UK College of Agriculture Alumni Plaza

Prepared By:

Research Fellow: Christopher Sass Ph.D, ASLA, Assistant Professor, University of Kentucky
Research Assistant: Wes Griffith, ASLA, University of Kentucky
Firm Liaison: Ramona Fry, RLA, ASLA, LEED BD+C, Element Design
August 2015

This investigation was conducted as part of the Landscape Architecture Foundation's 2015 Case Study Investigation (CSI) program. CSI matches faculty-student research teams with design practitioners to document the benefits of exemplary high-performing landscape projects. Teams develop methods to quantify environmental, economic and social benefits and produce Case Study Briefs for LAF's Landscape Performance Series.

Landscape Performance Benefits

Environmental

Captures 13,089 gallons of stormwater annually as a result of a reduction of approximately 21,000 sf of impervious surface.

Stormwater on site is collected via surface drainage and permeable paving throughout the plaza. With the addition of Alumni Plaza, stormwater is now stored below the permeable surface where the water gradually drains and/or evaporates over time, allowing for more storage capacity and slower addition of stormwater runoff to the surrounding spaces on campus (Figure 1).

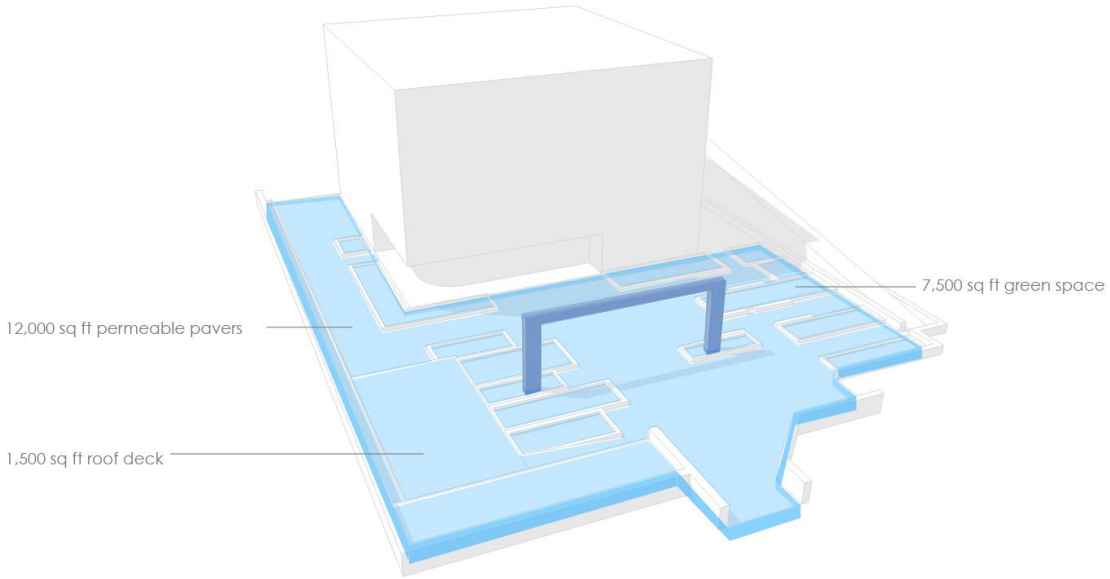

Figure 1: 21,000 sf of pervious surface that helps to collect stormwater and runoff (Wes Griffith)

To figure the amount of stormwater captured on site, we took the square footage of the site, in addition to the 2 ft depth that can absorb the rainwater through permeable surfaces. We then factor in Lexington's average total amount of rain received annually (45.2 in) to calculate how much rainfall collected on the site

Area of site = 21,000 sf (12,000sqft of permeable pavers 2ft deep, 7,500sqft planter space, 1,500sqft of decking with 2ft deep gravel underlayment)
Average annual precipitation = 45.2 in
Average precipitation amount in gallons for every in of rainfall = .6233 gallons per sf
45.2 in per year x .6233 gallons per square foot = 28.17 gallons per sf per year
28.17 gallons per sf x 21,000 sf of plaza space = 13,089 gallons per year maintained on site.
Not released into storm sewers.

Sources

Element Design, *Alumni Plaza Narrative,* Quality & Amenities. August 2014.

Kentucky AgWeather Center. University of Kentucky. 1981-2010 annual average precipitation for Fayette County (Accessed July 11, 2015)
http://wwwagwx.ca.uky.edu/ky/climate.php#Kentucky_Normals

NOAA national Climate Data Center (2015) Average Yearly Precipitation for Kentucky & Climate Normals 1981-2010.
http://www.currentresults.com/Weather/Kentucky/average-yearly-precipitation.php

Rainwater Calculation (2015) *Calculating Rainwater Available for Collection,* pdf
http://ucanr.edu/sites/scmg/files/30178.pdf

USGS Water Science School (2015) How much water falls during a storm?
http://water.usgs.gov/edu/activity-howmuchrain.php

Reduces the peak runoff rate by 62%, and, during a 10-year storm, can treat up to 100% of rainfall on its surface for sediment.

The stormwater collection system for the .46-acre site was designed to collect, filter, and drain runoff to prevent puddling and excessive runoff entering into the stormwater system on campus. Runoff from approximately 21,000 sf of the site's pervious surface is captured and stored 2 ft below while rock infill and permeable pavers allow sediment to be washed away from the surface and filtered out.

PREVIOUS PLAZA
Rational runoff coefficient (C)= .8 (Average concrete)
Rainfall intensity (I) = 4.3 in per hour (Figure 2)
Drainage are (A) = .46 acre
Peak discharge (Q) = C x I x A
.8 x 4.3 x .46
Q = 1.58 cfs

ALUMNI PLAZA
Rational runoff coefficient (C)= .3 (Average impervious surface)
Rainfall intensity (I) = 4.3 in per hour
Drainage are (A) = .46 acre
Peak discharge (Q) = C x I x A
.3 x 4.3 x .46
Q = .59 cfs
.59 / 1.58 = .373
Runoff flow decreases by 0.99 cfs or 62% less than the previous plaza space.

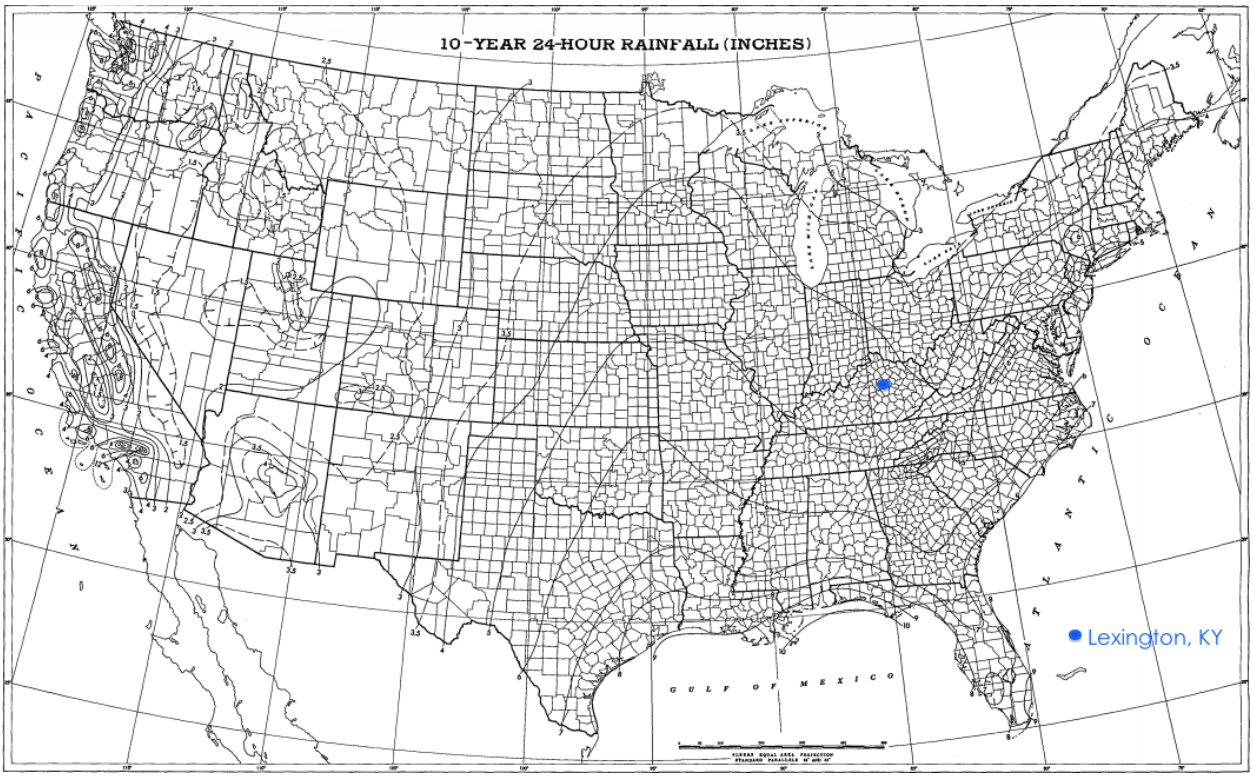

Figure 2: Graphic depicting average rainfall in ines during 10-year, 24-hour storm in the United States.

Sources

Taylor, Cheryl. *Raincatcher Narrative*, EPA Region 4 Rain Catcher Award Nomination Narrative. July 22, 2014.

LMNO Engineering, Research, and Software LTD. Rational Equation Calculator. 2013. http://www.lmnoeng.com/Hydrology/rational.php

United Stated Department of Commerce. Rainfall Frequency Atlas of United States, 1961 http://www.nws.noaa.gov/oh/hdsc/PF_documents/TechnicalPaper_No40.pdf

Established habitat for 7,500 sf of habitat for migrating insects, including over 10 different insect families.

To figure the increased quality of native habitat for migrating insects, we collected samples from seven planter beds that help to make up 7,500 sf of greenspace added to the plaza (Figure 3). We used an insect vacuum to sweep the planter beds, which we then collected, identified, and sorted into families (Table 1).

Native Vegetation
Purple Love grass
Sedum kamschaticum
Northern Sea Oats
Chia
Little Henry Itea
American Chestnut
Red Switch grass
Cherry Laurel
Cotton
Liriope 'Royal Purple'
Sun Flowers
Sideoats Grama grass
annual flowers
Black Gum
Buffalo grass

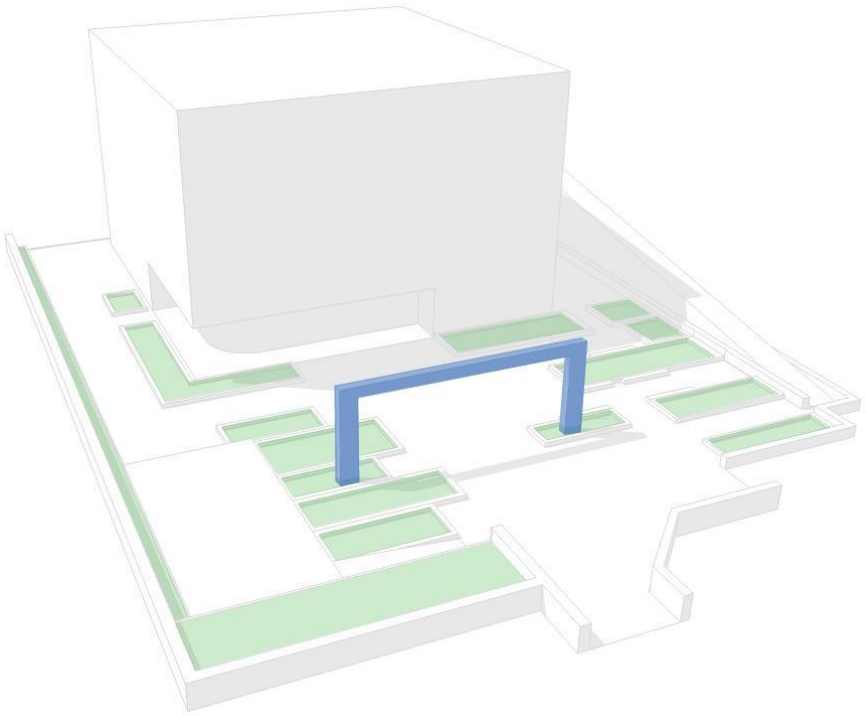

Figure 3: 7,500 sf of greenspace providing habitat for insect species

Sample #	Orthoptera	Diptera	Hymenoptera	Coleoptera	Hemiptera	Other Insects	Non-Insects
	Grasshoppers, Crickets	Flies, Midges	Wasps, Ants, Bees	Beetles	Leaf Hoppers, Stink Bugs, Leaf Bugs		
1 - Purple Lovegrass	17	9	4	1	1		
2 - Stonecrop	1	6	0	17	0		2- Arachnid
3 - Northern Sea Oats	0	3	0	1	0		
4 - Cherry Laurel	0	5	3	2	4		
5 - Purple Lovegrass	2	6	0	1	2	1 - Mantis	2- Isopoda, 2- Arachnid
6 - Red Switchgrass	0	2	0	1	0		1- Centipede
7 - Little Henry Itea	0	13	0	14	3	1- Earwig	

Table 1: Results of insects collected from seven planter beds

Sources
Ramona Fry, *Alumni Plaza Planting List*. UK Physical Plant Division, pdf
Personal research, Wes Griffith, July 22-29, 2015.

Provides a venue for the College of Agriculture, Food, and Environment (CAFE) to host organized events for clubs and other programs within the College. During the 2014-2015 academic year, 7 events were held in the plaza.

The events held in the plaza were retrieved through speaking with Ashley Casteel, Associate director/event management at the UK Student Center.

The space has provided the College of Agriculture to host events during the 2014-2015 Academic year, including: CAFE Exhibit/Fair, AGED Society Meeting, UK Food Collaborative Press Conference, UK AgEcon Centennial Celebration/Banquet/Reception, and CAFE College Meeting (Figure 5).

Date	Reserved Start	Reserved End	Event Start	Event End	Building	Room	Booking Event Name	Booking Event Type
8/26/14	8:00 AM	5:00 PM	12:00 PM	2:00 PM	Outdoor Locations	Garrigus Alumni Plaza	CAFE College Meeting	Exhibit/Fair
8/28/14	6:00 PM	8:00 PM	6:00 PM	8:00 PM	Outdoor Locations	Garrigus Alumni Plaza	AGED Society Meeting	Meeting
9/2/14	8:00 AM	10:00 PM	10:00 AM	1:00 PM	Outdoor Locations	Garrigus Alumni Plaza	UK Food Collaborative	Press Conference
9/3/14	8:00 AM	10:00 PM	8:00 AM	10:00 PM	Outdoor Locations	Garrigus Alumni Plaza	UK AgEcon Centennial Celebration	Preset
9/4/14	8:00 AM	10:00 PM	8:00 AM	10:00 PM	Outdoor Locations	Garrigus Alumni Plaza	UK AgEcon Centennial Celebration	Preset
9/5/14	8:00 AM	10:00 PM	5:00 PM	8:00 PM	Outdoor Locations	Garrigus Alumni Plaza	UK AgEcon Centennial Celebration	Banquet/Reception
8/25/15	9:00 AM	4:00 PM	9:00 AM	4:00 PM	Outdoor Locations	Garrigus Alumni Plaza	CAFE College Meeting	Meeting

Figure 5: Spreadsheet listing event dates and times during the 2014-2015 academic year (Ashley Casteel "Alumni Plaza Events")

Sources
Casteel, Ashley. "Alumni Plaza Events." Message to the author. 11 June 2015. E-mail.
Personal Communication, Ashley Casteel, Associate Director/Event Management, July 2015

Accommodates significant foot traffic, with 50-70 students per hour using the space on weekdays in the summer and fall.

- ***On average, on a weekday morning in the fall, 70.5 will access the space per hour.***
- ***During the summer months, on an average weekday, 50 will access the space.***

For the average amount of user access, the site was monitored for an hour 2 days per week from October 6 to October 17, 2014 as well as June 5 to June 16, 2015. (Figure 6).

Day	Season	Time	# of Visitors
Tuesday, October 7, 2014	Fall	9:00 AM	78
Thursday, October 9, 2014	Fall	11:00 AM	65
Tuesday, October 14, 2014	Fall	2:15 PM	76
Thursday, October 16, 2014	Fall	11:00 AM	63
Tuesday, June 6, 2015	Summer	1:00 PM	47
Wednesday, June 7, 2015	Summer	3:00 PM	51
Monday, June 12, 2015	Summer	11:30 AM	59
Thursday, June 15, 2015	Summer	2:00 PM	43

Figure 6: Chart of recorded number of visitors accessing the site per hour.

Sources
Personal Observation, Wes Griffith, Jeff Embree, Student Research, October 2014/July 2015

Economic

Raised $12,500 from fundraising and contributions that will be used for maintenance, repairs and future renovations.

During construction, the executive committee began to raise funds in order to maintain a budget for maintenance and future renovations. Alumni were offered the opportunity to purchase engraved pavers for $250 to honor colleagues, loved ones, and organizations. Contributions have been collected from Alumni donations as well as the money raised from the engraved pavers. Alumni Relations provided the UK community and alumni the opportunity to purchase a paver. The Alumni Plaza Dedication was held on Tuesday, June 24, 2014 where the first order of pavers was unveiled to the public.

Sources
Personal Communication, Lisa Collins, Assistant Dean for Academic Administration, July 7, 2015
Toombs, Billy. "Alumni Plaza Fundraising/Contributions." Message to the author. July 8 2015. E-mail.

Cost Comparison

Saves over $4,000 per year in energy and operating costs due to 14 30W LED lighting fixtures, compared to the cost of traditional incandescent bulbs.

Estimated cost of traditional incandescent bulbs = $328.59 per year
328.59 x 14 = $4,600.26
Estimated cost of LED bulbs = $32.85 per year
32.85 x 14 = $459.90
Estimated savings = $4,140.36 per year

Sources
Compare: LED Lights vs. Incandescent Light Bulbs vs. CFLs, Comparison Chart.
http://www.designrecycleinc.com/led%20comp%20chart.html

Saves about $1,200 annually due to the use of composite decking on site to avoid maintenance costs associated with wood decking

Estimated cost of composite decking = $7 per sf
7 x 1,500 = $10,500
Estimated cost of traditional wood decking = $4.50 per sf
4.50 x 1,500 = $6,750
Estimated price for cleaner, stain and sealant = $500 per year
Estimated price for 40 man hours = $720
Estimated savings in maintenance = $1,220 per year

Sources

Homewyse, Cost to Install Wood Decking, January 2015.
http://www.homewyse.com/services/cost_to_install_wood_decking.html
Great Day Improvements,Wood vs. Composite Decks, January 10, 2013.
http://www.greatdayimprovements.com/wood-vs-composite-decks.aspx