

Teaching Proposal: Landscape Architecture Foundation Landscape Performance Education Grant (LPEG), 2013-2014 Principal Investigator: Kenneth R. Brooks, FASLA, FCELA, PLA Professor of Landscape Architecture

The Design School at Arizona State University

Principal Investigator / Instructor Reflections

Background:

This project was conducted during the spring 2014 semester at The Design School at Arizona State University. The scope of the project was to explore the teaching and learning of landscape performance as a primary learning objective within the framework of the Master of Landscape Architecture thesis studio. Within the MLA program, a thesis or an applied culminating project is a core requirement in the concluding semester of the degree program. At ASU the difference between a "Thesis" and an "Applied Culminating Project" is that process and product of a "Thesis" must following standard ASU Graduate School format and procedures typical of traditional masters theses in most disciplines in most research institutions. The "Applied Culminating Project" permits the student to engage in an independent investigation in format and process that has much more flexibility in both the process and the deliverable products. Although students have the option to choose either approach (thesis or applied project), almost all choose, or are encouraged to choose the applied project format. In our School, this generally means that most of our MLA students enroll in a semester-long research project that explores a significant design issue and plies the findings of that research through a prototype design project that illustrates the application of those research findings in a professional design setting. Most of those students will enroll in a studio course that has a single faculty instructor. Some highly-capable and motivated students will be given permission by the faculty to work on their Applied Project independently of the studio with a Landscape Architecture faculty member of their choice. Each of the students will have a principle faculty critic and all of them will present and defend their work before a jury that includes the landscape architecture faculty as well as outside reviewers.

The Design School has professional studio-based masters programs in the disciplines of architecture (MArch), industrial design (MID), interior architecture (MIA), landscape architecture (MLA), visual communications design (MVCD) and urban design (MUD). Although most of these masters programs were established relatively recently, the MArch program has operated for many years and it has successfully used the applied studio project format for a culminating project for quite some time. It makes it easier to manage our programs – both in terms of communicating degree requirements to students and accountability policies with the ASU Graduate School by using these thesis/applied project options consistently for all of these degree programs across The Design School.

Our MArch and MLA programs are each accredited by the respective accrediting agencies (NAAB and LAAB). Both the MArch and the MLA degree programs have a two-year track for students that come from a professional undergraduate degree background and a three-year track that accommodates students without professional undergraduate background in the related discipline. The MUD program is structured as a post-professional degree, requiring a student to already have advanced professional education in either architecture or landscape architecture as a prerequisite to entry into the program. The instruction in the MUD program is carried out by architecture and landscape architecture faculty members of The Design School. MArch, MLA and MUD students have several overlapping courses within their curricula. Within the MLA Applied Project Studio this past spring, there were MLA and MUD students enrolled.

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Project Organization:

This LAF LPEG project was organized to use the MLA Applied Studio instructional framework to teach landscape architectural (and urban) design performance as a means of evaluation and assessment of the value and success of a design strategy. Each student enrolled in the course was assigned to select a significant critical topic of interest to base their term project on. Topics includes such issues as water management, riparian habitat, park utilization, urban infill, animal conservation, therapeutic gardens, transit, and sustainable building materials and strategies. Each student did research on their topic and explored ways that they could resolve problems, enhance design benefits and contribute to a quadruple bottom line outcome as demonstrated in a prototype design project. As a prototype project, the design needs to become a role-model or exemplar for applying the design strategies in other similar situations. The students also had to evaluate their final designs with a framework that identified the performance benefits of the design relative to the primary issue being studied. The goal of the project was to optimize design on the issue of special interest, and not necessarily endeavor to optimize on all possible issues.

Another major component of this LPEG project was the creation of an integrated seminar course dedicated to the topic of "Design Performance" that formally met for an hour each week to explore and discuss issues, philosophies, history and strategies for using "Design Performance" tools and techniques in evaluating, enhancing and promoting better design. We used the terminology "Design Performance" in place of "Landscape Performance" to give a broader transdisciplinary perspective more broadly accommodating to all of the disciplines in The Design School. Obviously, if the nature of the "design" is applied to landscapes or landscape architecture, we are implying "landscape performance."

By structuring and scheduling the Seminar within the clock hours of the Studio, we could guarantee participation of all of the studio participants in the Seminar. By making it quasi-independent, we could accommodate participation by some other students who were not a part of the Studio, but wanted to participate in the discussions and activities of the Seminar.

The official enrollment in the studio included 10 MLA students and 2 MUD students. We also had 2 MLA students who were working on "Independent Applied Projects" parallel with the studio. Although those 2 students were not required to participate in the studio, they did participate in the monthly mid-semester critiques and final presentations, just like all of the other MLA students. All 14 of these students participated in the Seminar, as did two other non-degree graduate students not enrolled in studio courses. One of those other two students is the ASU campus landscape architect who also serves in an adjunct teaching capacity with The Design School. The second non-degree graduate student is a person who's undergraduate degree is in Architectural Studies from our School and she also has a Master of Education and she currently serves as one of the staff members coordinating student development in our College.

The activities of the seminar included reading and discussing topics of design performance based on the book *Urban Design and the Bottom Line: Optimizing the Return on Perception*, by Dennis Jerke, Douglas R. Porter and Terry J. Lassar and published by ULI in 2008. Another activity of the seminar was to participate in the LAF Webinar on March 20, 2014, on incorporating landscape performance research into design, presented by Allyson Mendenhall, PLA, Associate, Director of DW Legacy Design; Design Workshop; Deb Mitchell, FASLA, PLA, Senior Vice President, SmithGroupJJR; and Skip Graffam, ASLA, PLA, Partner, Director of Research, OLIN. Students discussed the nature of the quadruple bottom line as advocated by Jerke (economic, ecological, social and aesthetic – sometimes referred to by others as Planet, Profit, People and Poetics) and sought way to demonstrate quadruple-bottom-line benefits into their own projects. Samples of some of the presentation materials from the seminar are included in the Illustrative Vignettes Folder of the submitted materials. Another reference of applied professional work was the project work from Ayers Saint Gross for the City of Washington, DC for their The Sustainable DC Plan (http://sustainable.dc.gov/finalplan).



The Studio Project Topics:

There were 14 projects, each with a different agenda of critical issues and problems to solve, developed by the students during the semester. The projects are described below. Most of the students have given me permission to use their name in crediting their work. Where I don't have such written permission, the student author remains anonymous. The deliverables for the applied studio project for the term were a set of three documents: 1) an illustrated oral presentation (a Powerpoint/pdf file presented by the student to a jury of professional reviewers); 2) a text and image document that could be read by an interested reviewer; and 3) a poster (dimensions 2' x 6') promoting the project. Some selected samples of the work have been provided with these reports.

The student projects:

Carol Kegley (MLA) **"Urban wetlands provide ecosystem services by re-using wastewater."** This is a proposal for an adaptive water strategy recycling wastewater through constructed urban wetlands and reusing it to generate an attractive and climate mitigating landscape for downtown Phoenix. This is one way towards conserving the fresh water supply while providing ecosystem services for people and the environment and creating a healthier downtown Phoenix.

Toby Roanhorse (MLA) *"Integrating traditional knowledge with dry wetland restoration"* A riparian area is ecologically rehabilitated in a manner that is culturally sensitive to a resident indigenous American Indian community using traditional ecological knowledge (TEK).

Christine Kimple (MLA) **"Dust Control Management."** Due to mismanagement of land use and climate change the hazards from dust will be ever increasing. The dangers are not only here in the Arizona, but also in other places in the world. Dust Control Management doesn't have a simple applied solution. It is a complex problem that manifests itself on multiple levels. Finding efficient ways to tackle land sources of dust and creating environments for focused investigation and research can influence our policy, knowledge and practice.

Melodii Zhu (MLA) *"Promoting Utilization Rates of Urban Neighborhood Parks."* Neighborhood park is a self expression of the community. It is a strong icon linking the relationship among neighbors. Low utilization rate is a common issue happens in most of our urban parks. Even though each park is serving thousands of residents, less than 20% of them really use the park. By providing flexible functions, neighborhood parks could serve multi-generations. The benefit of the project is to encourage social interaction, enhance personal health and create internal enjoyment.

Anonymous (MUD) **"Downtown East Revitalization through start-up economy."** The proposed project aims to establish a new innovation hub east of down town which cultivates strong entrepreneurship, harness creativity, lower economic barriers, and generate productive energy with healthy, inspiring environments.

Anonymous (MUD) *"Entertainment and Cultural District in Downtown Phoenix."* To build connection between the downtown phoenix and warehouse district and Southern neighborhood by incorporating entertainment, cultural and appropriate mix of other land uses and bring back the liveliness of the district which is lost in time.

Anonymous (MLA) *"Connecting stormwater infrastructure to natural hydrologic system in a xeric environments."* Urban runoff outfall is used to charge a rehabilitated riparian area.



Anonymous (MLA) *"Principles of therapeutic gardens and their application to a park hiking trail.*" Healing gardens are fast becoming a place of refuge for urbanites from the daily grind and the stressors that accompany our fast-paced world. Gardens in urban spaces may improve the overall health and well-being of individuals and thus communities as a whole. Evidence-based design can help us rediscover increased happiness and well-being of our mind-body-spirit as a whole with the healing powers of nature.

Jesse Westad (MLA) *"Green wall applications in the arid Southwest."* The rapid urbanization of the arid southwest has led to an increase in the urban heat island effect, a decrease in nature, irresponsible building practices, as well as noise and air pollution. Now that these systems are already in place how do we use nature to help mitigate these issues in the built environment? My project will focus on the applicability of green walls and how through proper usage can provide a very valuable asset to the urban dweller.

Cris Portugal (MLA) *"Using art to encourage community engagement in a south Phoenix TOD development zone."* A transit-oriented development node is created in south Phoenix that enhances the cultural and artistic heritage of the community.

Starin Butler (MLA) *"Exemplary Zoo Exhibit Design".* A well-designed zoo exhibit can help urban zoos fulfill their roles as wildlife conservation and education centers. By creating a zoo exhibit rubric, landscape architects and zoo officials will have the tools they need to assess, evaluate, and design exemplary zoo exhibits.

Jose Quintana (MLA) *"Creating great streets that promote smart paving systems – a pedestrian mall on the ASU campus."* An exploration of the sustainability characteristics of local hardscape materials and paving systems, demonstrated in a prototype design for a pedestrian streetscape on a campus.

Anonymous (MLA) *"Symbiotic school garden model."* An exploration of community gardening, environmental education, local food production within an educational system that provides vocational training, healthy living and economic opportunities to disadvantaged youth.

Anonymous (MLA) *"Arizona capital mall redevelopment with augmented reality enhancements".* Upgrading an existing urban landscape to enhance the narrative, function, and economic well-being of the pedestrian environment.

Student Work Evaluation and Critique:

During the semester, students has regular desk critiques during studio production time. At regular intervals, all students make semi-formal progress presentations to a review panel made up of faculty. These faculty members included the regular landscape architecture faculty, some adjunct faculty members, several of the architecture/urban design faculty and occasionally critics from outside the university. These may have been public officials serving a "client role" for a specific project or they may have been technical or professional experts providing additional mentoring in a particular student's project. These monthly progress reviews were scheduled and announced from the beginning of the course and were designated as open, public reviews.

Towards the end of the semester, we held a review with a couple of invited outside critics. Those critics were Ms. Astric Sykes, Associate of the firm of Mia Lehrer and Duane Blossom, FASLA, recently retired from Todd Associates. At the end of the term, our distinguished review panel included (in addition to faculty members), Dr. Mary Myers of Temple University and an LAF CSI & LPEG Fellow; Mr. Jay Hicks, ASLA of Logan-Simpson Design; and Mr. Chris Brown, FASLA of Floor Associates.

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Project Assessment:

I would make the judgment that the project was a success. The students engaged critical issues of interest to the profession and developed design strategies to illustrate resolving or advancing our understanding of those issues. Their projects were conducted professionally. I expect several of the projects to be entered into ASLA design awards programs at the state and national levels. Several have already been recognized for "Design Excellence" within The Design School. I also expect for one to three papers presented in a forum such as the CELA annual conference to come out of this work.

What did we do well? The structure of the project, with both a studio component and a seminar component, provided a framework for engaging the issues both intellectually and in hands-on professional, activity-based problem-solving settings. Including people who were not regularly enrolled thesis/applied project students into the discussion enhanced the richness of the learning environment (these other people included the other members of the landscape architecture faculty – both regular and adjunct; other graduate students who were not enrolled in the studio portion; community experts or "clients"; and outstanding experience professionals serving on the juries.

I believe that the project demonstrated that the consideration of design benefits perspective or an evidence-based design approach could be incorporated as one of the important learning objectives of most intermediate or advanced courses. I our case, the studio had a very broad and flexibly wide agenda, but it would be possible to make performance benefits a component of courses with a narrower learning agenda (including courses focusing on planting design, urban design, recreation planning, infill, brownfields reclamation, sustainable landscape construction or other similar professional specialties).

How could we improve the course?

I believe that incorporating learning objectives related to design performance, evidence-based design, and research-informed design into the thesis/applied project course on a regular and permanent basis is both justified and critical to advancing the capacity of the students to bring such skills to their professional settings. Celebrating the joy of discovery and a design well-crafted will put such students in a position of providing vision and leadership to their firms/agencies, professions and their service to society and the environment.

It would be difficult to justify making the course projects longer than the semester, giving the general tightness within the curriculum, but it might help students prepare for this semester by having an orientation session early in the fall semester so that they could begin planning and exploring ideas for possible thesis/applied projects before they begin the semester.

It might also enhance their confidence and competence in developing skill and experience with various design benefit tools to create a series of demonstration projects that give them some hands-on experience with various benefit calculation tools (either early within the course or earlier throughout the curriculum).

I believe that one of the goals of a thesis/applied project should be the expectation for a systematic or structured sharing of the information in ways that encourages and facilitates peer review. To that end, creating a format for sharing project findings would enhance the exchange of information from such student projects.

Kenneth R Brook

Kenneth R. Brooks, FASLA, FCELA, RLA Professor of Landscape Architecture Kenneth.Brooks@asu.edu

The Design School PO Box 871605, Tempe, AZ 85287-1605 480.965.3536 Fax: 480.965.0968 design.asu.edu



Teaching Proposal:

Landscape Architecture Foundation Landscape Performance Education Grant, 2013-2014

Proposed by: Kenneth R. Brooks, FASLA, FCELA, PLA Professor of Landscape Architecture The Design School at Arizona State University

Project Organization:

The proposal is organized around the work of two integrated and interactive courses – an advanced MLA design studio and an advanced graduate studio – each of them taught within the interdisciplinary Design School that is the home of the accredited BSLA and MLA programs at ASU. The LDE 690 Studio is the final studio in the MLA core curriculum with a focus on applied project design that serves as the "thesis" project for the MLA degree. The applied project is typically a complex, systems-based design exploration focusing on a topic mutually agreeable to the student and the faculty and related to the strengths and mission of the program. The projects will require the student to integrate comprehensive design skill and experience with research methods appropriate to the project to resolve and advocate for their particular design challenge. The work is mentored by the instructor (in this case, Brooks) and juried and critiqued by the whole landscape architecture faculty. This year there will be a special emphasis on the application of principles of evidence-based design and the concepts of design performance, design value and design assessment. Past projects have addressed such topics as urban forestry (an ASLA student winner), neighborhood water recycling (another ASLA student winner), complete streets, stormwater management, solar power farms (resulting in an invited paper at a national solar conference), the psychological sense of engagement with the neighborhood correlated to residential architectural styles (resulting in an invited paper to a CELA conference), riparian habitat restoration, pedestrian streetscapes and other topics related to urban design and resource planning and management.

The Seminar course (LPH 590) will be taught as an advanced graduate elective course with the fundamental purpose of exploring the concepts of design performance evaluation and advocacy. To that end, the students, instructor and guests will research, refine and retell the story about our advances in the systematic process of articulating, evaluating and advocating quality design strategies and outcomes. We will apply the practices of case study, post-occupancy evaluation, and other research methods to demonstrate the practices of evidence-based design applied in the interests of improving and enhancing environmental, economic, social, cultural, and aesthetic contexts. The seminar will then move to explore and develop pedagogic methods, strategies and materials for educating professional design students, practitioners, design educators, public policy decision-makers, and general public about best practices for applying performance-based design and evaluating design contributions on the basis of the breadth and depth of the services or values provided by such design.

Learning Outcomes:

For the studio course (LDE 690), the Learning Outcomes are:

- identification and exploration of significant design topics worthy of MLA theses
- precedent and case studies relevant to the issue(s)
- research into alternative approaches for resolving the design issues
- development of evidence-based design solutions
 - with assessments that illustrate performance values

For the seminar course (LPH 590), the Learning Outcomes are:

- exploration of the history and concepts of evidence-based and performance-based design
- exploration and demonstration of the application of design performance evaluation
- exploration and demonstration of the best practices in pedagogy related to development, delivery and assessment of professional course, curricula, and program content
- development of instructional materials advancing the teaching of design performance

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Learning Outcomes (continued):

Topics of discussion related to design performance will include:

- Traditional, historic and/or conventional concepts of design performance evaluation:
 - Vitruvius "firmness, commodity & delight"
 - Sullivan/Wright "form follows function"; "form and function are one"
 - Precedence-based design
 - AIA: "Standard of Practice"
 - Pro Forma studies
 - Case Study Investigations
 - Health, Safety, & Welfare
 - Bottom Line
- Contemporary advances to design performance evaluation:
 - Life-cycle cost analysis
 - Value engineering
 - Return on Investment (ROI)
 - Post-occupancy evaluation (POE)
 - Value-added design
- Quality assessment applied to project, firm and/or design management:
 - Total Quality Management (TQM) ISO 9000
 - Six Sigma Management (6 σ)
- Innovation and Experimental approaches
 - Best Practices
 - Triple Bottom Line
 - Quadruple Bottom Line
 - House of Quality
- SITES Program, Initiative and Aspirations
- Pedagogy

Course & Curriculum development Educational evaluation, assessment and accountability Instructional materials

Structure:

The two courses are organized as complementary and interactive. All of the MLA students participating in the studio (doing applied advanced design work) will also participate in the seminar). Additional students not in the MLA thesis studio will be recruited to participate in the seminar and to potentially apply their own problem-solving experience in a parallel fashion. Graduate students from other design disciplines, from sustainability science and from education will be recruited to participate in the seminar and enrich its transdisciplinary character. Landscape architecture will serve as the primary disciplinary perspective, but the related disciplines will all focus on the nature of evidence-based and performance-based approaches to design, design evaluation and design education and advocacy.

Schedule:

The schedule will fit the University's academic calendar in its 2014 spring term (Mid-January through early May). The studio will meet twice weekly on Wednesday and Friday afternoons (1:30-5:00) while the seminar will meet once weekly on Friday afternoons (1:30-2:30). While the use of studio time is structured with flexibility to permit informal production, critique, consultation, review and informal interaction between and among individual student designers, critics and instructors; the seminar is the formal time for

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all students, instructors and guests to engage in presentations, debates, and discussion. The general schedule will look like this:

January – establish and identify the context(s), backgrounds, challenges and opportunities February – explore alternatives, standard and best practices, and cultivate alternatives March – test alternatives, experiment with options and potential solution; mid-term presentation April – design development, pedagogical materials development; design and program evaluation May – final presentations, advocacy sharing of lesson learned

Assignments:

The principle assignments for the studio course will be to 1) explore a significant landscape architectural design issue with appropriate analysis of background, precedence, literature review, and context studies; 2) Prepare design alternatives with a developed final proposal; 3) Evaluate the design using performance assessment strategies to determine the success of the design; and 4) communicate the findings and recommendations of the design and of the performance-based evaluation in a professional peer setting. The assignments for the seminar will be to explore the practices of design performance evaluation and to develop strategies and materials for teaching and advocating design performance assessment.

Assessment/Evaluation:

Students' design work will be reviewed and critiqued by the instructor (Brooks); landscape architecture faculty colleagues, local design professionals, design faculty from related disciplines. Participants, critics and peer reviewers for the seminar course will come from design, sustainability, and education faculty colleagues and from practicing landscape architects and other designers. CSI Fellows, LAF staff and similar external experts will be invited as contributors, critics and peer reviewers both during the courses and at the conclusion of the courses.

On-campus critics will include faculty colleagues with backgrounds in landscape architecture, architecture, industrial design, interior architecture, visual communications design, healing & healthcare environments design, urban design, sustainability science, ecology, education and psychology.

Reading Materials and Resources:

Diamond, Robert M. 1998. *Designing and Assessing Courses and Curricula: A Practical Guide, 2nd ed.* San Francisco: Jossey-Bass Publishers.

Jerke, Dennis, Douglas R. Porter & Terry J. Lassar. 2008. Urban Design and the Bottom Line: Optimizing the Return on Perception. Washington, DC: Urban Land Institute.

Sustainable Sites Initiative. 2013. *SITES v2 Rating System and Reference Guide*. SSI. Web-based materials from LAF Sustainable Sites Initiative website and from ASLA's Advocacy Resources





LPH 598 Topic: Design Performance Spring 2014 Semester Instructor: Prof. Kenneth R. Brooks

Syllabus

The Course :

LPH 598 Topic: Design Performance (schedule line #29643). This course is a seminar exploring the concepts and applications of Design Performance, especially as applied to landscape architecture and urban design. The course is inspired by the recent work by the Landscape Architecture Foundation to advance concepts of landscape performance – the application of tools, processes and outcomes that enhance the capacity of the design to serve people and environment. (see the LAF Performance-Series information at: <u>http://www.lafoundation.org/research/landscape-performance-series/</u>). The principle goal of the course is to explore and cultivate strategies for developing, applying and advancing the concepts of design performance.

The course will be taught for variable credit (1-3 credits) as a general elective for landscape architecture, urban design and other interested students with advanced backgrounds in design or pedagogy. Students enrolling for one credit will participate in the course through readings, discussion, and a demonstration of concepts of design performance to a case-study design project. Students enrolling for more than 1 credit will also develop a project for sharing and/or teaching an example of design performance to other design professionals.

Meeting times and location:

The class meets regularly on Fridays from 1:30-2:20pm in the seminar room in the Tempe Center Studios of The Design School.

Instructor:

Prof. Kenneth R. Brooks Office: CDN 72 Email: Kenneth.Brooks@asu.edu Phone: 480-965-2533 Office Hours: Wednesdays 10:00-11:00am, Thursdays 2:00-4:00pm and by appointment; drop-ins accepted on a time-available basis (if you come by and I'm not available, please leave a message so that I can get back to you). The best way to consult with me is to request an appointment during class or by email.

Textbook:

"Urban Design and the Bottom Line
Dennis Jerke, Douglas R. Porter, Terry J. Lassar
Urban Land Institute
2008
9780874209969

Student E-mail Contact Requirements:

A portion of the communication among students and instructors for this course will be conducted through the ASU Blackboard On-line website in the myASU tools and the use of the college network server. In order to facilitate the secure use of the networks, it is necessary for all of the students in the course to use their officially assigned ASU e-mail accounts for access and communication. Although students are permitted to use non-ASU email accounts for simple unofficial e-mail communication, all official communication in the course will be through the ASU e-mail accounts. E-mail messages used in the course should include the name of the sender and a subject description in the e-mail header or subject line.

University Policy on Academic Integrity:

ASU's policies and standards related to academic integrity are provided at the website of the Office of Student Life. Students are expected to be familiar with standard practices of honesty, fairness and consideration of peers and colleagues as well as the consequences for violating those standards. Committing acts of dishonesty or unfairness or tolerating such acts by classmates will be subject to appropriate sanctions. Students are encouraged to discuss concerns or questions with the instructors to determine what is and isn't acceptable. Some actions maybe acceptable in this class while being unacceptable in others. (For instance, we will encourage students to work on projects in this class related to project assignments in other classes, as long as they have been concurrently preapproved by the instructors of both classes. The ASU academic integrity website can be found at:

http://www.asu.edu/studentaffairs/studentlife/judicial/academic_integrity.htm

Plagiarism and cheating are serious offenses and may be punished by failure on an exam, paper, exercise, or project; failure in the course; and/or expulsion from the university. Academic dishonesty and cheating also includes software piracy, since it is a form of unauthorized use of the intellectual property of others.

Late Work Policy:

Work submitted late will be reviewed and critiqued, but it will have a penalty of at least 10% per day for being late. For all work submitted through the on-line digital dropbox, the time/date stamp on that submittal shall be considered the submittal time.

Attendance, Participation and Professionalism:

Attendance and participation in the course is important to learning and will be strongly encouraged. Collaborative learning is a valuable form of learning software. When you're not able to participate, you're not able to learn from others, and they not from you. Roll may be called at various times. Roll may be called at various times. Students must participate at a rate of 90% or a grading penalty will be assessed for each 10% missed. Tardiness will be treated as one-half an absence.

Evaluation and Grading:

Points for assignments for the term will be organized as follows

- 50% for projects assigned
- 50% for participation, professionalism, attendance and contribution

Grading Scale:

Grades will be assigned according to the following scales and performance characterizations.:

Letter Points

<u>Grade</u> Earned(Approximate Percentage)

"A" grades indicate superior performance, significantly exceeds expectations and requirements

A+	between 98 - 100 %
А	between 93 - < 97 %
A-	between 90 - < 93 %

"B" grades indicate very good performance, meets professional expectations of competent performance

B+	between	87	-	<	90	%

B between 83 - < 87 %

B- between 80 - < 83 %

"C" grades indicate good performance, meets minimally acceptable professional performance standards

C+ between 77 - < 80 %

C between 70 - < 77 %

"D" grades indicate poor, marginal, not professionally acceptable

D between 60 - < 70 %

"E" grades indicate unacceptable or irresponsible performance

E less than 60%

University Policy on Incomplete Grades:

The University policy for incomplete work and incomplete grades will be followed in this course. A grade of Incomplete will only be assigned for circumstances beyond the control of the student with the student's grades-to-date being passing or better at the time of the request. Typical circumstances indicating a need for an incomplete include personal illness, family emergency, or sustained equipment failure. Students are encouraged to communicate with the instructors as soon as possible if they have circumstances that limit their ability to perform well in the course. The process requires that the student make a request and provide information that justifies the request. The instructor and student will fill out and file and a form indicating that an Incomplete grade will be assigned, outline the work to be completed and the date to be submitted.

Policy on cell phones, pagers and similar devises in class:

As a courtesy to students and speakers, it will be a class policy that all cell phones, pagers, beepers and other similar devises be turned off while class is in session. During any testing (including quizzes) all phones, pages, texting equipment and related devises must be turned off and put away. Any of these devises sitting out in plain sight during such periods are subject to confiscation because they raise a question about integrity. To protect yourself, make sure that the phone or pager is off and out of sight in a pocket, backpack, briefcase or purse.



Herberger Institute for Design & the Arts Prof. Kenneth R. Brooks, FASLA, FCELA, RLA

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Syllabus: Advanced Applied Project/Thesis Studio

Course(s): This syllabus serves several courses. This advanced design studio courses is intended as a culminating studio for master of landscape architecture and master of urban design students. The course sections for enrollment in the course include: *LDE* 690 Topics: Advanced Landscape Architecture Studio IV, LDE 593 Applied Projects, and MUD 690 Advanced Urban **Design Studio IV.** This is the regular thesis studio that most MLA students will take. The ASU Graduate College recognizes this course as a "non-thesis, culminating experience" or project. By being a "project," the Graduate College's rules for format, process, and content are somewhat relaxed. The expectations of the landscape architecture faculty is that exploration and presentation protocols may be more flexible but a researchable issue is systematically and rigorously examined, evaluated and specific conclusions and recommendations are made. Design, as a process for exploring or comparing ideas may be an acceptable part of the project, but it is probably not the object of the project intent ("doing a design project" is not the goal of the thesis studio). The schedule line number for LDE 690 is 19177 and for LDE 593 is 27554.

> The themed topic and focus of the course will be **Design Performance**. Students will develop a complex design project that addresses a significant professional issue. The project will explore and demonstrate how advanced design resolves that issue in a performative manner using evidence-based practices and performance-based metrics.

Instructor: Prof. Kenneth R. Brooks (serving as studio supervisor in consultation and collaboration with other landscape architecture and urban design faculty) Office: CDN 72 Ph: 480-965-2533 *Kenneth.Brooks@asu.edu* Office Hours: Wednesdays 10:00-11:00, Thursdays 2:00-4:00 and by appointment; drop-ins are invited on a time-available basis (if you come by and I'm not available, please leave a message so that I can get back to you). The best way to consult with me is to request an appointment during class or by email.



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Grading:	Traditional grades will be assigned by LA faculty consensus.
Description	This course is intended to give professional design students (especially MLA and MUD students) an opportunity to engage in complex design that applies a research-based approach. The course serves as a culminating experience for the MLA or MUD degree. The focus will be on both process and outcome related to a topic of significance to the discipline, of professional interest to the student and supportable by the resources of The Design School (including available faculty expertise).
Requirements:	Each student will propose a researchable topic or issue. The proposal will include a description of the issue, the methodology to be used in investigating it, the lead landscape architecture faculty, the anticipated outcomes and deliverables. Each student will propose at least two faculty members as lead reviewers (including the designated thesis studio supervisor). Students may invite other faculty and other professionals serve as critics, advisors, and/or reviewers. The proposals, periodic reviews and final project presentations/defense will be conducted and adjudicated by a committee of the landscape architecture and/or urban design faculty and invited guests. Students taking the formal thesis track (LDE 599) will follow a similar process, with the addition of review and acceptance by the officially-approved supervisory committee.
Course Meetings:	The thesis studio is scheduled to meet regularly on Wednesday and Friday afternoons from 1:30 - 5:55pm. Because of the independent nature of the projects, students will have flexibility in the use and management of this time for project work. Students will schedule weekly critique review sessions with the studio supervisor (Brooks) and with other faculty consultants. A monthly progress presentation will be made to a committee of faculty reviewers during the term.
Final Products:	All students will prepare both a formal oral final presentation and documents that can be digitally achieved. All students are also encouraged to present their work in a venue for professional peer-review (such as an article, a conference presentation or a competition submission) in a format appropriate to the venue.



Herberger Institute for Design & the Arts Prof. Kenneth R. Brooks, FASLA, FCELA, RLA

Spring Semester 2014 page 3 of 3

Review Dates: (all mid-reviews in TmpCt198 Seminar Room, Final review location will be announced.)

REVIEW	DATE	FOCUS / DURATION
1^{st} Mid-Review	Fri, Jan 28	Project Issues, Goals, Scope, Program, Expectations – 15 minutes
2 nd Mid-Review	Fri, Feb 28	Research, Ideation, Concepts, Implementation Strategies - 30 minutes
3 rd Mid-Review	Fri, Apr 4	Design Implementation and Development– 30 minutes
4 th Mid-Review	Fri, Apr 25	Prelim Final Rev Design Completion, Design Perf. Testing- 30 min.

TDS Public Design Reviews

Friday, May 9 Showcase Presentation- 30 minutes

Related Course: The thesis studio, focusing on Design Performance, will be complimented by seminar on Design Performance. The seminar will explore the nature of design performance and examine strategies, systems and tools for applying and communicating issues of performance.

Estrella Mountain Regional Park Healing Garden Traci Arellano | Spring 2014

ESTRELLA MOUNTAIN REGIONAL PARK

MARICOPA COUNTY PARKS & RECREATION DEPARTMENT





SPECIAL THANKS TO PROF. REBECCA FISH-EWAN | PROF. KEN BROOKS | PROF. DENISE BATES Phd





Therapeutic Landscapes Network defines a healing garden as, "any landscape, designed or wild, that facilitates human health and well-being."



Estrella Mountain Regional Park Nature Center 14805 West Vineyard Avenue Goodyear, AZ 85338



Week of January 13, 2014



A.



CONTEXT MAP









VINEYARD AVENU

PE

PROPOSED CENTENNIAL TRAIL

66





Maricopa County Parks and Recreation Department Estrella Mountain Regional Park



- Maricopa County Parks & Recreation Department
- West Valley Arts Council
- Three Rivers Historical Society (3RHS)





Remanduating the Southwest Ville (

- •Healing garden
- Centennial trailhead
- School desert awareness
- Environmental programs
- Special events
- Picnic area
- •Community volunteer site



SITE PROGRAM

Statement of Intent

If there is public access to visitors and staff to a healing garden in close proximity to the publically visited Nature Center at Estrella Mountain Regional Park then there will be a substantial increase in benefit to well-being of the participants by engaging human senses through natural stimuli and observation of wildlife.



EXISTING SITE































SITE PANORAMA: Future site of the healing garden



CONTEXT

- Estrella Mt Regional Park is 19,840 sq acres in Goodyear, AZ
- Located near the meeting of the Gila and Agua Fria rivers
- First park in county system established in 1954
- Site is directly southwest of the park's Nature Center



Week of January 20, 2014

Healing/sensory gardens are fast becoming a place of refuge for urbanites from the daily grind and the stressors that accompany our fast-paced world. Gardens are often green places of respite and solitude that can help to recharge our mental capacity to cope. This healing garden's purpose will be to help re-acknowledging the healing powers of nature that have been known and used for centuries, but have gone by the wayside as western medical advances moves toward technology and pharmacology and farther from the view of treating mind-body-spirit as a whole.

GOALS

The main area of interest is the recessed area to the SW of the nature center which is already a retention area where water is directed away from the building. The garden design will...

- Be reflective of the low-land Sonoran desert species
- Create a microhabitat for birds and butterflies
- Support vegetation that is lush versus just surviving
- Have seasonal color/textural interest
- Incorporate plants that represent the native culture (edible/medicinal)

SITE FACTS

- Estrella Mt Regional Park is 19,840 sq acres in Goodyear, AZ
- Located near the meeting of the Gila and Agua Fria rivers
- First park in Maricopa County system established in 1954 \bullet
- Part of a larger portfolio which is the Centennial Trail

PROJECT NARRATIVE



CENTENNIAL TRAIL PORTFOLIO: Part of the whole

- Part of a larger portfolio which is the Centennial Trail
- Trailhead with half-mile looped barrier-free trail
- 11 exhibit area nodes
- Community-led/grassroots project
- Official Arizona Centennial Legacy status by the Arizona Historical Advisory Commission.



REVISED TIMELINE



Week of February 3, 2014



PRECEDENCE

"A garden at your workplace may reduce stress" Ulrika Stigsdotter

U. Stigsdotter found there was "a significant connection between access to a garden and decrease in levels of stress at the workplace" and "gardens at workplaces play an important part in offering a more stress-free environment, irrespective of sex, age or socio-economic background."

"Natural versus urban scenes: Some psychophysiological effects" **Roger Ulrich**

R. Ulrich found that landscapes can be restorative by "reducing negative emotions, holding a person's attention and blocking stressful thoughts."

"Healing Gardens and Cognitive Behavioral Units in the Management of Alzheimer's Disease Patients: The Nancy Experience" Therese Rivasseau Jonveaux, et al

This study states that healing gardens provide a definite reduction in behavioral disorders such as irritableness, aggression and overall improved health, nutritional status and sleep patterns for Alzheimer's patient which is measurable in the patient's well-being.

Week of February 3, 2014

CASE STUDIES

WEST PHOENIX CITY COURTYARD TYPOLOGY **2005** YEAR **BANNER ESTRELLA HOSPITAL** SITE



The Banner Estrella courtyard has very straight geometric shapes placed asymmetrically in thirds. It has a very modernist feel with the concrete planters and clean lines. The water feature, "running along the outside face of the glass curtain wall spanning the length of the garden along the north side, this feature was a well-placed and welcome transitionary element, tying the interior and exterior spaces together." (Bradley, 2010)

The site has a lot of concrete. The paving, raised planters and water feature is concrete. There looks to be a portion of the linear walkway that is stabilized granite; however, the predominant material is concrete. There is elegance to the simplistic lines but it also makes the atmosphere very sterile and clinical. The plants were aesthetically pleasing and their 'tight' look complemented the concrete material; however, they did not evoke a "cozy" or informal feeling.









Banner Gateway Medical Center is a general medical and surgical hospital in Gilbert, AZ. It performed nearly at the level of nationally ranked U.S. News Best Hospitals in 2 adult specialties, as shown below. Banner Gateway Medical Center has 177 beds.

The healing garden is located in the maternity unit and has restricted access to the patients and their families. On one end is a courtyard which is a special event/seating area which the patient rooms in the 3-story high wing can look down upon. The space is bisected with a wall-water feature that obstructs your view to the play/eating area which invites you over with sounds of water and child laughter. The area is spacious yet cozy. It has abundant shade and a stateof-the-art play equipment with cool loungers for the parents.







Week of February 10, 2014
CASE STUDIES

PHOENIX CITY COURTYARD TYPOLOGY 2010 YEAR BANNER GOOD SAMARITAN HOSPITAL



Dedicated to healing the whole person—mind, body and soul—Banner Good Samaritan offers an enhanced healing environment for patients and their families. There are six gardens, including the award-winning Healing Garden, provide an atmosphere for reflection and relaxation. To ensure your spiritual and emotional needs are met, interfaith hospital chaplains are available around the clock to meet with families.

The healing garden is has multiple topographies and water featues. It has inviting alcoves which allow visitors to have quiet conversations or sit among planters of blooming flowers and succulents and other friendly visitors. The garden also sports amazing mosaic pillars that are colorful and the tiles that are used were a community project that was created by patients with inspirational sayings and words.







2011 | COURTYARD | GILBERT YEAR TYPOLOGY CITY





The Banner MD Anderson Cancer Center *Togetherness Garden* is reached by entering through a narrow doorway that symbolizes hope and victory at the conclusion of treatment. The facilities were built to heal; Along the way there are wildflowers, water features and stepping stones which all carry a metaphorical message of hope for cancer patients to live a fulfilling life.









Week of February 10, 2014

CASE STUDIES

PHOENIX E E E



2005 YEAR

ANCER SURVIVOR'S PARK



The Richard and Annette Bloch Cancer Survivors Park stretches a full block on First Street, from Willetta to Mc-Dowell. There's a nice shaded gazebo surrounded by cactuses, and a colorful obilisk in the center.

The highlight of the park are the bronze sculptures by artist Victor Salmones. The piece is called "Cancer...There's Hope," and it depicts eight people in various stages of fighting cancer. At the back are five figures meant to represent cancer patients and their supporters as they enter treatment. Treatment is represented by a large bronze maze, and there's a figure of a young woman working her way through the maze.

There are now 24 Richard and Annette Bloch Cancer Survivors Parks throughout U.S. and Canada. "Cancer Survivor Parks promote survivorship and provide common sense information that will guide and support the patient through his or her cancer journey."









was developed to stimulate the senses of sight, sound, smell and touch through the use of specific plants and trees for texture and scent, water features for sound, touch and sight and evening lighting for dramatic

visuals.

Week of February 10, 2014

CASE STUDIES





PHOENIX CITY ROOFTOP TYPOLOGY 2011 YEAR PHOENIX CHILDREN'S HOSPITAL









Phoenix Children's Hospital in Phoenix, Arizona is ranked nationally in 5 pediatric specialties. Phoenix Children's Hospital is a 425-bed children's general facility with 13,404 admissions in the most recent year reported.

The healing garden is located on the facility's rooftop and is restricted to the patients and their families. This creates a very secure-feeling environment. There are over-sized brightly painted flowerpots that adorn the garden and add whimsy to the area. Additionally there is a lot of funky seating and plenty of shade to encourage users to enjoy the glorious outdoors and incredible views.



Week of February 10, 2014

CASE STUDIES

SCOTTSDALE CITY COURTYARD TYPOLOGY **2007** YEAR THOMPSON PEAK HOSPITAL



The Thompson Peak healing garden was designed "to evoke feelings of well-being, provide places for serenity and rejuvenation, and impart visitors with a sense of connectedness to the natural world." (Gensler, 2014) Made possible through community philanthropy, the garden offers shaded outdoor gathering spaces, paths interwoven with drought-tolerant plantings, hummingbird and butterfly gardens, and water features. In addition to being visible from many patient rooms, lobby walls and doors were replaced with floor-toceiling glass to create a clear connection to other areas of the hospital and to draw in patients and visitors.











2. All creation and transformation requires a container. A garden is a sacred enclosure where the healing and recuperative process can unfold.

Week of February 17, 2014

- 1. Does nature plays a vital role in human health & wellbeing?
- 2. Do humans have a deep emotional connection with nature?
- 3. Do healing gardens provide nature in our urban environment?

nature

individual human needs



urban living

instinctual physiological societal



instinctual = mind physiological = body societal = spirit

ACCESS TO NATURE FOR INDIVIDUAL'S Role in Human Health & Wellbeing



BENEFITS TO MIND (Healthy Parks, 2014) >Cope & recover from stress >Restore concentration >Improve productivity >Calming, restorative effect on children and adolescents with ADHD

BENEFITS TO BODY (Therese Rivasseau Jonveaux, et al) >Recovery from illness quicker >Fewer amount of pain medications >Fosters recovery from mental fatigue >Boosts immune system >Increases life expectancy

BENEFITS TO SPIRIT (Maller, et al, 2005) >Reduces depression >Positive outlook on life >Higher life satisfaction >Beneficial physiological effects (ie increased happiness) when humans interact with animals, plants, & landscapes

1. Nature does play a vital role in human health and wellbeing!





- **1.** Does nature plays a vital role in human health & wellbeing?
- 2. Do humans have a deep emotional connection with nature?
- **3.** Do healing gardens provide nature in our urban environment?

"...the innately emotional affiliation of human beings to other living organisms. Innate means hereditary and hence part of ultimate human nature."

> **E.O.Wilson** Author of Biophilia, 1984

Cross-disciplinary reasearch

1. Horticulturist, research fellow and author of *Green Nature Human Nature* in 1996 explains the evolutionary basis of people-plant relationships and human responses to the environment. "People and plants are entwined by threads that reach back to the beginning of a species"...."emotional responses to nature setting are the psychic equivalent of body knowledge."

Charles A. Lewis, "Green Nature Human Nature: The Meaning of Plants in Our Lives," University of Illinois Press (Ubana and Chicago, 1996): 10-24.

2. Environmental Psychologists Rachel Kaplan and Steven Kaplan study human preferences for specific landscape configurations and identified 4 qualities humans use to determine preference: Coherence, Legibility, Complexity, Mystery.

Stephen Kaplan, Rachel Kaplan, and John S. Wendt, "Rated Preference and Complexity for Natural and Urban Visual Material," Perception and Psychophysics 12, no.14 (1972): 354-56.

3. Robert Ulrich, Ph.D., professor of architecture and landscape architecture at Texas A&M University and a pioneer of evidence-based design, measures physiological and pschophysiological responses (heart rate, blood pressure, muscle tension & brain waves) to preferred settings. Ulrich found 6 variables in qualities of landscape preference: Focality, Complexity, Depth, Ground Texture, Deflected Vistas, Appraised Threat.

Roger Ulrich, "Aesthetic and Affective Responses to Natural Environments," *Behavior and the Natural* Environment, ed. Irwin Altman and Joachim E. Wohlwill (New York: Plenum, 1983): 86-125.

2. Humans have a deep emotional connection with nature and is attracted to all that is alive and vital.







- 1. Does nature plays a vital role in human health & wellbeing?
- 2. Do humans have a deep emotional connection with nature?
- 3. Do healing gardens provide nature in our urban environment?

& wellbeing? with nature?

ACCESS TO NATURE Individual's Role with Local Community in Health & Wellbeing



BENEFITS TO SOCIAL-SELF (The Health and Social Benefits, 2005)

3. Healing Gardens do provide nature in our urban environment.





Design Principles vs Hospital Healing Gardens



PHASE DEVELOPMENT MAP



PRELIMINARY DESIGN

Week of February 17, 2014



instinctual = mind physiological = body societal = spirit

SPIRIT



12 BEST DESIGN PRINCIPLES

1. Simplicity is important | Empathize with the user's need for clear pathways and intuitive cues.....

2. Design should be reflective of the larger community | Holistic modeling; represent a larger feature in the landscape.....

3. Design should encourage clarity of layout and movement | Avoid dead end paths and complex formations.....

4. Design needs to have opportunities to make choices | Encourage interaction, offer contemplation or people watching areas.....

5. Design should provide physiological comfort and psychological security | Create options of sun or shade, protection from breezes and others' view.....

6. Design needs to create physical opportunities for movement and exercise | This brings physical and emotional benefits and helps to combat depression.....

7. Design should provide pleasing senses for the soul | Include elements of surprise, whimsy, variety in color, texture, size and massing.....

8. Use the healing power of nature through sight, smell, touch and hearing | Increased plant-human interactions.

9. Provide carefully defined anchor points | Contemplative situations require a full sense of involvement with the surroundings.....

10. Design should provide mystery and urge the visitor to explore | Garden elements should be revealed one at a time to not diminish the sense of discovery.....

11. Design should encourage wildlife | Provide habitat and diversity of food in berries, seeds, nuts and nectars with seasons in mind.....

12. Design should work with nature and natural forms | Avoid straight lines & planes, or excessive symmetry; Healing power of water as feminine energy.....











Looking southeast to southwest; Panorama outside EMRP Nature Center Looking north across healing garden, toward tortoise pen (2)Looking east at EMRP Nature Center west facade (3)

DESIGN PRINCIPLES ACHIEVED





VIEW 1



Looking southeast to southwest; Panorama outside EMRP Nature Center



DESIGN PRINCIPLES ACHIEVED



Looking north across healing garden, toward the tortoise pen

VIEW 2

Pleasing senses for spirit Healing power of nature Encourage wildlife



DESIGN PRINCIPLES ACHIEVED

P³ Clarity of layout and movement P⁴ Opportunity to make choices P⁵ Physiological comfort and psycological security P⁹ Provides anchor point **P**¹¹ Encourage wildlife interactions







Looking east at EMRP Nature Center west facade
12 Design Principles vs EMRP Site Plan

	CIRCULATION	PLANT LIST	SEATING	SPACE	VIEWS
SIMPLICITY					
REFLECTIVE OF COMMUNITY					
CLARITY OF LAYOUT					
OPPORTUNITY FOR CHOICES					
PHYSIOLOGICAL COMFORT					
OPPORTUNITY FOR EXERCISE					
PLEASING SENSES FOR SOUL					
HEALING POWER OF NATURE					
DEFINED ANCHOR POINTS					
PROVIDE MYSTERY					
ENCOURAGE WILDLIFE					
NATURE & NATURAL FORMS					

١	
I	

WILDLIFE HABITAT *** FOOD SHELTER CAMOUFLAGE

ECOLOGICAL ***

NATIVE SPECIES ELEVATION HARDINESS

> ATTRACTORS *** BLOOMS FRAGRANCE AESTHETICS

NATIVE PEOPLES ***

MEDICINE MATERIAL RESOURCE CEMERMONIAL

ESTRELLA MOUNTAIN REGIONAL PARK Healing Garden Plant List

Botanical Name	Common Name	Mature Size	Blooming Season	Reason
Trees				
Acacia constricta	White Thorn Acacia	10x15	spring to summer	Attracts
Chilopsis linearis	Desert Willow	25x20	spring to fall	Attracts
Parkinsonia florida	Blue Palo Verde	30x30	spring	Good fo
Prosopis pubescens	Screwbean Mesquite	15x20	spring to fall	Attracts
Shrubs				
Calliandra eriophylla	Pink Fairy duster	3x4	spring to fall	Attracts
Celtis pallida	Desert Hackberry	8x10	summer	Birds lov
Encelia farinosa	Brittlebush	3x4	winter to spring	Attracts
Ericameria laricifolia	Turpentine Bush	2x3	late summer to fall	Attracts
Justicia californica	Chuparosa	4x4	winter to spring	Attracts
Larrea tridentate	Creosote	6x6	spring to fall	Attracts
Lycium pallidum	Wolfberry	8x8	spring to fall	Attracts
Simmondsia chinensis	Jojoba	6x6	spring	Attracts
Tecoma stans	Arizona Yellow Bells	6x6	spring to fall	Attracts
Groundcover/Annuals/Perennials				
Baileya multiradiata	Desert Marigold	1x1	year-round	Beautifu
Daucus pusillus	Rattlesnake Weed	2x1	spring	Attracts
Eriogonum fasciculatum	Wild Buckwheat	1x2	spring	Attracts
Lupinus arizonicus	Arizona Lupine	3x3	spring	Beautifu

for Selection

- birds
- hummers
- or nesting
- wildlife
- hummers
- ve orange berries
- wildlife
- wildlife; fragrant
- hummers
- wildlife; fragrant
- wildlife; fragrant
- wildflower; medicinal
- hummers & butterflies
- al flowers year-round
- wildlife, medicinal, edible
- birds, medicinal
- ul flowers; sun-tracking

ESTRELLA MOUNTAIN REGIONAL PARK Healing Garden Plant List

Botanical Name	Common Name	Mature Size	Blooming Season	Reason fo
Cactus/Succulents/Accent				
Agave murpheyi	Murphey's Agave	5x4	Late winter to spring	Edible; ma
Asclepias subulata	Desert Milkweed	3x3	spring to fall	Attracts bu
Dasylirion wheeleri	Desert Spoon	4x4	summer	Attracts w
Fouquieria splendens	Ocotillo	24x18	spring	Attracts hu
Lophocereus schottii	Senita	10x10	spring to summer	Edible fruit
Opuntia acanthocarpa	Buckhorn Cholla	4x5	spring	Edible fruit
Opuntia basilaris	Beavertail Prickly Pear	1x3	spring	Beautiful f
Yucca elata	Soaptree Yucca	10x4	spring to summer	Attracts w

[Type Note: Estrella Mountain Regional park "ris[es] gradually from approximately 900 feet above sea level to the highest point in the park of 4,512 feet." (D. Bates) This locates the park in the *Lower Sonoran Zone* which is 0-4500'. These plants endure extreme temperatures that exceed 110°F in the summer and 25°F during the winter, as well as, precipitation of 6 inches or less annually.

or Selection
terial resource
itterflies
ildlife; material resource
ımmers
; material resource; spiritual
:
lowers; edible fruit
ildlife, medicinal, edible

Blue Palo Verde



Desert Marigold

Desert Willow





Rattlesnake Weed

Screwbean Mesquite



Wild Buckwheat

PLANT PALETTE

White Thorn Acacia



Arizona Lupine

Brittlebush



Parry's Penstemon

Chuparosa





Pink Fairy Duster

Desert Hackberry





Wolf Berry

Jojoba





AZ Yellow Bells

Buckhorn Cholla





Desert Milkweed



Parry's Agave



Purple Prickly Pear

Desert Spoon





Senita

PLANT PALETTE (cont)

Ocotillo





Soaptree Yucca

TAKE-AWAYS



1. Nature IS vital to our health and wellbeing...and should be designed into our lives.

2. There are multiple **BENEFITS** to the mind-body-spirit of individuals that spend time in and around Healing Gardens.

3. Healing Gardens are a BEST PRACTICE for anyone that wants health & happiness.

4. Healing Gardens can be created **ANYWHERE and be ANY SIZE.**

"Everybody needs beauty as well as bread, places to play in and pray in, where nature may heal and give strength to body and soul."

~John Muir~

Urban Wetlands providing ecosystem services

LDE 593 / MUD 593 Thesis / Applied Project Carol Kegley Spring 2014 Semester / Instructor: Prof. Kenneth R. Brooks

Site -Downtown Phoenix











The problem and context: Preserve fresh water as a resource while recycling wastewater through urban wetlands to provide ecosystem services

The direction of water management has taken throughout history has begun to show in severe drought conditions of groundwater and aquifer depletion while ocean levels rise. The established method of treating stormwater and rainwater in an urban environment has been to direct it off of surfaces and away from a city. As populations grew the water cycle became more manipulated. Dams, canals and large irrigation systems were built. Wastewater was isolated, collected and transferred outside of cities to be treated. This allowed for an immediate rise in standards of living for populations in urban environments. For centuries before and at the beginning of human civilization the natural hydrological cycle filtered, absorbed, transferred and balanced the distribution of water and waste through plants and soil to groundwater recharge which leads to river life and cycles which in turn flow to the oceans. Today the average flow of water into streams and reservoirs has been decreased by 37% (Sensitive Cities 2012). Climate and rainfall does play a role, however, the demand and use by civilizations can be managed and reduced while revealing how non-rainwater sources of water can play a role in delivering liveable, resilient and productive cities.

Rather than a costly and smelly waste treatment plant new industries, economic growth, and new technology can be used to generate new ways of collecting and using wastewater in a safe, and aesthetically pleasing construction. Through the Living Building challenge construction of wastewater treatment wetlands has already been included for on-site waste water treatment in the design of new buildings. Several buildings through the Living Building Challenge have been completed with constructed wetlands and awarded LEED platinum as well as Living Building Challenge credentials.

Population Growth









4 X current population

square mile.



By 2040 the surrounding downtown areas of Phoenix will have grown

These areas will have 10,000 and more people per



Drought

Areas of Drought Severity



Calculations: Drought severity is the mean of the lengths times the dryness of all droughts occurring in an area. Drought is defined as a contiguous period when soil moisture remains below the 20th percentile. Length is measured in months, and dryness is the average number of percentage points by which soil moisture drops below the 20th percentile. Drought data is re-sampled from original raster from into hydrological catchments.

Drought severity measures the average length of droughts times the dryness of the droughts from

Groundwater Stress

Areas where there is Ground Water Stress



Calculations: Groundwater footprint divided by the aquifer area. Groundwater footprint is defined as A[C/(R-E)], where C, R, and E are respectively the area - averaged annual abstraction of groundwater, recharge rate, and the groundwater contribution to the environmental stream flow. A is the areal extent of any region of interest where C, R, and E can be defined.

Ground water stress measures the amount of groundwater withdrawal relative to its recharge rate over a given aquifer. Values above on indicate where unsustainable groundwater consumption could affect groundwater availability and ground-water dependent ecosystems.



Aquifer Stress



Groundwater Stress



USGS Real Time Groundwater







Ν

- <10 Percentile - Much Below Normal
- 10-24 Percentile Below Normal
- 25-75 Percentile Normal
- 76-90 Percentile Above Normal
- Not Ranked

Solar Radiance

August 2008



More than 1.8 million people live in Phoenix itself, and 22 cities surround it in the Valley of the Sun, forming the largest metropolitan landscape by area in the United States.

Each year the valley receives about Seven Inches of rainfall. Average temperatures exceed 100 degrees for three months a year, with peaks as high as 120 degrees. Global Climate change means longer sustained days of heat means more loss of water to evaporation.

Desert nights no longer cool down they way they used to, because energy from the sun is trapped in roads and buildings, a phenomenon researchers call the "urban heat island effect."



Solar Radiance /Radiation

Irradiance - The amount of electromagnetic energy incident on a surface per unit time per unit area. In the past this quantity has often been referred to as "flux".

* When measuring solar irradiance (via satellite), scientists are measuring the amount of electromagnetic energy incident on a surface perpendicular to the incoming radiation at the top of the Earth's atmosphere, not the output at the solar surface. Solar Constant - The solar constant is the amount of energy received at the top of the Earth's atmosphere on a surface oriented perpendicular to the Sun's rays (at the mean distance of the Earth from the Sun). The generally accepted solar constant of 1368 W/m2 is a satellite measured yearly average.

Insolation - In general, solar radiation is received at the Earth's surface. The rate at which direct solar radiation is incident upon a unit horizontal surface at any point on or above the surface of Earth. Transmission Reflection *I will refer to insolation as direct solar radiation at the Earth's surface. How radiation is expressed in an urban environment with regards to Medium materials. Medium 2 Medium 1 Scattering Absorption Emission

Emission

Transmission	= Filter
Reflection/Scattering	= Reflection or Albedo
Absorption	= Shade

Walkability

Investing in implementing an ecosystem service is securing a greener economy for the downtown not only in the ecology but in the dollars gained by **venues and services** that **benefit** from the attraction of people.

A Study: Paved with Gold; the Real Value of Good Street Design, Commission for Architecture and the Built Environment, (London 2007).

This study shows that investments in pedestrian safety and an attractive street environment brings quantifiable

financial returns. Key Finding: On a seven-point pedestrian environment scale,

Every One Point Increase In Walkability Was Associated With 5.2% Higher Retail Prices and 4.9% Higher Commercial Rents.

Economic Value of Walkability, Victoria Transport Policy Institute, September 2009, citing a study by Accent Marketing and Research. Key Finding: This study of consumer expenditures in British towns found that customers who walk spend significantly more (\$50) compared to those who drive (\$40), take transit (\$38), or arrive by taxi, bicycling, or other mode (\$35).

"The Impact of Neighborhood Walkability on Walking Behavior" paper Published November 2013

The paper provides strong evidence that

Neighborhood walkability impacts the amount of time people walk. Those who live in a more walkable neighborhood, where the infrastructure is pedestrian-friendly, walk more than those who live in a neighborhood less conducive for walking.

People will take advantage of pedestrian-friendly environments and walk more – whatever their original predispositions were towards walking.



The First Era Of Water -Relying on Nature's Sources underground process Dependence on Natural Water Cycle



The Second Era Of Water Humans Manipulate Water Cycle A higher standard of living is achieved through innovations in water technology such as Canals, Dams, Irrigation Wastewater is collected and isolated Canals strain dirty water our of tank -less water born illness and disease Population Living Longer With sanitation and water-related diseases reduced population growth



Third Era Of Water Over-Development Failure to Integrate Delivery of water over long distances, open storage Lack Of Access 1/3rd of the world's population currently lacks access to fresh water. Earth's Climate Is Changing Temperatures are rising and the need for water will too. Precipitation cycle with change as a result

Based on Peter Gleik's essay "Facing Down The Hydo-Crisis" published in the World Policy Journal [(2009) World Policy Institute]

Hydrological Cycle-This process shows Earth's ability to filter itself through an air, land, and

Humans water needs were 'cleaned' by the Hydrological Cycle. Average life span of Human- 35 years.

New industries, economic growth, and new technology add to the demand of water world-wide



Fourth Era Of Water



Ecosystem Services from Non-rainwater supply solutions along with rainwater harvesting

To help establish a broader vision and system for a city like Phoenix to avoid committing to a growth pattern of costly augmentation of water supply and environmental damage. This proposal has the potential to improve water management and livability in the city at the same time.

Recycling and Wastewater, Greywater Condensate **Urban Wetlands**

Uses for Recycled Water

Landscape Public parks Golf course irrigation Cooling water air conditioning **Toilet flushing** Dust control, **Construction** activities Concrete mixing Artificial lakes or water feature

Downtown Wetlands

The full use of water ecosystem services in an urban environment can shift and combine the image of water from a resource focus to a service focus. Water supplies will be stressed because of the growth in demand. Bringing water out into public spaces in a manner that demonstrates a recyled use demonstrates the importance and needs on water. It will take a coevolution of technological and mutually reinforcing institutional and sociocultural goals and values. This project looked at ecosystem services as the catalyst for the shared goals and values in society and how these ecosystem services can be delivered through constructed urban wetlands.

Lessons learned from current construction demonstration sited and already existing models allow for diversity of configuration of constructed wetlands to adapt to growth and continue even distribution of recycled wastewater. A decentralized water system not only has landscape design and construction mitigating stormwater runoff and providing rainwater harvesting it creates re-uses for non rainwater sources such as HVAC condensate and wastewater wetlands. Wetlands are permanently waterlogged areas populated by hydrophytic plants such as reeds, They comprise a variety of sub-surface micro-habitats of differing oxygenation and redox potential. Constructed wetland systems are increasingly being employed for treatment of wastewater, sewage sludges and industrial effluents as a cost-effective, low energy and robust alternative to traditional engineered biological treatment such as the activated sludge process.

Constructed wetlands are classified according to their mode of operation as free water surface-flow, horizontal flow, vertical downflow or vertical upflow type. They have been used successfully in the treatment of domestic sewage, urban, highway and stormwater runoff, acid mine drainage, agricultural wastewater and industrial effluents (including landfill leachate). Biological oxygen demand (gases) and solids reduction occurs through microbial activity and removal of nitrogen and phosphorus through the processes of filtration, denitrification, plant uptake and absorption. This project is focused on the subsurface flow wetlands which through its construction allows for integration within a streetscape or urban space of a city.

Design structure of a new water management system

Use of water ecosystems and integrated wetlands develops multifunctional urban spaces

Conventional Wastewater Treatment

Single purpose to process and treat large volumes of wastewater on small parcels of land

Secondary benefits not considered

Process involves application of chemicals and energy for pumping, agitating and aerating

High cost of electricity /feul to operate waste treatment facility

Constructed Emergent plant Wetlands

Scaled to neighborhood and can be distributed throughout the watershed

Secondary benefits in conservation of water and ecosystem services that contribute to the landscape network

Byproducts can be used to augment landscape, natural areas and contribute to species and habitat diversity.

Wetland Process Diagram



Wetlands ecologies are both complex and stable and the root systems of the plants are adapted to thrive all the while submerged in water. Wetlands have continuous water flow, thus the plants are adapted to filter out nutrients very quickly. Plants do not take up the waste contaminants to their tissue the submerged root system is where nutrients are broken down so no portion of their leaves or stems contain contaminants.

Constructed Wetlands are differentiated by vegetation type and flow regime. A new function to wetlands is below ground treatment of wastewater. The benefit to this is a multifunctional green infrastructure that can be scaled to the neighborhood as well as a city block and distributed throughout the watershed.

The (HSF) horizontal subsurface flow wetland and the (VSF) vertical subsurface flow wetland are the two options for below-ground treatment stages. A hybrid of the two allows for more compactness and higher performance of treatment.

Case Study Sidwell Friends Middle School-Living Building



Case Study San Francisco Living Building

These Living Buildings clean wastewater through a living wetland system that moves from outside to inside the building.



- 11 Story Building 900 employees
- recycles 6,000 gallons per day of waste water
- 60% Reduction of municipal waste cost.

Plant Choices For and Urban Setting

Exterior wetland plants



Eleocharis *palustris*



Calex species



Acanthus mollis



Junicus *effusus*



Cyprus alternifolius



Chrondropetalum *tectorum*



Acorus gramineus

Interior wetland plants



Rumohra adiantiformis



Zantedeschia aethiopica



Agapanthus Preacox



Cyprus alternifolius

Adopting An Adaptive Regime

Attributes	Traditional Regime
System Boundary	Water supply, sewerage and flood control for economic and population growth and public health protection
Management Approach	Compartmentalization and optimization of single components of the water cycle.
Expertise	Narrow technical and economic focussed disciplines
Service Delivery	Centralised, linear and predominantly technologically and economically based
Role of Public	Water managed by government on behalf of communities
Risk	Risk regulated and controlled by government

Adaptive Regime

Multiple purposes for water considered over long-term time frames including waterway health, transport, recreation/amenity, micro-climate, energy, etc.

Adaptive, integrated, sustainable management of the total water cycle (including land-use)

Transdisciplinary, multi-stakeholder learning across, technica design, economic, social and ecological spheres, coordination across all levels and usually with social engagement.

Diverse, flexible solutions at multiple scales via a suite of approaches (technical, social, economic, ecological etc.)

Co-management of water between government, business and communities

Risk shared and diversified via private and public instruments

Wastewater design characteristics are used to determine size and design of the treatment system components. Design mass load of chemical oxygen demand (COD) and Total Kjeldahl Nitrogen (TKN) ar the primary water quality indicators or characteristics for sizing treatment components. The following table shows selected design influent concentrations that would be cleaned based on a flow rate of 5,000 gallons per day. The system is designed to provide for maximum treatment capacity in the space available in the wetland cells. If the flow of wastewater has sifnificantly higher concentrations of the key constituents listed in the Table 1. the treatment capacity will be reduced to less than 5,000 GPD. The flow into the system can be monitored by a control system and set manually by an operator that will allow overflow to the city sewer.

Concentra **Parameter** mg/L Design Flow, gallons per day 5,000 BOD (Biological Oxygen Demand) 260 COD (Chemical Oxygen Demand) 545 90 TSS (Total Suspended Solids) Total Kjeldahl Nitrogen as N^(c) 170 pH, standard units 6.5-8.5

Table 1.

(a) Wastewater pumped to the Living Machine System after primary treatment

(b) Mass load based on stated design flow multiplied by the listed parameter concentration

(c) Total Kjeldahl Nitrogen (organic + ammonia)

tion	Mass Load ^(b)		
	kg/d	lb/d	
	N/A	N/A	
	4.92	10.83	
	10.32	22.71	
	1.7	3.75	
	3.22	7.08	
	N/A	N/A	

Tidal Wetland Design Influent Wastewater Characteristics ^(a)

Process Schematic







Economic

Maximize Economic Value

Minimize Capital Costs Planning and Design Land Phasing Existing Treatment Existing Collection Financing

Operating Costs/ Value Added Financing cost Labor-Job Creation Power /Energy By-products Life Cycle costs

Environmental

Optimize Environmental Benefit

Water Quality Waste Decomposition Re Purification

Water Quantity Water Balance Sustain Flow

Natural Environment Biodiversity Disturbance Global Warming

Decentralized Wastewater Stakeholder Decision Model adapted using quadruple-bottom-line approach to help users determine what is most important to the community and How can decentralized wetlands in create these in urban environments through ecosystem services.

Social

Fulfill Community Objectives

Quality of Life Health Respitory Outdoor Environment Built Environment

Stability Dependable Resilient Safe

Equitability Serves all equally

Aesthetics

Return on Perception

Place-Making Identity Walkability Well Being

Productivity / inspiration Learning Visually Attraction

Social value /Legacy Future Generations

Designer as "one-man band."



The design is lead by a single learner of the discipline, who specializes and executes the design in isolation from other disciplines. Community and Stakeholders are represented. Coordination by standardization

Designer as an "orchestra conductor"

Multidisciplinary where the lead designer examines from other perspective and through their own discipline how to integrate and staple together the results from the other disciplines. Stakeholders and other disciplines contribute and synthesized by single party.

Designer as part of an "ensemble"



Designer / Planner
Discipline /Field of
expertise

Licensed professional in expertise/discipline

Adapted from Urban Ecological Design Plate #9 - The designer as part of an ensemble. Showing progression of management and collaboration towards a method that would include the quadruple bottom line.

System wide investment (management) by one party into the whole system.

System wide management of multi-disciplines within the single party, multi -closed loops systems. Pooled interdependence.

Interdisciplinary where there is coordination from the design concept for a unified guide to the problem solving and shared methods. Community and Stakeholders can contribute to the process Coordination by planning. Sequential interdependence

Transdisciplinary model and the quadruple bottom



Ecosystem Service Defined in the quadruple bottom line & Transdisciplinary model

Aesthetics

Scale: Human, Ecological, Local, City, Regional. Relevance, appropriateness, Proportions Color, texture, light, moisture, water, materials Habitat, productive soils

Social Equity

Human Uses

Benefits and Experiences Mental Health, Spiritual inspiration Physical Health, Walkability, Access Civic Attraction and community building Educational

Economic Government & PPP

Securities and Goods

Arable lands, crops Drinking water, energy Natural fibers, pharmaceuticals Seafood, textiles, timber Industrial products

Pollination protection

Ecology Ecosystem Services

Processes / Functions

Air pollution, CO2 absorption, carbon storage Disturbance regulation, drought mitigation, dust particle capture Erosion control, climate mitigation on different scales, groundwater recharge Nitrogen removal / fixation, photosynthesis, seed dispersal, self-purification Storm protection, UV protection, water purification Water recycling pollination protection


Ecosystem services out of the quadruple bottom line





Transdisciplinary model and the ecosystem services



in expertise/discipline



A healthy downtown Phoenix core is what is essential to the growth and health of the surrounding municipalities.



W. Washington Street W. Jefferson Street



Wastewater Use



Approximate** 1,200 gallons per day Peak flow greater for events

Desert Botanical Garden

Phoenix Zoo Approximate** 150,000 gallons per day Peak flow greater for events

Approximate based on 110,820 passengers per day

Airport

Phoenix

SkyHarbor

554,094 gallons per day

North

Urban Wetlands providing Ecosystem Services

The Climate of Phoenix

To Improve the quality of living in the urban city

While providing Non Rainwater and Rainwater supply solutions For the vibrant landscapes, cooling micro-climates, walkability in the urban city

Current Issues

Drought **Stressed Groundwater Resources Population Growth** Heat and Heat Island Lack of aesthetics in the urban downtown

Downtown city one square mile comparison



Phoenix, Arizona





Philadelphia, Pennsylvania



North

Downtown



Downtown



Green Spaces

Japanese Friendship Bu Garden Li

Burton Barr Library





5 002E

ASU Phoenix Campus







Civic Space Park



City Hall Plazas









Library Park



Cityscape







Margaret T. Hance Park

Margaret T. Hance Park



Arizona Center



Catholic Arch Diocese





Heritage Square





Convention Center



Police Headquarters





Catholic Arch Diocese















100 feet

0













North







This is the process of defining what are the elements of landscape design which contribute to the ecosystem services in the quadrupal bottom line and begins to look at placing an importance or priority on them base on the site specific conditions and use.



Convention Center



City Hall Plaza























Site



























First life, then spaces, then buildings The other way around never works.

Jan Gehl

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Project Assessment																													
Campus	Te	mpe I	Manz	anita	i Hall																								1
Project Status	De	sign [Devel	opm	ent/Co	mpletio	1 <u> </u>																						
Date	11-Apr-14																												
Form	Returns																												
	Academic/Economic						Envir									Socia	ıl/Cul	tural				Visua	ıl						
	Budget Maximization	Student Growth	Research Growth	Tourism	Operations and Maintenance Considerations	Innovation	Regenerative	Reuse	Recyclable	Deconstruction	Added Green Space	Stormwater Management	Proper Site Design	Reflected Heat and Glare	Heat Island Mitigation	Embodied Energy	Life Cycle Parameters	Public Access and Use	Place Making Componenets	Community Engagement	Area Vitalization	Safe for Students and Staff	Fluidity of Interaction and Movement	Sensitive to Context	Iconic in Place	Timeless Qualities	Human Scale as Needed	Visual Amenity for the campus	Operations and Maintenance Considerations
University	5	5	1	3	4	4														4	5	5				5		5	5
Campus					5		5	5	5	5	4	4	5	4	3	3	4	3	5	4	5	5	5	5	5		5	5	5
School/ College		3	1		3	3	5	5	5		4							3	4	4	4	4	4	5	5	5	5	5	5
Site											4	4	5		3			3	5	5			5	5	5		5	5	5
Total						37											82						82						95