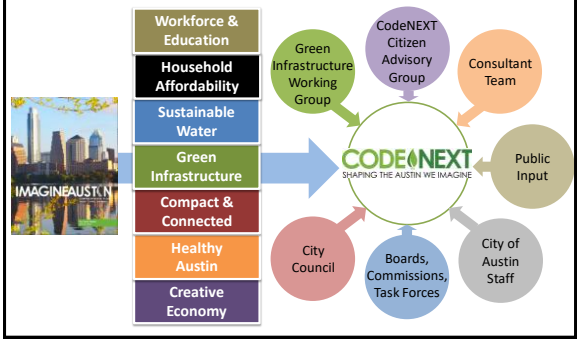
Beneficial Use of Stormwater

Green Infrastructure Working Group, 5.12.17

CodeNEXT Process: Implementing Imagine Austin



Goals of CodeNEXT

The goal of CodeNEXT is to revise our land use standards and regulations to:

- ✓ Preserve and enhance the best qualities of our communities
- ✓ Be fair, predictable, and easy to use
- ✓ Align with Imagine Austin's vision, policies, growth concept map, and priority programs.

Green Infrastructure Working Group

Council Direction (November 20, 2014)

- Asked that the CodeNEXT focus include green infrastructure & sustainable water management

Purpose of Green Infrastructure Working Group

- How we can achieve the Imagine Austin goals of **integrating nature into the city**, **sustainably managing our water resources**, and **creating complete communities** through revisions to the Land Development Code?

Green Infrastructure Working Group

- Over 300 stakeholders on email distribution list
- Six meetings between January and July 2015
- One of the four major topics discussed was beneficial use of stormwater

Existing Challenges: Beneficial Use

- Projected changes in Austin's climate include:
  - increases in annual average temperatures
  - more frequent high temperature extremes
  - more frequent drought conditions in the summer
  - more frequent extreme precipitation

Existing Challenges: Beneficial Use

- Historically, stormwater regarded as a nuisance to be dealt with instead of a valuable resource to be utilized
- Current code requirements do a good job of cleaning and slowing polluted runoff
- Does not address other key goals of enhancing creek baseflow, sustaining on-site vegetation, and reducing potable water consumption

CodeNEXT Proposal: Beneficial Use

- Sites will be required to retain and beneficially use stormwater
  - Recommended by the Green Infrastructure Working Group (2015) and the Austin Water Resource Planning Task Force (2014)
  - Accomplished through the use of green stormwater infrastructure practices, including rain gardens, porous pavement, rainwater harvesting, and green roofs (note: engineer may propose additional methods)
  - Similar requirement for infiltration and re-use have been adopted by multiple cities and states around the country


Rain Garden


Rainwater Harvesting


Porous Pavement


Green Roof

CodeNEXT Proposal: Beneficial Use

- On-site infiltration can reduce the negative impacts of impervious cover on the health of our creeks
  - Enhanced baseflow, reduced pollutant loads, reduced erosion and scour, better aquatic habitat, and improved recreational opportunities
- Re-use of stormwater both outdoors and indoors helps conserve potable water resources and reduce pressure on our water supply

CodeNEXT Proposal: Beneficial Use

- 23-3D-6030 Water Quality Controls and Beneficial Use Standards
  - "A portion of the required capture volume for water quality must be retained and beneficially used on-site through practices that infiltrate, evapotranspire, or harvest and use rainwater.
    1. The amount of rainfall that must be retained is based on the **impervious cover** and **associated runoff coefficient** for the **95th percentile rainfall event***, as prescribed in the Environmental Criteria Manual.
    2. Residential subdivisions must demonstrate compliance through practices located on common lots or in right-of-way or other methods as approved by the Watershed Protection Department."
  - Payment-in-lieu allowed in Urban Watersheds under certain conditions

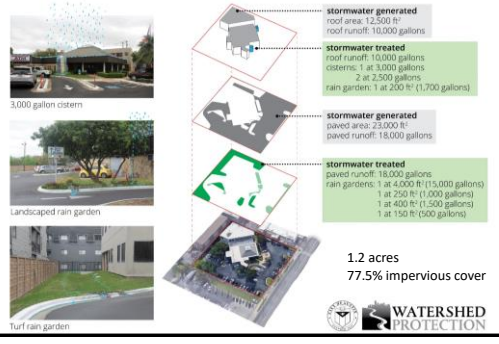
*95th percentile = 95 percent of all rainfall events are 1.79 inches or less

CodeNEXT Proposal: Beneficial Use

Impervious Cover	Runoff Captured		Percent of Water Quality Volume
	Treat	Retain On-Site*	
(percent)	(inches)	(inches)	
10%	0.5	0.13	26%
20%	0.5	0.26	52%
30%	0.6	0.38	64%
40%	0.7	0.51	73%
50%	0.8	0.64	80%
60%	0.9	0.77	86%
70%	1.0	0.90	90%
80%	1.1	1.03	93%
90%	1.2	1.15	96%
100%	1.3	1.28	99%

*Amount required to be retained on-site is calculated based on the amount of impervious cover and associated runoff coefficient to determine how much runoff is being generated in a 95th percentile event

Beneficial Use: Example Site



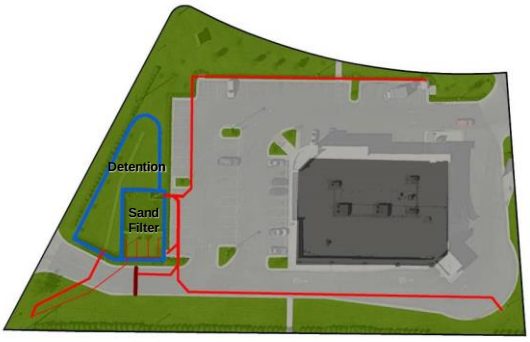
1.2 acres
77.5% impervious cover

WATERSHED PROTECTION

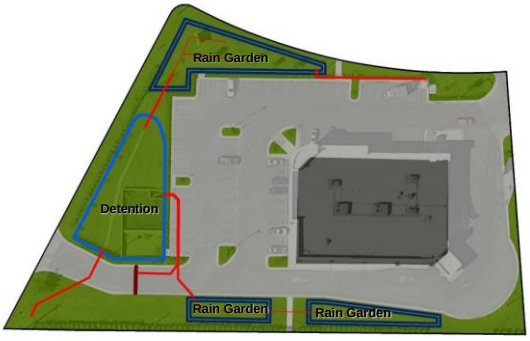
Frequently Asked Questions

- How much does this cost?
  - Based on Envision Tomorrow, stormwater management facilities (water quality + beneficial use + flood mitigation) typically ranged from 1 to 3% of total project costs
    - Cost for beneficial use is a subset of this overall estimate
    - Includes existing requirements for water quality
  - The cost of certain technologies (e.g., green roofs, subsurface detention) could raise the portion of project costs dedicated to stormwater management to as much as 5% of total project costs
  - This estimated percentage of total project cost is likely to be even smaller for larger, very urban building types

Case Study: CVS Pharmacy (Existing)



Case Study: CVS Pharmacy (Potential)



CVS Site: Conventional Sand-Filter vs. Rain Garden Cost Analysis

Cost Component	$/Units	Rain Garden	Existing/ Conventional
Water Quality Control			
Excavation	$15/yd3	$ 5,863	5,823
Embankment	$5/yd3	$ 358	$ -
Concrete	$500/yd3	$ -	$ 34,861
Rain Garden Soil	$36/yd3	$ 8,062	$ -
Sand	$8/yd3	$ -	$ 421
6" perforated pipe	$23/ft	$ 4,674	$ 2,185
6" solid pipe	$20/ft	$ 1,701	$ 1,900
Subtotal Water Quality Control		**$ 20,658**	**$ 45,190**
Storm Drainage			
18" RCP	$90.30/ft	**$ 30,702**	**$ 72,782**
Landscaping (Water Quality areas only)			
Required Plants			
$/Plant	$16/each	$ 9,744	$ 2,100 *
Sod cost	$3.60/yd2	$ 1,719	$ 859 *
Subtotal Landscaping		**$ 11,463**	**$ 2,959**
Totals		**$ 62,823**	**$ 120,931**

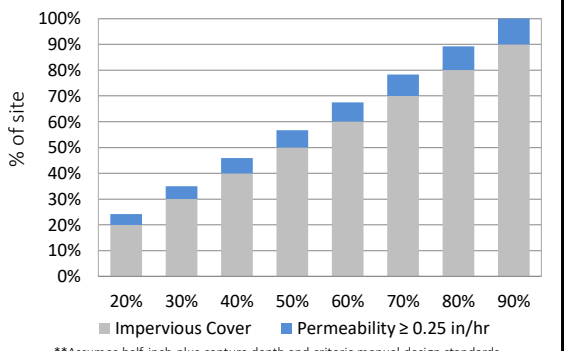
* Pro-rated costs for landscaping in areas in common with rain garden

Frequently Asked Questions

- How much space is this going to take up on the site?
  - Rain gardens typically take up 4 to 10 percent of the site, depending on the infiltration rate of the soil
  - Beneficial use strategies can be integrated with other site requirements, such as landscape and open space
  - Options such as cisterns, porous pavement, and green roofs allow for on-site solutions to be incorporated without sacrificing usable space

Rain garden size by percent IC:

Moderate infiltration rate



**Assumes half-inch-plus capture depth and criteria manual design standards

Frequently Asked Questions

- What if the site is constrained (e.g., poor-draining soils)?
  - Cisterns paired with irrigation, indoor use, or a green roof are an alternative for sites with high impervious cover and/or poor-draining soils
  - Option for payment-in-lieu for hardship cases in Urban watersheds where the code allows higher impervious cover limits

Frequently Asked Questions

- What are the options for holding on the harvested stormwater for longer periods of time?
  - Conflict for rainwater harvesting between drawdown times required for water quality (72 hours) and storage time for conservation benefits
  - Site has the option to comply separately with water quality and beneficial use, but often preferable for applicant to meet both standards with one system
  - Options for redundant systems (i.e., overflow cistern), upsized cisterns using water balance spreadsheet, smart sensors, or "leaky" cisterns

Frequently Asked Questions

- Will this change apply to building permits?
  - The new requirement will apply to site plans and subdivisions with greater than 8,000 square feet of impervious cover
  - Water quality control requirements do not apply to building permits for single-family/duplex residential homes
    - "The water quality control requirements in this division do not require water quality controls on a single-family or duplex lot but apply to the residential subdivision as a whole."

Frequently Asked Questions

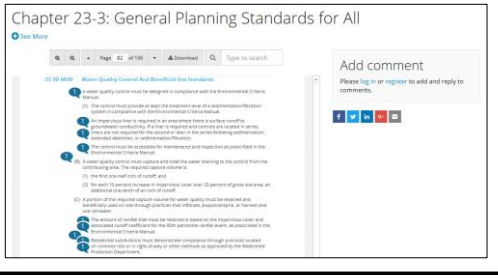
- How will inspection and maintenance be handled?
  - Water quality controls are inspected every three years
  - All controls must be designed to be accessible for inspection and maintenance
  - Additional requirements for controls in single-family residential subdivisions that are accepted for maintenance by the City (e.g., located on common lots or in the ROW)
  - Recommendations based on City's existing experience and challenges with inspection and maintenance of distributed systems

Frequently Asked Questions

- How much will this proposed change help achieve the goals of enhanced creek baseflow and conservation of potable water?
  - Watershed Protection staff are currently performing a modeling exercise to evaluate the impacts of beneficial use of stormwater on stream health in the upper Waller Creek watershed
  - The consultant for the Integrated Water Resource Plan is currently performing an analysis to identify potential opportunities for decentralized options including Building Scale Wastewater Reuse, Local Wastewater Scalping, Reclaimed Water Network, Rainwater Harvesting, Stormwater Harvesting, and Graywater Harvesting

How to Comment

- Code Comment Tool: codenext.civicomment.org
- New requirement found on Page 82 of Chapter 23-3



CodeNEXT Schedule

- January 30: Draft code released for public review
- March 29: Environment Code Talk
- April 18: Draft Zoning Map
- April - May: Green Infrastructure Working Group
- June 7: Initial Deadline for Code Comments
- July 7: Initial Deadline for Map Comments
- September - October: Planning/Zoning & Platting Commission
- December - April 2018: City Council
- Mid-2018: Anticipated Adoption

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