

City of Fort Collins



Irrigation Designs for Diverse Landscapes
March 4, 2016

5-24-15

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Eric Olson

- CID - Certified in Irrigation Design 2011 - present
- CLIA - Certified in Landscape Irrigation Auditing 2012 - present
- Certified Backflow Technician and Tester 1992 - present
- Irrigation Association Instructor 2014 - present
- Master Gardener Larimer County 2009 - present
- CWP - Certified Water Professional
 - Distribution Operator 2008 - 2012
 - Collection Operator 2008 - 2012




Associated Landscape Contractors of Colorado


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Land Use Code

Landscape and Irrigation Standards for Water Conservation

- Adopted to Fort Collins' Land Use Code 2009
- Division 3.2, Section 3.2.1 (E)(3) Water Conservation: - All landscaping plans shall be designed to incorporate water conservation materials and techniques through application of Xeriscape landscaping principles



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Landscape Standards

Landscaping & Irrigation Standards for Water Conservation

Follow 7 principles of Xeriscaping

- Design
- Soil
- Use of turf
- Irrigation design
- Hydrozones / plants
- Mulch
- Maintenance



Landscape and Irrigation Standards for Water Conservation
Effective July 17, 2008
www.fortcollins.gov/standards



October 2008

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Landscape Design Review

- Plants and trees must be selected from Fort Collins Plant List
- Plants categorized into hydrozones
- Annual water use chart
- Updated regularly



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Plant List
April 2011



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Plant List

Perennials (con't)


Botanic Name	Common Name	VL	L	M	H
<i>Clematis 'Ernest Markham'</i>	Red Clematis				M
<i>Clematis 'Henry'</i>	White Clematis				M
<i>Clematis integrifolia</i> Mongolian Bells	Mongolian Bells Clematis				M
<i>Clematis ligusticifolia</i>	Western Virgin's Bower Clematis		L		M
<i>Clematis montana rubens</i>	Pink Anemone Clematis				M
<i>Clematis 'Nelly Moser'</i>	Two-tone Pink Clematis				M
<i>Clematis 'Ranoma'</i>	Blue Clematis				M
<i>Clematis terniflora</i>	Sweet Autumn Clematis		L		M
<i>Clematis Waikey</i>	Purple Clematis				M
<i>Clematis x jackmanii</i>	Purple Clematis				M
<i>Cleome serrulata</i>	Rocky Mountain Bee Plant	VL	L		
<i>Convallaria majalis</i>	Lily-of-the-valley				M H
<i>Coreopsis auriculata</i> 'Nana'	Dwarf Coreopsis			L	
<i>Coreopsis auriculata</i> 'Zangfrit'	Fluted Coreopsis			L	
<i>Coreopsis grandiflora</i> 'Sunray'	Dwarf Double Coreopsis			L	
<i>Coreopsis lanceolata</i>	Lance-leaf Coreopsis			L	
<i>Coreopsis 'Limerock Ruby'</i>	Limerock Ruby Coreopsis				M
<i>Coreopsis rosea</i>	Pink Coreopsis				M
<i>Coreopsis verticillata</i>	Coreopsis			L	
<i>Crocosmia 'Lucifer'</i>	Lucifer Montbretia				M
<i>Dalea purpurea</i>	Purple Prairie Clover				L

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Front Range Soil


- Clay based
- Typically have an infiltration rate of ¼ inch per hour
- Sprinkler heads apply water faster than the soil can absorb
- Run-off occurs within 3-9 mins



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Soil Amendments

- Ordinance 084, 2003 requires soil amendment in areas of Fort Collins that are cleared and plan to hold plants and grass
 - Soil amendments are any material added to the soil to improve its physical properties
- 3 cubic yards of amendment / 1,000 square feet



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Appropriate Use of Turf

Annual water use chart = less than 15 gallons per square foot

Annual Water Use Chart
(an example)

Zone I.D.	Irrigated Area (s.f.)	Hydrozone	Water Use (gal./s.f.)	Total Water Use (gal.)
A1	6,380	Moderate	10	63,800
A2	8,100	Moderate	10	81,000
A3	5,330	High	18	95,940
A4	1,500	High	18	27,000
A5	820	Low	3	2,460
A6	490	Low	3	1,470
TOTAL	22,620		Avg.: 12.0	271,670


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Irrigation Plan

Requires a review of landscape and irrigation plans prior to building permit

- Water budget <15 gpsf
- Smart controller
- Master valve
- PRS heads
- Sprinkler audit turf zones

Field inspections to assure system is correctly installed per plan



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Mulch

- Reduces evaporation from soil, resulting in less water
- Prevents compaction
- Stabilizes soil moisture
- Moderates soil temperature extremes




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Maintenance

The most important element of the landscape is maintenance

Understand the sprinkler system:

- Wind and sun exposure
- precipitation rates of the heads
- Soil conditions
- Pressure = static and dynamic
- Possible upgrades



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Irrigation Techniques and Components

- Cycle-soak watering
- Pressure regulation
 - Backflow or heads
- Drip it!
- New technologies in irrigation




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Cycle Soak Watering

Apply the same amount of water to fill the reservoir

- Apply in two or three applications, one hour in between to absorb water
- Saves up to 20% water
- Waters the roots
- Ideal for slopes
- Result is healthier plants!




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Cycle Soak Watering

- Confusing to homeowners
- Pay attention to programming
 - Overlapping
 - Overwatering
 - Scheduling - commercial
- Record / write it down
- New controllers offer function
- Replace 9V battery



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High Pressure

- Damages system components
- Causes water hammer
- Misting or clouding; water droplets miss the intended area or are affected by the wind
- Wastes Water!
- Damages hardscapes, siding, parking lots, etc.




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High Pressure Solutions

- Small problems, pressure reducing stems/screens can be inserted into individual heads
- Large problems, pressure reducers can be installed on specific zones, the backflow device or at the sprinkler connection in the home



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Drip Systems

- Water use by gallons per hour vs. gallons per minute
- Drip lines above ground under mulch
- Water is applied with drip, micro-sprays or bubblers
- Water individual plant or groups of plants



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Drip Essentials

- Pressure regulation
Ensures the system delivers equal water throughout drip line
- Y - Screen filter
Cleans water for the system



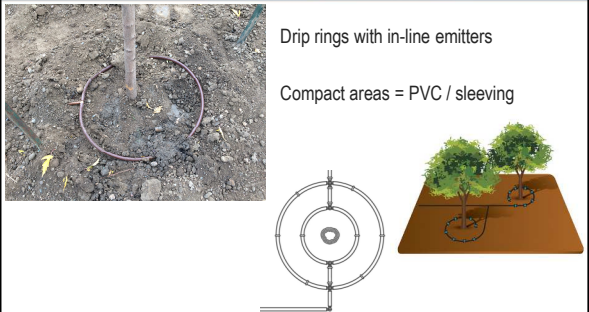
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Drip Rings for Trees

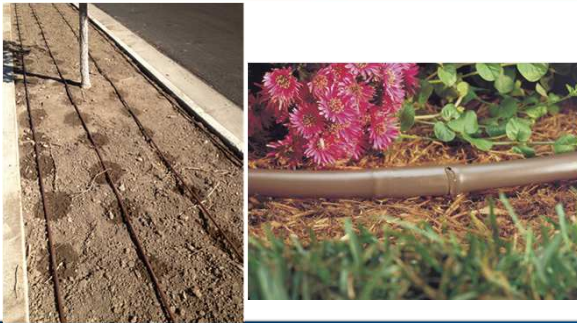
Drip rings with in-line emitters

Compact areas = PVC / sleeving



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In-Line Emitters



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Drip Advantages

- Extremely efficient method to water
- No watering restrictions!
- Consistent water = happy plants
- Prevents weed germination
- Foliage remains dry – less disease and leaf burns
- Great for odd shapes and narrow areas
- No water damage to houses or fence lines



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New Technologies in Irrigation

- Rain sensors
- Smart Controllers
- Soil moisture sensors
- Pressure reducing heads
- Pressure reduction at valves
- Flow sensors
- It's essential to MATCH the technology to the customers needs

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Rain Sensors

- Turns off the controller when it rains enough to activate the sensor
- When the sensor dries, the system is restored
- Won't fix poor scheduling
- If no rain, then no water savings



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Smart / Weather Based Controllers

- Input parameters of region, soil, plant type, sun exposure, slope, etc.
- Calculates how much water to apply daily
- Great for the set it and forget it
- Can overwater if not programmed correctly



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Soil Moisture Sensors

- Installed in the root zone of the grass
- Measures the amount of water in soil
- Turns off sprinklers when moisture level is reached
- Eliminates the need for rain sensor
- Multiple sensors can be used
- Wired and wireless available



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High Pressure



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Flow Sensors

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Backflow Funnies




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Water Efficiency

- Lawns are often the household's largest consumer of water
- Typically sprinkler systems average 50-60 percent efficient
- Proper maintenance can help poorly designed systems
 - Understanding the system is the key to efficiency



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