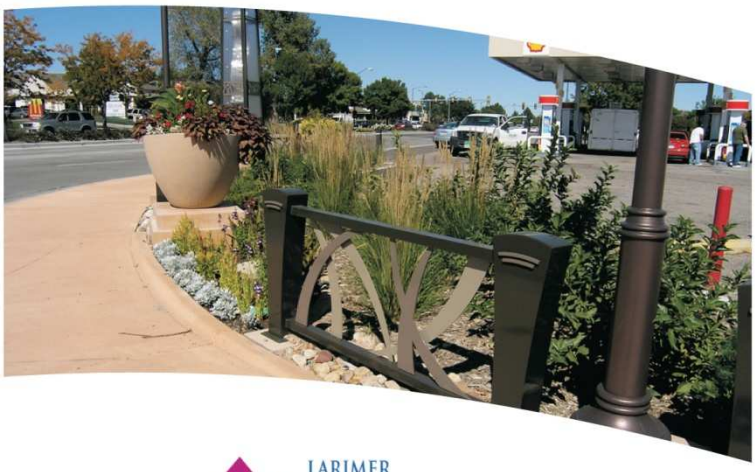
Appendix C

NOTE: Appendix Information is for Reference Only. Contact Local Entity Engineer for Current Information.

City of Fort Collins Streetscape
Design Standards and Guidelines

Streetscape Standards Fort Collins

LARIMER COUNTY URBAN AREA STREET STANDARDS | APPENDIX C



City of Fort Collins

LARIMER COUNTY
COMMITTED TO EXCELLENCE

Streetscape Standards

February 26, 2013

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For additional copies, please download from our website, or contact us using the information above.

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SECTION 1

Purpose and Intent

Based on the City of Fort Collins' vision to create a vibrant, world class community, these standards set forth a coordinated approach to the design and management of streets as visually appealing public spaces that contribute to Fort Collins' distinct identity.

The term "streetscape" generally encompasses the visual and pedestrian environment of a street. These streetscape standards involve parameters for tree-lined streets and sidewalks, other landscaping along street edges, and landscaped medians in arterial streets.

In addition to plantings, streetscapes may also encompass various urban design elements in certain settings. Examples include special curb treatments and median edges, low planter walls and landscape walls, railings, bollards, planter pots, stone features, public art, pylons, specialty lighting, signal and light pole treatments, specialty paving, transit stops and furnishings, and the like.

Every streetscape project involves its own context and constraints. Still, there is a need for standards to set the bar for level of quality and investment. These standards provide a framework for programming, budgeting, designing, maintaining, and renovating various incremental projects as part of a whole approach.

Exact details must then be adapted to fit and function with the unique context and constraints which exist in every project. The context and constraints include existing conditions that are expected to remain for the long term, and future change planned or envisioned by the City.

SECTION 2

Applicability & Use

These standards apply to all projects involving streetscapes in the City right-of-way including:

- Private development projects.
- City capital projects.
- Any other miscellaneous maintenance and renovation projects and efforts.

Private development and public capital projects may involve construction of new streets, and/or changes to existing streets.

The standards are intended to be used by:

- Staff, in the design and management of City streetscapes over time.
- Landscape architects and designers.
- Developers and decision makers in the development review process.
- Property owners, where plans and activities involve streetscapes.
- Citizens, City Councils, and staff, in discussions involving streetscape issues.

SECTION 3

Project Plan Submittal and Review

Streetscape projects that are part of development applications follow a standard City development review process, which will include collaboration with staff on streetscape design.

City capital projects involving streetscapes are reviewed administratively by interested City departments in an internal process of collaboration and routing of plans.

3.1

STREETSCAPE PROJECT DESCRIPTION REQUIRED

For streetscapes to be successful, it is important for City staff in multiple departments to have a clear understanding of the design intent, assumptions, and the needs for maintenance, monitoring, and replacements of plants or other components.

A project description is needed to supplement technical project plans. The purpose is to prompt designers and staff to record the whole story of the streetscsape project.

3.1.1 Streetscape Project Description required.

All streetscape projects involving landscaping and urban design elements shall include a Streetscape Project Description developed by City staff in collaboration with any project consultants, upon completion of design. The description shall:

- Be concise and avoid technical jargon.
- Include relevant commentary in addition to objective facts and information.
- Describe the design intent, assumptions, and maintenance and renovations that will be needed over time to realize the design intent.
- Note all aspects of the project from initial grading and soil preparation, to irrigation systems, to planting and establishment procedures, to management and maintenance.
- Note outstanding issues that need to be monitored over time.

Examples of topics to be addressed include:

- Reasons and concepts for all project decisions including planting, irrigation, mulches, boulders, hardscape, and urban design elements.
- Plant species needing pruning or trimming, specific weeding control practices, annual clean-up, dividing or periodic replacing to achieve the intent.

- Plant species with a limited track record in streetscapes that warrant monitoring.

- Mulches that need replenishing or clean-up.

- Urban design features that may need touch ups, replacements, stocking of parts, or other maintenance and renovations.

- Any other information useful for future understanding and management of the streetscape.

3.1.2 Project Statement File.

Staff shall maintain Project Statements for streetscapes on file.

SECTION 4

All Streets

The following standards apply to all street classifications city-wide, except where specific areas have applicable planning documents that set forth alternative standards tailored to the area.

4.1

STREET TREES

Rows of street trees along street edges are the fundamental, unifying element of continuity in city streetscapes.

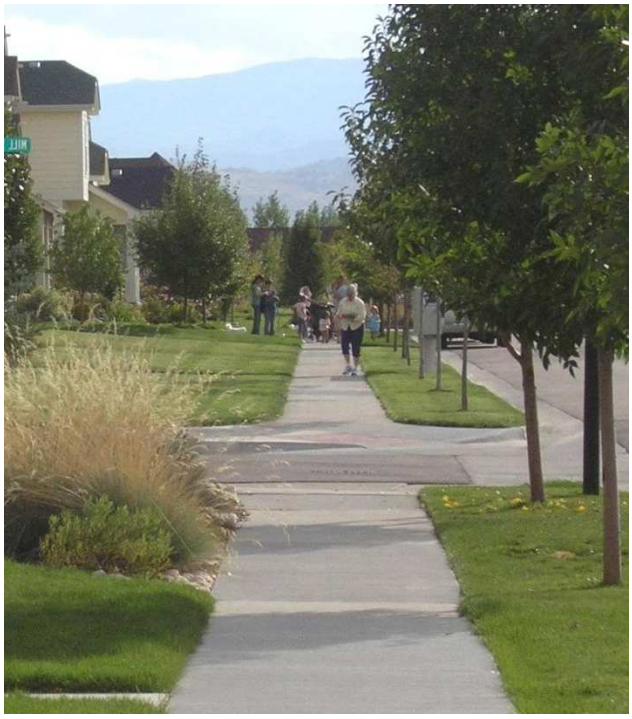
Street trees can be considered as multi-functional public infrastructure that:

- Defines the street as distinct space, providing a unifying framework for abutting developments.
- Provides canopy shading along streets and sidewalks to reduce glare and summer heat build-up.
- Provides a buffer between pedestrians on the sidewalk and vehicles in the roadway.
- Provides space for streetlights and signs, and for snow storage in winter.

Street trees in an arterial parkway.

4.1.1 Tree planting in parkways.

Wherever the sidewalk is separated from the curb in accordance with the *Larimer County Urban Area Street Standards*, rows of canopy shade trees shall be planted in the parkway at 30 to 40 foot intervals, centered between the curb and the sidewalk.

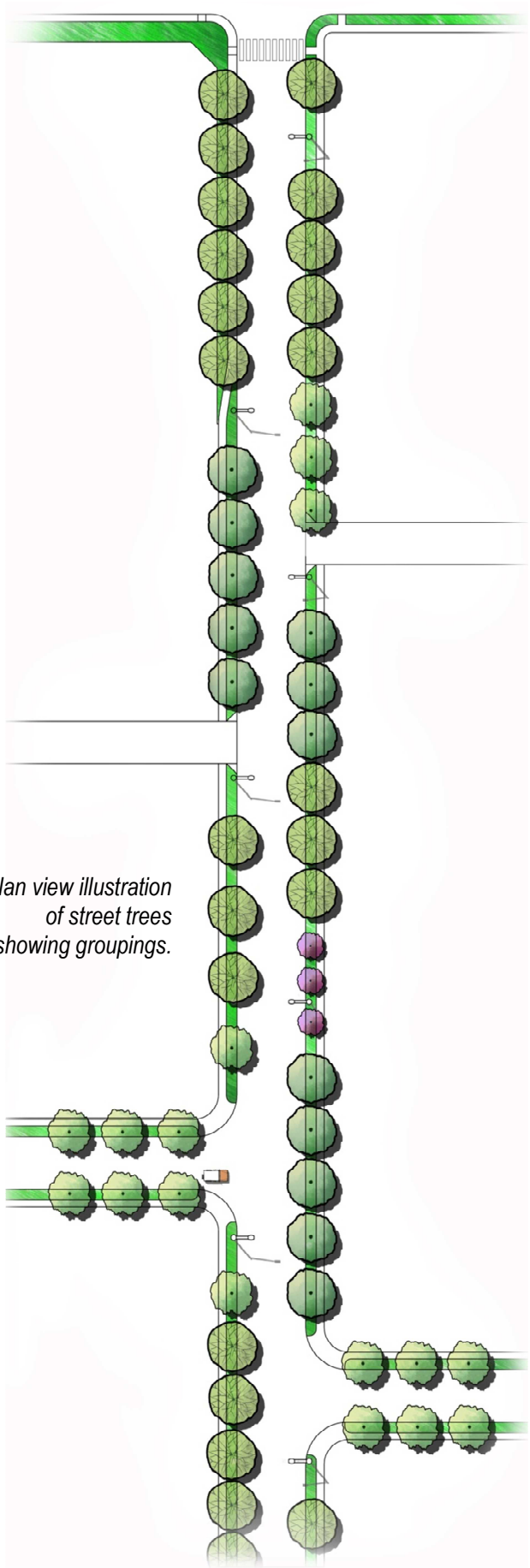


Street trees in a local street parkway.

4.1.2 Species groupings within tree rows.

To the extent reasonably feasible, street tree rows in landscape areas, whether inside or outside of the sidewalk, shall be in groupings of three, five, or more of a single species. The intent is to provide a degree of species diversity within a deliberate, repeating design pattern.

Designers are encouraged to arrange changes in species to reflect roadway conditions, such as open stretches of roadway between access points, stretches approaching intersections and driveways, and/or changes in adjoining land use.



Plan view illustration of street trees showing groupings.

4.1.3 Street trees in sidewalk cutouts.

If a project involves a new sidewalk that must be attached to the curb due to unique constraints or context, then the sidewalk width shall be wide enough to incorporate planting cutouts with tree grates to the maximum extent feasible.

- To the maximum extent feasible, such sidewalks shall be 12-15 feet wide with cutouts at least 25 square feet at 30- to 50-foot spacing. Larger cutouts with more than 25 square feet are encouraged.

- In all cases, trees in sidewalk cutouts shall be located at least 8 feet away from buildings and offset from building entrances.

- If such an attached sidewalk has an abutting landscape area, then 8 feet shall be the minimum width in which canopy trees shall be provided in sidewalk cutouts.

- The minimum area of any sidewalk cutouts shall be 16 square feet, using 4x4-foot tree grates. Larger cutouts with more than 16 square feet of area are encouraged, for example 4x6-foot or 4x9-foot tree grates, to support tree health.

8-foot sidewalk with 4'x4' tree grates, where there is an abutting landscape area.

- The soil surface in a sidewalk cutout shall be level with the bottom of the sidewalk slab. Trees shall then be planted with the top of the root ball 1-2 inches above the soil surface.

- All tree grates shall be installed per manufacturer's instructions. Frames shall be set in a true, flat plane to prevent rocking of the grate. The grate or a template shall be set in the frame before concrete is poured to ensure the final installation is square and flat.

- Grates shall be of a pedestrian-safe ADA-compliant style with slot openings 3/8-inch or less.

- A spacing interval up to 50 feet shall be permitted for street trees in grates where abutting commercial buildings face the street with no intervening vehicle use area between the street and the building.

4.1.4 Tree planting outside of sidewalks where existing constraints preclude parkway tree planting or sidewalk cutouts.

Where a sidewalk is attached to the curb and is less than 8 feet in width, canopy shade trees shall, to the extent reasonably feasible, be established in an area ranging from 3 to 7 feet behind the sidewalk at 30 to 40 foot intervals. This standard shall also apply where unusual constraints preclude tree planting in a parkway.

Any such planting will typically require coordination with abutting property owners.

Examples of street trees outside of sidewalks.

4.1.5 Adjustment of spacing intervals.

The Director or the City Forester may approve or require larger or smaller spacing intervals to better fit the growth habits of different street tree species, for safe use of the street or sidewalk, and to better fit with existing trees or other existing conditions unique to the location.

4.1.6 Overhead power line conflicts.

Ornamental trees may be planted in substitution of the canopy shade trees where overhead lines and fixtures prevent normal growth and maturity.

4.1.7 Spacing from driveways.

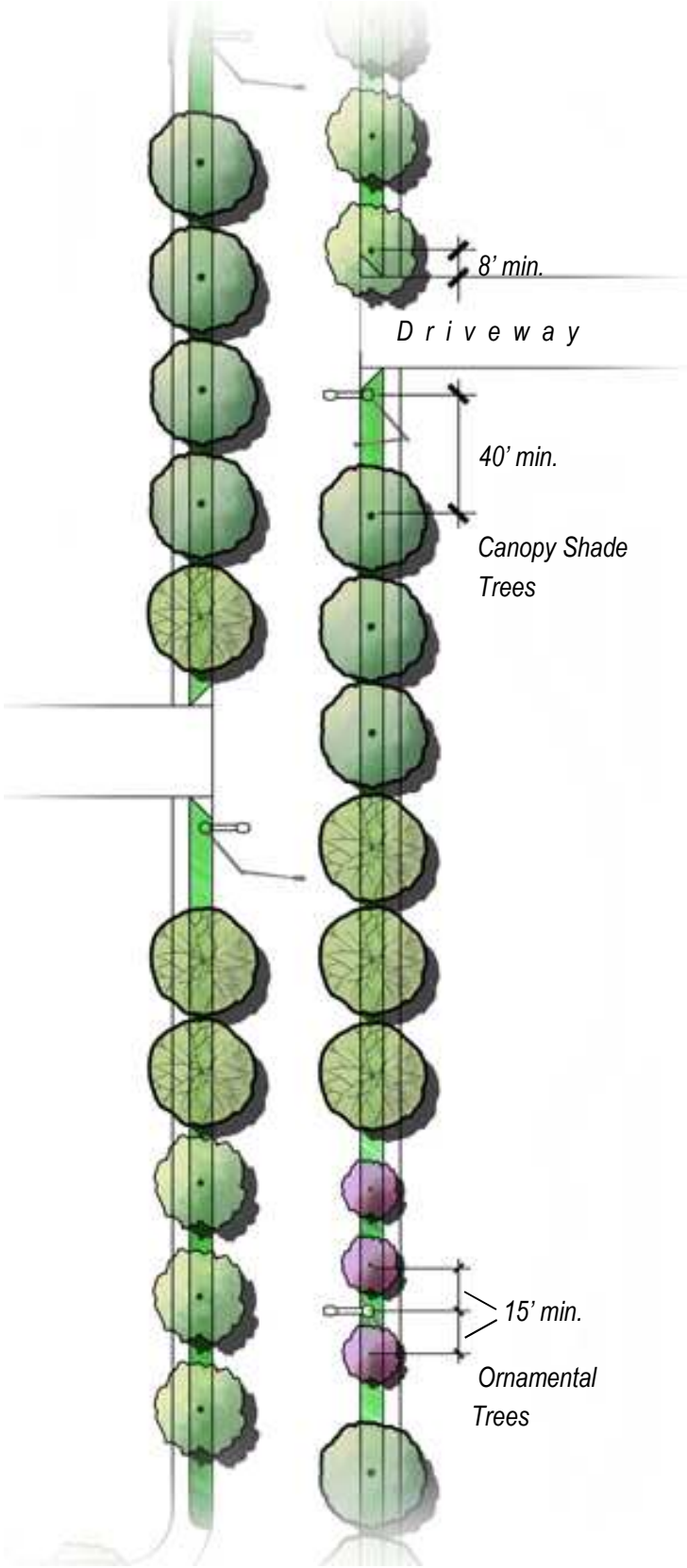
No tree shall be planted closer than 8 feet from any driveway or alley.

4.1.8 Tree separation from utilities.

Landscape and utility plans shall be coordinated. Following are the minimum dimension requirements for the most common tree/utility separations.

- 40 feet between canopy shade trees and streetlights. Fifteen (15) feet between ornamental trees and streetlights.
- 10 feet between trees and water or sewer lines.
- 4 feet between trees and gas lines.
- 4 feet between trees and underground electric lines shall be provided to the extent reasonably feasible.

Exceptions to these requirements may occur where utilities are not located in their standard designated locations, as approved by the City Forester or the Director. Tree/utility separations shall not be used as a means of avoiding the planting of required street trees.



Tree separations from streetlights and driveways.

4.2

PARKWAY LANDSCAPING – TURF-TYPE GRASS

Turf-type grass in parkways provides a multi-functional solution for landscaped edges along city streets of all classifications. Two main types of turf-type grasses may be used in Fort Collins streetscapes: cool-season turfgrasses, and warm-season native shortgrasses. Cool-season turfgrasses include improved varieties of Kentucky Bluegrass, Tall Fescue, Perennial Ryegrass, and Wheatgrasses. Warm-season native shortgrasses include improved varieties of Buffalograss and Blue Grama.

Efficiently irrigated, mowed cool-season turfgrass provides a living green edge to city streets over a long growing season. The green edge, along with street trees, is a unifying element that helps define City streets as continuous spaces, in conjunction with street trees.

Cool-season turfgrass can be a sustainable, functional landscape solution consistent with "xeriscape" and "water-wise" landscaping principles. These principles recognize cool-season turfgrass as an appropriate use of water in high visibility, multi-functional, high-use areas, and parkways typically fit that description. Cool-season turfgrass can be reasonably drought tolerant, depending on the species and improved variety. Problems resulting from periods of neglect are relatively easy to correct, and the turf rarely, if ever, needs replacement.

Non-gardeners and typical commercial crews can readily maintain cool-season turfgrass. It naturally inhibits weeds, and mowing is an efficient way to control weeds that do occur. It works well in conjunction with street trees with tolerance for shading. In winter, dormant turf is easy to keep tidy and trash-free. It tolerates foot traffic better than any other living ground cover.

Turfgrass parkways provide continuity and multiple functions.

Blue Grama and Buffalograss have very low irrigation and mowing needs. They are active and green for a shorter season than cool-season turfgrasses, but have an attractive straw color when dormant. They can offer a beautiful alternative to cool-season turfgrasses with their fine textures and soft gray-green color. They require full sun and significant weed control to maintain a high quality appearance in city landscapes. They do not tolerate shady spots, high levels of foot traffic, or overwatering. They are not as competitive with weeds, and weeds stand out in contrast to the texture and color of the grasses.

4.2.1 Requirements.

Section 5 includes parkway landscaping standards for Arterial Streets. Section 6 includes parkway landscaping standards for Collector and Local Streets.

4.3

PARKWAY LANDSCAPING - ALTERNATIVES TO TURF-TYPE GRASS

Mulched planting beds can be an acceptable alternative solution to turfgrass for parkway landscaping in some situations.

This alternative typically requires less water than cool-season turfgrass. With appropriate plant selection and proper maintenance it can offer seasonal interest and add character. While maintenance needs can be less frequent than a cool-season turfgrass mowing regime, they can be more complex and occasionally more time-consuming as weeding, trimming, mulching and replacing materials are important to keep the plantings healthy and attractive.

Mulched planting bed in the parkway limits water use and can provide visual interest.

4.3.1 Where Appropriate.

Alternatives to irrigated turfgrass can be an appropriate choice for property owners abutting collector and local streets, depending on whether the parkway is governed by an approved Development Plan. Alternatives can also be appropriate for arterial street projects in special plan areas that have recommended alternatives.

4.3.2 Requirements.

Section 5 includes parkway landscaping requirements for Arterial Streets. Section 6 includes parkway landscaping requirements for Collector and Local Streets.

4.4

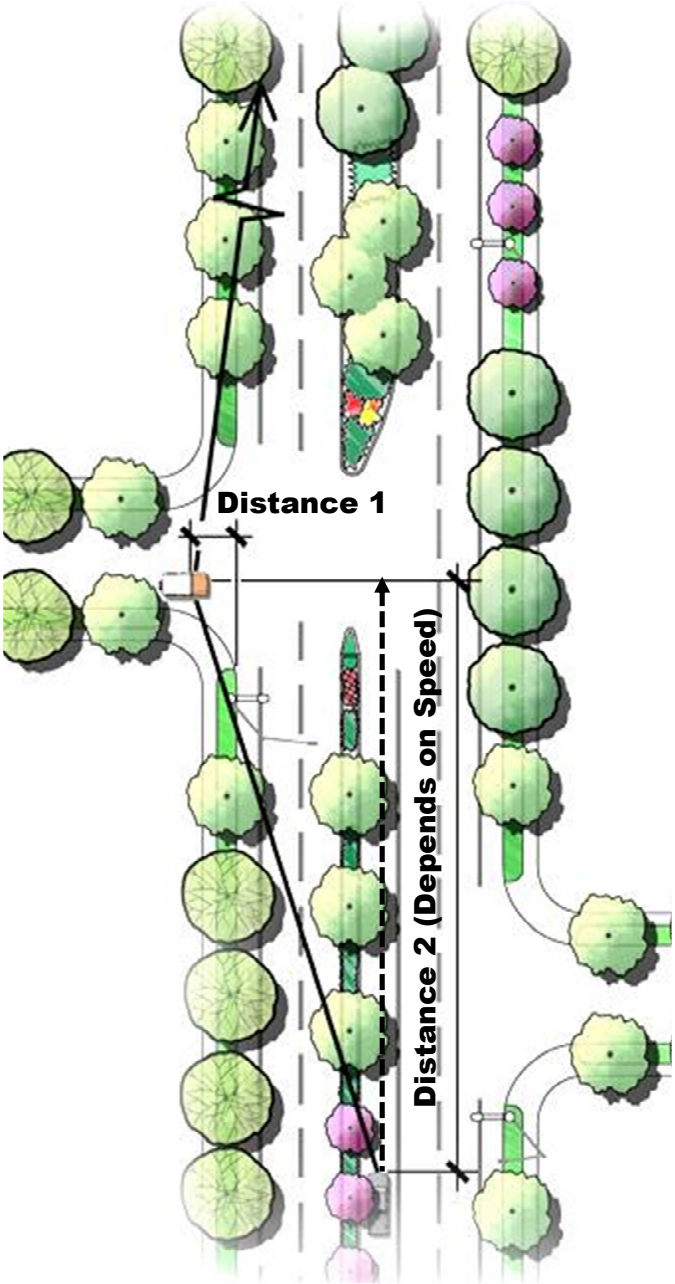
SIGHT DISTANCE TRIANGLES AT INTERSECTIONS

Sight distance generally refers to the line of sight from a driver at an unsignalized intersection to approaching vehicles that the driver needs to see in order to safely enter traffic.

4.4.1 Requirements.

A visual sight distance triangle, free of any structures or landscape elements shall be maintained at street intersections and driveways, as required in Figure 7-16 in the *Larimer County Urban Area Street Standards*.

Deciduous trees may be permitted to encroach into the clearance triangle provided that the lowest leaves shall be at least six (6) feet from grade and are spaced so that they do not obstruct line of sight.



Site Distance Triangle concept.

4.5

LOW IMPACT DEVELOPMENT – STORMWATER MANAGEMENT

In a "Low Impact Development" (LID) approach to streetscapes, landscaped parkways and medians are depressed rather than raised, to help manage stormwater runoff closer to the source. Depressed landscape areas are designed with special soil mixes, corresponding plantings, and other design techniques to infiltrate and filter runoff, instead of concentrating and conveying all runoff to centralized detention and treatment facilities.

The City's Stormwater Criteria Manual, which governs the management of stormwater in the city, describes design, plant selection, and maintenance techniques applicable to streetscapes.

4.5.1 LID encouraged.

LID techniques and technologies are encouraged whenever the drainage patterns and the infrastructure allows for such measures to be used.

4.5.2 Low Impact Development streetscape projects.

In any streetscape where a Low Impact Development approach is used, Streetscape Standards shall be adapted or modified as needed per the Stormwater Criteria Manual.

Illustration of LID concepts in a parkway.

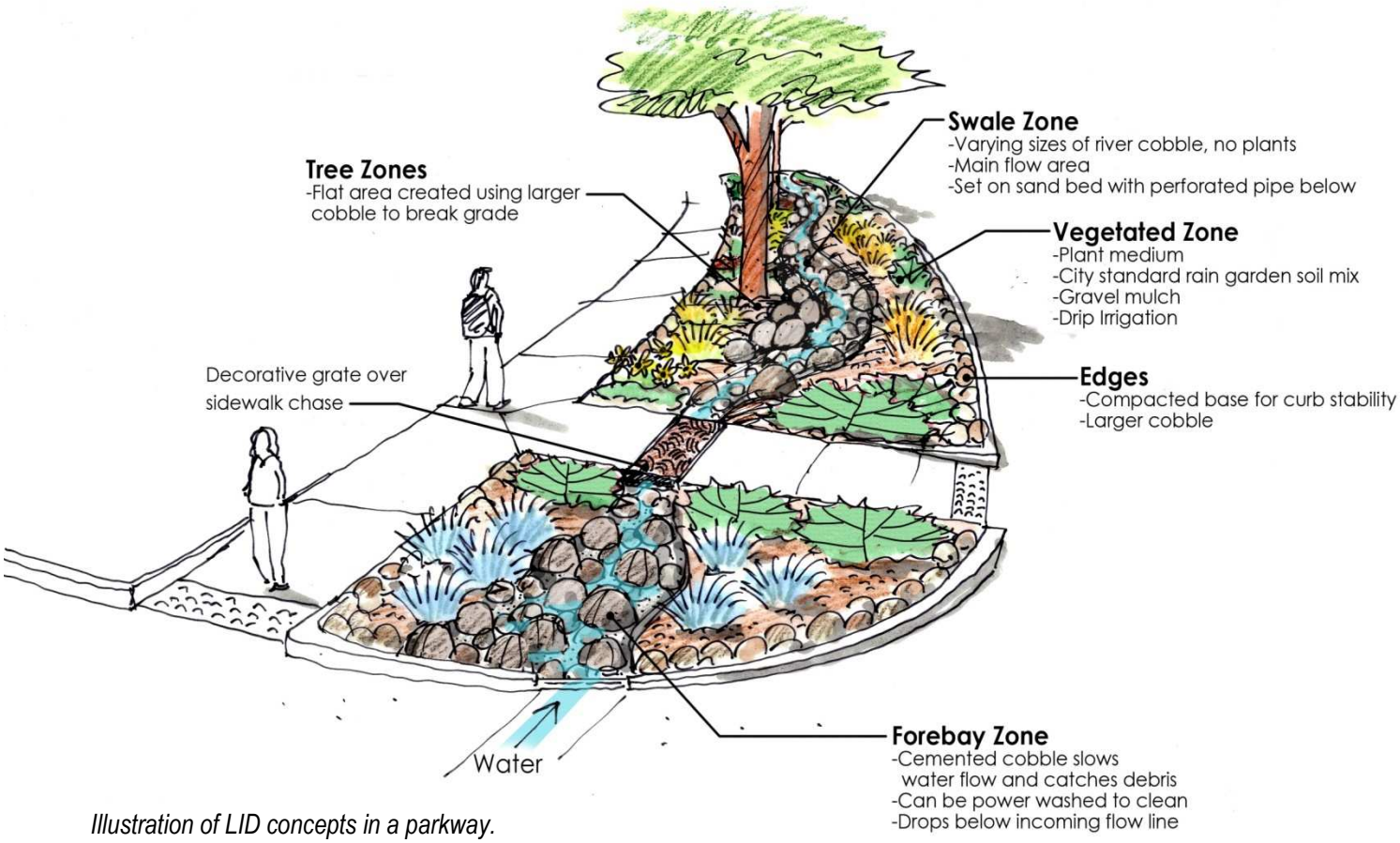


Illustration of LID concepts in a parkway.

Illustration of LID median concept with street runoff directed to a depressed median with a flush band instead of curb and gutter.

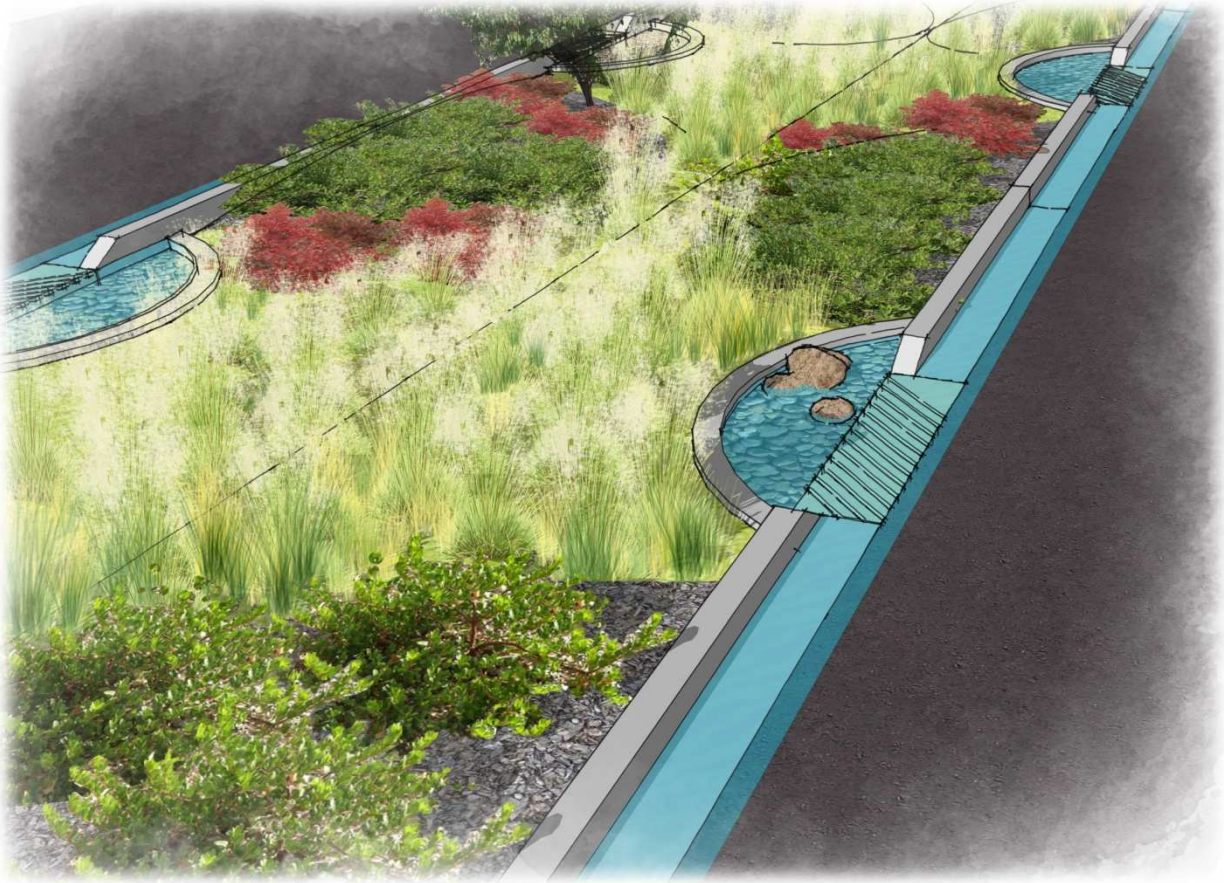


Illustration of LID median concept with street runoff directed to a depressed median with special curb and gutter inlets.

SECTION 5

Arterial Streets

The city's arterial streets are complex and expensive public infrastructure, combining virtually all utility and transportation systems of the city. Besides the functional needs for traffic and utilities, a pervasive theme throughout the City's Comprehensive Plan is the importance of streets as public space. As high-visibility public space, arterials create first impressions, are experienced by all residents on a daily basis, and play a large role in determining the character and conveying the civic intention of the City of Fort Collins.

Arterial streetscapes vary widely, from the Downtown core, to suburban residential areas, to the Natural Areas in the Poudre River valley.

Downtown core.

Suburban residential area.

Poudre River valley.

Some arterials are distinguished by the inclusion of medians along street corridors and in roundabouts. Besides managing traffic, medians provide very high-visibility space for landscaping, and provide a refuge for pedestrians crossing the road. Medians can humanize the scale of a wide street, and add beauty and civic identity. They are a highly visible mainstay of urban design, and thus are a major aspect of the City's streetscape efforts.

Medians in a roundabout.

5.1
ARTERIAL STREETSCAPES MAP

The Arterial Streetscapes Map recognizes differences between various arterials throughout the city. It indicates where a "Standard Arterial Streetscape" approach should apply, and where other corridor segments and gateway intersections warrant their own tailored approach to streetscape design and management.

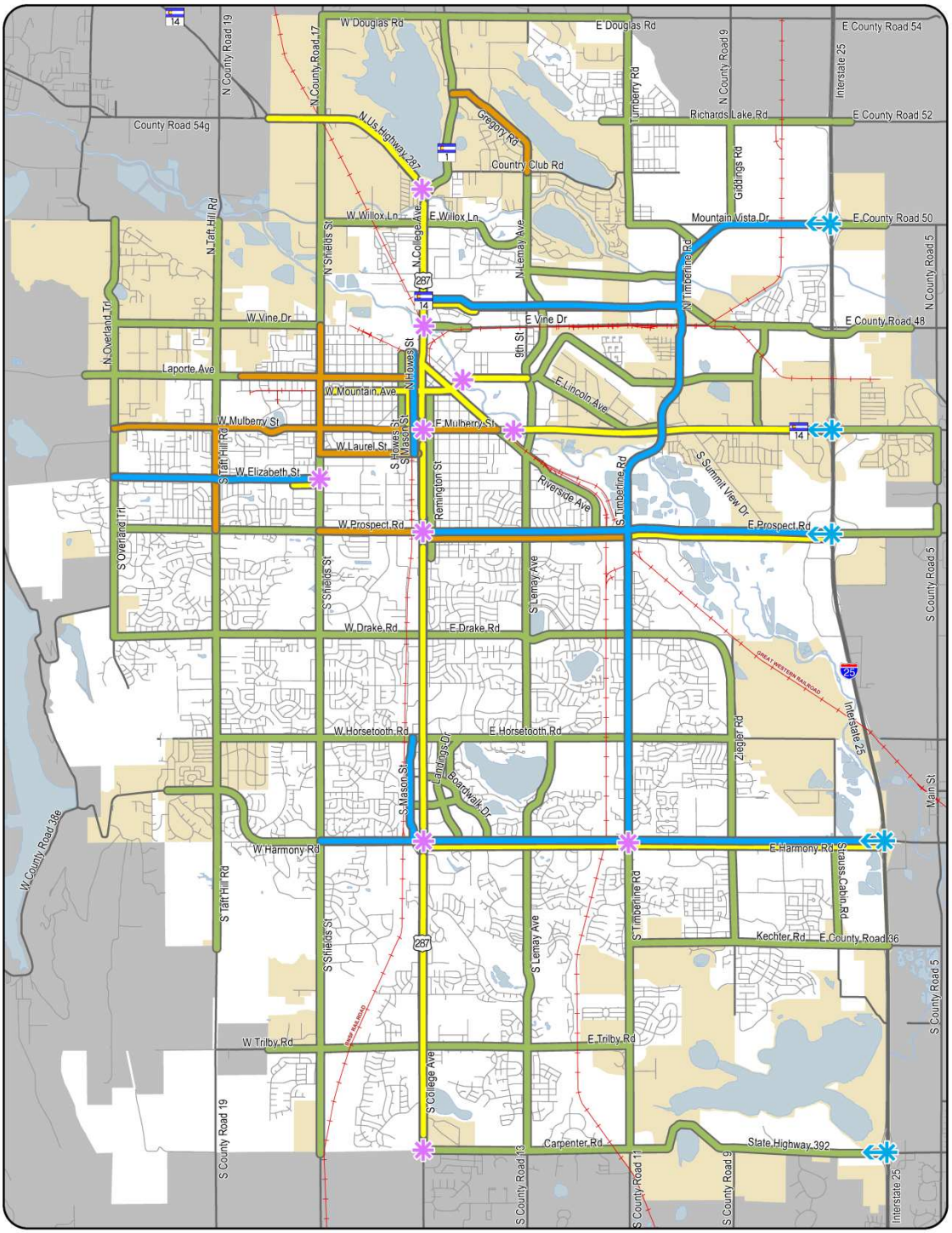
The map works in conjunction with design standards in the following chapters to guide investment in streetscapes throughout the city.

The types of Arterial Streetscapes and Gateways are:

- Standard Arterial Streetscapes.
- Enhanced Travel Corridors.
- Special Planning Areas.
- Streetscapes constrained by Existing Development.
- Gateway Intersections.
- Community Entrance Gateways (at Interstate 25).

Streetscape Design Standards and Guidelines

Arterial Streetscapes



Streetscape Types

- Standard Arterial Streetscape
- Enhanced Travel Corridor
- Special Planning Area
- Constrained by Existing Development

- Gateway Intersections
- Community Entrance Gateway (Interstate)
- Unincorporated Land in GMA
- City Limits

City of Fort Collins

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0 1 2 3 Miles

5.2

ARTERIAL STREETSCAPE DESIGN: STANDARD ARTERIAL STREETSCAPES - MEDIANS

The primary focus of "Standard Arterial Streetscapes" is on medians, including the medians in roundabouts.

Median standards emphasize mixed plantings of perennials, grasses, shrubs, and tree groupings, with a mulched ground surface. The intent of these standards is to reflect Fort Collins' western regional character with regionally-specific plants suited to the harsh roadway environment.

Planting compositions must include:

- Varied plant forms, textures, and foliage in addition to flowers.
- Coordinated, repeating groupings of plants to form an overall pattern.
- Accent groupings to add detail and variation within the overall pattern.
- Related elements such as mulches and boulders.

Illustration of standard arterial median landscaping approach.

5.2.1 Median width measurements.

All references to median widths are from face of curb to face of curb.

5.2.2 Median grading.

The ground surface in landscaped medians shall be crowned with a high point in the center, with slopes not to exceed 7:1 or approximately 14 percent. This standard shall not apply where a median has a cross slope due to opposing traffic lanes and curbs having different elevations, such that a crown may not be feasible.

5.2.3 Median grading in roundabouts.

The ground surface in center medians in roundabouts shall be crowned with slopes not to exceed 7:1 or approximately 14 percent. The intent of this standard is to increase the visual prominence of landscaping, and work in conjunction with planting and hardscape elements to achieve year-round screening of visibility across the roundabout to a height of at least 4 feet.

5.2.4 Median planting general approach.

Tree groupings and mixed plantings of other plant types shall be established and maintained in medians.

This standard shall not apply in the following situations:

- Trees shall not be planted in medians less than seven feet wide.
- Medians less than three feet wide shall be paved rather than planted.

5.2.5 Median tree groupings:

- Canopy shade trees, ornamental trees, and evergreen trees shall be planted in groups of three, five, or more to the extent reasonably feasible. Open intervals shall be provided between the groups.

- Open intervals between tree groups shall constitute 30-60% of the length of a given median. These percentages are intended to convey a general proportion rather than a precisely measured formula.

- Determination of the open intervals shall be based on the design intent and growth assumptions for trees over a given time frame.

- Where median length allows, repetition of tree groupings is encouraged.

5.2.6 Tree separation from median edges.

Separation of trees from concrete edges shall be provided by designers as needed based on assumptions for growth and pruning over a given time frame. The following minimum separations shall be provided for tree types as listed in Exhibit List of Recommended Plants:

Large canopy trees – 2.5 feet.

Ornamental trees – 1.5 feet.

Large evergreen trees – 7 feet.

Small evergreen trees – 5 feet.

5.2.7 Evergreen tree setbacks from face of curbs.

Evergreen trees shall be set back from the face of curbs:

Large evergreen trees – 9 feet.

Small evergreen trees – 7 feet.

5.2.8 Staggered median tree groupings if space permits.

Tree groupings shall be staggered rather than aligned in straight rows, where median width permits a stagger of at least 2 feet.

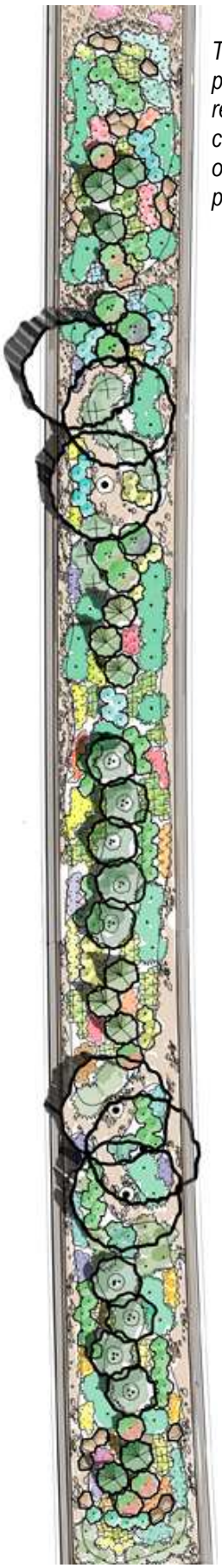
Example plan view of a median showing tree groupings.

5.2.9 Mixed plantings.

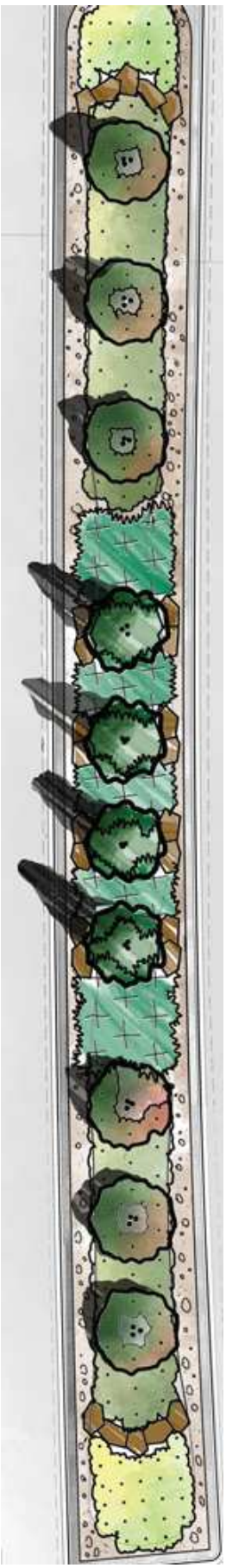
Mixed plantings of perennials, ornamental grasses, shrubs, and shrubby trees shall be planted and maintained to cover at least 75% of the median area within 5 years, based on assumptions for growth and maintenance of plants by the designer.

- Mixed plantings shall be composed of groups of at least 3 plants per group, with each group composed of a single species.
- Mixed plantings shall be composed for understory conditions at tree groupings, and open conditions in intervals between tree groupings.
- Mixed plantings shall be arranged in an informal pattern rather than formal rows or geometrically-shaped groupings. The informal pattern shall include coordinated, repeating groupings of plants in an overall composition, rather than random placement. Plantings shall be designed and maintained to span the full width of the median at maturity.
- Mixed planting standards apply to all medians 3 feet wide or wider.

Mixed planting in a newly planted median.



This – informal pattern, but with repeated groupings to create an overall order in the design pattern.



Not This – formal, geometric pattern of massed plantings. While this kind of design pattern is not the "Standard Arterial Streetscape" approach, it may be appropriate for special planning areas.

5.2.10 Mixed plantings – two options for intensity.

Two options for mixed plantings shall be permitted:

- Perennial Garden Style.
- Shrub Garden Style.

Perennial Garden Style: This option emphasizes the maximum degree of planting intensity, color, and variety, with perennials used for the full length of a median. This results in a higher number of different plant groupings and a higher total number of plants to achieve the required 75% plant coverage.

Shrub Garden Style: This option allows the use of larger shrubs and shrubby trees to achieve the required 75% coverage with a lower number of different plant groupings and lower total number of plants.

5.2.11 Perennial Garden Style requirements.

An average of at least 4 groupings of perennial or ornamental grasses, and 3 groupings of shrubs per 250 square feet shall be planted and maintained. Groupings shall be composed of single species with at least 3 plants.

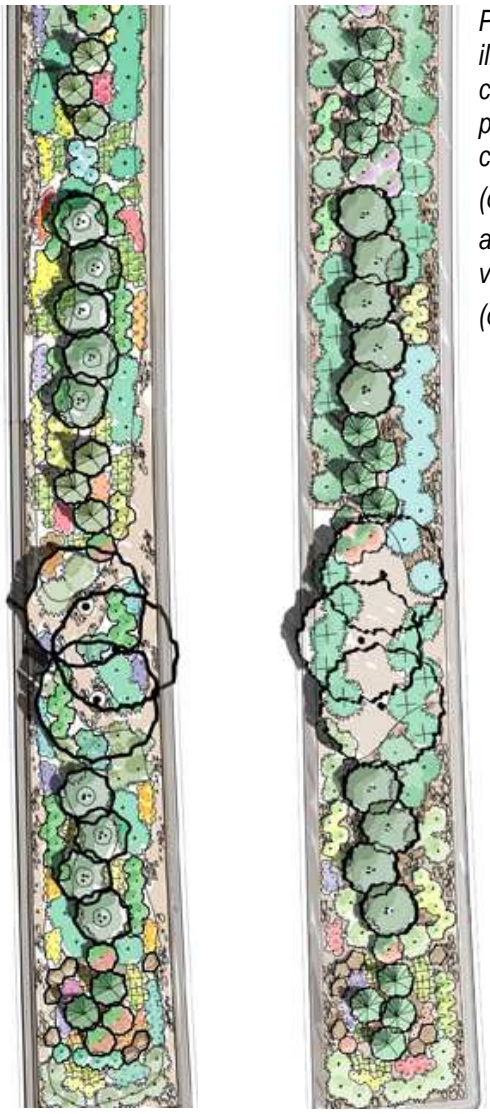
Illustration of Perennial Variety Style mixed planting, with open areas and tree groupings.

5.2.12 Shrub Garden Style requirements.

An average of at least 3 groupings of shrubs per 250 square feet shall be planted and maintained. Groupings shall be composed of single species with at least 3 plants.

In open areas at the ends of medians at intersections, at least 4 perennial or ornamental grass groupings and 3 shrub groupings shall be planted and maintained, with emphasis on color and/or texture over a long growing season.

Example of a mixed shrub planting with regionally adapted species (not a streetscape).



Plan view illustrations comparing perennial variety concept (on the left) and shrub variety concept (on the right) .

5.2.13 Decision on options.

The option to be used in any project shall be approved by the Director based on consideration of the relative importance of a given median to community image, intensity of adjacent land uses, the width and length of the median, and City budget considerations. In general, the Perennial Garden Style is more appropriate in higher-activity, mixed-use areas. The Shrub Garden Style is generally more appropriate in residential and other lower-activity areas.

5.2.14 Median noses and narrow ribbons - planting.

Median areas 3-7 feet wide shall be planted with low mixed planting under 30 inches in height.

5.2.15 Plants and mulches in conjunction.

Plant groupings shall be designed in association with either cobble mulch or organic mulch. Plants selected to feature green leaves and flowers are generally complemented by organic mulch, while stone mulch can detract from their effects. Stone mulch can complement evergreens, other plants selected to feature distinct forms or textures, and xeric plants with grey-green foliage.

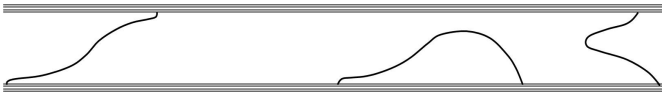
When mulches are mixed, the patterns shall be in sweeping curves, and not rectangular blocks or strips along the edge.

5.2.16 Mulches.

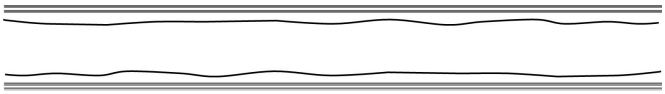
Organic mulch shall be used, either solely or in combination with stone mulch to add visual interest with a design pattern. Organic mulch shall be undyed shredded woody material. If a combination is used, the pattern shall be designed in conjunction with plant groupings, and the pattern shall span the full width of the median rather than dividing the median lengthwise into linear strips or lining the edge of the median.

This - mulch pattern spans the median in a sweeping curve.

Not this – mulch pattern in linear strips.



This – mulch pattern in sweeping curves designed with the direction of travel in mind.



Not this – mulch pattern in linear strips.

Not this – mulch pattern in blocks.

Stone mulch, if used, shall consist of 2-4-inch stone combined with groupings of 4-12 inch or larger stone hand placed as accents for visual interest and to separate abutting organic and stone mulches. Larger stone shall be placed

first, to be embedded, mingled, and settled with the smaller stone rather than loosely dumped.

Stone mulch placement example.

5.2.17 Boulders.

Boulders may be used to structure and complement plant groupings. They shall be designed and placed in deliberate groupings in association with the planting and mulch design pattern, and any low walls or slopes. They shall be placed prior to planting and mulching, and slightly sunk into the ground, to be embedded and mingled with mulches and plantings. Permitted boulders shall be tan Masonville sandstone quarry blocks, rounded river boulders, or weathered moss rock boulders.

Boulder selection shall be based on continuing an established theme, or establishing a theme where none exists.

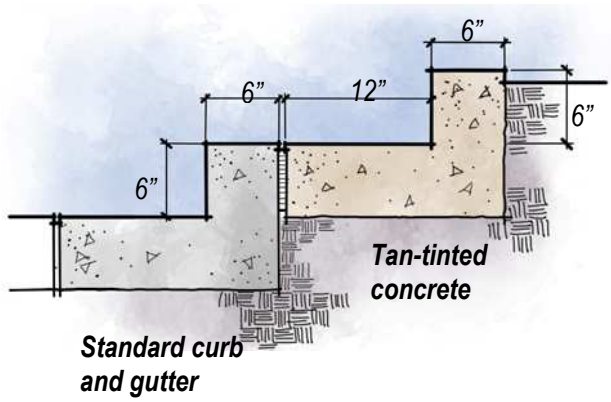
Tan Masonville sandstone quarry blocks.

Rounded river boulders as part of a whole design approach to plantings and mulches.

5.2.18 Median hardscape – edges and paving.

Hardscape treatments depend on different median widths and different contexts throughout the city, and shall comply with the following requirements:

A. In median areas that are at least 7 feet wide, a double curb edge shall be installed where a project includes 1) a new median, or 2) an existing median that lacks splash blocks or has splash blocks that warrant replacement. The purpose of this standard is to provide additional depth for planting areas, space for maintenance personnel, an additional correction barrier for vehicles leaving the roadway, and a visual design that complements the curb and gutter. Where a median tapers to less than 7 feet, the upper curb shall return across the median to enclose the upper landscape area.

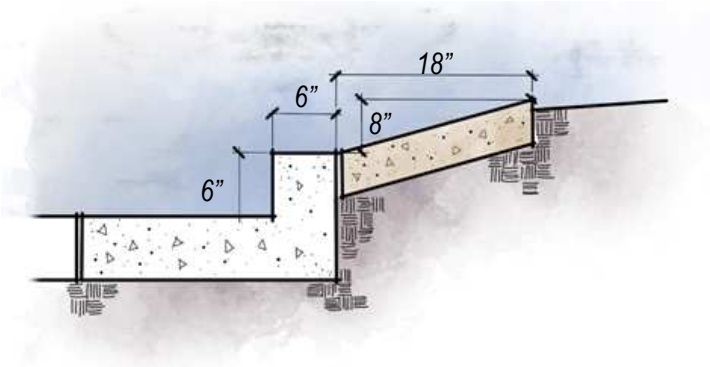


Double curb design.

Illustration of double curb.

The following exceptions to the double curb shall apply:

1) Sloped concrete splash blocks with integral tan tint and exposed aggregate finish shall be permitted in lieu of a double curb if a median project is located in a street segment or area of the city where existing splash blocks have a previously established theme and are expected to remain for a long term.



Sloped splash block design.

Sloped splash block design: existing Standard Arterial Streetscape corridors throughout the city include extensive segments with existing sloped concrete splash blocks, per a former standard.

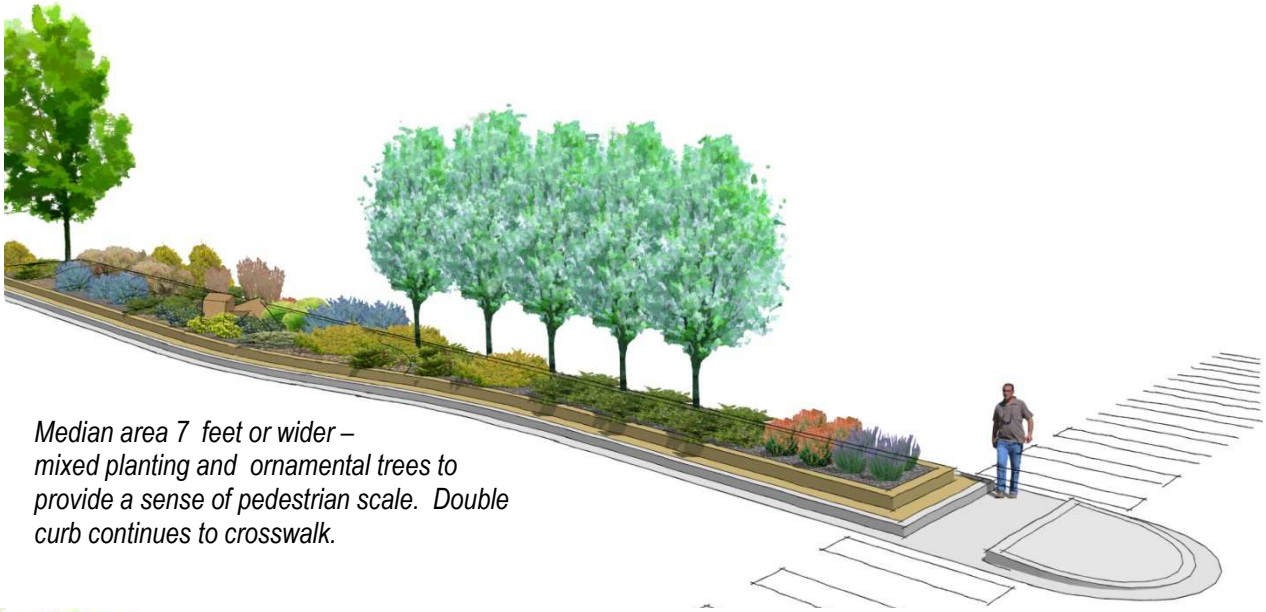
2) Where a median is less than 7 feet wide, the edge shall be a standard 6-inch curb with no double curb or splash block.

B. Median areas under 3 feet wide shall be paved rather than planted. Paving shall be rectangular concrete or brick pavers set on a concrete base.

The following exception to pavers shall apply: where existing tan exposed-aggregate concrete median paving establishes a prevailing theme, it shall be permitted for paving of medians under 3 feet wide.

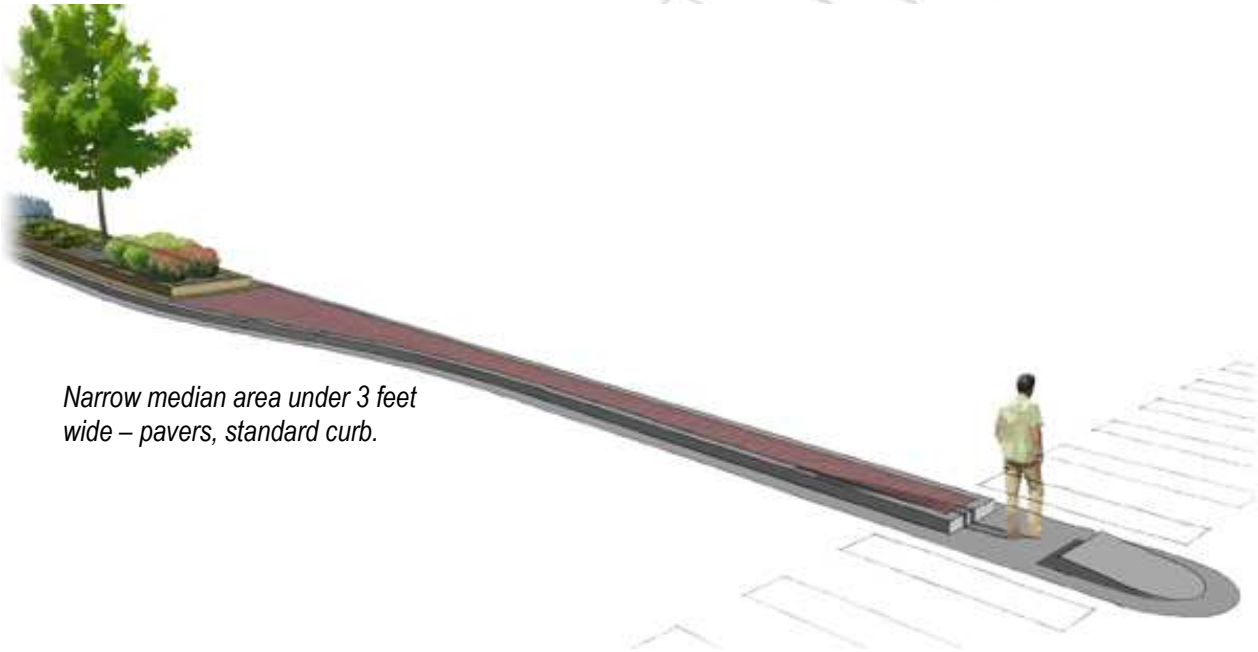
Tan exposed-aggregate concrete median paving.

Rectangular pavers set in a herringbone pattern.



Median area 7 feet or wider – mixed planting and ornamental trees to provide a sense of pedestrian scale. Double curb continues to crosswalk.

Narrow median area 3-7 feet wide – mixed planting, no trees, standard curb.



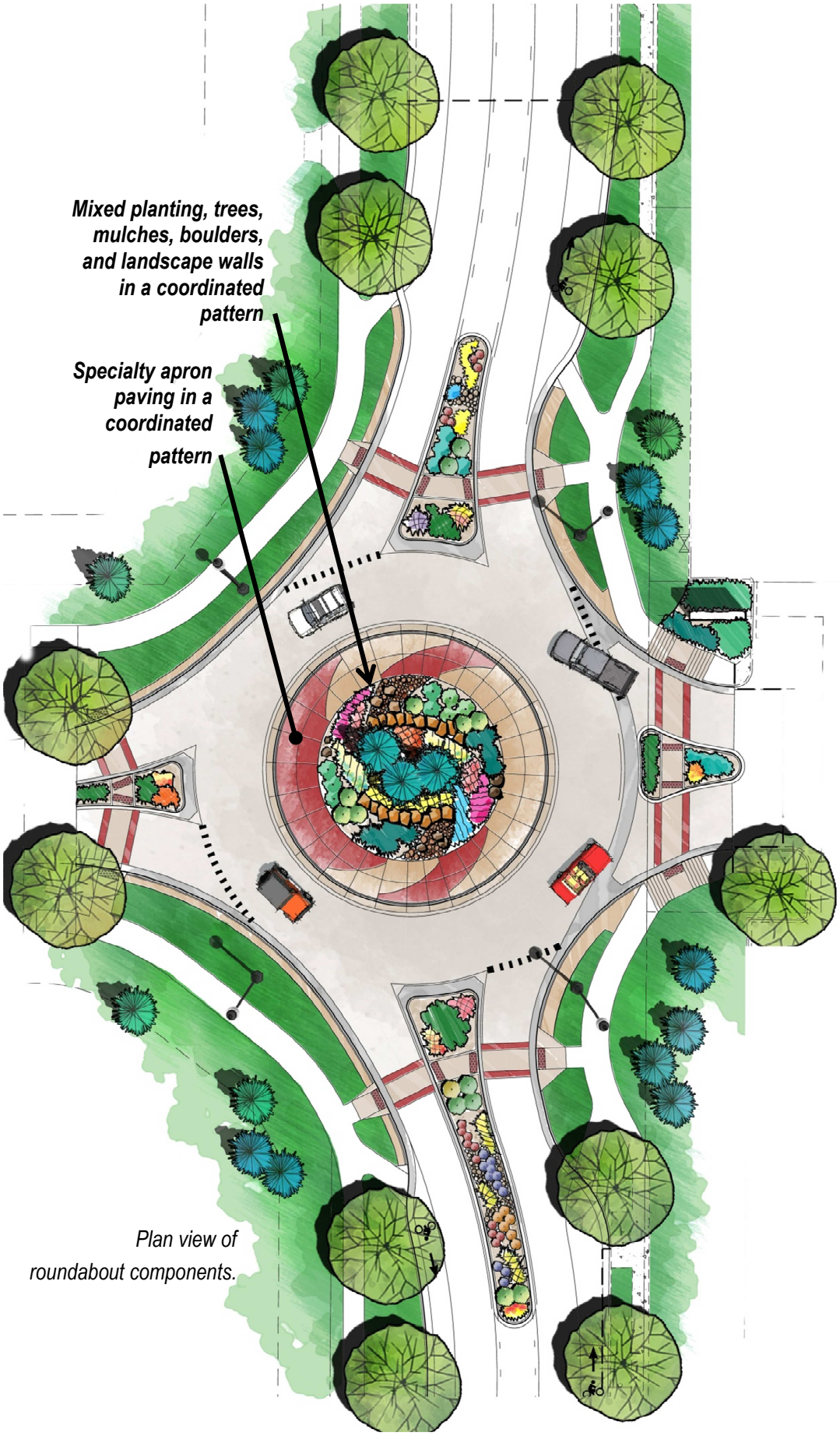
Narrow median area under 3 feet wide – pavers, standard curb.

5.2.19 Roundabout planting and hardscape:

Roundabout medians in Standard Arterial Streetscape areas shall be developed and maintained with tree groupings and mixed plantings in the Perennial Variety Style, with boulders and a mulched ground surface. Landscape walls may be included to reinforce the pattern and provide year-round structure for plantings.

Apron paving and any special curbs shall be designed for visual interest with tinted, textured concrete, pavers, or similar material.

Design of each individual roundabout shall be unique unless multiple roundabouts are related in a pair or group as part of a single traffic management project. Design elements include planting themes, plant species, apron paving, and other hardscape details.



Plan view of roundabout components.

Illustrations of roundabout landscaping approach with mixed planting, boulders, mulch and hardscape patterns all designed in conjunction. Lower graphic shows the inclusion of landscape walls.

5.3

ARTERIAL STREETSCAPE DESIGN: STANDARD ARTERIAL STREETSCAPES - PARKWAYS

The City maintains most arterial street parkways, with exceptions in a limited number of situations where other arrangements are made with another entity. Turfgrass provides a range of benefits as a solution to arterial street parkways as described in Section 4. The benefits describe are relevant for all street classifications, but are particularly relevant for arterials which form a continuous city-wide framework of public space.

5.3.1 Irrigated Turfgrass.

Parkways in Standard Arterial Streetscapes shall consist of irrigated turfgrass and street tree plantings as described in Chapter 4. Appropriate irrigation shall be provided to maintain health of plantings with efficient use of water.

Arterial street parkway.

5.4

ARTERIAL STREETSCAPE DESIGN: ENHANCED TRAVEL CORRIDORS (ETC'S)

Standard Arterial Streetscape standards may or may not be adequate and appropriate for design and maintenance of these corridors, depending on unique circumstances in each ETC.

These arterial corridors are intended to evolve as a framework that incorporates and supports high frequency transit with special emphasis on walkability and bicycling.

5.4.1 Tailored streetscape approach.

For streetscape projects where previous ETC plans do not define a streetscape approach, the Standard Arterial Streetscape standards in Section 5.2 shall be considered as the minimum requirement for the level of quality and investment.

Design and maintenance shall then be adapted to unique circumstances in each corridor as appropriate, based on study of and response to:

1. Guiding policies for ETC's.

2. Established precedents in the corridor that are consistent with the vision and policies for ETC's.

Examples of permissible design variations include:

3. Planting patterns to reinforce the pattern of transit facilities.

4. Hardscape elements – edge treatments, paving, planters, and the like, particularly where related to transit stops and shelters.

5. Urban design amenities in a coordinated program, particularly including paving, furnishings, and structures at transit stops and shelters.

In all cases, design shall include repeating elements to create a theme for the corridor and avoid clutter of unrelated elements.

5.5

ARTERIAL STREETSCAPE DESIGN: OTHER SPECIAL PLANNING AREAS

Special planning areas have subarea plans, corridor plans, or other planning documents that recognize their unique context and character. The level of specific direction for streetscapes varies among the plans.

These areas warrant their own distinctive streetscapes with tailored design and maintenance characteristics, rather than the Standard Arterial Streetcape.

5.5.1 Tailored streetscape approach.

For streetscape projects where plan documents are not definitive, the Standard Arterial Streetscape standards in Section 5.2 shall be considered as the minimum requirement for the level of quality and investment, and may be considered as a reference for design.

Design and maintenance shall then be adapted by project designers and staff based on study of and response to the context and any established precedents that are consistent with the vision and policies for the area, and are thus expected to remain.

Examples of permissible design variations on the Standard Arterial Streetscape include:

6. Distinct patterns of trees and other plant groupings.

7. Signature plant species.

8. Hardscape elements – edge treatments, paving, low planter walls or landscape walls, and the like.

9. Urban design amenities such as paving, street furnishings, and transit stop shelters or other themed structures in a coordinated program.

In all cases, design shall include repeating elements to create a theme for the area and avoid clutter.

Custom-tailored streetscape with parkway and median details as part of a whole planning approach to a street segment in Campus West.

5.6

ARTERIAL STREETSCAPE DESIGN: CONSTRAINED CORRIDORS AND SEGMENTS

These are arterial corridors and segments where the Standard Arterial Streetscape is not feasible due to physical constraints of existing development. Typically, both parkways and medians are constrained.

Example of a constrained arterial (East Prospect).

5.6.1 Tailored streetscape approach.

Streetscape projects in these areas shall incorporate aspects of a Standard Arterial Streetscape to the extent reasonably feasible. The allocation of available space and the compromises on each component of the street shall be determined on a project-by-project basis.

The most important aspects to consider in the streetscape approach are safe sidewalks and street trees as described in Chapter 4.

5.7

ARTERIAL STREETSCAPE DESIGN: GATEWAY INTERSECTIONS

These intersections are exceptional locations where the Standard Arterial Streetscape should be augmented with additional intensity of streetscape development in any capital projects. These locations warrant the highest level of investment for design, construction and maintenance.

The intent is to highlight entryways into the city, and also edges of districts within the city. The locations consist of intersections, whether signalized or roundabouts, extending outward as appropriate to include medians associated with the intersection.

5.7.2 Components.

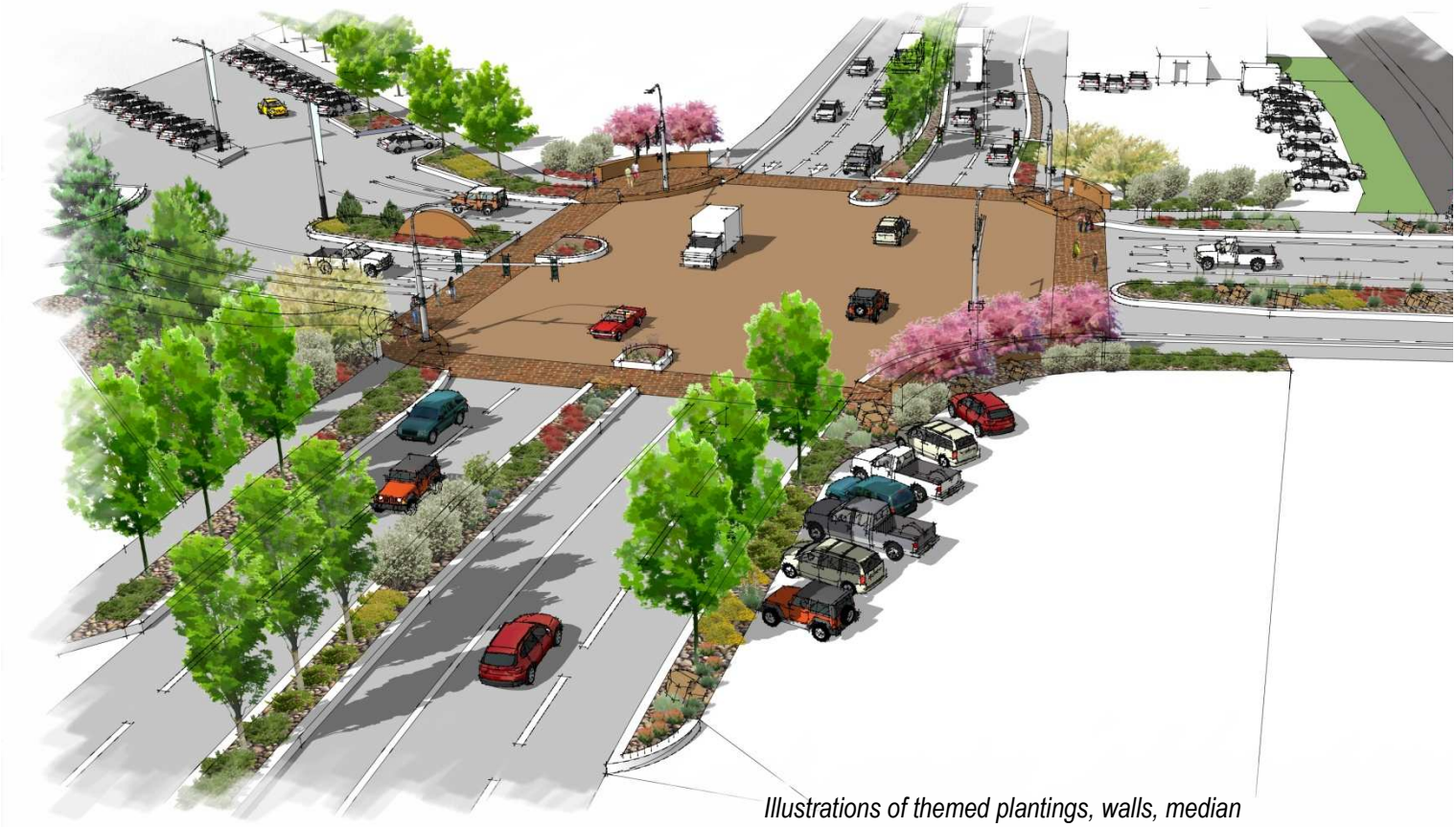
Streetscape projects at gateway intersections shall be enhanced with a coordinated program of components including at least four of the following:

- Plantings of annual flowers in beds or large pots.
- Railings or low walls.
- Bollards.
- Pedestrian lighting/ other specialty lighting.
- Columns, pylons or other urban design structures.
- Signal or light pole treatments.
- Color themes in repeated components.
- Special paving.

- Sculpture or other public art in addition to the components listed above.

Examples of enhanced gateway components – annual flowers, planter pots on plinths, railings, pedestrian lights, public art pylons, and tinted concrete paving.

Example of a median approaching a gateway intersection incorporating themed railings mingled with plant groupings.



Illustrations of themed plantings, walls, median planters, and specialty paving as exampes of special treatments to mark an enhanced gateway signalized intersection (above) and gateway roundabout (below).

5.8

ARTERIAL STREETSCAPE DESIGN: COMMUNITY ENTRANCE GATEWAYS (I-25)

Interstate 25 interchanges act as major community entrances, in conjunction with the arterial streets leading into Fort Collins from the interchanges.

Future improvements to the interchanges are expected to include gateway design features to reinforce the community entrance role.

Design and management of any such interchange improvements, and and arterial streetscapes near the interchanges, may present opportunities for coordination.

For example, any interchange gateway features may be appropriate to extend westward along a segment of the arterial streetscape. If such features are not appropriate to be extended, they may still influence, or be influenced by, the character of the arterial streetscape.

Example of enhanced gateway components at an I-25 Interchange, including stone walls and a themed planting design.

SECTION 6

Collector and Local Streets

6.1

PARKWAY LANDSCAPING

Streetscapes on collector and local streets typically consist of parkways only. The primary intent for parkway landscaping is to provide a setting for street trees, and work in conjunction with street trees for a number of purposes:

- Define streets as the framework of public space within which individual properties fit.
- Contribute to the attractiveness and visual interest of the street edge.
- Mark the transition from public to private space.
- Blend public interests in street infrastructure with interests of abutting property owners who are required to maintain these parkways by City Code.

6.1.1 Two approaches.

Two main approaches to landscaping parkways are permitted in collector and local streets: turf-type grasses, and mulched planting beds. Pros and cons of each are discussed in Section 4.
In both approaches, appropriate irrigation shall be provided to maintain health of plantings with efficient use of water.

In developments where there is no development plan that specifies parkway landscaping, the owner of the property abutting the parkway may select either approach, regardless of any Homeowner Association covenants that may apply to the development, and shall be responsible for the installation and maintenance of the parkway landscaping in accordance with Section 24-42 of the City Code.

6.1.2 Approved development plans govern.

In developments with approved landscape plans, the parkway landscaping must be in accordance with the plan.

A Homeowners Association (HOA), or a property owner with notice to and opportunity for comment from the HOA, may request a Parkway Landscaping Amendment to an approved plan for parkway landscaping. Such a request by a property owner shall be limited to the parkway strip abutting the lot of the property owner and shall be reviewed by the Director in accordance with Section 2.2.10(D) of the Land Use Code.

6.1.3 New development landscape plans.

Where a developer desires to offer non-turf grass options to homeowners, the landscape plan shall contain notes and drawings specifying options for non-turf ground cover plantings, with consistent mulch and a recommended plant palette.

6.1.4 Turf-type grass.

Turf-type grass shall be permitted, including both cool-season turfgrasses and warm-season native shortgrasses as discussed in Section 4. The choice of grass species and variety can make a major difference in water use needs, ease of establishment, survival of the grass, weeding, mowing, and renovation requirements.

Cool-season turfgrass parkway congruent among properties along the street, and also congruent with adjoining landscaping.

6.1.5 Mulched planting beds.

Non-turf ground cover plantings shall be permitted, including mulched planting beds and ground cover plantings. With an understanding of plant selection and proper irrigation and maintenance, these plantings can provide seasonal interest with little water required.

Property owners are encouraged to incorporate choices that provide a degree of congruence with neighboring properties in terms of mulches and character of plantings.

Mulched planting bed with a perennial garden in a parkway.

Combination of turf and planting beds in parkway areas.

6.1.6 Requirements for non-turf ground cover plantings:

A. Landscaping shall be designed, installed and maintained so that at least 50% of the area shall be covered with live plant material within 3 years from installation.

B. Plant materials shall be under 2 feet tall if within 5 feet of a driveway and under 3 feet tall in other areas. Owners are encouraged to select plants that maintain these height limits with little or no pruning.

C. Plant materials must not obscure the line of sight for traffic or obstruct the sidewalk. Plantings of any height that obstruct the line of sight or cause safety concerns may be required to be kept trimmed to a lower height or removed so visibility is provided/maintained.

D. No fences or thorny/prickly plant material are allowed.

E. In mulched planting beds, the soil surface shall be 2-3 inches below the curb and sidewalk to allow for mulch to be contained. To avoid clutter, no additional timbers, concrete products, plastic or metal edging, or similar material shall be included.

F. Exception: if edging is needed to keep turfgrass out of mulched areas, perpendicular to the street, such edging shall be flush or within 1 inch of the ground surface, so it is not a visible element.

G. Plant materials and mulch must be kept off the street and sidewalk.

H. Avoid cutting tree roots if converting an established turf parkway to a planting bed. Within a tree's dripline, minimize grade change to protect the tree roots.

This – organic mulch, healthy plants, and stepping stones if needed.

Not this – gravel that is not congruent with any other portions of the streetscape, dead plants, weeds, concrete products, and exposed fabric prevent this parkway from contributing to the street as attractive public space.

SECTION 7

Maintenance Standards

The purpose of this Section is to foster a consistent, high quality appearance for all streetscapes, whether maintained by the City, its agents, or by private developers, businesses, or individuals.

Given the high visibility of city streetscapes, the public is able to observe maintenance practices in the field as well as the results of that maintenance. The public perception of a well-maintained landscape is promoted by practices which benefit the health of the landscape materials and achieve a neat, well-cared for appearance. Quality maintenance is a function of workmanship, funding, knowledge, and technique. These standards attempt to ensure that all streetscapes are cared for in a manner which reflects the high esteem that citizens have for these important public spaces. Generally, all landscaping shall be maintained in a healthy condition throughout the growing season. A neat and attractive appearance is essential. Irrigation systems, structures, and sidewalks shall be maintained to represent the original integrity of the design and installation.

7.1

TREE MAINTENANCE AND MANAGEMENT REQUIREMENTS

7.1.1 Separate standards document.

A separate document, The *City of Fort Collins Tree Management Standards and Best Management Practices,* contains the City's standards for planting and maintenance for all trees in the public rights-of-way and apply whether the work is performed for the City contractually, by the City, or by private entities or individuals. Exceptions to the standards and practices require written approval of the City Forester.

7.1.2 Permits for tree work.

A permit must be obtained from the City Forester before any planting, pruning, removal, or destruction of any tree or shrub within the public right-of-way of any street or sidewalk. Businesses performing this work must be licensed by the City. No tree shall be cut back in such a manner that its health will be impaired or it creates an unsafe condition. An exception to this rule may occur to provide emergency relief of an immediate danger to persons or property. Any such emergency procedures must be reported promptly to the City Forester with plans for completion or follow-up work submitted for approval. See the *City of Fort Collins Tree Management Standards and Best Management Practices* for details on acceptable pruning practices.

7.2

MAINTENANCE RESPONSIBILITIES

Maintenance responsibilities vary among different street types, and also with specific circumstances of abutting properties.

7.2.1 Maintenance responsibilities standards and requirements:

A. Street trees located on the City right-of-way are the responsibility of the City Forestry Division to

manage, maintain, and replace on all streets, regardless of who maintains the surface.

B. Exception: some streetscape projects include a warranty period for establishment of newly planted trees in which the project is responsible.

C. Medians in arterial streets shall be maintained by the City.

Exception: some streetscape projects include a warranty period for establishment of median landscaping in which the project is responsible.

D. Parkway landscaping on Collector and Local streets shall be maintained by the adjacent property owner in accordance with City Code.

E. Parkway landscaping on arterial streets shall be the responsibility of the City if there is no individual, organization, or homeowners' association that prefers to maintain them, or that can be fairly allocated the maintenance responsibility based on their unique benefit .

F. The following four other different scenarios for planting and continuing maintenance are possible depending on circumstances:

1) The developer installs the landscape and the City takes responsibility for tree maintenance after a warranty period for full tree establishment during which time specific obligations are met. The surface (turfgrass, other plantings, mulches, irrigation) must continue to be maintained by the developer, homeowners' association, or other responsible party.

2) The developer installs the landscape and after meeting obligations during the first two years, the City takes responsibility for both tree and surface maintenance.

3) The landscape is part of a Capital Improvements Project and a contractor does the landscape work. The City is responsible for tree maintenance and may or may not be responsible for surface maintenance.

4) Adopt A Median -- the City encourages homeowners' associations, business groups, and other civic groups to take part in the Adopt-A-Median program. Contact the City Parks Division at 221-6660 for further information.

7.3

ACCEPTANCE OF NEW ARTERIAL STREETSCAPE PROJECTS FOR CITY MAINTENANCE

7.3.1 Streetscape installed to City standards.

Any new streetscape landscaping not designed and installed to these standards may be rejected by the City Parks Division for inclusion in its maintenance program. Developers and City capital projects shall notify the City Parks Division and conduct a walk-through with Parks and Forestry Division staff at the end of the warranty period. Any defects in the landscaping or irrigation system shall be corrected by

the project that installed the streetscape.

7.4 GENERAL MAINTENANCE STANDARDS

7.4.1 Trash.

Trash shall be removed on a regular basis.

7.4.2 Turf-type grass.

Cool-season turfgrasses shall be maintained at a 3-inch cut during the growing season. Trimming shall be concurrent with mowing, to match height of open turf, around mowing obstructions such as trees, curbs, and vacuum breakers. Turfgrass shall be edged concurrent with mowing when needed to prevent growth over edges. Visible clippings shall be removed from sidewalks and streets.
Buffalograss and Blue grama shall be maintained at a maximum height of 12 inches.

7.4.3 Shrubs.

Shrubs shall be pruned as needed to: 1) achieve the design intent; 2) remove dead or diseased branches; and 3) support plant health and vigor. Dead shrubs shall be removed and replaced immediately. Shrubs shall not extend over the curb or sidewalk.

7.4.4 Perennials.

Perennials shall be deadheaded and trimmed throughout the growing season as appropriate for the design intent for each species. Depending upon design intent, perennials and ornamental grasses shall be cut back in late fall or early spring prior to new growth. Dead perennials shall be removed immediately and replaced per the design intent.

7.4.5 Annuals.

Planting of annuals in the spring shall be in designated annual flower beds. Annuals shall be regularly deadheaded of spent blooms. Annuals shall be removed in the fall after the first hard freeze.

7.4.6 Mulch.

Mulch shall be replenished as needed to maintain complete coverage of the soil surface with a depth of 2-4 inches, with careful placement and reduced depth as needed underneath plants to avoid burying leaves or tender stems.

7.4.7 Weeds.

All landscaped areas shall be kept free of weeds and invasive grasses that are not part of the design intent. Weeding may be done manually or by the use of herbicide and or pre-emergent. The use of any restricted herbicides or soil sterilants is prohibited. In accordance with Best Management Practices, the effectiveness of the herbicide shall be monitored.

SECTION 8

Irrigation Standards

Proper watering systems help achieve City goals and citizen expectations for public spaces. Irrigation of parkway and median plant material is necessary to maintain a quality appearance and long term health of streetscape plantings.

It is the City's intent to be a good steward of water resources consistent with "xeriscape" and "water-wise" principles related to social, environmental, and economic sustainability.

All irrigation systems will be designed to meet the needs of each unique landscape by following best management practices and up-to-date technology. Without proper irrigation design and maintenance, good stewardship of the landscapes is not achievable.

8.1 IRRIGATION SYSTEM DESIGN

8.1.1 General design standards.

Irrigation design and installation shall comply with the following general standards:

A. Irrigation design shall be done by a certified irrigation designer unless otherwise approved by the Parks Department.

B. Irrigation system design and installation shall be monitored, inspected, and approved by the City Parks Division. Irrigation systems shall be installed and maintained so that irrigation equipment will not spray onto any streets, walkways, or features and structures that could be damaged by water.

C. The irrigation system must comply with the International Plumbing Code and with the City of Fort Collins Electrical Code.

D. Any deviation in taps from the approved construction plans must be approved by City of Fort Collins Utilities prior to installation. Any water service line shall be coordinated with City of Fort Collins Utilities.

E. Any deviation in layout of the irrigation system from the approved construction plans must be reviewed and approved by the City Parks Division prior to or during installation.

F. The irrigation system shall be designed to provide full coverage and matched precipitation rates.

G. Lateral piping shall be sized based on flow demands in gallons per minute (gpm); with velocities not to exceed 5.5 feet per second.

H. Xeriscape principles shall be utilized in the design of the irrigation system.

I. All designs shall meet the industry's Best Management Practices from the Irrigation Association and ALCC (Associate Landscape Contractors of Colorado).

J. Newly installed irrigation systems shall be subject to water audits.

K. The minimum distribution uniformity for spray heads shall be .55; for rotor heads it shall be .65; for stream rotors it shall be .75; and for impact heads it shall be .65.

L. Design considerations shall include: 1) shrub and perennial beds are to be zoned separately from turf areas; 2) sloped areas will have separate zoning for heads at the higher elevations from those at the lower elevation; 3) areas with different exposures are to be zoned separately; and 4) In-head check valves are to be used for all areas adjacent to walkways and at the bottom of berms and pond areas.

M. Xeric irrigation and drip systems come in a wide variety of configurations. The correct application shall be approved for each landscape design by the City Parks Department.

N. Trees planted in non-turf irrigated landscape areas require short-term and long-term irrigation and should be on individual or separate zones. Supplemental emitters shall be installed on top and around the root ball for short term health. Perimeter irrigation of the root ball shall be installed for long term and permanent irrigation.

O. The contractor shall install the saddle for the PVC or AC pipe.

P. The backflow prevention device and water meter shall meet the City of Fort Collins standards, and the flow meter shall be *Data Industrial*.

Q. A curb stop shall be installed between the meter pit and the backflow prevention device for isolation purposes. The curb stop shall be sleeved from the valve to grade and covered with a round valve box.

R. A blowout tube no larger than ¼" shall be placed between the meter pit-curb stop and the back flow prevention device. The injection port on the blow out tube shall be sweated on, attaching a female adapter with a threaded brass plug.

S. A blowout tee shall be installed immediately downstream of the backflow prevention device.

8.2 MATERIALS STANDARDS

8.2.1 Pipe:

A. Copper shall be type K rigid conforming to *ASTM Standard B88*.

B. Mainline shall be Class 200 PVC, NSF approved. If 3 inches or larger, use ringtite pipe.

C. Laterals shall be Class 200 PVC, NSF approved.

D. No laterals shall be smaller than 1-inch pipe.

E. Trickle tubing shall be weather and UV resistant material.

F. Polyethylene drip pipe shall be NSF approved, SDR pressure-rated pipe, only as approved for drip applications.

G. Funny pipe shall be used only for pop-up spray heads, and shall be compatible with the elbows needed for the sprinkler heads.

H. Lateral fittings shall be Schedule 40, Type 1, PVC solvent-weld, with *ASTM Standards D2466* and *D1784*.

I. Copper or cast bronze fittings, soldered or threaded per installation details shall be used for all copper pipe.

J. Mainline fittings shall be ductile iron for 3-inch and larger pipe; and shall be PVC Schedule 80 for smaller pipe.

K. Sleeving shall be ductile iron or PVC pipe under all paved surfaces. Sizes shall be a minimum of two sizes larger than the pipe being sleeved, but shall in no case be smaller than 2-inch diameter pipe.

8.2.2 Valves:

A. Remote control zone valves shall be electrically operated, appropriate for the water supply, with manual bleed device and flow control stem. Valves shall have a slow-opening and slow-closing action for protection against surge pressure. Brand and model shall be Rainbird PE Series Remote Control Valves, scrubber option with self cleaning screen unless City specifies other brand and model.

B. Valves used for two-wire system shall be properly grounded per manufacturers recommendation.

C. Drip valves, bubbler valves, and micro-spray valves shall be accompanied by pressure-reducing devices matched with recommended filters to assure proper operation and reduced failure of such equipment.

D. Isolation gate valves shall be *Kennedy* 1571X or *Matco* #100M, able to withstand a continuous operating pressure of 150 psi. Clear waterway shall be equal to full diameter of pipe. Shall be opened by turning square nut to the left (wheel opening is unacceptable).

E. Manual drain valves shall be ¾-inch ball valve with tee handle, *Watts* #B-6000, or approved equal.

F. Quick coupler valves shall be 1-inch brass, *Rainbird* #5RC units with rubber cover. Supply 1-inch brass key for *Rainbird* 55K.

G. Spears True Union ball valves shall be installed upstream of the remote control zone valve. Equivalent substitutes shall be accepted.

H. Valve boxes shall have matching locking cover which shall be *Carson, Pentex* or approved equal.

Box sizes shall be as specified to house one valve per box.

8.2.3 Control System:

A. Controllers shall have smart controller technology and shall be approved by the Parks Department. The number of stations shall include two extra stations for possible future use. The controller box shall be weather tight and vandal resistant with locking exterior disconnect. One *Eicon* pigtail or compatible remote controller pigtail shall be used for each 12 stations.

B. The Control System Enclosure shall be *Hofman* Model A242408LP with A24P24 steel panel, Model A-FK1208 floor stand kit and AL-2BR lock kit, or approved equal.

C. The surge protection shall be an 8-foot copper grounding rod, #4 solid copper wire, grounding buss receptacle, ground terminal strip and *Irritrol* SPD-587 surge protector per manufacturer's specifications and details.

D. The master valve shall be normally opened.

E. Control wiring shall be #14 solid copper direct burial UF or PE cable, UL approved, or larger, per system design and manufacturer's recommendations.

F. Five-wire systems shall have a consistent color scheme throughout: Red = live; White = ground; Black, Blue and Green = extra.

G. If two-wire systems are used, approved shielded wire or manufacturers recommended wire shall be used.

H. Approved wire connectors and water-proofing sealant shall be used to join control wires to zone valve wires. The wire connectors shall be what each specific manufacturer recommends. Two-wire systems shall use manufacturers specified wire per warranty provisions.

8.2.4 Sprinkler heads.

All sprinkler heads shall be of the same manufacturer as specified on the plans, marked with the manufacturer's name and model in such a way that materials can be identified without removal from the system. The City will specify brands and models to match other equipment in use in public systems in the vicinity. Gear driven rotor heads shall be *Hunter* or approved equal. Pop-up spray heads shall be *Hunter, Rainbird,* or approved equal. All heads should have pressure regulating device integrated in them to maintain proper operating pressure. They also shall have anti water draining valves to avoid water waste when not in operation. (Example: Rain Bird 1804 PRS/SAM heads. A minimum of 4" pop-up is required.)

8.3
INSTALLATION PREPARATION

8.3.1 Utility locates.

Locate all utilities prior to trenching and protect from damage. Required calls shall include, but are not limited to the following: City Parks Division, 221-6660, for locates and 1-800-922-1987 for utility locates within the City of Fort Collins. Contact other utilities as required.

8.3.2 Preliminary inspection.

The Contractor shall inspect tap and any existing irrigation system, as applicable, prior to work.

8.4
INSTALLATION PROCEDURES

8.4.1 Water service connections (taps):

A. Forty-eight hours prior to connection, the contractor shall contact the City of Fort Collins Water Utilities, at 221-6700 to schedule the work for water taps and inspections. A minimum two weeks prior notice shall be given to the Water Meter Shop, 221-6759, for installations which will require meters and/or backflow devices larger than 2 inches.

B. The contractor shall be responsible for excavation, connection to corporation stop at the water main, providing and installing the saddle for the PVC or A.C. pipe, making the connection to the existing water service, backfill and compaction, and pavement / shoulder / surface treatment replacement as needed. Soldered joints or fittings are permissible above grade or inside a vault. No solder, sealants, fluxes, pipe dope, and other materials shall contain any lead. All taps and installations are subject to approval and inspection by the City of Fort Collins Water Utilities. Install meter as specified in a precast vault. Inspection of service line (where appropriate), vault, water meter and backflow is to be coordinated with the City of Fort Collins Utilities.

C. The contractor shall install a winterization assembly downstream of the meter vault a minimum of 6 feet away from the outside of the meter vault on the copper pipe.

D. Copper pipe shall be soldered so that a continuous bead shows around the joint circumference. Insert a dielectric union wherever a copper-based metal (copper, brass, bronze) and an iron-based metal (iron, galvanized steel, stainless steel) are joined.

8.4.2 Pipe trenching:

A. Install pipe in open-cut trenches of sufficient width to facilitate thorough tamping/ puddling of suitable backfill material under and over pipe.

B. Trenches shall be as straight as possible, but when a bend of 20 degrees or more is necessary, proper fittings shall be used to reduce stress on the pipe.

C. Trench depths for mainlines shall be a minimum of 24 inches deep from top of pipe to finished grade.

D. Trench depths for laterals shall be a minimum of 16 inches deep from top of pipe to finished grade.

8.4.3 Sleeving:

A. Wires shall be in separate sleeves from pipe, and shall be 2-inch minimum size pipe.

B. Sleeves shall have traceable marker tape on upper side and both ends for future locates.

C. Sleeves shall be installed at a depth which permits the encased pipe or wiring to remain at the specified burial depth.

D. Boring for sleeving shall not be permitted unless an obstruction in a pipe path cannot be moved, or pipe cannot be re-routed.

E. Any mainline installed in existing sleeves at a greater depth than adjacent pipe shall have a manual drain valve at each end if the sleeve is longer than 20 feet, or at one end if the sleeve is less than 20 feet.

F. Sleeves shall be installed so ends extend past edge of curb, gutter, sidewalk, bikepath or other obstruction, a minimum of 2 feet.

G. Sleeves shall be marked with an "x" chiseled in walk (or other surface) directly over the sleeve location.

H. Sleeves shall be laid to drain at minimum grade of 5 inches per 100 feet.

I. Sleeves shall be bedded in 2 inches of fill sand and covered by 6 inches of fill sand.

J. Sleeves installed for future use shall be capped at both ends.

K. Sleeving shall not have joints unless necessary due to length of sleeving run. If joints are necessary, only solvent welded joints are allowed.

L. Compaction of backfill for sleeves shall be 95% of *Standard Proctor Density, ASTM D698-78*. Use of water (puddling) around sleeves for compaction, is prohibited.

8.4.4 Pipe installation:

A. Teflon tape shall be used on all threaded joints; only Schedule 80 pipe may be threaded.

B. Reducing of pipe size shall be done with reducing insert couplings, at least 6 inches beyond the last tee of the larger pipe.

C. PVC lateral pipe shall be snaked from side to side within the trench.

D. Cut pipe ends shall be cut square and deburred. Pipe ends shall be cleaned before using primer and solvent cement. Pipe ends shall be joined in a manner recommended by manufacturer and in accordance with accepted industry practices. Joints shall cure for 30 minutes

before handling, and 24 hours before allowing water in the pipe.

E. Backfill shall be free from rubbish, stones larger than two 2-inch diameter, frozen material and vegetative matter. Backfill shall not be placed in freezing weather. If backfill material is rocky, the pipe shall be bedded in 2 inches of fill sand covered by 6 inches of fill sand.

F. After puddling or tamping, all trenches shall be left slightly mounded to allow for settling.

G. Backfill shall be compacted to proper densities depending on whether the surface area over the line will be paved or landscaped.

8.4.5 Thrust blocks:

A. Thrust blocks shall be installed where PVC mainline 2.5 inches or larger changes direction over 20 degrees.

B. Thrust blocks shall consist of a minimum of one cubic foot of concrete.

C. No concrete shall be allowed to remain on pipe joints.

D. Wiring shall be placed away from thrust blocks to avoid contact with concrete.

8.4.6 Valve installation:

A. Valves shall be installed at least 12 inches from, and aligned with, with adjacent walls or paved edges.

B. Automatic Remote Valves shall be installed so that valves are accessible for repairs. Make electrical connections so as to allow pigtail so solenoids can be removed from the valve with 24 inches (minimum) slack to allow the ends to be pulled 12 inches above ground. The zone wire should be coiled. Flush completely before installing the valve. Thoroughly flush piping system under full head of water for three minutes through furthest valve, before installing heads.

C. The top of the valve box shall be flush with the finish grade.

D. The valve assembly shall include the ball valve and union per detail for ease of maintenance and repair. Valves shall be installed in valve boxes per details.

E. Quick couple valves shall be installed in 10-inch round locking valve boxes. Valves shall be flush completely before installation. Thoroughly flush the piping system under a full head of water for three minutes through the furthest valve.

F. Isolation gate valves shall be installed in the valve box.

G. Valve boxes shall be branded with the following codes: “SV” and the controller valve number per as-built plans for all remote control valves; “DV” for all drain valves; “GV” for

all isolation valves; “DRGV” for all drip system isolation valves; “QC” for all quick coupling valves; “WA” for all winterization assemblies; “FM” for all flow meter assemblies; and “MV” for all master valve assemblies. Use a branding iron stamp with 3-inch high letters.

H. Valve boxes shall NOT rest on mainlines. Brick or other non-compressible material shall be used per details.

I. Valves shall be installed in boxes with adequate space to access valves with ease. Valves shall not be too deep to be accessible for repairs. A 3-inch depth of ¾-inch washed gravel shall be placed in the bottom of each valve box with enough space to fully turn valve for removal per detail.

J. Six-inch valve boxes shall be limited to wire splices, drip end caps, and drains.

8.4.7 Head installation:

A. Heads shall be set plumb and level with the finish grade. In sloped areas, heads shall be tilted as necessary to provide the full radius spray pattern.

B. Lateral lines shall be flushed before installing heads. Thoroughly flush the piping system under a full head of water for three minutes through the furthest head, before installing the heads. Cap the risers if a delay of head installation occurs.

C. Pop-up heads along walks and bikeways shall be bedded in a 6 inch layer of sand under the base of the head. Heads that border sidewalks and curbs shall be 1–1 ½ inches from the concrete.

D. Nozzles appropriate for best performance shall be installed.

E. Nozzles and radius of throw shall be adjusted to minimize overspray onto hard surfaces.

8.4.8 Electrical connections:

A. New connections shall be approved through the City of Fort Collins Electric Utilities. Call 221-6700 to obtain power information and request connection. Actual connection to transformer or other power source will be done by the City of Fort Collins Electric Utilities. Work shall be coordinated and scheduled by calling 221-6700.

B. All work other than actual connection, including access to the transformer box where applicable, shall be supplied by the contractor.

C. All materials shall be provided by the contractor. When working near any City electric facility, prior coordination and approval is required.

8.4.9 Controller Installation:

A. Controllers shall be installed in an above-ground location suitable to prevent vandalism and provide protection from adverse weather conditions, and per City direction.

B. All exposed wiring to and from the controller shall be encased in galvanized metal conduit.

C. Exterior controllers to be installed on a 6-inch thick concrete pad.

D. Controllers shall be installed per City direction and manufacturers specifications. Surge protection, grounding rods and other accessory components shall be included as specified.

E. Wire markers shall be attached to the ends of control wires inside the controller unit. Label wires with the identification number of the remote control valve activated by the wire.

8.4.10 Wiring:

A. Wiring shall comply with City of Fort Collins Electrical Code.

B. The power source shall be brought to the controller via a ground fault receptacle installed within the controller casing.

C. Control wires shall be strung as close as possible to the mainline, consistently along and slightly below one side of the pipe.

D. A minimum loop of 24 inches shall be left at each valve and controller, and at each splice, at the ends of each sleeve, at 100-foot intervals along continuous runs of wiring, and changes of direction of 90 degrees or more.

E. Band wires together at ten (10) foot intervals with pipe wrapping tape.

F. Install common ground wire and one control wire for each remote control valve. Multiple valves on a single control wire are prohibited. Install three extra wires, as specified, to the furthest valve on the system and/or each branch of the system.

8.5 TESTING

8.5.1 Testing requirements:

A. All tests shall be run in the presence of staff from the City Parks Division. Schedule all tests a minimum of forty-eight hours in advance. Repeat any failed tests until full acceptance is obtained.

B. An operational test shall activate each remote control valve from the controller.

C. The contractor shall replace, adjust or move heads and nozzles as needed to obtain acceptable performance of the system as directed by staff.

D. The contractor shall replace defective valves, wiring or other appurtenances to correct operational deficiencies.

8.6
COMPLETION SERVICES

8.6.1 Requirements upon completion of construction:

A. When project construction is complete, the contractor shall request a punchlist inspection for construction acceptance from the City Parks Division.

B. The system shall be demonstrated to staff from the City Parks Division.

C. Product ordering information shall be provided to City Parks Division staff including model numbers, sizes and styles for all components.

D. Electronic as-built drawings shall be provided.

E. Two sets of as-built drawings shall be provided, showing the system as installed with each sheet clearly marked **"As-built Drawings",** the name of the project, and all information clearly provided.

F. The as-built drawings provided shall consist of one set of reproducible mylars, no larger than 24" x 36", and one set of all sheets reduced to 11" x 17", with each station color coded, and each sheet plastic laminated.

G. A completed backflow test for the backflow prevention device shall be provided by a licensed backflow tester.

H. All excess materials, tools, rubbish and debris shall be removed to leave a cleaned-up site.

8.6.2 Warranty and maintenance period:

A. A two-year warranty and maintenance period provided by the contractor shall begin upon construction acceptance by the City Parks Division.

B. The system shall be maintained in optimal working condition for the duration of the period between construction acceptance and final acceptance. Periodic adjustments shall be made to achieve the most effective and efficient application of water.

8.6.3 Final acceptance:

A. The contractor shall schedule a final acceptance inspection by the City Parks Division at least thirty days before the end of the one-year maintenance period.

B. The contractor shall provide operating keys, servicing tools, test equipment, warranties/guarantees, maintenance manuals, and the contractor's affidavit of release of liens. Submittal of all these items must be accompanied by a transmittal letter and delivered to the City Parks Division offices (delivery at the project site is not acceptable.)

C. The yearly backflow test report on the backflow device shall be submitted to the City Parks Division.

8.7

GUARANTEE/WARRANTY AND REPLACEMENT

8.7.1 Requirements.

For the period following construction acceptance notice by the City, and prior to final acceptance, all irrigation materials, equipment, workmanship and other appurtenances are to be guaranteed and warranted against defects. Settling of trenches or other depressions, damages to structures or landscaping caused by settling and other defects shall be corrected by the contractor at no cost to the City. Repairs shall be made within seven days of notification by the City Parks Division. The guarantee and warranty shall apply to all originally installed materials and equipment, and to replacements made during the guarantee/warranty period.

SECTION 9

Fine Grading And Soil Preparation Standards

9.1 GENERAL STANDARDS

Soil preparation is a crucial part of streetscape landscaping success. Individual projects may require specially tailored soil preparation, beyond the scope of these minimum standards, for sustainable health of specialized plantings.

9.1.1 Soil testing.

Soils tests conducted by the CSU Soils Lab must be completed and submitted to the City for review; and recommendations in the lab reports shall be followed in all cases. Generally this will include soil amendment and fertilizer recommendations; and in some cases, complete replacement of topsoil may be required.

9.1.2 Topsoil required.

If a landscape area is undisturbed, topsoil shall be stripped to a 6-inch depth, or to topsoil depth as determined by field inspection. Stockpile and re-spread stripped topsoil over landscape areas after rough grades are established. If the site has been disturbed, or sufficient topsoil is not available, topsoil shall be imported to achieve six 6-inch depth in all landscaped areas.

9.2 SUBMITTALS

9.2.1 Soil Amendments.

Submit a representative sample and written confirmation from the supplier of soil amendment material composition including: percent organic matter, salts, nutrient composition and trademark.

9.2.2 Topsoil.

Submit a representative sample and written confirmation from supplier of material composition including: percent organic matter, salts, and nutrient composition.

9.3 MATERIALS STANDARDS

9.3.1 Soil Amendment.

Premium 3, by *A-1 Organics,* or an approved equal high quality composted material containing a minimum of 50% organic matter shall be required for all soil amendment. The mixture shall be free from clay subsoil, stones, lumps, plants or roots, sticks, weed stolons, seeds, high salt content and other materials harmful to plant life. The compost shall be coarsely ground with an even composition and have an acidity in the range of pH 5.5 to pH 7.0. All material shall be sufficiently composted such that no original source material used is recognizable.

9.3.2 Topsoil.

Topsoil must be taken from a well drained, arable site and shall be reasonably free of subsoil, stones, clods, sticks, roots and other

objectionable extraneous matter or debris. No stones or other materials over 2 inches in size shall be allowed. Topsoil shall contain no toxic materials and have an acidity in the range of pH 5.5 to pH 8.5.

9.3.3. Fertilizer.

Triple superphosphate with a chemical analysis of 0-46-0 shall be incorporated into soil along with soil amendment.

9.4 ROUGH GRADING OPERATIONS

9.4.1 Utility locates.

All utilities shall be located prior to trenching and shall be protected from damage. Required calls shall include, but are not limited to the following: 221-6660 for Parks Division locates and 1-800-922-1987 for utility locates.

9.4.2 Acceptance of rough grading by other contractors.

The landscape contractor shall inspect and confirm that any rough grading from other contractors is per approved plans, and allows for 6-inch minimum depth of topsoil and specified soil amendments.

9.4.3 Clearing and grubbing.

The contractor shall grub and remove unsuitable woody and rock material present in the surface grade.

9.4.4 Maintain drainage.

The contractor shall take precautions to accommodate proper drainage and flow during and after grading and soil preparation.

9.4.5 Kill weeds.

Apply herbicide to areas where noxious weed beds have been established and / or where seed mix is to be planted. Herbicide must be applied by certified contractors at the rate recommended by the manufacturer after proper notification has been done in accordance with the chemical applicator's standards.

9.4.6 Rip planting areas.

Rip to 8-inch depth with agriculture subsoiler in all areas to receive plantings. Remove all objects greater than 2 inches in diameter.

9.5 FINISH GRADING OPERATIONS

9.5.1 Topsoil placement shall include the following procedures:

A. Spread 6 inches of topsoil over the entire landscaped area and grade to smooth and even lines. Establish swales and drainage as required per plans.

B. Evenly distribute soil amendment at rate of 3 cubic yards per 1,000 square of area, or 1-inch depth over the entire area to be prepared. Modify the rate if a soil test recommends otherwise. Till amendments into top 6 inches of soil. Compact to a firm, but not hard density (80% of *Standard Proctor Density* at 2% optimum moisture). Evenly distribute triple superphosphate fertilizer at the rate of 15 pounds per 1,000 square feet. Modify the type and rate if a soil test recommends otherwise.

C. Trim finish grade elevations adjacent to paved areas to one inch below pavement finish grade.

SECTION 10

Grass Seeding Standards

10.1

GRASS SEEDING

10.1.1 Seed Mixes.

Seed mixes shall be approved by the City Parks Division based on the activity to take place, planned irrigation method and maintenance to be performed in the area being seeded.

10.1.2 Pre-approved Dryland Mix.

For temporary or permanent unmowed and non-irrigated areas, the following mix shall be permitted:

45% Blue Grama,
25% Buffalograss (treated), and
30% Little Bluestem.

10.1.3 Pre-approved turfgrass mix.

For irrigated, mowed areas, the following mixes shall be permitted: 1) a blend of five turf type dwarf Tall Fescues, or 2) a mix of Kentucky Bluegrass varieties and up to 15% Perennial Rye.

10.1.4 Submittals.

Certificates showing State, Federal or other inspection showing source and origin shall be submitted.

10.1.5 Seed quality.

Seed shall be of fresh, clean, new crop seed composed of the varieties approved by the City with tested minimum percentages of purity and germination clearly labeled on the package. All seed shall be at least 99.9% free of *Poa annua* and all weeds.

10.1.6 Mulch for seeded areas.

Mulch depends on the slope of the seeded area as follows:

A. For slopes 30% and less, native grass straw without weed seed and consisting of grasses as specified for the seeded application shall be used.

B. For slopes 30% and greater: Hydromulch using *Weyerhauser* "Silva-Fiber" mulch or approved equal shall be used. The mulch shall not contain any substance which might inhibit germination or growth of grass seed. The mulch shall be dyed a green color to allow metering of its application.

10.1.7 Tackifier.

Teratack III, or approved equal shall be used.

10.1.8 Netting.

For slopes greater than 30%, *Soil Saver* jute netting or approved equal shall be used. Netting shall be stapled with No. 11 gauge steel wire forged into a 6-inch long U-shape, and painted for visibility in mowed areas.

10.1.9 Fertilizer.

Fertilizer. Fertilizer with a formula of 18-46-0 shall be used on all areas to be seeded. Apply 8 pounds per 1,000

square foot of seeded area and rake lightly into top 1/8 inch of soil just prior to seeding operation.

10.1.10 Inspection.

The contractor shall inspect finish grade and trim where needed to obtain finish grades of one inch below adjacent pavements. Verify positive drainage away from all structures. Verify or complete removal of rock and debris larger than one inch from all areas to be seeded.

10.1.11 Weather for seeding.

Seed shall not be sown in windy weather or when ground is frozen or otherwise untillable.

10.1.12 Methods for seeding:

A. A brillion type drill or hydraulic seeding methods may be used. Drill the seed in a manner such that after surface is raked and rolled, the seed has ¼-inch of cover.

B. Hydraulic seeding shall be used in areas that are not accessible for machine methods. A hydraulic pump capable of being operated at 100 gallons per minute and at 100 pounds per square inch pressure shall be used. The equipment shall have an acceptable pressure gauge and a nozzle adaptable to hydraulic seeding requirements. Storage tanks shall have a means of agitation and a means of estimating the volume used or remaining in the tank. Do not seed and mulch in the same operation.

10.1.13 Seeding rates.

The following rates of application shall apply:

A. Dryland Mix – 12 pounds pure live seed per acre.

B. Irrigated Mix – 9 pounds pure live seed per acre for the Tall Fescue blend, or 4 pounds pure live seed for the Kentucky Blue/Perennial Rye mix.

10.1.14 Mulching operations for native grass mulch.

Mulch shall be applied at a rate of two 2 tons per acre within 24 hours after seeding.

10.1.15 Hydromulching operations.

Wood cellulose fibers shall be evenly dispersed by agitatation in water. When sprayed uniformly on the soil surface, the fibers shall form a blotter-like ground cover that readily absorbs water and allows infiltration to the underlying soil. Cellulose fiber mulch shall be added with the proportionate quantities of water and other approved materials in the slurry tank. All ingredients shall be mixed to form a homogenous slurry. Using the color of the mulch as a metering agent, spray apply the slurry mixture uniformly over the seeded area. Apply with tackafier used at a rate of 120 pounds per acre. Unless otherwise ordered for specific areas, fiber mulch shall be applied at the rate of 2,000 pounds per acre. Hydraulic mulching shall not be performed in the presence of free surface water resulting from rains, melting snow or other causes.

10.1.16 Mulch netting operations.

Mulched areas over 30% slope shall be stabilized with netting. If the contractor fails to net and subsequent soil erosion occurs, the contractor shall re-establish the finish grade, soil preparation, seed bed, and apply netting at no cost to the City.

10.1.17 Watering.

Immediately after seeding and mulching, water the seeded area slightly to a depth of 2 inches, but with care so that no erosion takes place and no gullies are formed. Water lightly two times per day and keep the seeded area moist until turf is established. Sloped areas shall be hand watered until turf is established to prevent erosion. Water these areas more often but for shorter periods of time.

10.1.18 Clean up.

All hydromulch and other mulch materials shall be removed from all plant materials, fences, concrete and other areas except for the seed bed.

10.1.19 Protection of seeded areas for establishment.

The contractor shall provide and install barriers as required to protect seeded areas from pedestrian and vehicular damage. Signage shall be provided if needed.

EXHIBIT A

List of Recommended Plants

The list below contains recommended plant species for streetscapes. This list will be monitored by staff as part of an ongoing program with periodic updates based on evaluation of success of plantings over time.

Designers of individual streetscape projects may propose plants not on the list based on the design intent for the particular project.

List of Recommended Plants

Last Amended 11.8.2012

	Comments
	Key: CO native status as determined by USDA Plants Database
Canopy Shade Trees	
Acer negundo - Boxelder 'Sensation'	
Catalpa speciosa - Northern Catalpa	Tolerant of alkaline soils; holds a strong dominant leader; male tree so no boxelder bugs
Celtis occidentalis - Northern Hackberry	
Gleditsia triacanthos v. inermis - Honeylocust 'Imperial,' 'Shademaster', 'Skyline'	Wrap young trees
Gymnocladus dioicus - Kentucky Coffeetree 'Espresso'	
Quercus buckleyi - Texas Red Oak	Many seed sources, not predictably cold hardy
Quercus macrocarpa - Bur Oak	Slow growing
Quercus muehlenbergii - Chinkapin Oak	
Quercus robur - English Oak, Skymaster	
Quercus shumardii - Shumard Oak	From a northern source
Tilia americana - American Linden 'Boulevard', 'Frontyard', 'Legend', 'Sentry'	Do not use in along roads that are treated with deicing salts
Tilia cordata - Littleleaf Linden 'Chancellor', 'Dropmore', 'Greenspire', 'Norlin', 'Olympic', 'Prestige', 'Shamrock'	Do not use in along roads that are treated with deicing salts
Tilia x euchlora - Redmond Linden	Do not use in along roads that are treated with deicing salts
Tilia x flavescens - Glenleven Linden	Do not use in along roads that are treated with deicing salts
Ulmus davidiana - David Elm	
Ulmus japonica x U. wilsoniana – Elm 'Accolade', 'Triumph'	Use in smaller quantities
Ornamental Trees	
Acer grandidentatum - Wasatch Maple	
Acer tataricum - Tatarian maple 'Hot Wings', 'Pattern Perfect'	
Crataegus crusgalli - Thornless Cockspur Hawthorn	
Malus sp. - Crabapple 'Adams', 'Profusion', 'Radiant', 'Spring Snow', 'Thunderchild'	Spring Snow' has some limited fireblight problems.
Pyrus calleryana - Flowering Pear 'Aristocrat', 'Capital', 'Chanticleer', 'Cleveland Select', 'Redspire'	
Quercus gambelli - Gambel Oak	
Quercus alba x robur – Oak 'Crimson Spire'	
Syringa reticulata - Japanese Tree Lilac 'Ivory Silk'	

	Comments
Large Evergreen Trees	
Picea Pungens - Blue Spruce 'Fat Albert', 'Baby Blue Eyes'	Sensitive to salt.
Pinus nigra - Austrian Pine	Only use in wide medians.
Small Evergreen Trees	
Juniperus scopulorum - Rocky Mountain Juniper 'Cologreen', 'Moonglow', 'Wichita Blue'	
Juniperus monosperma - Oneseed Juniper	Very low water use
Picea pungens - Dwarf Blue Spruce 'Sester', 'Globosa', 'Montgomery'	
Pinus mugho - Mugo Pine 'Tannenbaum'	
Shrubby Trees/Large Shrubs	
Acer grandidentatum - Bigtooth Maple	
Quercus gambelli - Gambel Oak	
Cercocarpus ledifolius - Curlleaf Mountain-Mahogany	
Xanthoceras sorbifolia - Yellowhorn	
Rhus glabra, R. glabra cismontana - Smooth Sumac, Rocky Mountain Smooth Sumac	
Deciduous Shrubs	
Amelanchier alnifolia - Regent Serviceberry	
Amorpha canescens - Leadplant	Deadhead
Amorpha nana - Dwarf Leadplant	Deadhead
Aronia arbutifolia - Red Chokeberry	
Aronia melanocarpa - Chokeberry, Dwarf Iroquois Beauty	
Artemisia tridentata - Tall Western Sage	
Atriplex canescens - Fourwing Saltbush	
Caragana pygmaea - Pygmy Peashrub	
Caragana rosea - Rose Peashrub	
Ceratoides lanata - Winterfat	
Cercocarpus ledifolius - Curl Leaf Mountain Mahogany	Can grow to be quite large with too much water
Cercocarpus ledifolius intricatus - Little Leaf Mountain Mahogany	
Cercocarpus montanus - True Mountain Mahogany	
Chamaebatiaria millefolium - Fernbush	Deadhead
Chrysothamnus nauseosus nauseosus - Dwarf Blue Rabbitbrush	Gets large with irrigation

	Comments
Chrysothamnus nauseosus albiculatus - Tall Blue Rabbitbrush	
Chrysothamnus nauseosus graveolens - Green Rabbitbrush	
Caryopteris incana - Blue Mist Spirea	Shear back after blooming, prune out dead wood annually
Caryopteris x clandonensis - Dark Knight Spirea	Used on Harmony project
Cotoneaster apiculatus - Cranberry Cotoneaster	
Cotoneaster horizontalis - Rock Cotoneaster	
Cytisus scoparius 'Burkwoodii' - Red Burkwoodii Broom	
Ephedra equisetina - Bluestem Joint Fir	
Ephedra viridis - Mormon Tea	
Euonymus alatus 'Compactus' - Dwarf Burning Bush	
Fallugia paradoxa - Apache Plume	
Ligustrum vulgare 'Lodense' - Lodense Privet	
Physocarpus monogynus - Mountain Ninebark	
Physocarpus opulifolius - Ninebark	
Potentilla fruticosa - Potentilla	
Potentilla fruticosa davurica '*Prairie Snow'* - Prairie Snow Potentilla	
Potentilla fruticosa '*Yellow Gem'* - Yellow Gem Potentilla	
Prunus besseyi 'Pawnee Buttes' - Creeping Western Sand Cherry	
Rhus aromatica'Gro-low' - Fragrant Dwarf Sumac	Needs ample space
Rhus glabra cismontana - Rocky Mountain Sumac	Needs ample space
Rhus trilobata 'Autumn Amber' - Creeping Three-leaf Sumac	
Ribes aureum - Golden Currant	
Ribes cereum - Wax Currant	
Rosa x *var.* - Shrub Rose	Remove deadwood each spring, many will continue blooming if deadheaded.
Spiraea nipponica - Snowmound Spirea	
Spiraea thunbergii - Mellow Yellow Spirea	
Spiraea x *vanhouttei* - Vanhoutte Spirea	
Symphoricarpos occidentalis - Snowberry	
Symphoricarpos orbiculatus - Red Coralberry	
Symphoricarpos x *chenaultii* - 'Hancock' Coralberry	
Syringa meyeri - Dwarf Korean Lilac	Looks best when deadheaded after blooming
Syringa patula 'Miss Kim' - Miss Kim Dwarf Lilac	Looks best when deadheaded after blooming

	Comments
Evergreen Shrubs	
Juniperus chinensis - Chinese Juniper	
Juniperus communis - Common Juniper	
Juniperus horizontalis - Creeping Juniper	
Juniperus monosperma - Oneseed Juniper	
Juniperus scopulorum - Rocky Mountain Juniper	
Picea pungens - Globe Spruce	
Pinus mugo - Mugo Pine	
Evergreen (Broad-leafed)	
Arctostaphylos uva-ursi - Kinnikinnick	
Arctostaphylos x coloradoensis panchito - Panchito Manzanita	
Euonymus kiautschovicus - Manhattan Euonymus	
Yucca filamentosa - Adam's needle Yucca	
Yucca glauca - Soapweed	
Ornamental Grasses	
Boutelous gracilis - Blue Grama Grass	Winter interest; cut back in spring
Bouteloua gracilis - 'Blonde Ambition' Blue Grama Grass	
Deschampsia caespitosa - Tufted Hair Grass	
Festuca ovina glauca - Blue Fescue	
Pennisetum alopecuroides - Fountain Grass	This acts more like an annual
Schizachyrium scoparium - Little Bluestem	
Sorghastrum nutans - Indiangrass	
Perennials	
Achillea filipendulina 'Parker's Variety' - Tall Yellow Yarrow	Deadhead
Achillea 'Moonshine' - Moonshine Yarrow	Deadhead
Asclepias tuberosa - Butterfly Weed	
Agastache 'Coronado Red' - Coronado Red Hyssop	Do not cut back until spring to promote overwintering
Agastache cana 'Sonoran Sunset' - Sonoran Sunset Hyssop	Do not cut back until spring to promote overwintering
Agastache rupestris - Sunset Hyssop	Do not cut back until spring to promote overwintering
Artemisia frigida - Fringed Sage	
Artemisia schmidtiana - Silver Mound Sage	Cut back in mid-summer when sprawls

	Comments
Artemisia versicolor - Sea Foam Sage	
Coreopsis verticillata 'Zagreb' - Coreopsis	Grows well in rocky, well drained soil
Echinacea purpurea - Purple Coneflower	Deadhead, if too much irrigation, will get root fungus
Echinacea purpurea 'White Swan' - White Coneflower	Deadhead, if too much irrigation, will get root fungus
Erigeron speciosus var. macranthus - Aspen Fleabane, Aspen Daisy	
Gailardia aristata - Native Blanket Flower	Short lived
Geranium cinereum - 'Ballerina' Cranesbill	
Geranium dalmaticum - Compact Rose Cranesbill	Alpine and rock gardens, does not seed out
Geranium endressii - 'Wargrave Pink' Pink Cranesbill	Attractive to pollinators
Geranium himalayense 'Plenum' - Birch Double Cranesbill	Very showy
Geranium x 'Johnson's Blue' - Blue Cranesbill	
Geranium sanguineum - Bloody Cranesbill	
Hemerocallis spp. - Daylily	Deadhead, cut back in late fall
Hesperaloe parviflora - Red False Yucca	Needs good drainage, don't use bark mulch around crown, marginal hardiness
Lavandula angustifolia - Lavender	Shear back after bloom, can have winter dieback
Liatris punctata - Gayfeather, Dotted Blazing Star	
Liatris spicata 'Floristan Violet' - Purple Gayfeather	
Linum flavum 'Compactum' - Yellow Flax	
Lychnis coronaria - Rose Compion	Bennial, reseeds aggressively
Oenothera macrocarpa - Missouri Primrose	Self sows
Penstemon pinifolius - Pineleaf Penstemon	Shear back after bloom
Penstemon strictus - Rocky Mountain Pentstemon	Deadhead
Persicaria affinis - Himalayan Border Jewel	
Rudbeckia fulgida 'Goldsturm' - Black-Eyed Susan	Other varieties may live longer
Salvia pachyphylla - Mojave Sage	Marginal hardiness, needs excellent drainage
Sedum 'Autumn Joy' - Stonecrop	
Groundcovers	
Alyssum montanum - Mountain Basket of Gold	
Callirhoe involucrata - Winecups	Self sows. Cut back after first flush of blooms to promote new growth
Ceratostigma plumbaginoides - Plumbago	Can die out in winter
Euonymus fortunei - Euonymus	Invasive in some states
Polygonum reynoutria - Fleeceflower	Considered invasive in many states; plant where it can be contained