

Streetscape and Transportation Enhancement Program Manual

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INTRODUCTION

Traffic is a concern for many Tempe residents. In order to provide safe and efficient traffic conditions on neighborhood streets, the City of Tempe Transportation Division has developed the Streetscape and Transportation Enhancement Program (STEP), which includes policies and guidelines to improve traffic conditions on Tempe streets.

Several objectives have been established to clearly define a program and process that may be implemented for large and small scale projects, including the current speed hump program, and other projects that may or may not be addressed through the City's existing Capital Improvement Program (CIP). The City of Tempe developed the STEP manual to outline a process that the City can use to prioritize projects and the steps necessary for initiation and implementation by residents and neighborhood groups.

Additionally, the City has emphasized the importance of broad-based resident participation in the STEP process, which is essential to the development of a safe, effective transportation system.

Through the development of the Comprehensive Transportation Plan, the City of Tempe established goals, policies, and measures to create the best environment for residents and guests to live, work, and play, through the integration of transportation and land use policies that will ensure the development and implementation of a safe, efficient, accessible, and balanced transportation system.

Additionally, the Transportation Element of the General Plan will incorporate the Comprehensive Transportation Plan and will identify City goals, policies, and objectives to provide a vibrant, safe,

efficient, and balanced transportation system in Tempe. The predominant objective is to provide enhanced mobility, clean air, conservation of energy, neighborhood livability and enhanced quality of life.

Guiding principals and policies that provide the foundation for the City's Transportation goals as stated in the Comprehensive Transportation Plan include:

- The commitment to accommodating additional regional travel demand and capacity needs by enhancing transit and other modes as alternatives to widening.
- The application of regional funding to capital and operating expenses for traffic and transit investments to meet future and current travel needs and demands.
- Accommodating additional demand and optimizing the transportation network through the use of new technology or innovative approaches such as Intelligent Transportation Systems (ITS) and Travel Demand Management (TDM) programs.

The Comprehensive Transportation Plan will also serve as the Transportation Element of the General Plan. The general objectives of the Plan are outlined as:

- Developing a functional relationship between the diverse land uses in Tempe and the transportation system that serves them.
- Identifying strategies for strengthening cooperative land use, transportation planning and design efforts between the



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INTRODUCTION

City of Tempe, Arizona State University, and other public and private stakeholders.

- Continuing to actively involve neighborhood and community representatives in on-going planning and design of transportation systems, facilities, and services.
- Working to ensure that transportation solutions preserve and enhance Tempe's neighborhoods, and that Tempe's zoning ordinances and relevant codes are consistent with transportation goals.
- Incorporating the provisions of the Comprehensive Transportation Plan as the Transportation Element of the General Plan.
- Establishing a strong visual identity and aesthetic for Tempe, its gateway entrances, and its neighborhoods.

Additionally, the City of Tempe has established measures of success as a benchmark to monitor progress and effectiveness of the Comprehensive Transportation Plan's recommended policies over time. The effectiveness of the implementation of the Plan will be monitored by several measures of success. These measures are as follows:

- The majority of Tempe residents feel that their community has an excellent transportation system that contributes to making Tempe the best place to live, work, and play. City codes and ordinances work together to balance transportation and land use, enhancing Tempe's quality of life and encouraging sustainable economic development.

- All Tempe neighborhoods have safe and convenient bicycle and pedestrian access to neighborhood schools, parks, shopping, and transit.
- Transportation improvements needed to implement neighborhood plans are in place by 2030.
- The rate per capita of single occupant vehicle miles traveled within Tempe is reduced by at least 20 percent by 2030.
- Transit trips as a percentage of all trips within Tempe at least double by 2030.
- All Tempe residents have access to fast and frequent (10- to 15-minute) transit service within a 5- to 10- minute walk from home.
- One third of attendees use transit, bike, or walk to special events in Tempe.
- A one-mile bikeway grid system is created.
- Air quality "hot spots" are reduced within Tempe and the City contributes to bringing overall regional air quality within attainable standards.



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2.0

STEP GOALS AND POLICIES

The welfare of the City requires the safe, efficient and economical movement of persons and goods while maintaining livability and environmental quality. It is essential to develop and maintain a complete transportation system (freeways, major streets, public transit, bicycle, and pedestrian ways) adequate to accommodate public needs. The intensity of land development and the travel demand produced by it must be in balance with the planned capacity of the transportation system. If this balance is not maintained, the inevitable result is traffic intrusion onto residential, local and collector streets.

By implementing the STEP, the City of Tempe expects to:

- Protect neighborhoods from “unwanted” traffic
- Encourage broad-based resident participation
- Reduce the speed and/or volume of traffic on local and collector streets

GENERAL SCOPE

The City developed the STEP to reassess and introduce a clear process for handling traffic issues and to provide new alternatives to the existing traffic management program. The STEP process addresses both small and large scale traffic calming alternatives. A small scale traffic calming project is one that can be implemented within the budgetary authority of the Public Works Manager, while one that requires City Council action for budgeting, will be considered a large scale project. The STEP outlines a process that the City can use to prioritize projects and steps necessary for initiation and implementation by residents and neighborhood groups.

In the past, the primary tool used to address concerns about speeding and unwanted traffic was speed humps. However, requests for speed humps have declined over time and the development of a clear STEP protocol in which neighbors can be involved in larger scale changes has become necessary.

Traffic problems addressed by the STEP include:

- Speeding
- High-volume traffic
- Pedestrian and bicycle safety
- “Unwanted” traffic
- Sight-distance problems
- On-going traffic law violations

LARGE AND SMALL SCALE PROBLEMS

Large scale traffic problems, or problems necessitating solutions which require Council approval, typically involve failure to fully stop at multiple intersection signs, excessive speeding or large volumes of traffic that significantly impact residential streets, multiple intersections, or multiple street corridors within a particular area.

Resolution to large scale problems often requires an area-wide approach.

Examples of large scale traffic calming alternatives are:

- Traffic circles
- Road closures
- Semi-diverters
- Star diverters
- Cul-de-sacs
- Diagonal diverters
- Chokers



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STEP GOALS AND POLICIES

- Right-turn diverters
- Chicanes
- Traffic footballs

Small scale traffic problems can be addressed through the use of one of the tools listed above, and/ or a combination of several alternatives including signage, enforcement, striping, or public notification. City staff may determine that the traffic issue will effectively be solved through signage, enforcement, striping, or public notification, and can implement those options without a consensus of approval. Examples of small scale traffic problems are blocked views of traffic at intersections, failure to stop at intersection stop signs, motorists parking along curbs and blocking driveways, traffic volume not allowing pedestrians or motorists to cross streets, excessive traffic speeds along a segment of street less than one block long, or reoccurring traffic collisions.

Small scale projects typically include alternatives such as:

Signage

- Stop *
- Yield
- Speed Limits
- Stop Ahead
- No Parking
- Permit Parking **
- Loading Zones
- Handicap Parking Zones

*Note: The installation of stop signs must be consistent with the warrants established by the Manual of Uniform Traffic Control Devices (MUTCD) and City of Tempe.

**Note: The City of Tempe has an existing program for permit parking that should be deferred to if the permit parking option is being considered.

Striping/Pavement

- Street centerline
- Red curb
- Lane lines
- Crosswalks
- Stop bars
- Speed humps
- Yellow curb
- Parking areas
- Parking restrictions

Enforcement

- Increased police presence
- Selective Enforcement Motorcycle Squad



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STEP GUIDELINES AND PROCESS

The STEP provides stakeholders a process to request that the City implement traffic calming devices or strategies in their neighborhoods. Stakeholders include both the property owner and the responsible individuals who reside in the home. A successful process includes reporting a problem, requesting a field evaluation from City staff, developing an Action Team, identifying possible solutions to neighborhood traffic conditions, conducting community meetings, achieving consensus for testing the measures and achieving consensus for implementing traffic mitigation solutions that are uniquely tailored to traffic problems in the neighborhood.

The process relies heavily on the involvement of the stakeholder making the request and an Action Team. City staff will provide technical assistance and identify base costs that the City would be responsible for and any costs for “betterments” that would be required by the affected mitigation area. Any “betterments,” or additional construction such as landscaping in a median, would not be eligible for funding as a part of the STEP and would require funding from stakeholders with a consensus of approval and/or through application to the Neighborhood Grant Program.

Prior to submitting a Citizen Request Form for the review of a neighborhood traffic problem, it is highly suggested that the citizen utilize the Selective Enforcement Motorcycle Squad program offered by the City.

SELECTIVE ENFORCEMENT MOTORCYCLE SQUAD

The Selective Enforcement Motorcycle Squad (SEMS) is a traffic enforcement unit within the Police Department. The SEMS unit was created to work on neighborhood traffic safety concerns in cooperation with the City of Tempe Transportation and Neighborhood Services divisions. SEMS provides stronger enforcement measures including the use of radar to reduce vehicular

speeding in neighborhoods and the presence of motorcycle officers to deter other issues. If you would like to notify the SEMS unit about an on-going traffic concern, you can:

- Call 480-858-7376
- Visit www.tempe.gov/police/trafficbureau/complaintform.html
- Visit the Tempe PD Station located at 120 E. 5th Street or the Tempe PD Substation located at 8201 S. Hardy Drive

Even if a stakeholder has chosen to utilize the Selective Enforcement Motorcycle Squad program offered by the City, they may choose to initiate the STEP process.

STAKEHOLDER SUBMITS A STEP REQUEST FORM

The stakeholder submits a STEP request form which includes the following information:

- Name and address
- Written narrative of the traffic concern
- Any documentation (photos, video, etc.) that provides evidence
- A stakeholder support form or letter by five additional households or property owners supporting the traffic concern

Once the request is submitted, the requests will be processed in the order in which they are received.

CITY STAFF REVIEW

Upon receipt of a completed request form, City staff will review the application and, if needed, conduct the applicable field surveys, traffic counts or data research necessary to determine the following:

- Is there a problem that justifies further action?
- What type of problem is it?



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STEP GUIDELINES AND PROCESS

- What is the study area for the identified problem?
- What are the applicable tools from the toolbox to address the problem?

CITY STAFF RESPONSE

City staff will prepare an initial response to the requestor within 30 days outlining necessary studies, traffic counts or data research. After completion of the initial studies, staff will prepare a memorandum that verifies the recommendation for further action, details the problem, identifies the potential study area and lists the applicable tools that could be implemented to address the problem. Project area boundaries in which input will be sought will be determined by City staff based on the Traffic Engineer's assessment of how the proposed traffic calming measure will impact the surrounding area. Each tool will include the costs that are to be paid by the City and costs that would be required to be paid by stakeholders within the study area. Finally, the memorandum would outline the process and timeline for moving ahead.

If City staff indicates that the proposed problem does not justify further action, the requestor can choose to appeal to the Public Works Manager, who may reverse the decision.

DECISION TO PROCEED WITH SMALL SCALE PROJECTS

In response to the memorandum, the requestor may choose to proceed or end the process. If the recommended action is a small scale solution, then the project can move forward with the requestor working to gain consensus approval, defined as, petition approval by:

- All, or 100%, of the stakeholders whose street

access is affected and who live immediately adjacent to the traffic management measure, agree with the measure.

- Most all, or 75%, of the stakeholders whose primary street would be affected by the traffic management measure agree with the implementation of the measure.
- A majority, or 51%, of the remaining stakeholders whose access is affected by the traffic management measure agree with the implementation of the measure.

The petition for approval will be provided by City staff.

A small scale project is typically defined as a project that:

- Can be implemented within the budgetary authority of the Public Works Manager
- Includes speed reduction measures such as speed humps or speed tables
- Includes signage, striping, enforcement, or other such changes to traffic circulation that do not require a wide area approach

DECISION TO PROCEED WITH LARGE SCALE PROJECTS

If the recommended action is a large scale project, and the requestor chooses to proceed, City staff will hold public meetings with the affected stakeholders to determine the appropriate actions.

STEP TEAM INFORMATIONAL MEETING

City staff will send notification to the affected neighborhood about the public meeting. Meetings will be held independently of other neighborhood meetings and the agenda will be set by the City, unless there is a neighborhood meeting in which City staff can facilitate



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STEP GUIDELINES AND PROCESS

the discussion. A reasonable effort will be made to notify both the property owner and the person who lives at the address of the property in the project area, including multi-family housing. The purpose of the public meeting is to provide the affected stakeholders a summary of the identified problem, the applicable tools to address the problem, available funding to address the problem, and the process for moving ahead. Notification of public meetings will be sent via US mail and/or via doorhangers as determined by City staff. Additional methods could be used as determined by City staff. At the public meeting, City staff will also notify the stakeholders of the need for an Action Team and will request volunteers to participate on the Action Team.

FORM AN ACTION TEAM

The Action Team will be made up of five to 10 stakeholder representatives, including the requestor. The Action Team will include a geographically equitable distribution of stakeholders with a diversity of opinions related to the problem. If possible, a representative of an affected Homeowner's Association or Neighborhood Association formally recognized by the City will be appointed to the Action Team.

DEVELOP A DRAFT ACTION PLAN

The Action Team will determine meeting times and locations to develop a draft Action Plan. Working collaboratively with City staff, the team will develop an Action Plan that includes:

- A statement of the problem
- A statement or list of the objectives
- A map of the study area: including a boundary of the study area and adjoining

area; private property lines; streets and the location of the proposed toolbox solutions

- A description and photograph of any of the traffic calming tools to be used
- A schedule for installing the traffic calming test measures(s)
- Identification of tools that may be installed on a temporary basis to further measure community support before permanent installation
- A summary of the project costs based on the City estimate for installation and the community commitment for funding betterments, if any
- Future monitoring of traffic conditions to ensure the effectiveness of the solutions

COMMUNITY PRESENTATION FOR TESTING

A second public meeting will be held to present the Draft Action Plan and record public comments. The City will make a reasonable effort to notify each household or property owner in the study area advertising the time, date, location and purpose of the meeting via mailing/doorhangers. Notification will include a link to the City website where the Draft Action Plan can be reviewed and downloaded. Those not able to attend the meeting will be provided the opportunity to comment via letter, telephone, email, or on the City's website. The public meeting will provide an opportunity for the Action Team, with the support of City staff, to present the recommendations that have been developed.



3**3.0****STEP GUIDELINES AND PROCESS****30-DAY COMMENT PERIOD**

A 30-day comment period will be initiated after the public meeting. During the 30-day comment period, staff will compile and review the written comments submitted via letter, telephone, email, at the public meeting, or on the City website. The online comment form will be available for a one-month period. The stakeholders must provide their name and address in order for the comment to be included in the official public comment. After the 30-day comment period, City staff will prepare a tally of stakeholder input to confirm whether or not consensus for the proposed traffic calming measure was reached.

For the testing and implementation of traffic calming measures, multiple comments in favor or against the traffic calming measures from each single-family household will be counted as one comment. If comments from a single household conflict with each other, the comments will not be counted. It is up to each household to agree on their position. If the comments (in favor or against the proposed traffic calming measure) from the property owner and the renter are in disagreement, the property owner's comment will be counted toward the overall comment tally.

City staff will communicate the findings of the comment period to the neighborhood and determine the next steps.

If, based on stakeholder input, City staff believes it is possible to obtain consensus, City staff will work with the Action Team to obtain consensus as outlined in Conditions for Approval. If, based on stakeholder input, City staff determines that consensus is not possible, the findings will be referred back to the Action Team for further consideration.

CONDITIONS FOR APPROVAL OF TESTING

The consensus threshold for testing of proposed traffic calming measures is:

- Fifty-one or more percent of the households in the project area that comment on the proposed traffic calming measures must be in favor of testing of the measures prior to implementation of testing. Staff will determine if sufficient level of neighborhood participation has occurred prior to testing.

If consensus is reached to test the traffic calming measures, a minimum 30-day (90-day maximum) test period will occur. Staff will attempt to hold follow-up neighborhood meetings during the middle to end stages of the test phase.

During the test phase, staff will compile and review the written comments submitted via letter, telephone, email, at the public meeting, or on the City website. The online comment form will be available to determine the level of support of the test. The stakeholders must provide their name and address in order for the comment to be included in the official public comment. After the comment period, the City staff will prepare a tally of stakeholder input to confirm whether or not consensus for implementation can be reached.

CONDITIONS FOR APPROVAL OF IMPLEMENTATION

If consensus is possible, City staff will work with the Action Team to document final approval for implementation.



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STEP GUIDELINES AND PROCESS

Permanent traffic calming measure installation approvals shall consist of:

- All, or 100%, of the stakeholders whose street access is affected and who live immediately adjacent to the traffic management measure, agree with the measure.
- Most all, or 75%, of the stakeholders whose primary street would be affected by the traffic management measure agree with the implementation of the measure.
- A majority, or 51%, of the remaining stakeholders whose access is affected by the traffic management measure agree with the implementation of the measure.

For project areas with 100 or more households, petition signatures must be collected for 100% of those stakeholders adjacent to the traffic calming measure, and 75% of those stakeholders on the same street as the traffic calming measure. Petition signatures may be collected for 51% of the stakeholders whose access is affected or the City will mail postage-paid ballots or use other methods to determine the level of support for these stakeholders.

Upon approval of implementation, the Draft Action Plan will be presented to the Transportation Commission. If the Draft Action Plan requires additional funding outside the established Capital Improvement Program (CIP), the Transportation Commission will provide a recommendation and forward the item to the City Council for approval. If the Draft Action Plan does not require additional funding outside the CIP, the presentation to the Transportation Commission is for information only.

IF APPROVAL IS NOT ACHIEVED

If the conditions for approval are not met, City staff will revise the Draft Action Plan to address the issues raised at the community meeting and expressed in the written feedback. The Action Team will then meet to review the revised Draft Action Plan and determine if the newly revised Draft should be presented at a public meeting. If so, the revised Draft Action Plan will be presented to the neighbors and the process of gathering stakeholder feedback will begin again (i.e., City staff will compile input from area stakeholders during a 30-day period).

PROJECT SELECTION AND PRIORITIZATION

Once a project has been selected and it has the necessary approval of the stakeholders as outlined above, it will be prioritized for funding. Small scale projects and speed humps are typically funded through a line item in the City budget for traffic management. However, large scale projects, depending on the estimate of their costs, may require a separate budget line item as a part of the City's CIP. Projects to be funded through the line item for traffic management will be prioritized by City staff on a first-come, first served basis. Large scale projects requiring other funding will be prioritized by City staff as a part of the City's annual budgeting process. Whether small or large, the ability of the City to implement projects in any given year may be limited by the availability of City funds for such purposes. The Neighborhood grant funds are available for Neighborhood and Homeowner's Associations registered within the City's Neighborhood Services Division. Traffic calming projects and enhancements are eligible for consideration in this competitive annual funding process.

A STEP "tool" is a mechanism (e.g., speed hump, traffic circle) or activity (e.g., police enforcement) that effectively changes the driving behavior of motorists.

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STEP TOOLBOX

The STEP tools have been developed to address traffic calming through speed control, volume control, safety and effectiveness.

The toolbox of techniques is consistent with the Maricopa Association of Governments (MAG), Americans with Disabilities Act (ADA), American Association of State Highway and Transportation Officials (AASHTO), and City of Tempe design standards for vehicular, bicycle and pedestrian traffic. The toolbox will be available to residents and will take into consideration “green” principles.

Table 1 summarizes each of the tools which are further explained in this section.

Table 2 outlines the estimated construction costs for each tool.

IDENTIFY THE PROBLEM

Streets often have a single problem, or problems for which there is a single cause that requires tools designed to address the root cause of the problem. For example, unwanted traffic in a neighborhood may generate complaints about speeding. Implementing tools that reduce speeding may have a short term benefit, but may not address the larger concern, which is unwanted traffic. Therefore, City staff, through the analysis of the problem identified by a neighborhood, may recommend the use of tools that address the cause of the problem – unwanted traffic, rather than tools that simply address the affect – speeding.

MIXING/MATCHING

While there may be more than one tool appropriate for solving a traffic problem, the use of a variety of tools can

have an unintended effect of increasing project costs and/or causing confusion for motorists which can also be a safety hazard. Therefore, consideration must be given as to the appropriate matching of tools, and their placement and spacing in such a manner that they do not have unintended consequences.

MULTI-MODAL CONSIDERATIONS

Streets serve many modes, including buses, bicycles and pedestrians. As a result, any tool used to affect the way that cars operate on a street may also affect transit buses, emergency vehicles, bicyclists and pedestrians.

In considering the tools to be applied, the potential affect on these other modes must be taken into consideration so that there are not unintended consequences of the action. In some cases, the implementation and/or placement of traffic management tools such as a speed hump, may restrict access or affect the response time of emergency vehicles.

The tools in the STEP toolbox identify the potential for impact to other modes to ensure the safety of others using the street. When designing the traffic calming tool, bicycle and pedestrian movement will be taken into consideration.

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TABLE 1: IMPACTS OF TRAFFIC MANAGEMENT DEVICES

Traffic Device/Type	Traffic Reduction	Speed Reduction	Safety	Traffic Access Restriction	Emergency Vehicle Access	Maintenance Problems	Level of Violation	Impact to Bicycles	Impact to Transit	Costs
Median	No	Yes	None	Some	No Problems	Vandalism	Low	Some	None	Moderate
One-way Choker	Likely	Yes	None	None	Some constraint	Yes	Moderate	Minor	Minor	Moderate
Two-way Choker	No	Minor	None	Non	No Problems	Yes	Low	Yes	Yes	Moderate
Bulb-Out	Unlikely	Minor	Improved for peds	None	Some constraint	Yes	Low	Yes	Yes	Moderate
Chicane	Unlikely	Likely	None	None	Some constraint	Vandalism	Moderate	Minor	Minor	Moderate
Star diverters	Yes	Yes	Unclear	Yes	Some constraints	Yes	Low	None	Yes	Moderate
Right-turn diverters	Yes	Likely	Unclear	Minor	Minor	Low	Low	None	Some	Moderate
Traffic Footballs	Unlikely	Likely	None	None	Likely	Likely	Low	Some	Some	High
Intersection Cul-de-sac	Yes	Likely	Improved	Total	Some constraint	Vandalism	Low	None	Totally restricted	High
Traffic Circle	Possible	Likely	Unclear	None	Some constraints	Vandalism	Low	None	Restricted	Moderate
Median Barrier	Yes	None	Improved	Right turn only	Minor constraint	None	Low	Minor constraint	None	Moderate
Roundabouts	Possible	Likely	Unclear	None	None	Likely	Low	None	None	High
Speed Humps*	Unlikely	Minor	None	None	Minor	None	Low	Minor	Some	Low
Speed Tables	Unlikely	Minor	None	None	Minor	None	Low	Minor	Some	Moderate
Departure Choker	Yes	Minor	Improved	Yes	No Problems	None	Moderate	Minor	Some	Moderate
Entry Choker	Yes	Minor	Improved	Yes	Some constraint	None	Moderate	Minor	Possible	Moderate
Diverters	Yes	Likely	Improved	Yes	Some constraints	Yes	Low	Minor	Yes	Moderate
Semi-diverter (Type A)	Yes	Likely	Improved	One direction	Minor constraint	Vandalism	High	Some	Some	Moderate
Semi-diverter (Type B)	Yes	Likely	Improved	Yes	Some constraint	Yes	Low	None	Yes	Moderate
Stop Sign*	Unlikely	None	Unclear	None	No Problems	Vandalism	High	None	None	Low
No left/right Turn Signs	Yes	None	Improved	No turns	No Problems	Vandalism	High	None	No Turns	Low
One-Way Street	Unlikely	None	Improved	One direction	One direction	None	Low	One direction	One direction	Low
Chokers	Unlikely	Minor	Improved for peds	None	Some constraints	None	Low	Minor constraint	None	Moderate
Diagonal diverters	Yes	Likely	Improved	Thru Traffic	Some constraints	Vandalism	Low	Some	Some	Moderate
Right-turn diverters	Yes	Likely	Unclear	Minor	Minor	Low	Low	None	Some	Moderate
Permit Parking*	No	No	None	None	None	Low	Low	None	None	Low



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4.0 MEDIAN

PURPOSE:

A median is a raised island near the centerline of a local street. The median narrows the traffic flow and serves as a “channel” to slow traffic.

DESIGN CONSIDERATIONS:

The construction of a median may be funded by the City of Tempe based on the budgetary authority of the Public Works Manager. Landscaping or other improvements beyond basic construction may increase the cost of the project and may require additional stakeholder participation in funding.

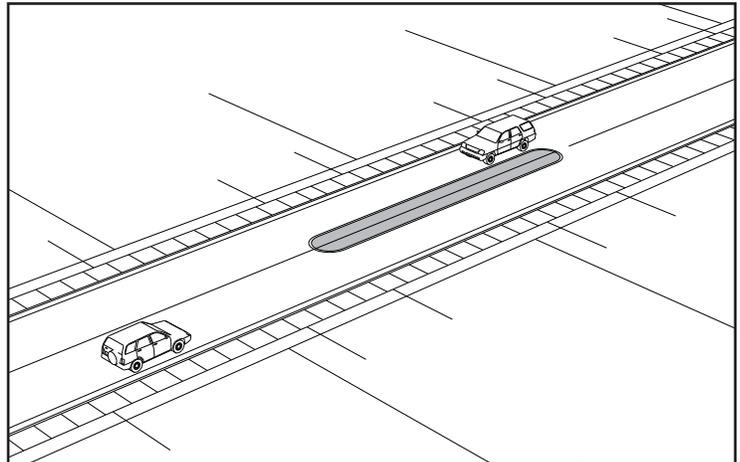
Depending on the type and location of the median, utilities may be impacted and require some level of relocation.

ADVANTAGES:

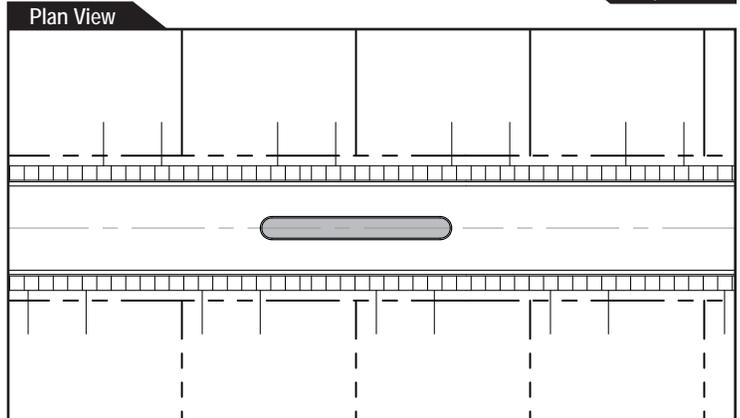
The implementation of a median for traffic calming will produce a speed reduction and may reduce traffic noise. Medians may be constructed on local, collector, or arterial streets.

DISADVANTAGES:

Medians do not reduce traffic or inherently improve safety and will require maintenance. The implementation of medians will, in most cases, limit on-street parking. Medians may also limit bicycle lanes and driveway access.



Oblique View



Plan View

Can be used on local street	Yes
Can be used on collector street	Maybe
Can be used on arterial street	Maybe
Reduces traffic	No
Reduces operating speed	Yes
Reduces noise	Maybe
Improves safety	No
Restricts traffic access	Maybe
Restricts and/or slows emergency response time	No
Requires maintenance due to vandalism	Yes
Level of violations	Low
Adversely impacts bicyclists	Maybe
Adversely impacts transit	No

Fast Facts

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4.0 ONE-WAY CHOKER

PURPOSE:

The one-way choker is a barrier on either side of the street that “channels” traffic at certain points on local streets. The one-way choker serves to reduce traffic speed, noise, and may reduce traffic volume.

DESIGN CONSIDERATIONS:

The construction of a one-way choker may be funded by the City of Tempe based on the budgetary authority of the Public Works Manager. Landscaping or other improvements beyond basic construction may increase the cost of the project and may require additional stakeholder participation in funding.

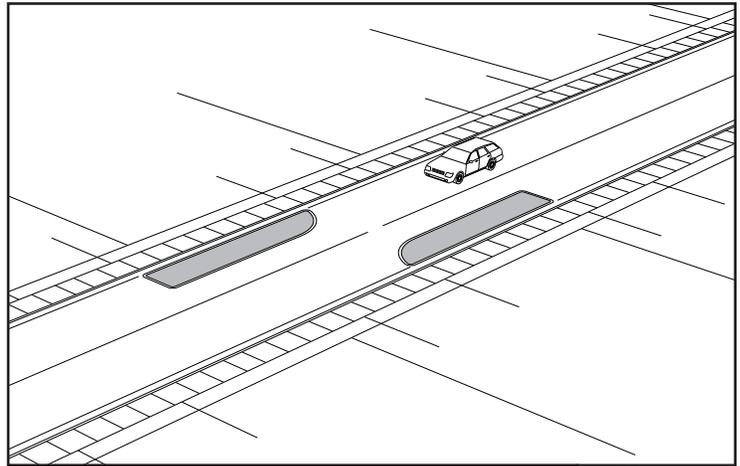
Depending on the type and location of the one-way choker, utilities may be impacted and require some level of relocation. Problems related to drainage may also result from the implementation of the one-way choker.

ADVANTAGES:

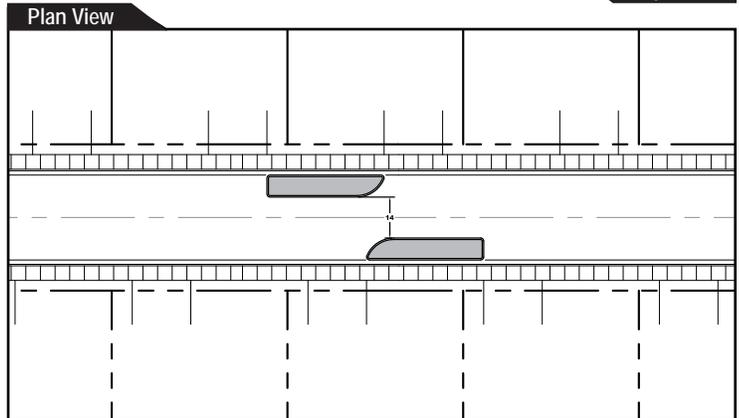
The one-way choker can be used on local streets and may reduce traffic volume as well as traffic speeds and traffic noise.

DISADVANTAGES:

The one-way choker is a higher cost alternative and may result in the development of new traffic patterns of travel. The one-way choker may restrict emergency vehicle access and access to driveways.



Oblique View



Plan View

Can be used on local street	Yes
Can be used on collector street	No
Can be used on arterial street	No
Reduces traffic	Maybe
Reduces operating speed	Yes
Reduces noise	Maybe
Improves safety	No
Restricts traffic access	No
Restricts and/or slows emergency response time	Yes
Requires maintenance due to vandalism	Yes
Level of violations	Moderate
Adversely impacts bicyclists	Minor
Adversely impacts transit	Minor

Fast Facts

4

4.0 TWO-WAY CHOKER

PURPOSE:

The two-way choker is a barrier on either side of the street that narrows the local or collector street but allows traffic in both directions. The two-way choker is used primarily to reduce traffic speeds but may result in reduced traffic volumes and noise.

DESIGN CONSIDERATIONS:

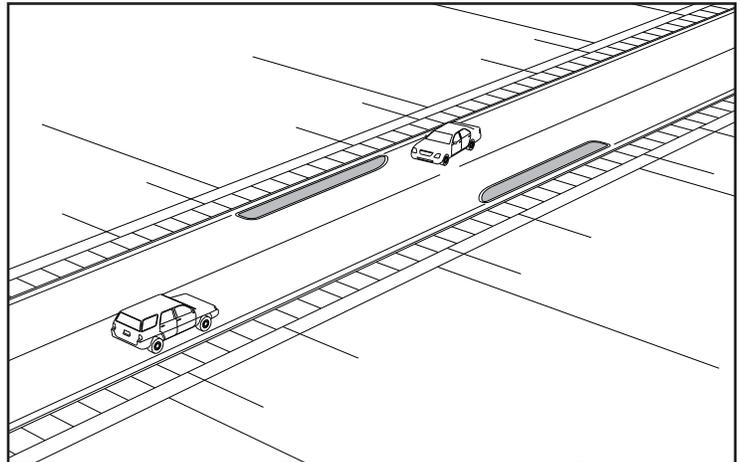
The construction of a two-way choker may be funded by the City of Tempe based on the budgetary authority of the Public Works Manager. Landscaping or other improvements beyond basic construction may increase the cost of the project and may require additional stakeholder participation in funding.

ADVANTAGES:

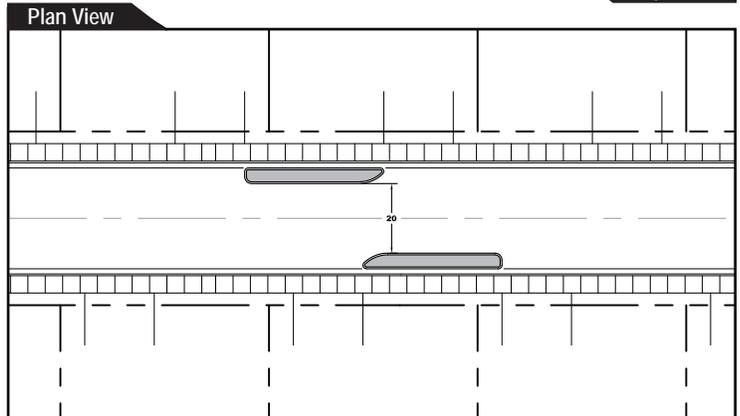
Compared to the one-way choker, the two-way choker does not as significantly restrict emergency vehicle access. The two-way choker allows traffic in both directions.

DISADVANTAGES:

A two-way choker often does not result in a marked reduction in traffic speed and noise and may require the loss of bicycle lanes. In many cases, the speed reduction of the two-way choker diminishes as drivers become accustomed to its presence. The two-way choker may also impede driveway access and may require regular maintenance due to vandalism.



Oblique View



Plan View

Can be used on local street	Yes
Can be used on collector street	Yes
Can be used on arterial street	No
Reduces traffic	No
Reduces operating speed	Minor
Reduces noise	No
Improves safety	No
Restricts traffic access	No
Restricts and/or slows emergency response time	No
Requires maintenance due to vandalism	Yes
Level of violations	Low
Adversely impacts bicyclists	Maybe
Adversely impacts transit	Minor

Fast Facts

4

4.0 BULB-OUT

PURPOSE:

A bulb-out is a barrier on both sides of the street intersection that narrows the street but allows traffic in both directions. The bulb-out is used primarily to reduce traffic speeds but may result in reduced traffic volumes and noise.

DESIGN CONSIDERATIONS:

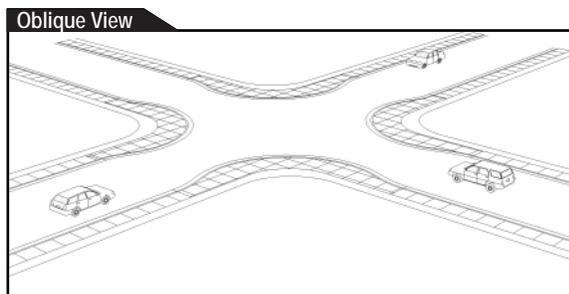
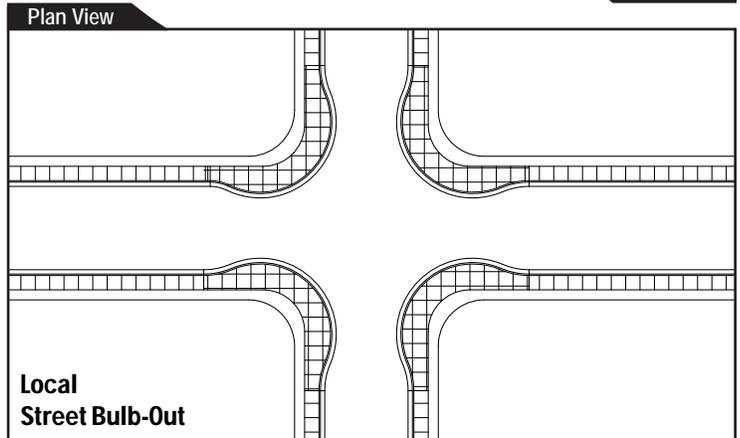
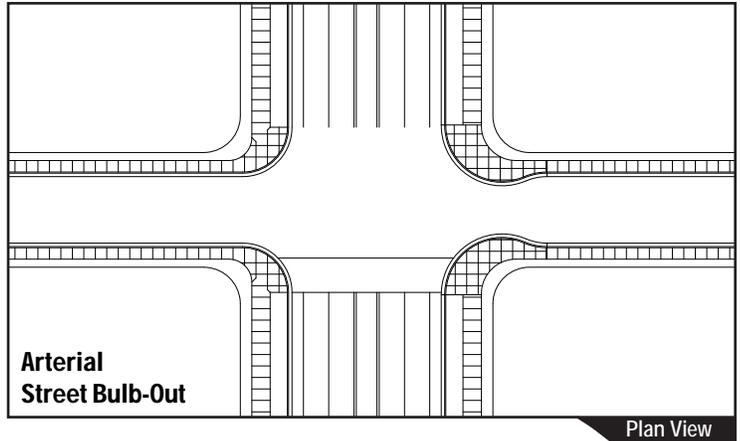
The construction of a bulb-out may be funded by the City of Tempe based on the budgetary authority of the Public Works Manager. Landscaping or other improvements beyond basic construction may increase the cost of the project and may require additional stakeholder participation in funding.

ADVANTAGES:

Bulb-outs do not significantly restrict emergency vehicle access except for large fire trucks making right turns. Bulb-outs may reduce the operating speed of traffic and may also reduce traffic volume and noise.

DISADVANTAGES:

Bulb-outs may not result in marked reduction in traffic speed and noise and may require the loss of bicycle lanes. In many cases, speed reduction of the bulb-outs diminishes as drivers become accustomed to their presence. Bulb-outs may also require regular maintenance due to vandalism.



Can be used on local street	Yes
Can be used on collector street	Yes
Can be used on arterial street	Yes
Reduces traffic	No
Reduces operating speed	Minor
Reduces noise	No
Improves safety	No
Restricts traffic access	No
Restricts and/or slows emergency response time	Unclear
Requires maintenance due to vandalism	Yes
Level of violations	Low
Adversely impacts bicyclists	Maybe
Adversely impacts transit	Minor

Fast Facts

4

4.0 CHICANE

PURPOSE:

The chicane is a series of curb extensions on alternating sides of a local street which narrow the roadway to one lane and require the driver to steer from one side of the road to the other. The chicane serves to reduce traffic speed and may reduce traffic volume.

DESIGN CONSIDERATIONS:

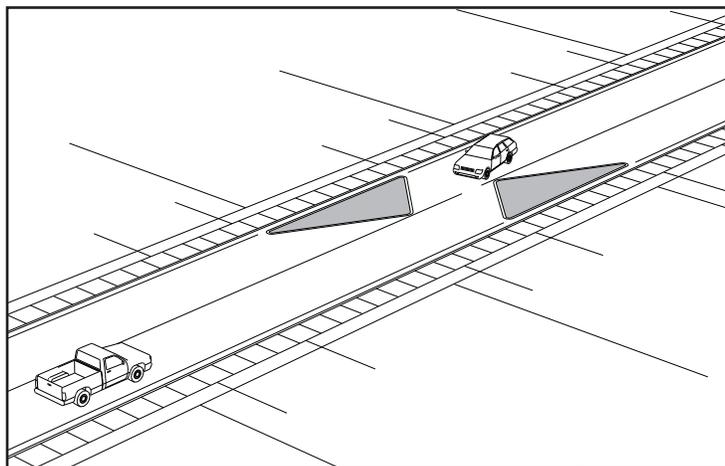
The construction of a chicane may be funded by the City of Tempe based on the budgetary authority of the Public Works Manager. Landscaping or other improvements beyond basic construction may increase the cost of the project and may require additional neighborhood participation in funding.

ADVANTAGES:

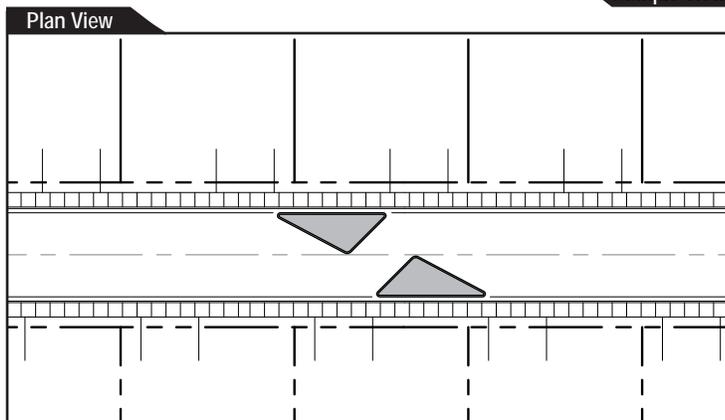
The chicane reduces traffic speed and noise. The chicane may also reduce traffic volume and would restrict "straight through" movement of traffic.

DISADVANTAGES:

With no other traffic present, drivers would be able to accelerate through the chicane which may result in increased travel speed and acceleration noise. The chicane loses its effectiveness when a low volume of traffic is present.



Oblique View



Plan View

Can be used on local street	Yes
Can be used on collector street	No
Can be used on arterial street	No
Reduces traffic	No
Reduces operating speed	Yes
Reduces noise	Yes
Improves safety	No
Restricts traffic access	No
Restricts and/or slows emergency response time	Yes
Requires maintenance due to vandalism	Yes
Level of violations	Moderate
Adversely impacts bicyclists	Minor
Adversely impacts transit	Minor

Fast Facts

4

4.0

STAR DIVERTER

PURPOSE:

The star diverter is a raised barrier placed in the intersection that allows traffic to make only right turns and prevents traffic from proceeding through the intersection.

DESIGN CONSIDERATIONS:

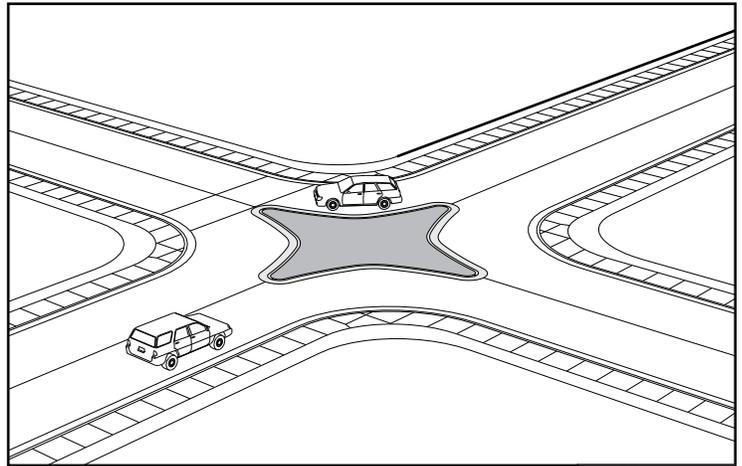
The construction of a star diverter may be funded by the City of Tempe based on the budgetary authority of the Public Works Manager. Landscaping or other improvements beyond basic construction may increase the cost of the project and may require additional neighborhood participation in funding.

ADVANTAGES:

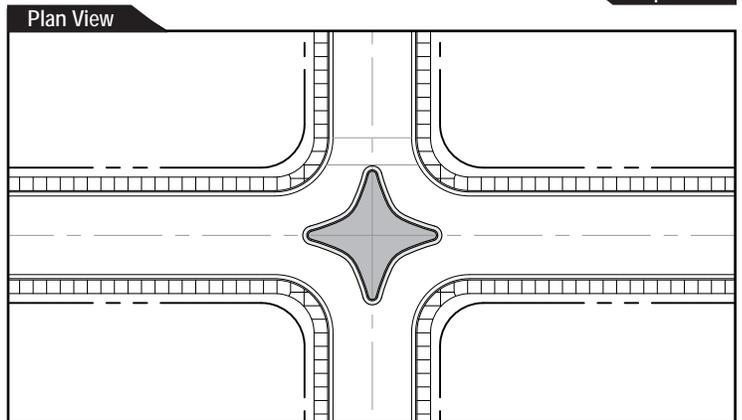
The star diverter can be installed within the existing intersection and right-of-way. The star diverter may reduce traffic volume and restrict "straight through" movement of traffic.

DISADVANTAGES:

The star diverter eliminates all left turns and through traffic and would change local traffic circulation patterns.



Oblique View



Plan View

Can be used on local street	Yes
Can be used on collector street	Yes
Can be used on arterial street	No
Reduces traffic	Yes
Reduces operating speed	Yes
Reduces noise	Yes
Improves safety	Unclear
Restricts traffic access	Yes
Restricts and/or slows emergency response time	Yes
Requires maintenance due to vandalism	Yes
Level of violations	Low
Adversely impacts bicyclists	Maybe
Adversely impacts transit	Yes

Fast Facts

4

4.0

RIGHT TURN DIVERTER

PURPOSE:

The right-turn diverter is a raised barrier that prevents cut-through traffic and forces right turns by prohibiting traffic to proceed through the intersection.

DESIGN CONSIDERATIONS:

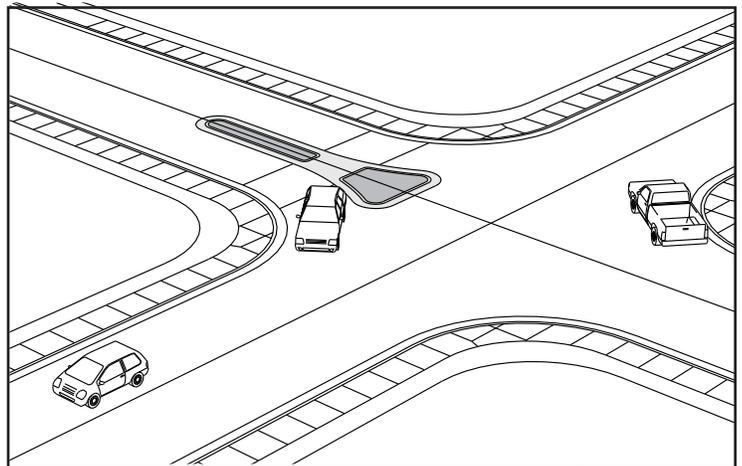
The construction of a right-turn diverter may be funded by the City of Tempe based on the budgetary authority of the Public Works Manager. Landscaping or other improvements beyond basic construction may increase the cost of the project and may require additional stakeholder participation in funding.

ADVANTAGES:

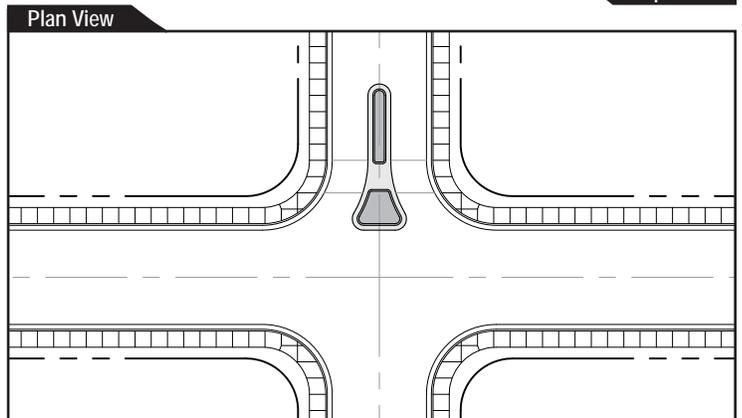
The right-turn diverter prevents cut-through traffic and reduces traffic volume on local and collector streets.

DISADVANTAGES:

The right-turn diverter is ineffective if implemented in places where traffic can use driveways to bypass the diverter. The right-turn diverter may also redirect traffic to low volume streets causing additional impact to residents. Before being implemented, traffic circulation patterns must be reviewed to ensure that restricting through traffic and permitting only right turns will not be detrimental to efficient circulation. This traffic calming tool must be supplemented by regulatory turn restrictions.



Oblique View



Plan View

Can be used on local street	Yes
Can be used on collector street	Yes
Can be used on arterial street	No
Reduces traffic	Yes
Reduces operating speed	Maybe
Reduces noise	Yes
Improves safety	Unclear
Restricts traffic access	Minor
Restricts and/or slows emergency response time	Minor
Requires maintenance due to vandalism	Low
Level of violations	Low
Adversely impacts bicyclists	No
Adversely impacts transit	Maybe

Fast Facts

4

4.0

TRAFFIC FOOTBALLS

PURPOSE:

Traffic footballs are raised curvilinear medians in the roadway that require drivers to steer around the curves. When several are used consecutively, traffic footballs serve to slow traffic on local or collector streets by guiding traffic.

DESIGN CONSIDERATIONS:

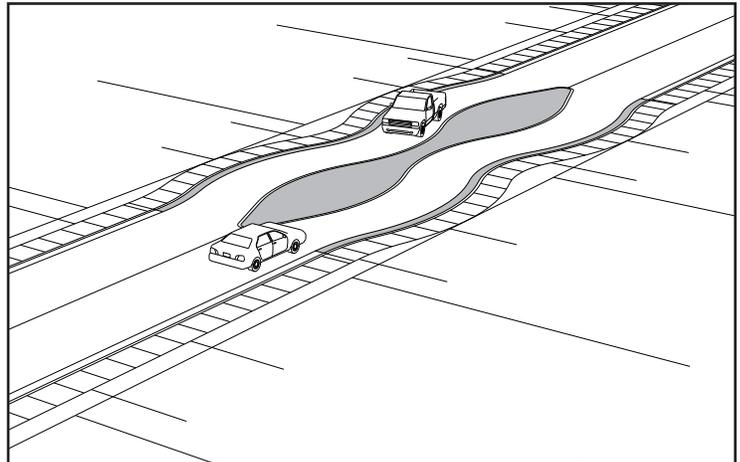
The construction of traffic footballs may be funded by the City of Tempe based on the budgetary authority of the Public Works Manager. Landscaping or other improvements beyond basic construction may increase the cost of the project and may require additional stakeholder participation in funding.

ADVANTAGES:

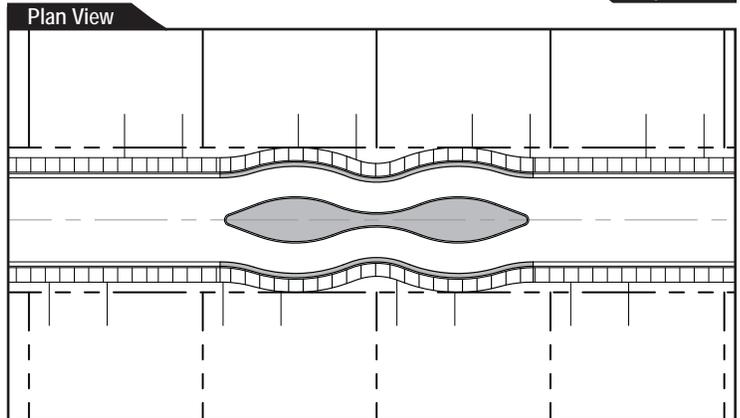
When implemented correctly, traffic footballs are effective means of slowing traffic.

DISADVANTAGES:

Creating a curvature in the roadway may have an adverse impact on bicycle lanes, on-street parking and emergency vehicle access.



Oblique View



Plan View

Can be used on local street	Yes
Can be used on collector street	Yes
Can be used on arterial street	No
Reduces traffic	No
Reduces operating speed	Yes
Reduces noise	Maybe
Improves safety	No
Restricts traffic access	No
Restricts and/or slows emergency response time	Maybe
Requires maintenance due to vandalism	Low
Level of violations	Low
Adversely impacts bicyclists	Maybe
Adversely impacts transit	Maybe

Fast Facts

4

4.0

INTERSECTION CUL-DE-SAC

PURPOSE:

The intersection cul-de-sac prevents cut-through traffic by blockading a road prior to an intersection.

DESIGN CONSIDERATIONS:

The construction of an intersection cul-de-sac may be funded by the City of Tempe based on the budgetary authority of the Public Works Manager. Landscaping or other improvements beyond basic construction may increase the cost of the project and may require additional stakeholder participation in funding.

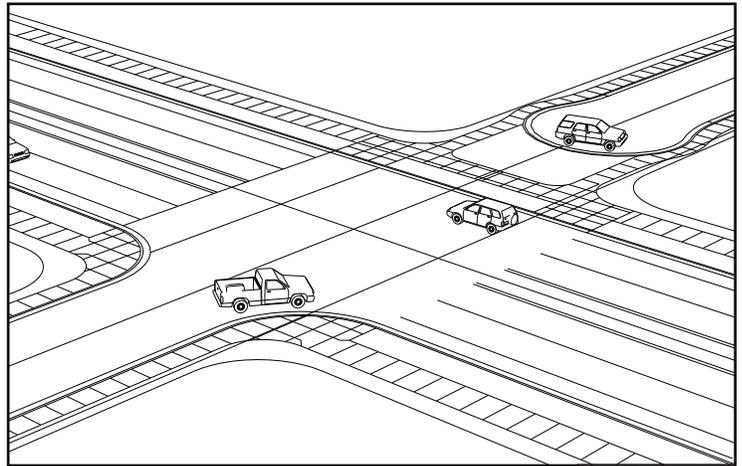
The implementation of an intersection cul-de-sac would also require approval from the fire and sanitation departments as it impacts access.

ADVANTAGES:

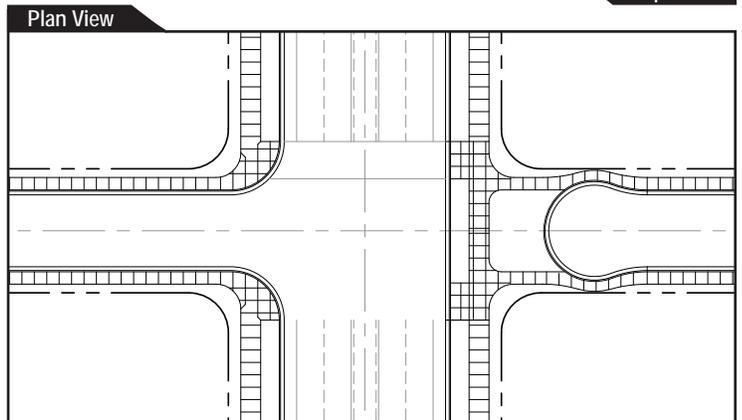
An intersection cul-de-sac will effectively block cut-through traffic and slow traffic speeds.

DISADVANTAGES:

Speed reduction occurs only on the street that is closed. Cul-de-sacs have a high cost of implementation and may impact utilities and access. Intersection cul-de-sacs can only be implemented on local streets. Transit, emergency service, and sanitation routes may also be impacted by prohibiting through traffic.



Oblique View



Plan View

Can be used on local street	Yes
Can be used on collector street	Yes
Can be used on arterial street	No
Reduces traffic	Yes
Reduces operating speed	Maybe
Reduces noise	Yes
Improves safety	Unclear
Restricts traffic access	Minor
Restricts and/or slows emergency response time	Minor
Requires maintenance due to vandalism	Low
Level of violations	Low
Adversely impacts bicyclists	No
Adversely impacts transit	Maybe

Fast Facts

4

4.0

TRAFFIC CIRCLE

PURPOSE:

Traffic circles are raised islands, placed in intersections, around which traffic circulates. Traffic circles are implemented to slow traffic and discourage cut-through traffic.

DESIGN CONSIDERATIONS:

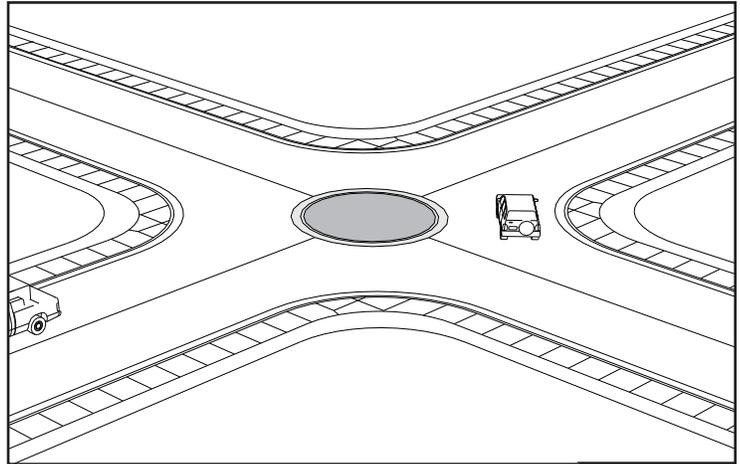
The construction of a traffic circle may be funded by the City of Tempe based on the budgetary authority of the Public Works Manager. Landscaping or other improvements beyond basic construction may increase the cost of the project and may require additional stakeholder participation in funding.

ADVANTAGES:

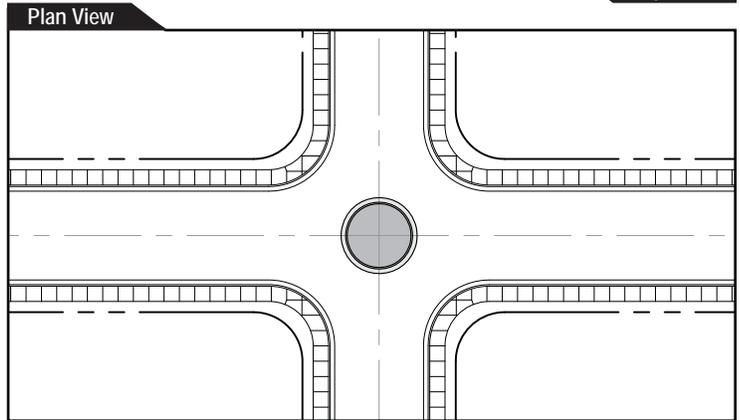
Traffic circles are effective at reducing speed and can be used on both local and collector streets. Traffic circles also can improve safety by moderating speeds and can have a positive aesthetic value.

DISADVANTAGES:

Traffic circles can be difficult for large vehicles or emergency vehicles to navigate. Traffic circles must be designed in such a manner as to not encroach on crosswalks.



Oblique View



Plan View

Can be used on local street	Yes
Can be used on collector street	Yes
Can be used on arterial street	No
Reduces traffic	Possibly
Reduces operating speed	Likely
Reduces noise	No
Improves safety	Unclear
Restricts traffic access	No
Restricts and/or slows emergency response time	Minor
Requires maintenance due to vandalism	Yes
Level of violations	Low
Adversely impacts bicyclists	Now
Adversely impacts transit	Yes

Fast Facts

4

4.0

MEDIAN BARRIER

PURPOSE:

Median barriers are islands located along the centerline of a street and continue through an intersection to block traffic at a cross street.

DESIGN CONSIDERATIONS:

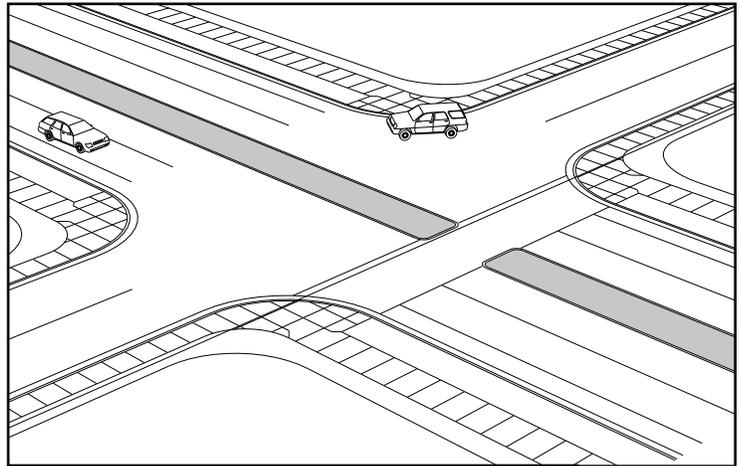
The construction of a median barrier may be funded by the City of Tempe based on the budgetary authority of the Public Works Manager. Landscaping or other improvements beyond basic construction may increase the cost of the project and may require additional stakeholder participation in funding.

ADVANTAGES:

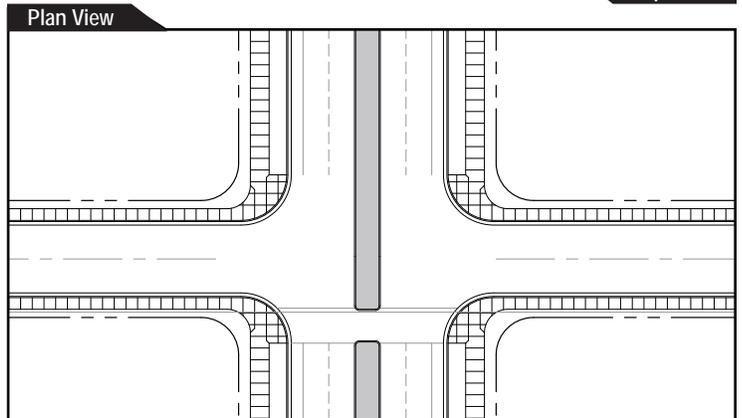
Median barriers can improve safety at dangerous or high volume intersections and can reduce traffic volumes on major streets.

DISADVANTAGES:

Median barriers require wider streets and also limit turning to and from side streets for local residents and emergency vehicles.



Oblique View



Plan View

Can be used on local street	Yes
Can be used on collector street	Yes
Can be used on arterial street	No
Reduces traffic	Yes
Reduces operating speed	No
Reduces noise	Yes
Improves safety	Yes
Restricts traffic access	Minor
Restricts and/or slows emergency response time	Minor
Requires maintenance due to vandalism	Low
Level of violations	Low
Adversely impacts bicyclists	No
Adversely impacts transit	Maybe

Fast Facts

4

4.0 ROUNDABOUTS

PURPOSE:

Roundabouts require traffic to circulate counterclockwise around a center island. Roundabouts typically slow traffic to 15 mph but usually do not provide a reduction in traffic volume.

DESIGN CONSIDERATIONS:

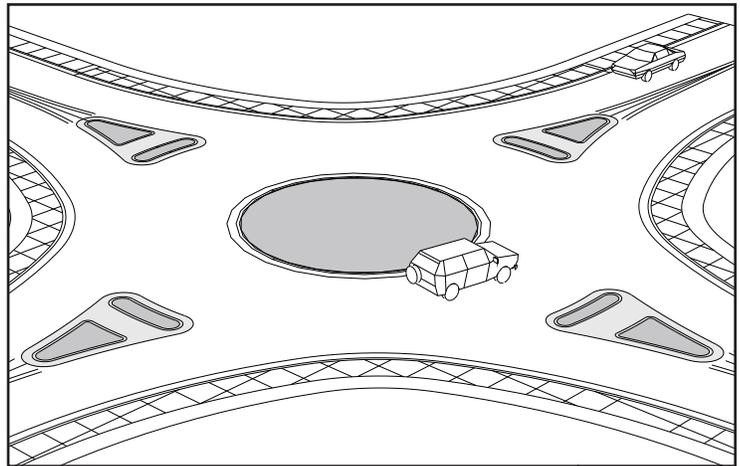
The construction of a roundabout may be funded by the City of Tempe based on the budgetary authority of the Public Works Manager. Landscaping or other improvements beyond basic construction may increase the cost of the project and may require additional stakeholder participation in funding.

ADVANTAGES:

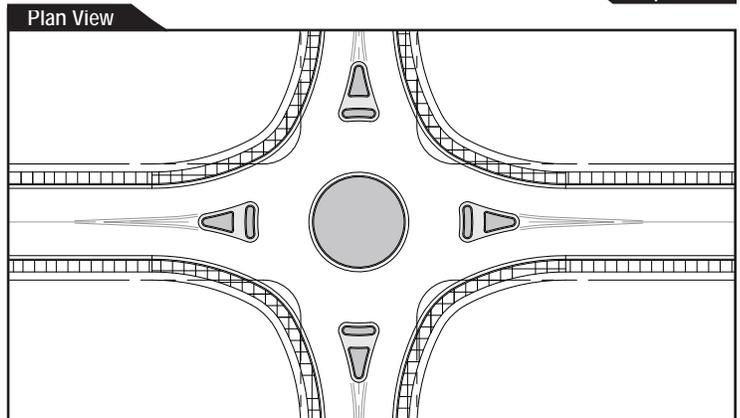
Roundabouts can be effective in moderating traffic speeds on arterial streets. Roundabouts can be aesthetically pleasing when well landscaped. Roundabouts can be safer and less expensive than traffic signals.

DISADVANTAGES:

The construction of roundabouts may require additional right-of-way, and may impact adjacent properties and utilities. Roundabouts may not be able to accommodate large vehicles.



Oblique View



Plan View

Can be used on local street	Yes
Can be used on collector street	Yes
Can be used on arterial street	Maybe
Reduces traffic	Maybe
Reduces operating speed	Likely
Reduces noise	Maybe
Improves safety	Unclear
Restricts traffic access	No
Restricts and/or slows emergency response time	Yes
Requires maintenance due to vandalism	Yes
Level of violations	Low
Adversely impacts bicyclists	No
Adversely impacts transit	No

Fast Facts

4

4.0 SPEED HUMP

PURPOSE:

Speed humps are rounded raised areas of pavement that are parabolic in shape and are placed across roadways primarily to reduce the speed of traffic on local and collector streets.

DESIGN CONSIDERATIONS:

The construction of speed humps may be funded by the City of Tempe based on the budgetary authority of the Public Works Manager. Landscaping or other improvements beyond basic construction may increase the cost of the project and may require additional stakeholder participation in funding.

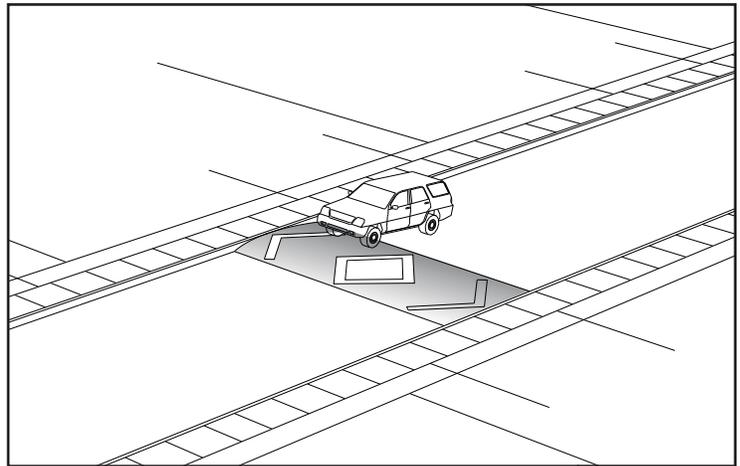
Speed humps are often installed in a series and are spaced between 300 and 600-feet apart.

ADVANTAGES:

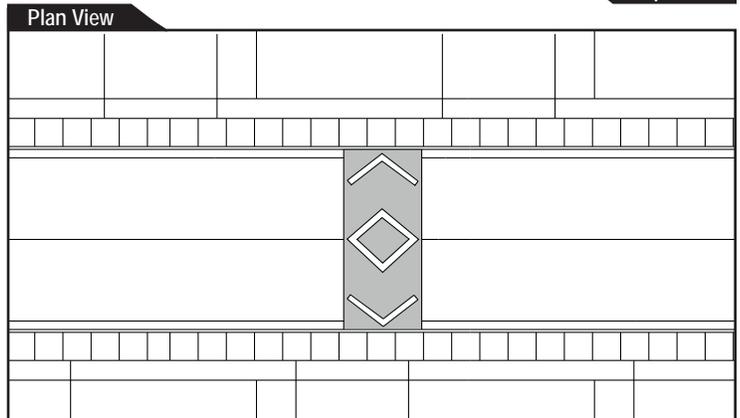
Speed humps slow traffic more gradually than speed bumps and can be effective in slowing traffic and reducing traffic volume.

DISADVANTAGES:

Drivers can slow before the speed hump and accelerate between speed humps producing more acceleration noise. Speed humps can impact emergency routes or transit routes. Speed humps typically slow emergency vehicle response time by approximately 8 to 10 seconds per speed hump. Drivers wanting to avoid streets with speed humps often divert to streets less capable of dealing with higher volumes of cars.



Oblique View



Plan View

Can be used on local street	Yes
Can be used on collector street	Yes
Can be used on arterial street	No
Reduces traffic	No
Reduces operating speed	Minor
Reduces noise	No
Improves safety	No
Restricts traffic access	No
Restricts and/or slows emergency response time	Yes
Requires maintenance due to vandalism	No
Level of violations	No
Adversely impacts bicyclists	Minor
Adversely impacts transit	Possible

Fast Facts

4

4.0 SPEED TABLE

PURPOSE:

Speed tables are raised and “flat-topped” and are generally wide enough to accommodate the wheelbase of a car. The purpose of the speed table is to reduce the speed of traffic on local or collector streets. Speed tables may be installed mid-block or at an intersection to facilitate pedestrian crossing.

DESIGN CONSIDERATIONS:

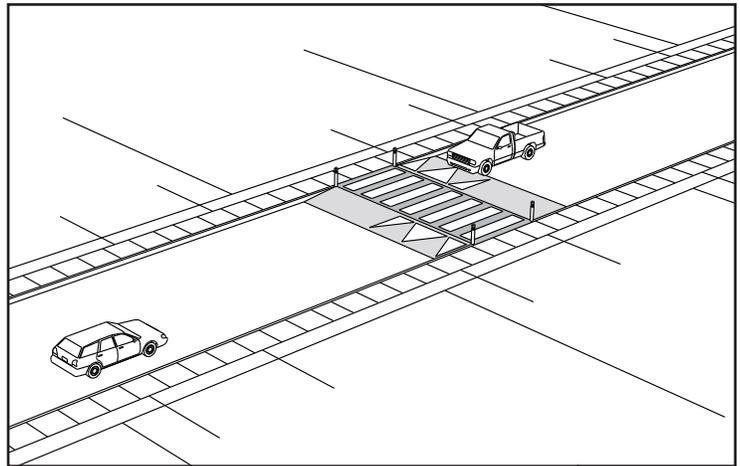
The construction of speed tables may be funded by the City of Tempe based on the budgetary authority of the Public Works Manager. Landscaping or other improvements beyond basic construction may increase the cost of the project and may require additional stakeholder participation in funding.

ADVANTAGES:

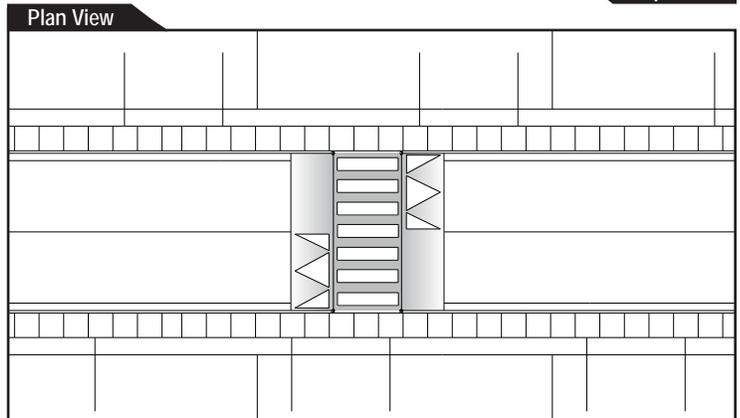
Speed tables function similar to speed humps, however speed tables tend to have less impact on cars and emergency vehicles and can be marked as a raised crosswalk and can provide a pedestrian crossing.

DISADVANTAGES:

Speed tables tend to cost more to construct than speed humps and may be less effective at reducing traffic speed. Speed tables can impact emergency or transit routes. Speed tables also typically slow emergency vehicle response time. The construction of speed tables may also produce drainage problems.



Oblique View



Plan View

Can be used on local street	Yes
Can be used on collector street	Yes
Can be used on arterial street	No
Reduces traffic	No
Reduces operating speed	Minor
Reduces noise	No
Improves safety	No
Restricts traffic access	No
Restricts and/or slows emergency response time	Minor
Requires maintenance due to vandalism	No
Level of violations	No
Adversely impacts bicyclists	Minor
Adversely impacts transit	Possibly

Fast Facts

4

4.0

DEPARTURE CHOKER

PURPOSE:

A departure choker is a curb extension that narrows a local or collector street to allow travel in only one direction. The departure choker serves to reduce the speed of traffic and eliminate flow in one direction.

DESIGN CONSIDERATIONS:

The construction of a departure choker may be funded by the City of Tempe based on the budgetary authority of the Public Works Manager. Landscaping or other improvements beyond basic construction may increase the cost of the project and may require additional stakeholder participation in funding.

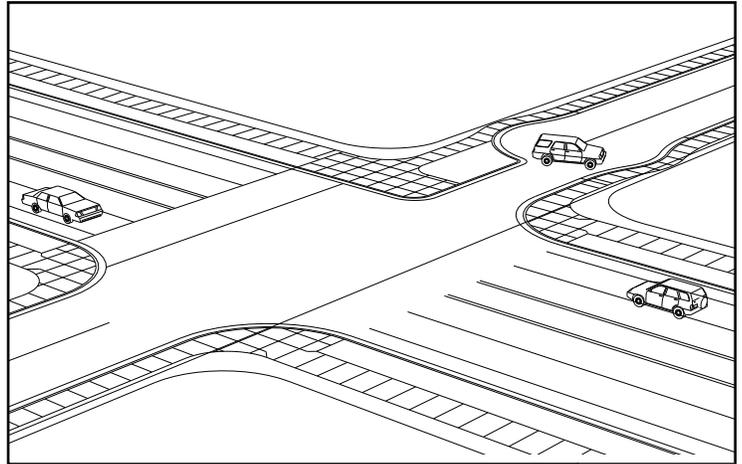
The implementation of a departure choker would require approval from the fire and sanitation departments as it may impact access.

ADVANTAGES:

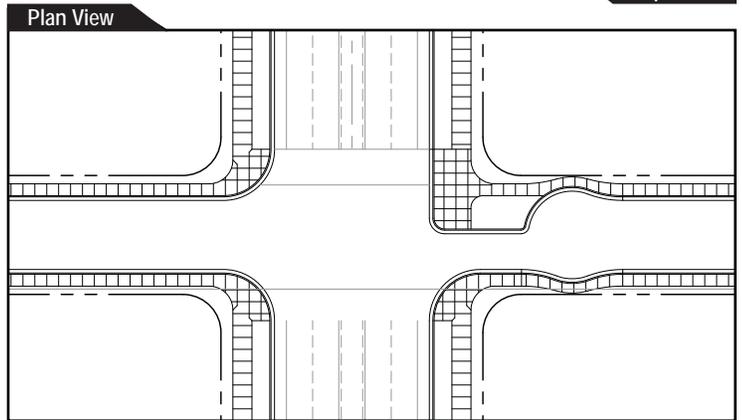
Departure chokers can reduce both traffic speed and volume and if designed well, can have positive aesthetic value. The departure choker is also negotiable for emergency vehicles.

DISADVANTAGES:

Departure chokers lose effectiveness in the absence of other traffic. Bicycle lanes may be removed and bicyclists would have to merge with vehicular traffic. Departure chokers may require the elimination of some on-street parking.



Oblique View



Plan View

Can be used on local street	Yes
Can be used on collector street	Yes
Can be used on arterial street	No
Reduces traffic	Yes
Reduces operating speed	Minor
Reduces noise	Yes
Improves safety	Yes
Restricts traffic access	Yes
Restricts and/or slows emergency response time	No
Requires maintenance due to vandalism	No
Level of violations	Moderate
Adversely impacts bicyclists	Minor
Adversely impacts transit	Possibly

Fast Facts

4

4.0

ENTRY CHOKER

PURPOSE:

An entry choker is similar to a departure choker except it restricts traffic from entering a street.

DESIGN CONSIDERATIONS:

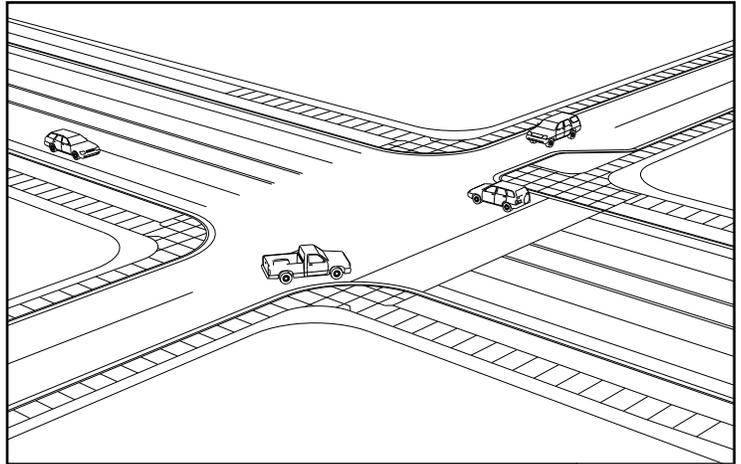
The construction of an entry choker may be funded by the City of Tempe based on the budgetary authority of the Public Works Manager. Landscaping or other improvements beyond basic construction may increase the cost of the project and may require additional stakeholder participation in funding.

ADVANTAGES:

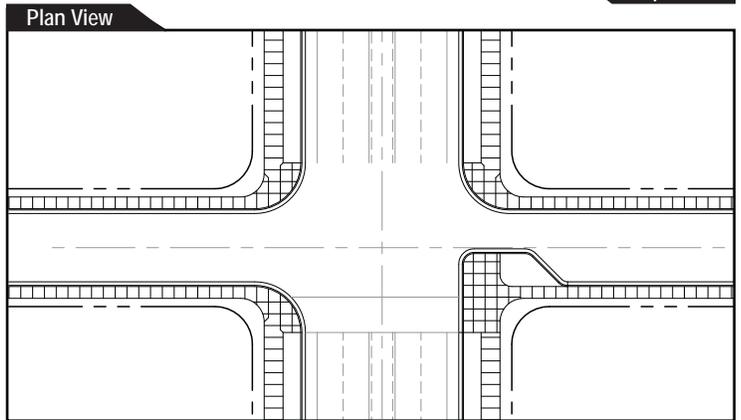
Entry chokers are easily negotiable by large vehicles and can reduce both traffic speed and volume. If designed well, entry chokers can have positive aesthetic value.

DISADVANTAGES:

Entry chokers also loose effectiveness in the absence of other traffic. Bicycle lanes may be removed and bicyclists would have to merge with vehicular traffic. Entry chokers may require the elimination of some on-street parking.



Oblique View



Plan View

Can be used on local street	Yes
Can be used on collector street	Yes
Can be used on arterial street	No
Reduces traffic	Yes
Reduces operating speed	Minor
Reduces noise	Yes
Improves safety	Yes
Restricts traffic access	Yes
Restricts and/or slows emergency response time	Yes
Requires maintenance due to vandalism	No
Level of violations	Moderate
Adversely impacts bicyclists	Minor
Adversely impacts transit	Possibly

Fast Facts

4

4.0 DIVERTER

PURPOSE:

A diverter is a traffic calming tool constructed diagonally across an intersection to redirect traffic and maintain one movement.

DESIGN CONSIDERATIONS:

The construction of a diverter may be funded by the City of Tempe based on the budgetary authority of the Public Works Manager. Landscaping or other improvements beyond basic construction may increase the cost of the project and may require additional stakeholder participation in funding.

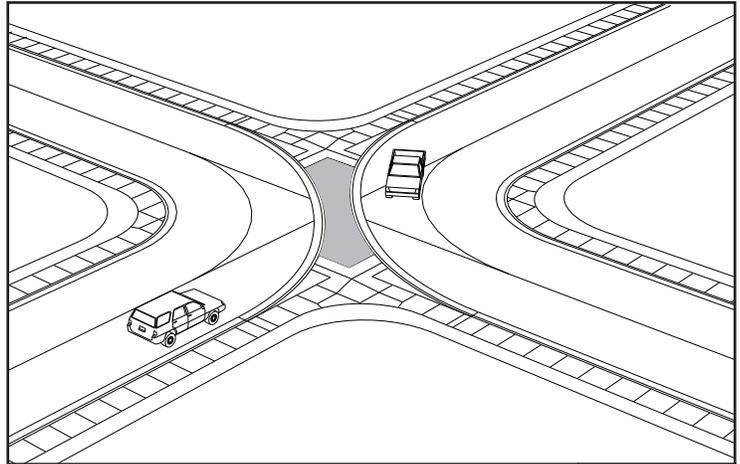
The implementation of a diverter would require approval from the fire and sanitation departments as it may impact access.

ADVANTAGES:

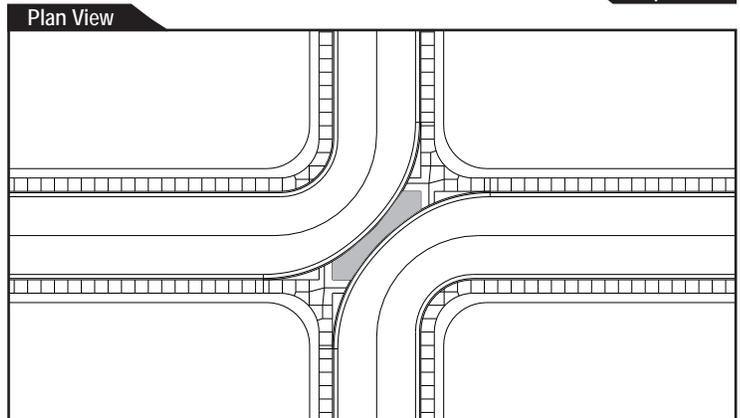
Diverters can improve safety by restricting turning movements and can reduce traffic volume on a cut-through route on a major street.

DISADVANTAGES:

Diverters typically limit turning and access. Implementation of a diverter may require a wider street to accommodate traffic.



Oblique View



Plan View

Can be used on local street	Yes
Can be used on collector street	Maybe
Can be used on arterial street	No
Reduces traffic	Yes
Reduces operating speed	Likely
Reduces noise	Yes
Improves safety	Yes
Restricts traffic access	Yes
Restricts and/or slows emergency response time	Yes
Requires maintenance due to vandalism	Yes
Level of violations	Low
Adversely impacts bicyclists	Some
Adversely impacts transit	Yes

Fast Facts

4

4.0

SEMI-DIVERTER (TYPE A)

PURPOSE:

A semi-diverter is similar to a diverter but does not completely bisect the intersection diagonally.

DESIGN CONSIDERATIONS:

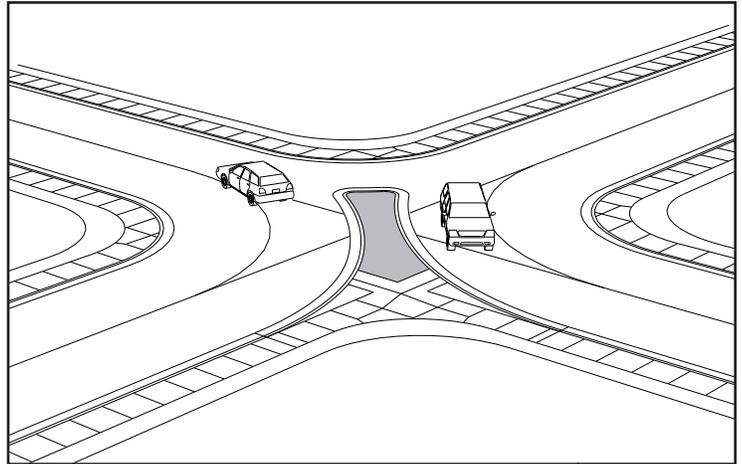
The construction of a semi-diverter (type a) may be funded by the City of Tempe based on the budgetary authority of the Public Works Manager. Landscaping or other improvements beyond basic construction may increase the cost of the project and may require additional stakeholder participation in funding.

ADVANTAGES:

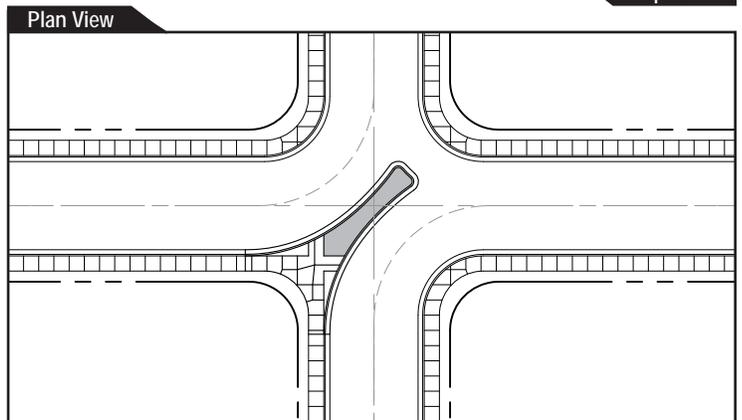
Semi-diverters can improve safety by restricting turning movements and can reduce traffic volume on a cut-through route on a major street.

DISADVANTAGES:

Semi-diverters typically limit turning and access. Implementation of a diverter may require a wider street to accommodate traffic.



Oblique View



Plan View

Can be used on local street	Yes
Can be used on collector street	Maybe
Can be used on arterial street	No
Reduces traffic	Yes
Reduces operating speed	Likely
Reduces noise	Yes
Improves safety	Yes
Restricts traffic access	Yes
Restricts and/or slows emergency response time	Yes
Requires maintenance due to vandalism	Yes
Level of violations	Low
Adversely impacts bicyclists	Some
Adversely impacts transit	Yes

Fast Facts

4

4.0

SEMI-DIVERTER (TYPE B)

PURPOSE:

A semi-diverter is similar to a diverter but does not completely bisect the intersection diagonally.

DESIGN CONSIDERATIONS:

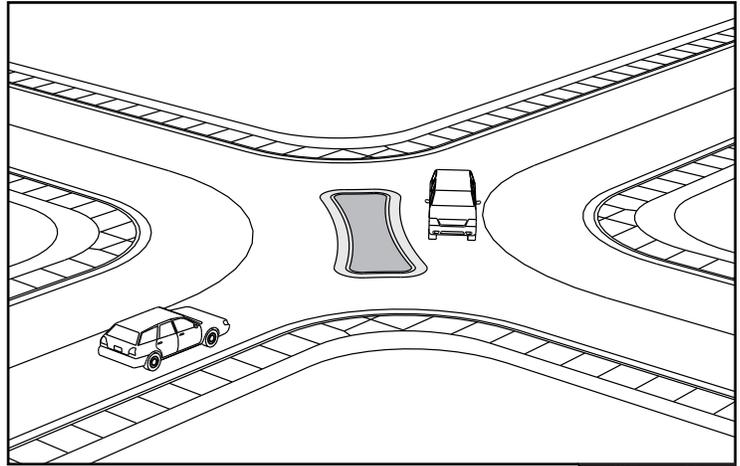
The construction of a semi-diverter (type b) may be funded by the City of Tempe based on the budgetary authority of the Public Works Manager. Landscaping or other improvements beyond basic construction may increase the cost of the project and may require additional stakeholder participation in funding.

ADVANTAGES:

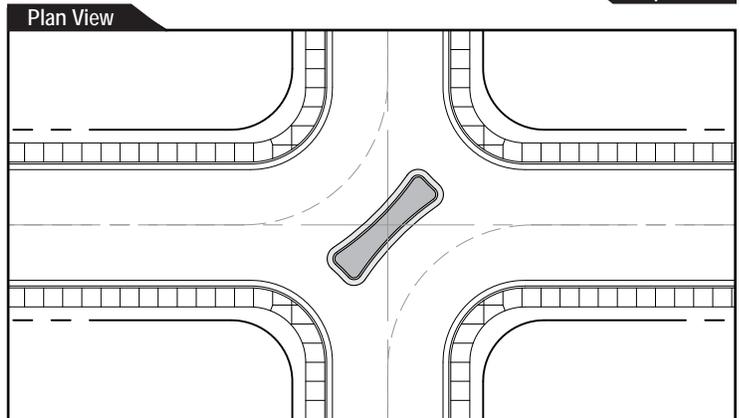
Semi-diverters can improve safety by restricting turning movements and can reduce traffic volume on a cut-through route on a major street.

DISADVANTAGES:

Semi-diverters typically limit turning and access. Implementation of a diverter may require a wider street to accommodate traffic.



Oblique View



Can be used on local street	Yes
Can be used on collector street	Maybe
Can be used on arterial street	No
Reduces traffic	Yes
Reduces operating speed	Likely
Reduces noise	Yes
Improves safety	Yes
Restricts traffic access	Yes
Restricts and/or slows emergency response time	Yes
Requires maintenance due to vandalism	Yes
Level of violations	Low
Adversely impacts bicyclists	No
Adversely impacts transit	Yes

Fast Facts

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TABLE 2

COST AND CONSTRUCTION OF STEP TOOLS

Traffic Device/ Type	Cost	Construction Details
Median	\$7,500	<p>Construction would utilize doweled in place concrete medians. The median should be 6 inches in height with a face of curb batter of 10 degrees. Rebar should be cut to length and anchored in the existing asphalt. Medians should not be less than 4 feet wide nor less than 25 feet long.</p> <p>The use of MAG Standard Detail 220 Type A Curb and Gutter or MAG Standard Detail Type A Single Curb is required.</p> <p>Depending on the type and location of the median, utilities may be impacted and require some level of relocation.</p>
One-Way Choker	\$5,000	<p>Construction would utilize doweled in place concrete chokers. The chokers should be 6 inches in height with a face of curb batter of 10 degrees. Rebar should be cut to length and anchored in the existing asphalt.</p> <p>The use of MAG Standard Detail 220 Type A Curb and Gutter or MAG Standard Detail Type A Single Curb is required.</p> <p>Problems related to drainage and irrigation may also result from the implementation of a one-way choker.</p>
Two-Way Choker	\$3,500	<p>Construction would utilize doweled in place concrete barriers. The two-way choker should be 6 inches in height with a face of curb batter of 10 degrees. Rebar should be cut to length and anchored in the existing asphalt.</p> <p>The use of MAG Standard Detail 220 Type A Curb and Gutter or MAG Standard Detail Type A Single Curb is required.</p>
Bulb-Out	\$4,000 (per bulb-out Pair)	<p>Typically, two bulb-outs are constructed at the intersection of an arterial street, while four bulb-outs are constructed at the intersection of local or collector streets. Construction would utilize doweled in place concrete barriers. The bulb-out should be 6 inches in height with a face of curb batter of 10 degrees. Rebar should be cut to length and anchored in the existing asphalt.</p> <p>The use of MAG Standard Detail 220 Type A Curb and Gutter or MAG Standard Detail Type A Single Curb is required.</p> <p>Problems related to drainage and irrigation may result from the implementation of bulb-outs.</p>
Chicane	\$5,000	<p>Construction would utilize doweled in place concrete barriers. The chicane should be 6 inches in height with a face of curb batter of 10 degrees. Rebar should be cut to length and anchored in the existing asphalt.</p> <p>The desired effect of a chicane may be achieved by alternating on-street parking.</p> <p>The use of MAG Standard Detail 220 Type A Curb and Gutter or MAG Standard Detail Type A Single Curb is required.</p>
Star Diverter	\$6,000	<p>Construction would utilize doweled in place concrete barriers. The star diverter should be 6 inches in height with a face of curb batter of 10 degrees. Rebar should be cut to length and anchored in the existing asphalt.</p> <p>The use of MAG Standard Detail 220 Type A Curb and Gutter or MAG Standard Detail Type A Single Curb is required.</p>
Right-Turn diverter	\$2,500	<p>Construction would utilize doweled in place concrete barriers. The right-turn diverter should be 6 inches in height with a face of curb batter of 10 degrees. Rebar should be cut to length and anchored in the existing asphalt.</p> <p>The use of MAG Standard Detail 220 Type A Curb and Gutter or MAG Standard Detail Type A Single Curb is required.</p>
Traffic Footballs	\$17,500	<p>Construction would utilize doweled in place concrete barriers. The traffic footballs should be 6 inches in height with a face of curb batter of 10 degrees. Rebar should be cut to length and anchored in the existing asphalt.</p> <p>The construction of traffic footballs may require the relocation of curb, gutter, and sidewalk.</p> <p>The use of MAG Standard Detail 220 Type A Curb and Gutter or MAG Standard Detail Type A Single Curb is required.</p>
Intersection Cul-de-sac	\$11,500	<p>Construction would utilize doweled in place concrete barriers. The intersection cul-de-sac should be 6 inches in height with a face of curb batter of 10 degrees. Rebar should be cut to length and anchored in the existing asphalt.</p> <p>An intersection cul-de-sac may require the replacement or removal of curb, gutter, and sidewalk. The construction of cul-de-sacs may also impact utilities and access.</p> <p>The cul-de-sac may have limited applicability if it prevents accessibility by fire and sanitation vehicles. This tool would require additional approval from effected City departments.</p> <p>The use of MAG Standard Detail 220 Type A Curb and Gutter or MAG Standard Detail Type A Single Curb is required.</p>

Note: Costs were derived in 2006. The cost of landscaping, additional betterments, and maintenance are not included in the cost estimates provided.



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TABLE 2

COST AND CONSTRUCTION STEP TOOLS

Traffic Device/ Type	Cost	Construction Details
Traffic Circle	\$3,500	Construction would utilize doweled in place concrete barriers. The traffic circle should be 6 inches in height with a face of curb batter of 10 degrees. Rebar should be cut to length and anchored in the existing asphalt. The use of MAG Standard Detail 220 Type A Curb and Gutter or MAG Standard Detail Type A Single Curb is required.
Median Barrier	\$21,500	Construction would utilize doweled in place concrete barriers. The median barrier should be 6 inches in height with a face of curb batter of 10 degrees. Rebar should be cut to length and anchored in the existing asphalt. The use of MAG Standard Detail 220 Type A Curb and Gutter or MAG Standard Detail Type A Single Curb is required.
Roundabouts	\$38,500	Construction would utilize doweled in place concrete barriers. Roundabouts should be 6 inches in height with a face of curb batter of 10 degrees. Rebar should be cut to length and anchored in the existing asphalt. The construction of a roundabout may require additional right-of-way and may impact adjacent properties. The construction of a roundabout may also require the replacement or relocation of utilities. The use of MAG Standard Detail 220 Type A Curb and Gutter or MAG Standard Detail Type A Single Curb is required.
Speed Hump	\$2,000	Speed humps are typically 12 to 14 feet in length and parabolic in shape. Crossing speeds determine the height of the speed hump which may range from 3 to 4-inches at the crest of the hump. Speed humps will be considered on local or collector streets where the posted speed does not exceed 30 mph and traffic volumes exceed 400 vehicles per day. Speed humps may be considered when speeds on these streets exceed the posted speed by 6 mph or more and by at least 85% of those vehicles using the street. Speed humps may impact transit, emergency services, and sanitation routes and may also require mitigation for drainage.
Speed Table	\$2,000	Speed tables are generally 22-feet in the direction of travel and include 6-foot ramps on each side and at least a 10-foot flat top. Speed tables require an approximate 5% grade to accommodate a 3 to 4-inch height. Speed tables may be installed on a local or collector street at the mid-block or at the intersection to facilitate pedestrian crossing. Speed tables may impact transit, emergency services, and sanitation routes and may also require mitigation for drainage.
Departure Choker	\$12,000	Construction would utilize doweled in place concrete barriers. The departure choker should be 6 inches in height with a face of curb batter of 10 degrees. Rebar should be cut to length and anchored in the existing asphalt. The departure choker may have limited applicability if it prevents accessibility by fire and sanitation vehicles. This tool would require additional approval from effected City departments. The use of MAG Standard Detail 220 Type A Curb and Gutter or MAG Standard Detail Type A Single Curb is required.
Entry Choker	\$7,500	Construction would utilize doweled in place concrete barriers. The entry choker should be 6 inches in height with a face of curb batter of 10 degrees. Rebar should be cut to length and anchored in the existing asphalt. The use of MAG Standard Detail 220 Type A Curb and Gutter or MAG Standard Detail Type A Single Curb is required.
Diverter	\$10,000	Construction would utilize doweled in place concrete barriers. The diverter should be 6 inches in height with a face of curb batter of 10 degrees. Rebar should be cut to length and anchored in the existing asphalt. The diverter may have limited applicability if it prevents accessibility by fire and sanitation vehicles. This tool would require additional approval from effected City departments. The use of MAG Standard Detail 220 Type A Curb and Gutter or MAG Standard Detail Type A Single Curb is required.
Semi-Diverter (Type A)	\$6,000	Construction would utilize doweled in place concrete barriers. The semi-diverter (type a) should be 6 inches in height with a face of curb batter of 10 degrees. Rebar should be cut to length and anchored in the existing asphalt. The use of MAG Standard Detail 220 Type A Curb and Gutter or MAG Standard Detail Type A Single Curb is required.
Semi-Diverter (Type B)	\$2,500	Construction would utilize doweled in place concrete barriers. The semi-diverter (type b) should be 6 inches in height with a face of curb batter of 10 degrees. Rebar should be cut to length and anchored in the existing asphalt. The use of MAG Standard Detail 220 Type A Curb and Gutter or MAG Standard Detail Type A Single Curb is required

Note: Costs were derived in 2006. The cost of landscaping, additional betterments, and maintenance are not included in the cost estimates provided.



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APPLICATION FORMS

STAKEHOLDER ACTION REQUEST FORM

Contact Name:	Date:
Name:	E-mail:
Day Phone:	
Address:	
Location of Concern:	
Description of Concern:	

For Official Use Only	
Project #:	
Date Received:	
Date Field Inspected (if needed):	
Field Inspection Results (if needed):	
Date Response to Stakeholder Contact:	
Resolution of Concern:	
Date Completed:	
Traffic Engineer Signature:	
Date:	

5 APPLICATION FORMS

STAKEHOLDER SUPPORT FORM

Instructions: Stakeholders within your neighborhood have identified traffic problems that they would like to see addressed. These concerns are briefly described below. If you support the preparation of a plan to address these problems, you should sign this petition. Only one person per household (per street address) should sign. If you want to be a member of a Neighborhood Action Team that will help prepare the Action Plan, check the box next to your signature. If a plan is developed to solve traffic problems in your neighborhood, you may be asked to help pay for the solutions.

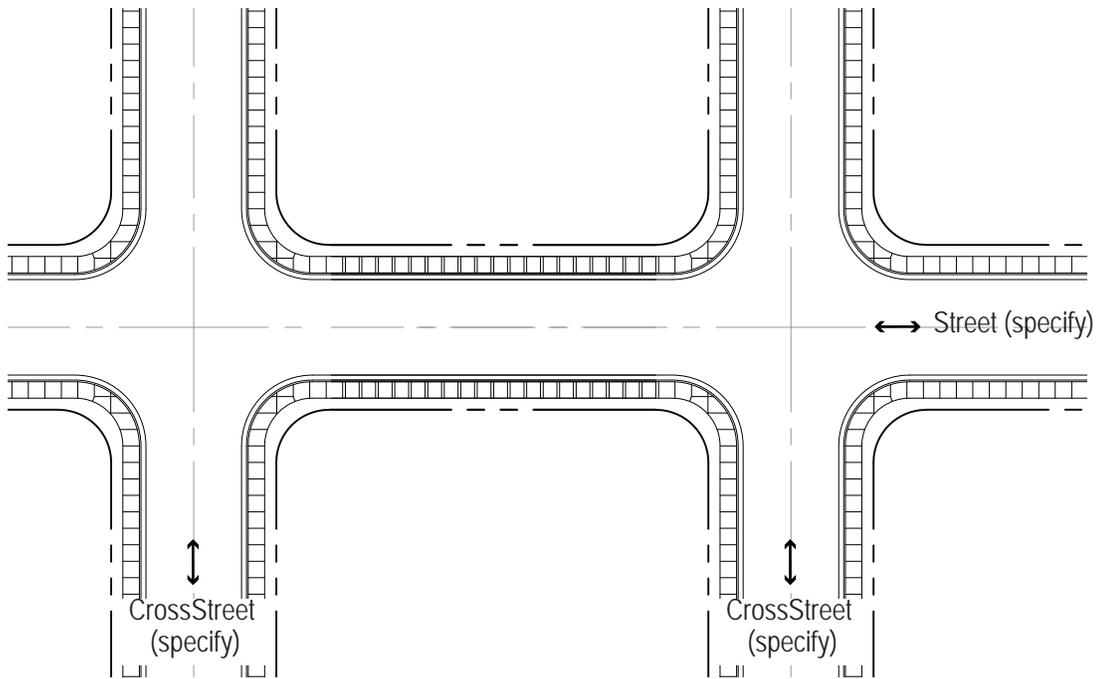
Summary of Concerns: (insert identified traffic-related issue/problem)

#	Print Name	Resident Address	Signature	Yes. I am interested in being on a team to prepare a plan of action (provide phone number)
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				

APPLICATION FORMS

STAKEHOLDER REQUEST FORM

Name:
Address:
Description of Location (attach map as necessary):



Applicant's Statement: *I have reviewed the attached materials and understand my responsibilities for having a traffic calming device installed at the requested location.*

Signature: _____ Date: _____

	Outline of Installation Procedures
	Sample Petition Form
	Map Showing Required Petition Area
	Copy of Adopted NTMP Policy
	Other:

For Official Use:	
Date received:	
Department:	
Action Taken:	