Breaking Down Silos
Integrating Water into Land Use Planning

Integrating Outdoor Water Use and Landscape Requirements into Codes & Plans

Why We Are Here

- Addressing outdoor water use and the ways that landscape ordinances fit into long range planning efforts.
- Which landscape ordinances give the biggest bang for the buck.
- How planners can do a better job of fitting landscape ordinances directly into the planning process.
- What other municipalities are doing in the region.

SPEAKERS

- **Kevin Reidy**, *State Water Conservation Technical Specialist*
- **Rick Schultz**, *Water Conservation Specialist, Castle Rock Water*
- **Lyle Whitney**, *Water Conservation Supervisor*, *City of Aurora*
- **Linda Dannenberger**, *Planning Division Director, Mesa County*

Landscape Use in Castle Rock

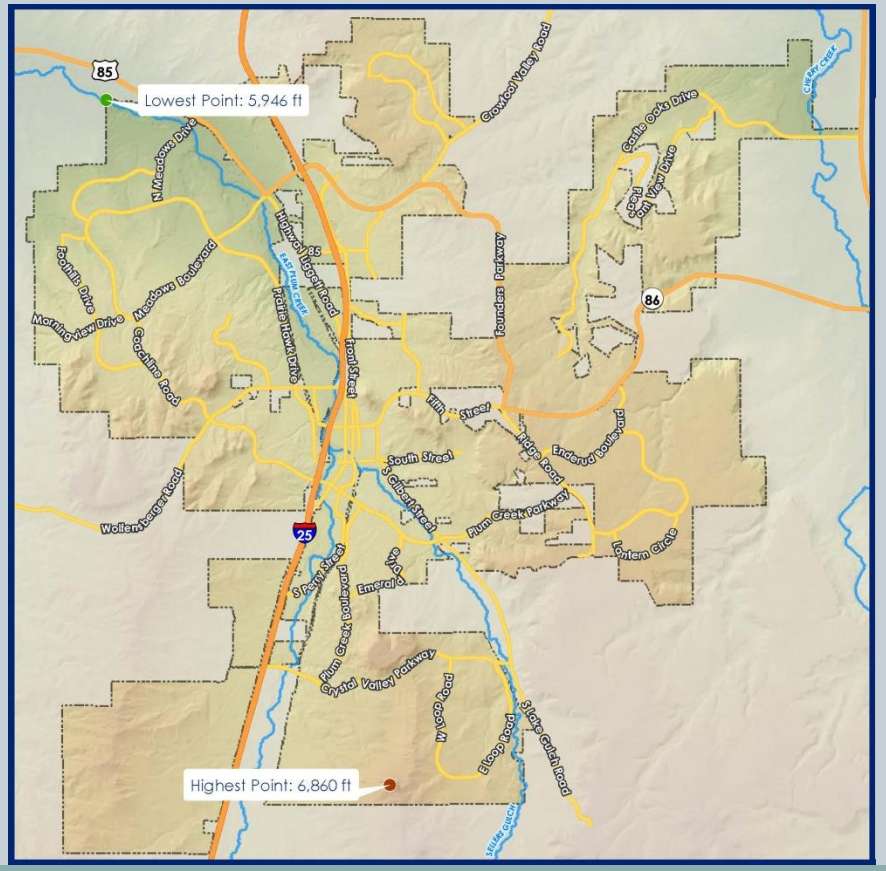
RICK SCHULTZ
WATER CONSERVATION SPECIALIST

Can Community Planning and Water Efficiency Coexist?

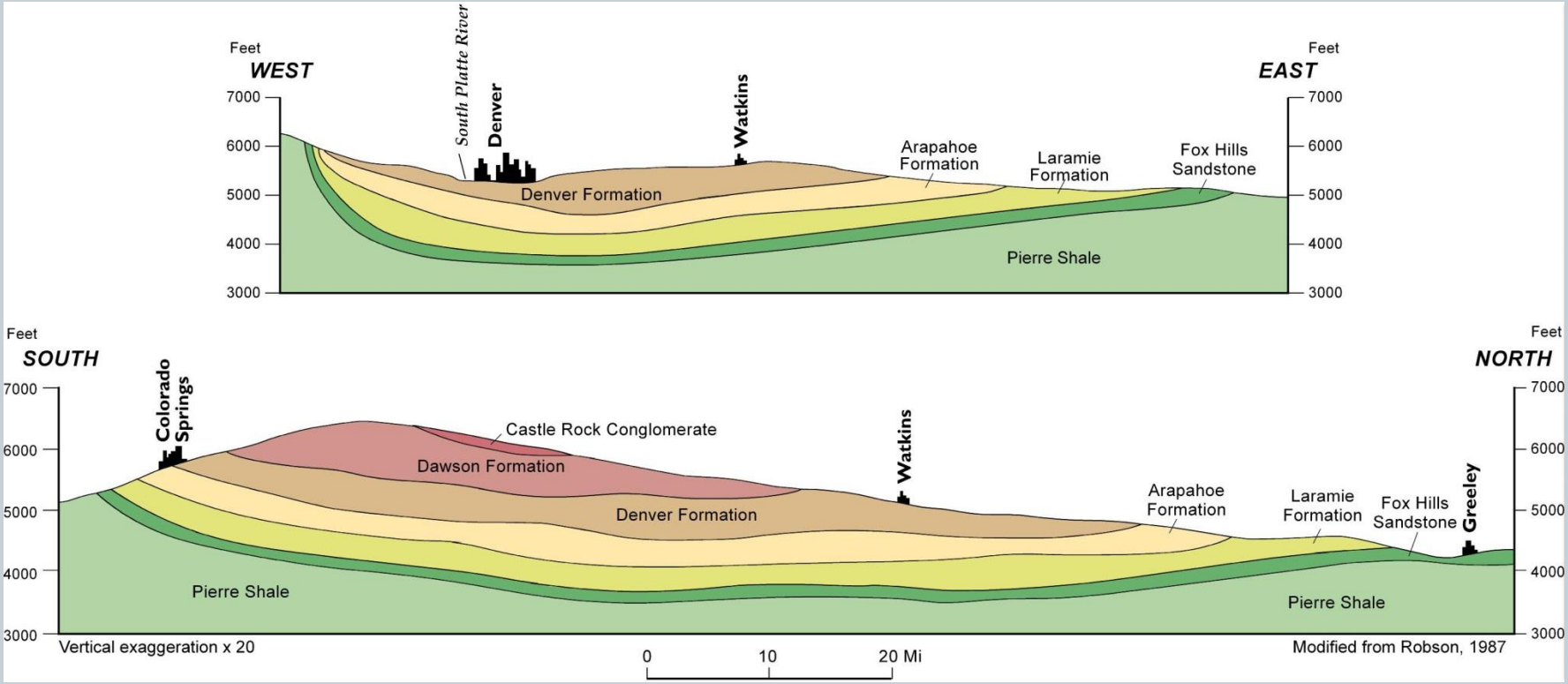
March 14, 2017

Castle Rock, CO

- Located along the I-25 corridor mid-way between Denver and Colorado Springs
- Semi-Arid high desert climate
- Groundwater based supply
- Elevation 5,946’ – 6,860’
- 34.3 square miles
- 62,188 people

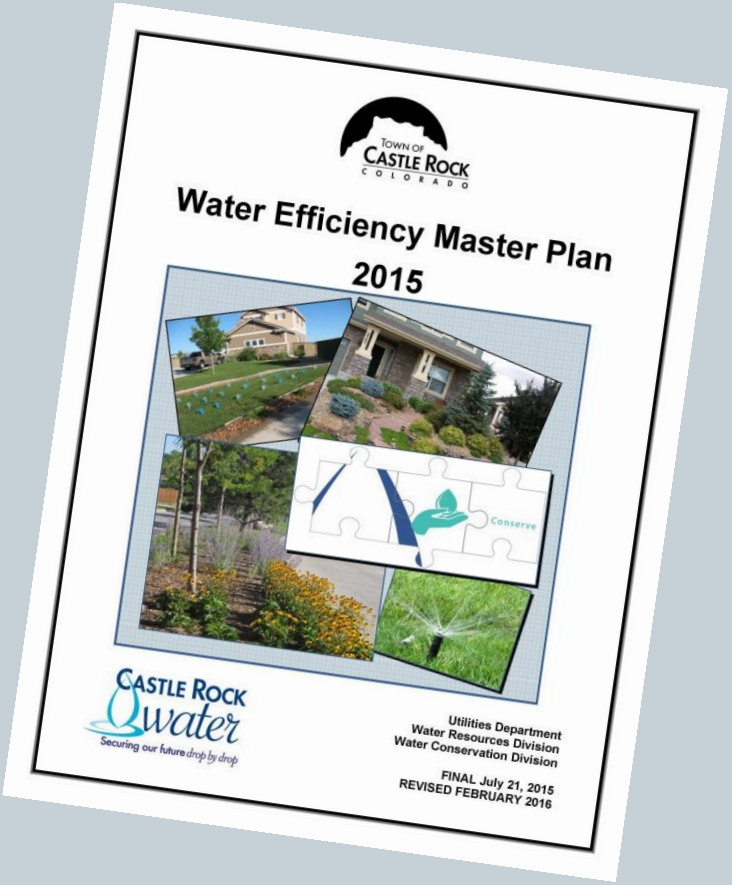


Water Source, Groundwater



Water Efficiency

- 1992 Water Resources Management Plan identified conservation as a viable method to extending water supply
- 1996 adopted a water conservation plan setting goals for the community
- 2006 Water Conservation Master Plan
  - 165 – 135 gpcd (18%)
- 2015 Updated Water Efficiency Master Plan
  - 122 – 100 gpcd (18%)

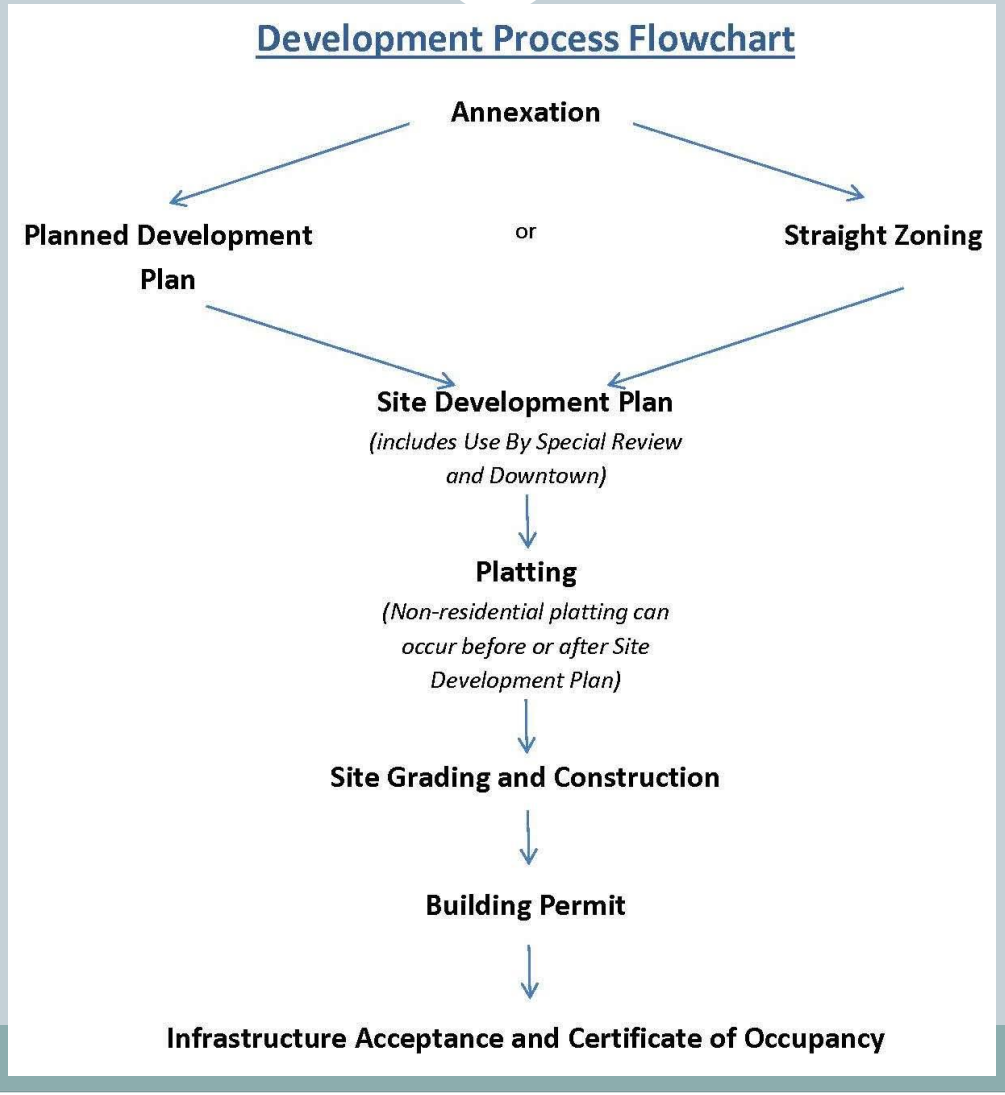


Water Source, Renewable

- 2013 – 177,373,935 gallons (9.4%)
- 2014 – 295,888,149 gallons (13.2%)
- 2015 – 272,000,804 gallons (11.1%)
- 2016 – 300,529,618 gallons (11.0%)

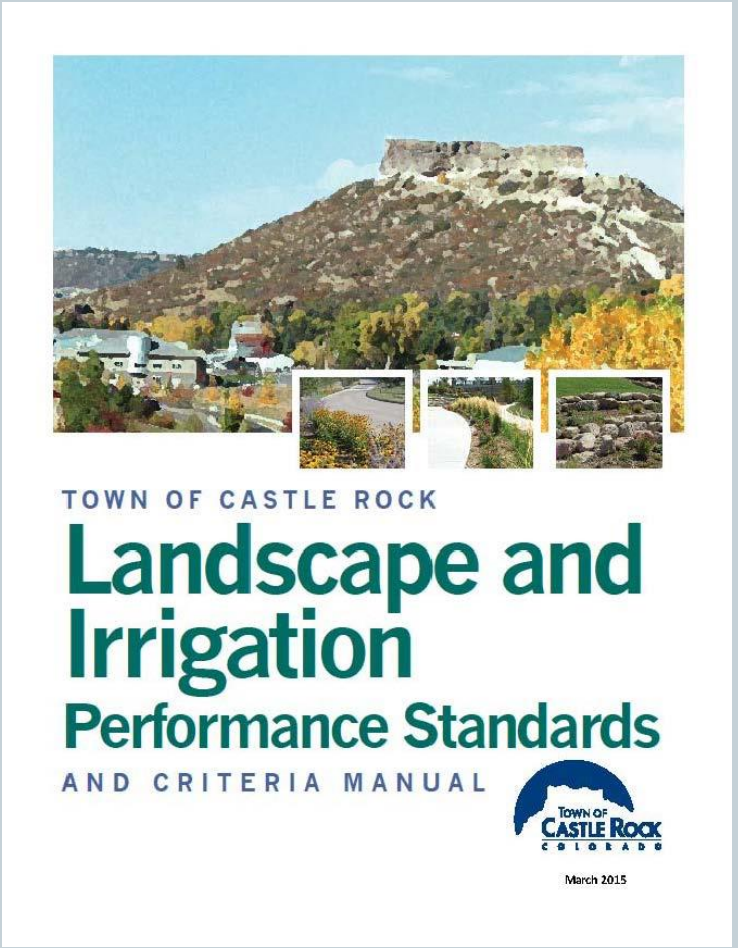
Plum Creek Water Purification Facility Online April, 2013

Development Procedures Manual



Regulations

- Landscape
  - Soil
  - Plant material
  - Parking lots
  - Streetscapes
  - Multi-Family
- Irrigation (non-residential)
  - Smart controllers
  - Flow sensors
  - Master valves
  - 6” minimum pop-up height
  - Internal check valves
  - Internal pressure regulation
  - Application rate less than 1.25”/hour
  - Head to head coverage
  - No overhead in areas less than 10’



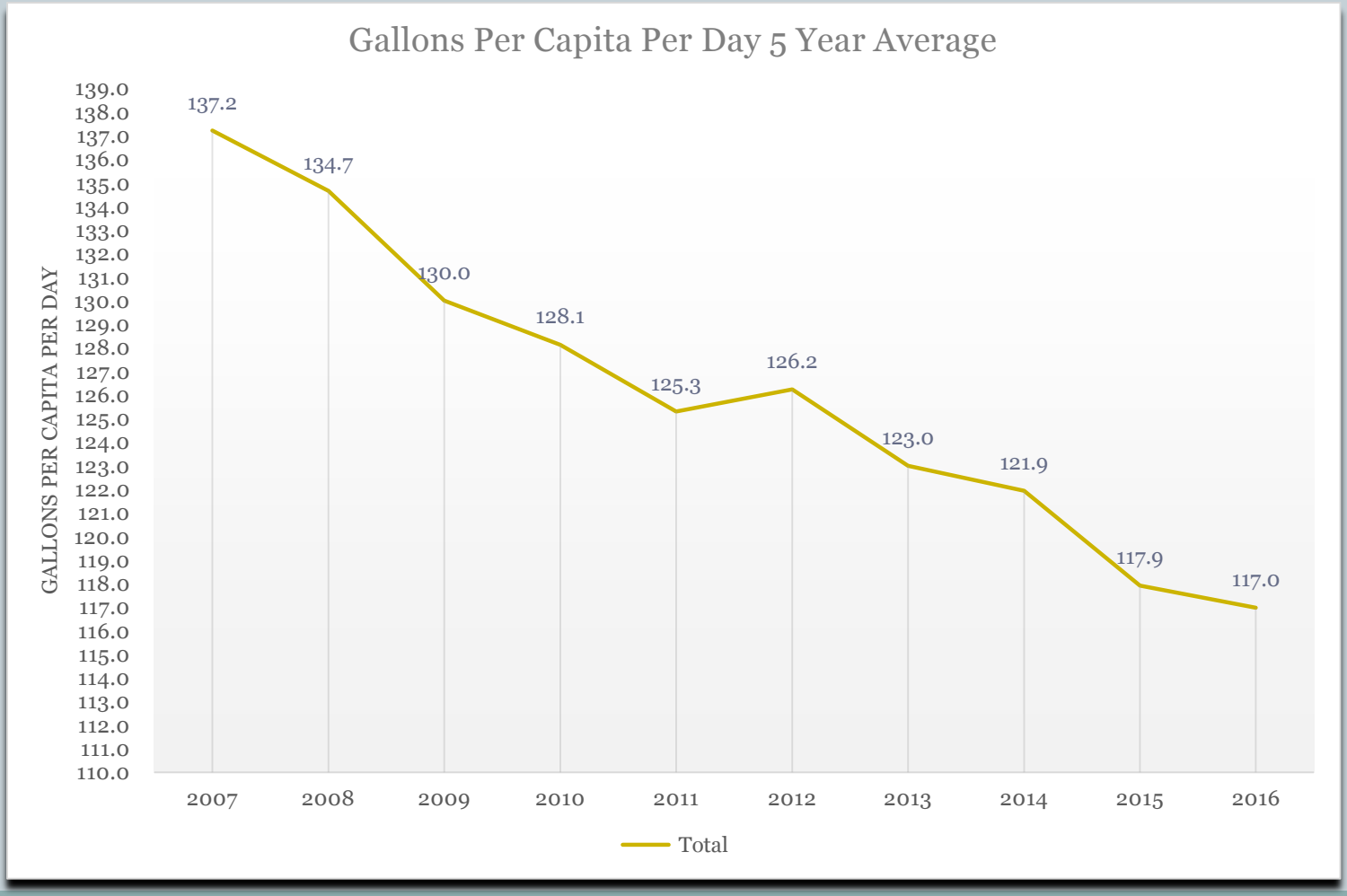
Plan Review and Inspections

- Submittal, review, and approval process for all non-residential projects
- Ensures compliance with regulations
- Inspections
  - Before, during, and after construction
- Final site compliance inspection prior to certificate of occupancy or permit closeout

Inspections

Inspections

Does It Work?


Gallons Per Capita Per Day 5 Year Average
GALLONS PER CAPITA PER DAY
139.0
138.0
137.0
136.0
135.0
134.0
133.0
132.0
131.0
130.0
129.0
128.0
127.0
126.0
125.0
124.0
123.0
122.0
121.0
120.0
119.0
118.0
117.0
116.0
115.0
114.0
113.0
112.0
111.0
110.0
137.2
134.7
130.0
128.1
125.3
126.2
123.0
121.9
117.9
117.0
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
Total

Changing Landscape Use in Aurora

Lyle Whitney

Water Conservation Supervisor

Land Use Pattern Strategies

1. Smaller Lot Size
2. Single Family to Multi-family Development
3. Denser Multi-family
4. **A decrease in irrigable area and type**

Code Changes

Proposed Changes

1. **Reduction of turf requirements**
    1. Disallow turf in ~~tree lawn~~ streetscapes (arterial, common areas)
    2. Change turf limitations in residential development
2. Simpler xeriscape requirements
    1. Removal of plan submittal step for front yard SFR xeric options
    2. Turf and xeric options have same standards
3. Streetscapes considered part of front lawn
4. Plant quantity requirement standardized

Proposed Table 14.3

Table 14.3 Home Yard Landscaping Front, Side and Rear Yard Landscaping Requirements for Single-Family Detached Two-Family and Single-Family Attached Duplex Homes			
Front yards: Areas located in front of the house elevation including the streetscape area between the sidewalk and street curbs. Side and backyards visible to the public will follow front yard standards.			
		Xeric Option	Turf Option
1.	Turf.	0%	Min: 400 sf Max: 40% or 1,000 sf, whichever is less
2.	Trees.	1 shade tree (2.5" caliper) and either 1 ornamental tree (2" caliper) or 1 evergreen tree (≥ 6' tall)	
3.	Shrubs. (In areas without turf)	≥ 0.025 shrubs per SF of landscaped area excluding turf areas. ≤ 30% of shrub count can be ornamental grasses/perennials. ≥ 5 plant species must be included to provide seasonal/visual interest. # of shrubs = (front yard landscaped area sf – turf sf) x 0.025	
4.	Rock and inorganic mulches.	≤ 50% non-turf areas can be inorganic rock mulch.	
5.	Pavers.	≤ 40% of landscaped area can be brick pavers, asphalt pavers and natural stone.	
6.	Features	One of the following features shall be incorporated: a. Wall: 1' – 2.5' high decorative stone, stucco or CMU wall. b. Fence. c. Berms: earth berm ≤ 2.5' tall. Slopes not to exceed 1:4 slope. d. Natural boulders: ≥ 2' x 2' x 2'	
7.	Side yards.	Side Yard, no public view: No plant material required, mulches required. Side Yard, public view: front yard standards + 1 tree/25 linear ft.	
8.	Rear yards.	Rear Yards, no public view: no standards, ≤ 45% turf Rear Yards, public view: front yard standards	

Turf Option Changes

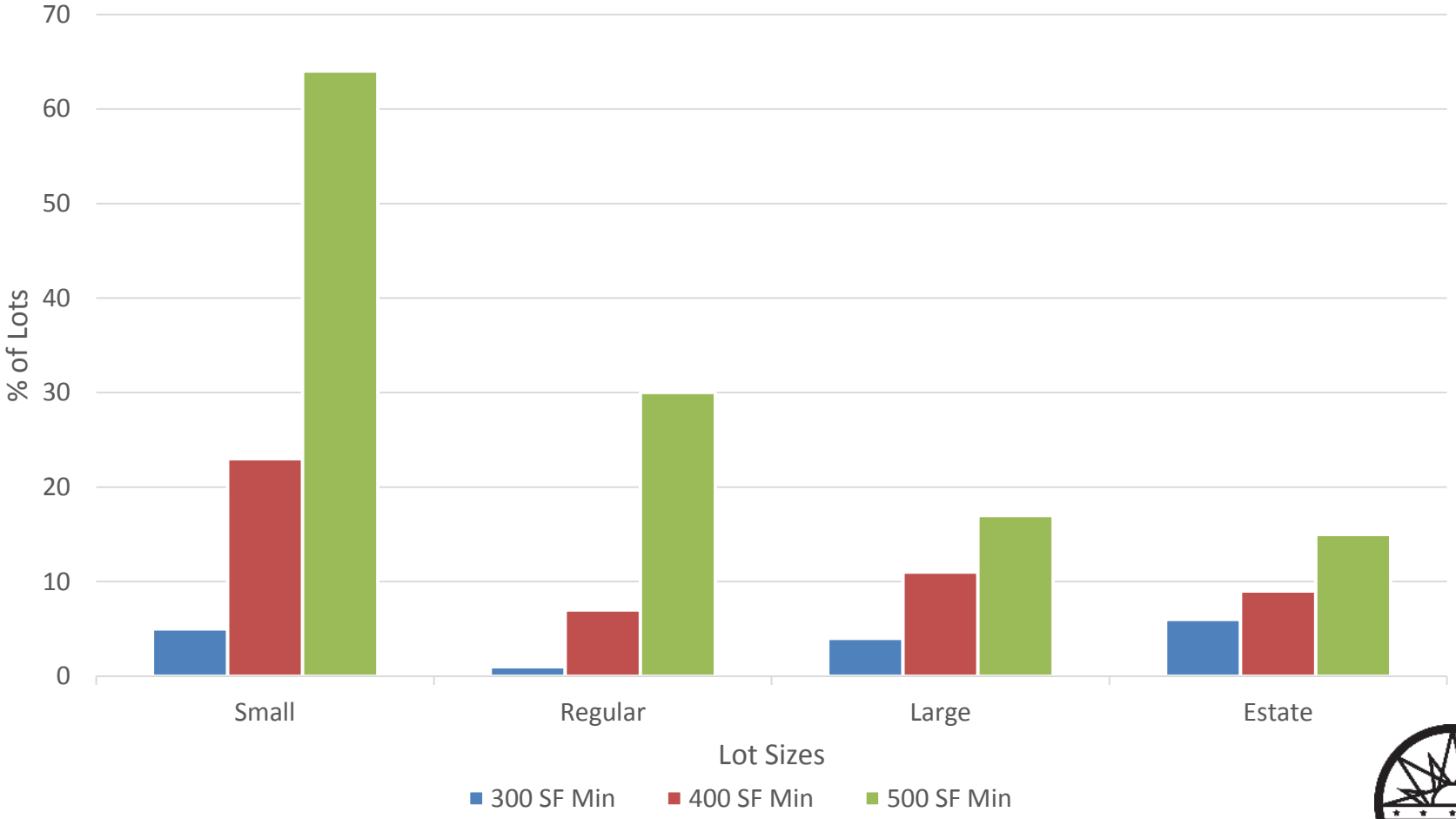
Current

- Turf:
  - Small: 40% - 50%
  - Standard: 30% - 40%
  - Large: 25% - 40%
  - Estate: 25% - 40%
- Shrubs:
  - Small – 8
  - Standard – 16
  - Large – 26
  - Estate – 36
- No hardscape required

Proposed

- Turf:
  - Min: 400 SF
  - Max: 40% or 1,000 SF (all sizes)
- Shrubs:
  - 0.025 / SF
  - SF = (Landscaped Area – Turf Area)
- Hardscape required (to match xeric requirements)

Analysis of Turf Minimums



Water Savings with Turf Adjustments

	Residential Water Savings Potential 2016 -2020			
	Turf SF	% Turf Reduction	H2O Savings (AF)	% Water Savings
Residential FY*:	2,043,208	43%	60	31%
	Non-Residential Water Savings Potential 2016 - 2020			
Arterials**:	721,057	100%	89	45%

* Front yard turf option: Minimum = 400 square feet, Maximum = 40% of front yard area or 1,000 square feet, whichever comes first

** Streetscapes that are along arterials and commonly owned and maintained by any non-single family residential customers

Xeric Option Changes

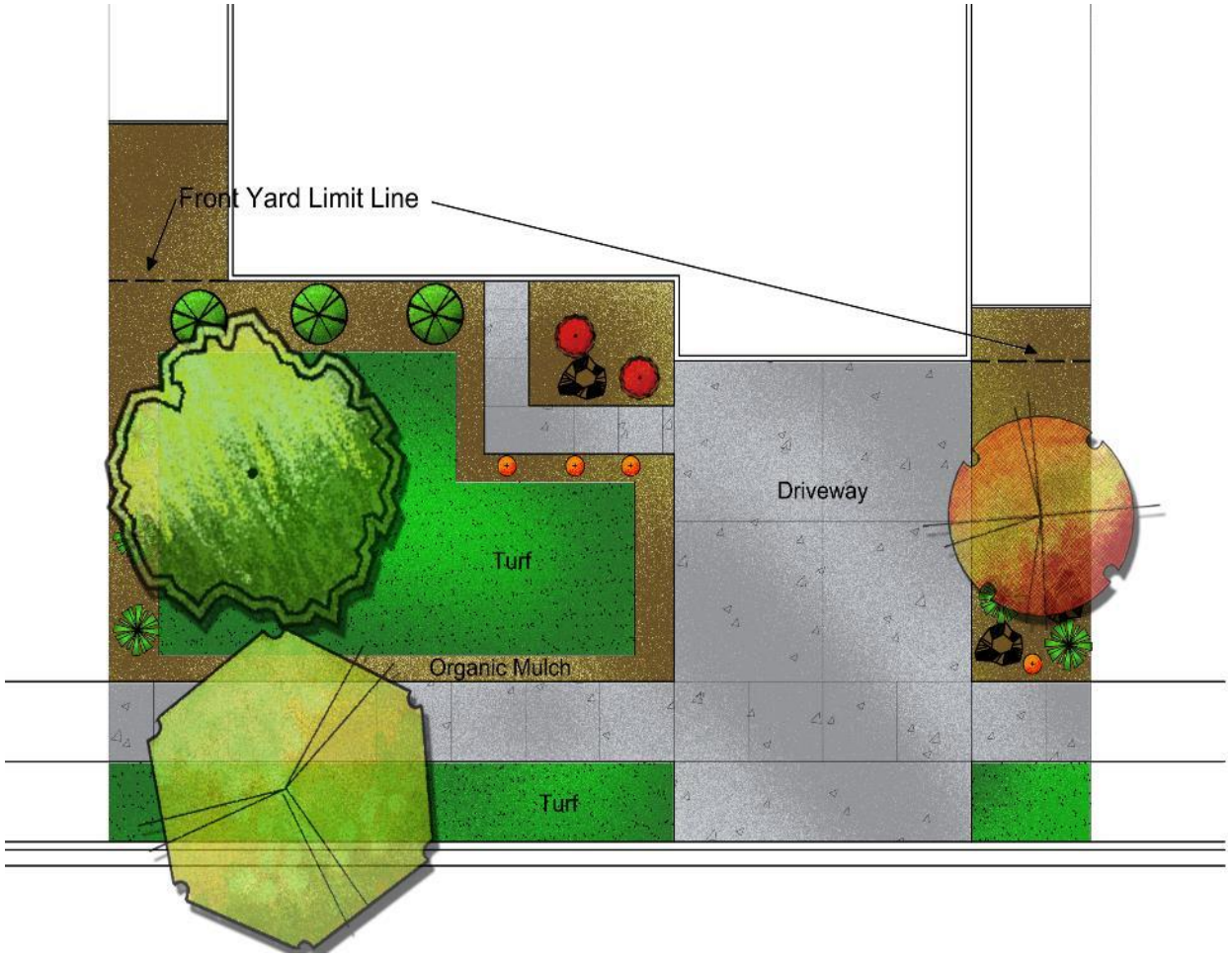
Current

- Landscape plan required
- 50% plant coverage
  - Includes two trees

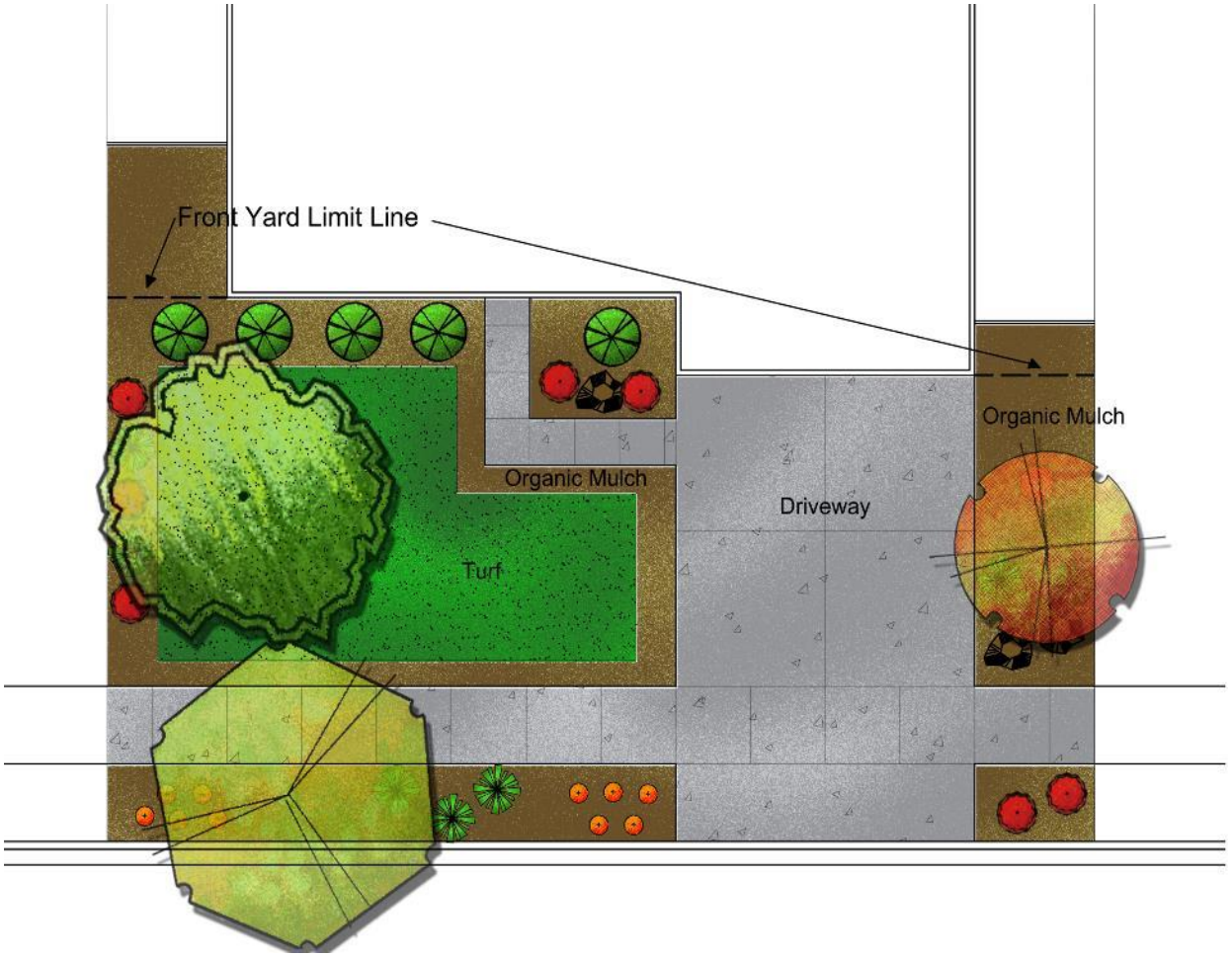
Proposed

- No landscape plan required
- 0.025 shrubs / SF
- Two trees still required
  - Deciduous
  - Ornamental/Evergreen

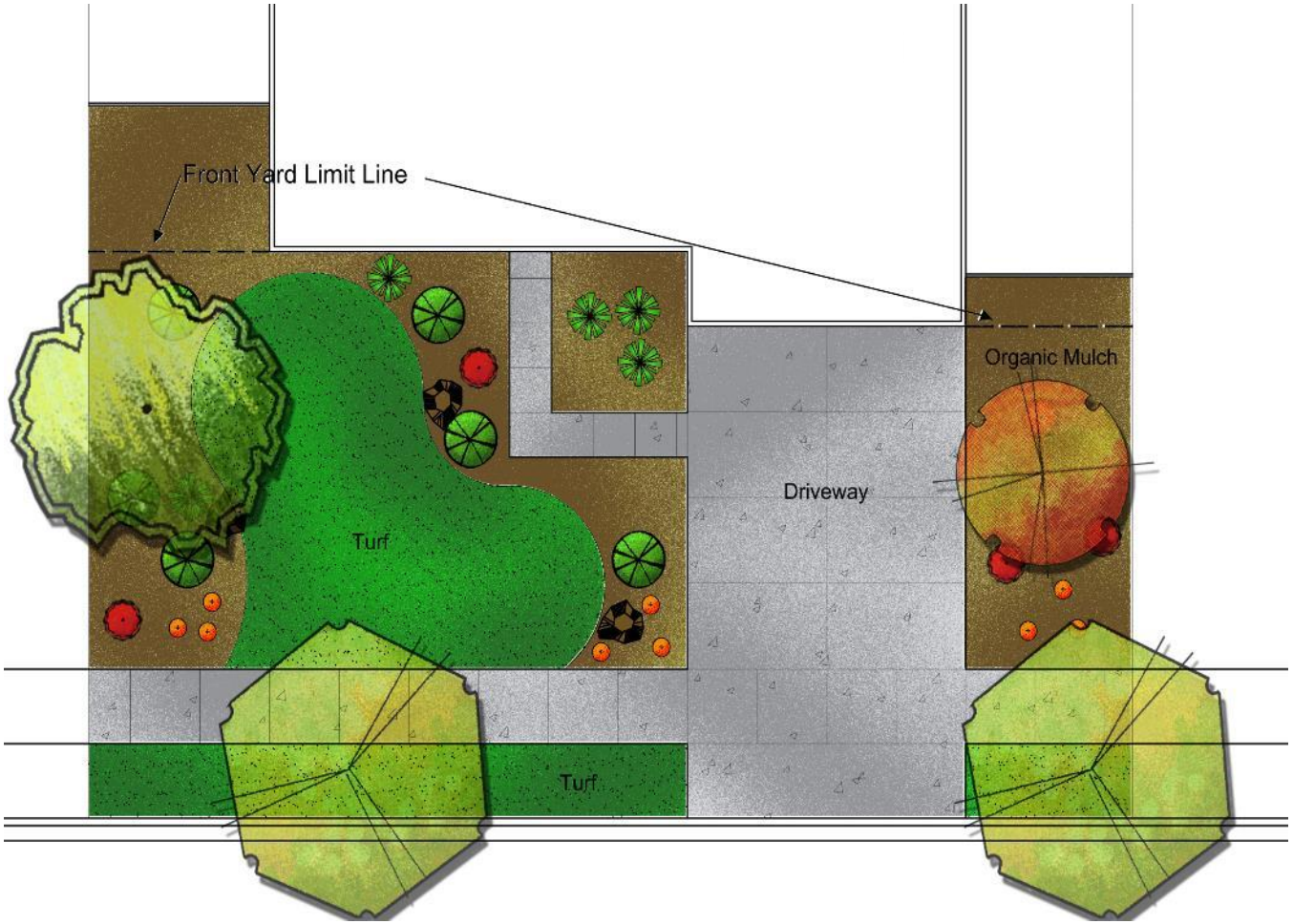
Small Lot – Current Turf Requirements



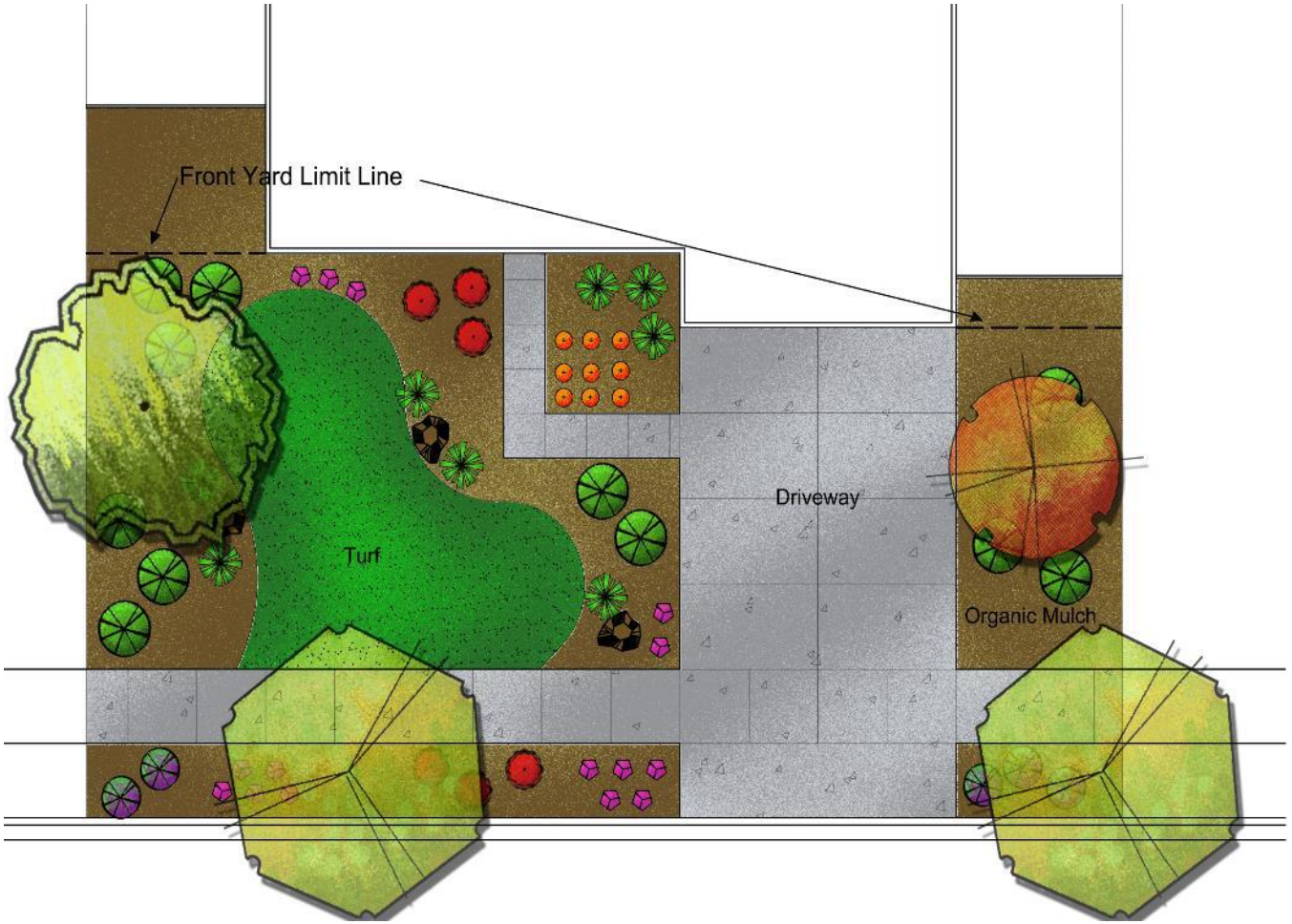
Small Lot – New Turf Requirements



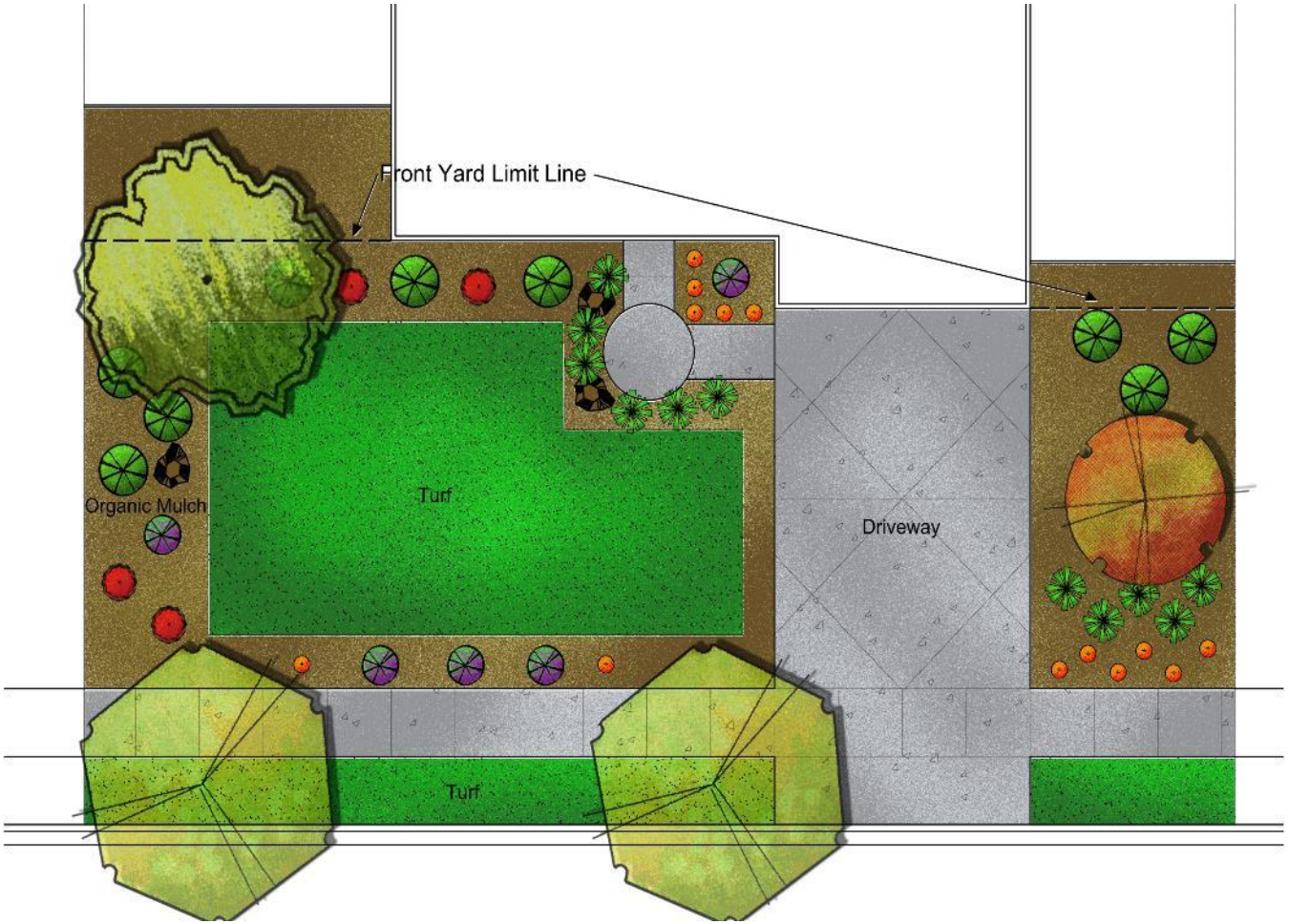
Standard Lot – Current Turf Requirements



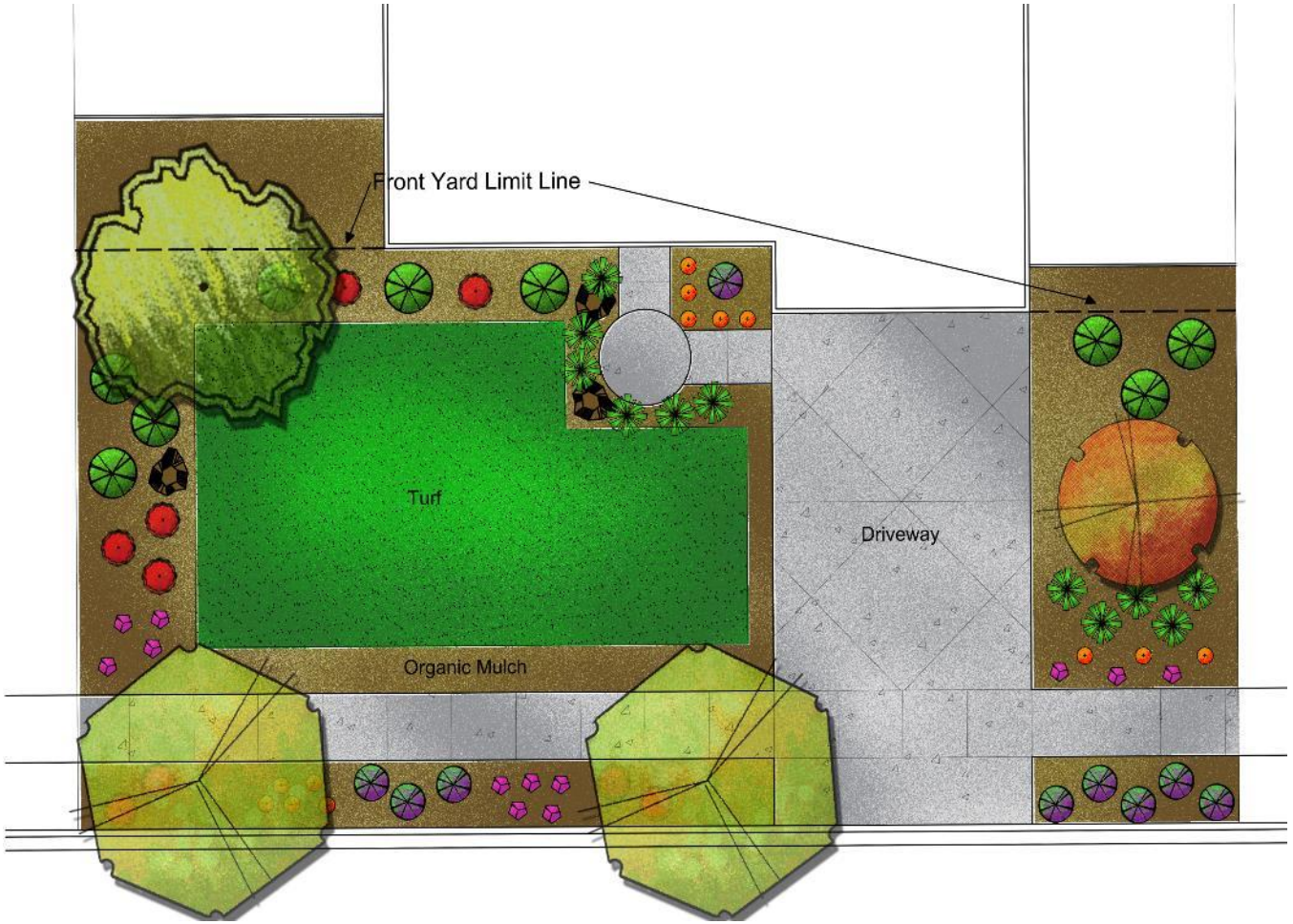
Standard Lot – New Turf Requirements



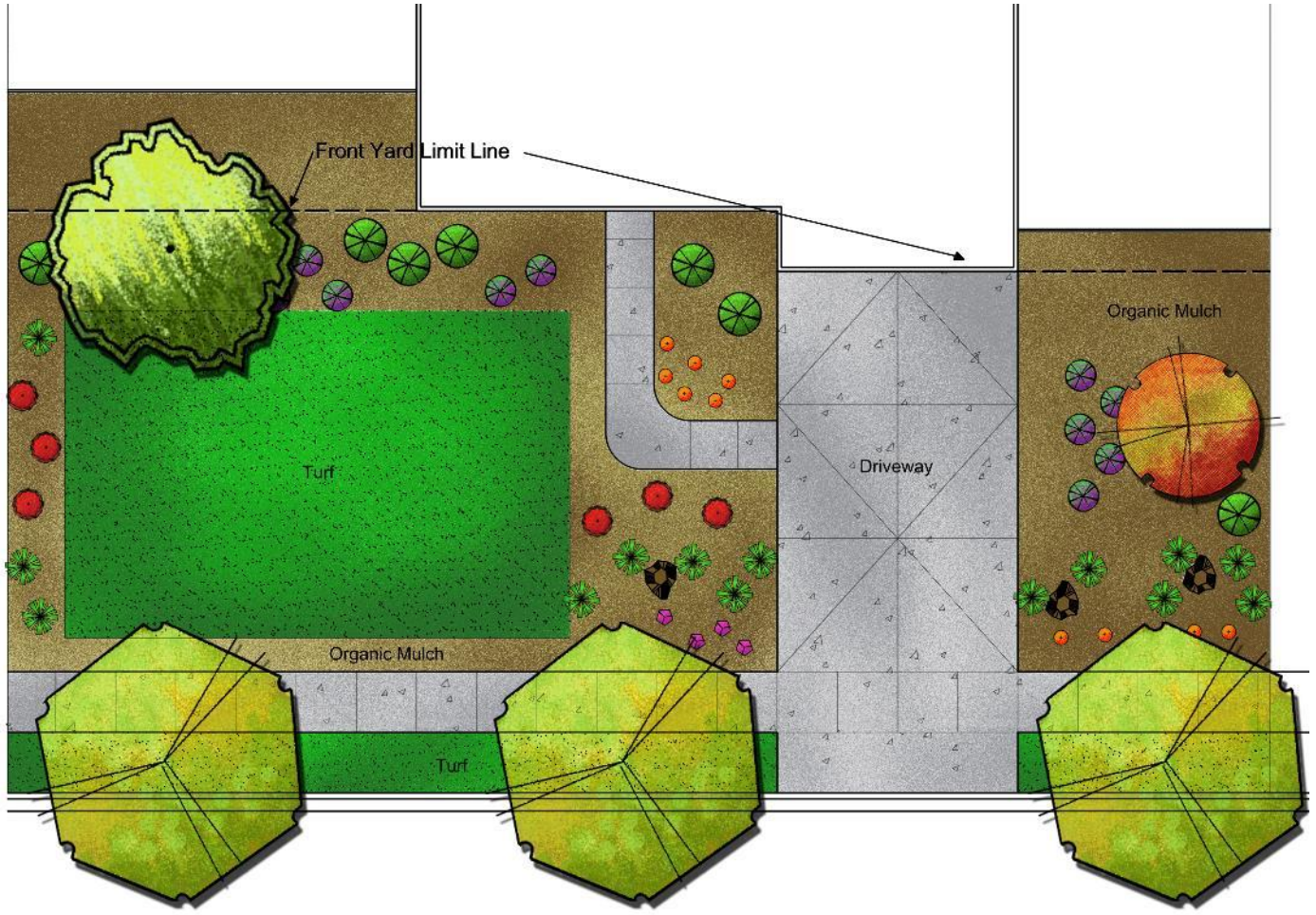
Large Lot – Current Turf Requirements



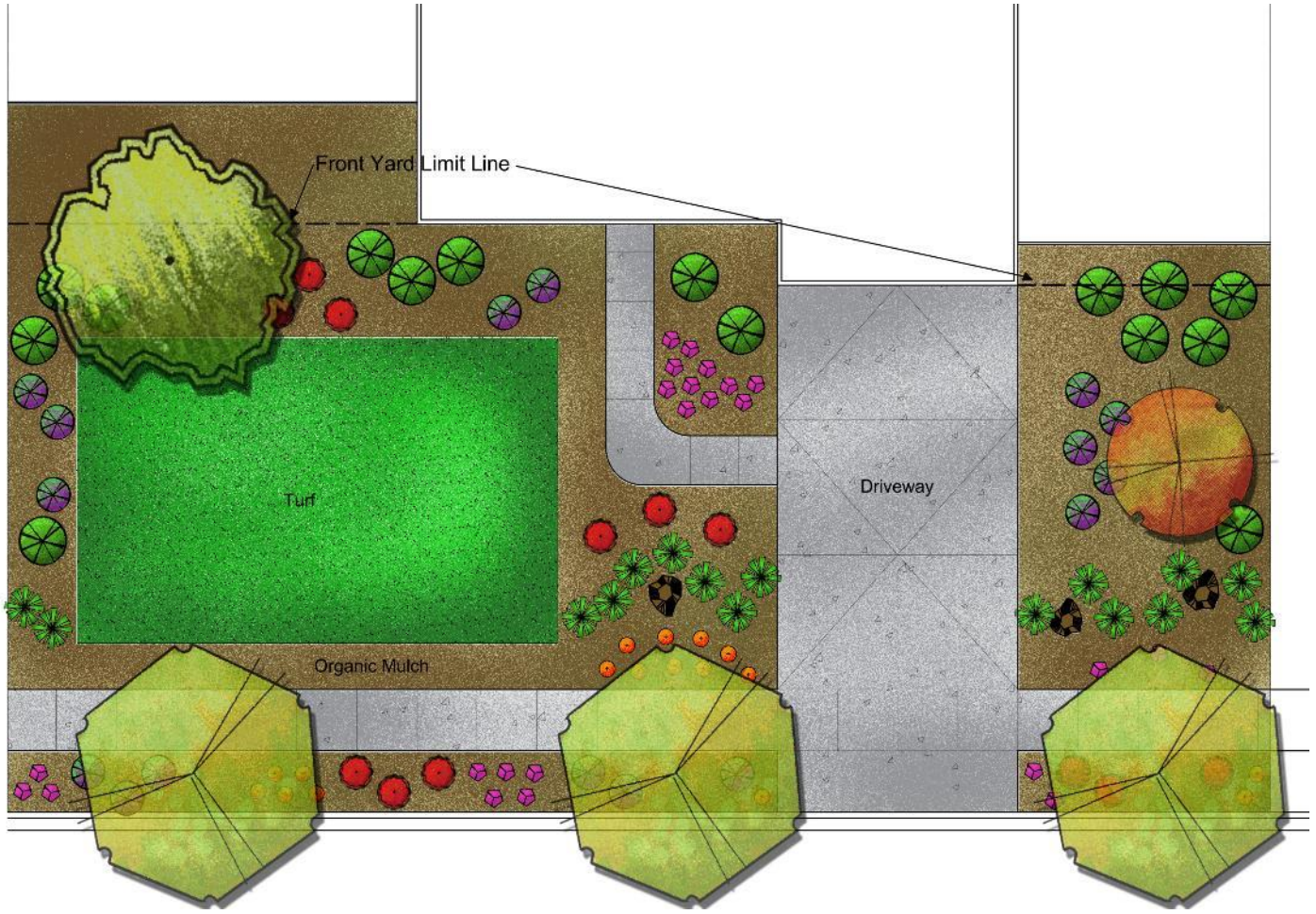
Large Lot – New Turf Requirements



Estate Lot – Current Turf Requirements



Estate Lot – New Turf Requirements



Incentives

Incentives (non-residential)

- Z-Zone Tap Fee (Irrigation Meters)
  - $25,000 deposit
  - 3 year establishment period
  - Water allocations based on landscape

Revised 2014 Tap Fees	
High-Water Use (HWU)	$2.75/sf
Low-Water Use (LWU)	$1.47/sf
No Water Use (Z-Zone)	$0.00/sf

→ Temporary Tap

Water Savings Potential

Zone	Pre-Z-Zone Option	Post-Z-Zone Option	Post-Z-Zone SF
High Water	47%	17.5%	415,305
Low Water	47%	40.1%	953,744
No Water	6%	42.4%	1,009,164

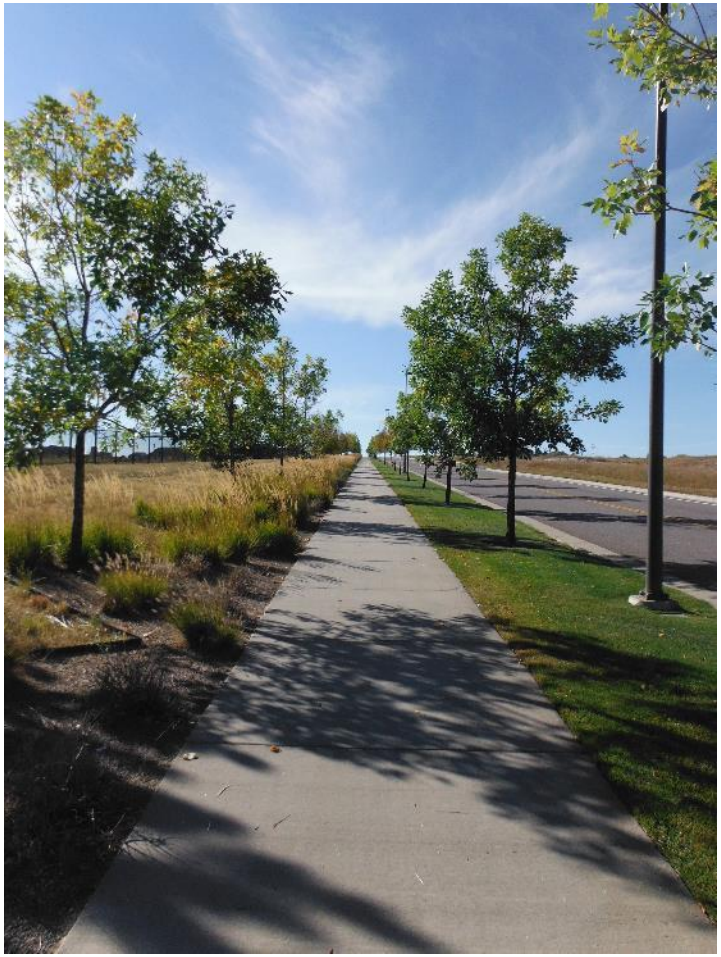
Potential Savings = 9,430,638 gallons/year

7 out of 8 developments have opted for Z-zone

Incentives (residential)

- Front Yard xeriscape tap fee credit
  - 100% xeriscape in front yard
  - $1,000 credit
- Estate Lot Variance
  - ¾ acre minimum “developed”
  - Tap fee based on water need and landscape
  - Contract follows deed to property
  - Recovery fee component

Away from…



And towards…

It’s already being practiced

Mesa County

Landscape Code

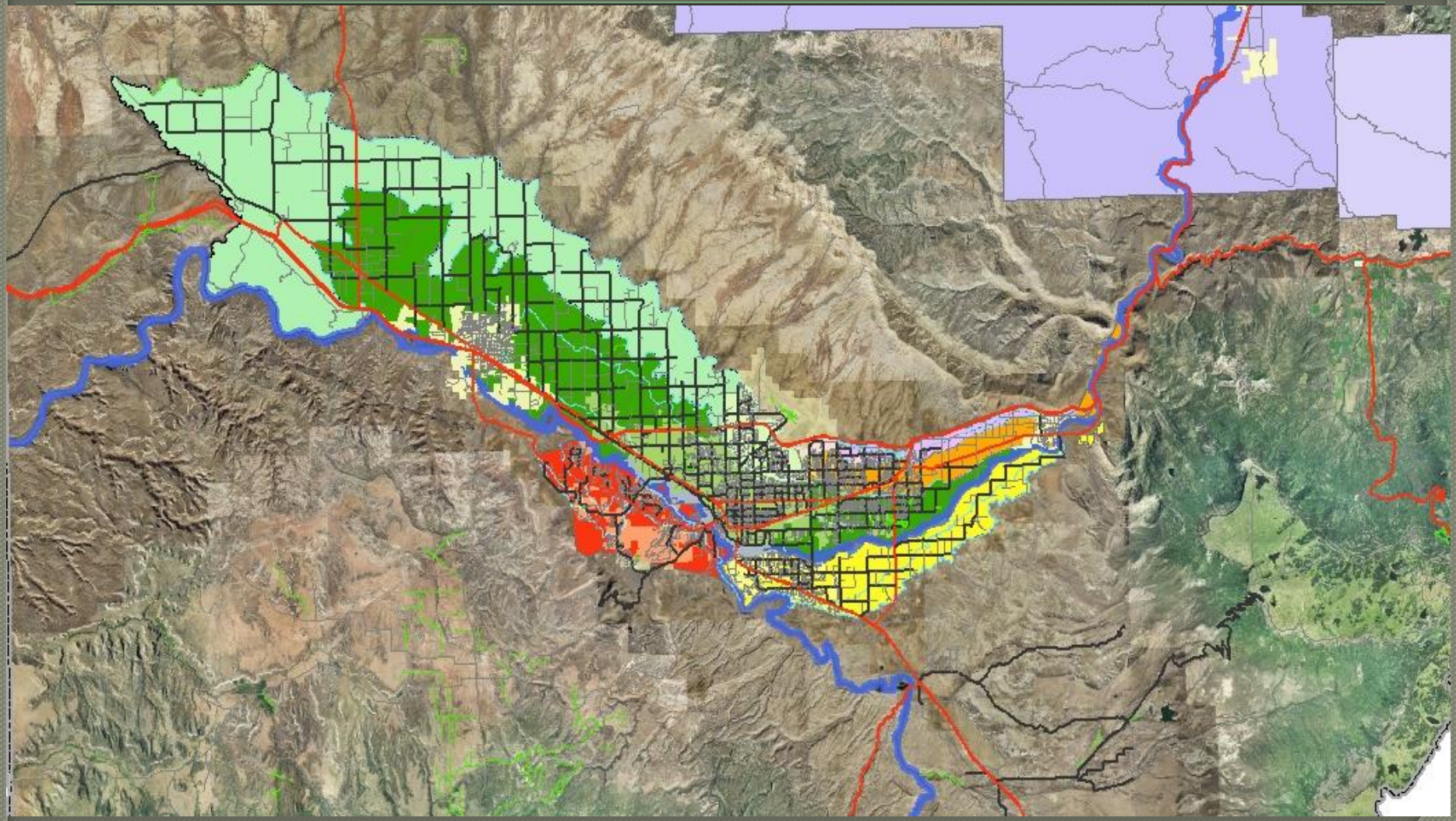
Linda Dannenberger, *Planning Division Director*

March 14, 2017

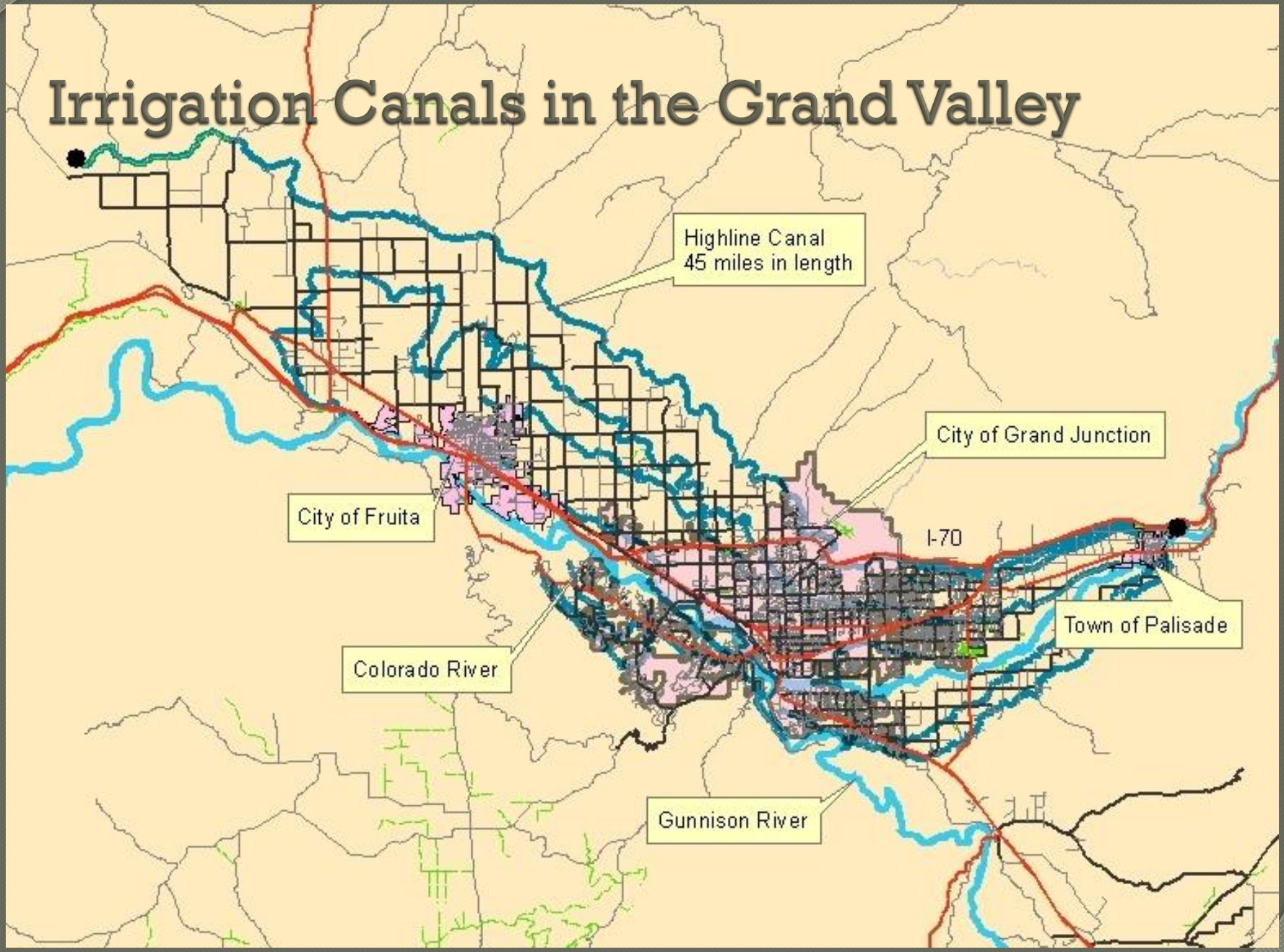
Purpose of a low water landscape code

- Provide a framework for developers to create appropriate, sustainable landscapes in the desert context
- Encourage water conservation, reduce erosion, develop efficient landscape irrigation practices, and reduce storm water runoff
- Increase property values within the community for the long term
- Promote community vitality

Water and the Grand Valley



Irrigation Canals in the Grand Valley



where we came from

The path to create new regulations

- Technical Review Committee
- Development Community
- Professional Feedback
- Utilities
- Community Leadership

Objectives

1. Provide **flexibility** & inspire **creativity**
2. Maintain **cost consistency** to development
3. Reward **water conservation**
4. Provide **pertinent information**

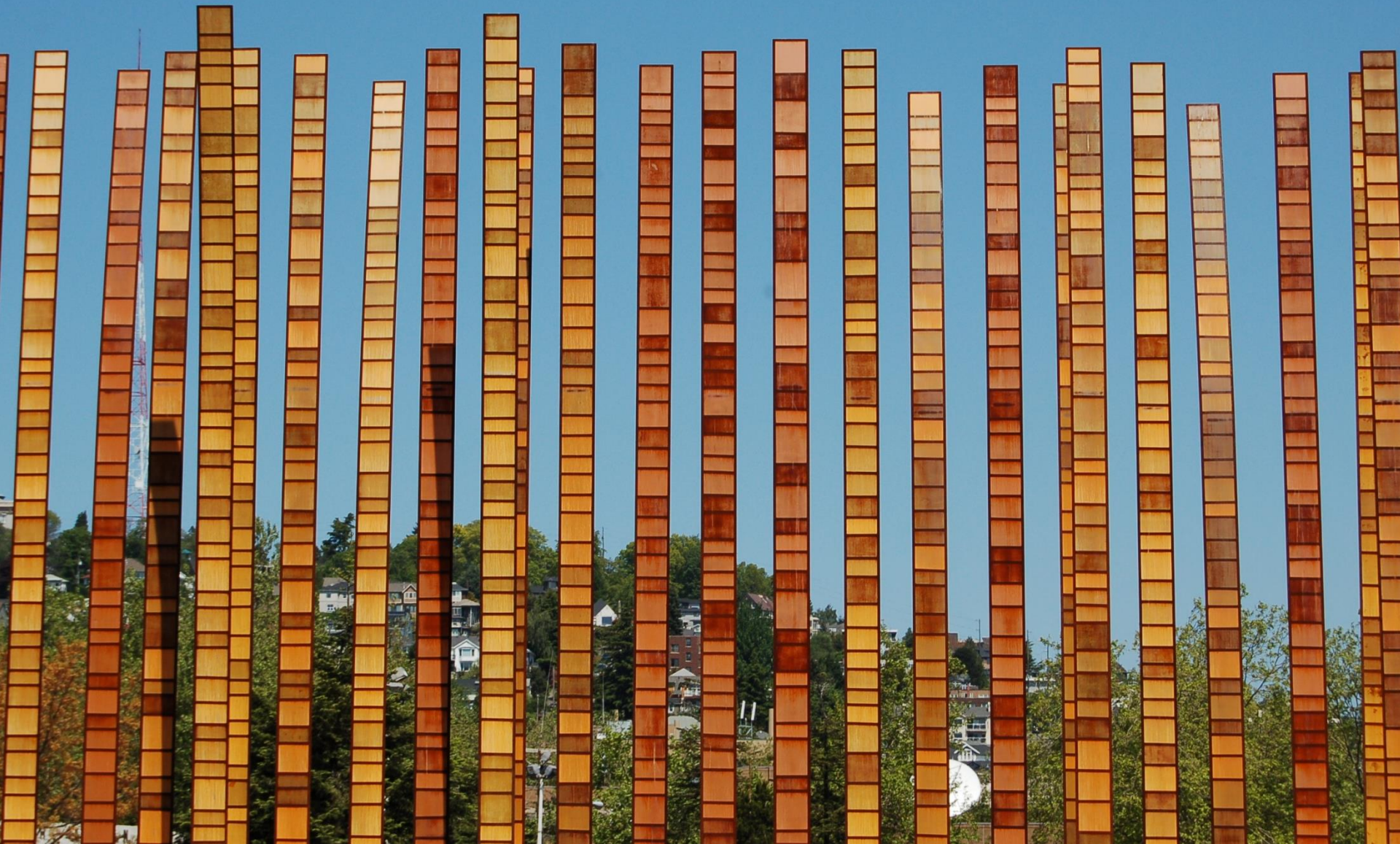
1. Flexibility & creativity

Flexible Landscape Point System

- Specialized point system for different types of applications
- Points assigned to site design and planting options
- Required minimum points for approval
- Excess points earned "rollover" to another area, such as excess street frontage landscape improvements points rolling over to the buffer area

Examples of Creativity

This is an actual fence – not a graphic added to the slide!



Xeric and Dry Standards

- Drought tolerant plants
- Properly designed irrigation systems
- Use irrigation water where available
- Preserve existing vegetation
- Limited water required for up to 2 years for establishment

Xeric landscaping in a high desert subdivision

Parking Lot Landscape – Xeric – no turf

Dry Landscapes

No Water Available

- Applicant must demonstrate that water is not available for landscaping
- Non-living materials and features will be used primarily
- Minimal plantings are required

Dry Landscapes

Chart F in the Land Development Code
Acceptable Materials

- Boulders (minimum size 24" x 30")
- Dry creek bed or other significant landscape feature
- Western collectibles-small (ex: wagon wheel, antlers)
- Large western antiques (ex: mining cart, wagon)
- Shade structure or other structure (ex: small bridge, pavilion)
- Fine art/sculpture (NOT including small garden ornaments)
- 3-6' Masonry wall with decorative features
- Shrubs: #2 container size
- Evergreen Tree
- Use of low-water-consumption grasses for at least 5% of bed coverage
- Use of permeable, realistic, artificial turf on at least 5% of bed coverage
- Preservation of existing significant vegetated areas and/or natural rockscapes
- Reclamation of native species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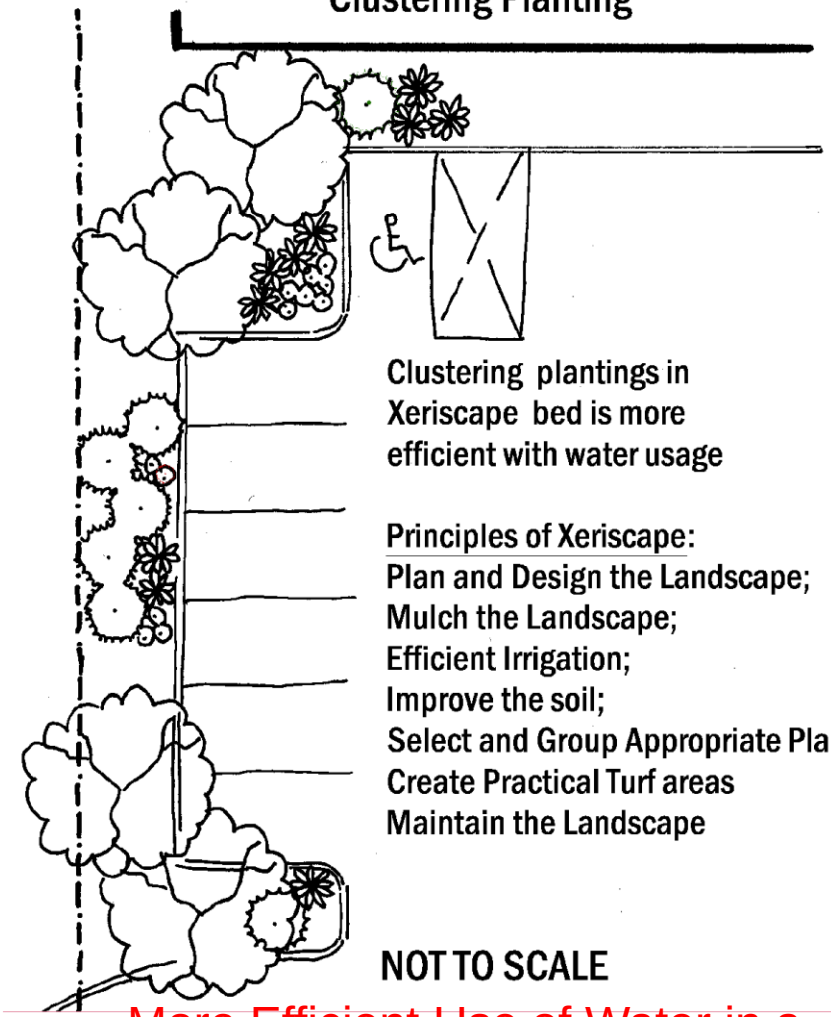
Clustering Planting



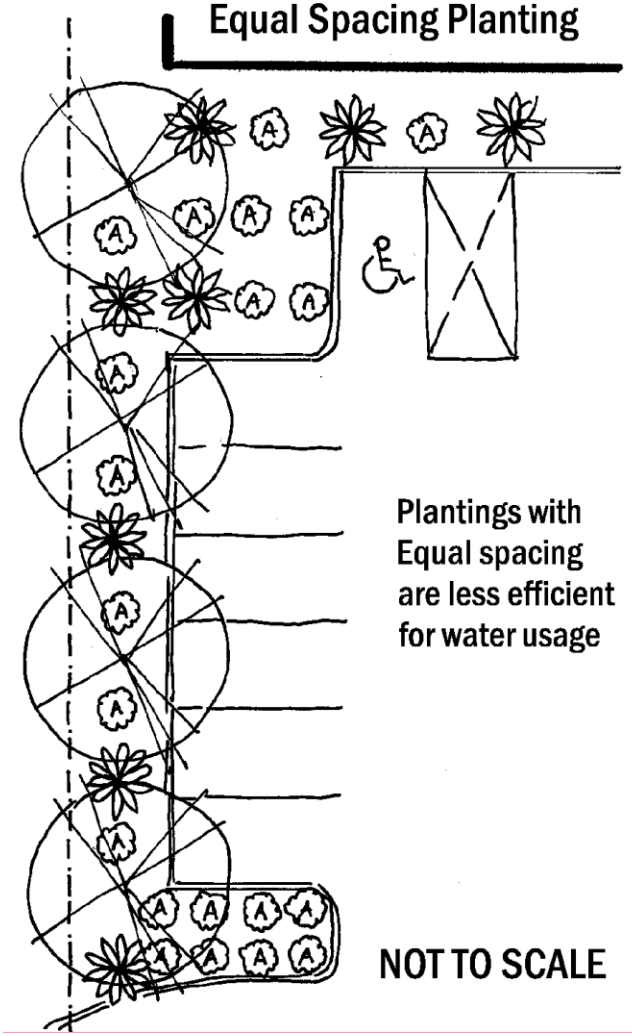
Clustering plantings in Xeriscape bed is more efficient with water usage

Principles of Xeriscape:
Plan and Design the Landscape;
Mulch the Landscape;
Efficient Irrigation;
Improve the soil;
Select and Group Appropriate Plant
Create Practical Turf areas
Maintain the Landscape

NOT TO SCALE

More Efficient Use of Water in a Clustered Design

Equal Spacing Planting



Plantings with Equal spacing are less efficient for water usage

NOT TO SCALE

Equal Spacing Style


11 South Country Club Drive
Exit Street View
Clustered Planting Style
© 2013 INEGI
© 2013 Google
© 2014 Google
Google earth
Report a problem
33°24'50.75" N 111°50'26.82" W elev 1247 ft eye alt 1247 ft

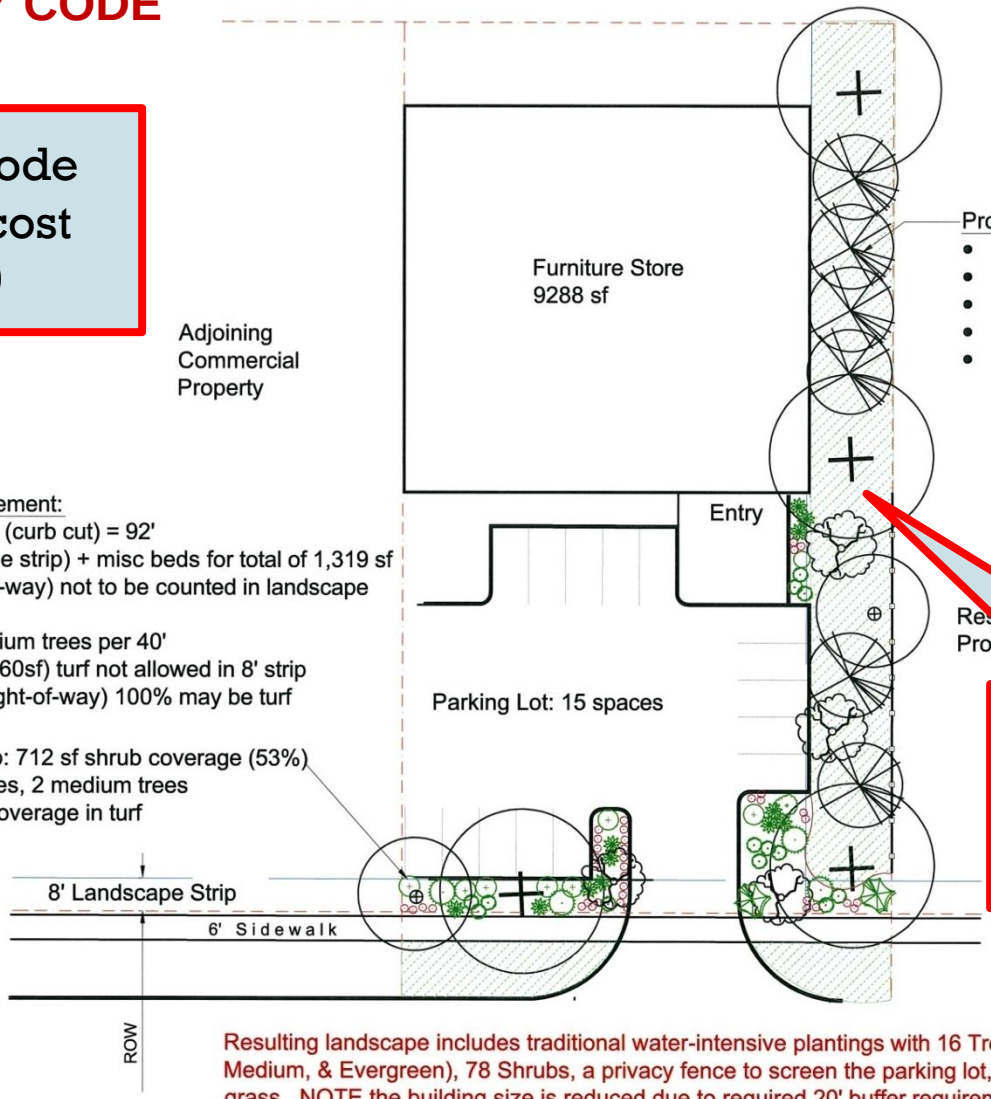
2. Maintain Cost Consistency

- Design Testing
  - Different scenarios were explored using the proposed point system
  - An external cost analysis on each scenario was provided by a nursery

Commercial Parking Lot

MESA COUNTY CODE

Previous Code minimum cost $25,920



Buffer Requirement
- 20' Strip
- 50% shrub coverage or 100% turf
- 1 large or 2 medium trees per 30 LF
- "sufficient to render compatibility not a problem"

Provided:
- 20' Buffer Strip
- 218' x 20' = 4,360 sf buffer area
- 4 large trees and 8 medium trees
- 100% coverage in turf
- Along entire property line

Street Frontage & ROW Requirement:
- Street Frontage: 120' - 28' (curb cut) = 92'
- 92' x 8' = 736 sf (Landscape strip) + misc beds for total of 1,319 sf
- 74' x 13.5'= 999 sf (right-of-way) not to be counted in landscape coverage calculation
- Required: 1 large or 2 medium trees per 40'
- 50% coverage (all beds= 660sf) turf not allowed in 8' strip
- 50% coverage (500 sf in right-of-way) 100% may be turf

Provided:
- Landscape strip: 712 sf shrub coverage (53%)
  - 2 large trees, 2 medium trees
- ROW: 999 sf coverage in turf

Previous Code required 20' buffer strip

Resulting landscape includes traditional water-intensive plantings with 16 Trees (Large, Medium, & Evergreen), 78 Shrubs, a privacy fence to screen the parking lot, and 4,900 sf turf grass. NOTE the building size is reduced due to required 20' buffer requirement.
Expected Cost to Install: $25,920

Scenario 1

Commercial Parking Lot

How to apply points using Chart B & Chart E

Required: Chart B (85 pts) + Chart E (20 pts) = 105 points

Provided: Chart B (95 pts) + Chart E (10 pts) = 105 points

Points are allowed to roll-over between charts.

Design Scenario #1
$21,406

Baseline Buffer: 10'
Gain of 1,028 sf Bldg

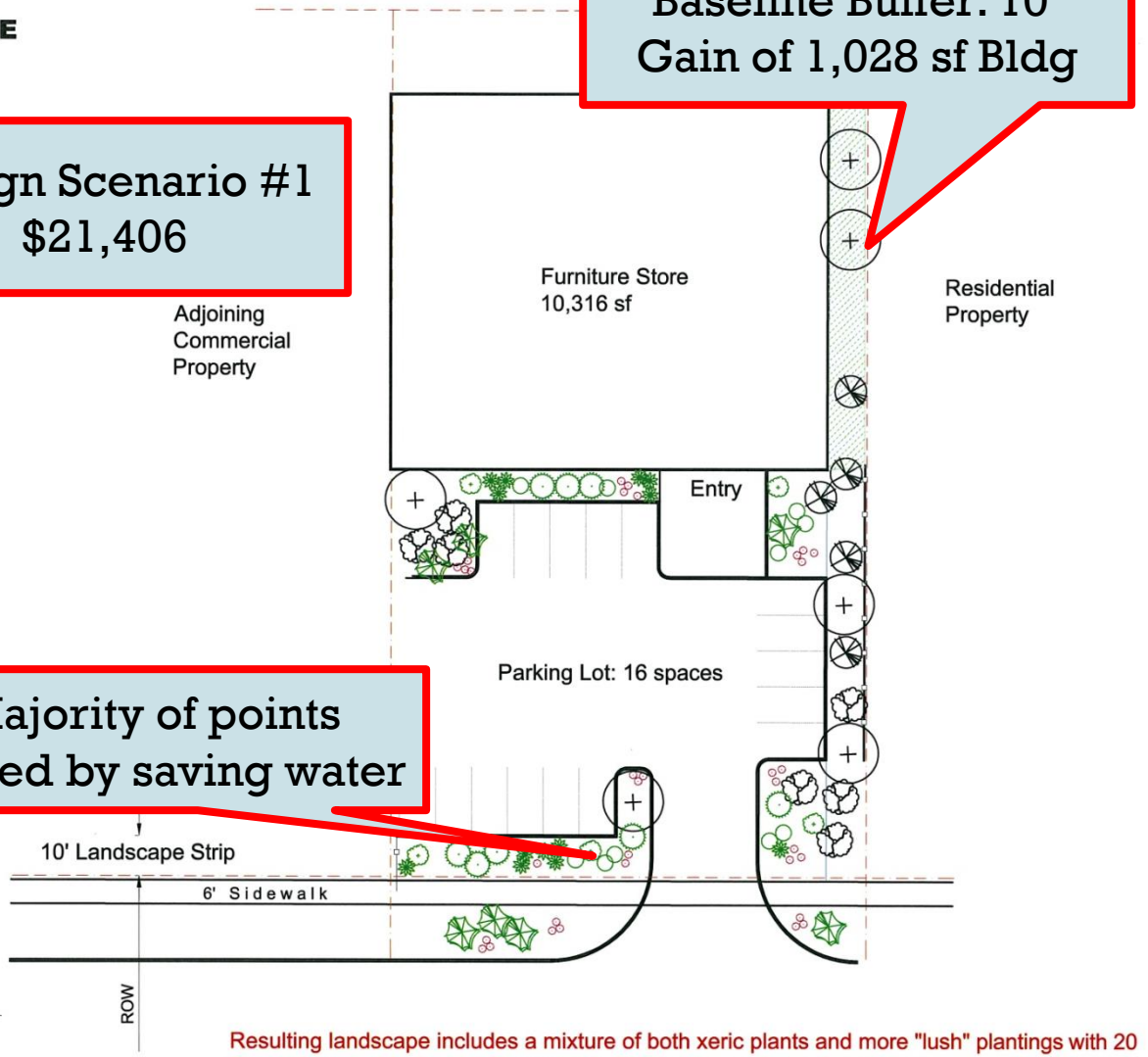
From Chart B :

1. Preservation of existing vegetation:	0
2. Site Design:	
• 100% of parking between street & building	-10
3. Size of Planting Islands	
• Interior Islands: Min 8.5'	0
• Perimeter Planting Bed: 10' (+2')	15
4. Trees	
• Interior Islands: 1 Large Tree	5
• Perimeter Beds: Option A & B combined	10
5. Shrubs	
• Option C: xeric @ 30% coverage	10
• Foundation Plantings @ 50% coverage	5
6. Water-Saving Plant Selection	
• Xeric plants: 100% of total SF	35
• Specified Water Sense controller	
• No turf in beds over 10' in width	

Majority of points earned by saving water

From Chart E :

1. Buffer Site Design Options	
• 5' Fence	0
2. Buffer Planting Options	
• Use of low-water grasses	5
• Use of low or very low water plants in bed	5
	10



Resulting landscape includes a mixture of both xeric plants and more "lush" plantings with 20 Trees (Large, Medium, & Evergreen), 79 Shrubs, a privacy fence to screen parking lot, and 1,020 sf of native grasses.
Expected Cost to Install: $ 21,406

Scenario 2

Commercial Parking Lot

How to apply points using Chart B & Chart E

Required: Chart B (85 pts) + Chart E (20 pts) = 105 points

Provided: Chart B (80 pts) + Chart E (25 pts) = 105 points

Points are allowed to roll-over between charts.

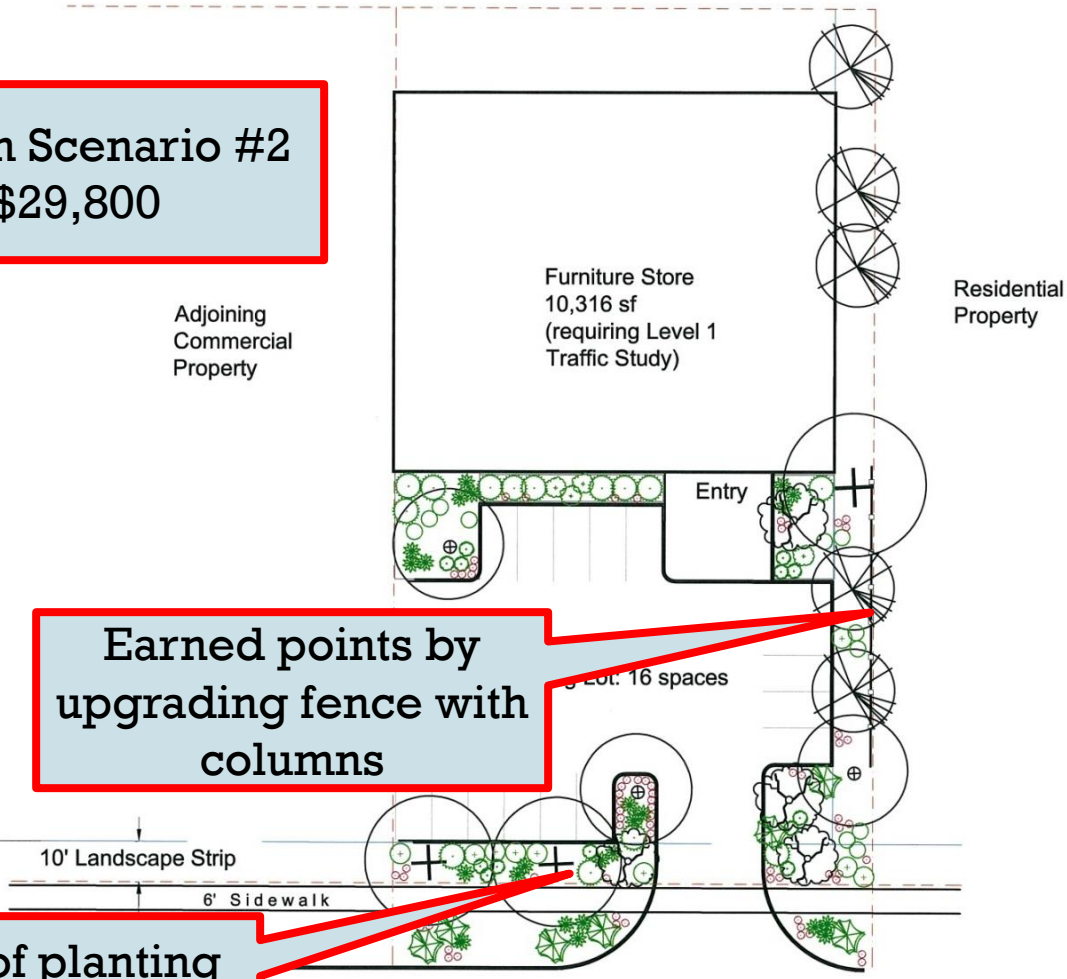
Design Scenario #2
$29,800

From Chart B :

1. Preservation of existing vegetation:	0
2. Site Design:	
• 100% of parking between street & building	-10
3. Size of Planting Islands	
• Interior Islands: 10' (+ 1.5)	5
• Perimeter Planting Bed: 10' (+2')	15
4. Trees	
• Interior Islands: 1 Large Tree	5
• Perimeter Beds: Option A & B combined	10
• Additional Trees: 3	3
5. Shrubs	
• Option B: #5 Shrubs @ 42% coverage	12
• Foundation Plantings @ 50% coverage	5
6. Water-Saving Plant Selection	
• Xeric plants: 40% of total SF	10
• Specified Water Sense controller	10
• No turf in beds over 10' in width	15
	80

From Chart E :

1. Buffer Site Design Options	
• 6' Fence (0) with Pilasters (10)	10
2. Buffer Planting Options	
• 30% Bed/shrub coverage	
• Use of low or very low wate	



Earned points by upgrading fence with columns

Majority of planting clustered in front

sulting landscape includes a mixture of both xeric plants and more "lush" plantings with 15 ees (Large, Medium, & Evergreen), 147 Shrubs, privacy fence with decorative pilasters to creen parking lot, and no turf grass.
Expected Cost to Install: $29,800

Scenario 3

Commercial Parking Lot: Dry Landscape

How to apply points using Chart B, Chart E, & Chart F

Required: Chart B & Chart F(Combined 45 pts for Parking Lot) +
Chart E & Chart F (Combined 30 pts for Buffer design) = 75 points

Provided: Chart B & F (50 pts) + Chart E & F (25 pts) = 75 points

Points are allowed to roll-over between charts.

From Chart B & F (Parking Lot) :

1. Preservation of existing vegetation:	0
2. Site Design:	
• 50% or more parking to side or rear	15
3. Size of Planting Islands	
• Interior Islands: Min 8.5'	
• Perimeter Planting Bed: 10' (+2')	
Dry Landscape Options:	
• 7 Boulders (7)	
• 2 Western Collectibles (2)	
• 1 Artist sculpture (5)	
• 36" Masonry wall with stone cap (5)	
• 5% or greater bed coverage with shrubs (5)	
• 1 Evergreen trees (1)	15
	50

From Chart E & F (Buffer) :

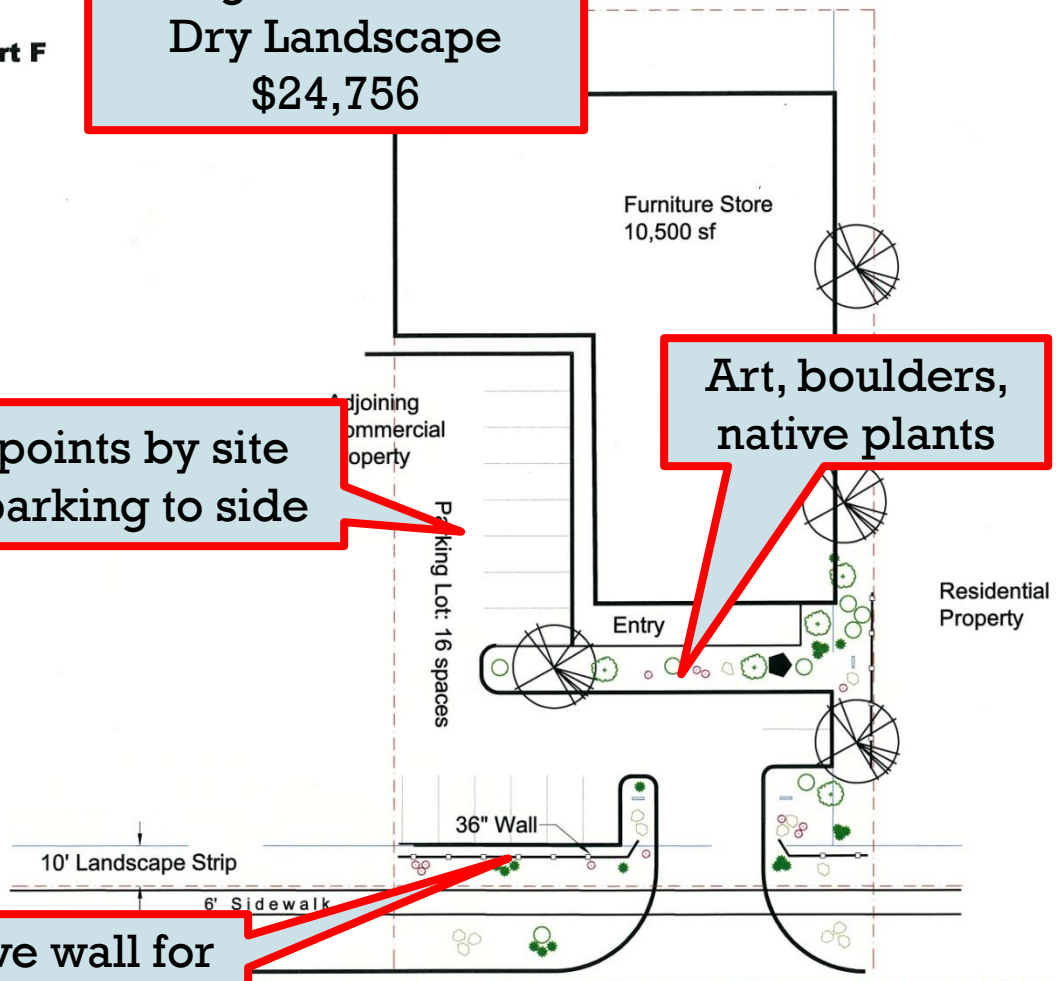
1. Buffer Site Design Options	
• 5' Wall (10) with Pilasters (10)	20
Dry Landscape Options	
• 1 Boulder	
• 1 Western Collectible	
• 3 Evergreen Trees	

Design Scenario #3
Dry Landscape
$24,756

Earned points by site design: parking to side

Art, boulders, native plants

Low decorative wall for screening of parking



Design adjusted to earn points by moving the parking away from the road. Resulting landscape includes desert xeric landscape with 4 Evergreen Trees, 44 Shrubs, a wall with pilasters to screen parking lot, boulders, wagon wheels, and a decorative low wall along street frontage. Cost includes allowance for hauling water for 2 years to establish landscape.
Expected Cost to Install: $24,756

3. Water conservation

- Required in some contexts
- Encouraged in others
- Working with Water Districts
  - Some districts will not allow outdoor water taps -- they are enthusiastic about encouragement of xeriscape


NO
TRUCKS


Privacy Fence (5) with "upgrades" (10) = 15 points
Significant Entry Planting = 10 points
Low Water Shrubs at 30% coverage = 10 points
No Turf = 15 points

Coffee Shop in Mesa, Colorado Before Landscaping Installed


STATE ST
Blink
COFFEE
ATM
Grand Valley Bank
Plateau Valley Medical Clinic
Mesa Office • 268-5054
MESA CREEK
WINE & SPIRITS
ESPRESSO
SMOOTHIES
ICE CREAM
SALADS
FOOD...
WI-FI

Afterwards…….


TOYOTA
SANDWICHES
TRAIL MIX
ENERGY BARS
NUTS

Golf Course Landscape in the High Desert

Code format

1. Identify the Use and required landscape areas in a Master Chart
2. Sub charts for each type of landscape area
3. Establishes Minimum Number of points for each landscape area
4. Materials Standards
5. Landscape Handbook

Installation and Maintenance

- Landscape elements are considered site amenities like parking, signage, etc.
- If there is a property owners association, then the covenants must address maintenance responsibility
- Security must be provided to cover the replacement cost of the vegetation for one year after planting

- Thank you for listening!

- http://www.mesacounty.us/planning/land-development-code.aspx

Questions?

Next Steps & Upcoming Trainings

Visit
https://www.colorado.gov/pacific/cowaterplan/integrating-water-land-use-planning

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