

Appendix C. TRAFFIC CALMING PROGRAM TOOLBOX

PHASE I.....	2
Do Not Enter Sign.....	3
One-Way Sign	4
Turn Prohibition	5
Pavement Markings.....	6
Speed Monitoring Trailer	7
Neighborhood Speed Watch	8
Police Enforcement	9
PHASE II - HORIZONTAL DEFLECTION.....	10
Bulb-Outs.....	11
Center Island Narrowing.....	11
Chicanes.....	13
Chokers/Slow Points	14
Full Closures.....	15
Full Diverter	16
Gateway Treatment.....	17
Median Barriers	18
Oval Median	19
Semi-Diverter.....	20
Traffic Circle	21
Two-Lane Slow Point.....	22
PHASE II - VERTICAL DEFLECTION.....	23
Raised Crosswalks	24
Raised Intersections	25
Speed Humps/Tables	25

PHASE I

Do Not Enter Sign.....	3
One-Way Sign	4
Turn Prohibition.....	5
Pavement Markings.....	6
Speed Monitoring Trailer	7
Neighborhood Speed Watch	8
Police Enforcement	9

Do Not Enter Sign

Description: Restrict access

Purpose: The purpose of a this sign is to indicate to drivers that they are not permitted to proceed straight ahead. When used as a traffic calming measure, it is intended to discourage through traffic from short-cutting along a street. The sign may be accompanied by a supplementary plate sign indicating the time(s) of the day and the days of the week when the regulation applies.

Potential Advantages:

- May result in significant reductions in traffic volumes

Potential Disadvantages:

- No significant effect on vehicle speeds.
- Restricts resident access.



One-Way Sign

Description: Directional movement sign.

Purpose: The purpose of a One-Way sign is to indicate to drivers that traffic is allowed to travel only in the direction of the arrow on the street or section of street. When used as a traffic calming measure, the intent of a One-Way sign is to prevent through traffic from short-cutting along a street.

Potential Advantages:

- Vehicle-vehicle and vehicle-pedestrian conflicts at intersections are reduced as there are fewer turning movements.
- Reduction in traffic volume.

Potential Disadvantages:

- Removal of traffic travelling in the opposing direction can result in an increase in vehicle speeds.
- Reduction in traffic volume may be partially offset by an increase in traffic in the remaining direction.



Turn Prohibition

Description: Turn Prohibition sign

Purpose: The purpose of a Right (Left) Turn Prohibition sign is to indicate to drivers that they are not permitted to turn right (left). When used as a traffic calming measure, this sign is intended to prevent traffic from short-cutting along a street. The sign may be accompanied by a supplementary plate indicating the time(s) of the day and the days of the week when the regulation applies.

Potential Advantages:

- May result in significant reductions in traffic volumes where supported periodically with police enforcement.

Potential Disadvantages:

- No significant effect on vehicle speeds.
- Restricts resident access.



103rd Street & Eby

Pavement Markings

Description: Stop bars, yield bars, turn arrows, delineators, lane markings, crosswalks, etc.

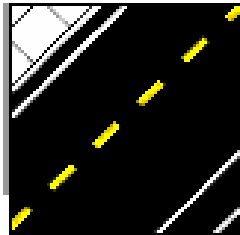
Purpose: To delineate and to transmit to motorists, bicyclists, and pedestrians important information necessary to safely travel upon the City's street.

Potential Advantages:

- Low initial cost.
- Quick application.

Potential Disadvantages:

- Maintenance cost.
- May not be visible when covered with snow.



Speed Monitoring Trailer

Description: Portable radar speed meter capable of measuring vehicle speed and displaying the speed of the motorist.

Purpose: Educate residents and drivers about vehicle speeds.

Potential Advantages:

- Speeds may be reduced during short intervals where the radar trailer is located.
- An effective public relations and educational tool.

Potential Disadvantages:

- Not an enforcement tool.
- Not effective in modifying long-term habits.
- Effect on speed limited to the vicinity of the trailer.
- Not effective on multi-lane roadways.



Neighborhood Speed Watch

Description: Residents use radar equipment to identify speeding vehicles.

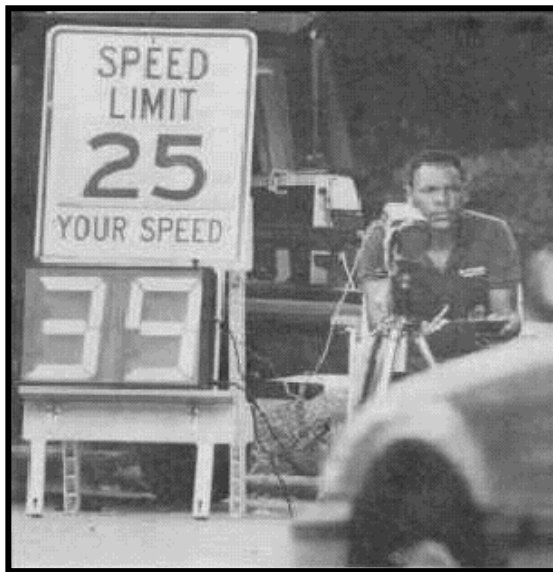
Purpose: To slow vehicle traffic, educate drivers about vehicle speeds, and allow residents to take an active part in the program. This program does not issue speeding tickets.

Potential Advantages:

- Reduces speed by increasing driver awareness about speeding on residential streets and about safety.
- An effective public relations and educational tool.

Potential Disadvantages:

- Not an enforcement tool.
- Not effective in modifying long-term habits.



Police Enforcement

Description: Increased enforcement of speed limits on problem local streets.

Purpose: To reduce traffic speed and increase traffic safety.

Potential Advantages:

- Visible enforcement could reduce speed by increasing driver awareness about speeding on residential streets and about safety.
- The approach is flexible and can be tailored to suit needs.
- Response can be quick and effective.

Potential Disadvantages:

- Long-term benefits of speed reduction are unsubstantiated without regular periodic enforcement.
- It may be difficult to provide enforcement to the extent and with the frequency that residents desire.



PHASE II - HORIZONTAL DEFLECTION

Bulb-Outs	11
Center Island Narrowing	11
Chicanes.....	13
Chokers/Slow Points.....	14
Full Closures.....	15
Full Diverter.....	16
Gateway Treatment	17
Median Barriers	18
Oval Median	19
Semi-Diverter	20
Traffic Circle.....	21
Two-Lane Slow Point	22

Bulb-Outs

Description: The lane is narrowed at an intersection or mid-block by extending the curbs on one or both sides of the street toward the center of the roadway or by building detached raised islands to allow for drainage and bike lane passage. May be used in conjunction with striped crosswalks.

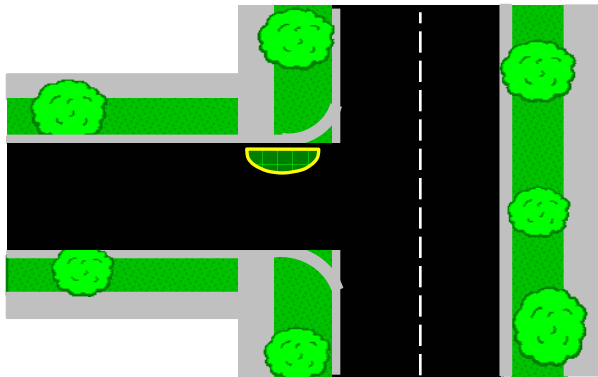
Purpose: To slow traffic at intersections and to improve pedestrian safety.

Potential Advantages:

- May reduce vehicle speed.
- May reduce cut-through traffic.
- Reduces crossing distance for pedestrians.
- Minimal impact to emergency vehicles.
- Does not restrict access for residents.
- Can be designed to restrict truck entry.
- Can be aesthetically pleasing (if landscaped).

Potential Disadvantages:

- Needs to be designed to accommodate bicyclists.
- Can impact drainage (depending on design and location).
- Curbside parking must be prohibited at the bulb, thus eliminating at least one space at each bulb location.
- Low impact on mid-block speeding.
- Maintenance responsibility, if landscaped.
- Can impede legitimate truck movements.



80th Street & Marty

Center Island Narrowing

Description: Constructed or painted islands located before an intersection or mid-block along the centerline of a street.

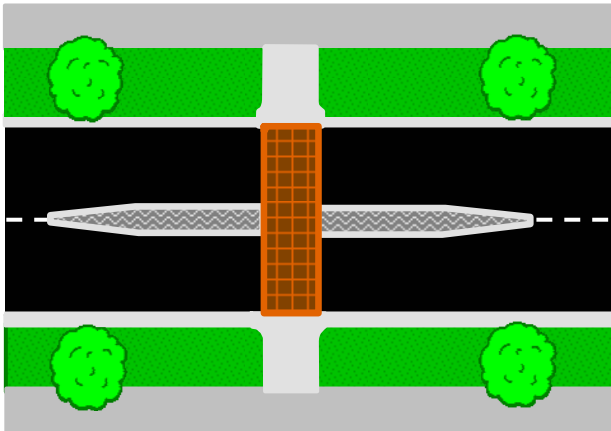
Purpose: To reduce traffic speed by narrowing the roadway with a median, and to increase pedestrian safety by providing a refuge halfway across the street, so that only one direction of traffic need be crossed at a time.

Potential Advantages:

- May reduce traffic speed.
- Improves pedestrian safety.
- Does not restrict emergency vehicle access.
- Can be aesthetically pleasing (if landscaped).
- Does not restrict access for residents.

Potential Disadvantages:

- Will impact parking.
- May eliminate the possibility of future bike lane installation on street by narrowing the travel lane.



Chicanes

Description: Curb extensions or islands that alternate from one side of the street to the other, forming S-shaped curves.

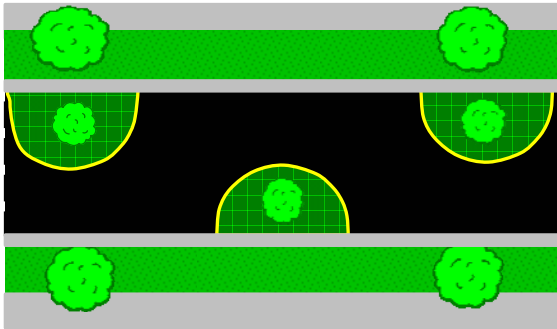
Purpose: To slow vehicle speed mid-block using horizontal deflection.

Potential Advantages:

- May reduce speed.
- Does not restrict access to residents.
- Can be aesthetically pleasing (if landscaped).

Potential Disadvantages:

- May increase conflicts between motor vehicles, bicyclists, and pedestrians.
- May create opportunities for head-on collisions on narrow streets.
- Will slow down emergency vehicles.
- Loss of curbside parking.



Chokers/Slow Points

Description: Curb extensions on one or both sides of the street that narrow the street at that location. They may be designed to alter the path of travel or to create single lane, one-way traffic.

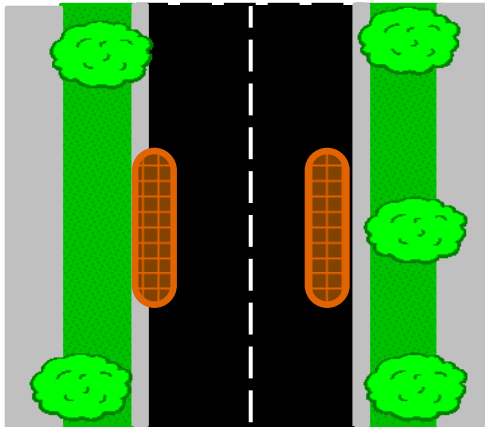
Purpose: To reduce vehicle speed mid-block and to increase pedestrian safety.

Potential Advantages:

- Reduces vehicle speed (more effective when used in series).
- Reduced crossing distance for pedestrians thereby increasing pedestrian safety.
- Aesthetically pleasing (if landscaped).
- Provides visual obstruction.
- Minimal impact to emergency vehicles.

Potential Disadvantages:

- May create conflict between opposing drivers.
- May impact emergency response times.
- Reduces curbside parking.



Full Closures

Description: Complete closure of a street either at an intersection or at a mid-block location.

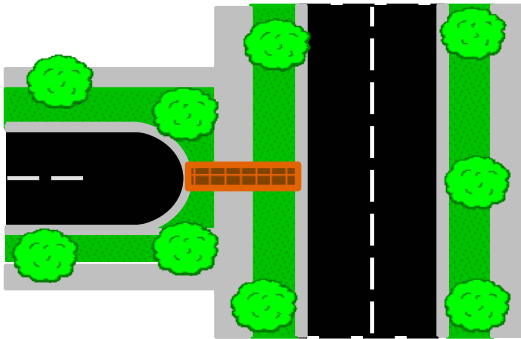
Purpose: To restrict access.

Potential Advantages:

- Effective at reducing traffic speeds and volumes.
- Can allow bicycle and pedestrian through-movements.
- Can be designed to allow emergency vehicle access.
- Aesthetically pleasing (if landscaped).
- Creates effective dead-ends that may encourage pedestrian activity.

Potential Disadvantages:

- May increase trip length.
- May create confusion for users unless signed properly.



Full Diverter

Description: Barriers placed diagonally across an intersection blocking through movement.

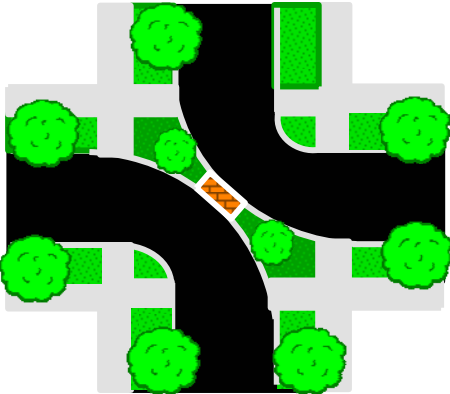
Purpose: To reduce traffic volume.

Potential Advantages:

- Reduces traffic volume.
- Can be designed to preserve emergency vehicle access.
- Can be designed to allow pedestrian and bicycle through-movement.

Potential Disadvantages:

- Can increase trip length.
- Restricts access to residents.



93rd Terr & Riggs

Gateway Treatment

Description: A short median at the entrance to a residential street.

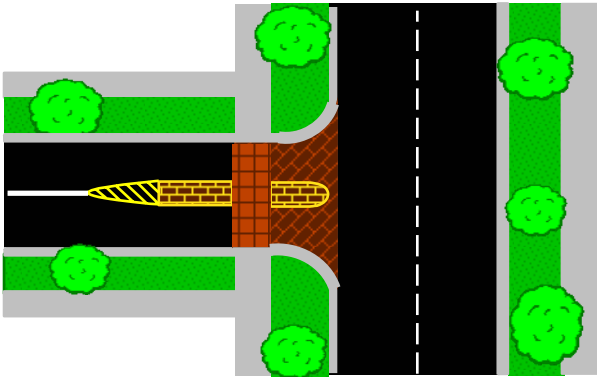
Purpose: To slow vehicles as they turn into the street and to limit the exit to a single lane

Potential Advantages:

- Reduced entry speed.
- Prevents drivers from forming a second lane and so reduces some cut-through traffic.
- Improved aesthetics if well landscaped and maintained.
- Easier and safer crossings for pedestrians.
- Minimal impact on emergency vehicles.
- Does not restrict resident access.

Potential Disadvantages:

- May require some minor widening on narrower street. Makes turns by service vehicles and emergency vehicles more difficult.
- Maintenance responsibility if landscaped.



Median Barriers

Description: Islands located along the centerline of a street and continuing through an intersection to block through movement across a major street.

Purpose: To prevent cut-through traffic.

Potential Advantages:

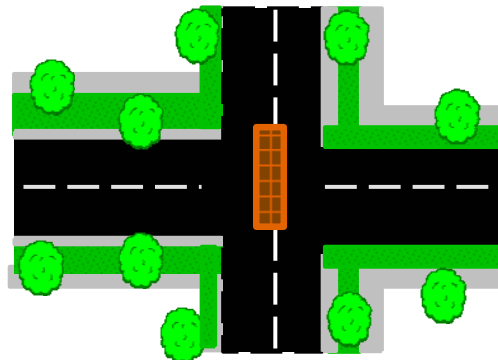
- Makes the intersection safer by reducing the number of conflicting turning movements.
- Can be designed to allow through-movement for cyclists.
- Reduces local street volumes.
- Aesthetically pleasing (if landscaped).

Potential Disadvantages:

- May shift traffic to other locations where turn opportunities exist.
- May inconvenience local residents.
- May impact parking on the major street depending on lane width.
- Blocks emergency vehicle access and delays emergency response.



83rd Street & Travis



Oval Median

Description: An oval median with trees located midblock.

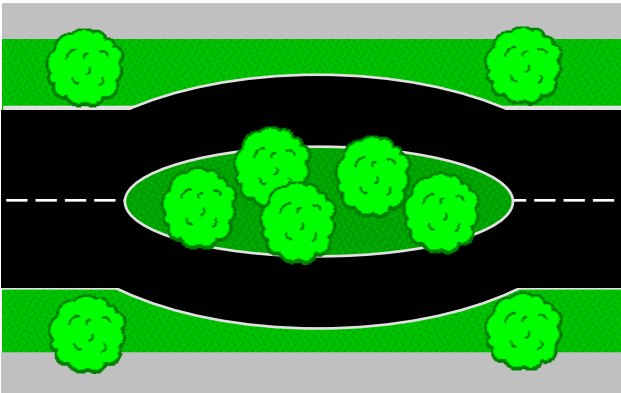
Purpose: To slow vehicles as they pass around the oval median

Potential Advantages:

- Will reduce vehicle speeds.
- Improved aesthetics if well landscaped and maintained.
- Easier and safer crossings for pedestrians.
- Minimal impact on emergency vehicles.
- Does not affect resident access.

Potential Disadvantages:

- Requires widening of the road into the planter strips.
- Maintenance responsibility if landscaped.
- Loss of on-street parking at and on the approaches to the median.



Semi-Diverters

Description: Barriers that block travel in one direction for a short distance on otherwise two-way streets.

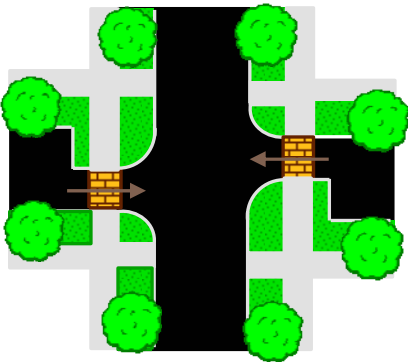
Purpose: To reduce traffic volume in the diverted direction.

Potential Advantages:

- Restricts movement into a street while maintaining access and movement within the street block for residents.
- Reduces cut-through traffic.
- Self-enforcing.
- Reduces crossing distance for pedestrians.
- Aesthetically pleasing (if landscaped).
- Emergency vehicles can travel in restricted direction.
- Can be designed to provide two-way access for bicycles.

Potential Disadvantages:

- May increase trip length for some residents.
- No impact on vehicle speeds mid-block.
- Restricts access to residents.



63rd Street & Riley

Traffic Circle

Description: Islands of varying dimensions placed in intersections around which traffic circulates.

Purpose: To slow vehicle speeds at intersections using horizontal deflection and a visual deterrent to higher speeds.

Potential Advantages:

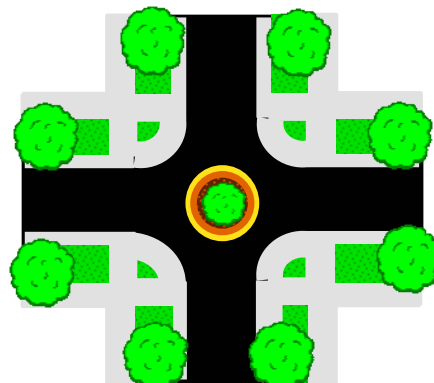
- Reduces vehicle speeds.
- Improves safety.
- Visually appealing.
- Creates a visual obstruction that deters through traffic.
- Does not restrict access for residents.

Potential Disadvantages:

- Effect on vehicle speed limited to device's immediate vicinity.
- May increase emergency vehicle response time.
- May limit truck and bus access.
- Maintenance responsibility if landscaped.
- Automobile driver's lines of sight may be reduced if landscaped.
- May promote deliberate violation of proper movement.



86th Street & Travis



Two-Lane Slow Point

Description: Two triangular islands with angled median in between.

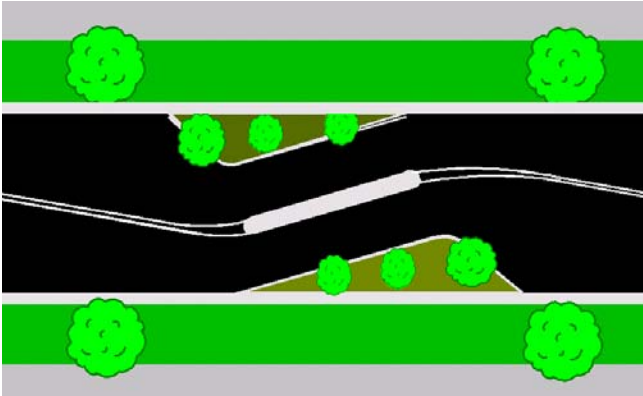
Purpose: To slow vehicles as they pass through the slow point.

Potential Advantages:

- Reduced speeds.
- Improved aesthetics if well landscaped and maintained.
- Easier and safer crossings for pedestrians.
- Minimal impact on emergency vehicles.
- Does not restrict resident access.

Potential Disadvantages:

- Maintenance responsibility if landscaped.



PHASE II - VERTICAL DEFLECTION*

Raised Crosswalks.....	24
Raised Intersections	25
Speed Humps/Tables	25

*vertical deflection measures are only authorized for residential streets

Raised Crosswalks*

Description: Raised pavement that can be combined with crosswalk markings and/or signage to provide pedestrians with a level street crossing. May be used mid-block or at intersections.

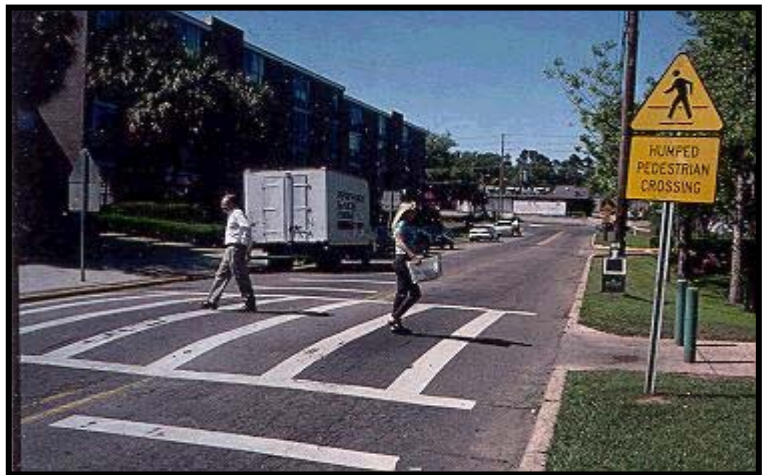
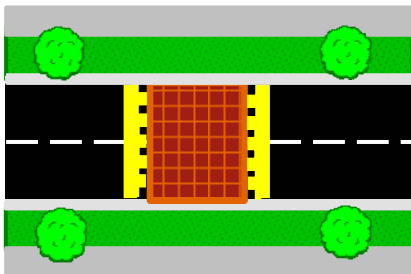
Purpose: To reduce vehicle speeds mid-block and to improve pedestrian safety.

Potential Advantages:

- May reduce vehicle speeds.
- May improve safety for pedestrians by making them more visible.
- Does not affect resident access.
- Attractive if constructed with pavers.

Potential Disadvantages:

- May impact emergency vehicle response.
- May disrupt drainage depending on design.
- May increase noise.
- May give pedestrians a false sense of security.



*vertical deflection measures are only authorized for residential streets

Raised Intersections*

Description: Flat raised areas covering entire intersections with ramps on all approaches and often with brick or other textured materials on the flat section.

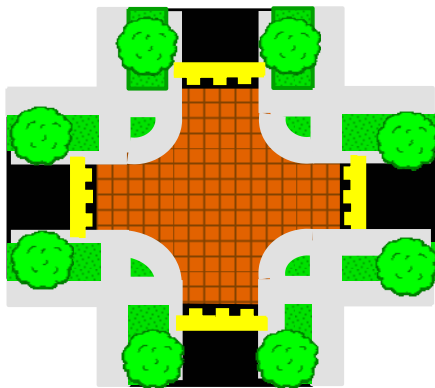
Purpose: To slow vehicle traffic at an intersection.

Potential Advantages:

- Slows vehicles in intersections and therefore makes conflict avoidance easier.
- Highlight intersection.
- Improves pedestrian safety.
- Aesthetically pleasing if well designed.
- Effective speed reduction at intersection.
- Does not restrict resident access.

Potential Disadvantages:

- May increase emergency response time.
- May increase turning difficulty.
- Increases maintenance.
- Impact on speed limited to within approximately 200' of intersection.
- Far more disruptive on large vehicles.
- May increase noise due to acceleration and braking.
- May disrupt drainage.



*vertical deflection measures are only authorized for residential streets

Speed Humps/Tables*

Description: Raised section of pavement across the roadway with curved transitions. Humps are generally 3.5" high and 12' long. Elongated speed humps (speed tables) are generally 3"-4" high x 22' long. Impacts on vehicle speed vary with size of device.

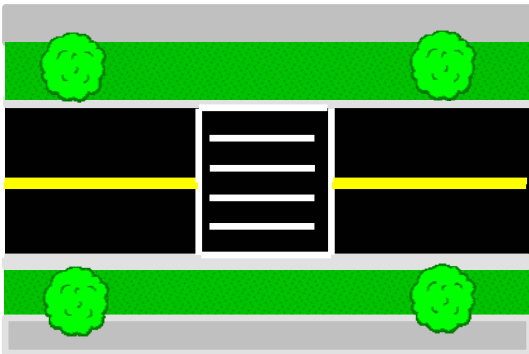
Purpose: To reduce vehicle speed.

Potential Advantages:

- Reduces vehicle speed.
- Can reduce vehicular volumes.
- Does not restrict parking.
- Requires minimum maintenance.
- Does not restrict resident access.

Potential Disadvantages:

- May increase emergency response time.
- Increases maintenance.
- Impact on speed limited to within approximately 200' of treatment.
- Far more disruptive on large vehicles.
- May increase noise due to acceleration and braking.
- May disrupt drainage.



Near 119th Street & Metcalf

*vertical deflection measures are only authorized for residential streets