



R O U N D T A B L E

Successful Medians

Chico, California did not have a standard for median island design and construction when I started as urban forester there in 1990. Design and construction of the median was left to the discretion of the developer's civil engineer so long as the curbing, island width, and configurations met the City's design standards. Once that was done, the irrigation system design, landscape design, soil preparation, and planting methods varied with the interest of the developer and how much money they wanted to spend. As the person responsible for maintaining the City's landscape installations, I saw firsthand how bad things could really get when landscaping was an afterthought.

A roadway must be sturdy and durable enough to support heavy loads for many years with minimal maintenance. To do that, all topsoil is removed down to the subgrade, which is then compacted to at least 95% relative compaction, and then base rock is added in layers and compacted to at least 95% relative compaction. This process produces a dense air- and water-tight foundation for the roadway curbing and paving. That is great for paving, but guess what happens next?

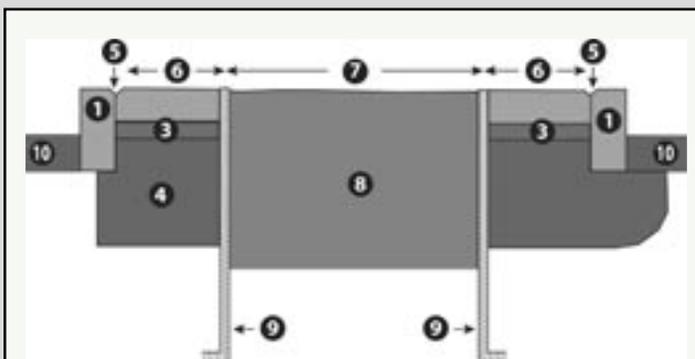
In a typical median island landscape installation, the curbing is set on top of the compacted base as is the irrigation system. Topsoil is then placed from the compacted base to the top of the curb. With a typical curb section at 12 inches (30.48 cm), the final planter depth is 11 to 15 inches (30 to 38 cm). A 12-foot-wide (3.66 m) median island would on average have 12.5 cubic

feet (.35 cu m) of soil per linear foot of median island. That is not enough to grow a tree, let alone additional shrubs and ground covers in the landscape.

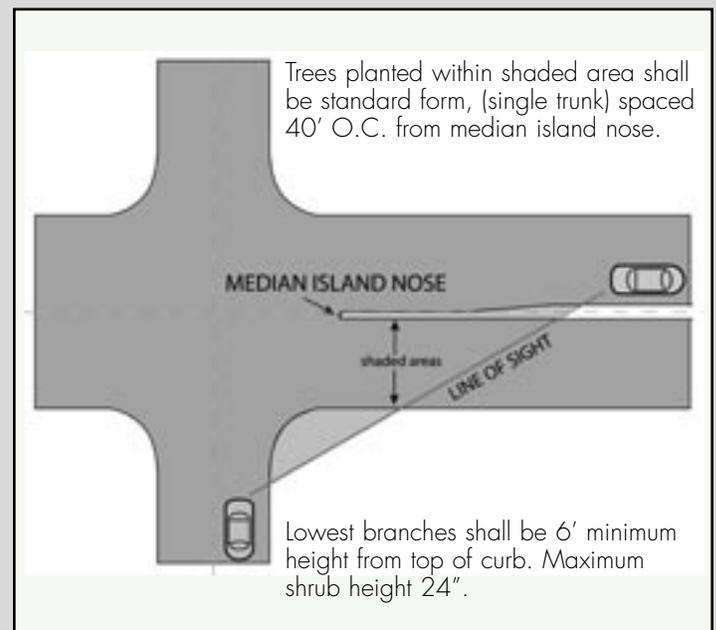
Poor plant growth is not the only problem with poor design and construction of median islands. If the base of the roadway is solid, where does excess irrigation and rainwater go? The water takes the path of least resistance, usually between the compacted base rock and pavement! What is the number one enemy of roadway base? Water! In Chico we could manage the summer irrigation to minimize excess water, but we could not control the winter rainfall. As a result, many of the roadway sections along older median islands suffered from base failures and roadway alligatoring (cracking).

To correct this problem, I worked with city engineering staff to develop a roadway/median section that included adequate drainage for the roadway and soil preparation for the landscaping. All base material was removed from the median island down to native soil, which was scarified. A 1:1 or 2:1 taper was cut in the base to support lateral loads under the roadway. Native topsoil was placed in the median after the irrigation mainlines were installed. Subsurface drainage was installed if subgrade conditions prohibited water percolation. A 12-foot-wide (3.66 m) median island would on average have 27 cubic feet (.76 cu m) of soil per linear foot of median island using this design.

In Hayden, Idaho, where I now work, the median islands on Government Way were recently installed using the



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|-------------------------------------|-------------------------------|
| 1. concrete curb | 6. one foot concrete mow band |
| 2. four inch thick stamped concrete | 7. planting area |
| 3. two inch sand base | 8. prepared planting soil |
| 4. compacted subgrade | 9. root control barrier |
| 5. tooled edge | 10. roadway |



older, typical design method. I am working through the process of incorporating the Chico design standards into the design standards for future median islands here in Hayden.

Sight lines are a major concern at intersections, especially at non-signalized intersections. In Chico, California, sight lines at landscaped intersections are determined using the following formula: sight line = speed limit x 11. At 35 MPH, the sight line would be 385 feet (117 m).

Median islands are very effective at lowering traffic speeds because the landscaping provides a visual speed reference for drivers. Without the islands, there is no visual reference for a driver to gage speed; traffic speeds tend to increase as a result. Yes, drivers should be using the speedometer in the vehicle. However, as a side note, drivers aren't paying much attention to the roadway these days anyway, let alone the speedometer!

How do we convince developers to commit space for medians? The challenge is to convince the local governing body to require them. If that can be accomplished, the developers follow suit in order to obtain development approvals. In Hayden, staff is reviewing and updating all development standards, including median island design standards. To ensure a buy-in by Council at the end, I am making sure local interest groups and stakeholders have a hand in the process. Nothing deflates the approval process faster than stakeholders standing before a governing body and claiming to have been shut out. My recommendation is to invite everybody into the process early on. At that point, it is their decision to participate or not.

What challenges remain for us in terms of medians? The biggest challenge for any landscape is to fund ongoing maintenance. Capital improvement dollars are usually always there, but my recommendation has always been to forego landscape improvement unless maintenance can be funded. Put in all of the basics, such as sleeving, water and power supplies, and communication facilities, but no more.

Always include allowances for maintenance. Install at least a one-foot (.3 m) concrete maintenance strip on one side of the median island. That may be the only maintenance access along a busy thoroughfare.

—Chris Boza, *Community Forester, City of Hayden, Idaho*

Our median landscape program is relatively new and is getting about five million dollars a year through Albuquerque's Capital Improvements Plan funds. The public works department installs the medians then passes maintenance to the parks department. Over half of the city medians have been landscaped. This

new program uses basic templates citywide—loved by the public works people but not so much by the tree and landscape people who don't like using the same three trees everywhere in town. Besides being visually uninteresting, template designs don't take into account site specifics of neighborhood, potential for maintenance, soil, and so on.

Median plantings are irrigated but not in a long-term way. Parks is expected to modify the system as needed. Soil volume is easy—we have huge medians—but it's not the most desirable soil. Public works tends to fill with a lot of gravel. Also, our sandy soil (and irrigation water) is very salty so trees must be chosen with this in mind. These include goldenrain tree (*Koelreuteria paniculata*), locust (*Robinia pseudoacacia*), lacebark elm (*Ulmus parvifolia*), Arizona sycamore (*Platanus wrightii*), and ash (*Fraxinus* sp.). We also use piñon pine (*Pinus edulis*), chaste tree (*Vitex agnus-castus*), desert willow (*Chilopsis linearis*), and New Mexico olive (*Forestiera neomexicana*).

Sand accumulation is another problem. We are pretty open land; when the spring winds come they bring in sand and it fills in on top of the landscape fabric but can't be removed without cleaning off the rocks and sifting. I saw a picture of someone using a wet/dry vac at their home. In terms of garbage accumulation in medians, our plantings are pretty widely spaced which lets most garbage through when the wind blows. The planters used to be filled with grass or shrubs, but now with xeric guidelines, the City is reducing turf and planting well-spaced xeriphytic plants.

All new medians are designed with a drivepad (wide sidewalk) for a work truck to park on. If the median can't be made wide enough for a drivepad, the designer must identify potential places for workers to park and cross traffic.

—Nick Kuhn, *City Forester, Albuquerque, New Mexico*

Roadways with medians are often the most heavily traveled corridors through a city. These medians offer unique opportunities for municipal tree and landscape professionals to showcase plant materials and leave a lasting impression on both citizens and visitors. Well planned and maintained medians can generate a tremendous amount of interest and enthusiasm from the public, which can ultimately lead to strong public support of local park and tree programs.

In Savannah, Georgia the planting of road medians depends on the nature of the median. All new road projects go through a formal review process by the Site Plan Review Team which consists of City staff from the following departments: Traffic Engineering, Water/Sewer, Stormwater, Streets, and Park & Tree. Local city and county government officials recognize the importance

of trees and landscape and have agreed that all road projects will include a landscape design component. Median width is dictated by Traffic Engineering based on traffic speed, volume, turning lanes, and vehicle stacking requirements. The City landscape architect designs a landscape plan in consultation with Park & Tree. Planting or renovation of established medians is much less formal and is done purely at the discretion and collaboration of the Forestry and Parks administrators.

One of Savannah's challenges is that it has several established neighborhoods where drive-through traffic has become an issue over the years as population and traffic density have increased. This problem has become a neighborhood safety issue and major source of public complaints. An outside consultant was recently hired to objectively analyze problem areas. He strongly advocated the installation of roundabouts for traffic control and calming, with trees and landscape being a vital component. Several well attended meetings were held in City Hall to discuss the consultant's recommendations and get all players on board. As a result, roundabouts will be part of the solution to long-term traffic problems in Savannah.

Since Savannah generally has a well established tree canopy along the sides of its roadways, median plantings



Savannah has a tendency to charm and mesmerize visitors through its beauty and history. A cathedral of live oaks (*Quercus virginiana*) draped in Spanish moss creates a shaded corridor along Liberty Street, with a colorful understory of mature azaleas.



The lacy white blooms of Chinese fringetrees (*Chionanthus retusus*) contrast beautifully with 'Red Ruffle' azaleas against a backdrop of live oak along Abercorn median in midtown Savannah.



Azaleas (*Rhododendron* sp.) and loropetalum (*Loropetalum chinensis*) offer a striking floral display, shaded by century-old live oaks along Oglethorpe median in downtown Savannah, Georgia. Savannah • Photos by Bill Haws

often emphasize year-round seasonal color. Savannah is well known for its Southern live oak (*Quercus virginiana*), which makes for a perfect dark green backdrop to tree species that offer a profuse spring bloom as well as striking fall color. My favorite is Chinese fringetree (*Chionanthus retusus*), which explodes in lacy white blooms in the spring and displays deep yellow foliage in the late fall/early winter months. Chinese fringetree also tolerates a wide range of soil conditions and exposures, while being resistant to breakage, insects, and disease. Ultimately, you know you've achieved success with median plantings when you receive dozens of calls and emails every year asking 'What is that and where can I buy it?'

—*Bill Haws, Forestry Administrator, Savannah, Georgia*

How are our medians designed? Here in Dublin, Ohio, prior to the roadway design, Engineering has a series of public meetings to review draft concepts for potential roadway improvements, landscape treatments, and general corridor character designs based on feedback from previous workshops.

The installation aspect is split between Engineering and Parks and Open Space. Engineering oversees the installation of the hardscape such as bricks/pavers and stone walls, in addition to the paving, curbs and gutters. Parks and Open Space handles the new planting installation, maintenance, and any future renovations. The landscape architect in Parks & Open Space works closely with Engineering during the design phase to draw up and implement a plan for the softscape. New construction projects always incorporate new topsoil. In addition, Parks & Open Space blends compost in a 1:3 ratio in the planting beds and tree wells.

Given Midwest winters and a city that prides itself on clean streets, the effects of salt are always a challenge. Prior to having a landscape architect on staff in Parks & Open Space, the planting design was put together by an outside architecture agency with little input from City staff. Now the LA in Parks & Open Space contacts me on the tree/shrub selections used on the City medians. Experience has shown what plants are tolerant of salt and what not to use. Evergreens are out. Ginkgo (*Ginkgo biloba*), Kentucky coffeetree (*Gymnocladus dioica*) and Japanese tree lilac (*Syringa reticulata*) are in!

Our ordinance spells out the requirements for line-of-sight issues. We have two civil engineers who look for sight issues and notify me if there is a landscape problem. Trees are essential within a median, not only for aesthetics but also for slowing down traffic. Dublin's new method for traffic calming is roundabouts. Currently we have eleven, with two in construction and seven in design.

Challenges? With Emerald Ash Borer in our neighborhood, it is a challenge to find large trees that will do well in the harsh environment found on medians. Another challenge is to find a way to keep motorists from running over the best looking and healthiest trees!

—*Paula Chope, City Forester, Dublin, Ohio*

The City of Milwaukee has 120 miles (193 km) of irrigated and landscaped boulevards that represent a long-term investment in public infrastructure that is rare in major American cities. Many cities have landscaped boulevards in their downtown areas; however few are as extensive and well developed as Milwaukee's. Milwaukee's proud heritage of landscaped boulevards dates back to the 1920s and expanded as the city grew in the 1950s and 1960s.

Forestry designed the system based on a customer service philosophy responsive to residents and adjacent property owners. The result was a visually striking boulevard system that is popular with the community. At the height of its glory, Milwaukee's boulevards resembled a roadside botanical garden boasting 475 (192 ha) acres of well manicured turf, over 3,000 stunning annual beds, and thousands of shrubs and trees that required a seasonal workforce of 120 employees to maintain.

The customer request service philosophy that fueled rapid growth of landscaped boulevards during the mid 20th century could not be sustained under the fiscal constraints of the 21st century. Many of the landscape beds added at the request of residents, or by staff in an attempt to conceal the base of light poles, irrigation vacuum breakers, and other street infrastructure, were small and out of scale with the boulevard and consequently added little value. Nevertheless, these low impact beds still required multiple maintenance visits annually to plant, water, weed, edge, and mulch.



One of 300 new Signature Beds adorning Milwaukee's boulevards • Milwaukee Photos by Scott Baran

Forestry recognized that for the boulevard system to survive, significant restructuring would be necessary.

To ensure its future, Forestry developed a thoughtful and deliberative plan based in part on recommendations from community representatives and landscape professionals. The plan provides for long-term sustainability of the boulevard system based on sound design principles and resource alignment. The plan also recognized that tough choices were necessary in today's climate of competing priorities and tight resources. Forestry developed *Sustainable Boulevards*, Milwaukee's Strategic Boulevard Plan.

Sustainable Boulevards calls for:

- Removal of approximately 1,800 low-impact flower beds to be replaced with grass and trees
- The addition of signature landscape beds at approximately 300 locations throughout the city
- Planting 4,500 shade trees on boulevards to increase tree canopy; and
- Conversion to an automated drip irrigation system to save water and operating costs

Sustainable Boulevards identifies three distinct types of boulevards: Gateway, Historic/Landmark, and Connecting. Gateway boulevards occur at entry points to the city and within the city limits at prominent areas such as the central business district. Gateway boulevards also typically include an entrance sign that is sponsored by local business, with 1/3 of sponsor revenue earmarked for boulevard maintenance. As the name implies, Historic/Landmark boulevards occur in designated historic areas and at significant landmarks. Connector boulevards support the majority of 4,500 new shade trees to be added to the boulevards.

The hallmark of *Sustainable Boulevards* is the striking large raised signature landscape beds that are being installed at key focal points throughout the city. Signature beds average 1,200 square feet (111 sq m) in size and include natural stone elements such as boulders, Lannon stone (limestone quarried from Lannon, Wisconsin), or recycled granite street pavers and massed perennials (maximum of three species for ease of maintenance), flowering shrubs, ornamental trees, and annuals strategically placed at the noses or along the borders of the bed for season-long interest. Signature beds also include modern drip irrigation systems to conserve water and reduce operating costs. Most signature beds are raised to provide an adequate volume of quality topsoil and optimal viewing for passing motorists. In narrow boulevards, crushed granite borders or annuals are placed closest to the roadway to minimize impacts from road salt.

Sustainable Boulevards is in its third year of a planned three-year conversion. During the first two phases Forestry removed approximately 1,200 low-impact landscape beds along 80 miles (128 km) of boulevard and added 200 new signature beds at strategic locations and approximately 2,400 new shade trees on connector boulevard segments. Phase III will be completed in 2010. The City's budget allocation of \$1.5



Milwaukee Gateway Signature Bed sponsored by the Milwaukee Brewers

million to construct the new signature beds is leveraged by Milwaukee's municipal nursery, which grows most of the plants required to support *Sustainable Boulevards* at a substantial savings over comparable wholesale purchase.

So what makes *Sustainable Boulevards* sustainable?

- **Low maintenance plant composition.** Simplistic designs utilizing perennials, flowering shrubs, and ornamental trees and only limited annuals in signature beds will reduce maintenance frequencies.
- **Fewer, but larger landscape beds.** The strategic placement of larger signature beds near key intersections, commerce centers, landmarks, and gateways to the city will enable the beds to be serviced more efficiently than the smaller widely scattered beds they replace.
- **Water-conserving automated irrigation.** Sustainable Boulevards replaces Milwaukee's manual overhead irrigation system with a sophisticated automated drip irrigation system. Automation of the irrigation system represents a significant savings in labor costs.
- **Replacement of 1,800 annual beds with turf and shade trees.** Additional mowing acreage represents a relatively low incremental maintenance cost. Once established, the new shade trees will be integrated into the City's five-year pruning cycle.

Milwaukee's investment in *Sustainable Boulevards* will enable the City to reduce its seasonal workforce by 18 employees, at a savings of approximately \$160,000 annually, and ensure the longevity of Milwaukee's boulevard system for years to come.

—David Sivyver, *Forestry Services Manager, Milwaukee, Wisconsin*

Surrey is a large city geographically, encompassing 317 square kilometres (122 square miles). As the 12th largest city in Canada, Surrey is rapidly evolving from a rural and suburban area to a metropolitan area with six distinct communities connected via an arterial road network. It is this arterial road network that is the focus for street beautification and the installation of landscaped medians.

The landscape median program is rooted in a Council-adopted urban forestry policy of the 1980s. The policy requires that space be allocated for street trees during all road widening programs. However, the design and

construction of landscape medians was carried out on an ad hoc basis until the late 90s.

The run-up to the new millennium marked a turning point for the City. In December of 1998 a team of City



Recently developed median in Surrey British Columbia • Surrey
Photos Courtesy Surrey BC Parks



Mid-1990s Surrey median with no paved perimeter strip

and consulting arborists, landscape architects and engineers proposed a Millennium Median Beautification Concept Plan (The Plan). The Plan stemmed from a Council request, supported by a capital funding program, to install landscaping to beautify the arterial streets that connect Surrey's distinct communities. The Plan promoted a framework for a range of median types and identified implementation project priorities. Many components of the conceptual framework are retained in the City's 2004 *Guidelines for Arterial Medians*. Because the City's engineers were involved from the beginning of the process, issues such as sightlines and pedestrian impacts were dealt with early in the process.

Integral to the median program success was support from the City's engineers for the adoption of a new median construction standard that stipulated high quality growing medium provided in substantial depths to support mature tree growth. Soil types and volumes are specified according to City standards; independent soil testing and staff inspections are required for all new installations. The adequacy of the soil specifications ensure that trees will flourish in the medians, adding to the environmental integrity of the City.

Features of interest include a reduction of mown grass and an emphasis on drought tolerant evergreen trees and shrubs with a balanced selection of hardy deciduous and non-deciduous plants. The issue of drought tolerance is important, as Surrey's medians are not irrigated. Bulbs such as daffodils are often planted at key points along the medians, and species selection of trees, shrubs and herbs allow the medians to achieve distinct seasonal and floral effects while retaining green foliage year-round. Maintenance is carefully considered in median designs by including paved perimeters to avoid debris and road-salt damage to plants; paved staging areas in the medians reduce traffic congestion and increase safety for maintenance crews. The required maintenance funding has been provided annually by Council through its Beautification Program to ensure the upkeep of this substantial capital investment. Several kilometres of new medians are being developed each year.

The City of Surrey is exploring options for concave cross sections for medians that integrate rainwater and plant selection that will help to create habitat corridors as per the City's Ecosystems Management Plan recommendations. Other local municipalities have begun to emulate Surrey's landscape medians. More information about Surrey's median program is available by email; write to parksrecculture@surrey.ca.

—Owen Croy, *Manager of Parks and Tiina Mack, Landscape Architect/Parks Planning, Research and Design Manager, City of Surrey Parks, Recreation and Culture Department*

In Minneapolis, Minnesota median planting strips are valued yet have historically been underemphasized. That has changed over the last ten years due to a symbiotic relationship that has developed between the Minneapolis Park and Recreation Board's (MPRB) Forestry Division and the City Department of Public Works (PW). The creation of medians falls under PW but the trees are planted and maintained by the MPRB. Because the MPRB is a separate municipal government agency, one may think that traffic and construction engineers would look at trees as an after thought. Actually just the opposite is true. PW officials involve Forestry Division staff from start to finish because there is a high expectation that median trees will contribute to the community.

The public's vocal appreciation of trees is clearly understood by both city council members and the elected MPRB commissioners. Capitalizing on this support, the City and the MPRB adopted an urban forest policy (UFP) in 2004. Among the components of the policy are simple standards and guidelines for the size of medians. This helped formalize the construction of medians with the emphasis on tree survival. Since then the UFP has had an unexpected benefit by actually preventing the creation of medians in places where there is not adequate room for them.

Despite having this foundation in place, there are still challenges when dealing with medians in Minneapolis. The biggest challenge is tree survival. Wider medians are better for several reasons; the most important is the amount of root space. Another is that cars leaving the road are more likely to strike trees on a narrower median. This is especially true on icy Minnesota roads that require deicing salts. Wider medians mean less salt affecting the tree.

Unfortunately, preexisting conditions often dictate what we have to work with. An ideal situation in Minneapolis is on King's Highway which runs through a residential neighborhood. Not only is the median 25 feet (7.62 m) wide, the traffic load is much lower than on major traffic corridors. This means fewer tree collisions and far less salt use. As a result we are able to plant a wide variety of trees that provide great seasonal interest.

By contrast, Broadway Avenue was reconstructed in 2005 with no plans for trees in the median—that is, until a council member got involved. His demand for trees posed an interesting challenge for the 8-foot-wide (2.44 m) medians. Not only would subsoil have to be removed and replaced but heavy traffic would certainly result in occasional collisions with trees. The MPRB and PW negotiated the amount of soil replacement so as to fit the budget. 'Accolade' elms (*Ulmus 'Accolade'*) were chosen because of their ability to withstand tough growing conditions. Since then some of the original

trees have been replaced. However, the results were well worth the effort.

Another extreme median makeover took place downtown on Washington Avenue where existing 12-foot-wide (3.66 m) medians were paved with concrete. The mayor received funding from the EPA to plant trees in the downtown area. The most practical approach was to excavate the concrete from the existing medians and amend the soil to support trees. PW construction crews performed the preparatory work. MPRB crews planted disease resistant elms (*Ulmus* sp.) and honeylocusts (*Gleditsia triacanthos* var. *inermis*). In five short years the change has been a positive improvement for this very visible route.

The newest medians in Minneapolis were constructed last summer on Lyndale Avenue South, a commuter route running through both residential and commercial areas. Because mature trees line the existing right-of-way, the road width stayed the same. This dictated

the median width, a whopping 7 feet (2.13 m). The medians were intended for traffic calming purposes as well as for tree planting. As a result the soil in the medians is all new and runs the full length, over 350 feet (107 m). Sixty-five new elms and 'Autumn Blaze' maples (*Acer x freemanii*) will be planted this spring. Because the street is extremely busy, we are planning to use tree-watering bags so that that staff exposure to traffic can be minimized. Time will tell how well these sturdy trees fare.

In Minneapolis, the challenge of planting and maintaining trees in medians is only going to increase. Residents recognize the improved appearance of neighborhoods when medians are planted with trees. Satisfying this demand serves to foster the political support that has made tree care the MPRB's most popular tax-supported service.

—Ralph Sievert, Director of Forestry, Minneapolis Park and Recreation Board 