

Gray to Green

Integration of Green Infrastructure at the University
of Texas at Arlington

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UTA Profile

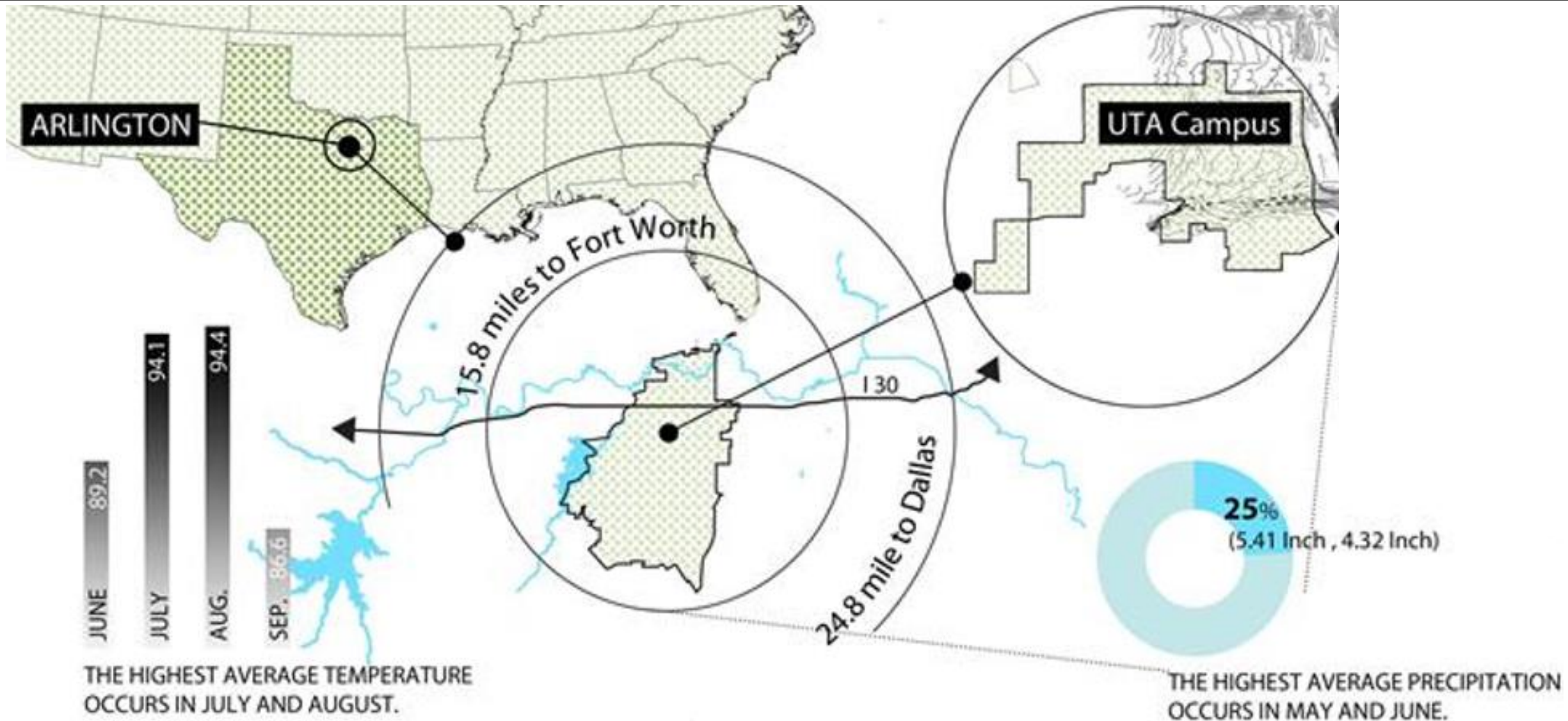
420 acres, 112 buildings,
33,500+ students, 5,600
employees and **growing**

- Nearly 1.5 million sq ft of building space added since 2007

Campus functions much like a municipality

- 24/7 operations
- Businesses
- Housing
- Open Space
- Transportation
- Police

UTA Campus Location (Wu, Xu, Pradhananga, & Özdil, 2016)



[illegible]

Sustainability Guiding Principles

- Support sustainable building practices through integrated master planning and policies to support UTA green building initiatives
- Develop infrastructure that can be adequately maintained post construction to the benefit of UTA and the community.
- Create a pedestrian and bicycle friendly routes
- Improve air and water quality
- Educate stakeholders on the social, environmental & financial benefits of sustainability
- Use UTA projects as research opportunities for new technologies and approaches where appropriate

Master Plan: Greening the Campus through Density, Diversity, and Efficiency

- **Mixed-use development at College Park** offers students an environment enabling them to remain on campus for a wide variety of additional services and amenities
- Growth serves not just students, but also the immediate **community** through a parking structure (not surface lots) and **economic development**
- Efficient use of space with 15,000 sq ft of retail, housing for 600 students, and **parking structure** with capacity for 1,800 vehicles leaving room for **green space**



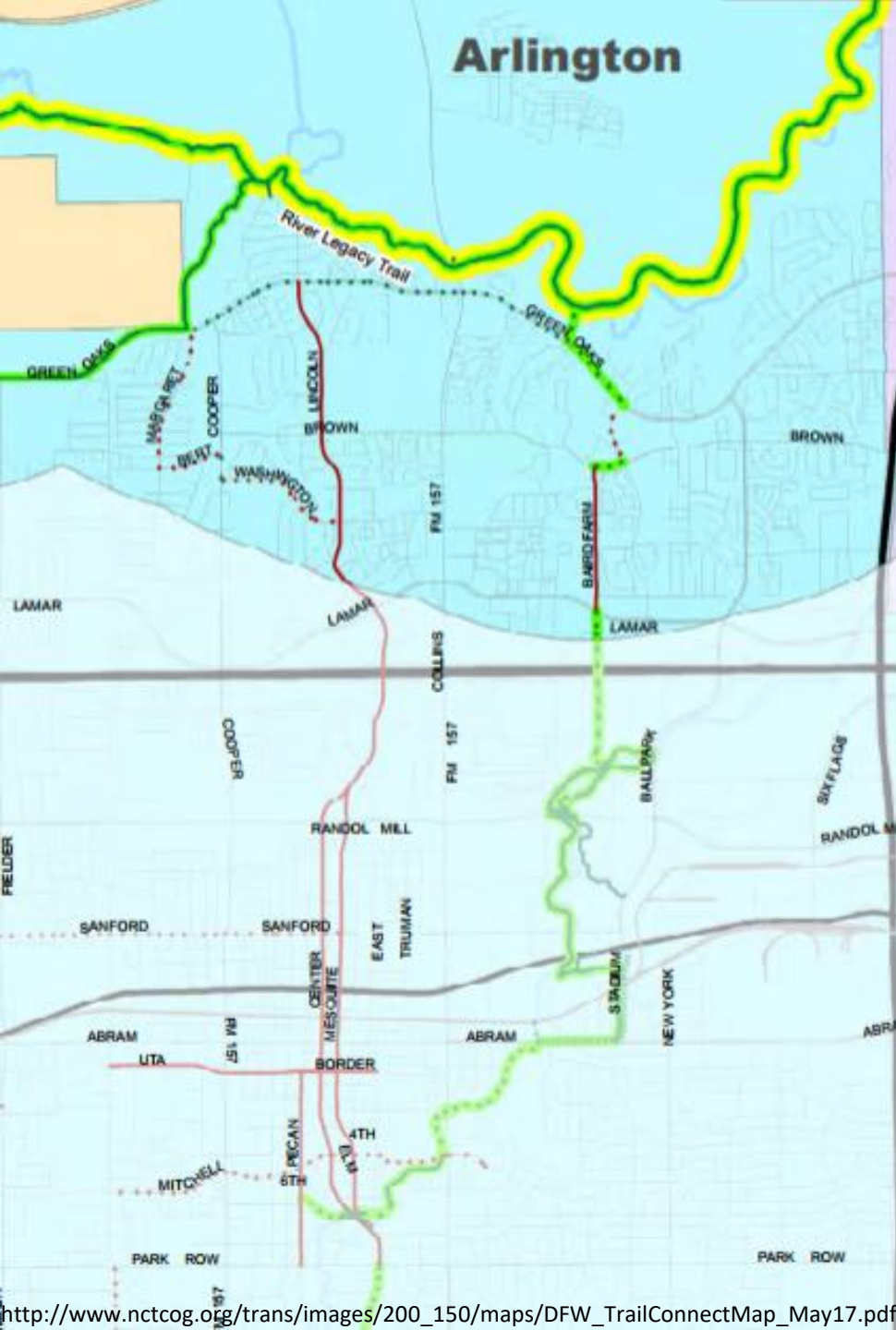
Specific names of tenants and customer parking areas, their status, location, and size are (i) not intended to be and should not be or have been relied upon, (ii) subject to change, modification and deletion by Landlord and (iii) not a representation or warranty as to the opening or continued operation of any store named or depicted on the site plan. Square foot measured using the BOMA standards.

Master Plan: Greening the Campus through Green Building Policy

Committed to pursue Leadership in Energy and Environmental Design (LEED) Certifications with minimum Silver target

- LEED Gold
 - College Park Center
 - Engineering Research Building





Master Plan: Greening the Campus through Connectivity

“**Gray to Green**” objective of the plan aims to transform surface parking lots to open spaces and improves pedestrian and bicycle connections throughout the campus.

Connectivity to the regional veloweb
Bike share and car share



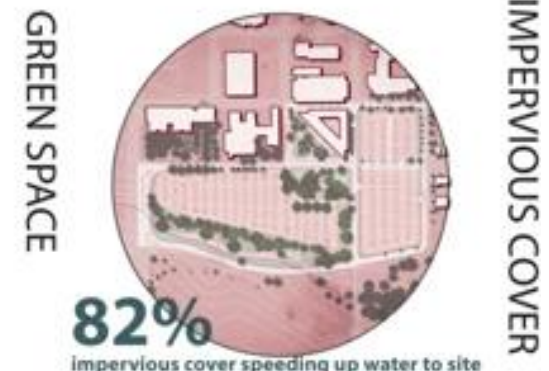
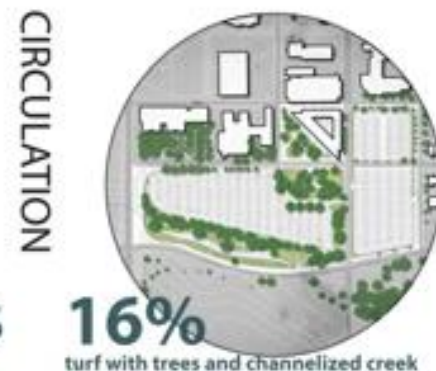
Master Plan: Greening the Campus through Open Spaces

Open spaces incorporate water-wise habitat designs

- Native and xeric-adapted plants
- “Low mow” lawn turf with reduced water use

Rainwater collection systems for reuse in landscape irrigation

- Engineering Research Building 28,000 gal tank
- Community Gardens



Sustainable Sites Initiative (SITES™)

First national rating system for sustainable landscapes

- American Society of Landscape Architects (ASLA)
- Lady Bird Johnson Wildflower Center at the University of Texas at Austin
- United States Botanic Garden
- Diverse group of stakeholder organizations

The Green at College Park one of three projects worldwide to receive certification in 2012



The Green at College Park

- 2.6 acres
- Native grasses and adaptive plants
- Dry creek bed that helps manage rainwater and storm water runoff that drains into Johnson Creek
- Large lawn, curved stone wall providing seating with shade arbors
- Pedestrian promenade with permeable paving materials made from recycled bottles

(National Wildlife Federation, 2011)



Photo: 21 Nov 2017 Amber Raley

EPA Campus RainWorks Challenge

The Campus RainWorks Challenge seeks to engage with undergraduate and graduate students to foster a dialogue about responsible stormwater management and showcase the environmental, economic, and social benefits of green infrastructure practices.

(EPA, 2017)

*2015
First
Place
Master
Planning*

**Eco-Flow: A Water Sensitive
Placemaking Response to Climate
Change**

Design Team M42:

- Baishaki Biswas, B. Architecture, Candidate for Masters in Landscape Architecture
- Sherry Fabricant, B.A. Psychology, B.B.A. Management, Candidate for Masters in Landscape Architecture
- Jacob Schwarz, B.S. Exercise & Sports Science, Candidate for Masters in Landscape Architecture
- Ahoura Zandiatashbar, B. Architecture Engineering, M. Architecture, M. Urban Design, Ph.D. Student in Urban Planning

Faculty Advisor:

- Taner R. Özdil, Ph.D., ASLA, Department of Planning & Landscape Architecture

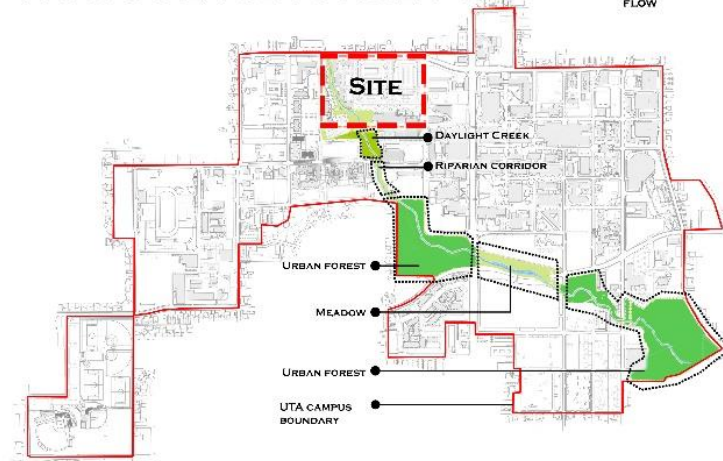
ECO - FLOW

A WATER-SENSITIVE PLACEMAKING RESPONSE TO CLIMATE CHANGE

EXISTING PROBLEMS



CAMPUS ECOLOGICAL PLAN



COLLECT
RAIN WATER AND AC CONDENSATION



CLEAN
CLEAN THE URBAN RUNOFF



PROTECT
PROTECT THE CREEK

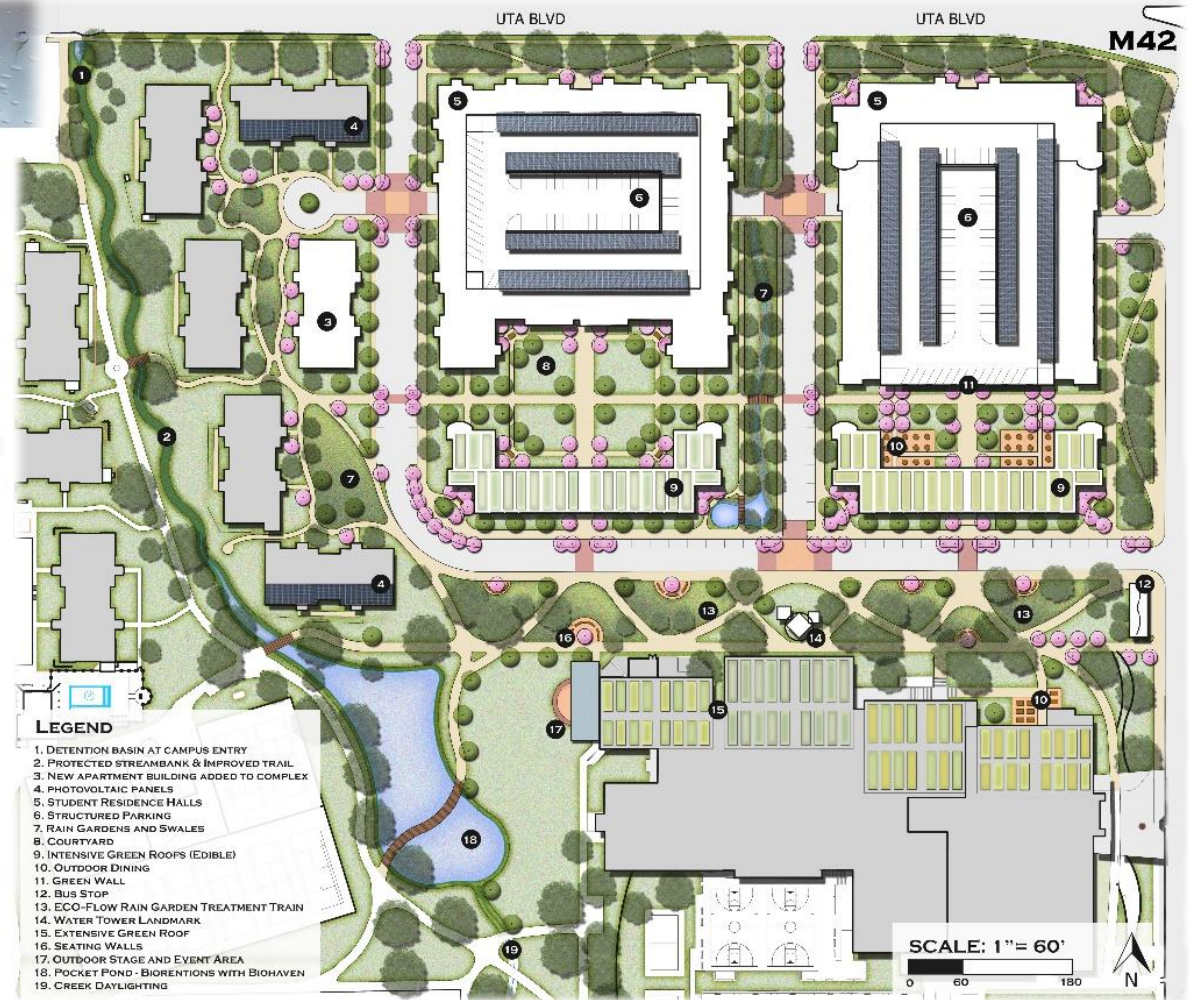
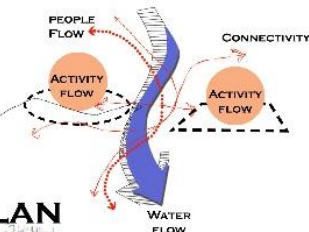


PROVIDE
PROVIDE BETTER LIFE FOR FUTURE

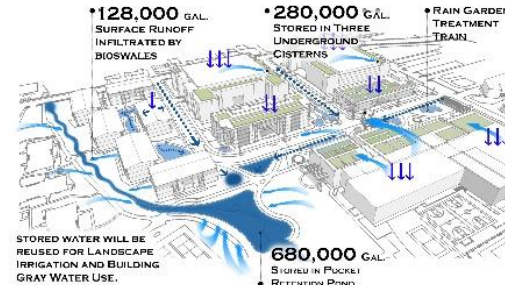
PROJECT GOALS

GREEN INFRASTRUCTURE DESIGN
INCREASE CONNECTIVITY
IMPROVE SOIL QUALITY
DAYLIGHT CREEK
RESTORE SOIL QUALITY
INCORPORATE SMART BUILDINGS
IMPROVE MICRO CLIMATE
PROMOTE SOCIAL ENGAGEMENTS
INSTALL NATIVE PLANT DIVERSITY
PHOTOVOLTAIC TO SUPPORT GREEN ENERGY

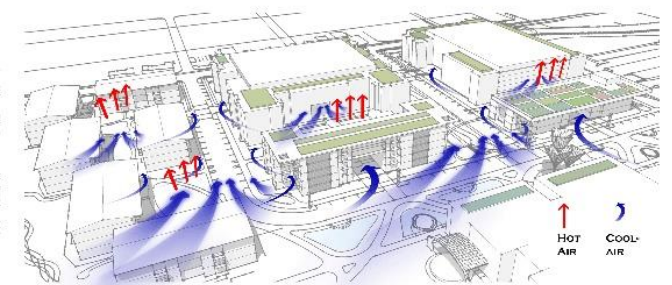
CONCEPT



HYDROLOGY [2" RAIN EVENT]



MICRO CLIMATE





M42

OUTCOMES

- 25" YR. RUNOFF REDUCTION FROM EXISTING CONDITIONS
- 596,642 GAL. YR. CAPTURED RAIN WATER REDUCES POTENTIAL WATER USE FOR IRRIGATION
- 623,000 GAL. YR. GROUNDWATER RECHARGE
- 100% AREA OF PROTECTED STREAM BANK
- 3 ACRES OF RESTORED SOILS ON SITE
- 93% OF 200 CANOPY TREES PROTECTED
- 2% INCREASE IN NATIVE TREE CANOPY COVER
- 80% OF DINING HALL ROOF AND 50% OF ACTIVITY CENTER ROOF SHADED BY VEGETATION
- 300 SQ. FT. GREEN WALL ADDED
- 3 ACRES OF AIR IN HARDSCAPE
- 1.162 MTL. KW. YR. GREEN ENERGY GENERATED ON STRUCTURED PARKING
- 5,000 TONS OF CO₂ GREENHOUSE GASES MITIGATED VIA PHOTOVOLTAIC SYSTEMS

PERFORMANCE

TREE COVER

93% OF EXISTING TREES
RETAINED + 250 NEW TREES
= 510 TREES ON SITE



SURFACE WATER

DAYLIGHT TRADING HOUSE CREEK
ADD 42,409 SQ. FT.
OF BIORETENTION



PERMEABLE

INCREASED PERMEABLE SURFACES
51% NOW COVERS
36% OF SITE



IMPERMEABLE

DECREASED IMPERMEABLE
SURFACES FROM 83%
TO 64% OF SITE



MITIGATED HEAT

INCREASED HEAT
MITIGATING SURFACES
258,426 SQ. FT.



HEAT CONTRIBUTION

DECREASED REFLECTIVE HEAT
SURFACE 22% TO
456,886 SQ. FT.



VALUE TO CAMPUS

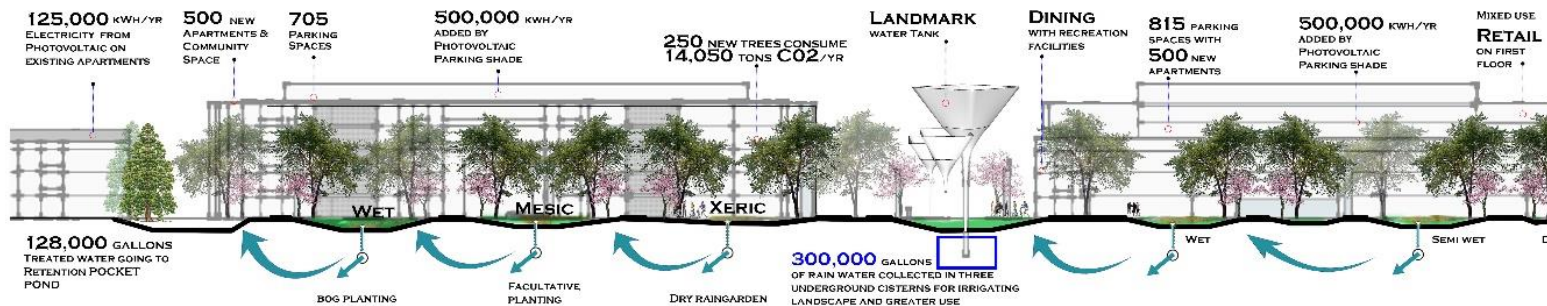


RETENTION POCKET POND

RESILIENCY

- REDUCE "HEAT ISLAND" EFFECT
- REDUCE INDOOR ENERGY DEMAND
- MITIGATE ACID RAIN EFFECT
- REDUCE STORM WATER VOLUME
- REDUCES CO₂ IMPACTS
- MANAGES STORM WATER RUN-OFF
- WATER CONSERVATION
- REDUCTION IN WATER COSTS
- INCREASES INFILTRATION
- REDUCES PEAK FLOW
- IMPROVES WATER QUALITY
- DECREASES THE ENERGY OF MOVING STORM WATER
- MITIGATE DOWNSTREAM FLOODING
- DECREASE STREAM BANK EROSION
- REDUCE STORM WATER RUNOFF
- IMPROVES BIODIVERSITY

RAIN GARDEN TREATMENT TRAIN SECTION



GREEN INFRASTRUCTURE

BIOSWALE, RETENTION, AND DETENTION PONDS, CISTERNS TO COLLECT RAIN WATER AND CONDENSATION FROM HVAC, PERMEABLE PAVEMENT, PARKING SPACES, SIDEWALKS, AND TRAILS, BUILDING ORIENTATION, COURTYARD, EXTENSIVE GREEN ROOFS, AND GREEN WALLS MITIGATE SUMMER HEAT

SMART PARKING GARAGE WITH PHOTOVOLTAIC PANELS ON TOP WITH WHITE ROOF TO SQUELCH GREEN ENERGY

NATIVE PLANTS & TREES IMPROVE ECOLOGICAL CIRCULARITY

ENERGY EFFICIENT SMART SUSTAINABLE BUILDINGS

NATIVE DECIDUOUS CANOPY TREES IMPROVE MICRO CLIMATE

Hydroscape Video 2012 Honorable Mention

Resources

- Environmental Protection Agency (2017). Campus RainWorks Challenge retrieved from <https://www.epa.gov/green-infrastructure/campus-rainworks-challenge-0>
- National Wildlife Federation (2011). Campus Ecology retrieved from <https://www.nwf.org/~media/Campus-Ecology/Files/Case-Studies/2011-Case-Studies/N-Z/University%20of%20TX%20Arlington%202011%20Case%20Study%20FINAL.ashx>
- University of Texas at Arlington (2005). Campus Master Plan Update and Design Guidelines retrieved from http://www.uta.edu/masterplan/ut_arlington_master_plan.pdf

Student Work

- Biswas, B., Fabricat, S. Schwarz, Zandiatashbar, A. & Özdil, T. R. (2015). *Eco-Flow: A Water Sensitive Placemaking Response to Climate Change*. First Place Winner Master Planning EPA Campus RainWorks Challenge.
- Plummer, M., Paziresh, R., Watkins, J., Podeszwa, A. & Özdil, T. R. (2016) *Conveyance: Communicating Ecology through Design*. Master Planning submission EPA Campus RainWorks Challenge.
- Sampler, B., Elliot, K. & Özdil, T. R. (2012). *Hydroscape*. Video submission EPA Campus RainWorks Challenge.
- Wu, C., Xu, C., Pradhananga, A. & Özdil, T. R. (2012). *UTA Campus Vision*. Master Planning submission EPA Campus RainWorks Challenge.