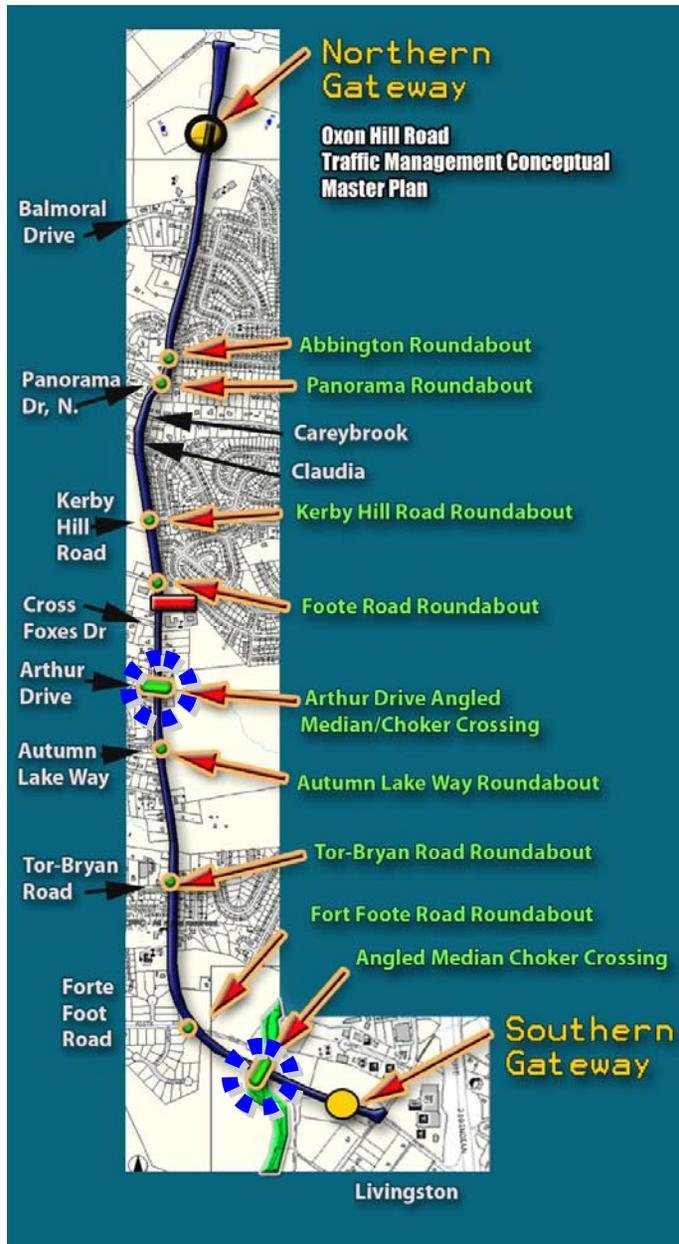


# Chokers and Crossing Islands – Henson Trail Crossing and School Crossings



Two of the most important safety locations are the Fort Foote Elementary School and the Henson Creek Trail. The school has significant misbehavior by parents and others accessing the school with drop-offs and pick-ups. The Henson crossing has significant sight distance, grade and nearby signal issues. My observations are that these are the two most significant potential safety locations of the corridor. Both are candidates for significant median islands and curb extensions. Used in combination these create a strong choker visual and traffic speed control effect. Several generalized designs are offered here.



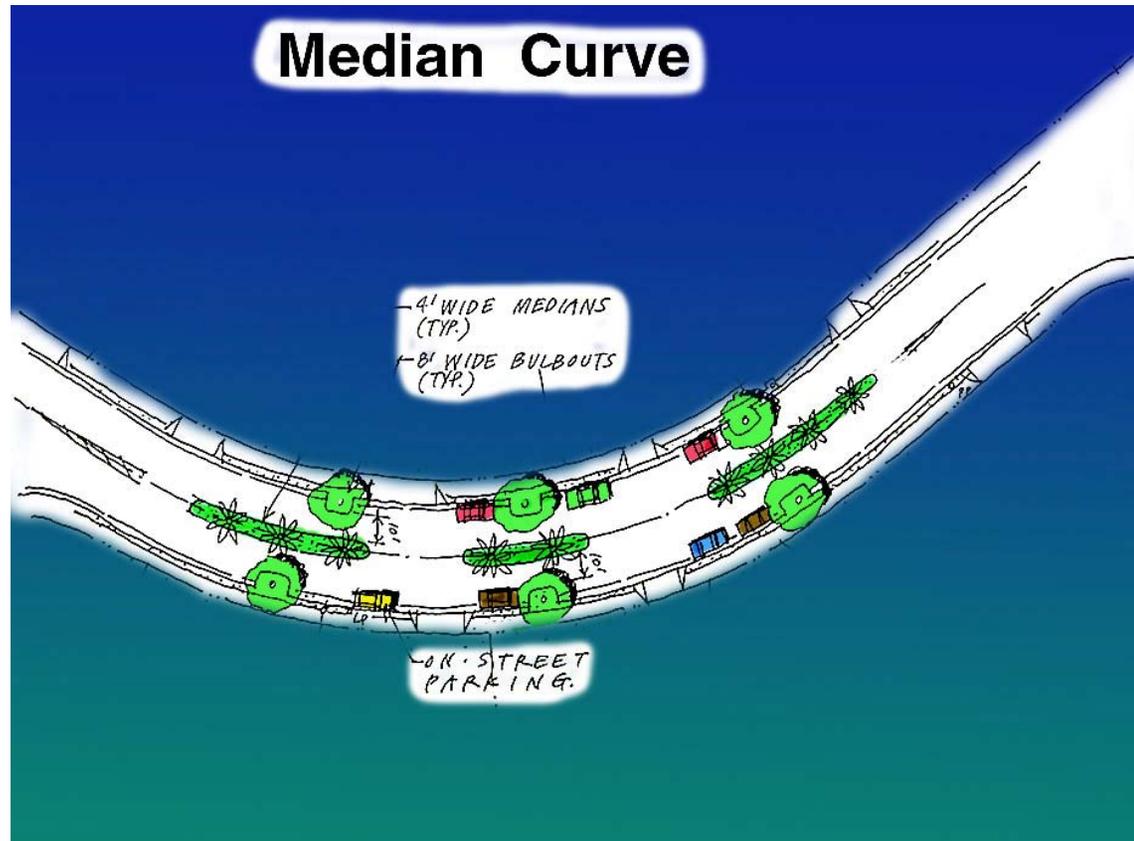
Oxon Hill Road Conceptual Master Plan

# Median Islands with Tree Wells on Curves

## Medians with Tree Wells

In order to eliminate motorists passing prudent drivers and their ability of motorists to “slingshot” their speeds through curves, a series of well positioned medians or medians with tree wells on curves shall be considered.

Traffic management tools and placement has different impacts on driveways, parking, and large vehicles. These impacts can only be worked out by local neighbors and property owners, with County staff support. Area neighbors best know how serious speeding problems are by them, and how much they would welcome a particular treatment on their block.



## Tree Wells

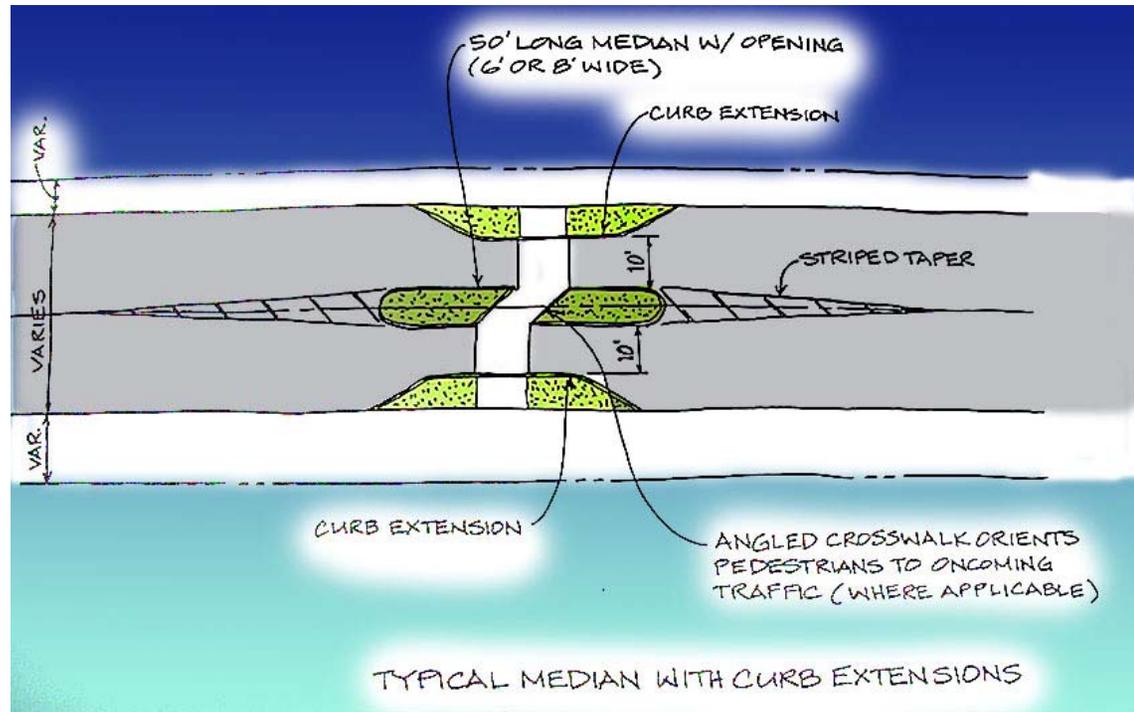
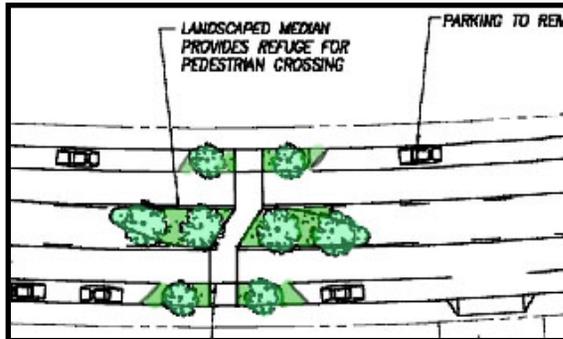


# Chokers and Crossing Islands

## Which Tool Do We Use?

The final selection of each traffic management tool (chokers, crossing island, tree wells, angled slow point) must be made after neighborhood leaders, County staff and residents of each block test a variety of tools. Tests can be conducted with placement of cones.

Drawings provided in this plan illustrate example locations and features. These illustrations provide an idea of how much parking will be impacted by placing appropriate length bulbouts and medians. On some blocks the small loss of parking will not be significant. On a few blocks the loss of a single parking space may be significant.



*Photo : Example choker at a school crossing. This crossing includes two curb extensions and a crossing island. The crossing island should be a minimum of six feet wide in order to allow pedestrians to pause and recheck for traffic at the midway point. Well designed chokers hold average motorist speeds to 15-25 mph. Landscaping is essential for detection of islands, visual effects, and neighborhood acceptance. Chokers also have greater effect over longer distances when landscaping can be seen from a distance.*



# Chokers and Crossing Islands

## Chokers

Chokers are sets of two or more raised islands located either near intersections or at mid block locations. Chokers are generally constructed of durable concrete or stone curbing, then landscaped to create attractive neighborhood features or gateway effects.

### Benefits:

*In general, chokers and crossing islands provide the following benefits:*

- Chokers separate opposing vehicular traffic, increasing motorist safety.
- Chokers can reduce vehicle speeds by creating horizontal deflection or roadway narrowing.
- Chokers can reduce speeds by visually tightening roadways and reducing excess pavement width.
- Chokers can reduce vehicular speeds through curves by preventing vehicles from crossing road centerlines to maintain speed.
- Chokers are often combined with pedestrian crossings, providing crossing islands for pedestrians. They make pedestrian crossings more noticeable to motorists.
- Chokers should include landscaping to increase median visibility to motorists and beautify roadways.
- Chokers can be used with raised speed tables for added speed reduction effects.

### Concerns and Limitations:

*In general, chokers and crossing islands raise the following concerns or have the following limitations:*

- Chokers can eliminate on-street parking.
- Chokers are hard to place when many driveways are present.
- Chokers with attractive landscaping require regular maintenance.
- Chokers lacking landscaping may be difficult to detect. In this case, added markings, appropriate signs, mounding of median centers, or other features emphasize median locations.
- Care should be taken to not over-sign chokers (special signs and sizes are needed to keep neighborhoods attractive).



# Median Islands and Median Curves

## Median Islands

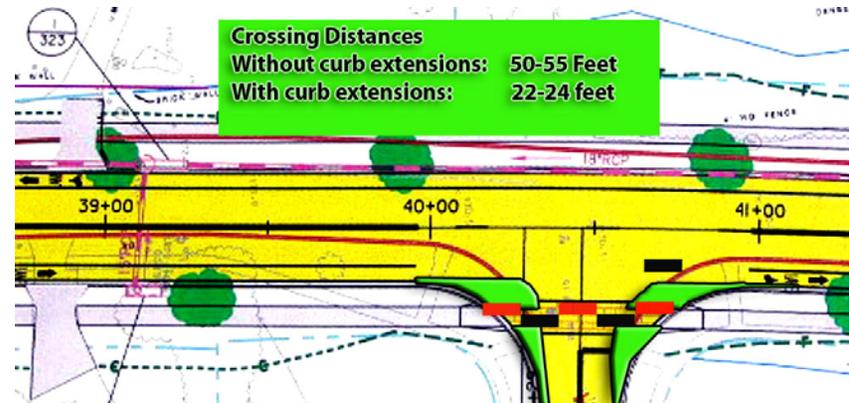
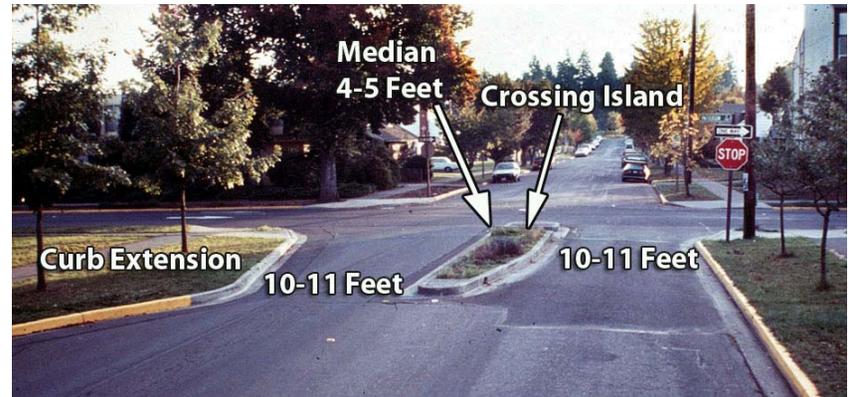
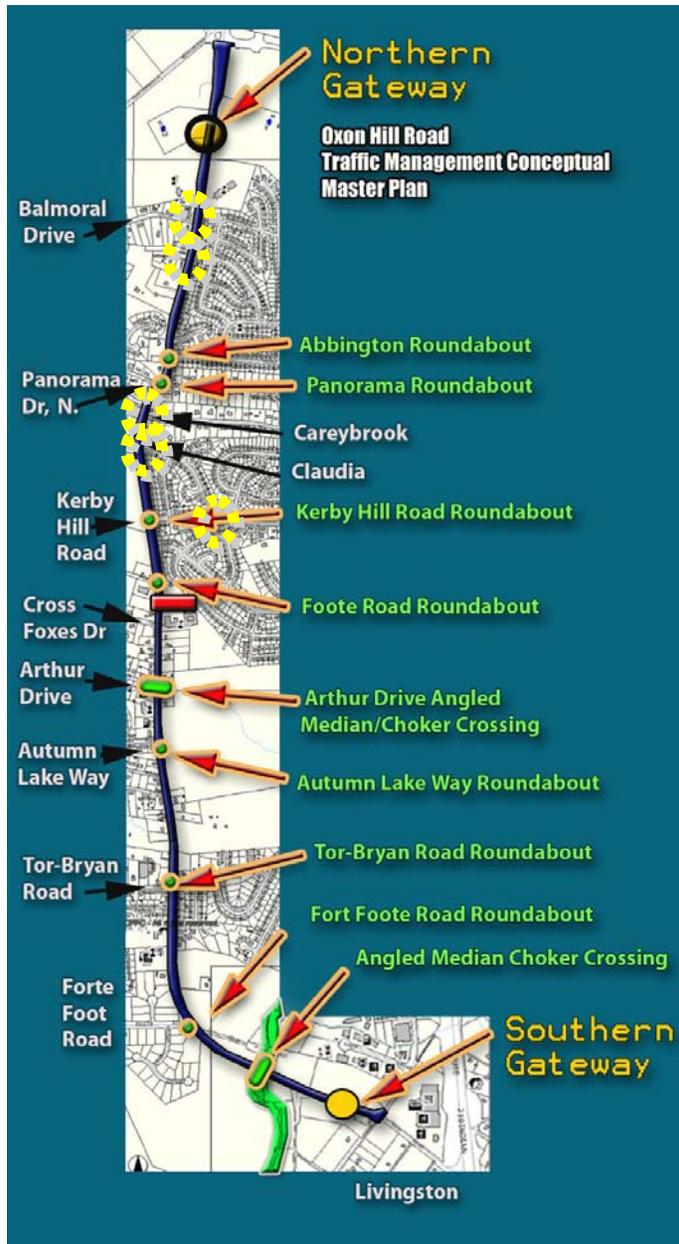
Median islands are recommended in a number of locations to help slow entering traffic into key areas of neighborhoods. Median islands are potential solutions in all locations on the map. In some cases medians can be well landscaped. In a few they will need to be kept low to allow oversized vehicles to mount them. Only field testing will determine which type/style of median will work in tight locations.

### Steps for Implementation:

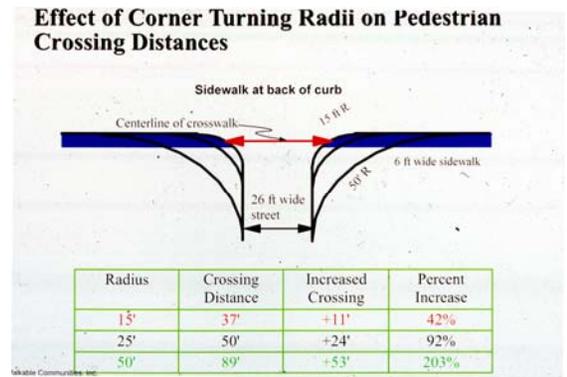
- Test location and sizing of median islands shown in the adjacent map with a weekend/evening block party.
- Decide which locations and types of islands will work with driveways, trucks, buses and other operational and access needs. Then design and build a variety of islands with the first round of funding.
- Based on early success and ongoing community interest and need, continue to construct sets of median islands for overall effects.



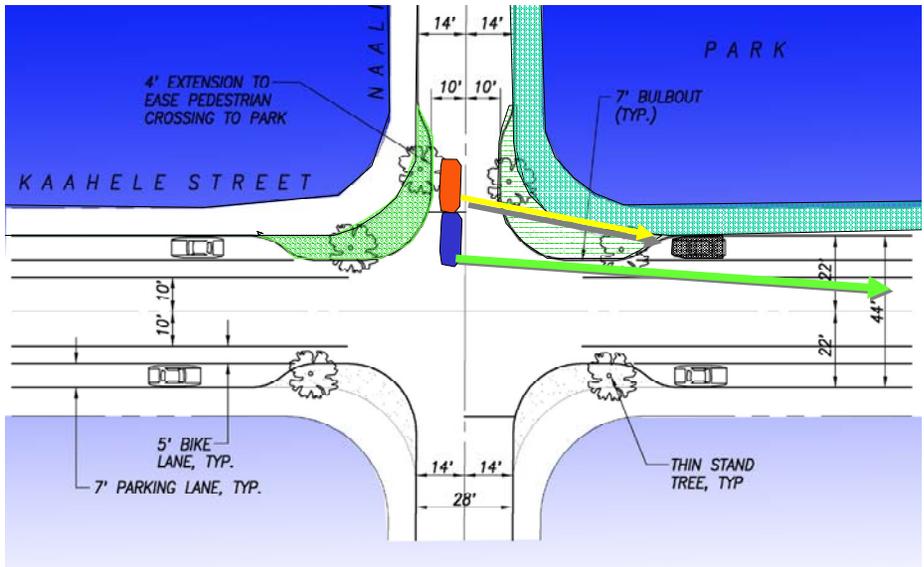
# Curb Extensions (Bulbouts)



Curb extensions are to be used on all intersections. They will also be used at regular intervals to prevent imprudent drivers from passing to the right. Current Prince County plans increase side street crossings of 36-40 feet to 44-55 feet. This takes pedestrians 10-12 seconds to cross. Walkable Communities, Inc. proposes reducing the crossing distances to 20-24 feet, reducing exposure to 5-6 seconds.



# Curb Extensions (Bulbouts)



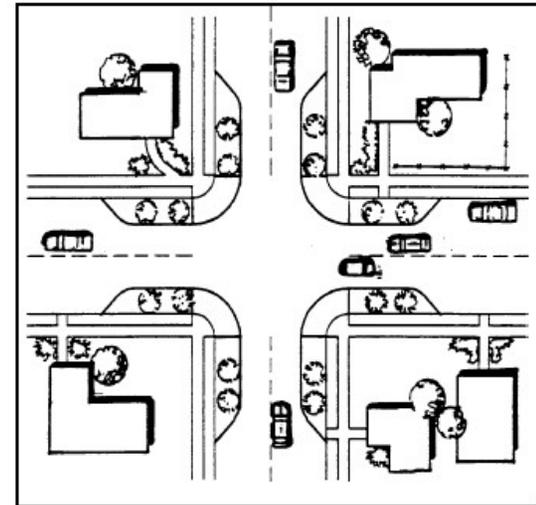
## Bulbouts and Curb Extensions

These two terms can be synonymous because in each case, curbs are extended toward the center of streets. Bulbouts are typically short, abrupt curb extensions used primarily at intersections and key mid-block locations. They extend from curbs in shapes of “bulbs” or round bulges, reducing pavement widths.

### Benefits

- Bulbouts reduce vehicle speeds by narrowing travel lanes or by introducing horizontal deflection (changing the direction of vehicle’s paths).
- Bulbouts reduce vehicle travel lane widths, decreasing distances pedestrians travel to cross streets.

- Bulbouts improve pedestrian safety by reducing corner radii, discouraging high speed turns.
- Bulbouts allow pedestrians and vehicles to safely move closer to travel lanes, beyond parked cars, to look for oncoming traffic.
- Bulbouts protect on-street parking by providing physical barriers and buffers to vehicles in travel lanes.
- Bulbouts are usually designed with landscaping to be more visible to motorists and to beautify roadways.



### Concerns and Limitations

In general, bulbouts have raised the following concerns or have these limitations:

- Bulbouts can affect drainage patterns on existing streets or make maintenance more difficult.
- Bulbouts generally require vertical landscaping or adequate street lighting to be more visible to oncoming vehicles.

**Bulbouts are used not only as independent traffic calming features ... but also as key parts of chokers, angled slow points, crossing islands and many other traffic calming tools.**

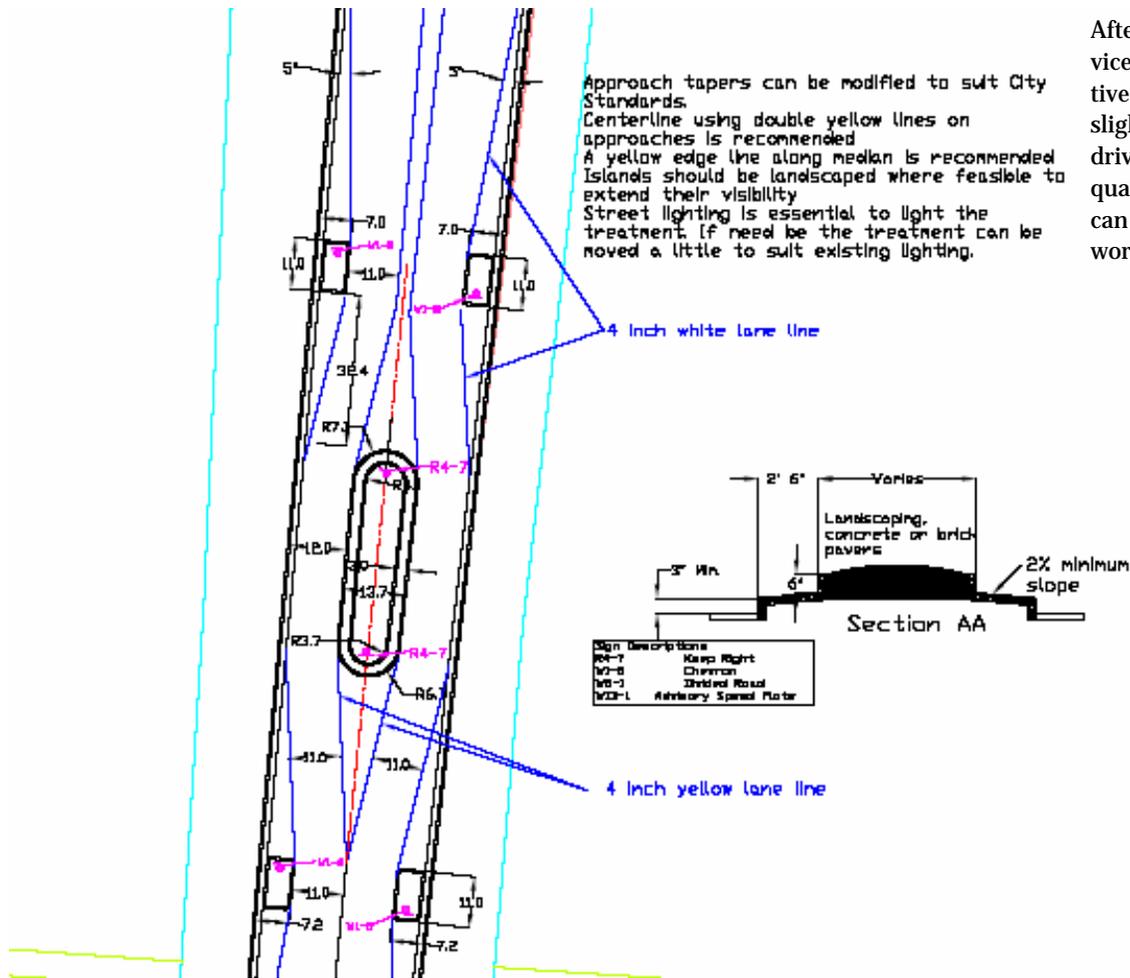
# Curb Extensions (Bulbouts)



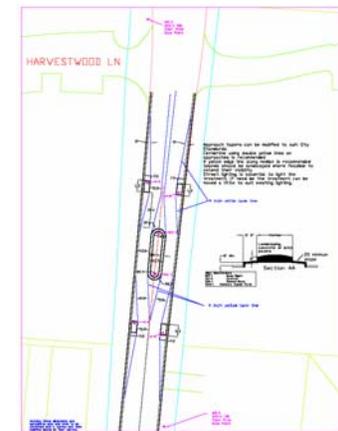
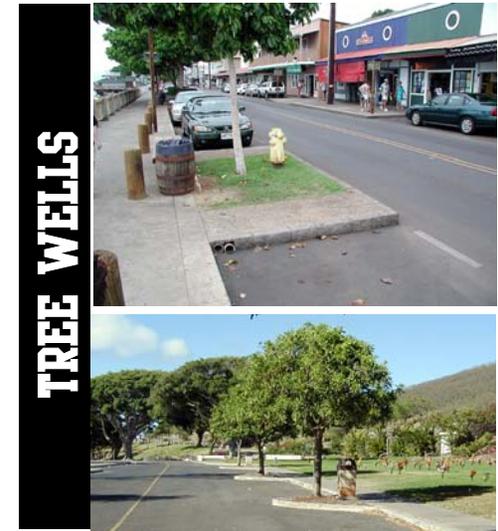
Curb extensions come in a great variety of materials, colors, shapes, textures and sizes. Care and selection must be given to overall aesthetics of streets. In some cases color and landscape materials provide focal points, while in others surrounding buildings or parks dominate the scene.



# Median with Tree Wells (Details)



After testing a number of chicanes, chokers and other devices, Michael Wallwork, P.E. drew an additional alternative. In some cases, medians with tree wells preserve slightly more parking and better fit with some complex driveway combinations. Tree wells provide places for quality landscaped islands. If needed, the center island can be crossed by large trucks, which may have difficulty working around standard islands.



Michael Wallwork, P. E. has designed one additional horizontal deflection tool, medians with tree wells, that can be positioned on some of the narrower street sections. This treatment minimizes the taking of parking. Sample dimensions and markings are provided in this illustration.

# Medians – Benefits and Limitations

## Medians (with and without Tree Wells)

Medians are raised islands located near centers of roadways. Medians are generally constructed of durable concrete or stone materials. In some cases asphalt is used for curbing.

Painted medians have little or no effect on motorists, and they are not considered basic traffic calming tools

### Benefits

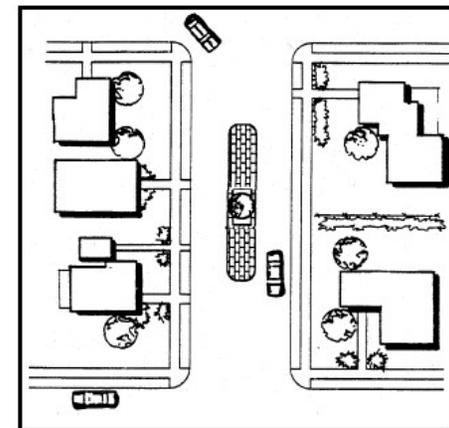
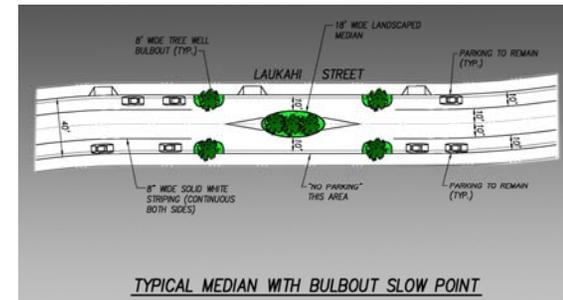
In general, medians provide the following benefits:

- Medians separate opposing vehicular traffic, increasing motorist safety.
- Medians can reduce vehicle speeds by creating horizontal deflection in travel ways.
- Medians can reduce the number of conflicts that occur at any one time.
- Medians can eliminate unwanted and unsafe turning movements.
- Medians can reduce speeds by visually tightening roadways and using excess pavement width.
- Medians can reduce speeds by placing trees, shrubs or other landscaping in the roadway. This placement allows motorists to gauge their speeds against tall vertical features.
- Medians can reduce vehicular speeds along curves by preventing vehicles from crossing road centerlines to maintain higher speed.
- Medians are often combined with pedestrian crossings, providing refuge islands for pedestrians and making pedestrian crossings more noticeable to motorists. On wider medians, pedestrian crossings can include diagonal paths to direct pedestrians to face oncoming traffic and thus increase safety.
- Medians should include landscaping to increase their visibility to motorists and beautify roadways.

### Concerns and Limitations

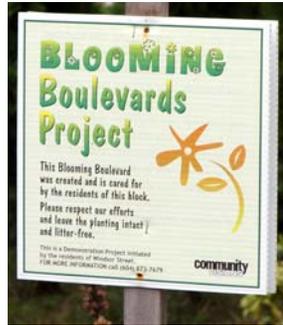
In general, medians have raised the following concerns or contain the following limitations:

- Medians can eliminate on-street parking.
- Medians can reduce access into some drive-ways.
- Medians with landscaping require regular maintenance.
- Medians lacking landscaping may be difficult to detect. In this case, added markings, appropriate signs, mounding of median centers, or other features emphasize median locations.



# Landscaping and Level of Attraction

- Projects are often accepted/rejected on how they impact adjacent properties or the appearance of the entire neighborhood.
- City staff must work diligently to reduce the amount of unessential signage and markings. This appropriate treatment is best handled by proposing and having city council approve guidelines maximizing landscaping and minimizing sign stock and nonessential markings.
- Several of the recommendations include new landscaping features. At the second meeting, residents indicated that they would like medium to high levels of landscaping. The City should work with the Strawberry Farms Neighborhood Association to determine who will care for landscaping of the new treatments, and they should enter into a Neighborhood Maintenance Agreement with the City.



# Signing and Temporary Devices



**Signs and Markings** Photos 1-3: In early traffic calming years some engineering and tort liability staff made poor decisions about signing and pavement markings. Signing and markings should comply with appropriate aesthetics as well as safety guidelines. Signs should not overpower place, dominate and take over neighborhood ambience. Signs in these photos are considered oversized and overdone, raising objections in each of the neighborhoods where they appear. Many signs can be smaller, fewer in number. With added landscaping and appropriate markings a more sensitive set of signs and markings can be applied.

**Temporary Treatments** Photos 4-5: Residents find even temporary features that are unattractive poor strategy. Many perfectly good traffic calming treatments have been rejected when residents see ugly parking blocks, or worse in their neighborhoods. The bottom right photo is a temporary installation in Toronto, Canada that was more carefully crafted and placed. Curbing is placed, filled with sand with bricks and attractive posts placed on top. This feature was tested, accepted and a final version was built and adopted for permanent placement at this site and a number of similar locations.



# Appendix

## Traffic Calming

### Design Resources

**Florida Department of Transportation's Roundabout Guide** (1999), Florida Department of Transportation, Institute of Transportation Engineers.

*This guide developed guidelines to assist agencies with decisions regarding roundabout design and implementation. The purpose of the guide is to provide guidance for the planning, design and operation of roundabouts in Florida. It deals with the identification of appropriate sites for roundabouts, geometric design of roundabouts to meet FDOT requirements and operational considerations such as signing, marking, lighting and landscaping.*

**Making Streets that Work** (1996), City of Seattle.

*This document is a two-part educational tool for the creation of strong, sustainable communities based on street design. The guidebook is divided into four chapters preceded by a brief introduction discussing general project information and followed by an extensive section on additional resources. The guidebook is intended to help communities better understand neighborhood issues, identify opportunities, and recommend changes to streets as part of their neighborhood's planning process.*

**National Bicycling and Walking Study: Case Study # 19, Traffic Calming and Auto-Restricted Zones and other Traffic Management Techniques - Their Effects on Bicycling and Pedestrians** (1992), Federal Highway Administration.

<http://www.fhwa.dot.gov/safety/fourthlevel/pdf/Case19.pdf>

*This report discusses traffic calming and other traffic management methods. It is divided into three parts. The first two major sections examine the history and traffic-calming techniques installed in Europe, Japan, and the United States. The final section of the report examines the practical and policy implication of traffic calming.*

**Traffic Calming** (1995), American Planning Association.

**Traditional Neighborhood Development Street Design Guidelines** (1997), Proposed Recommended Practice, Institute of Transportation Engineers.

[http://safety.fhwa.dot.gov/fourthlevel/pdf/TND\\_Manual.pdf](http://safety.fhwa.dot.gov/fourthlevel/pdf/TND_Manual.pdf)

*This report includes a discussion of the concepts of traditional neighborhood development (TND), which are also referred to as "the new urbanism," as they relate to the role of streets in TND communities; a discussion of the community design parameters under which the guidelines would apply; presentation of the design principles underlying the guidelines; specific guidance on geometric street design; and an appendix that summarizes some recent findings on the relationship between urban design and travel demand.*

**Traffic Calming: State of the Practice** (1999), Institute of Transportation Engineers

<http://safety.fhwa.dot.gov/fourthlevel/pdf/ite/intro.pdf> (document in full)

<http://www.ite.org/traffic/tcstate.htm#tcsop> (by chapter)

*This report contains a synthesis of traffic calming experiences to date in the United States and Canada. It includes information on traffic calming in residential areas and in areas where high speed rural highways transition into rural communities. The report draws from detailed information collected on traffic calming programs in twenty featured communities, another 30 communities surveyed less extensively, and a parallel Canadian effort by the Canadian ITE (CITE) and the Transportation Association of Canada (TAC). The intended audience is transportation professionals.*

**Traffic Control Manual for In-Street Work** (1994), Seattle Engineering Department, City of Seattle.

<http://www.cityofseattle.net/transportation/trafficcontrolmanual.htm>

*This report provides information about establishing safe construction and work zones that consistently and clearly convey to motorists that work is being performed in the roadway.*

# Appendix

**Roundabouts: An informational guide, FHWA, Publication No. FHWA-RD-00-067** (1999), .

*This guide provides assistance in explaining the purpose of roundabouts, planning, capacity, geometrics, critical dimensions, operations, uses, safety and related issues. Although this version is a bit dated and does not provide sufficient guidance on either ADA or pedestrian/bicycle issues, it is one of the most popular and well used guides.*

## **Local Area Traffic Management, Part 10**

### **Guide to Traffic Engineering Practice**

(Austroads, 1988), National Office Austroads, Level 10, Roden Cutler House 24-28 Campbell Street, Haymarket, NSW Australia, (02) 218-6218

*This Australian guide is one of the oldest and most respected publications working toward uniformity of practice in design, construction and user aspects of roads. This part of the Engineering Practice series is focused on local streets. It incorporates the needs, public process, study, implementation and monitoring.*



**Canadian Guide to Neighborhood Traffic Calming, ITE, (December, 1998), .**

*This guide provides assistance in establishing some traffic calming standards, while explaining that it is used in conjunction with local conditions and professional judgment.*

*Chapters include topics on community involvement, traffic calming process, and attainment of community support. The guide stresses that neighborhood understanding and support is the most important factor in successful integration of traffic calming.*

**Traffic Calming in Practice, County Surveyors Society, Department of Transport, Association of London Borough Engineers and Surveyors (November, 1994) .**

*This book was produced to provide information to practitioners for practical advice on how to go about traffic calming; and for information on what techniques have proven successful, or indeed unsuccessful, elsewhere. Eighty case studies are provided. Commentary on the case studies provides quick reference summarizing effectiveness, cost and main features.*

**Traffic Calming — The Solution to Urban Traffic and a Vision for Neighborhood Livability (CART — Citizens Advocating Responsible Transportation), (1989), Australia.** Reprinted in the United States in 1993, with permission, by Sensible Transportation Options for People (STOP), Tigard, Oregon, (503) 624-6083.

*This guide is one of the first of its kind in the world. It has served to introduce many citizens and practitioners tools proven effective in reducing inappropriate motorist actions in neighborhood settings.*

**Take BACK Your Streets — How to protect Communities from Asphalt and Traffic, (May, 1995), Conservation Law Foundation, Boston Massachusetts (617)-350-0990.**

*This document was produced primarily for New England communities. It places streets in context of the purposes and functions of community and explains road planning, laws governing road planning, reasons why (in populated areas) it is best to slow traffic, traffic calming measures, and steps readers would consider when highway agencies propose projects that would impact quality of life.*



# Construction Details and Drainage



These photos are provided to illustrate various construction steps, techniques and conditions. Traffic calming installation is a new science and art. Some cities have learned methods to install traffic calming features at affordable prices by using tools and approaches to minimize changes in drainage. Careful selection of tools will reduce impacts on driveways and utilities, as well as negative impacts to trucks, buses and fire equipment, all while addressing speeding issues. County engineering staff and local construction crews should focus on placing these designs; then use their experience to place added treatments.

# Construction Details and Drainage

These speed tables are made of durable reinforced concrete material. Costs for the islands are minimized by adding curbing to the islands themselves, and not building independent curbs, which might impact drainage. To omit curbing on this island would allow motorists to go around the island to maintain speed.

The elevation change (percent grade) on speed tables is critical. Too gradual a change does not reduce speed sufficiently. Too much change results in motorists going too slow, then spiking their speeds. A 7% grade change has proven to be most effective of all.

Use of Seminole Line Markings on approach, bright materials, appropriate signing, and perhaps a small cluster of trees or shrubs near the treatment (see plans) can be important ... adding to the safety, as well as recognition distance out where changes in speeds occur. Proper use of auxiliary landscaping and line markings can double the distance and overall effectiveness of traffic calming treatments.



These median islands vary in cost. The upper photo has no impact on drainage and is the most affordable. The lower photo also shows a condition where drainage is not impacted, even though the curb extension is attached to the curb. There is sufficient downgrade to allow water to flow to the nearest catch basin.

# Construction Details, Durability, Attractiveness and Maintenance



Neighborhood engineering projects require high levels of attractiveness and durability. Although it is essential to come up with affordable treatments to traffic calm entire neighborhoods, sacrificing appropriate durable and attractive materials is a mistake in front of anyone's house.

**THIS**



**NOT THIS**



Avoid early traffic calming failures by selecting only materials that hold up well and receive compliments by area residents. The center left photo is a curb extension made of asphalt. Although it does much of the same work as concrete it is immediately seen by shop owners, motorists and pedestrians as a degradation of the block, not an asset.

*Curb Extensions, medians and other traffic calming features should be built to be durable, attractive and easy to maintain.*

*The two photos below illustrate two types of corners ... the first is easy to plow and sweep, the other requires extensive hand sweeping.*



Colorized, stamped brick asphalt with concrete curbing might have done well in the same location and still been affordable.

**THIS**



**NOT THIS**



# Snow Season and General Maintenance



## Attractive Guideposts

*In Toronto, Canada they make use of guideposts and other landscaping to help guide snow plow operators around tips of bulbouts, medians or other features.*

*Often as roadway maintenance staff are adjusting to traffic calming there are complaints that these features slow them in their mission.*

*Meanwhile experienced snow plow crews in serious winter cities consider such comments as “nimpy.” “We can handle anything, so long as it is designed well” they exclaim.*

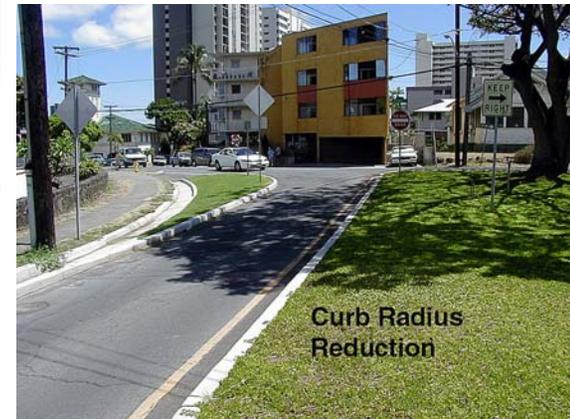


## Too Tall!

*Keep plantings trimmed to 18-24 inches high. Careful selection of plant material is essential. Plants should be selected that grow well for the climate and which do not require extensive pruning. In general, plant materials should grow above 18-24 inches. Trees should be undercut to 7.0 feet.*



*Construction costs are kept much lower when islands are separated from existing curbs. Meanwhile on flat ground additional high pressure hoses, or other suitable cleaning methods are needed. Curb drains often self clean, however, if significant grade is involved.*



# Lighting and Lighting Fixtures



**Lighting.** Traffic calming features must be well lit. Designers need to pay attention to proper placement of lighting fixtures, assuring traffic calming features are under existing street lamps, or that new, appropriate level and placement of lighting is achieved. It is essential that motorists on each approach to a traffic calming treatment can see the treatment day and night.

Lighting can be standard cobra lamps, already in place in many locations throughout most neighborhoods, or it can be a new type of fixture

preferred by residents. In some cases low level, ground lighting, or pedestrian scale lamps will be desired and appropriate (see above right photos).

**Added Lighting.** Columbus has a program permitting local neighborhoods to upscale their lighting with added aesthetic features. Neighbors pay the difference between the price of a cobra lamp and any new feature lighting they prefer. If any new lighting meets the needs of the traffic calming feature and costs the same

or less than the standard type of lighting, this will be included as part of the installation. Examples of lighting found functional and attractive traffic calming features: (1) attractive lighting fixtures, (2) ground level spot lighting which illuminates the medians, shrubs, trees and other features, (3) lighting on gateway features, such as signs, poles or other features, (4) side lighting that creates guidance along road or median edges, (often achieved through up-spot lighting, bollard lights or some other key featured lighting source, or combination of sources).

# Appendix

## Recommended Guidelines for Crosswalk Installation

From FHWA— Publication No. FHWA-RD-01-102

Pedestrian Facilities Users Guide

Marked crosswalks serve two purposes: (1) they tell the pedestrian the best place to cross, and (2) they clarify that a legal crosswalk exists at a particular location.

Marked crosswalks are one tool to get pedestrians safely across the street. When considering marked crosswalks at uncontrolled locations, the question should not simply be: "Should I provide a marked crosswalk or not?" Instead, the question should be: "Is this an appropriate tool for getting pedestrians across the street?" Regardless of whether marked crosswalks are used, there remains the fundamental objective of getting pedestrians safely across the street.

In most cases, marked crosswalks are best used in combination with other treatments (e.g., curb extensions raised crossing islands, traffic signals, roadway narrowing, enhanced overhead lighting, traffic-calming measures, etc.). Think of marked crosswalks as one of a progression of design treatments. If one treatment does not ade-

quately accomplish the task, then move on to the next one. The failure of one particular treatment is not a license to give up and do nothing. In all cases, the final design must address the goal of getting pedestrians across the road safely.

Marked pedestrian crosswalks may be used to delineate preferred pedestrian paths across roadways under the following conditions:

1. At locations with stop signs or traffic signals. Vehicular traffic might block pedestrian traffic when stopping for a stop sign or red light; marking crosswalks may help to reduce this occurrence.
2. At non-signalized street crossing locations in designated school zones. Use of adult crossing guards, school signs and markings, and/or traffic signals with pedestrian signals (when warranted) should be used in conjunction with the marked crosswalk, as needed.
3. At non-signalized locations where engineering judgment dictates that the number of motor vehicle lanes, pedestrian exposure, average daily traffic (ADT), posted speed limit, and geometry of the location would make the use of specially designated crosswalks desirable for traffic/pedestrian safety

and mobility. This must consider the conditions listed below.

Marked crosswalks alone are insufficient (i.e., without traffic-calming treatments, traffic signals, and pedestrian signals when warranted, or other substantial crossing improvement) and should not be used under the following conditions:

1. Where the speed limit exceeds 64.4 km/h (40 mi/h).
2. On a roadway with four or more lanes without a raised median or crossing island that has (or will soon have) an ADT of 12,000 or greater.
3. On a roadway with four or more lanes with a raised median or crossing island that has (or will soon have) an ADT of 15,000 or greater.

Street crossing locations should be routinely reviewed to consider the following available options:

- Option 1 — No special provisions needed.
- Option 2 — Provide a marked crosswalk alone.
- Option 3 — Install other crossing improvements (with or without a marked In —

# Appendix

crosswalk) to reduce vehicle speeds, shorten crossing distances, increase the likelihood of motorists stopping and yielding, and/or other outcome.

The spacing of marked crosswalks should also be considered so that they are not placed too close together.

A more conservative use of crosswalks is generally preferred. Thus, it is recommended that in situations where marked crosswalks alone are acceptable that a higher priority be placed on their use at locations having a minimum of 20 pedestrian crossings per peak hour (or 15 or more elderly and/or child pedestrians per peak hour). In all cases, good engineering judgment must be applied.

## Other Factors

### Distance of Marked Crosswalks From Signalized Intersections

Marked crosswalks should not be installed in close proximity to traffic signals, since pedestrians should be encouraged to cross at the signal in most situations. The minimum distance from a signal for installing a marked crosswalk should be determined by local traffic engineers based on pedestrian crossing demand, type of roadway, traffic

volume, and other factors. The objective of adding a marked crosswalk is to channel pedestrians to safer crossing points. It should be understood, however, that pedestrian crossing behavior may be difficult to control merely by the addition of marked crosswalks. The new marked crosswalk should not unduly restrict platooned traffic, and should also be consistent with marked crosswalks at other unsignalized locations in the area.

### Other Treatments

In addition to installing marked crosswalks (or, in some cases, instead of installing marked crosswalks), there are other treatments that should be considered to provide safer and easier crossings for pedestrians at problem locations. Examples of these pedestrian improvements include:

- Providing raised medians (or raised crossing islands) on multi-lane roads.
- Installing traffic signals and pedestrian signals where warranted, and where serious pedestrian crossing problems exist.
- Reducing the exposure distance for pedestrians by:
- Providing curb extensions.

- Providing pedestrian islands.
- Reducing four-lane undivided road sections to two through lanes with a left-turn bay (or a two-way left-turn lane), sidewalks, and bicycle lanes.
- When marked crosswalks are used on uncontrolled multi-lane roads, consideration should be given to installing advance stop lines as much as 9.1 m (30 ft) prior to the crosswalk (with a

STOP HERE FOR CROSSWALK sign) in each direction to reduce the likelihood of a multiple-threat pedestrian collision.

- Bus stops should be located on the far side of uncontrolled marked crosswalks.
- Installing traffic-calming measures to slow vehicle speeds and/or reduce cut-through traffic.

Such measures may include:

- Raised crossings (raised crosswalks, raised intersections).
- Street-narrowing measures (chicanes, slow points, "skinny street" designs).

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- Intersection designs (traffic mini-circles, diagonal diverters).
- Others (see *ITE Traffic-Calming Guide* for further details) Some of these traffic-calming measures are better suited to local or neighborhood streets than to arterial streets:
- Providing adequate nighttime street lighting for pedestrians in areas with nighttime pedestrian activity where illumination is inadequate.
- Designing safer intersections and driveways for pedestrians (e.g., crossing islands, tighter turn radii), which take into consideration the needs of pedestrians.

These guidelines were developed in an FHWA report entitled *Safety Effects of Marked vs. Unmarked*

*Crosswalks at Uncontrolled Locations*.<sup>(1)</sup>

This report may be found at:

[www.walkinginfo.org/rd/devices.htm](http://www.walkinginfo.org/rd/devices.htm).

In developing these proposed U.S. guidelines for marked crosswalks and other pedestrian measures, consideration was given not only to the research results in this study, but also to crosswalk guidelines and related-pedestrian safety research in Australia, Can-

ada, Germany, Great Britain, Hungary, The Netherlands, Norway, and Sweden (see references 2-8).

## References

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# Appendix

**Livable Streets, by Donald Appleyard, with M. Sue Gerson and Mark Lintell** (1981), University of California Press, Berkeley and Los Angeles, California, London, England. ISBN 0-520-03689-1

*This book grew out of ten years of research into the quality of life in residential environments and the impacts of traffic on them. Donald's seminal work on this topic is still one of the most valuable in understanding the role and importance of well designed, constructed, operated and maintained neighborhood streets.*

*Appleyard measures the impacts of street noise, traffic volume and traffic speed on important qualitative measures, such as levels of human association and friendship, child safety, pride, crime, property values and other social impacts.*

*He went on to become one of the first practical traffic calming implementers in America (Berkeley, Oakland and San Francisco). Sadly, he was later killed in traffic by a speeding, out-of-control driver.*

**Reclaiming Our Streets** (February, 1993), City of Portland, Oregon, Bureau of Traffic Management, prepared by the Reclaiming Our Streets Task Force.

*Traffic solutions, safer streets, more livable neighborhoods. From media campaigns, education and encouragement to enforcement, engineering and legislation.*

**The Citizens' Guide to Traffic Calming — Streets, Sidewalks, People and Cars, by Dan Burden** (April, 2000), California Local Government Commission, Center for Livable Communities. 916) 448-1198, <http://www.lgc.org>

Now one of the most widely read and distributed publications on traffic calming, this workbook helps practitioners and citizens better understand the dynamics of vehicle and pedestrian movement, identifies traffic calming opportunities, and recommends improvements to streets through new strategies, highly effective public process and modern tools.

Sections include: (1) Street Wise, with a discussion of street design and speeding, (2) Traffic Calming Process, (3) The Toolbox of 20 traffic calming tools, and (4) Resources, including inventory forms and tools needed to survey and evaluate neighborhood streets.

**Emergency Response: Traffic Calming and Traditional Neighborhood Streets, by Dan Burden, with Paul Zykofsky** (December, 2000), California Local Government Commission, Center for Livable Communities. 916) 448-1198, <http://www.lgc.org>

This book is written to further the understanding, dialogue and common needs of public works staff, neighborhood leaders and emergency response teams, concerned with maintaining access and quality response times to and inside neighborhoods.

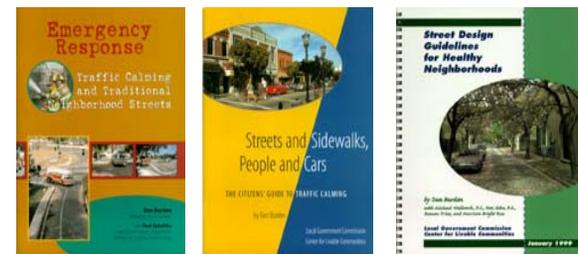
The book details both traditional street forms and modern traffic calming tools, providing alternatives to stop signs and speed humps.

**Street Design Guidelines for Healthy Neighborhoods, by Dan Burden, with Michael Wallwork, P.E., Ken Sides, P.E., Ramon Trias and Harrison Bright Rue** (January, 2002), California Local Government Commission, Center for Livable Communities. 916) 448-1198, <http://www.lgc.org>

This book is a response to the growing need of public works staff and neighborhoods seeking improved ways to design multi-functional streets that work for everyone.

The guide provides applications specific to traditional (old historic and now modern) street forms. The authors are careful to point out that recommended street dimensions used in this guide should not be applied to conventional (sprawl/cul-de-sac patterned) neighborhoods.

A number of communities have now adopted these guidelines to provide a base line for new traditional development.



## Trees

### **Trees in Medians**

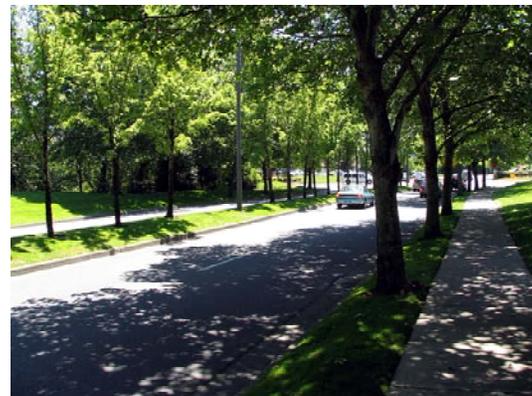
*The purpose of the research was to learn if there is higher incidence of crashes and crash severity when placing trees in urban medians. Comparisons were made for linear miles of medians with trees and medians without trees. Crashes and crash severity did not increase with trees in medians.*

*The study was conducted for CALTRANS by Professor Sullivan, and was reviewed and commented upon by Reid Ewing for the City of Palo Alto, California in 2002. Based on the results of this review the City of Palo Alto and Caltrans have agreed to permit trees in urban medians.*



***Tree Guidelines for San Joaquin Valley Communities***, March, (1999) By E. Gregory McPherson, James R.I. Simpson, Paula J. Peper, Qingfu Xiao, Western Center for Urban Forest Research and Education, Produced by the Local Government Commission, Inc.

The purpose of this compilation was to document benefits of street trees to air quality, drainage, cooling and evaporation, walkability, property values, attractiveness of streets, livability and other factors leading to quality urban spaces. The document also provides an excellent bibliography on urban street trees and forestry.



# Appendix

***Trees in Urban Design, Second Edition***, March, (1999) By Henry F. Arnold, 1992 (Van Nostrand Reinhold.

The purpose of this publication is to provide aesthetic and technical detail on placement, planting and nurturing of urban street trees.

Many urban foresters reference this as “the book to have to understand the urban tree and urban forest.”

In the introduction paragraph to the book the importance of trees is emphasized:

*“The remarkable aesthetic power of trees distracts artists so much that their potential for building dense organic compositions has been replaced by an over-refined, precious reverence for individual trees. Trees are the most exquisite and most sparingly apportioned raw material of urban design. Our cities display a mere dollop of their sensual color and form. There are exceptions both in North America and Europe to this general rule. Yet the paradox remains—we fail to design with our most humane raw material.”*



Oxon Hill Road Conceptual Master Plan

## Placemaking and Streetscapes

***The Experience of Place, by Tony Hiss***, March, (1990), Alfred A. Knopf, New York.

This book offers insight into improving cities and countryside by paying close attention to place-making. This includes our relationship, bond and connection with place. The author describes loss of place, importance of place in everyday life, and in meeting and healing social problems. The author reviews the importance of William H. Whyte’s studies of plazas and traffic choked streets.

The book addresses basic needs of people and society including connectedness, public value of place, working landscapes and thinking regionally.

***Public Streets for Public Use by Anne Vernez Moudon*** (1991), Columbia University Press, Morningside Edition, New York, Oxford.

The future of public streets and their reclamation as places for human heart and habitat are linked in this writing. The book points out that contemporary American cities continue to ignore the necessity of pedestrian movement and transit.

The book provides substantial documentation of the growing problems associated with failure to provide for walking and placemaking. It identifies essential and appropriate uses of public streets as places to live, associate and share.

