the cost of the physical controls that have to be installed?

Speaking as a taxpayer, which I hate to use the term taxpayer, I do not want those controls in my neighborhood nor do I want to have to pay to have those controls in my neighborhood. I drive accordingly and don't want to be punished for someone else's actions. I want the offender to pay.

We need to look at this problem from an economic standpoint first, not just from an engineering point of view. I believe raising the speeding fines in residential areas and school zones will be an effective control for our police departments.

I would like to thank you for this format to view my thoughts. I'm certainly not directing this at you or anyone else in particular. My main goal is to hopefully begin a different thought process regarding an issue that is very sensitive to all of use and needs to be dealt with. Again I would like to thank you for your time,

Director of Public Works, City of xxx