Reflection on Teaching Landscape Performance in an Undergraduate *Seminar – Designed Landscape - Theory and Criticism*.

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Department of Horticulture and Landscape Architecture
Colorado State University, Fort Collins, CO

Grant Period: Fall 2017

Background

The course, *LAND 392_Seminar – Design Landscape – Theory and Criticism,* is the only discussion course within our undergraduate landscape architecture program. This two credit course is solely discussion based with intensive weekly readings and writings. The course topics were previously only on design theory. But given this opportunity, I was able to integrate the landscape performance series into the weekly readings, class discussions, student presentations, occasional guest lecturers, and various writing assignments. The academic objectives of this course are 1) Practice critical thinking to inform your design work, 2) Write and speak about design issues, 3) Understand design theory and criticism in the context of design, 4) Understand what landscape performance is and how it is measured. Students who take this fall course will continue with their final capstone studio project in the spring, where they will be required to integrate landscape performance within their studio designs.

This course is a 50 minute discussion class held twice a week for 16 weeks. There were 25 registered students for the undergraduate course. On our first day of class, students stated that no one had ever heard of the Landscape Performance Series (LPS) before. I ended the semester with a conclusive survey.

Process

The course began with introductory landscape theory readings and discussions. Students were introduced to landscape performance by the third week of the course. They began with online research of the LPS website for an overall initial introduction with focus on the Benefits Toolkit. Allyson Mendenhall, Principal and Director of DW Legacy Design at Design Workshop, met with my students and lectured on the introduction of landscape performance and demonstrated how Design Workshop utilizes the measurement of landscape performance within their office. It was instrumental for students to witness how they may take this knowledge into their professional experiences once they graduate. After the lecture, the students were assigned to submit follow-up questions for Allyson, with a one page written reflection of her lecture. Students were then led to study one of the benefits toolkit more closely. Students wrote a 3-page paper of their reflections on i-Tree.

Throughout the semester, we interconnected discussions from readings within *Theory in Landscape Architecture* and continued to intertwine the lessons and conversations on landscape performance. Students also focused on the case studies, with research, readings, and group presentations of several highlighted projects. Students were assigned to present the following projects to the class:

1. 63rd St Beach, Jackson Park
2. AT&T Performing Arts Center: Sammons Park
3. Cascade Garden
4. High Desert Community
5. Randall Children's Hospital
6. Renaissance Park
7. The Morton Arboretum: Meadow Lake & Permeable Main Parking Lot
8. University of Texas at Dallas Landscape Enhancements
9. Westerly Creek

The projects were selected to provide a range of landscape scales and project types, with variation in performance metrics.

After the Case Study research, students circled back to readings and discussions from *Theory in Landscape Architecture* and the connections to landscape performance. Some topics included the meaning of landscapes, landscape narratives, the balance of designing with metrics versus aesthetics, and the integration of landscape ecology within design.

Additionally, Adam Greenspan, the current President of the Landscape Architecture Foundation (LAF) and Partner at PWP Landscape Architecture, provided a live online presentation of how he designs and constructs landscapes with landscape performance in mind. Projects he presented included:

1. University of Texas at Dallas, Dallas, Texas
2. Barangaroo, Sydney, Australia
3. Glenstone, Potomac, Maryland
4. Transbay Transit Center, San Francisco, California
5. Newport Beach Civic Center Park, Newport Beach, California

Students also tested out the phone applications to measure the campus landscape performance on the Monfort Quad on CSU's campus. Students measured temperature, wind, noise, light, tree calipers and sun shadows.

We concluded the course readings and discussions on the topic of the *High Performance Landscape Guidelines: 21st Century Parks for NY* which allowed for deep conservation on how progressive NYC standards are for park planning.

Assignments

- This seminar discussion course required students to read weekly on topics of 1) The Nature of Theory in Landscape Architecture, 2) Design Process, 3)Form, Meaning, and Experience, 4) Society, Language, and the Representation of Landscape, and 5) Ecological Design and the Aesthetics of Sustainability. Additionally, Students researched the LAF LPS website, the Benefits Toolkit, and the Case Study Briefs.

- For every discussion, students were assigned to post a thorough discussion question on each author within the readings. Students would post the night before class on our Canvas course site and I would compile the questions for class discussion the following morning. Discussions were often in smaller groups of 4-5 students initially. After smaller discussions, students then shared the group's overall conversation and response to the proposed question. Within the last few weeks of the semester, I began to add photographs that related to the questions to provide a deeper conversation about the landscapes being viewed. Students gave great feedback on this addition. The additional visual connection to the written questions allowed for deeper conversation with project examples.

- Students wrote a one page weekly summary of the in-class discussions each week.

- The final assignment required students to write a 5-page paper. They had the opportunity to select their own paper topic that integrated the background and lessons on landscape performance with the ongoing readings and discussions with landscape theory.

Reflections

This was a fantastic opportunity to integrate landscape performance into the landscape theory discussions. The addition to this landscape performance topic to the theory course was very well received by students. At the end of the course, students took a voluntary anonymous survey of the course. Students favored the idea of being able to measure landscape performance so that they could improve their landscape designs within studio and take this knowledge to the profession once they graduate. 96% of students planned on utilizing these tools in their final capstone design studio. Students also wished they had studied this topic earlier in the curriculum and some felt it should be required to be integrated into studio projects. Some also felt that there should be a 'lesson's learned' section so that students would learn more from projects that were not as successful. Some students also commented on the clarity of the Benefits Toolkit. It seemed difficult for students to find how to measure and what was needed within designs to get results. Further description and more of a *how-to* would be helpful.

Lessons Learned

Overall, I think this was an excellent opportunity for students to learn about landscape performance and have ongoing reflections and discussions on the topic. The class sessions were very engaging and I really enjoyed the student conversations around the various topics. This course was not a project based or studio course so I couldn't assign them to utilize or test the metrics in one of their projects. I feel that it would've been more helpful for students to

physically test out parts of the Benefits Toolkit within a project. However, I feel like it was important for students to spend a semester learning about the capabilities of landscape performance before being asked to attach the concepts to a studio project. Fortunately, I will be teaching their spring capstone studio. They will be required to continue learning about LPS and will be required to use at least one of the Benefits Toolkits on their project. Students will also obtain a professional mentor who will assist them on their projects and designs. I think this will be a great tool to maybe get professionals educated about this in the process.

After learning more about the actual benefits of physically measuring the landscape, meaningful data really requires extensive time. Students were asked to physically measure the campus landscape. But for it to be meaningful, students would ideally measure the same locations morning, noon, and early evening, and during all four seasons. Given that this was only a two credit discussion course, I was unable to give such an assignment. Instead, students tested out the phone applications to perform those metrics. I believe extensive research on proper applications is needed for great accuracy. Many applications we used did not provide accurate temperature data when sampling sun and shade locations. I hope to purchase the equipment for the program in the future so students can test and create data for projects in other classes.

The Benefits Toolkit is very extensive and I wish students were given more time to do further research on each. I will incorporate this into my capstone studio with them. For this course, they only focused on i-Tree.

In the future, I would like to host a landscape performance workshop for all landscape architecture students that would include several local professionals who could present and provide a panel discussion on how they may using landscape performance in their firms. It was instrumental for students to hear how Allyson Mendenhall and Adam Greenspan utilize these strategies professionally.

LAND 392_Seminar-Designed Landscapes–Theory and Criticism fall 2017

Tuesdays and Thursdays 9-9:50am NESB 101

Associate Professor	Kelly Curl Kelly.Curl@colostate.edu Office: B104 NESB Office Hours: By appointment or drop in 970-491-7283
Credits	LAND 392 02 (0-0-2), (lecture, lab/studio, discussion)
Prerequisite	LAND 365 Landscape Contract Drawings and Specifications
Course Description	Readings, discussions, and writing in landscape architectural design theory; critical analysis of the designed and constructed landscape.
Academic objectives	Practice critical thinking to inform your design work Write and speak about design issues Understand design theory and criticism in the context of design Understand what landscape performance is and how it is measured
Instructional Method	This course will be taught in a traditional classroom setting with background for each topic presented and exploration of each topic developed through readings, reports, and in-class discussions.
Required Text	Adams, Michelle. (2011). High Performance Landscape Guidelines: 21st Century Parks for NY, *Design Trust for Public Space*. https://www.nycgovparks.org/sub_about/sustainable_parks/design_guidelines.pdf Swaffield, Simon (Editor). (2002). *Theory in Landscape Architecture*. University of Pennsylvania Press. Philadelphia, PA. Landscape Architecture Foundation (LAF): www.lafoundation.org Landscape Performance Series (by LAF): https://landscapeperformance.org/
Recommended Text	Herrington, Susan. (2017). *Landscape Theory and Design*. Routledge, New York,NY Waldheim, Charles (Editor). 2006. *The Landscape Urbanism Reader*. Princeton Architectural Press, New York. New York
Evaluation	**A** Submittals are complete and/or of distinction professional school quality. **B** Submittals would be complete and/or of distinctive professional school quality with moderate revisions or additions. **C** Submittals would be complete and/or of distinctive professional school quality with major revisions or additions. **D** Submittals are incomplete and/or nearly without redeeming qualities **F** Submittals are without redeeming qualities.
Rules for Success	**Show Up!** You must attend every class to be successful in this course. **Do the work!** You must choose to do your very best work in preparing for each class session discussions and on all weekly assignments. Take great notes. **Actively participate!** This is a discussion based course so you must offer your best comments, questions, and answers. Active discussion is expected from all students.
Course Assignments	Your participation in the in-class discussions is critical. Post a well-thought out discussion question(s) from the required reading on the Canvas Discussion page. Your weekly assignment is to write a minimum of a one page summary of the in-class discussions. **50%** Weekly written summary of in-class discussions. **20%** Canvas Discussion Questions. **20%** Research and presentations. **10%** Final Paper.

Policy Regarding Academic Honesty/Dishonesty	In addition to "General Policies for Landscape Architecture Courses" refer to the University statement on academic honesty in the General Catalogue, section "Student Rights and Responsibility. " If you are caught cheating you will automatically receive an F for the course, you will be subject to maximum penalties of the University and you will be barred from participation in the course for the remainder of the semester. **Honor Pledge** This course will adhere to the Academic Integrity Policy of the Colorado State University General Catalog and the Student Conduct Code. ALL graded activities of the course will comply. • I pledge on my honor that I will not receive or give any unauthorized assistance in this course and endeavor toward meaningful social and environmental responsibility. Student signature and date _____

Wk 1	August 22	Course Introduction **Assignment:** Read *Part 1 – Nature of Theory in Landscape Architecture, p1-31.* Swaffield, Simon (Editor). 2002. *Theory in Landscape Architecture*. University of Pennsylvania Press. Philadelphia, PA.
	August 24	In-class discussion on *Part 1 – Nature of Theory in Landscape Architecture* **Assignment:** Read *Landscape Architecture: An Apocalyptic Manifesto* By Heidi Hohmann and Joern Langhorst http://www.public.iastate.edu/~isitdead/dead_f2.pdf
Wk 2	August 29	In-class discussion on *Landscape Architecture: An Apocalyptic Manifesto.* **Assignment:** Read *Eyes that Can See and Hands the Can Make. A response.* By Elizabeth K. Meyer http://www.arch.virginia.edu/lunch/print/trespass/pdf/meyer.pdf
	August 31	In-class discussion on Meyer's response. **Assignment:** Review Landscape Architecture Foundation's *Landscape Performance Series* website. https://landscapeperformance.org/
Wk 3	September 5	In-class preview and discussion on Landscape Performance. **Assignment:** research on Benefits Toolkits https://landscapeperformance.org/benefits-toolkit?&&&keys=&
	September 7	Landscape Performance discussion with Allyson Mendenhall from Design Workshop in Denver, CO. **Assignment:** research on Benefits Toolkits https://landscapeperformance.org/benefits-toolkit?&&&keys=&
Wk 4	September 12	Student presentations/discussions on iTree- Benefits Toolkit
	September 14	Student presentations/discussions on iTree- Benefits Toolkit
Wk 5	September 19	LAF Webinar – Megan Barnes
	September 21	In-class discussion on the LAF Webinar **Assignment:** Read Part II: The Design Process. p33-72. Swaffield, Simon (Editor). 2002. *Theory in Landscape Architecture*. University of Pennsylvania Press. Philadelphia, PA.
Wk 6	September 26	In-class discussion on Part II, p33-56
	September 28	In-class discussion on Part II, p57-75
Wk 7	October 3	LPS Case Study Presentations and discussions
	October 6	LPS Case Study Presentations and discussions
Wk 8	October 10	LPS Case Study Presentations and discussions
	October 12	LPS Case Study Presentations and discussions
Wk 9	October 17	In-class discussion on Case Studies
	October 19	In-class discussion on Case Studies **Assignment:** Read *Part III: The Design Process*. p73-88. Post discussion questions on Canvas for each author. Swaffield, Simon (Editor). 2002. *Theory in Landscape Architecture*. University of Pennsylvania Press. Philadelphia, PA.

Wk 10	October 24	In-class discussion on *Part III: The Design Process*. p73-88. **Assignment:** Read *Part III: The Design Process*. p89-101. Post discussion questions on Canvas for each author. Swaffield, Simon (Editor). 2002. *Theory in Landscape Architecture*. University of Pennsylvania Press. Philadelphia, PA.
	October 26	In-class discussion on *Part III: The Design Process*. p89-101. **Assignment:** Read *Part III: The Design Process*. p102-121. Swaffield, Simon (Editor). 2002. *Theory in Landscape Architecture*. University of Pennsylvania Press. Philadelphia, PA.
Wk 11	October 31	In-class discussion on *Part III: The Design Process*. p102-121. **Assignment:** Read *Part IV: Society, Language, and the Representation of Landscape*. p123-136. Swaffield, Simon (Editor). 2002. *Theory in Landscape Architecture*. University of Pennsylvania Press. Philadelphia, PA.
	November 2	In-class discussion on *Part IV: Society, Language, and the Representation of Landscape*. p123-136. **Assignment:** Read *Part IV: Society, Language, and the Representation of Landscape*. p136-144. Swaffield, Simon (Editor). 2002. *Theory in Landscape Architecture*. University of Pennsylvania Press. Philadelphia, PA.
Wk 12	November 7	In-class discussion on Read *Part IV: Society, Language, and the Representation of Landscape*. p136-144. **Assignment:** Read *Part IV: Society, Language, and the Representation of Landscape*. p144-170. Swaffield, Simon (Editor). 2002. *Theory in Landscape Architecture*. University of Pennsylvania Press. Philadelphia, PA.
	November 9	In-class discussion on *Part IV: Society, Language, and the Representation of Landscape*. p144-170. **Assignment:** Research projects Adam Greenspan will talk about in his lecture.
Wk 13	November 14	Online lecture and discussion with Adam Greenspan about landscape performance within the design process at PWP Landscape Architecture, Inc. **Assignment:** Read *Part V: Ecological Design and the Aesthetics of Sustainability*. p171-187. Swaffield, Simon (Editor). 2002. *Theory in Landscape Architecture*. University of Pennsylvania Press. Philadelphia, PA.
	November 16	In-class discussion on the presentation by Adam Greenspan. **Assignment:** Read *Part V: Ecological Design and the Aesthetics of Sustainability*. p171-206. Swaffield, Simon (Editor). 2002. *Theory in Landscape Architecture*. University of Pennsylvania Press. Philadelphia, PA.
Wk 14	November 21	FALL BREAK – no class
	November 23	FALL BREAK – no class
Wk 15	November 28	In-class discussion on *Part V: Ecological Design and the Aesthetics of Sustainability*. p171-206. **Assignment:** Read *Part VI: Integrating Site, Place, and Region + Conclusion*. P207-230.

		Swaffield, Simon (Editor). 2002. *Theory in Landscape Architecture*. University of Pennsylvania Press. Philadelphia, PA.
	November 30	In-class discussion on Read *Part VI: Integrating Site, Place, and Region + Conclusion.* P207-230. **Assignment:** Read *High Performance Landscape Guidelines: 21st Century Parks for NY*. p1-18, 52-83. https://www.nycgovparks.org/sub_about/sustainable_parks/design_guidelines.pdf
Wk 16	December 5	In-class discussion on *High Performance Landscape Guidelines: 21st Century Parks for NY*. p1-18
	December 7	In-class discussion on *High Performance Landscape Guidelines: 21st Century Parks for NY*. p52-83. Course summary discussion

Final Meeting: Monday, December 11 @ 9:40-11:40am. Final Paper Due.

UT DALLAS LANDSCAPE ENHANCEMENTS
PWP LANDSCAPE ARCHITECTS

LAF Performance Series Case Studies

Taylor Dave, Sydnie Kroneberger,
Vinnie Martinelli, Jessica Ricalde

VISION

Through the first phase of the University of Texas at Dallas' Campus Identity and Landscape Framework Plan, native plantings and walkable areas transformed the car-centric barren asphalt campus into one of architectural stability, forward-thinking greenery, and a social hub of the community.

ISSUES

- Foster connections and social interaction
- Become a place of curiosity and increase in desire for student retention and application rate
- Redesign the formal main entrance
- Increase quality of stormwater runoff and retention

METHODOLOGY

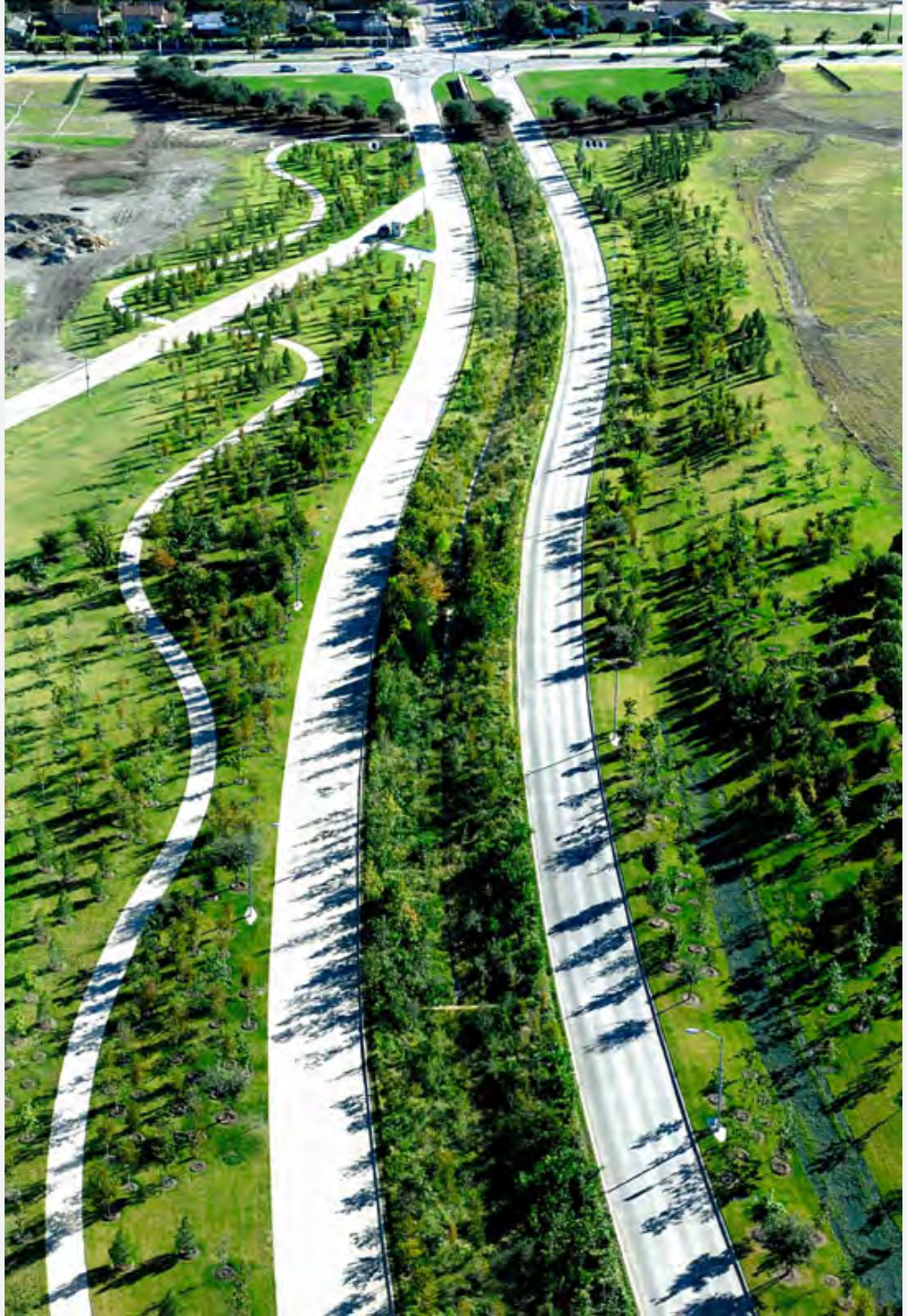
The UT Dallas team designed its research strategy under three focused thematic areas;

Environmental

Economic

Social (including cultural and aesthetic)

for all three case studies.



FINDINGS

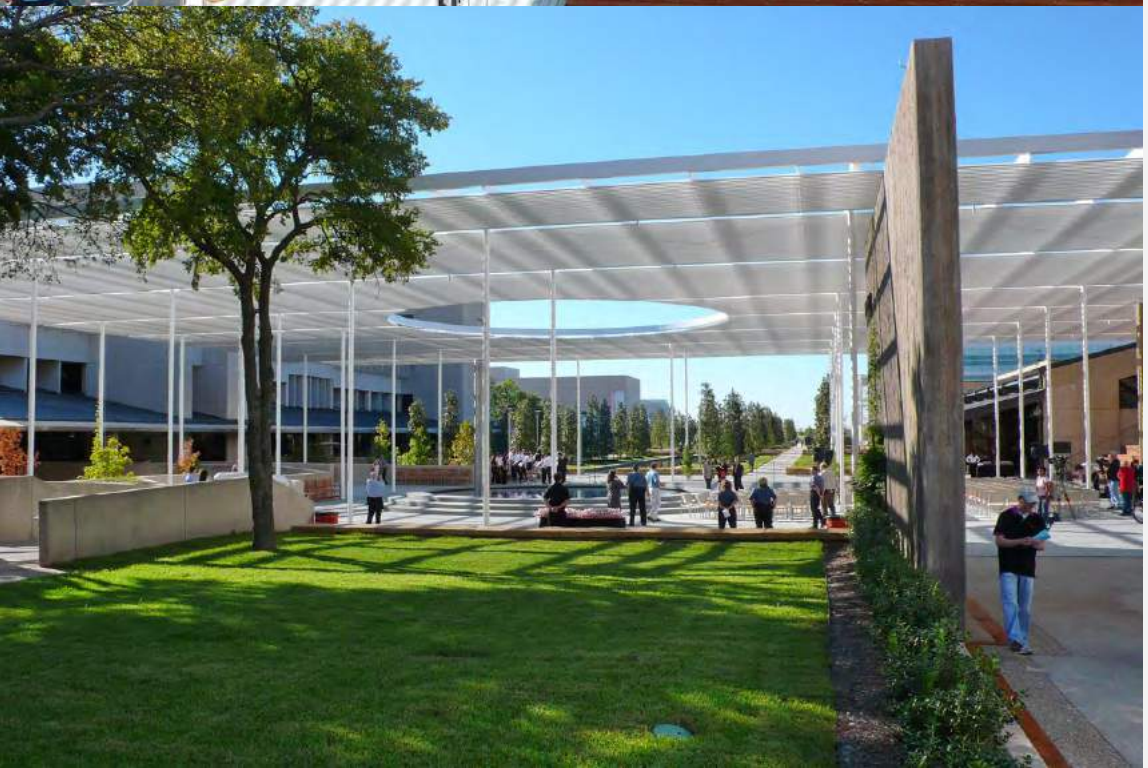
The findings of the investigations in all cases focused on

- Site related performance benefits
- Its immediate adjacencies
- The project block group/neighborhood/district or zip code.

The data collected through these strategies were systematically reviewed.

METRICS

- The carbon sequestered is calculated with National Tree Benefit Calculator.
- The number of miles a motorized vehicle travels in a year was found at Federal Highway Administration (FHWA) website (recorded since 2010) with the carbon calculator (americanforests.org).
- The stormwater runoff is calculated with Rational Method (Q=CiA). The Co-efficient numbers for different materials is referenced from the LARE reference manual.
- The watersheds considered for calculations were referred from the documents provided by the firm. Three kinds of areas (bio-retention area, pervious surfaces area and impervious surfaces area) were calculated.



ACCOMPLISHMENTS

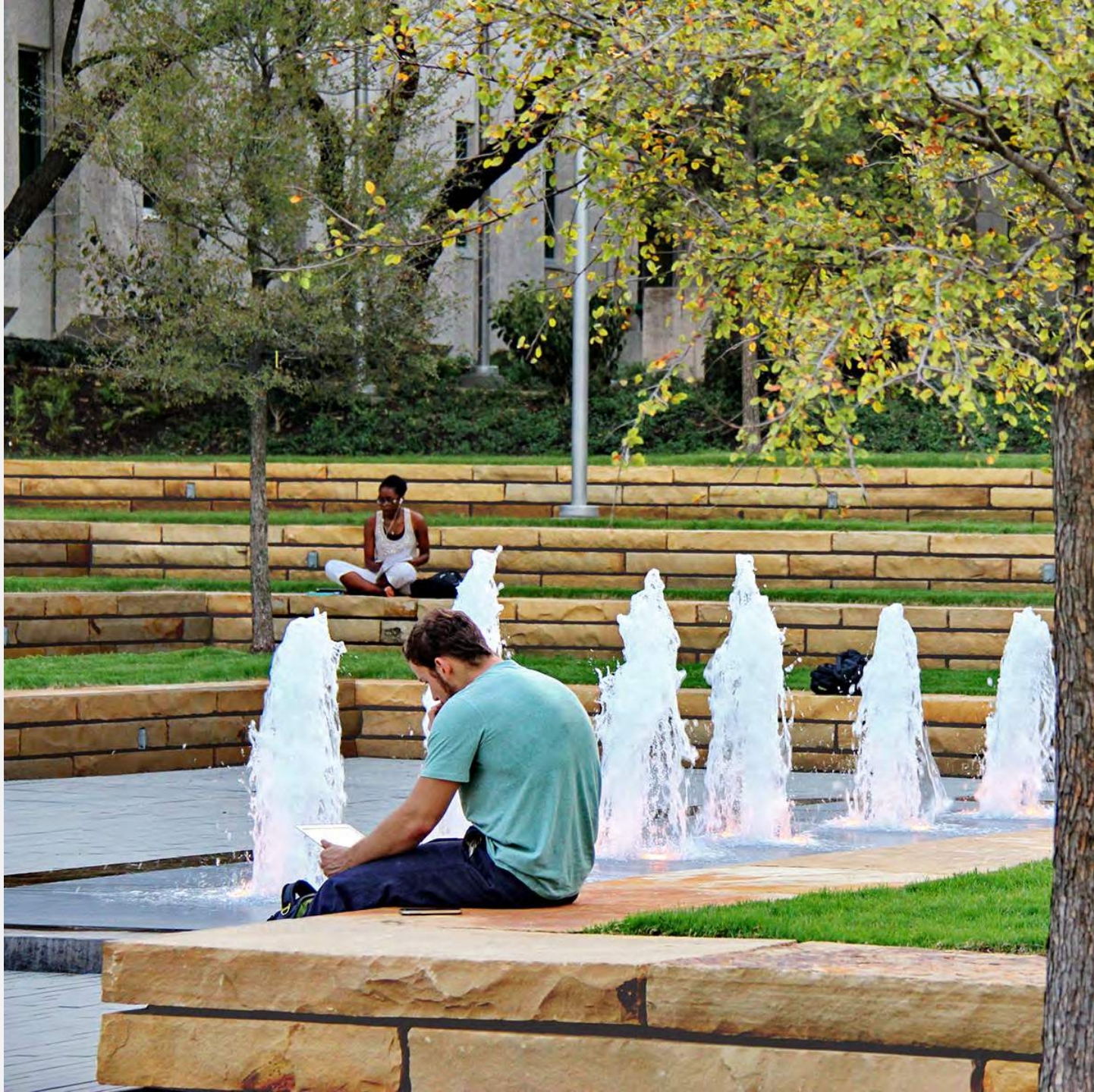
- Influenced decision 44% of students surveyed to apply and enroll. Also, likely contributed to a 13% increase in enrollment from 2010 to 2012.
- Source of pride for the community, students, faculty, etc.
- Increase in 5,000 trees (sequesters 154 tons of CO2 annually- equivalent to the CO2 emitted from driving approximately 373,494 miles in a single passenger vehicle, intercepts approximately 1,077,946 gallons of stormwater runoff annually.)

ACCOMPLISHMENTS

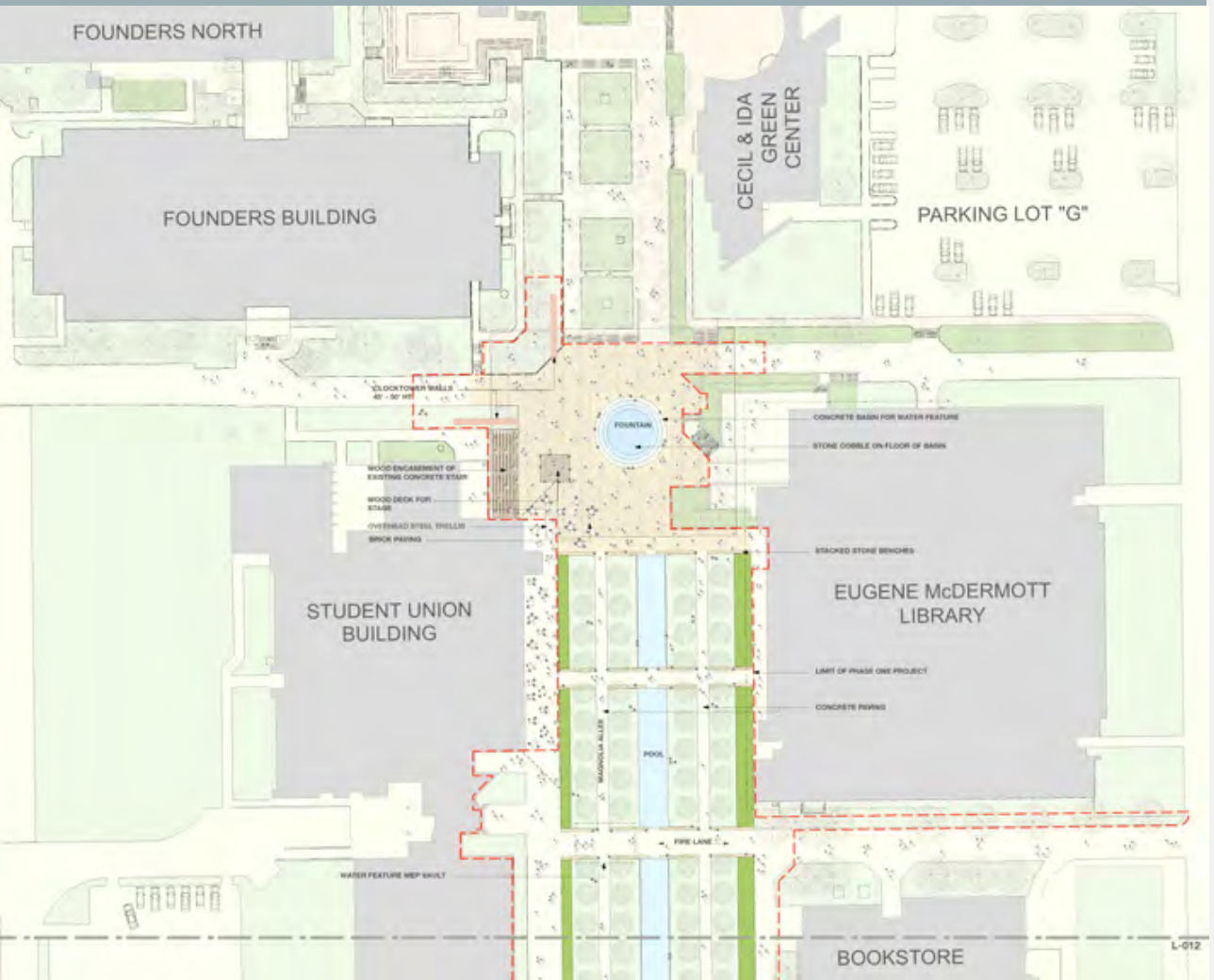
- Contains one of the largest rain gardens in the Dallas Fort Worth region.
- Increase in seating and recreational objects (256-sf, human-scale chess boards and 1,112 linear ft. of seat wall made of Austin-sourced granite, large walls as bulletin boards).
- Strong relationships in design to the history (digital clock walls to tie to instruments legacy, fog fountain to mist vines).

ACCOMPLISHMENTS

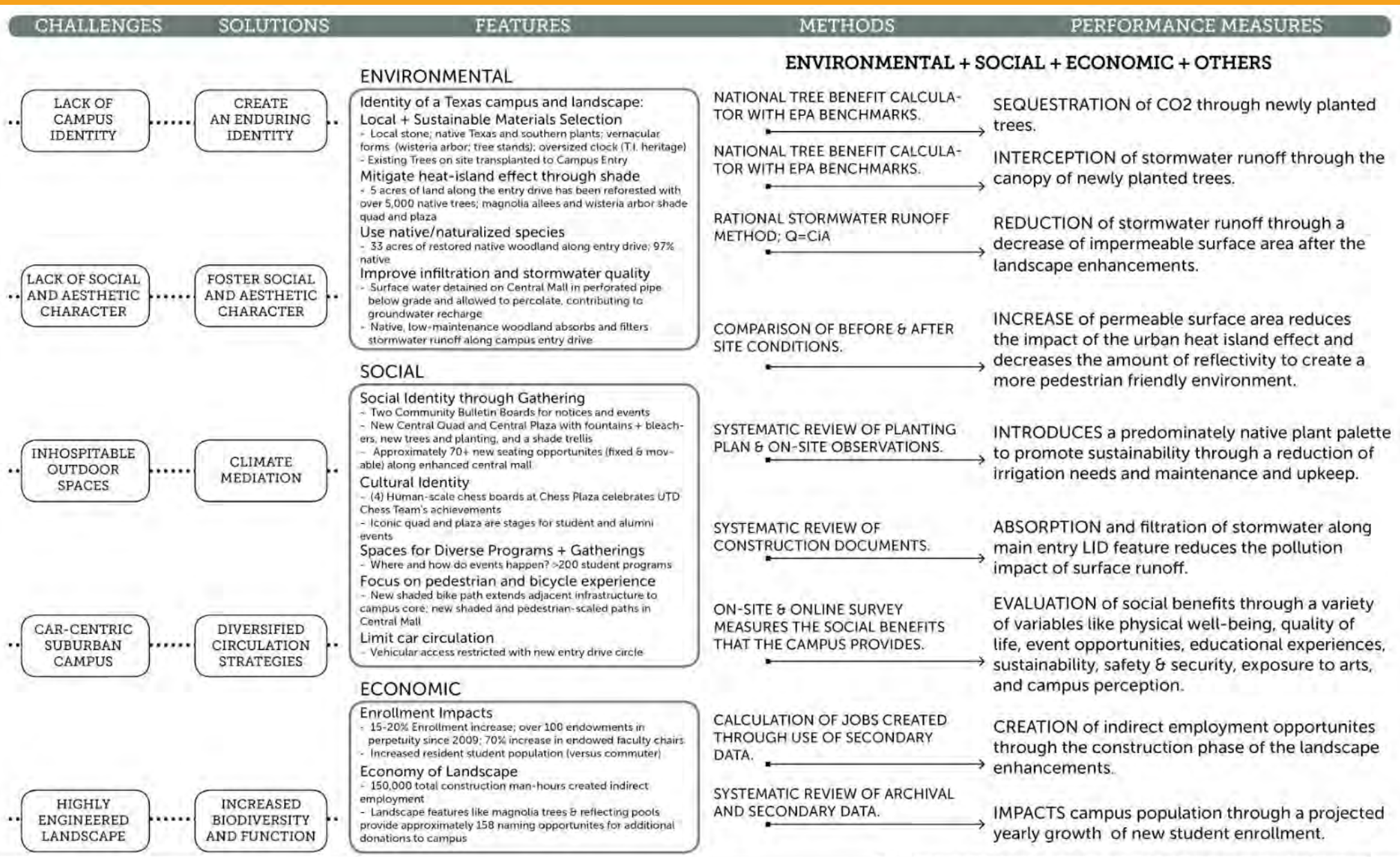
- Low carbon-footprint materials.
- New amphitheater.
- 97% native plant palette (reduce maintenance and irrigation costs).
- Created an estimated 72 jobs with approximately 150,000 construction man-hours documented for the time period between October 2008 to October 2010.



COMPARISONS



PROS	CONS
Central trellis materials: •Major sculptural element •Fiberglass Reinforced Polymer (FRP) •79% weight difference (lighter than standard industry materials) •Lower dead load, limited corrodibility, and a lifespan that is approximately twice as long a conventional metal building material	•Cost of installation may be up to 20% higher than typical industry standards
•Research into economic changes	•Economic changes was indirect and not as informative as researcher desired
•Able to use the tree benefit calculator tool	•Plants aren't fully matured- hard to get concise evidence on water retention and stormwater runoff interception
•Watersheds calculated by the firm	•Potential for human error in area calculations •Calculations may vary significantly and produce different results; especially if the porosity of the soil changes and if the bio-retention area has an outflow or any kind of perforated pipes
•Surveys conducted about enrollment decisions and campus improvement opinions to minimize bias	•Survey conducted over the summer months and nearly half of the respondents were employees, while the other half was students


CHALLENGES
SOLUTIONS
FEATURES
METHODS
PERFORMANCE MEASURES
ENVIRONMENTAL + SOCIAL + ECONOMIC + OTHERS
LACK OF CAMPUS IDENTITY
CREATE AN ENDURING IDENTITY
LACK OF SOCIAL AND AESTHETIC CHARACTER
FOSTER SOCIAL AND AESTHETIC CHARACTER
INHOSPITABLE OUTDOOR SPACES
CLIMATE MEDIATION
CAR-CENTRIC SUBURBAN CAMPUS
DIVERSIFIED CIRCULATION STRATEGIES
HIGHLY ENGINEERED LANDSCAPE
INCREASED BIODIVERSITY AND FUNCTION
ENVIRONMENTAL
Identity of a Texas campus and landscape:
Local + Sustainable Materials Selection
- Local stone; native Texas and southern plants; vernacular forms (wisteria arbor; tree stands); oversized clock (T.I. heritage)
- Existing Trees on site transplanted to Campus Entry
Mitigate heat-island effect through shade
- 5 acres of land along the entry drive has been reforested with over 5,000 native trees; magnolia allees and wisteria arbor shade quad and plaza
Use native/naturalized species
- 33 acres of restored native woodland along entry drive; 97% native
Improve infiltration and stormwater quality
- Surface water detained on Central Mall in perforated pipe below grade and allowed to percolate, contributing to groundwater recharge
- Native, low-maintenance woodland absorbs and filters stormwater runoff along campus entry drive
SOCIAL
Social Identity through Gathering
- Two Community Bulletin Boards for notices and events
- New Central Quad and Central Plaza with fountains + bleachers, new trees and planting, and a shade trellis
- Approximately 70+ new seating opportunites (fixed & movable) along enhanced central mall
Cultural Identity
- (4) Human-scale chess boards at Chess Plaza celebrates UTD Chess Team's achievements
- Iconic quad and plaza are stages for student and alumni events
Spaces for Diverse Programs + Gatherings
- Where and how do events happen? >200 student programs
Focus on pedestrian and bicycle experience
- New shaded bike path extends adjacent infrastructure to campus core; new shaded and pedestrian-scaled paths in Central Mall
Limit car circulation
- Vehicular access restricted with new entry drive circle
ECONOMIC
Enrollment Impacts
- 15-20% Enrollment increase; over 100 endowments in perpetuity since 2009; 70% increase in endowed faculty chairs
- Increased resident student population (versus commuter)
Economy of Landscape
- 150,000 total construction man-hours created indirect employment
- Landscape features like magnolia trees & reflecting pools provide approximately 158 naming opportunites for additional donations to campus
NATIONAL TREE BENEFIT CALCULATOR WITH EPA BENCHMARKS.
SEQUESTRATION of CO2 through newly planted trees.
NATIONAL TREE BENEFIT CALCULATOR WITH EPA BENCHMARKS.
INTERCEPTION of stormwater runoff through the canopy of newly planted trees.
RATIONAL STORMWATER RUNOFF METHOD; Q=CiA
REDUCTION of stormwater runoff through a decrease of impermeable surface area after the landscape enhancements.
COMPARISON OF BEFORE & AFTER SITE CONDITIONS.
INCREASE of permeable surface area reduces the impact of the urban heat island effect and decreases the amount of reflectivity to create a more pedestrian friendly environment.
SYSTEMATIC REVIEW OF PLANTING PLAN & ON-SITE OBSERVATIONS.
INTRODUCES a predominately native plant palette to promote sustainability through a reduction of irrigation needs and maintenance and upkeep.
SYSTEMATIC REVIEW OF CONSTRUCTION DOCUMENTS.
ABSORPTION and filtration of stormwater along main entry LID feature reduces the pollution impact of surface runoff.
ON-SITE & ONLINE SURVEY MEASURES THE SOCIAL BENEFITS THAT THE CAMPUS PROVIDES.
EVALUATION of social benefits through a variety of variables like physical well-being, quality of life, event opportunities, educational experiences, sustainability, safety & security, exposure to arts, and campus perception.
CALCULATION OF JOBS CREATED THROUGH USE OF SECONDARY DATA.
CREATION of indirect employment opportunites through the construction phase of the landscape enhancements.
SYSTEMATIC REVIEW OF ARCHIVAL AND SECONDARY DATA.
IMPACTS campus population through a projected yearly growth of new student enrollment.

LEARNING

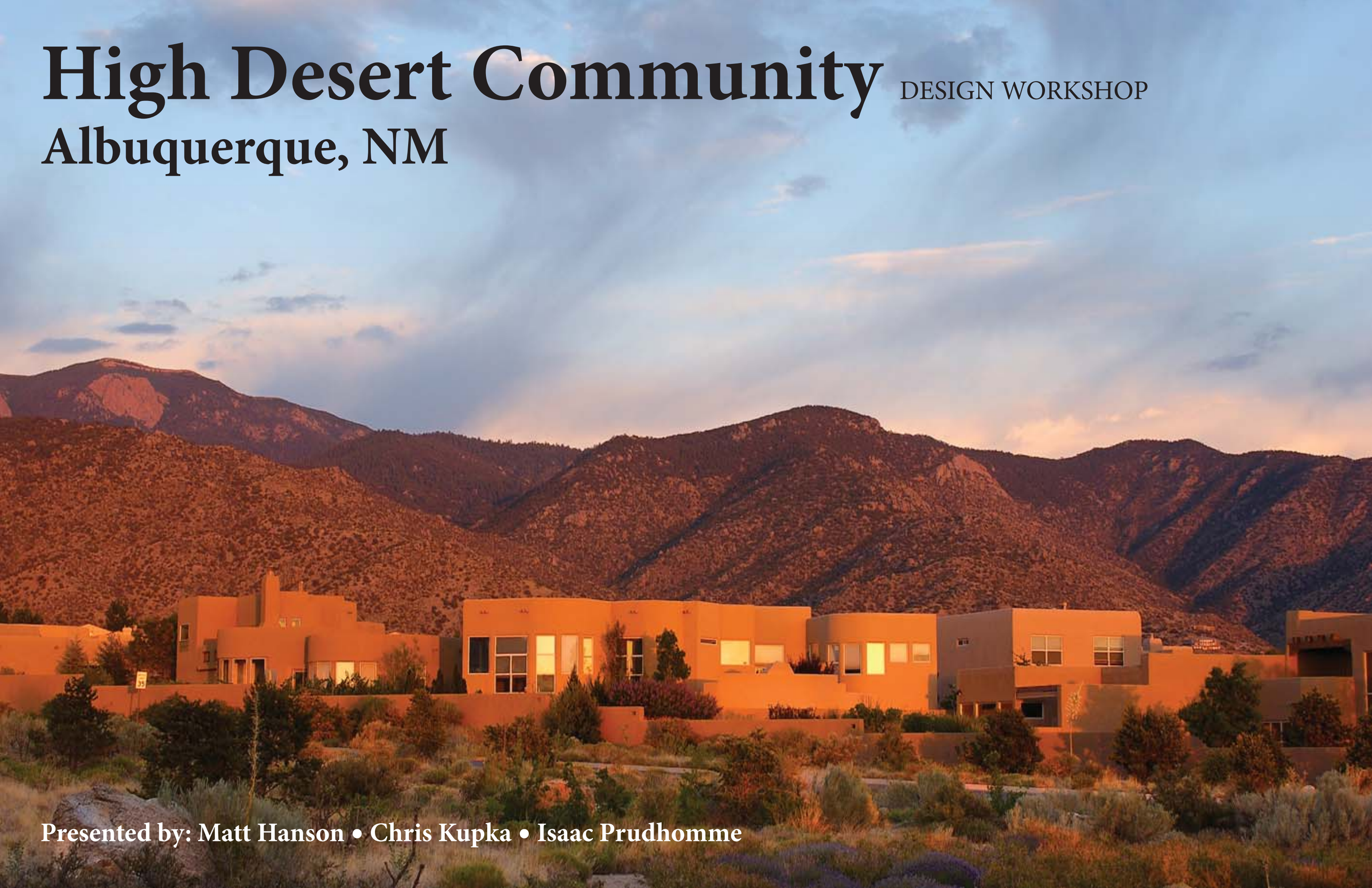
A catalysis project like phase 1 of the UT Dallas Campus Identity & Landscape Framework Plan can **instigate changes not only within the campus but also in the community at large.**

Example:

- The 'Cotton Belt' line from DART with a 'transit plaza' and mixed-use center directly north of the campus UT Dallas LPS Methodology will be activated with multi-modal connections.
- The 2025 vision has the place-holder property valued at approximately $165 million (2010).

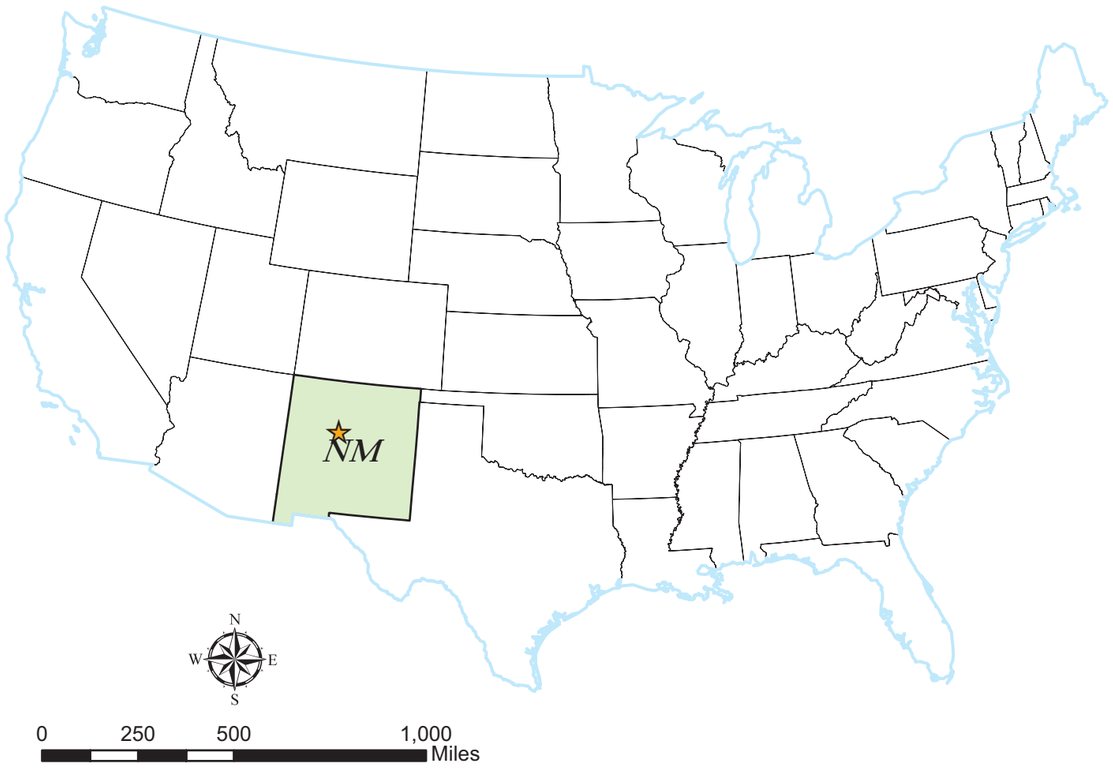
High Desert Community DESIGN WORKSHOP

Albuquerque, NM



Presented by: Matt Hanson • Chris Kupka • Isaac Prudhomme

Project Location



High Desert Community, Albuquerque, NM

- **Design Workshop**

Project Overview

- Model for sustainable master planned communities
- Low-impact design
  - > water conservation
  - > wildlife habitat restoration
  - > material recycling
  - > cultural endowment
- Altered water-conservation & landscape planting ordinances at both city & state levels
- Pioneered Design Workshop's philosophy & comprehensive approach:

  DW Legacy Design® founded on balancing:
  - > environmental sensitivity
  - > community connections
  - > artistic beauty
  - > economic viability

High Desert Community, Albuquerque, NM

- **Design Workshop**

Role of Design Workshop

- Provide leadership for all phases of the project
- Lead a multidisciplinary team including:
  - > environmental consultants
  - > civil engineers
  - > architects
- Collaborate with officials, students, & teachers from Albuquerque Academy

Challenge

- Low-impact, diverse community
- Support local natural systems & services
- Cultivate social & cultural well-being

High Desert Community, Albuquerque, NM • **Design Workshop**

Solution

- Follow the natural landscapes to determine form, density, & materials
- Conserve natural stormwater arroyos
- Avoid development in existing hydraulic paths
- Use local materials, permeable paving, native & on-site transplanted vegetation, & natural hydraulic recycling

High Desert Community, Albuquerque, NM

- **Design Workshop**

Solution

- Maximize wildlife habitat by:
  - > minimizing land disturbance
  - > enhancing ecosystems through multifunctional open space
- Cluster residential properties to:
  - > buffer existing wildlife corridors
  - > minimize impact closer to wilderness boundaries
- > maximize connectivity to existing infrastructure & cultural resources

High Desert Community, Albuquerque, NM

- **Design Workshop**

Sustainable Features

- Minimized area of disturbance on each lot
- Preserved over 62% (665 acres) of pre-development hydrology
- Uses stormwater to feed rain gardens & irrigate water-wise demonstration gardens
- Doubled biomass of critical habitat vegetation of the Juniper pinion ecotype
- Mulched public areas and open space with decomposed granite (from onsite) or recycled dam sediments
- Incorporated existing boulders into open space landscapes rather than hauling them away
- Limited street lights
- Enhanced wildlife habitat & human/wildlife connections
- Enhanced communal stewardship
- Influenced the city's Design & Construction Regulations
- Spurred regional nursery sales of native plants

High Desert Community, Albuquerque, NM

- **Design Workshop**

Environmental Methodology

Environmental Considerations

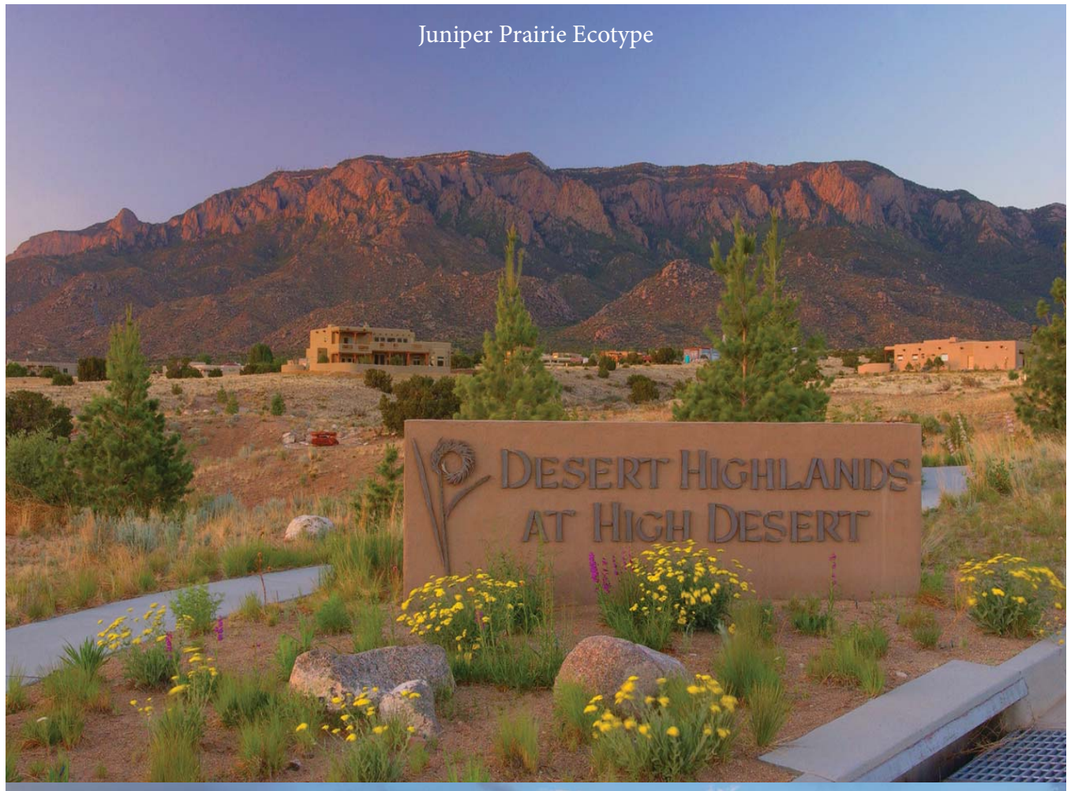
High Dessert maintains 50% of the original prairie ecotype.

How This Was Accomplished:

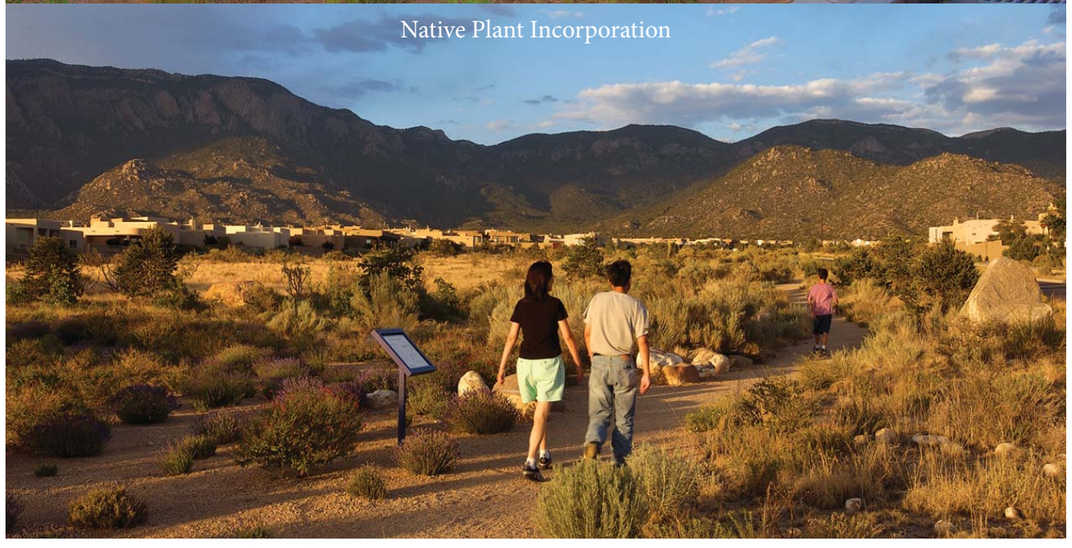
Minimizing Construction Disturbance
- Limited the area of construction zones
- Analysis over areas of importance

Hillside Cut Roads
- Roads were cut into the hillside to minimize mass grading
- Creates a smaller area of land that is being disturbed

Native Plant Palette
- Used plants native to the area
- Plants that are native are more water efficient and more likely to survive because of their adaption to the local climate



Juniper Prairie Ecotype


Native Plant Incorporation

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Environmental Methodology

Environmental Considerations

Uses only 20% of the city's annual water allowance in landscape areas, saving as much as 28.7 million gallons or $300,000 each year.

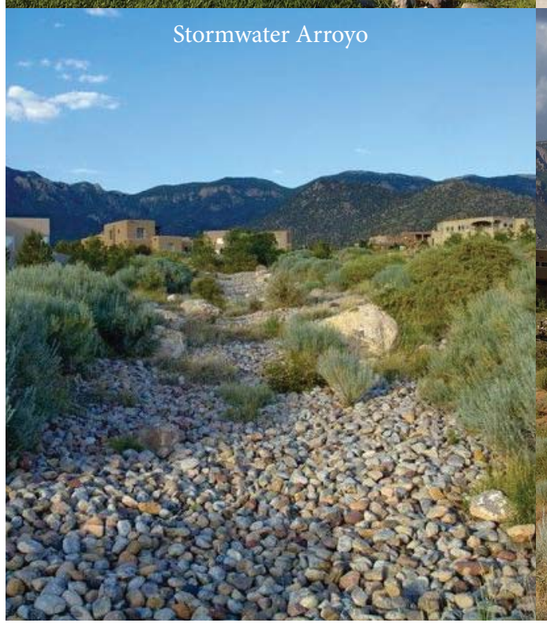
How This Was Accomplished:

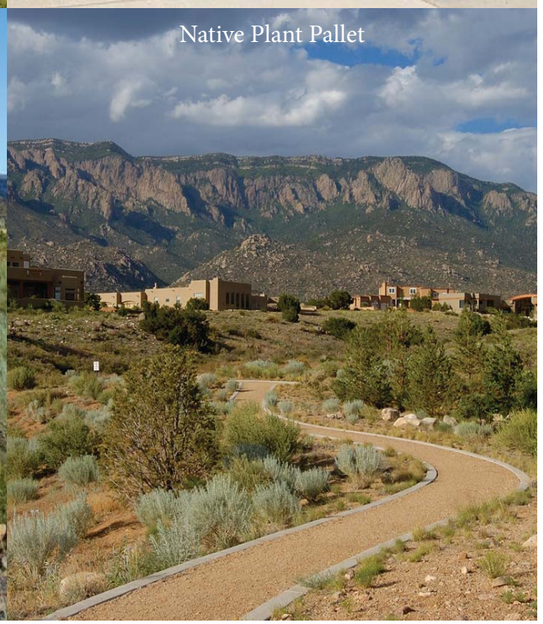
Planting Efficiently
- Native plants to the area have a much lower water intake
- Native plants are better able to adapt to adverse conditions
- Native plant pallet

Stormwater
- Effective use of stormwater collection methods
- Across site drainage between parcels of land
- Elimination of curbs and gutters allowed for a pairing with natural stomwater arroyos
- Planting areas are fed with collected water from arroyos


Environment Based Landscape


Before Environmental Considerations


Stormwater Arroyo


Native Plant Pallet

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Environmental Methodology

Environmental Considerations

Increased critical bird-breeding habitat for two endangered species, the Peregrine Falcon and the Grey Vireo, by approximately 7 acres.

How This Was Accomplished:

Minimizing Disturbance Area

- Area of disturbance were calculated for each area of the juniper prairie
- Efforts were made to minimize what area needed to be disturbed
- Disturbed areas were planted with twice the amount of vegetation that they began with

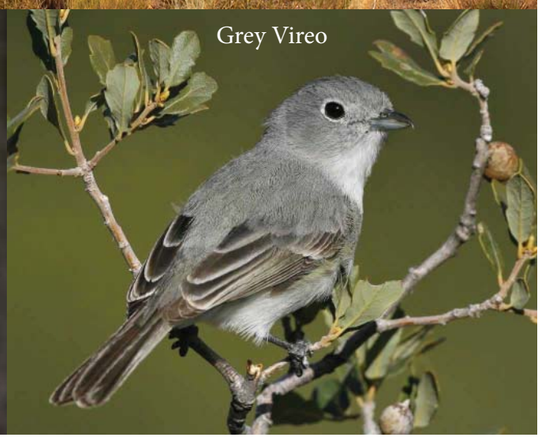
Increased carbon sequestration on the site by 170,160 tons by restoring twice the volume of vegetation that was displaced bay all areas of disturbance.

How This Was Accomplished:

Strategic Planting

- Disturbance areas got twice the amount of care and consideration when they were being replanted
- Planting double the amount made the ecosystem a more cohesive form

Peregrine Falcon



Grey Vireo

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Environmental Methodology

Environmental Considerations

Preserves the equivalent of 15,230 trees a year, by using decomposed-granite mulch instead of traditional wood chip mulch application. At a ten year lifespan, the granite mulch can save 100,000 gallons of fuel, and reduce carbon release by an estimated 617,600 tons.

How This Was Accomplished:

Keeping It Onsite

- Onsite material recycling eliminated annual reapplication of a typical 2” mulch covering
- Tree species were researched to determine which trees would most likely be milled for mulch in the region
- Trees were researched to find their density per volume to determine how many tree would be needed to get the mulch covering
- Fuel savings were determined by subtracting the difference between the two mulching methods, and calculating the dump truck fuel efficiency (8mpg diesel)
- Carbon was reduced by limiting the importation of materials from off site locations.
- Miles saved were entered into the ALG carbon calculator

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Cost Comparison

Water-efficient native plants allowed for a $300,000 saving compared to cities annual water allowance.

- Uses less than 20% of annual water allowance
- Saves as much as 28.7 million gallons

Relocation of 3,500 trees within disturbed areas saved ~$496,000 as compared to buying and planting new trees.

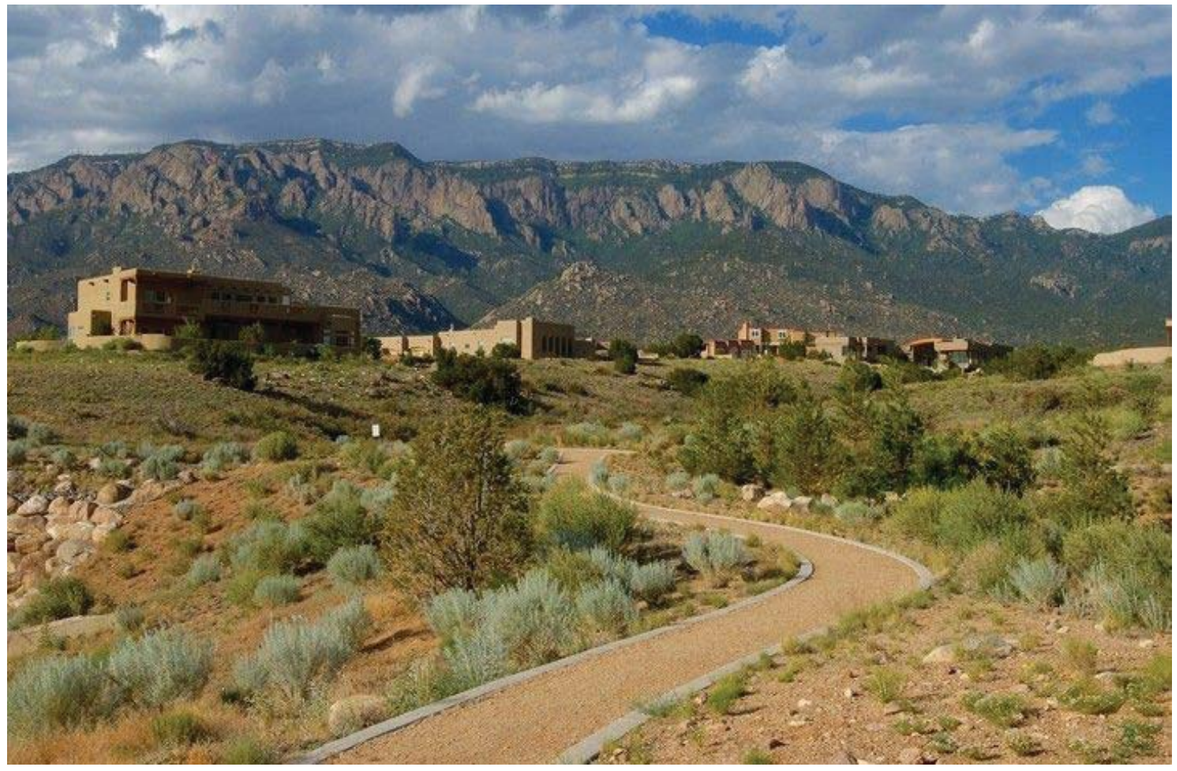
- 73% cost reduction for every tree planted
- Cost savings were determined by comparing typical balled and burlap installation prices vs transplant prices
- Cost of 6’ balled and burlapped evergreen planted = $150
- Cost of transplanted tree =$40
- Total number of trees needed 3,545
- $40 x 3,545= $141,800 vs. $150 x 3,545= $638,100
- Total savings $496,300

High Desert Community, Albuquerque, NM

- **Design Workshop**

Cost Comparison

Using decomposed granite from on site, and dam sediment dredged from the near by damn as mulch and paths the High Desert Community was able to save ~$2,530,000 over the next 10 years



Wood Mulch

- Average cost of wood mulch $25/cy
- 10,250cy needed annually
- 10,250 x $25= $256,250 annually (x 10)= $2,562,500
- Dump truck carries 5 yards
- 10,250/5= 2,050 Trips
- Nearest feasible mulch source= 40 mile round trip
- 2,050 x 40= 82,000 x 10 yr= 820,000 Trip Miles
- 820,000/8mpg= 102,500 gals of Diesel
- 102,500 x $3.56= $364,900 in fuel
- $2,562,500 + $364,900=

$2,927,400 over 10 years

Granite Mulch

- 2” granite applied= $.20/sf x 1,660,416sf=$332,083 per app.
- Needs to be applied ever 5 years $332,083 x 2= $664,166 in labor
- Dredging= $55,000
- Same amount of dump truck trips as Wood
- The dam is a 10 mile round trip
- 2,050 x 10= 20,500 Trip Miles
- 20,500/8mpg= 2,562.5 gals of Diesel
- 2,562.5 x $3.56= $9,122 in fuel
- $664,166 + $55,500 + 9,122=

$397,369 over 10 years

Note: these are the numbers provided by LAF

High Desert Community, Albuquerque, NM

- **Design Workshop**

- Public involvement & transparency are crucial to success
- Pioneering sustainable features is highly dependent on relationships with reputable manufacturers & contractors
- Must have solid baseline data & pre-construction analysis
- Continuously evaluate data calculations to test validity

High Desert Community, Albuquerque, NM

- **Design Workshop**

LAND 392_Seminar-Designed Landscapes–Theory and Criticism fall 2017
Tuesdays and Thursdays 9-9:50am Shepardson 102

Landscape Architecture Foundation - Survey

1. Since taking this course, how familiar are you with the Landscape Architecture Foundation (LAF)?
   - ☐ Never heard of it before 13%
   - ☐ Have heard of it but can't explain details 22%
   - ☐ Have heard of it and can recall specific research, scholarship, and leadership opportunities 65%

2. What was your opinion on LAF when you first learned of it?

- I think that this website is a good foundation for scientific research and learning about ecological/sustainable systems.
- I first learned of it at the beginning of college, thinking it was great that there was an organization dedicated to LA. I believed it to be like ASLA.
- I thought it was a great direction that landscape architecture was heading. It is a subject that needs to be promoted and talked about more.
- I had never hear of it before so I was interested see what it was.
- I was surprised that it is not more well-known. The case studies and the toolkit are very useful resources and should be more utilized in the profession.
- I thought it was a great site for information on different projects.
- I did not know much about it at first. My fist opinion was that it was a great site for students to use.
- Good way to share ideas.
- I didn't have much of an opinion because I didn't know much about it.
- I thought this was a great educational course on the topic.
- When I first learned about LAF, I thought it was interesting but didn't realize that it could be used as a resource to help with my designs.
- A valuable organization for the profession.
- Interactive website that teaches about landscape design.
- It seems like a great resource for measuring landscapes.
- I didn't know what is was specifically but had a general idea of what it might entail.
- When I first learned about LAF I thought it was a good research tool.
- I can find useful resources on this website.
- It's an amazing tool to help us quantify the benefits of a project.
- The case studies in LAF can help me.

- I think it holds excellent resources to study. I'm still learning it.
- It seemed to be a helpful series for evaluating landscapes and gave standards to how the profession is being viewed.

3. How familiar are you with the *landscape performance series*?
   - ☐ I now know what it is and can explain the basics 22%
   - ☐ I now know what it is and know how it may be used in studio or future professional employment 78%

4. My first impressions of landscape performance were:

- Good idea. Nice way to critically think about how we can improve our designs and landscapes.
- Learning about the case studies helps me and others how to look at other projects, learn from mistakes and successes from others. It's very educational.
- I was surprised it was not more well-known. I am impressed with how well it is organized and how easy it is to navigate.
- Amazed that there were tools so accessible to everyone.
- I really liked the learning performance series. It is cool to see a more in-depth look at designs.
- This looks interesting.
- I was wildly impressed and excited about this kind of practice.
- My first impression was it was a complicated analysis of the landscape. However I then learned it is a great, easily accessible resource.
- It's a nice tool with a lot of potential.
- It's a great tool for not only students, but also firms.
- Curiosity but sometimes confusion.
- Very interesting idea with a lot of potential. Needs serious refinement. Great for marketing.
- Seems like a useful tool.
- It could be a useful asset in the future once I had a better understanding.
- Never heard of it before but it is very interesting.
- Good set of Case Studies to show benefits of landscape architecture projects.
- Good idea but seems a little bias.
- Very academic and professional.

5. Have you used landscape performance in other coursework outside of this course?
   - ☐ Yes 26%
   - ☐ No 74%

6. Do you plan to use landscape performance in your final capstone studio project?
   - Yes 96%
   - No 4%

7. In what ways could landscape performance be utilized in your studio projects?

- Calculating the metrics of the space before and after.
- I could use many of the benefits toolkits resources such as the tree calculator for my project to help measure the sustainability and benefits of my design.
- They provide great examples for what to strive for when I am designing.
- Add depth and breadth, add environmental, economic, and social considerations to designs.
- Previous information regarding similar studio projects.
- It could be used to measure the social performance of the site, such as traffic.
- Being able to understand your site and its potential is a useful skill in designing.
- Could use it to figure out environmental benefits like carbon sequestration and storm water.
- The case studies are good examples for guiding the direction of the design process.
- Helps me understand how effective and how beneficial the ways of designing a space will be.
- Using some of the technologies (iTree calculator), and providing metrics.
- Searching ecological methods for application in my own projects.
- Evaluating the effectiveness of design decisions.
- It's going to be helpful while looking at precedents.
- It can be used to theoretically analyze a site for ecological improvements.
- Learning about budgeting and sustainable stormwater methods.
- Has precedent examples and tools for research.
- Good way to see what works and doesn't. And useful for getting a better sense in how a landscape will perform.
- Benefits calculator for benefit predictions.
- It can help with testing my site I design and to do site analysis. It will help me measure things to make the site better.
- I can use the case studies for sites similar to mine and see what did and did not work in those sites, and consider that in my design.

8. Did your review and research on the Case Studies provide guidance on "measuring" the landscape?
   - ☐ Yes 100%
   - ☐ No 0%

9. Provide examples from your Case Study research that you may be able to replicate or utilize in the future?

- Measuring sounds, soils, traffic flow, sunlight, tree count, etc. Studying how designers design and improve a site that is contaminated.
- Tree benefits, water conservation, soil quality, shade/sun/shadow.
- This provides more ideas on how to do things. What works and what doesn't?
- The impact of canopy cover.
- UT Dallas project, using vegetation and planting schemes to make behavioral changes in people and physical changes to the site.
- I would love to replicate the social improvements made by PWP to UT Dallas.
- Measuring unwanted views.
- The tree calculator and the design processes.
- The idea of a "complete street" was used in my urban design course this semester.
- Carbon sequestration, stormwater runoff calculations, noise levels, heat, humidity (relative atmospheric conditions), water use (irrigation) needs.
- Sustainable practices.
- Measuring economic performance.
- Understanding the client you are trying to attract and what their needs are and if you successfully accomplished that in your design.
- Although perhaps less "scientific", I really liked the attention paid to observations.
- Effective planting types.
- I really liked the cascade gardens projects. As it is the scale and type of design I would like to do.

10. Was the Benefits Toolkit helpful in providing opportunities for obtaining landscape metrics?
    - ☐ Yes 87%
    - ☐ No 13%

11. If Yes, how? Provide examples. If no, why? Explain further.

- It explained how different methods can be on a site to improve social, environmental and economic problems.
- Using the iTree calculator to measure benefits for the site. Need to learn more though.

- Provides tools that could be useful maybe not fully right now, but in the future on projects outside of school.
- How trees, in a measured way, can effect/improve our landscape. iTree.
- Measuring sounds, solids, traffic flow, shade, sunlight, tree count, etc.
- I used the tree benefits calculator to evaluate the benefits that a specific tree would bring on a project.
- We haven't had the opportunity to use the tools like that before so that was neat.
- It wasn't very straight forward – hard to comprehend. A lot of steps.
- Can determine the amounts of carbon sequestration and determined water saving amounts.
- iTree, Stormwater runoff calculator.
- I was able to use it in things like figuring out shadows, tree calipers, and temperature.
- I had no idea what landscape metrics could entail, and the toolkit helped my basic understanding.
- iTree to calculate shade and carbon sequestration, land value.
- I need more time to explore these toolkits.
- Helped to measure the benefits of our design.

12. List any suggestions you have regarding, 1) Including landscape performance in the additional landscape architecture curriculum, 2) Suggestions for course assignments, additional readings or tools to help you understand and use landscape performance.

- Our undergraduate program should make it required to integrate the landscape performance into studio projects.
- More emphasis on how offices look and operate around standards.
- The Benefits Toolkit would be so much more beneficial if it was organized and straight forward and useable in our own projects. It was quite complicated to understand.
- Maybe utilize the tool benefits kit on a small project during this course.
- I think landscape performance is a very important aspect of landscape architecture and should be one of the first things we learn about in the program. It's important to know how a design actually functions and how it performs services economically and environmentally.
- We should have more assignments that make us explore the benefits toolkits so that we become more familiar with it.
- Studies should be conducted for longer periods of time to really understand what happens with a site.
- It would be great to have a project where it was required to use all of the calculators.
- I feel like my main concern for landscape performance is that it is not rigorous or critical. For example, when evaluating the effectiveness of a site, in what way will our bias's as

landscape architects get in the way of how effective a landscape is. The accuracy of evaluations.

- Should also include a lesson's learned section that also provides information on projects that were unsuccessful and allows for better design in the future.
- Design a landscape using the benefits toolkit and provide a design proposal and research of why it's a good design artistically and scientifically.
- Incorporate a student section that shows how students used LAF in their studio projects or research papers.

CASCADE GARDENS CASE STUDY

KENNA, TIA, & KAITLIN

Designed by Design Workshop Inc.

At a Glance

DESIGNER
Design Workshop, Inc.

PROJECT TYPE
Single-family residence

FORMER LAND USE
Residential

LOCATION
Undisclosed
Aspen, Colorado
Map it

CLIMATE ZONE
Humid continental

SIZE
2.49 acres

BUDGET
Undisclosed

COMPLETION DATE
2009

OVERVIEW

- ➔ Tranquil High altitude residential property
- ➔ Designed to preserve the area's natural setting and ecosystem while providing outdoor amenities
- ➔ Dismantling existing house- building a new home integrated into landscape with minimal site disturbance
- ➔ Improve the existing pond in order to support fish life

The design creates a serene environment that compliments its surroundings and provides the relaxing outdoor spaces the homeowners wanted

SUSTAINABLE FEATURES

- Healthy Aquatic ecosystem
  - Complete with a pond and cascade creek
- Preserved native flora
- Deepened pond to support aquatic life
- Added riparian vegetation to improve water quality
- Used Native Materials to build outdoor space
- Minimized site disturbance
- Eliminated need for connection to municipal stormwater system
- Implemented renewable energy sources

CHALLENGES & GOALS

- ➔ Creation of viable habitat
  - ◆ Reconciled with fishing and boating requests
- ➔ Responsible disposal of the previous property materials
- ➔ Stormwater harvesting and reuse
- ➔ Aesthetic for a limited native plant palette

SOLUTIONS

- ➔ Donated all old materials and appliances from home to local charities
- ➔ Mature trees preserved the steep slopes adjacent to the home
- ➔ Swales collect stormwater and snowmelt
  - ◆ Repurposed for landscape irrigation

LANDSCAPE PERFORMANCE BENEFITS

- ➔ Blocks approximately 97.8% of unwanted views
- ➔ Sequesters 31,200 lbs of carbon annually
- ➔ Reduced the projects landfill burden by over 3,700 cubic feet
- ➔ Reduced irrigation/fertilizer needs by 60%
  - ◆ Saves 75,000 gallons of water a

METHODOLOGY (CARBON)

➔ Entered data for 44 mature Globe Willow trees and 18 Colorado Blue Spruce trees into tree value calculator to determine carbon sequestration

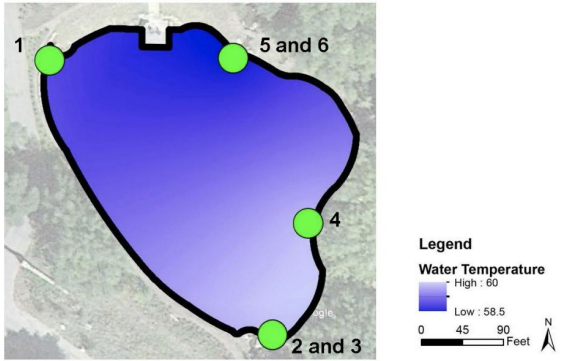
METHODOLOGY (HABITAT)

- ➔ Worked with aquatic consultants to improve existing pond
  - ◆ Performed on-site analysis of water temp., alkalinity, pH, hardness, oxygen levels
- ➔ Pond deepened to 14 feet and lined
- ➔ Added oxygenators
- ➔ Added vegetation cover, dead tree trunks and other structures for trout habitat

DATA COLLECTION

OBJECTID	on-site pH	Depth	Temperature	Time	Alkalinity	TSS (mg SS/)L	Hardness
2882| 1	7.5	3 inches	59	1:35	130	32	124.20
2883| 2	7.5	3 inches	60	1:50	150	18	118.01
2884| 3	7.5	18 inches	NA	1:50	NA	22	125.28
2885| 4	7.8	3 inches	60	1:53	175	18	136.05
2886| 5	7.5	3 inches	58.5	2:00	120	14	118.62
2887| 6	NA	18 inches	NA	2:00	NA	33	117.61

Parameter	Level
pH	6.5-8.5
Alkalinity	10-400 ppm
Hardness	>20 ppm
Dissolved Oxygen	5-12 ppm

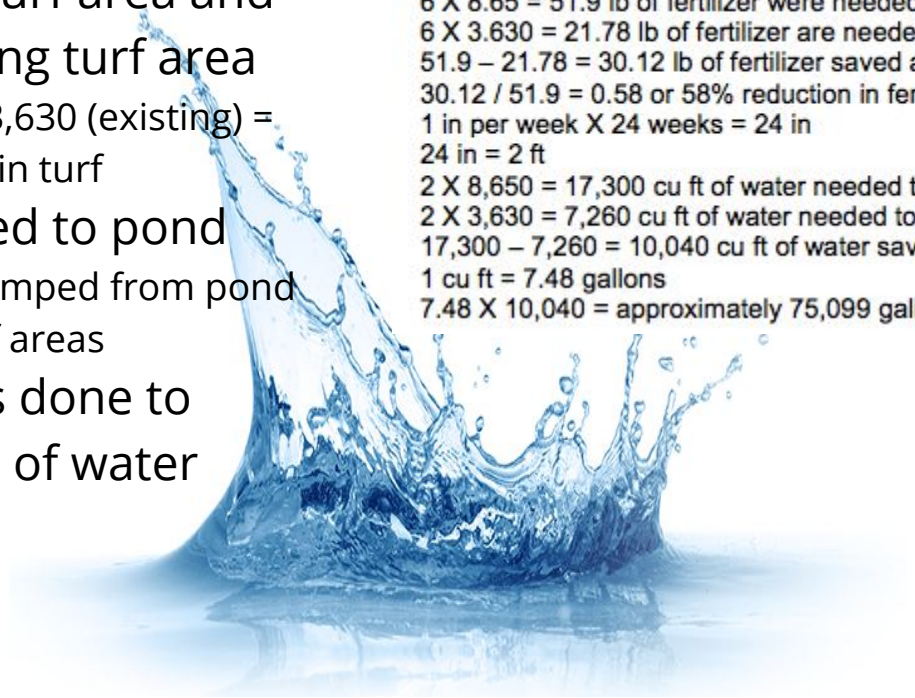


METHODOLOGY (RECYCLING)

- Average weight for Western White Pine timber was obtained from the American Wood Council
  - Weight : 27.2lb/cu ft.
  - Volume: 847.25 cu ft.
  - Total weight: 11.52 tons
- Recycling the 11.52 tons saved 20 metric tons of carbon dioxide

METHODOLOGY (WATER CONSERVATION)

- Mapped previous turf area and compared to existing turf area
  - 8,650 (previous) - 3,630 (existing) = 5,020 sf reduction in turf
- Stormwater directed to pond
  - Irrigation water pumped from pond and applied to turf areas
- Lots of calculations done to determine amount of water saved annually



2 lb / 1,000 sf X 3 times per year = 6 lb / 1,000 sf per year
6 X 8.65 = 51.9 lb of fertilizer were needed in previous condition
6 X 3.630 = 21.78 lb of fertilizer are needed in current condition
51.9 – 21.78 = 30.12 lb of fertilizer saved annually
30.12 / 51.9 = 0.58 or 58% reduction in fertilizer use
1 in per week X 24 weeks = 24 in
24 in = 2 ft
2 X 8,650 = 17,300 cu ft of water needed to irrigate previous condition
2 X 3,630 = 7,260 cu ft of water needed to irrigate current condition
17,300 – 7,260 = 10,040 cu ft of water saved annually
1 cu ft = 7.48 gallons
7.48 X 10,040 = approximately 75,099 gallons of water saved annually

METHODOLOGY (UNWANTED VIEWS)

- ➔ A road circling a large portion of the site created unwanted views of traffic
- ➔ A panoramic photo was taken from the patio as the key point of the property
- ➔ Photoshop was used to show a before and after of implementation of berms, planting, and mature trees to block views

BEFORE

AFTER

METHODOLOGY (ENERGY COST ANALYSIS)

- ➔ Installing a ground source heat pump avoided $97,000 in Pitkin County Renewal Energy Mitigation Program fees
- ➔ Heat pumps by Water Furnace = $28,000 to install
- ➔ Cost of drilling, field pipe, and grout = $55,000
- ➔ Annual Maintenance cost = $1,500 annually
- ➔ Total fees = $97,183.47
- ➔ Total cost to date = $90,5000
- ➔ **Saved roughly $7,000 for a 5 year period**