CITY OF MONONA

RESIDENTIAL TRAFFIC MANAGEMENT PROGRAM (RTMP)

OBJECTIVES, POLICIES AND PROCEDURE

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INTRODUCTION

Traffic has a significant impact on the residential quality of life. Traffic management tools can encourage drivers to slow down and stick to the main streets. Through the use of traffic management tools the city seeks to ensure safe and efficient travel on local city streets for all users - motorist, pedestrian, bicyclist, and transit rider with minimal conflict or disruption to local residents or other travelers.

There are three forms of “unwanted traffic” recognized on residential streets:

1. Traffic using the street as a shortcut, detour or overflow from a congested arterial.
2. Excessive traffic speeds.
3. Other unsafe conditions or behaviors.

Traffic problems are generally approached through the three E’s: education, enforcement, and engineering. This document, called the Residential Traffic Management Program or RTMP includes the use of all three approaches.

Police enforcement is and will always remain an effective tool to reinforce motorist behavior. However, it is recognized that providing an enforcement level that is effective in modifying driver behavior will require a significant commitment of police resources.

Education can also play an important role. For example, most residential speeding is done by the residents living in or near the neighborhood. The best way to reduce speed is for the people living in the neighborhood to obey the speed limit.

Engineered changes to roadways, such as speed tables, also encourage drivers to slow down or to avoid taking a short cut through the neighborhood.

Absence of sidewalks. Addressing traffic issues is more difficult on most Monona streets because of the absence of sidewalks. Without sidewalks, most, if not all, of the generally accepted engineered solutions or traffic calming devices are much more difficult to use in a way that safely accommodates all users - drivers, bicyclists, and pedestrians. Monona's residents and their elected officials will have to decide on a case-by-case basis whether the construction of sidewalks is warranted in specific locations.

Studies reviewed by the National Highway Traffic Safety *consistently correlate increased vehicle speed and likelihood of death in pedestrian accidents*.[1] Several studies have shown that approximately five percent of pedestrians would die when struck by a vehicle traveling 20 mph. That fatality percentage jumps to 40 percent for vehicles traveling 30 mph, which is the defined threshold for a speeding problem in this RTMP. Research by the Federal Highway Administration indicates that the *likelihood of a pedestrian accident increases* at higher speeds, because motorists are less likely to see and react to a pedestrian in time.

The City of Monona currently lacks an objective process for evaluating resident traffic complaints. Each complaint is treated on an ad hoc basis. The lack of a process enhances the chances of unequal treatment or at least the perception of unequal treatment. The RTMP treats everyone the same – no one is "more equal" than anyone else.

Moreover, the process and guidelines in the RTMP will require the city staff to consider the same factors in the same way so that similar situations should be treated similarly.

Finally, this program encourages the involvement of residents in not only identifying problems, but also in developing solutions to traffic issues on the streets where they live and drive.

Scheduled Road Reconstruction: Regardless of whether there is a pending RTMP application, the need for a traffic calming devices shall be considered in the design phase of all street reconstruction projects.

Monona Drive Construction Traffic Diversion: Speed Cushions are a type of raised street section that is 12' to 22' long and no more than 3.5" high. Speed cushions consist of three sections with gaps for the wheels of large vehicles, like fire trucks and ambulances. Emergency vehicles can drive through the center section without affecting response time or jolting patients in an ambulance. Speed cushions, however, cannot be cleared of snow and ice with a truck-

[1] *"Literature Review on Vehicle Travel Speeds and Pedestrian Injuries",* U. S. Department of Transportation, National Highway Traffic Safety Administration, DOT HS 809 021 October 1999 –Final Report.

mounted snowplow. Heavy rubber speed cushions can be installed seasonally. *Speed cushions may be appropriate when a community wishes to discourage traffic diversion onto to Local and Collector Streets due to a major road project on a nearby Arterial street.* Speed cushions may be useful in discouraging traffic diversion during the Monona Drive project.

Objectives

The objectives of the Residential Traffic Management Program are to:

1. Improve residential livability by reducing excessive motor vehicle speeds and reducing cut-through traffic on Local Streets[2];
2. Promote safe, convenient, accessible and pleasant conditions for bicyclists, pedestrians, motorists, and residents on neighborhood streets; and
3. Encourage citizen involvement in all phases of Residential Traffic Management activities.

The purpose of the RTMP is to provide a framework for the identification, evaluation, and reduction of negative traffic impacts on residential quality of life in Monona.

[2] The capitalized phrase "Local Streets" refers to the street's classification. DOT describes Local Streets as serving "primarily to provide direct access to abutting land and access to the higher order systems. Local streets offer the lowest level of mobility, and service to through-traffic movement on this system is usually discouraged." Definitions of the complete urban street classification system are included in Appendix E.

Monona RTMP Policies

The *following policies shall guide decisions* in the implementation of the Monona Residential Traffic Management Program. The RTMP applies only to residential streets under the control of the City of Monona.[3]

1. A speeding problem exists when the 85th percentile speed is 5 mph or more over the posted speed limit on a specific section of street. The 85th percentile speed is the speed at or under which 85 percent of people are driving. The *appropriate speed limit* is 25 mph for all residential streets (Local and Collector) in Monona.[4]

2. Whether the measure or combination of measures would be expected to solve the identified problem based on demonstrated past experience.

3. Neighborhood cut-through traffic should be routed to collector and arterial streets.

4. Emergency and service vehicle access and circulation must be preserved. Special care should be used in applying traffic calming devices to address speeding concerns on critical emergency routes.

5. RTMP projects should maintain adequate local street automobile access, encourage and enhance pedestrian and bicycle mobility and access within and through the city's residential areas, and facilitate access to public transit.

6. The City shall employ engineering, education, and enforcement to reduce residential traffic problems. [Refer to Appendix C for a detailed description of traffic management devices.]

7. All traffic management and traffic control devices shall be planned, designed, implemented, and maintained in keeping with sound engineering practices.

8. To implement the RTMP, city staff will follow the procedures set forth in the next section (*'Procedures'*). Implementation of recommended solutions will be limited by available and budgeted funding and staff time.

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[3] The RTMP does **not apply** to streets in predominantly commercial areas or roadways under the control of other jurisdictions (state or county). Thus, the RTMP does not apply to Monona Drive (CTH BB), Broadway (CTH BW), or the Beltline Highway (USH 12 &18) because they are not under the control of the city of Monona.

[4] A generally accepted traffic engineering practice is that, *for traffic flow efficiency*, speed limits should be set at the nearest 5 mph increment to the 85th percentile speed. For instance, if the 85th percentile speed on a road were measured at 27 mph, then the speed limit on the road would typically be set at 25 mph. However, other considerations such as adjacent land use, crash history, vision obstructions, and pedestrian safety may suggest a need for a lower speed limit. Since speed limits are generally set using the 85th percentile speed, it is *expected* that 15 percent of the vehicles will exceed the speed limit on a regular basis. Non-arterial streets in residential neighborhoods should be posted 25 mph. All residential streets in Monona are non-arterial.

9. The RTMP may be applied to either Local Streets or Collector Streets. Application of the RTMP to Collector Streets must carefully consider the potential to divert traffic to other adjacent streets.[5]

10. Evaluating the use of traffic calming devices that involve physical restrictions, especially the use of speed humps or tables, must take into consideration the impact the installation will have on long-wheel-based vehicles (fire apparatus, ambulances, snow plows and garbage trucks) and the potential to divert traffic to other adjacent streets.

11. The RTMP may also be used to identify and address other traffic-related safety problems.

[5] City streets are functionally classified based upon the volume of traffic it serves and most importantly by the connection it makes within the City's and the metropolitan area's transportation network. Streets are classified as either: Arterials, Collectors or Local Streets. (See Appendix E for *Definitions of Street Classifications and List of Monona Streets by Classification)*

Monona RTMP Procedure

Overview of the Process

The Residential Traffic Management Program provides a mechanism for citizen groups and individual citizens to work with the City to identify traffic-related problems and help identify and select what traffic management practices and devices might be used to manage traffic in their neighborhood or on streets they use.

Neighborhood involvement and support is strongly encouraged. Once problems are identified, city staff will collect pertinent data. This section describes in detail the steps involved in participating in the program from the initial application for involvement, to developing a traffic management plan, to installing one or more traffic management devices.

After receiving public input, City Staff will select a *proposed* preferred alternative and present it to and the Public Safety Commission for further public input, committee discussion and recommendation to the city council. If the proposal requires physical changes to the roadway (such as speed tables or traffic circles, but also including pavement marking, signing, and sidewalks), then before the proposal is submitted to the city council, the Public Works Committee shall also review the proposal. The recommendation of each committee shall be forwarded to the city council. The city council shall review and approve, reject, or revise the proposed solution.

Step 1. Apply To Participate

Projects are initiated by submission of a Project Application (See Appendix A). Individuals may apply to participate in RTMP, but are **STRONGLY** encouraged to submit a "Neighborhood Petition of Support for Traffic Calming" to the City Administrator. The petition form is available from the City of Monona web site or at City Hall. The City Administrator may assign any or all duties under this program to other city staff. (All references to "City Administrator" shall be read to include the City Administrator's designees.)

Policy note: The purpose of requiring a written application is to clearly identify the problem and its location.

The petition shall specifically identify **both** the problem area by street addresses (e.g. 5500 Thunderbird Lane to 5700 Thunderbird Lane) and the particular traffic-related problem. Applicants should specifically describe the problem (e.g. excessive speed, too much traffic, obstructed visibility, or other problems). The City Administrator may modify the petition area to address unique circumstances.

Submission of a **petition with signatures** representing at least twenty households and businesses within the area directly affected by the traffic problem is **strongly encouraged**, but not required for a street to be considered for the program. Each home or business is entitled to one signature.

Policy note: The purpose of encouraging a petition with signatures is to demonstrate that other people also perceive that the traffic problem exists.

Upon receipt of a complete application, the City Administrator will direct city staff to collect background, preliminary information about current conditions. However, for applications that are not accompanied by a petition with signatures from at least twenty households and businesses directly affected by the traffic problem, **before** directing staff to investigate the proposal, the City Administrator *may* ask the Public Safety Commission to review the application and determine whether the petition identifies a problem that warrants the use of staff resources.

The information collected by city staff will include the location, description of the problem and *may* include preliminary collection of traffic crash data, bicycle volume, pedestrian activity, traffic speed, and traffic volume. Staff will also calculate the number of RTMP points generated in the proposed project area (See Appendix B "POINT ASSIGNMENT FOR ASSESSING RTMP REQUESTS."). Higher point scores reflect a potentially significant traffic-related problem that needs to be addressed, possibly by traffic calming devices. When an area that scores 30 points or more, that generally indicates a significant potential problem.

Staff will also determine the 'project area'. The project area includes all properties adjacent to the city street on the blocks that are the subject of the application and along intersecting streets for at least one block.

The application and data collected by city staff will be submitted to the **Public Safety Commission** for consideration and development of a preliminary plan (See *Step 2. Preliminary Plan*, below). Applicants and all residents of the project area shall be notified of the time and place of these meetings (by mail or email). **It is essential that traffic data be collected before any project is implemented so that the effectiveness can be determined.**

Projects are intended to respond to traffic-related issues primarily including speeding or excessive through-traffic, but may also address other safety problems. Solutions may include education, enhanced enforcement, or modifications to the street to slow traffic or to completely or partially divert traffic off the Local Street to a nearby arterial street.

Step 2. Develop Preliminary Plan

Project development consists of the following:

1. Assessment of issues;
2. Identification of project objectives;
3. Development of alternative plans/solutions; and
4. Selection of a proposed plan/solution.

Public Meetings. The **Public Safety Commission** will consider the RTMP application at a public meeting(s). Applicants and all residents of the project area shall be notified of the time and place of these meetings (by mail or email).

The purposes of the meeting are to inform residents about the RTMP request and process, to gather additional information from residents about traffic issues and related neighborhood needs. City staff may prepare alternative plans for presentation at the meeting.

Selection of Solutions. Assessment of issues and the identification of project objectives will be accomplished through public meetings with the **Public Safety Commission**. City Staff will propose solutions based on citizen input and sound engineering principles. Solutions may include one or more of the following: traffic management and control devices, education efforts, and law enforcement. City staff may also recommend No Action. Staff shall propose a preferred alternative solution and at least one other alternative.

Education and enforcement actions may be implemented by City Staff at any time during the process. City staff shall notify the applicants of such activity. Education efforts may include traffic safety newsletters, neighborhood speed watch, speed monitoring trailers, or enhanced enforcement. Neighborhood speed watch provides residents an opportunity to use a radar unit to clock speeds on their street. License plate numbers are recorded and city staff sends the registered owner a letter. No citations are issued (See *Appendix C – Traffic Management Tools* for more information).

The use education and enforcement efforts are *not* a prerequisite before implementing physical traffic calming devices. Also, it is *not* mandatory to delay the implementation of physical traffic calming devices while education and enforcement efforts are used.

Factors for Committee Consideration. The **Public Safety Commission** will consider the plan with respect to: public safety, local neighborhood traffic, pedestrian use, bicycle use, transit access, extent of traffic diversion, emergency vehicle access, service vehicle access (snowplowing, solid waste collection, etc.), and number of RTMP points. The **Public Safety Commission** will also consider whether the neighborhood identified objectives will be met by the proposed plan and the extent of public support for the plan.

Council decision. The Public Safety Commission will select a preferred alternative solution and refer that recommendation to the city council. If the proposal requires physical changes to the roadway (such as speed tables or traffic circles, but also including pavement marking, signing, and sidewalks), then before the proposal is submitted to the city council, the Public Works Committee shall also review the proposal. The recommendation of each committee shall be forwarded to the city council. The city council shall review and approve, reject, or revise the proposed solution.

Step 3. Develop Final Plan

Once a plan is approved by the City Council and funding is available, City staff will develop the final plan.

Depending on the complexity of the project, city staff may install a temporary device for the time necessary to evaluate it (usually not more than 30 days). For most projects, a temporary installation will not be required. Unless otherwise directed by the Mayor or city council, the City Administrator shall have discretion to determine whether a temporary installation is warranted.

The City Administrator will *not* forward a project to the survey stage if a temporary device was installed and it was found to be unsafe, ineffective, or violated state traffic laws or other City policies. The City Administrator will inform the applicants, mayor, and city council of this decision and the reasons therefore. The mayor or any two aldermen may request that this decision be reviewed by the Public Safety Commission or city council.

The following photos are an example of a temporary and then the permanent installation at a location in the city of Madison.

Temporary installation of a traffic circle at New Washburn way and Dandaneau Trail

Permanent installation of a traffic circle at New Washburn way and Dandaneau Trail

Step 4. Construct Permanent Traffic Management Device(s)

Construction is administered by the City and is generally completed during the following construction season.

Final Draft by Doug Wood, November 2009.
Reviewed by Public Safety on December 15, 2009
Reviewed by Public Works on *

APPENDIX A - Application and Petition Form

NEIGHBORHOOD PETITION OF SUPPORT to include
_____ *Location by street name and block number*

In the City of Monona's RESIDENTIAL TRAFFIC MANAGEMENT PROGRAM

By signing this form you are indicating **your support** and formally requesting to participate in the City of Monona's **Residential Traffic Management Program (RTMP)** and I understand that:

1. The program uses physical devices such as ***islands***, ***traffic circles***, ***speed tables and speed humps*** to discourage the negative driving behavior and improve neighborhood livability.

2. The program strongly encourages a show of ***resident support to be considered*** for potential funding and ***does not guarantee*** a street will make the project list.

3. Traffic problems will be evaluated based on data, including: traffic volume, % of traffic traveling 5 mph over the posted speed limit, number of crashes, and other traffic-related data. Project locations that are near schools, parks, or other locations that generates pedestrian traffic, or on bike routes are favored.

4. Traffic problems will be evaluated by city staff and proposals will typically be reviewed by city committees and the city council.

ALL APPLICATIONS WILL BE CONSIDERED, BUT SUBMISSION OF AN APPLICATION DOES NOT GUARANTEE ANY ACTION BY THE CITY.

If you have questions regarding the Residential Traffic Management Program, please contact the city of Monona at 222-2525, or see the City of Monona website at: http://www.mymonona.com/

Print name of person circulating this petition_____

SIGNATURE	PRINT NAME	ADDRESS	PHONE # OR EMAIL

Collecting signatures **from at least 20 households within the project area is STRONGLY encouraged. Only ONE signature per household or business will be considered.**

RTMP Application – page 2

The group or person requesting participation in the Residential Traffic Management Program must complete the following section. In addition, the submission of petitions with signatures from at least 20 households within the project area is STRONGLY encouraged.

Requester must provide contact information:

Name _____

Address _____

Email _____

Phone number _____

Location: (Also, if necessary, attach location diagram.)

Describe or State the Problem (Mark all that apply. Examples, explanations, and descriptions are strongly encouraged):

Speeds are too high_____

Too much traffic _____

Traffic cutting through the neighborhood_____

Crashes_____

Visibility is obstructed By what? Building? Tree? Brush?

Traffic not stopping for stop signs_____

Road layout is confusing_____

Unsafe for pedestrians_____

Unsafe for bicyclists_____

Other? Be specific. _____

Is the problem worse at a particular time? Daytime or night? Morning “rush hour”? Afternoon “rush hour”? Lunch time? Winter conditions?

APPENDIX B
Point Assignment for Objective Evaluation of Residential Traffic Problems

This point assignment guideline is intended to assist in the evaluation of the scope of the problem or potential problem.

Few locations will present such an obvious need. The point system helps to objectively identify problem locations. Generally, **locations with 30 points or more are good candidates** for an RTMP evaluation and action.

Professional engineering judgment, along with informed public input, will be applied to determine the appropriate solution(s) consistent with generally accepted engineering principles.

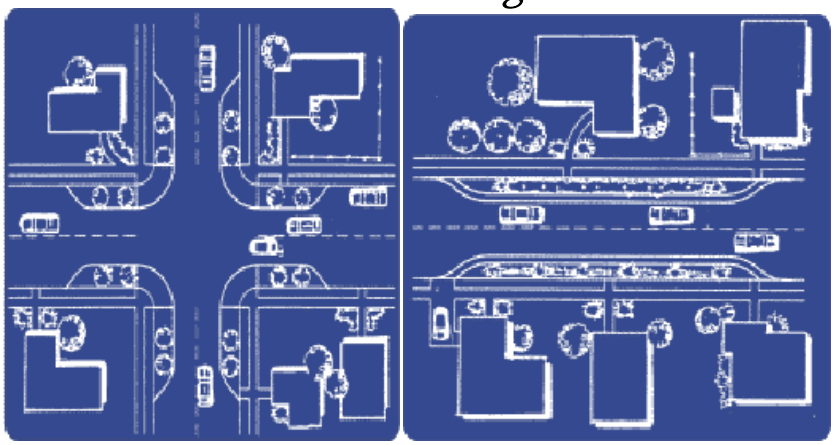
Measure	Definition	Points
Speeding	Average daily percentage of vehicles traveling 5 mph or more over the speed limit at the point on the project street with the highest speed. One point for each percentage point over 5 MPH and a second point for each percentage point over 10 MPH.	0 - 40
Volume	Average daily traffic volume, at the point on the project street with the highest average volume, divided by 100.	0 - 30
Crashes	Number of reported crashes on the project street in the last five years.	5 each
Bike/Transit Routes	Street designated as Official or Unofficial Bicycle Routes, or used as a regular transit bus route.	5 each
School Walk Route	Street is a direct route to any school for grades K-6.	5 points
Elementary, Middle and High Schools	Public or private elementary, middle or high school within one-quarter mile of the petition area.	5 each
Pedestrian Generators	Public or private facilities on or near the project street, such as schools, parks, community houses, senior housing, etc., which generate a substantial amount of pedestrian traffic.	5 each
Dangerous Conditions	Conditions on the project street which lead to increased hazards, such as the absence of a sidewalk on either side of the street or inadequate, uncorrectable site distance problems.	5 each
Existing Traffic Calming Measures	Are there existing traffic calming measures on the street?	- 5 (yes) 0 (no)

THREE E's
ENGINEERED CHANGES TO ROADWAY
EDUCATION & ENFORCEMENT

A. ENGINEERED CHANGES TO ROADWAY

Traffic calming relies upon physical changes to streets to slow motor vehicles or to reduce traffic volumes. These changes are designed to affect drivers' perceptions of the street and to influence driver behavior in a manner that is self-enforcing. Unlike traditional methods of traffic management, traffic calming does not rely primarily upon the threat of police enforcement for its effectiveness. In addition to the measures listed in this appendix, staff may also recommend other measures or devices as they are developed and accepted provided they meet generally traffic engineering accepted principles.

1. Street and Lane Narrowing or Chokers



Motorists tend to drive at speeds they consider safe and reasonable and tend to drive more slowly on narrower roads and traffic lanes than wider ones. Reducing road widths can reduce traffic speeds. The judicious placement of parking (protected by curbs and made more visible by landscaping) can achieve the same effect, if there is evidence that the on-street parking will be used. Road narrowings have the added advantage of reducing the expanse of road to be crossed by pedestrians, thus reducing pedestrian crossing time.

Narrowing the roadway for motor vehicles in the absence of adequate pedestrian and bicycle facilities creates safety hazards for pedestrians and bicyclists (as done on the lower stretch of Winnequah Road, for example).

Other criteria to be applied and considered prior to street narrowing include:

Bicycle Accommodations: On streets designated as a bike route or servicing a significant volume of bicycle traffic, a sufficiently wide bicycle lane should be provided through the narrowed area. Where traffic and/or bicycle volumes are sufficiently low, exclusive bicycle lanes may not be required.

Snow Removal: The pavement width of streets shall not be narrowed to a point where it becomes an impediment to snow removal.

Parking Restrictions: In most cases on local access streets, street narrowing, such as with the installation of a pedestrian refuge island at an intersection, will require the prohibition of parking at all times along the street curb the full length of the narrowed section plus approximately 20'.

Lane Width: Travel lanes shall not be narrowed to a width less than 9', exclusive of gutter. Bicycle lanes where required shall be 4' wide exclusive of gutter. If parking is allowed, the parking and bicycle lane combination shall be a minimum of 13'.

2. Bicycle Lanes

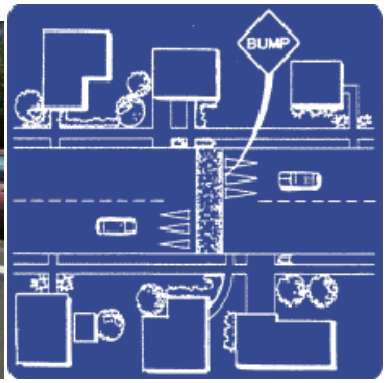
Lane widths available to motorists can be reduced on some streets by the installation of bicycle lanes, either next to curb (*preventing stopping or parking by motor vehicles*) or adjacent to parking. The space needed for bicycle lanes introduced on an existing street may reduce the width or number of general traffic lanes or the amount of parking. Marked bicycle lanes cause a perception of a narrower roadway and can reduce traffic speeds. Marked bicycle lanes make bicycling safer even if traffic speeds are not reduced by increasing motorists' awareness of the likely presence of bicyclists.

3. Sidewalks

Construction of sidewalks removes nearly all pedestrians from the roadway, except when crossing the street. Streets with sidewalks are much safer for pedestrians than streets without sidewalks. Construction of sidewalks significantly reduces the likelihood of pedestrian/vehicle crashes.

Sidewalks allow pedestrians to travel much more safely and without constant monitoring for the approach of motor vehicles or bicycles. Parents are more likely to allow younger children to walk to school, library, parks, or a friend's house if sidewalks are present.

4. Raised Street Sections - Speed Humps, Speed Tables, and Speed Cushions



Speed hump

Speed tables

Speed table at a 3-way intersection

Speed Cushions

Raised street sections or speed humps can reduce vehicle speeds on local streets. The hump is a raised area, no greater than 3.5 inches high, extending transversely across the street. **Speed tables** typically are constructed with a longitudinal length of 22'. **Speed humps** are generally about 12' to 14' long.

Speed Cushions are another type of raised street section with basically the same design as a speed hump or table. Speed cushions consist of three sections with gaps for the wheels of large vehicles, like fire trucks and ambulances. Emergency vehicles can drive through the center section without affecting response time or jolting patients in an ambulance.

Speed cushions, however, cannot be cleared of snow and ice with a truck-mounted snowplow. Heavy rubber speed cushions can be installed seasonally. *Speed cushions may be appropriate when a community wishes to discourage traffic diversion onto to Local and Collector Streets due to a major road project on a nearby Arterial street.* Speed cushions may be useful in discouraging traffic diversion during the Monona Drive project.

Generally to be effective, several speed humps, speed tables, or speed cushions must be used in a series. Spacing and length of the raised street section have been shown to reduce traffic speeds. For example, 12' speed humps spaced at 200 to 250 feet have been shown to result in an 85th percentile speed of 20 mph, a 400 to 450 spacing has been shown to result in a 25 mph speed, whereas, an 800- to 850-foot spacing has been shown to result in a 30 mph speed.

Other criteria to be applied prior to installation of speed humps, speed tables, or speed cushions include:

Signing and Marking: Speed humps are required to be signed with a combination of signs and/or pavement markings to warn motorists and bicyclists of their presence.

Traffic Safety and Diversion: Any use of speed humps must take into consideration the impact the installation will have on long-wheel-based vehicles (fire apparatus, ambulances, snow plows and garbage trucks) and the potential to divert traffic to other adjacent streets.

Street Functional Classification: Speed humps should only be installed to address documented safety problems or traffic concerns supported by traffic engineering studies. Speed humps can be considered on local and neighborhood collector streets as functionally classified by the city of Monona with traffic volumes up to 5,000 vehicles per day. Consideration of speed humps on collector streets with traffic volumes between 3,000 and 5,000 vehicles per day will be based on a case-by-case review, considering traffic volume and transit bus service and Monona Fire Department operations (including EMS services).

Street Width: Speed humps should be used only on streets with no more than two travel lanes and less than or equal to 32 feet in width. In addition, the pavement should have good surface and drainage qualities.

Street Grade: Speed humps should only be considered on streets with grades of 8% or less approaching the hump.

Street Alignment: Speed humps should not be placed within severe horizontal or vertical curves that might result in substantial horizontal or vertical forces on a vehicle traversing the hump. Humps should be avoided within horizontal curves of less than 300 feet centerline radius and on vertical curves with less than the minimum safe stopping sight distance. If possible, humps should be located on tangent rather than curve sections.

Sight Distance: Speed humps should generally be installed only where the minimum safe stopping sight distance (as defined in AASHTO's *A Policy on Geometric Design of Streets*) can be provided.

Traffic Speeds: Speed humps should generally be installed only on streets where the posted speed limit is 25 mph or less.

Traffic Volumes: Speed humps should typically be installed only on streets with 3,000 vehicles per day or less. Monona Fire Department (including emergency medical services) needs to be consulted before speed humps can be installed on streets with traffic volumes between 3,000 and 5,000 vehicles per day.

Emergency Vehicle Access: Speed humps should not be installed on streets that are defined or used as primary or routine emergency vehicle access routes.

5. Raised Pedestrian Crossing & Pedestrian Flags

Speed table combined with raised crosswalk and median

High visibility flags for pedestrians

Raised crosswalk

A Raised Pedestrian Crossing is essentially a speed table with the flattened portion serving as a sidewalk. The “table” portion of the crossing is typically 10 to 15 feet long (measured in the direction of travel). Studies have shown raised pedestrian crossings to be very effective in causing motorists to yield to pedestrians. Raised Pedestrian Crossings may not be appropriate if the intersection is part of a bus or emergency route for the same reasons as apply to speed humps.

Pedestrian flags. Orange flags are placed in containers at each end of a crosswalk. People wanting to cross the street at the crosswalk pick up a flag to signal to drivers their intent to cross the street, then cross the street and place the flag in the container on the other side for the next person to use. See:

http://www.safercommunity.net/trafficsafety/community_safety/pedflags.html
And

http://www.safercommunity.net/trafficsafety/documents/peds/Ped%20Flags%20Brochure-web,%20Revised%201-1-04.pdf

6. Traffic Circles

Traffic circle

Traffic circles are circles of varying diameter formed by curbs. Motorists must drive around the circle or in the case of longer vehicles drivers may drive slowly onto and over a mountable concrete curb forming the circle. Traffic circles reduce motor vehicle speeds through the intersection, depending on the current intersection controls in place.

Other criteria to be applied and considered prior to installation include:

Design Considerations: For each intersection the size of the circle will vary depending on the circumstances for that specific intersection. In general, the size of the circle will be determined by the geometrics of the intersection with the largest circle that meets the design considerations being constructed. *Note that in most instances the circle constructed will be smaller to accommodate snow removal equipment.*

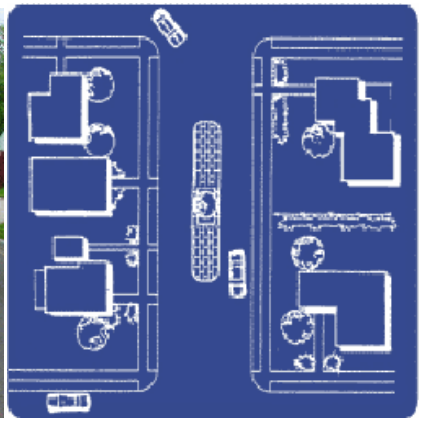
Where intersecting streets differ significantly in width, it may be more appropriate to design an elongated "circle" using half circles with tangent sections between them. Smaller circles will be considered on a case-by-case basis. Normally the circle will be located as close to the middle of the intersection as practical. Under special circumstances, such as being on a Fire Department response route, bus route or due to snow removal accommodations, the size and/or location of the circle will be adjusted to more appropriately meet these special circumstances.

Design Considerations for "T" Intersections: For "T" type intersections, all of the above design considerations apply. In addition, curb extensions (or curb bulbs) may be included along the top of the "T" at the entrance and exit to the intersection.

Signage: Signs will be used to identify and delineate traffic circles.

Parking Removal: Normally, parking will not be prohibited in the vicinity of the circle beyond that which is prohibited by state or local traffic laws, i.e., "within the intersection" or "within 15' of crosswalk area". However, where special circumstances dictate, such as where the circle is on a response route for the Fire Department or to accommodate snow removal, or in an area where there is an unusually high use by trucks, additional parking may be prohibited as needed.

7. Medians



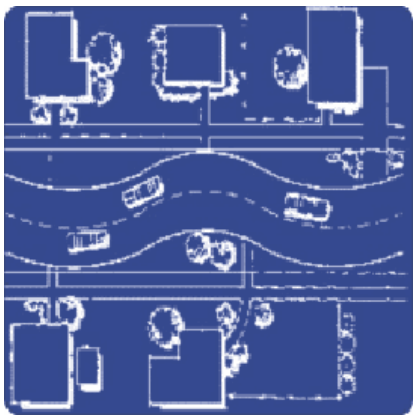
Medians: Where medians are used to narrow streets, the preferred minimum width for medians is six feet, but actual width will be determined based on existing circumstances. Travel lanes shall not be narrowed to a width less than nine feet, exclusive of gutter. Bicycle lanes where required shall be four feet wide exclusive of gutter. If parking is allowed, the parking and bicycle lane combination shall be a minimum of 13 feet.

8. Gateway Treatment

Gateway treatment

Gateway treatments are usually located at the entrances of a neighborhood and are intended to discourage excessive traffic and reduce speed. They also provide a sense of neighborhood cohesion and pride. A gateway treatment may include changes in street appearance (street width, and paving material(s) and landscaping (signage, plantings) to signal the demarcation between a major street and an adjacent residential area, or between areas of residential and commercial usage.

9. Chicanes



Chicane

Chicanes are a form of curb extension which alternate from one side of the street to the other. The road is in effect narrowed first from one side then the other and finally from the first side again in relatively short succession. Chicanes break up the typically long sight lines along streets and thus combine physical and psychological techniques to reduce speeds.

Lane Width: Where chicanes are used, the travel lanes shall not be narrowed to a width less than nine feet, exclusive of gutter. Bicycle lanes where required shall be four feet wide exclusive of gutter.

Snow Removal: Chicanes shall be designed to minimize the accumulation of snow piles and trash in the gutter interface between existing curb and gutter and chicane.

10. Full or Partial Road Closures [Semi-Diverters/Diverters/Cul-de-sac]

Roads can be closed to motor vehicles at intersections, preventing through movement and requiring access to be gained from other streets. Closure should be undertaken in such a way as to avoid simple displacement of traffic to adjacent residential streets. It will usually be possible and desirable to retain pedestrian and bicycle access. These physical barriers redirect traffic heading for a certain street onto a different course, reducing vehicle overload on vulnerable (usually residential) streets overrun by through traffic looking for shortcuts.

11. Stop Signs

In some instances stop signs can be used as an effective traffic management and safety device. However, in most instances stop signs are not used as a traffic management device within the RTMP.

Stop signs are used to assign the right-of-way at an intersection. They are installed at intersections where a crash problem is identified, where unremovable visibility restrictions exist (such as buildings or topography), and/or where volumes are high enough that the normal right-of-way rule is unduly hazardous.

Stop signs are generally not installed to divert traffic or reduce speeding. Studies from other jurisdictions show that such use of stop signs seldom has the desired effect. In fact, the use of stop signs solely to regulate speed typically causes negative traffic safety impacts (noncompliance with the signs and increased crashes as well as mid-block speeding).

B. Education and Enforcement

Education Tools:

1. Traffic Safety Newsletter

Heighten awareness of traffic safety concerns among local residents. Most drivers traveling on local Monona streets are residents of Monona. Most speeding drivers are also local residents. Educate the residents on the speeds and volumes. Include traffic safety tips to reduce speeds and educate the drivers.

2. Pavement Markings

The city may install “25 MPH” pavement markings on streets with 85th percentile speed 5 mph or above or more over the posted speed limit (or stated differently, 15 percent of drivers travel at speeds of 5 mph or more over the posted speed limit).

3. Speed Monitoring Trailers

Portable trailer, equipped with posted speed limit sign, detects the speed of passing vehicles and displays the traveling speed. This will heighten driver awareness of the posted speed limit compared to the speed they are traveling.

4. Permanent Speed Display Unit

Permanent Speed Display Unit

A permanent electronic radar display is a device that is mounted on a street speed limit sign and displays the travel speeds of each vehicle approaching the device.

5. Neighborhood Speed Watch

The Neighborhood Speed Watch provides residents an opportunity to reduce vehicular speeds by training them to use a radar unit to clock speeds on their street. Local residents monitor speed of vehicles traveling through their neighborhood with radar equipment on loan from the Monona Police Department. Residents must be trained to use the radar unit and be given instructions for collecting data. Participants record license plate numbers of those motorists driving in excess of the posted speed limit. This information is given to the City Police Department and a letter is sent to the vehicle's registered owner. The letter informs the owner of the violation and encourages them, or drivers of their vehicles, to drive at or below the posted speed limit. Since this is a community awareness program, no formal violations or fines are issued.

Availability of the program shall be promoted on the city web site, newsletters, press releases, and other means.

Enforcement

If excessive speeds are noted, the Police may focus a speed enforcement effort at a location.

Appendix E - List of Streets by Classification in Monona

The WisDOT street classifications for Monona's streets are as follows:

Arterial: Monona Drive, Broadway, Atwood Avenue (north of Cottage Grove Road to Madison city limits), Pflaum Road (south half from Monona Drive to Admiral Drive) and South Towne Drive.

Collector:
Bridge Road (Frost Woods Road to Broadway),
Copps Avenue (Femrite Drive to Broadway),
Dean Avenue (Monona Drive to Winnequah Road),
Femrite Drive,
Frost Woods Road (Monona Drive to Bridge Road),
Industrial Drive (South Towne Drive to western corporate limits),
Midmoor Road,
Nichols Road,
Owen Road (Midmoor Road to Winnequah Road), and
Winnequah Road (Monona Drive to Bridge Road).
(Total: 7.77 miles)

Local: All other streets. (Total: 25.63 miles)

Wisconsin Department of Transportation
Facilities Development Manual
Chapter 4 Highway Systems
Section 1 Introduction and Definitions
Subject 15 Functional Classification System

1.2 - Urban Classifications

Principal Arterials: Principal arterials serve the major centers of activity of an urban area, the highest traffic volume corridors, and the longest trip desires, and carry a high proportion of the total urban area travel on a minimum of mileage. The urban principal arterials are connected to the system of rural principal and minor arterials. Within this category the urban principal arterials are subdivided into (1) interstate highways, (2) other freeways and expressways (connecting links of rural principal arterials, connecting links of rural minor arterials, and non-connecting links), and (3) other principal arterials (connecting links of rural principal arterials, connecting links of rural minor arterials, and non-connecting links).

Minor Arterials: Minor arterials provide intracommunity continuity and service to trips of moderate length, with more emphasis on land access than principal arterials. The minor arterial system interconnects with the urban arterial system and provides system connections to the rural collectors.

Collectors: Collectors provide both land access service and traffic circulation within residential neighborhoods, commercial areas, and industrial areas. The collector system penetrates residential neighborhoods, distributing trips from the arterials through the area to the local streets. The collectors also collect traffic from the local streets in residential neighborhoods and channel it onto the arterial system. In the central business district, and in other areas of like development and traffic density, the collector system may include the street grid, which forms the basic unit for traffic circulation.

Local Streets: Local streets comprise all facilities not on one of the higher systems. They serve primarily to provide direct access to abutting land and access to the higher order systems. Local streets offer the lowest level of mobility, and service to through-traffic movement on this system is usually discouraged.

Appendix F - Effectiveness of Traffic Calming Measures

This table was prepared by Fehr & Peers (transportation consultants). http://www.fehrandpeers.com/

TrafficCalming.org

Effectiveness of Traffic Calming Measures...

Speed Impacts of Traffic Calming Measures (standard deviations in parentheses)				
	Sample Size	85th Percentile Speed Afterward	Average Change in 85th Percentile Speed	Average % Change
12' Speed Hump	179	27.4 mph (4.0 mph)	-7.6 mph (3.5 mph)	-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 (786)	-44 (36)
Half Closure	53	-1611 (2444)	-42 (41)
Diagonal Diverter	27	-501 (622)	-35 (46)
Other Volume Control	10	-1167 (1781)	-31 (36)

Safety Impacts of Traffic Calming Measures (U.S. Experience)				
	Number of Observations	Average Number of Collisions		% Change in Collisions
		Before Treatment	After Treatment	
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 probability level ** Significant at 0.04 probability level

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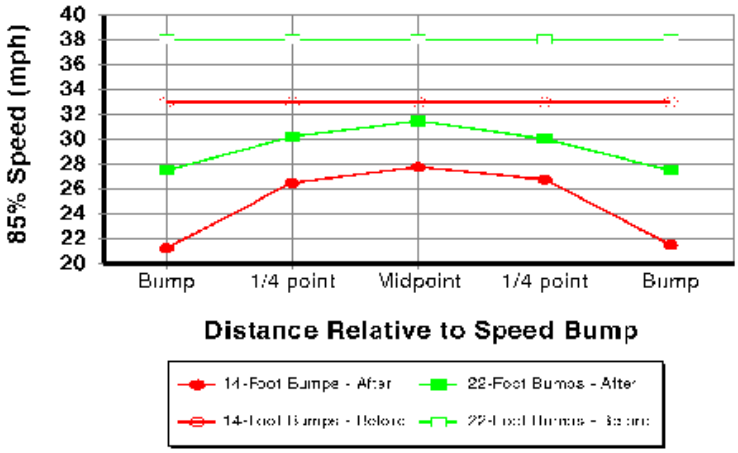
Portland, Oregon Findings

Figure 35 - Speed Profile Over Speed Bumps at 400-600 foot Spacing



http://www.portlandonline.com/transportation/index.cfm?&a=85432&c=35934

Section 8 - Findings and Conclusions

City of Portland Speed Bump Peer Review

Overview

Through this project, it is shown that speed bumps are an effective tool in reducing vehicle speeds in the City of Portland, particularly the speeds of the fastest drivers, on treated streets. Also, speed bumps do not cause an increase in speeds on the parallel untreated streets, and in fact reduce speeds on many parallel untreated streets. With this reduction in speed, speed bumps frequently divert traffic off the treated streets. It appears that this volume reduction often diverts vehicles to the appropriate nearby collectors and arterial streets and a net reduction in volumes is realized on a neighborhood-level as a result. Crash rates are also reduced on the treated and untreated streets combined after speed bumps are installed, which is mainly due to the reduction in traffic volumes. The specific findings and conclusions of this peer review can be summarized as follows:

Vehicle Speeds

Speed bumps are an effective tool in reducing travel speeds to be consistent with posted speed limits. They are very effective in reducing the speeds of the fastest drivers. Speeds also decreased slightly (2 mph) on parallel untreated streets. More specifically:

> On average, **14-foot speed bumps reduced 85th percentile travel speeds by 6.9 mph to 25.8 mph after speed bumps were installed**. This is approximately equal to a typical 25 mph speed limit on local streets.
>
> After the study streets were treated with 14-foot speed bumps, 20 percent of motorists on average were traveling at speeds greater than 25 mph (60% before). Further, only one percent of motorists were traveling more than 10 mph over the speed limit, as opposed to 14.5 percent before 14 foot bumps were installed.
>
> **22-foot speed bumps decreased 85th percentile travel speeds on average by 8.2 mph to 29.9 mph.** This is slightly higher than a 25 mph hour speed limit on local streets, but on target with a 30 mph speed limit on neighborhood collector streets.

After streets were treated with 22-foot speed bumps, 43 percent of motorists continued to travel at speeds over the speed limit (77% before); however, only 2.8 percent traveled at speeds more than 10 mph over the speed limit (22% before).

Traffic Volumes

Traffic volumes decrease on streets treated with speed bumps. The amount of volume reduction depends on the amount of speed reduction and availability of alternate routes. **Some but not all of this volume diverts to the parallel untreated streets**. Other findings regarding traffic volumes include:

On streets treated with 14-foot speed bumps, the average traffic volume reduction was 33 percent, or 490 daily vehicles (ADT). Therefore the average after traffic volume on streets treated with 14-foot speed bumps was 980 ADT. The reduction in traffic volumes complies with the Cityâ€™s traffic threshold curve.

After installing 22-foot speed bumps, traffic volumes decreased by an average of 21 percent, or 1,015 ADT. The resulting after traffic volume on streets treated with 22-foot speed bumps was an average of 3,720 ADT. This reduction complies with the Cityâ€™s traffic threshold curve.

Public Opinion

A public opinion survey was distributed to approximately 1,200 residents living on or parallel to a speed bump street. In all 400 people responded. Overall, more respondents thought speed bumps improved livability in their neighborhood (48%) than thought the livability got worse (39%). Of those living on streets treated with speed bumps, 57 percent of the respondents believed that speed bumps have improved livability on their street.

Recommendations

Shortly after they are introduced, the currently designed 14 and 22 foot speed bumps effectively reduce travel speeds to be consistent with posted speed limits. They also effectively reduce the speeds of the fastest drivers. However, the City has limited data available about how speeds on treated streets change over time. Additional research into the effect of the duration of installation of speed bumps on travel speeds should be performed.

Traffic volumes decrease on streets treated with speed bumps. The amount of reduction depends on the speed reduction and the availability of alternate routes.

The incidence of crashes decrease with the installation of speed bumps. The decrease in crashes is strongly driven by the reduction in traffic volumes. Additional research into the change in crash types as a result of the volume reduction would be valuable.

Figure 1 shows before and after 85th percentile travel speeds on streets treated with speed bumps (both 14-foot and 22-foot), parallel untreated streets and the combination of all study streets. Overall, with installation of speed bumps the average 85th percentile travel speed on the treated and parallel untreated study streets combined decreased 5.4 mph to 27.5 mph.

Figure 1 - Effect of Speed Bumps on 85th Percentile Speeds

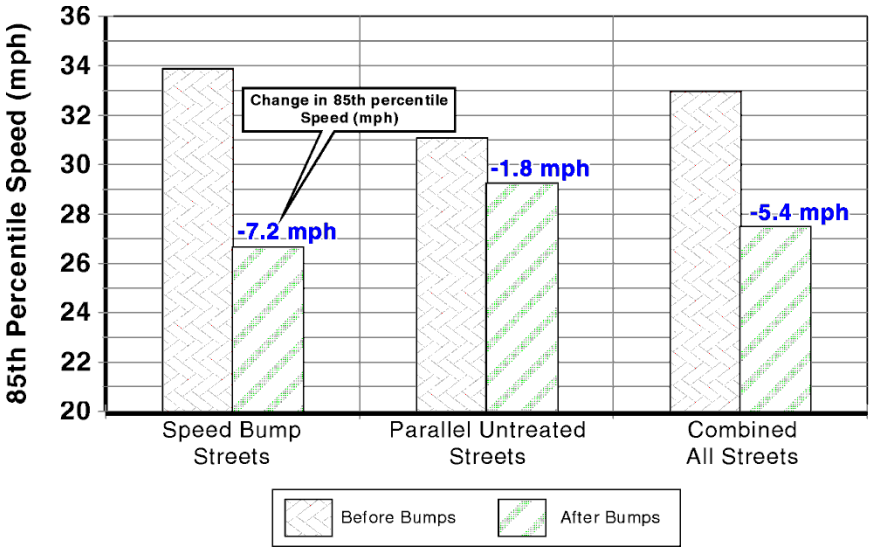
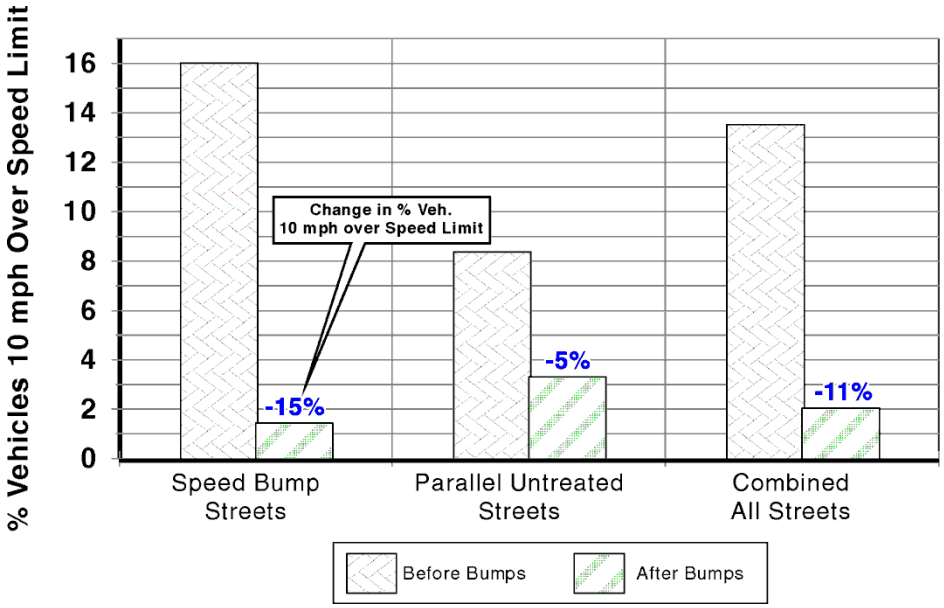


Figure 2 shows the effect of speed bumps on those motorists traveling more than 10 mph over the speed limit on streets treated with speed bumps, parallel untreated streets and all study streets combined. Overall, before speed bumps were installed approximately 13 percent of motorists traveled more than 10 mph over the speed limit. After installation of speed bumps, only two percent of motorists traveled more than 10 mph over the speed limit.

Figure 2 - Effect of Speed Bumps on Percent of Vehicles 10 mph or more Over Speed Limit



http://www.portlandonline.com/transportation/index.cfm?&a=85455&c=35934

Appendix G - Sources

City of Madison
NTMP:
http://www.cityofmadison.com/trafficEngineering/programsTraffic.cfm
City of Madison speed watch program:
http://www.cityofmadison.com/trafficEngineering/programsSpeed.cfm

City of Middleton, Wisconsin:
Neighborhood Traffic Management Program

Arlington, Virginia:
http://www.arlingtonva.us/departments/EnvironmentalServices/dot/planning/ntc/images/file71552.pdf

Portland, Oregon – excellent resource with studies, designs, photos.
http://www.portlandonline.com/Transportation/index.cfm?a=83939&c=38764

Fitchburg, Wisconsin:
http://www.city.fitchburg.wi.us/transportation/traffic_complaints.php

City of Boulder, Colorado:
http://www.bouldercolorado.gov/index.php?option=com_content&task=view&id=306&Itemid=1206

Pennsylvania's Neighborhood Traffic Calming Resource by Craig Ciekot:
http://www.students.bucknell.edu/projects/trafficcalming/EffectivnessPennTCR.PDF

Traffic Calming website of Fehr & Peers
http://www.trafficcalming.org/

Appendix H – Installation of Rubber Speed Bump

An album of photos from Portland, Oregon showing the installation of a rubber speed bump on SE Henderson, 156th to 162nd Avenue.

1. Section lifted from truck.

2. A section is used to align connector plate.

3. Street is drilled through connector plate.

4. Dust is removed from drilled holes.

5. Epoxy is poured into drilled holes.

6. Lag bolts placed into epoxy.

7. Ramp sections added to connector

8. Ramp sections bolted to connector

plate.

plate.

9. Ramp holes plugged.

10. Ramp to ramp connectors inserted.

11. Edge restraint placed. (original style)

12. Finished installation with truck reinforcing.