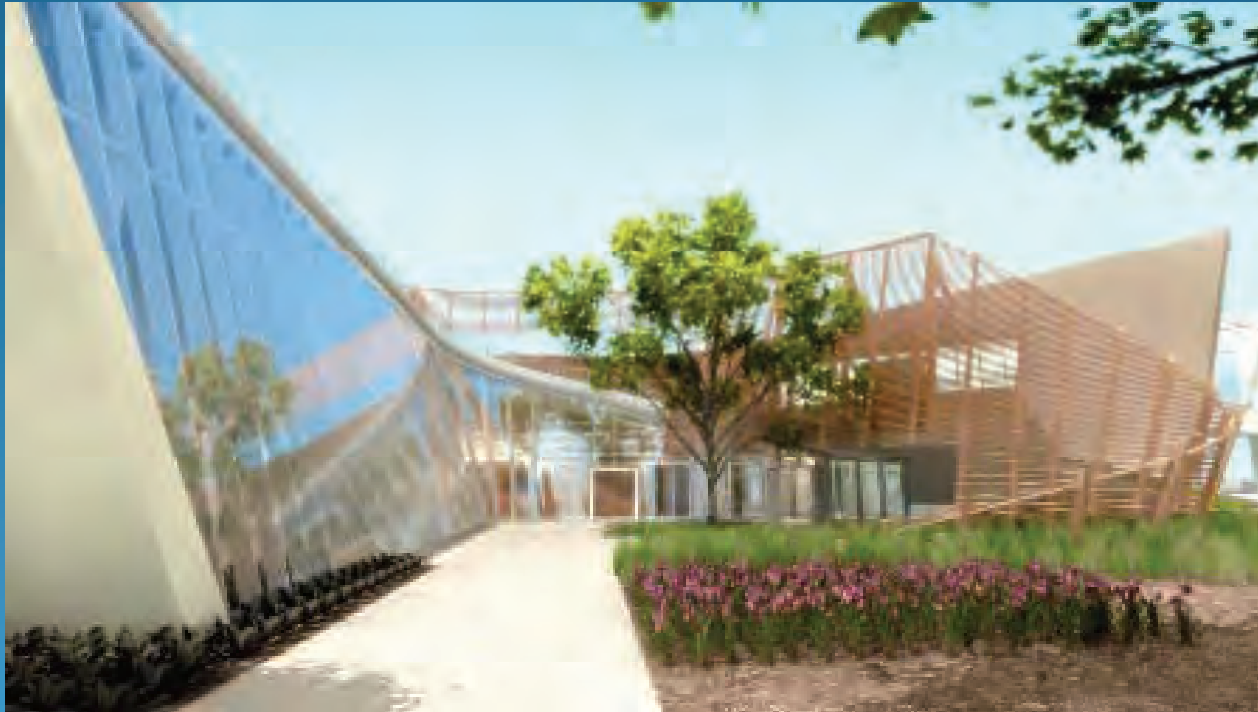


Frontier Project

Rancho Cucamonga



Daniel Apt, RBF Consulting

ASCE LID Conference 2010
LID 201 Workshop



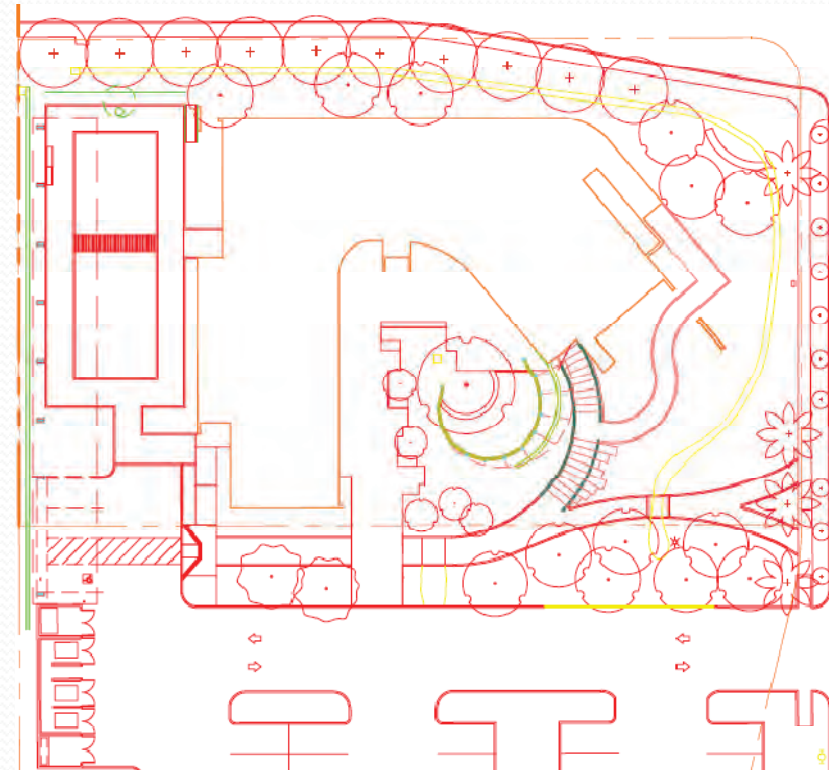
Project Location

Rancho Cucamonga



Project Description

- Cucamonga Valley Water District in Rancho Cucamonga, CA
– *Frontier Project*
- 0.7 acre development site
- Construction includes
 - 14,400 S.F. building
 - Office Space
 - Meeting Facilities
 - Public Demonstration Space
 - Courtyards
 - Walkways & Sidewalks
 - Landscaped Areas



Project Drivers

- Water District Goals
 - Sustainable Approach
 - Water Conservation
 - Public Demonstration Space
 - LEED Platinum
- Hydrologic Condition of Concern
 - Does not discharge directly to the MS4
 - Post –development volume must equal pre-development volume for 1-year, 2-year and 5 year frequency storms

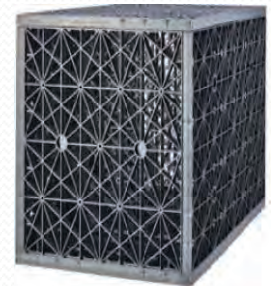
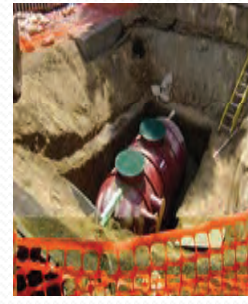
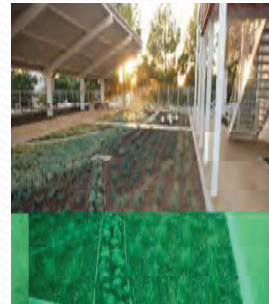
A Sustainable Approach

- **Water Harvesting**
 - Meet Water District Goals of :
 - Water Conservation
 - Groundwater Recharge
 - Meet Irrigation Needs
 - Runoff Reductions
 - LEED Credits 6.1
- **Low Impact Development**
 - Runoff Reductions
 - Pollutant Removal
 - LEED Credits 6.1 & 6.2

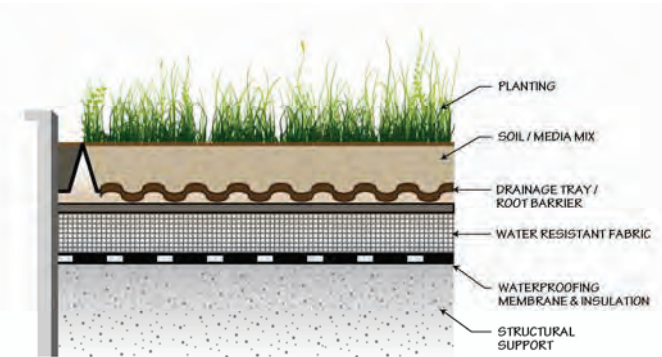


LID & Water Harvesting Measures

- Green Roof
- Porous Pavement
- Decomposed Granite
- Bioretention/Rain Garden
- Cistern/Rain Tank (Water Harvesting)
- Underground Infiltration Device



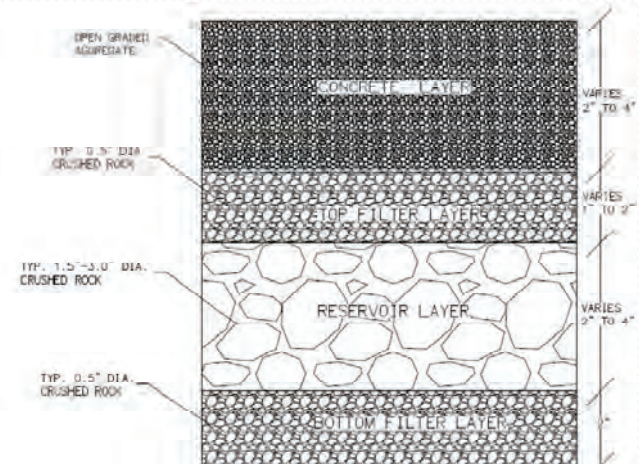
Green Roof



Green Roof

- Specifications
 - Extensive (18 inches of soil media)
 - Partial roof coverage
 - Bitumen waterproof membrane
 - Plants: Aloe, Hesperaloe
 - Soil mix: **25% topsoil, 25% compost, 50% sand**
 - **Green roof area: 55% reduction in annual runoff**
- Costs
 - \$50,000 (1,614 sf: \$30 per square foot)

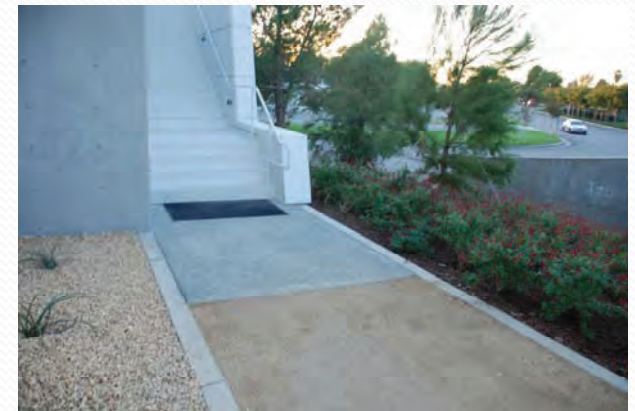
Porous Concrete



- Porous Concrete selected due to: LEED Heat Island Effect Credit
- Runoff Coefficient 0.1
- Cost - \$50,000 (1300 S.F. - \$38 per square foot)



Decomposed Granite Walkways



- Runoff Coefficient – 0.5
- Depth of 1.5 inches
- Cost \$30,000 (4235 sq ft. \$7 per square foot)



Bioretention/RainGarden

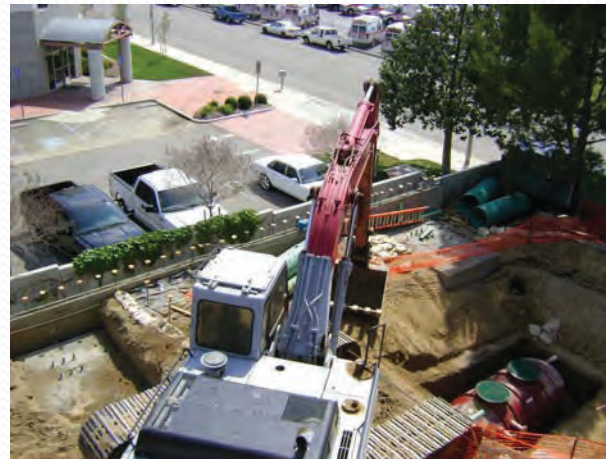


- Specifications
 - 8 inches of soil media
 - Plants: Lamb's Ears, Senecio, Echeveria, Blue Fescue
 - Soil mix: 50% sand, 20% compost, 30% soil
 - Under drain
- Costs
 - \$12 per square foot

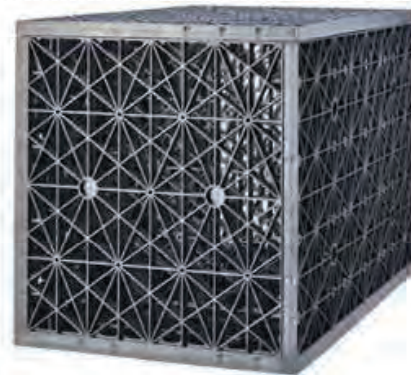
Cistern/ Rain Tank



- Xeres
- Capacity 1,600 gallons
- Irrigation needs
- Cost: \$40,000

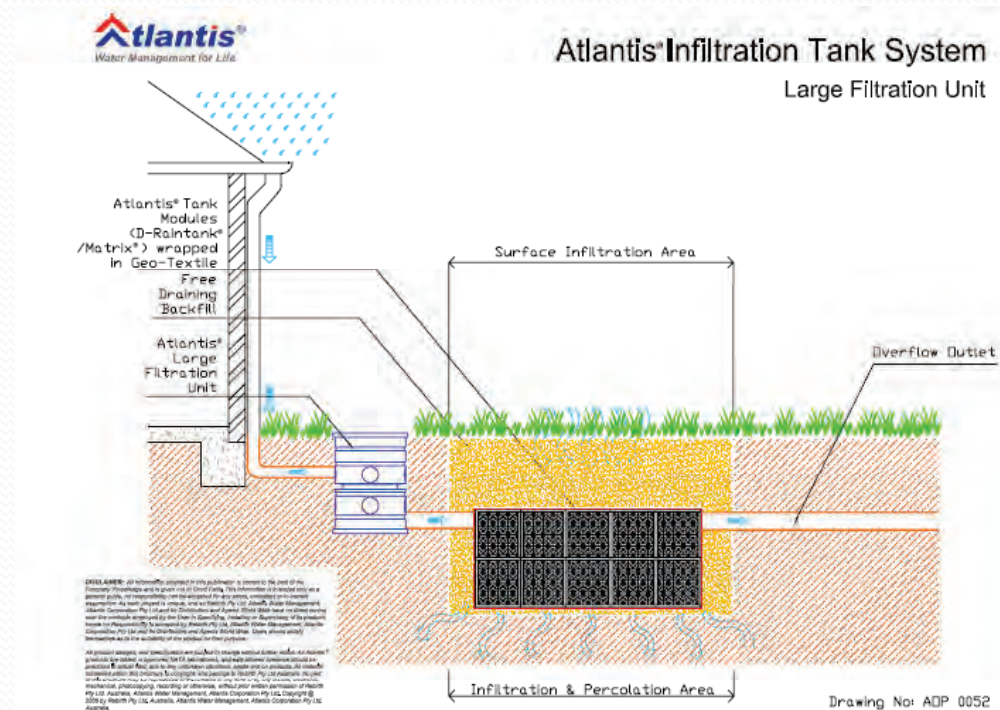


Underground Infiltration Device Atlantis[®] Infiltration Tank

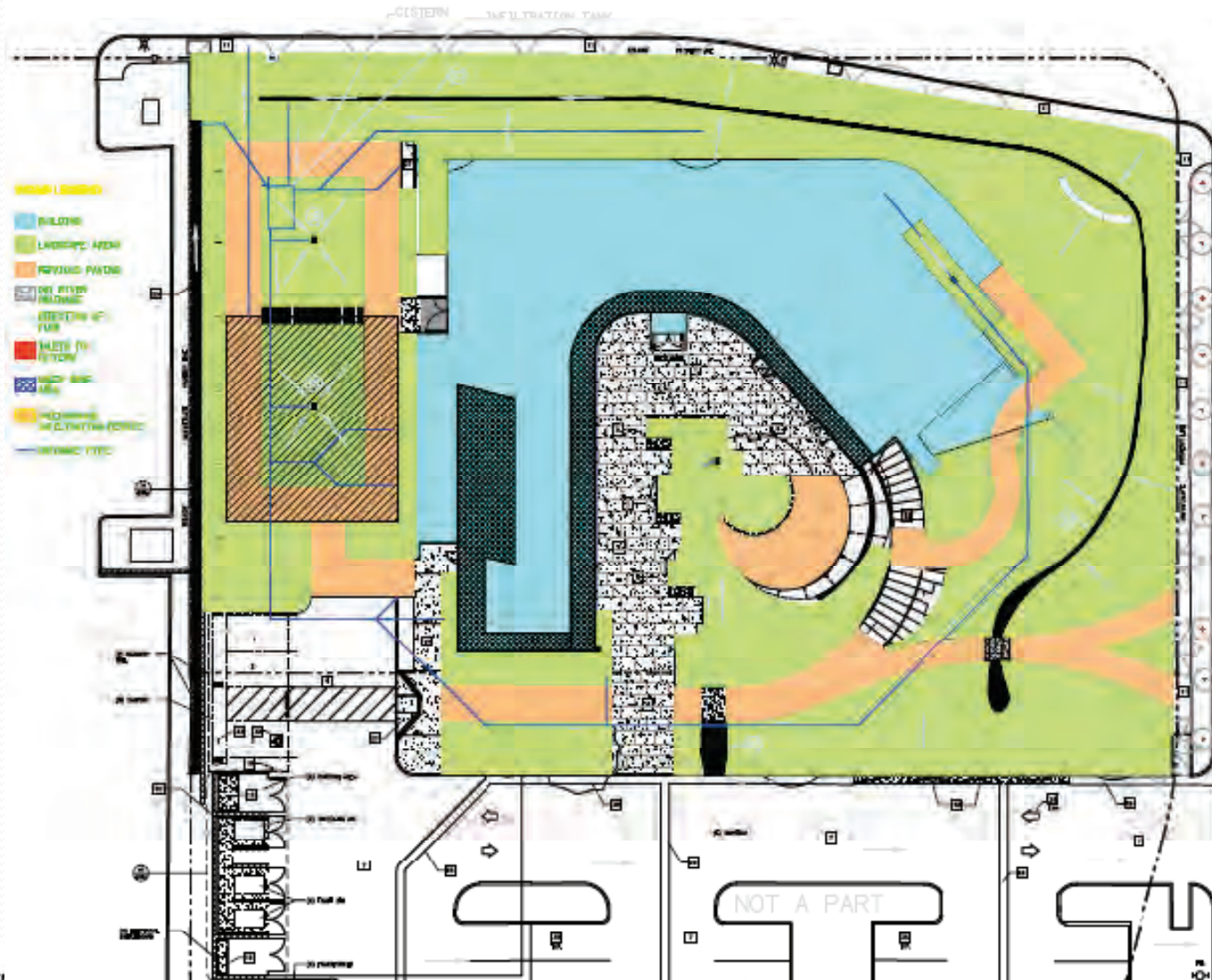


Atlantis[®] Infiltration Tank

- 100% Pollutant Removal
- 90% Void Space
 - Smaller footprint than aggregate trenches
- Capacity: 7,200 Cubic Feet (6,164 cf = 5 year event Pre/Post)
- Cost: \$98,000



Frontier Project WQMP Layout



Lessons Learned

- Water District’s “sustainable” approach provided an opportunity for LID & water harvesting
- Advantages of LID & water harvesting must be presented early in the design process
- Early coordination in the site design process:
 - Project proponent
 - Planners
 - Architects
 - Engineers
 - Landscape Architects
- Coordination with architects & contractor throughout the construction process
- LID & Water Harvesting integrated to:
 - Meet water quality requirements
 - Meet hydromodification requirements
 - Assist in meeting irrigation needs and groundwater recharge



Questions?



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www.frontierproject.com



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