and Development: A New Western Par presented as listic Approach to Sustainable Water Manageme in Northwest Douglas County



March 2007



- enters –
- / Conklin, Littleton City Council Mode
- g Roush, P.E., President, Leonard Ric ineers, Inc.
- Noble, Esq., Ryley, Carlock & Applew
- istopher S. Douglass, P.E., Meurer & /

nt Statewide Drought

- asing Front Range Municipal Demand
- las County Regulations

ic Approach Required- Cut Demands 50%



DEMA Out Irrig

ation

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icants

- minion Water and Sanitation District
- stle Pines North Metropolitan District uglas County

ding

- Iorado Water Conservation Board
- minion Water and Sanitation District
- uglas County
- stle Pines North
- Im Valley Heights HOA
- underbird Water & Sanitation District

hairs

- nda Sandquist Lead Chair, attorney
- y Conklin Littleton City Council, hydrology background

nittee Participants

- Irew Appell Denver Water Planning Division
- Porter Design Workshop, land planner
- e Gilsdorf Arapahoe Acres Nursery, Chatfield East HOA
- ole Adams Thunderbird Water & San Dist
- Watson Douglas County
- se Salazar Douglas County
- nt Mecham No. Colo. Water Conservancy Dist.
- ve Merritt Colo. River Water Conservation Dist.
- I Lander City of Boulder CWWC

- ado Water Conservation Board a McCaig, Rod Kuharich
- **Engineers Office**
- k Byers, Dick Wolfe
- ado Department of Public Health and Environment/
- sley Carr









of a Scarce Resource

omponent of Total nagement

ig States Allow irage It











ent Law:

- % of precipitation diverted and consumed must be augme
- o Exceptions:
- \rightarrow Gravel pits (CRS 37-80-120)
- → Streambed reservoirs (CRS 37-84-117(5))
- here 30% or less of precipitation falling on lake surface mu ugmented)



(Based on 1,500 Sq Ft Roof Area)















- Influencing Demand
- ted Area
- scaping
- em Performance
- r Management

- elopment Criteria and Density
- rvious Area
- ted Turf Area
- ted Planting Area
- **Irrigated** Area

- Categories
- Jegrass
- scue
- iffalograss
- ings
- aditional
- oderate
- ative

cation Method

Irrigation System	Efficiency
pray	75%
otor	80%
ubsurface Drip	95%

allation & Operations Method

Description	Efficiency	
xcellent	100%	
ood	80%	

tive Precipitation

tion System Technology

Technology Adjustmen
Γάσισι
80%
40%
0%

ing these factors a formula was developed to estab oor water demands:

Vater <u>(Landscaping - Water Management)</u> X Ir Ind System Performance

Traditional Landscaping

- Moderate Conservation Landscaping
- Water Wise Landscaping

Total Irrigation Area = 50.2% of Lot







Domestic

<u>Acre-Feet</u> = 0.30

Alternative Water Demand Summary

One Single Family Residential Equivalent (SFE)				
Demand Scenario	Irrigation Demand		Savin Trad	
	(acre- feet)	(gallons per square foot)		
al Landscaping	0.35	32.3		
Conservation Landscaping	0.16	15.3	5	
se Landscaping	0.08	7.6	7	

- Irrigated Area 57% water savings
- Landscaping 34% water savings
- System Performance 52% water savings
- Water Management 34% water savings





- der Commitment
- ormation and Education
- sources
- c Acceptance
- lling to implement water savings
- equires a paradigm shift in landscape thinking













ancho Viejo







Precipitation Collection Average of Study Period - 1500 sf of Roof Capture Area



- f scale:
- allon capacity ~ \$5.50 to \$6.50 per gallon
- allon capacity ~ \$2.00 to \$2.40 per gallon
- orage (10,000+ gallon)~ \$1.00 to \$1.75 per gallon



Cost/benefit analysis
in this study:
Depends on individu situation in terms of a supplies (e.g. wells g

e Single Family Residential Equivalent (SFE)

enario	Irrigation Demand	Cistern Supply	Supplemental Irrigation	Supply Fro Precipitati
			Supply	
	(Acre- Feet)	(Acre- Feet)	(Acre-Feet)	(%)
caping	0.35	0.00	0.35	0%
caping &	0.35	0.04	0.31	12%
vation	0.16	0.00	0.16	0%
vation &	0.16	0.04	0.12	26%
	0.08	0.00	0.08	0%

nment Codes – Government codes implementen ncentive for water conservation on holistic basis as ed conservation actions.

rojects – Pilot projects to provide real data to su r findings, outdoor water conservation savings, and nce.

ative Action – Legislative action to facilitate rain and attract capital for pilot projects while providing b to guard against abuse.