INTEGRATION OF WATER HARVESTING AND GI/LID IN THE CITY OF TUCSON AND PIMA COUNTY

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PSOMAS, Tucson, AZ

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Outline: The Joint Effort

Motivation to Adopt LID/GI

- Beneficial Use of Stormwater and The City/County Water Study
- LID as a Stormwater Quality Management Tool

Products by the LID Working Group

- A Revised Pima County Detention/Retention Manual
- A Neighborhood Scale Water Harvesting Manual
- A Case Studies Catalog

Encourage Integrated Use of Stormwater

Regulatory:

- **City of Tucson:** Commercial Water Harvesting Ordinance + Development Standards (2010)
- **Pima County:** Revised Detention/Retention Manual (expect – 2012)
- **Pima County:** Stormwater Discharge Permit (AZPDES)
- **COT:** Stormwater Discharge Permit (AZPDES)

AZ PDES

- '…..EPA is encouraging the increasing use of **LID practices,** including incorporating LID provisions in NPDES (National Pollutant Discharge Elimination System) permits. ADEQ has responded by incorporating some LID provisions in this permit.'

Studies:

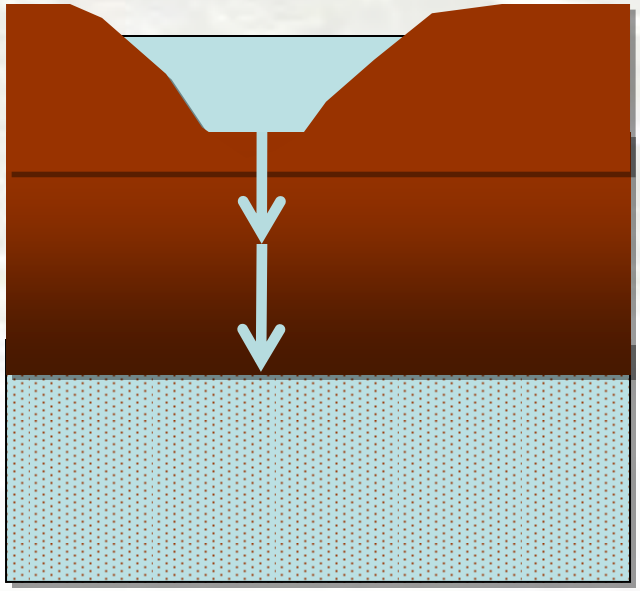
- **City of Tucson/Pima County Water and Wastewater Study (2008)**
- **NPDES Permit: City & County have 4 years to determine if LID part of permit**

Panels:

- **Governor's Blue Ribbon Panel on Water Sustainability (2009-2011)**
  - Reclaimed Water
  - Gray Water
  - Stormwater

Recharge vs Capture

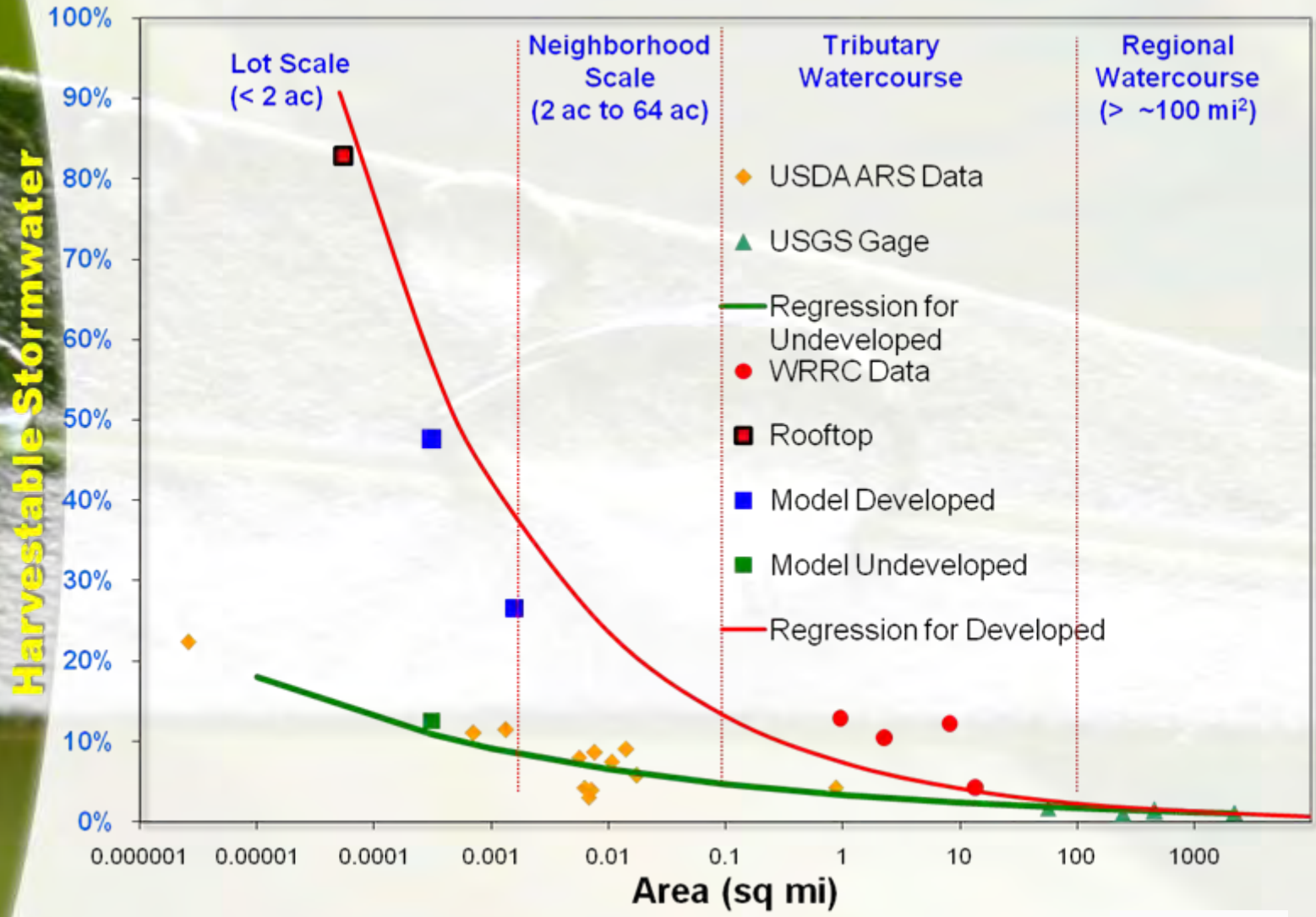
Recharge - Infiltrate to the regional aquifer for future use.



Capture – store for use in the near term.

‘Harvestable’ Water (Rainwater / Stormwater)

i.e. water yield



Low Impact Development and Green Infrastructure

Low Impact Development (LID)

'A comprehensive stormwater management and site-design technique. . . the goal of any construction project is to design a hydrologically functional site that mimics predevelopment conditions…'

Green Infrastructure -

'As a general principal, Green Infrastructure techniques use soils and vegetation to infiltrate, evapotranspirate, and/or recycle stormwater runoff…'

EPA Green Infrastructure Homepage - Glossary

Low Impact Development (LID)

Mimic pre-development hydrology

LID Planning

- Disconnect and minimize impervious surfaces.
- Maintain pre-development waterways.

LID Flow Paths

- Lengthen and roughen overland flow paths.

LID Infiltration/ Features

- Pervious pavement.
- Swales, filter strips.
- Bioretention.
- Rainwater catchment systems.
- Detention basins.

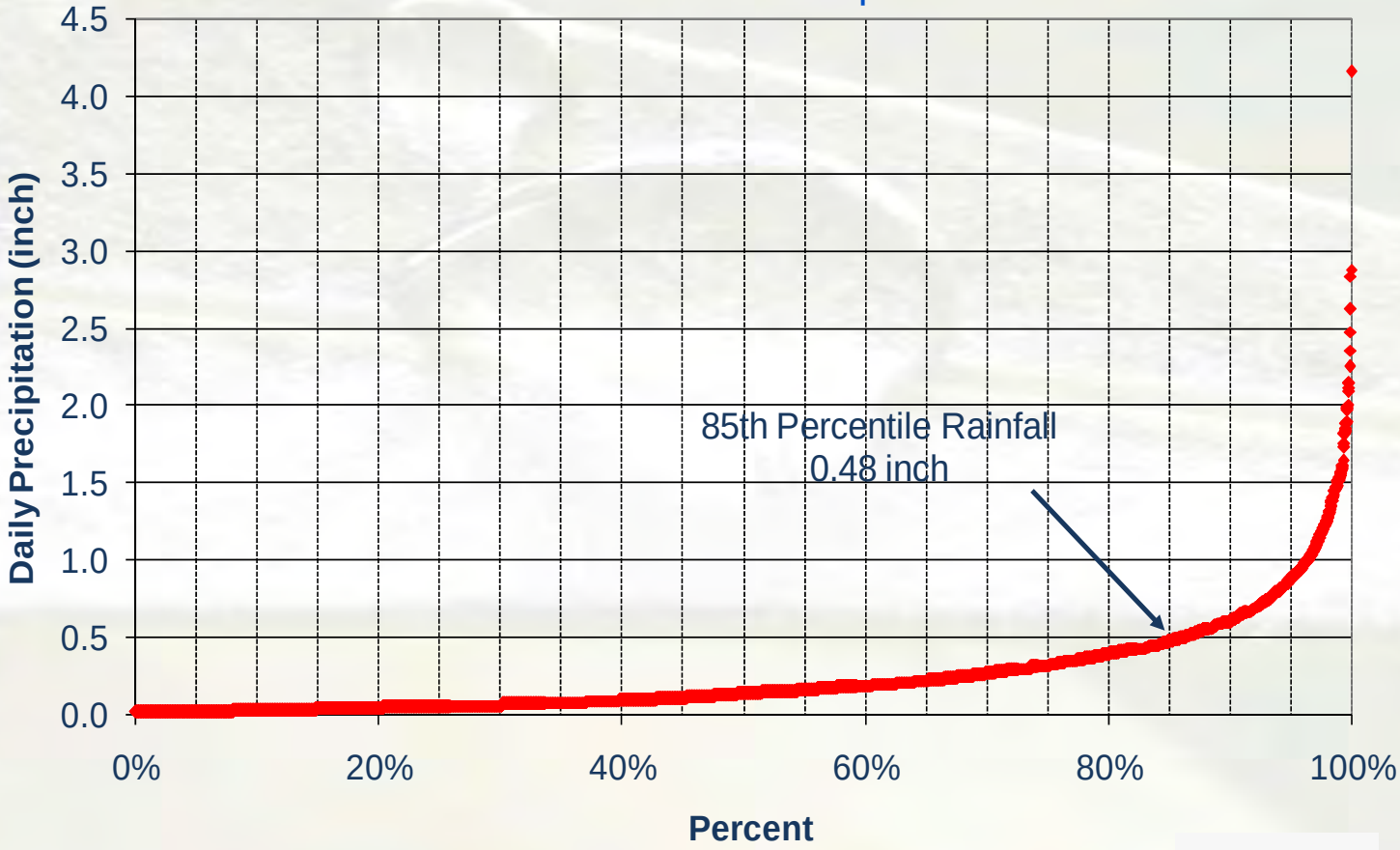
Source: Low Impact Development Center

Next Steps:

CITY-COUNTY WATER-WASTEWATER INFRASTRUCTURE & PLANNING STUDY

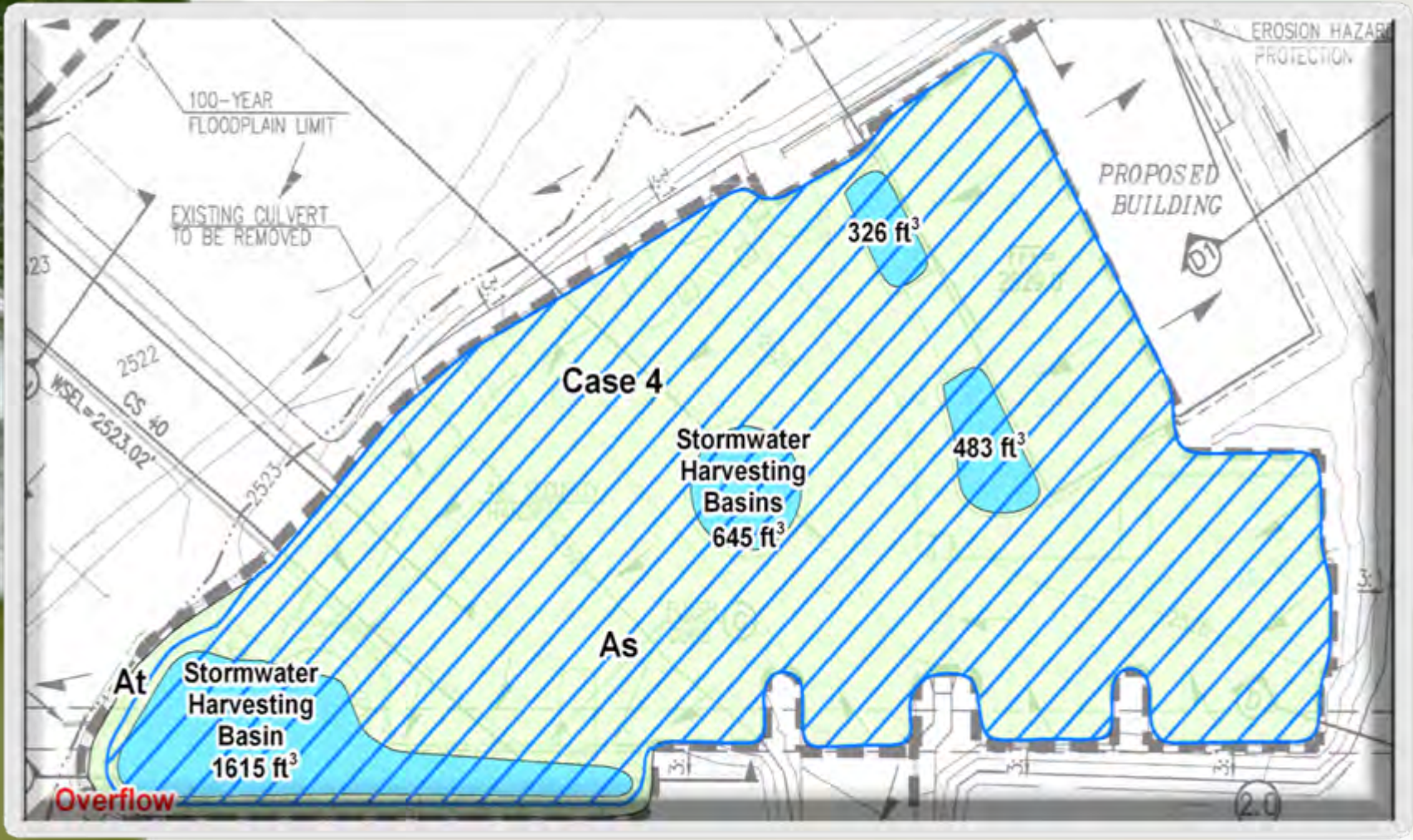
Pima County:
DETENTION–RETENTION MANUAL (Draft)

Replace Retention Requirement with a
'First Flush' Retention Requirement



Pima County:

DECENTRALIZED 'FIRST FLUSH' RETENTION



Neighborhood-Scale Water Harvesting Manual

Local Priority	Type: Pretreatment	Type: Bioretention	Type: Filtration	Type: Infiltration	Type: Runoff Volume	Type: Minimization	Type: End of Pipe	Agency / Jurisdiction Document Date of Publication	Research Team Member Assignments	City of Santa Barbara SW BMP Guidance Manual 2008
high								Best (LID) Site Design Practices (Non Structural BMPs)		X
high					O			Natural/Sensitive Area Conservation/Restoration	Stantec (JT)	O
high					O			Impervious Area Disconnection		O
high					O			Minimize Impervious/Disturbed Areas		O
high					O			Cluster Development (Minimize Construction Footprint)		
high					O			Minimize Soil Compaction		
high				O				Protect/Use Natural Flow Paths and Buffers		O
high				O				Promotion of Open Space Design/Natural Infiltration		
high	O							Implement Source Controls		
medium	X		X					Media Filters / Filtration Devices		X
high	X		X					Sand Filter and Gravel Filters	Eric	X
medium	X							Hydrodynamic / Solids Removal Devices		X
medium	X							Oil and Water Separators		
high		X						Bioretention / Rain Gardens	Dave	X
high		X						Tree Pits / Tree Box Filters / Planters	Irene	X
high			X					Xeriscaped Buffers / Filter Strips / Swales	Evan	X
high				X				Dry Wells	Evan	X
high				X				Infiltration Basin / Systems	Stantec (JT)	X
high				X				Infiltration Trench or Gallery		X
high				X				Soil Amendments / Structural Soils	Irene	X
high						X		Porous/Pervious Pavements	Irene	X
high						X		Rainwater Harvesting for Use (Rain Barrel / Cistern)	Irene	X
high						X		Self-Treating Areas (Zero Discharge Microbasins)	Dave	X
high						X		Downspout Disconnection / Redirection	Stantec (JT)	X
high							X	Detention Basin / Gallery / Dry Ponds	Stantec (JW)	X
high							X	Retention Basin	Stantec (JW)	
medium								Diversion Structures / Flow Splitters / Green Outlets	Stantec (JT)	X
high								Source Controls (Non Structural BMPs)		X
?					O			Runoff Volume Minimization	Stantec (JT)	O
?	O							Manage Potential Stormwater Hotspots		
?	O							Roof Runoff Protection		
?	O							Runoff Quality Protection		O

City of Tucson

Emphasis:

- Reduce need for additional groundwater pumping
- Alternative management strategy for residential street stormwater runoff
- Promote small urban waters restoration
- Provide alternative water source for residential street landscaping

Existing requirements:

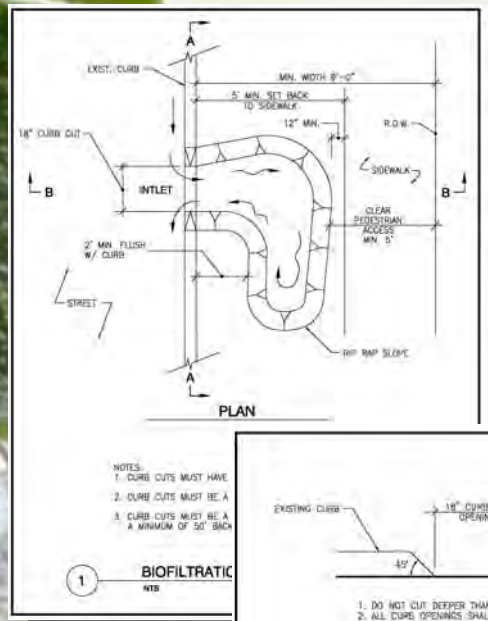
- Under current Stormwater Discharge permit, LID is a recognized as a Best Practice
- City has 4 years to determine if will be mandatory
- Improve water quality of major watercourses and recharging

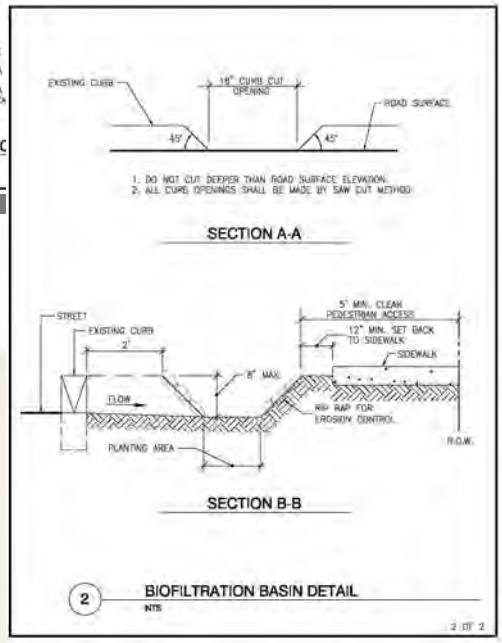
Next Steps:

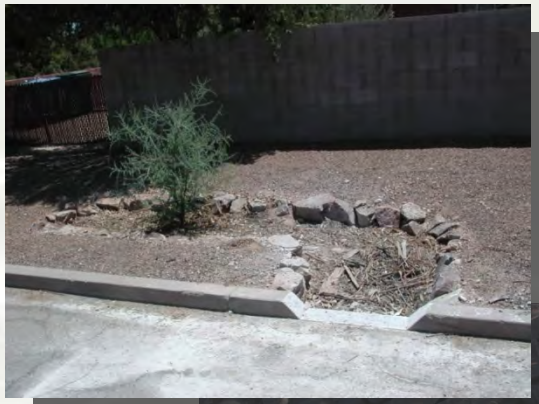
- Develop City-County Neighborhood Scale Water Harvesting Manual
- Compile local case studies

City of Tucson

Approved: Curb cut standards

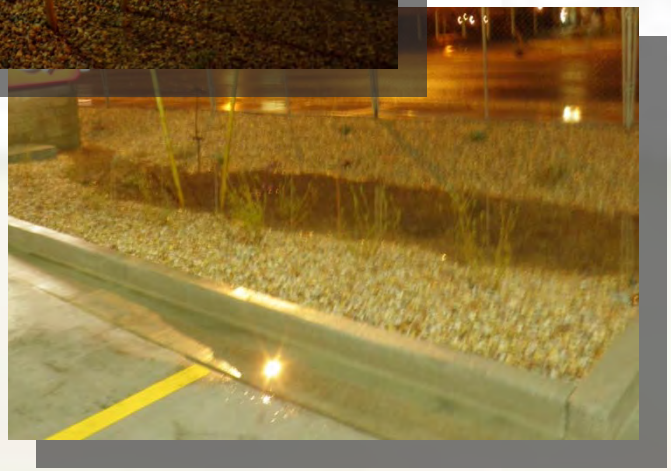






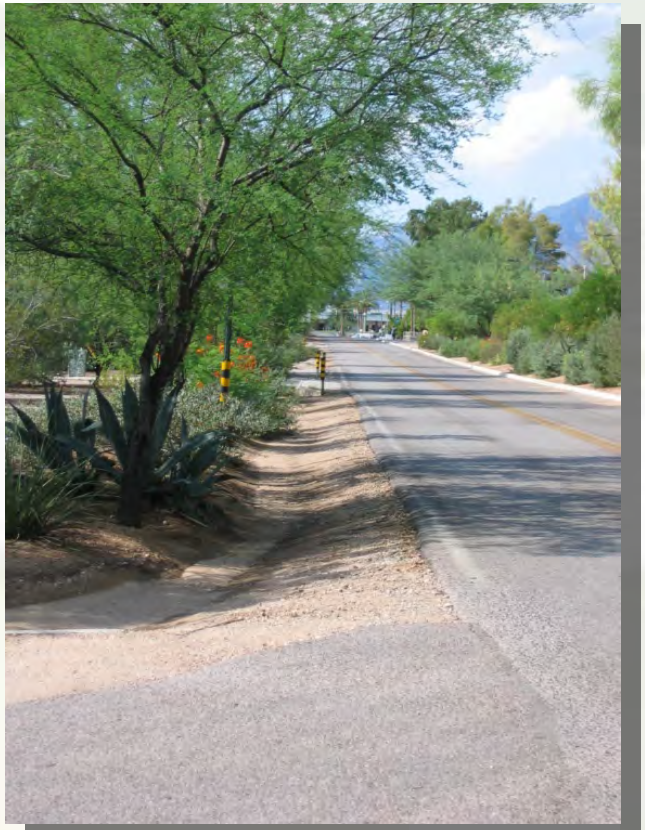
City of Tucson

Ordinanced: Commercial Rainwater Harvesting



Case Studies Catalogue

Small Scale: Neighborhood - scale



Case Studies Catalogue

Highland Vista Park: Collector street – residential land use
Native vegetation irrigated with harvested stormwater

Case Studies Catalogue

Rincon Heights: Residential collector

Photo: *Watershed Management Group (WMG)*

Case Studies

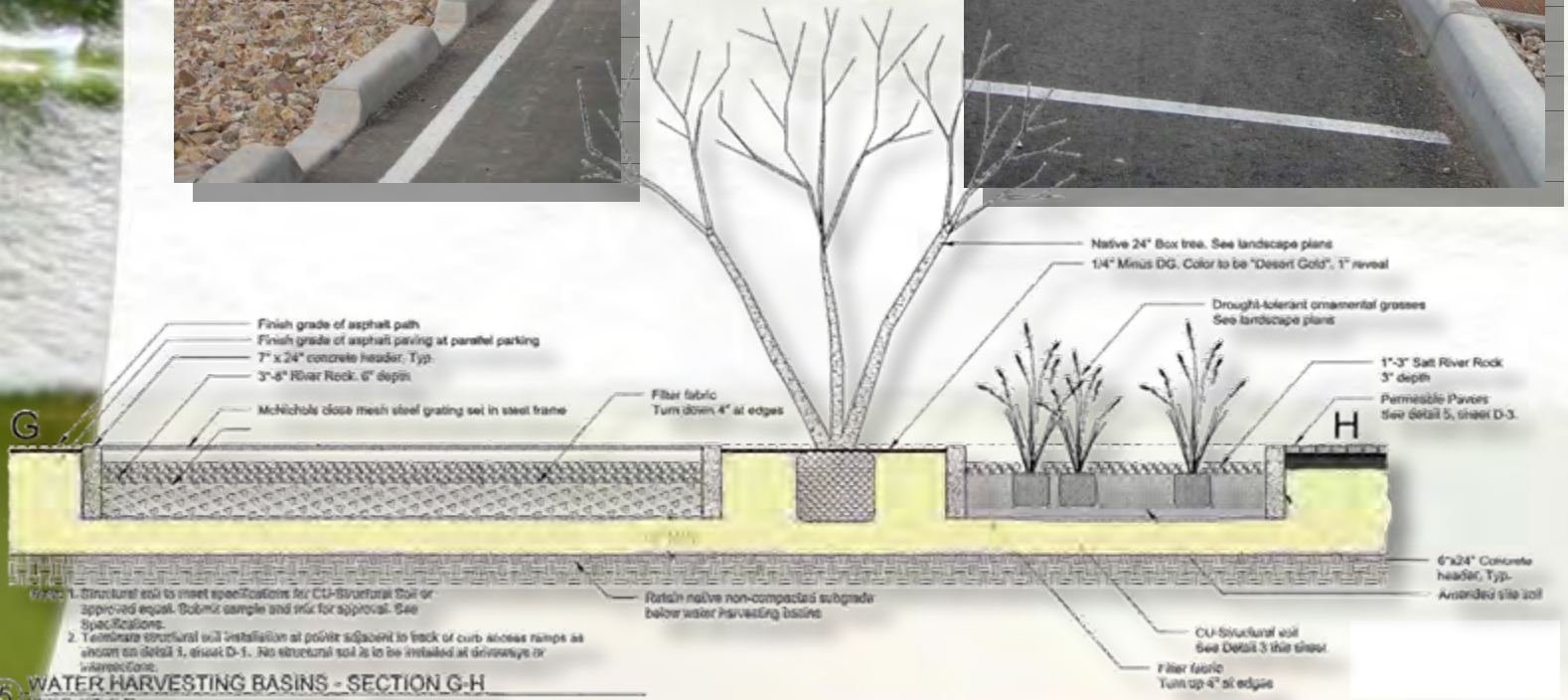
Ward 3: Municipal Facility – onsite capture

Case Studies

Scott Avenue: Collector street - commercial land uses

Case Studies

Camino Campestre: Collector Street – residential/park land use



So?

Current Project Timeline:

- March 2012: Regional LID Conference
- Mid-2012: Draft Neighborhood Scale Water Harvesting Manual (public review by end of 2012)
- Mid- 2012: Pima County Dentention/Retention Manual for public review
- Late 2012: Draft Case Study Catalogue

Resources

City-County Water Study White Paper on Stormwater

http://www.tucsonpimawaterstudy.com/Reports/Phase2/Stormwater.Mgt.Tech.Paper.pdf

City of Tucson Water Harvesting Ordinance

http://www.tucsonaz.gov/ocsd/sustainability/water/rainwaterharvesting.php

Notes on Tucson LID Workshop

http://rfcd.pima.gov/pdd/lid/

AridLID

http://www.aridlid.org/

Questions

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