RESTORATIVE CAMPUS LANDSCAPES

FOSTERING EDUCATION THROUGH RESTORATION

by

JOSEF GUTIERREZ

A REPORT

submitted in partial fulfillment of the requirements for the degree

MASTER OF LANDSCAPE ARCHITECTURE

Department of Landscape Architecture
College of Architecture, Planning and Design

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Approved by:

Major Professor:
Laurence A. Clement Jr. , JD, ASLA

Abstract

Restorative landscapes are a growing trend within health care environments and can have a lasting impact on people if applied within other settings, particularly higher education campuses. Their design captures the many healing qualities of nature that humans are instinctively attracted to (Heerwagen, 2011). Within restorative landscapes, people have been historically found to experience relief of stress, improved morale, and improved overall well-being (Barnes et al., 1999). While campus planning standards do consider the outdoor environment as an extension of the classroom, higher education campuses can do more to utilize the cognitive benefits of nature for students, faculty and staff.

This project explores principles and theories of restorative landscape design, empirical psychological research, and campus design to develop a framework that facilitates the creation of restorative campus spaces on higher education campuses. In partnership with the Office of Design and Construction Management at the University of Kansas, the framework was subsequently applied through the design of the landscape for the Center for Design Research on the KU campus.

In the context of current campus planning challenges, restorative landscape design is a potentially valuable strategy in strengthening the beneficial roles and efficacy of the campus landscape. This design project explores its application to envision places within a higher education campus that, along with other benefits, relieve stress for students, faculty and staff.

restorative campus landscapes

Restorative Campus Landscapes:
Fostering Education Through Restoration

A report submitted in partial fulfillment of the requirements for the degree:
Master of Landscape Architecture

Department of Landscape Architecture/Regional Community Planning
College of Architecture, Planning & Design
Kansas State University, Manhattan, Kansas

Committee Members:
Major Professor:
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Secondary Member:
Katie Kingery-Page | Assistant Professor | Landscape Architecture | Kansas State University

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Candice Shoemaker | Professor | Horticulture, Forestry, and Recreation Resources | Kansas State University

In partnership with:
The Office of Design & Construction Management | The University of Kansas

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introduction

Humans have an instinctive attraction to nature, which in terms of this project, refers to outdoor environments and their biophysical characteristics (Heerwagen, 2011). People intuitively spend time outdoors, whether for work, play or relaxation. The type of space they use may be dissimilar as well, such as a plaza, garden, or farm. No matter the occasion, spending time with nature is a basic human need and not an amenity (Heerwagen, 2011). This attraction implies that nature has a distinct positive impact on human well-being. Time spent in outdoor environments often provides a lasting improvement in everyday living.

Restorative landscape design focuses on the innate human attraction to nature. The term, restorative, refers to the psychologically rejuvenating effects on human well-being. Restorative landscapes are typically designed to invoke specific outcomes for people, such as healing or contemplation. This area of design has been a growing trend within landscape architecture. Because of their positive therapeutic effect on people, restorative landscapes commonly occur within hospital or healthcare environments. Therefore, there is an opportunity for landscape architects to apply restorative landscapes in other areas of design (Thwaites et al., 2006). Capturing the benefits of human interaction with nature can be an influential aspect of landscapes outside of healthcare settings. This project explores how restorative landscapes can be implemented within higher education campuses, specifically, in order to create spaces that relieve stress and improve overall well-being.

personal motivation

Landscapes have a profound impact on people. As landscape architects, our designs can greatly influence them in positive ways. In my eyes, this aspect is an extremely powerful and meaningful part of the profession. This notion stood out to me at the 2011 ASLA Conference during two sessions hosted by Richard Louv and Mario Nievera. Both lectures spoke about the lasting impact that landscapes have on the people that experience them. Nievera spoke about creating landscapes that appeal to the senses and therefore invoke meaning within its users. Listening to the lecture reinforced why I initially began studying landscape architecture. Upon speaking with the lecturers afterwards, I had thought about how I could somehow apply this concept to a master's project. Louv's following lecture brought that idea to fruition as he spoke about increasing access to nature within design and making the most of its restorative qualities. It was an aspect of the profession I had not otherwise thought of, but had struck me that day. As a student and through further research in other classes, I was inspired to apply the principles of restorative landscape design within campuses in order to create more meaningful spaces for students.

definition 01
project details

dilemma

Literature related to restorative landscapes primarily links their design to healthcare environments. Current campus design strategies lack an explicit emphasis on utilizing the restorative qualities of nature. The rigorous challenges that higher education imposes create an immensely stressful environment for its students. The campus landscape, which evolves to meet the current needs of its users, should further engage students, faculty, and staff. Therefore, the dilemma persists:

Higher education campuses seldom incorporate restorative landscapes designed with the intent of facilitating student well-being and education.

research question

How can restorative or therapeutic landscapes be implemented in higher education campuses to relieve stress and improve the well-being of its students, faculty, and staff?

project goals & objectives

Goal: To discover the potential value that restorative landscapes have for higher education campuses and the institution itself

Objective: Design a framework diagram for creating restorative landscapes within higher education campuses that will relieve stress for students, faculty, and staff

Goal: To understand how to create a functional outdoor campus space that can foster education and community interaction

Objective: Design the landscape for the Center for Design Research at the University of Kansas at a master plan scale and at a site scale

Figure 1.01: Project Site

Bob Billings Parkway

Westbrooke Drive

Westbrooke Circle

Figure 1.02: Center for Design Research

Figure 1.03: Center for Design Research

project site

The chosen project site is the landscape that serves the Center for Design Research (CDR) at the University of Kansas. It lies on the West Campus of the university, which is about a mile away from the main campus. The CDR building itself was designed and constructed by Studio 804, a design-build architecture studio on campus. It is part of an adaptive reuse of an historic family-owned dairy farm west of the Lied Center on the main campus. The CDR facility in particular was built between an existing house and barn, both of which have been renovated. Recently opened in 2012, the CDR serves as a sustainable facility for design research, conferences, and meetings. The renovated house and barn will soon be used as offices and studio space respectively.

Lawrence, Kansas
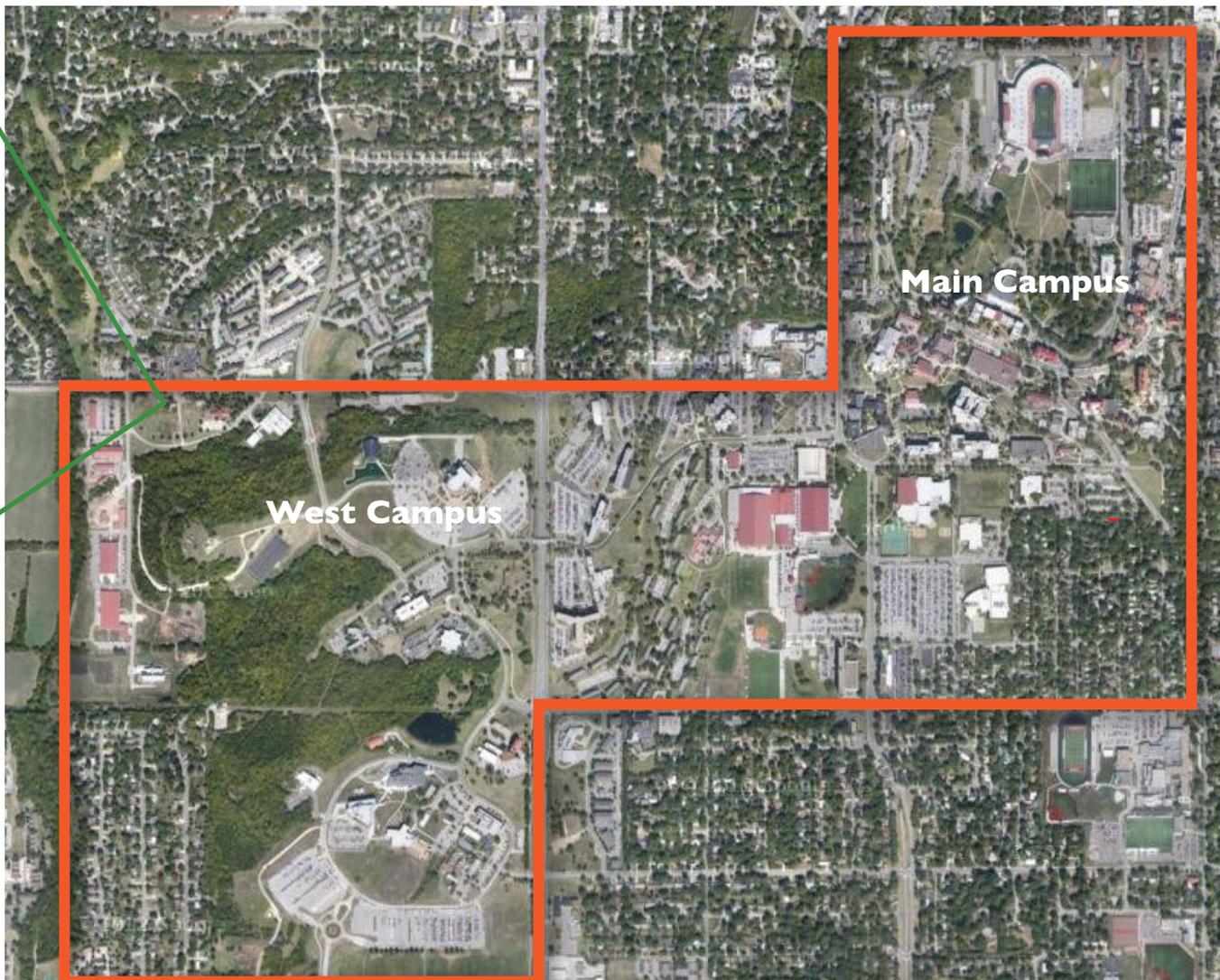
Figure 1.04: Campus Location Map (by Author)

Chamney Family

Family History

The property of the CDR was formerly owned by local farmer, Harold Chamney, and his family. Known as the Chamney Dairy Farm, the farm was one of the largest dairies in Lawrence. Harold Chamney started the farm in 1912, and became a recognized farmer by the 1930s (Hawley 2010). His farm became the first dairy to incorporate an in-ground silo, terraced farming practices, and a milking parlor. The parlor became instrumental to his success and advertisement as it allowed visitors to view the milking process through a glass window (Hawley 2010). His style for innovative technologies helped him earn the honor as one of 10 master farmers in Kansas (Hawley 2010). By the 1940s, they were known for their home deliveries of "farm-fresh" milk to roughly 300 customers, which included local professors and two groceries (Hawley 2010). Each member of the family contributed to its dairy business, children and future grandchildren included.

By the early 1960s however, the dairy business had slowed and was forced to shut down in 1970 due to the development of a new four lane road, now known as Bob Billings Parkway, adjacent to the property (Hawley 2010). The new road cut through farm property to allow for easier access to KU basketball games (Thomas 2011). During that time, the University of Kansas had purchased over 130 acres of property from the family to complete the development (Hawley 2010).

University of Kansas Ownership

Today, the farm's fields are still owned by the Kansas University Endowment Association (KUEA) (Thomas 2011). Only three of the farm's original 10 buildings still exist: a house, a barn, and a bull stable. Since the farm's closure in the 1970s, the buildings housed local departments on campus. The bull stable was used for a ceramics studio. The barn was used as a glass-forming studio. The house had been occasionally used for Interior and Industrial design classes (Thomas 2011).

Since 2004, the Department of Design had been planning for a renovation of the property (Thomas 2011). By this time, the buildings were abandoned and wearing down. In 2009, KUEA approved a proposal for the property to house the development of the current Center for Design Research (Thomas 2011). The house and barn were renovated as well during the construction of the CDR facility. The Center for Design Research aims to follow the footsteps of Harold Chamney and produce innovative ways of solving problems through collaborative efforts.

Figure 1.05: Historic Chamney family farm

University of Kansas

History

The University of Kansas was born in 1855 when a provision was passed by the first legislature. Despite this, the institution faced many hardships on its way to its formal opening in September, 1866 (Ward 2002). Amos A. Lawrence, whom the town was named after, had initially made plans for a college to be built on the hill west of the town, Mount Oread (Ward, 2002). Though efforts were made, the institution was thwarted from growth as several local churches also desired to establish a college. From 1856 to 1860, several Church denominations made efforts to establish an institution in the town of Lawrence, Kansas. The Presbyterian Church followed Lawrence with two attempts to establish a college but was inevitably stalled due to financial constraints (Ward, 2002).

The establishment of an institution was later initiated by the Kansas State government. The Leavenworth constitution of 1858 and the Wyandotte constitution of 1858 both had provisions that allowed for an establishment of a college university (Ward, 2002). The state of Kansas was later admitted to the Union in 1861, and therefore adopted the Wyandotte constitution. Congress then reserved 72

sections of land for the institution to be selected by the governor (Ward, 2002).

Though it was widely presumed that Lawrence would be the chosen place for the university, several towns were in contention for the place of the university, including Manhattan and Emporia (Ward, 2002). Manhattan later withdrew from the selection process due to the fact that they had recently received the agricultural school. Lawrence eventually won the rights to the location but by one vote of the chairman of the legislature (Ward, 2002). The state had also set a provision that the college would go to Emporia if the city of Lawrence could not fulfill its promises of 40 acres of land and $15,000 in endowment money. As they approached the deadline, it was feared that Lawrence would lose the rights to the institution, but a late donation from Amos Lawrence helped Lawrence secure the university (Ward, 2002).

By 1864, the Kansas legislature officially passed a law organizing the university. As the University of Kansas, the institution was modeled after the University of Michigan. When the doors opened in 1866, there were six departments: "the department of science, literature, and the arts; the

department of law; theory and practice of elementary instruction; the department of agriculture; and the normal department" (Ward 2002).

Campus Master Plan History

In 1904, the campus for the university had evolved from a series of "outdoor rooms" when George Kessler implemented the institution's first master plan. The Kessler plan incorporated a main academic building, now Wescoe Hall, to anchor a grand mall that served as an axis for the entire campus. It featured parks and residence halls located along the axis (KU Design & Construction Management 2013).

The second master plan for the university was developed by Hare and Hare, a landscape architectural firm in Kansas City. Like the Kessler Plan, it focused on a main academic building, Frank Strong Hall (KU Design & Construction Management 2013). However, the plan removed the north-south axis that dominated the campus. Though there were several developments, the master plan did not predict the impact of streets, parking, and vehicular access (KU Design & Construction Management 2013).

Figure 1.06: (Top) University of Kansas Campus
Figure 1.07: (Bottom) 1904 Kessler Master Plan Aerial

The next plan was the 1973 Physical Development Plan. By this time, there were statewide regulations put in place in order to ensure the needs of Kansas and the needs of the school programs. The plan was initially developed with a land use plan by the KU Office of Facilities Planning. Van Doren-Hazard-Stallings-Schnacke, a Topeka firm, completed the final document. The plan focused on serving the academic programs through more organized spaces, more service functions through non-traditional facilities, and improved circulation systems that aid vehicular and pedestrian accessibility.

The most recent plan was designed internally by KU in 1997 (KU Design & Construction Management 2013). It was a design that would serve as a 20-year plan for future development. Its two guiding principles were to "preserve the beauty of Mount Oread," and to "create an environment which shows respect for learning" (KU Design & Construction Management 2013). It also focused on the physical development process, addressing the visual quality of the campus, the facilities needs, safety concerns, potential development sites, and transportation needs.
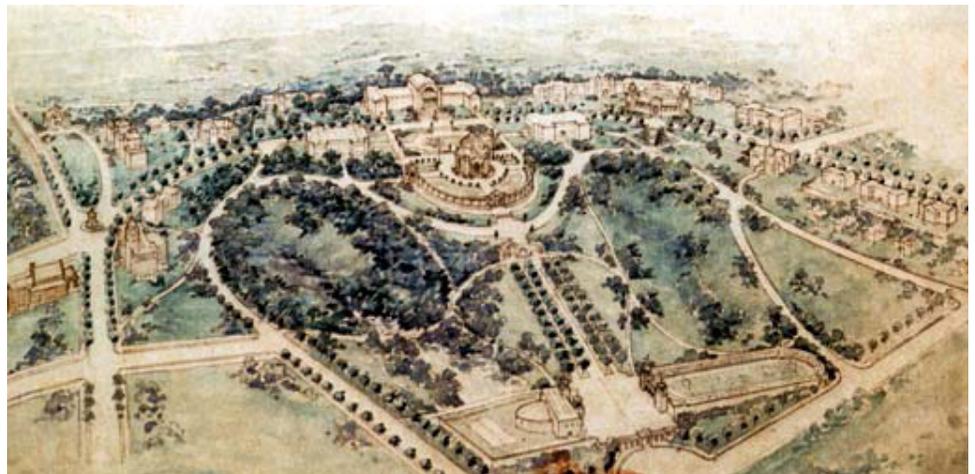
Office of Design & Construction Management

Project Requirements

In partnership with Ms. Peg Livingood, landscape architect and project manager at the Office of Design and Construction Management at the University of Kansas, a design project for the landscape of the Center for Design Research (CDR) at the University of Kansas will take place. The project will seek to answer the previously mentioned research question as well as serve the project needs of the university.

The Office of Design and Construction Management seeks to revitalize the immediate landscape for the CDR so that it supports the needs and functions of the adaptively restored buildings. The project calls for outdoor classrooms, spaces for contemplation and gathering, and a connection to the existing bike trail on campus. The project will guide the built design of this immediate landscape in the near future. In regards to the master plan, there are efforts for future development of new buildings and infrastructure within the site (which would require additional phasing), but its design is not dependent on this project. Therefore, the master plan development within this project will be predominantly hypothetical, and may serve as inspiration for future plans.

Project Relationship

Design work for the Center for Design Research was conducted in consultation with Ms. Livingood, Allison Gerth, and Gregory Thomas, a professor for the School of Architecture at the University of Kansas. The communication was important, as I have limited transportation to the site. Initial meetings and site visits took place early in the Fall 2012 semester. Correspondence also took place week-to-week upon necessity. Face-to-face meetings were for presentations and review.

For theoretical and design feedback, the majority of the communication was conducted with major professor, Lorn Clement. Through him, I received the opportunity for this project at the University of Kansas. Regular face to face meetings between he and I were scheduled during typical studio hours (Monday, Wednesday, and Friday afternoons). Additional committee members include Katie Kingery-Page, an assistant professor in the Landscape Architecture department, and Candice Shoemaker, a professor of Horticulture and Human Health. They provided feedback throughout research and design development.

relevance to landscape architecture

There is a lack of literature that explicitly argues for the use of restorative landscapes within campus design. Its integration and implementation can be a new and valuable strategy for 21st Century Campus Planning. Major investments are continuously made to improve the physical campus environment (Eckert 2012). Restorative landscapes provide a positive impact on education, the primary reason institutions exist in the first place. If the landscapes we design for students could potentially help them perform and learn, then not only will the value of campuses increase, but the value of the institution itself will rise as well. With such value, campus design has the potential to be more successful. In addition, the project may serve as a precedent for future restorative design work on higher education campuses.

	AUG.	SEPT.	OCT.	NOV.

DURATION

MISCELLANEOUS TASKS OR EVENTS

-LAR 704:
 projects 1 & 2
-PLAN 660
 salon #1 &
 project 1

-LAR 704:
 projects 3 & 4
-PLAN 660
-LAR 645
 presentation
-Alice's wedding

-LAR 704: final
 project
-PLAN 660:
 Video Appointment
-Work: Bramlage security
-Thanksgiving Break

PROCESS

(project definition) → (research) → (inventory & analysis) → (design development) → →

TASKS & DEADLINES

-preliminary
 research
-determination of
 project site
-research question
-project definition

-gather literature
-literature map
-proposal document
 draft

-site visit
-meeting with
 stakeholders
-site inventory
 diagrams
-site analysis
 diagrams

-develop program
-master plan
 development
-document design
-design framework
 development
-final proposal
 document

design process

The methodology behind this project was carried out through the stages of development shown above. The work plan shows the design process as well as the individual work that was developed over the Fall and Spring semesters. The plan revolves around five development stages: Topical Research & Literature Review, Inventory & Analysis, Creation of a Design Framework, Application through Site Design, and Project Production & Design Communication. Each stage is discussed in the forthcoming section, *Investigation*.

DEC.	JAN.	FEB.	MAR.	APR.	MAY

-LAR 704: final
 project
-PLAN 660:
 Final Project
-Christmas
 Break in San
 Diego

-Christmas Break
 in San Diego
-update portfolio
 and resume
-Spring semester

-LAR 560 Tech Mod:
 invesitgative reports

-LAR 745 Professional
 Practice: case studies

-Spring break

-LAR 560 Tech Mod:
 invesitgative reports

-LAR 745 Professional
 Practice: case studies

site design   **project production**   **document composition**   **revisions**   **submittal**

-finalize master
 plan
-finalize design
 framework
-consult with
 stakeholders
-detail site scale
 design

-design graphics
-final document
 text
-mid-crit
-design revisions

-finalize book
 document
-substantial completion
 presentation

-revise design and
 book document
-final product
-final defense

Figure 1.08: Work Plan (by Author)

RESTORATIVE CAMPUS LANDSCAPES

PROMOTING
HUMAN
INTERACTION
- ENHANCING THE COMMUNITY
- ENCOURAGING FURTHER INTERACTION
THROUGH

PARTICIPATORY
LANDSCAPES
- SINCE THE STUDENTS & TEACHERS
FREQUENT THE CAMPUS MOST
SHOULD THEY DICTATE THE
IMPORTANT DESIGN DECISIONS?

HISTORICAL
RESEARCH
- PRECEDENT?

COMMUNITY DEVELOPMENT
- CONNECTING WITH
STUDENTS
- BUILDING UPON STUDENTS
INTERESTS

ENHANCING SENSE OF PLACE

"NATURE"
- ANY SINGLE ELEMENT OF THE "NATURAL
ENVIRONMENT" (i.e. PLANTS, ANIMALS, etc.)
- REFERS TO CONNECTION TO THE GEOLOGICAL,
HYDROLOGICAL, BIOPHYSICAL, BIOCHEMICAL
PROCESSES THAT HAVE OCCURRED THROUGHOUT
TIME TO CREATE THE EARTH AS IT IS TODAY

21ST CENTURY
CAMPUS
PLANNING

research **02**
literature review

literature map

The literature map (shown right) illustrates the approach that was used to research and organize relevant literature. It identifies three broad categories and theoretical limits that were deduced to be central to the project development. Articles, books, and other literature were grouped in to these categories, and key ideas were drawn from them. Each of these findings was subsequently summarized within the forthcoming literature review. The development from this map formed the basis for the creation of a framework for design.

campus design

place-making

Daniel Kenney
Clare Cooper Marcus
Stefanos Polyzoides

fluid figures of open space

"park-once" principle
interconnectivity
pedestrian network

student engagement

campus sprawl
education
campus use
interaction

typological unity

architecture
open space

restorative design

exposure to nature

cognitive benefits
Stephen Kaplan

experience of place

human perception
place identity
sensory appeal
Martha Tyson

healing

stress relief
illness recovery
horticultural therapy
Marni Barnes
Clare Cooper Marcus

psychological theory

information exchange

symbolic language

"view from the window"

Roger Ulrich
restoration
healthcare

attention restoration theory

Stephen Kaplan
direct attention
involuntary attention
mental fatigue

the restorative experience

compatibility
extent
fascination
escape
William Sullivan
Frances Kuo

restorative campus landscapes

Figure 2.01: Literature Map (by Author)

psychological research

Extensive scientific research already exists pertaining to the restorative value of nature, which again refers to outdoor environments and their biophysical characteristics. The specific research that is important for this project is: why people need restorative experiences and how nature provides the best cure to provide it.

Causes of Stress

Stephen Kaplan, a professor of psychology at the University of Michigan, developed a theory called the Attention Restoration Theory (A.R.T.), which examines information exchange between people and the environment. This process of information exchange is largely tied to human attention, which is voluntary or involuntary. Involuntary attention is effortless engagement of the mind. In contrast, voluntary attention requires effort and energy, and is referred to as "directed attention" (Kaplan 1995). It is susceptible to fatigue, such as through extensive mental effort. The result may have emphatic negative impacts. Because of the possibility of fatigue, directed attention is important to human effectiveness (Kaplan 1995). It can influence problem solving, perception, thought, or feeling. This becomes an issue due to the fact that humans are

"addicted" to information (Kaplan 1995). "Information overload," which decreases one's directed attention, is a common cause for stress, the most perceived problem that restorative landscapes aim to relieve (Thwaites et al. 2006). Kaplan's theory focuses on restoring this voluntary attention, for it will not only relieve stress but also improve mental well-being and effectiveness.

The Restorative Experience

The restorative experience can be used in several ways to restore directed attention. Sleep, where involuntary attention is high, is a common way to do so. However, it is largely inefficient. After careful research by psychologists, such as Kaplan and Roger Ulrich, several components have been found to be crucial in creating a restorative landscape. They include: engaging fascination, providing a "temporary escape," providing extent, and providing compatibility (Kaplan 1995) (Ulrich 1999). Fascination provides opportunities for reflection. An "escape" allows one to temporarily avoid the rigors of one's life (and therefore reduce resultant mental fatigue). Extent enables the environment to engage a person's mind; thus providing interest. Compatibility refers to one's place identity (as discussed earlier)

(Kaplan 1995). Based on their findings, these opportunities provide a comprehensive restorative experience, which is able to manage or relieve stress and restore directed attention.

The Value of Exposure to Nature

A restorative landscape aims to increase human access to nature. The broad definition of "nature" implies its various qualities and characteristics. Nature does not necessarily refer to a remote environment or an undeveloped piece of land. Restorative landscape design harnesses the variety of landscape forms that may represent nature. As Stephen Kaplan mentioned in the book, With People In Mind, "the focus is on the setting rather than the plants themselves, and on flora rather than fauna" (Kaplan et al, 1998).

Nature has been found to have positive benefits on human well-being (Ulrich 1999; Kaplan et. al. 1998). The theory that nature relieves stress dates back centuries. Past research suggests that nature, such as scenes of vegetation or water, has been historically associated with relaxation and that people learn this association over time (Ulrich 1999). For example, people go on vacation

to rural or remote areas for relaxation. The urban context that they are escaping from represents the stressful environment. Built environments are often characterized as "taxing or excessively stimulating" (Ulrich 1999). Work environments too are often characterized as detrimental to restoration due to "visual complexity, noise, intensity and movement" (Ulrich 1999).

Empirical findings over the last three decades have been performed in efforts to validate the value human interaction with nature. Roger Ulrich, Professor of Architecture at the Center for Healthcare Building Research at Chalmers University of Technology in Sweden, has performed numerous studies regarding the health benefits. One in particular studied hospital patients and 95 percent of those interviewed reported a positive change in mood as a result of spending time outside (Ulrich 1999). Ulrich also found that a mere view from the window within patient's rooms had a prominent effect on therapy (Ulrich 1999). Due to his evidence, restorative landscapes have become a large influence on healthcare patient recovery.

Another study by Marni Barnes and Clare Cooper Marcus, authors of the book,

Healing Gardens, asked university students where they preferred to be when stressed. 71 percent of the interviewed students preferred outdoor settings (Barnes et al. 1999). Other school related studies, such as those performed by Frances Kuo, have shown that students who increased their exposure to nature improved their test scores as opposed to those who did not (Kuo 2010).

Beyond improved overall well-being, research studies have also shown that proximity and exposure to "green" environments will result in a better quality of life, especially for those with behavioral and cognitive problems (Taylor et. al. 1998). Studies by Faber Taylor, Angela Wiley, Frances Kuo, and William Sullivan have reported decreases in aggression and violence as well as a positive impact on children with Attention Deficit Disorder (ADD). People within urban environments devoid of significant green space were therefore found to be at risk of social and psychological breakdowns in behavior (Taylor et. al. 1998; Sullivan 2005).

These previous research theories and empirical findings suggest that nature has a profoundly positive impact on

human well-being and social behavior, and promote further experiences of outdoor green environments throughout daily living. Such evidence therefore guides and informs restorative landscape design, the forthcoming section.

restorative landscape design research

Brief History

For centuries, designers and planners have harnessed particular attractive qualities of nature to invoke restorative responses (Thwaites et al. 2006). Greeks were early proponents of utilizing southern orientation for their courtyards. This was a decision thought to facilitate dreaming and subconscious thought, which they believed to be central to the curing process for patients (Thwaites et al. 2006). Frederick Law Olmsted was also known to capture the benefits of nature, for he believed people would further enjoy the spaces he designed if they were properly exposed to seemingly natural environments (Kaplan 1995).

Design Philosophy

Restorative landscape design emphasizes human "healing" through exposure to nature. The term, "healing," may imply several different meanings, such as illness recovery or relief. In regards to this project, the term, "restorative," refers to an improvement of human well-being, such as through stress relief. This type of design is also referred to as biophilic design, and stems on the interaction and relationship between people and their surrounding environment (Wilson

1984). This type of interaction, also known as biophilia, is essential to human living, and is not merely a cultural amenity (Heerwagen 2011). Because of it, the concept of the experience of place becomes a critical component of restorative landscape design (Barnes et al. 1999). Sense of place "defines the identity, significance, meaning, intention, and felt value given to a place" (Williams 1999). Consideration of this component entails understanding how people perceive space, react to it, and use it. Through restorative spaces, designers are intentionally invoking an emotional response in attempts to "heal" its users. This cannot be done successfully unless the interpretation of space is understood (Barnes et al. 1999).

Human perception of space begins immediately. There is a "symbolic value" that is inherent within the environment (Barnes et al. 1999). It triggers several different emotions, each subjective to the particular environment that one experiences. It also communicates information that is quickly picked up by our sensory organs but slowly received by the conscious mind (Barnes et al. 1999). This intrinsic symbolism allows people to define their place within that environment (whether they belong and whether they are a participant or observer).

For example, when a person approaches a gate, they quickly perceive whether or not they are invited. A closed gate is uninviting while an open gate communicates a welcoming signal. Beyond these initial stages, there is a level of "filtering," where the images that had been previously observed trigger an additional emotional response, often dictated by past experiences (Barnes et al. 1999). During this stage, people may become unhappy, stressed, relieved, etc., depending on the information communicated by that environment's symbolic language. The resultant emotion determines one's "place identity," or fit within their location. If that fit is determined to be healthy, then that environment is deemed restorative (Williams 1999).

Given the amount of information that the environment already conveys, people strive for more (Kaplan 1998). Because one must determine their "fit" within their surroundings, there is a basic need to understand them as well as find opportunities for exploration. In recognition of this need, Kaplan developed a preference model for natural scenes, known as the Understanding-and-Exploration Framework, so that restorative landscapes can be designed to suit the human inclinations

(Kaplan 1998). The framework is based on the human perception of images (as mentioned earlier). Kaplan explains that the initial stages of viewing represent the two-dimensional plane or "surface" of the environment. The later stages of viewing represent the three-dimensional plane and involve "the inference of what is deeper in the scene (Kaplan 1998). Four informational factors, coherence, complexity, legibility, and mystery, are entailed within the preference framework (shown below). Coherence and complexity are based within the two-dimensional plane, and quickly provide information such as scene's number, grouping or placement. Legibility and mystery infer the third dimension to the user; thus, allowing people to picture themselves within the scene (Kaplan 1998).

Coherence: the level of order that a scene possesses. A coherent scene is orderly, which often makes it easier to understand

Complexity: the level of richness that a scene possesses. Richness or variety within a scene promotes exploration

Legibility: the level of distinctiveness that a scene possesses. A legible scene has

identifiable components, such as landmarks that help with wayfinding.

Mystery: the suggestive quality of a scene that infers that there is more to see. Curved paths and obstructed views are common in a scene with mystery.

These factors help people understand their surroundings as well as find the potential for its exploration. They are how people relate to their environment; thus, making it crucial to design of restorative landscapes.

Design
Restorative landscapes require careful consideration of its users. Designers must be aware of the "feeling" that is imposed by space (Barnes et al. 1999). It is the most crucial aspect. Because of this, there are several design approaches, traditional, botanical, and people-oriented, that are typical of restorative landscapes (Barnes et al. 1999).

Traditional Approach
The traditional approach to restorative landscape design focuses on historical precedents, regional characteristics, and art (Barnes et al. 1999). Historical precedents

include designs that are known to provide healing benefits for people. Their proven success guides this traditional approach, as they continue to be applied within modern day landscapes. Such precedents include: Japanese gardens, the labyrinth, and the monastic cloister garden. With history tracing as far back as 2000 B.C., these precedents are found to successfully serve its users. Each is a "conscious creation of psychologically oriented design" (Barnes et al. 1999). As a result, these precedents still contribute to the design of today's healing spaces.

Regional characteristics are also important to maintain when designing restorative landscapes. Drawing upon these characteristics will breed familiarity and comfort for those experiencing the space (Barnes et al. 1999). This is important, as people are able to establish their "fit" or "place identity" with their surroundings.

Statement art can be used as a strategy for doing so. They are represented by installations or landmarks, which invoke a message to those within the space. The artistic qualities of these installations may spark "fascination" or provide a temporary "escape." If they convey this type of

response, the healing landscape is more successful.

Botanical Approach

The botanical approach concentrates on maintaining sustainable spaces and the use of medicinal plants (Barnes et al. 1999). Sustainability within restorative landscapes means creating spaces that can thrive without depleting the natural resources of the surrounding environment. Such harmony with the environment will therefore invoke a similar sense of harmony for people. This effect may occur on a conscious or subconscious level. The concept is that if this harmony within a landscape is maintained, then it will naturally extend to all living things in that environment (Barnes et al. 1999).

This approach is also important to design. The concept of horticultural therapy, or "gardening used to improve a human's psychological, physical, educational, and social adjustment," has become a valuable treatment for psychiatric patients (Mattson 2008). Recreational planting or gardening have been found to have therapeutic benefits. An influential proponent of this practice was Dr. Karl Menninger, an American psychiatrist from Topeka, Kansas.

He believed that through horticultural therapy, patients are able to "make a cooperative deal with nature for a prompt reward" (Mattson 2008). Such a reward may include recovery, attention restoration, or other cognitive benefits that were previously mentioned.

People Oriented Approach

The last approach focuses on the personal user experience in particular. As designers it involves researching and understanding the personal experiences of those we are creating space for. This understanding will allow the design to connect with the users on a deeper, more personal level. Because of this, stress reduction, compatibility, fascination, or other therapeutic qualities may take place more effectively. Typically, this approach will supplement clinical practice and catering to the needs of ill patients. Despite this, the people-oriented approach may be used elsewhere in design, for it takes into consideration the needs of people, and not patients alone. (Barnes et al. 1999)

Restorative Space Typologies

In addition to the typical approaches to design, Barnes and Cooper Marcus have defined several space typologies that are instrumental within restorative landscapes

(Barnes et. al. 1999). They are known to have a great impact on the people they serve, and will be an important guideline in the design framework. The framework itself will help distill this list in order to determine which spaces are appropriate for a higher education campus, whose design principles are covered later in the chapter.

Landscaped Grounds: Extensive landscaped areas between buildings that may be used as a park or campus (Barnes et al. 1999)

Landscaped Setback: A landscaped area in front of the main entrance to a building that is not typically used but provides a visually pleasing setting to the entry (Barnes et al. 1999)

The Front Porch: Features at the main entrance that resemble the front porch of a house. Often a combination of pedestrian and vehicular access with places to sit and wait for transportation (Barnes et al. 1999)

Entry Garden: Green space close the main entrance that is designed for use, unlike a landscape setback (Barnes et al. 1999)

Courtyard: The "core" of a building

complex; has walls on all four sides and is immediately visible upon entry into the building (Barnes et al. 1999)

Plaza: Outdoor hardscapes that are furnished for use; such as for gathering and interaction (Barnes et al. 1999)

Roof Garden: Area on top of a building that is landscaped and designed for use by patients, staff or visitors (Barnes et al. 1999)

Roof Terrace: Predominantly hardscaped area with some vegetation on the side of a building; forms a "balcony" for that building (Barnes et al. 1999)

Healing Garden: Indoor or outdoor garden spaces that are specifically designed for healing and recovery (Barnes et al. 1999)

Meditation Garden: Small, quiet, enclosed space that is specifically labeled with signage as a place for contemplation (Barnes et al. 1999)

Viewing Garden: Small garden that is not accessible but is viewable from inside the building (Barnes et al. 1999)

A "Tucked Away" Garden: Garden that is set apart from the building but is reasonably accessible (Barnes et al. 1999)

Borrowed Landscape: Natural or designed landscape areas that are adjacent to new buildings; important for capturing views from within the building (Barnes et al. 1999)

Nature Trails/Preserves: Outdoor walking paths that may provide opportunities for exercise or contemplation (Barnes et al. 1999)

Atrium Garden: Indoor garden; typically in buildings where the climate does not allow for much outdoor experiences throughout the year (Barnes et al. 1999)

Restorative Landscape Precedent Study

Elizabeth and Nona Evans Restorative Garden

Location:
Cleveland, Ohio

Firm:
Dirtworks, PC

Landscape Architect:
David Kamp, FASLA

Client:
Cleveland Botanical Garden

Status:
Built (1988)

Design Concept
Set within a public botanical garden, this project focuses on capturing the restorative properties of nature for the elderly. Because the late Elizabeth Evans was a strong supporter of garden therapy, Kamp and early contributors wanted to incorporate the attractive qualities of gardens and horticulture. They believed that it would create a comfortable, restorative environment for all ages.

Program Elements
The restorative garden features three distinct areas: a contemplative garden, a demonstration/exploration garden, and a horticultural therapy garden. The contemplative garden serves as the entry space for all three spaces. Within it are a lawn space, reflecting pool, and several places for sitting. Fragrances and flowers are kept to a minimum so that the space is a truly contemplative area.

Within the horticultural therapy garden, there is an increased use of color and a sensory engaging plant palette. The garden is more spacious for horticultural therapy activities. Varieties of basil were used for their long growing season and various heights. Because this space is more public, planter walls and berms were used to create some sense of privacy for the therapy programs.

The demonstration garden is designed to encourage personal learning and discovery. It is characterized by an enclosing stone wall, which features a variety of opportunities for touching, smelling and hearing. Native stones, vibrant flowers, and a water feature were used to engage these senses. Through this sensory enriching experience, people may learn about the culture of the botanical garden and engage in group activities.

Design Approach
This project provides an excellent example of using the botanical and people-oriented design approaches. As an extension of a larger botanical garden, the Evans Restorative Garden focuses on sensory-enriching and medicinal plants to enhance its spaces. Its aid in horticultural therapy proves the impact that nature has on people. The use of three different, but cohesive gardens shows the designer's attention to the personal experience of the users. Time spent in each of these spaces provides a thorough restorative experience.

Meadow

A Garden for Learning and Exploring

Demonstration Wall w/
Plantings & Water Features

Ravine &
Japanese Garden
Beyond

A Garden for Horticultural Therapy

Fountain

Overlook

Basil Walk

Magnolia

Public Path

Lawn
Panel

Welcome

Library

Reflecting
Pool

Hidden Garden

A Garden for Contemplation

Main Path

Rose Garden

Entry

Dining Terrace

Figure 2.02: Elizabath and Nona Evans Restorative Garden Site Plan (Copyright: Dirtworks PC; Used by Permission)

Figure 2.03: (Right) Horticultural Therapy
Figure 2.04: (Bottom)Horticultural Therapy
Figure 2.05: (Far Right) Contemplative
Garden Reflecting Pool
Figure 2.06: (Bottom Right) Sensory
Engaging Plants
(Figures copyright: Dirtworks PC; Used by
Permission)

Relevant Design Components

Horticultural Therapy

Though not adjacent to a medical hospital, the restorative garden serves a botanical garden that hosts programs for anyone to receive horticultural therapy. Through these programs, people are educated about gardening, taught techniques, and brought in closer contact with nature. The designated spaces for therapy are more public, featuring less degrees of enclosure. The openness invites people to engage in the programs.

Reflecting Pool

A reflecting pool is used within the contemplation garden. These are calm water features whose linear form provides "extent" for one's mind. The green foliage of the vegetation adjacent to the pool is maintained throughout the space in order to keep the garden and pool reflections a calm environment.

Sensory Engaging Environment

Creating an environment that appeals to one's senses is important for restoration. The designers kept this in mind as they selected the planting and site furnishings. Basil is used within the horticultural therapy garden for its varying growing heights. The different heights allow people of all ages (and those within a wheelchair) to touch and smell the vegetation. Spatially, the plantings act as buffers that can obstruct views, and provide a sense of mystery or enclosure. Natural rock is also incorporated into the seating elements throughout the site. This choice of material educates people on their regional surroundings. Through these sensory engaging design elements, people are further stimulated within the garden.

Howard Ulfelder Healing Garden

Location:
Boston, MA

Landscape Architect:
Halvorson Design Partnership

Architect:
Cambridge Seven Associates

Client:
Massachusetts General Hospital

Status:
Built (2005)

Design Concept

The Howard Ulfelder healing garden is a rooftop garden located next to the oncology department of the Yawkey Center for Outpatient Care at the Massachusetts General Hospital. The original designers of the hospital wanted a place of respite for their cancer patients, but the only peaceful space available was a chapel. Once the Yawkey Center was built, a rooftop garden space was allocated. The goal was to create a place for patients to receive the restorative benefits that the outdoor environment provides. By using natural materials, the healing garden provides a comfortable setting within a typically stressful urban environment.

Program Elements

To create a tranquil space, the healing garden uses a variety of seating options situated around a primary lawn space. Individual semiprivate spaces were created this way to capture the panoramic views of the Charles River, the Longfellow Bridge, and the Boston skyline respectively. A circular path connects all of these spaces, and provides patients easy access. The further the path reaches away from the building, the less formal the path becomes, allowing patients to let their mind wander. The incorporation of natural materials provides an experience that is unlike the time spent within the hospital. Rich vegetation, wood, water, granite, and glass temporarily give patients the impression of a natural environment; thus, allowing them to "get away" from the stresses a hospital invokes.

Relevance to Project

Restorative Experience

The Ulfelder Healing Garden utilizes many of the principles that were gathered in the previously shown research. Despite its minimal space, the project is able to create a successful series of public and private spaces. Such variety of spaces gives patients several different opportunities for restoration and recovery. The expansive views of the city provide the extent that patients need to engage fascination. The tree coverage brings down the scale of the tall urban buildings and also gives a heightened sense of privacy. The close proximity of these healing spaces to the hospital completes the restorative experience.

SEATING AREA
OVERLOOKING
THE CITY

GRANITE
SCULPTURE

FOUNTAIN

OVERLOOK TO
THE CHARLES
RIVER

GRANITE
SEAT WALL

GRANITE
SCULPTURE

LAWN

RAMP

RAMP

PAVILION WITH SEATING AREA
AND PLANTING POTS

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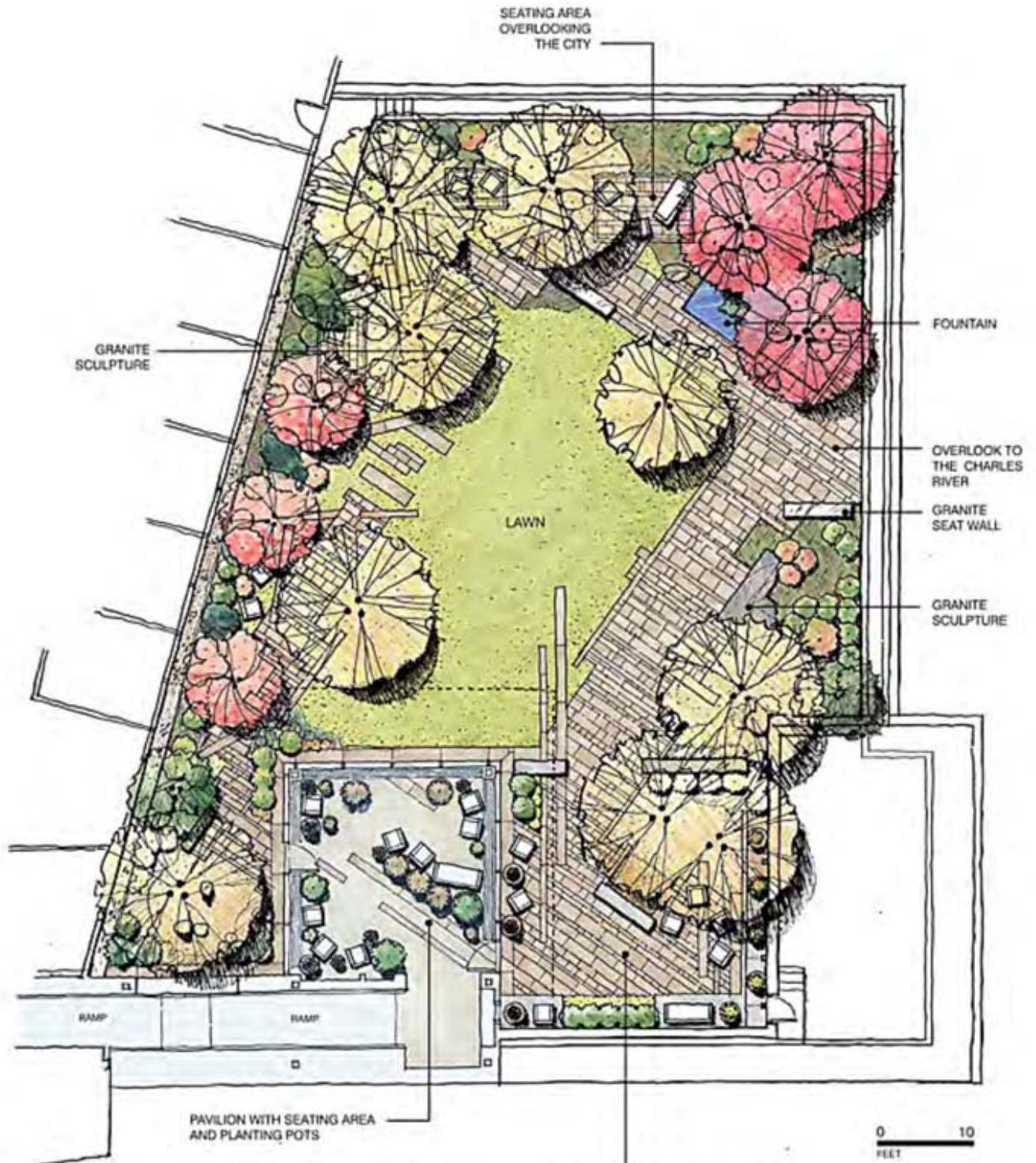
Figure 2.07: Ulfelder Healing Garden Site Plan (Copyright: Halvorson Design Partnership; Used by Permission)
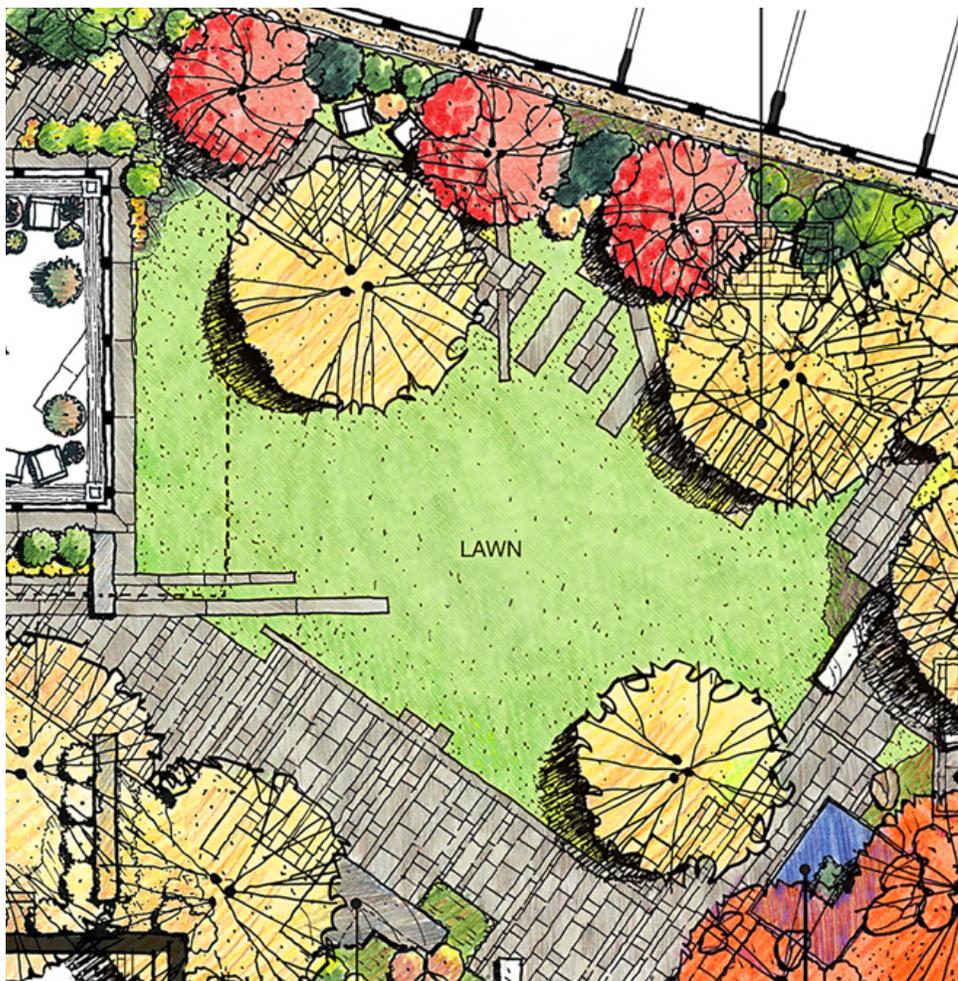
Relevant Design Components

Figure: 2.08: Rotated Grid Alignment (Left)
Figure: 2.09: Secondary Seating Alcove (Bottom Left)
Figure 2.10: Informal Site Circulation (Bottom Right)
(Figures copyright: Halvorson Design Partnership; Used by Permission)

Rotated Grid Alignment

The design for the project utilizes a rotated grid alignment. Preliminary design charrettes resulted in this chosen layout, which was found to provide more landscape space for the restorative garden.

Site Circulation

The circulation on site revolves around the central green space of the garden. Its loop around the site is instrumental to patient recovery. Patients and family undergoing much stress will not have to worry about wayfinding, as they are able to wander the paths and eventually reach their way back to the hospital. Paths also shift from formal to informal movement. This progression is represented through the materiality as it becomes less organized. The subsequent path-space relationship creates a series of semiprivate and private areas for restoration.

Secondary Spaces

Various seating alcoves are created around the central lawn space as secondary and tertiary spaces. Secondary spaces placed around the primary open space are a restorative design strategy used to accommodate the varying needs of patients. Here, each are strategically placed in order to create private contemplation areas or capture views onto the city and river. Contemplation eases the mind and relieves stress for patients. The views also engage the mind through their vast extent. In addition to quiet contemplation, alcoves provide opportunities for two people to sit, chat, and eat.

Legend

Formal Circulation

Informal Circulation

Grid

Seating Alcove

SEATING AREA
OVERLOOKING
THE CITY

FOUNTAIN

GRANITE
SCULPTURE

OVERLOOK TO
THE CHARLES
RIVER

GRANITE
SEAT WALL

GRANITE
SCULPTURE

LAWN

PAVILION WITH SEATING AREA
AND PLANTING POTS

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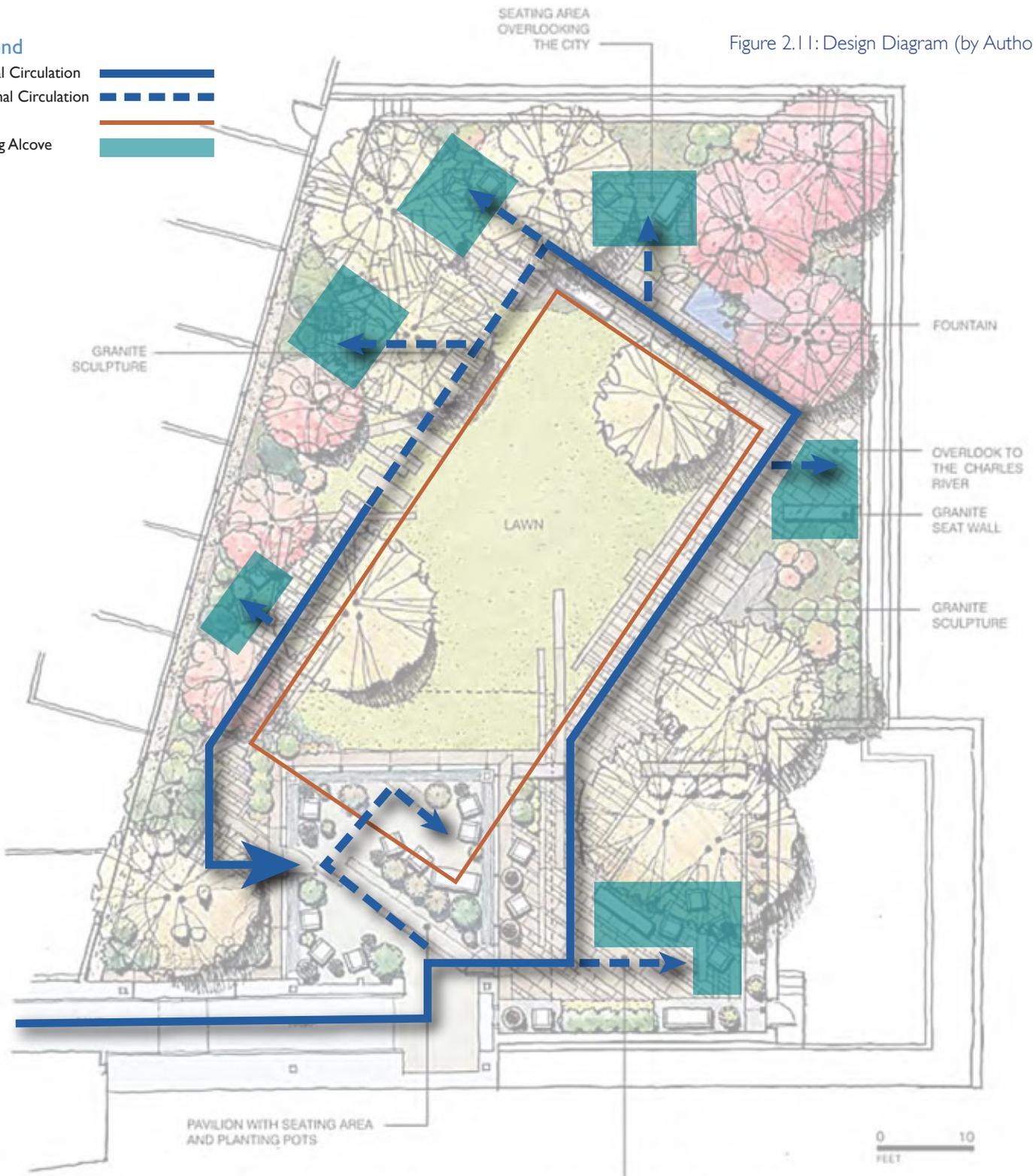
campus design research

Current Key Issues

Campuses face many unique challenges as student needs evolve. Students are "generally less prepared for college than ever" (Kenney et al. 2005). The amount of students needing remedial classes has increased over the last decade. As a result, more types of campus spaces are needed to accommodate student learning. David Orr argues that campus architecture, among other spaces, is so bland, that they have a minimal impact on the way students learn and the way they use the space (Orr 1994). This is the challenge that many higher education campuses face: keeping up with student needs.

Campus sprawl and a resultant loss of community is another concern that plagues many higher education institutions. According to Kenney, Kenney and Dumont, the feeling of community on college campuses has declined (Kenney et al. 2005). Other trends help facilitate this issue. The rapid advances in technology provide many amenities that propel students to remain indoors and disengaged from interaction. Suburbanization of the physical campus layout pushes students away from campus in search of more vibrant city-life (Kenney et al. 2005). Students often maintain busy

lives and a "loner lifestyle." For these reasons, there lies an opportunity for campuses to be rethought to foster community, campus use, and education.

The physical environment is also an issue, as it is a "marker of institutional quality" (Eckert 2012). Students spend long hours of the day on campuses that are unattractive for use or for learning. Campus buildings do little for student engagement (Orr 1994). Despite this, "more than 50 percent of student learning in college occurs outside the classroom" (Kenney et al. 2005). Campuses, particularly spaces outside of its buildings, should offer opportunities for "chance encounters," quiet reflection, and other interaction. They are instrumental to student learning (Strange et al. 2001). Good learning spaces are places that "feel good" to people, and combine nature and "interesting architecture" (Orr 1994).

The Value of Community

Promoting community has become an important value for institutions across the country. Without a strong sense of community, there becomes a higher risk of crime, ethnic hostility, property damage, drug use, and a general decline of civility

(Kenney et al. 2005). As mentioned earlier, students are then not attracted to campus use. The physical design of a campus "reveals a great deal about society's values" as well as the institution (Rybczynski 2005). If students are not inclined to use their campus space; there are negative implications for the institution itself. It implies that the campus does little to promote a "fundamental component of higher education—the free exchange of ideas" (Kenney et al. 2005). This means creating opportunities for interaction, where this exchange and expression is fostered. The physical campus design has an obligation to facilitate community and therefore provide an enriching and enjoyable campus life.

Placemaking

Like restorative landscapes, sense of place is important within campus design. Leaders and educators strive to strengthen the learning experience for their students. Their efforts are ultimately dependent to the campus experience (Kenney et al. 2005). Placemaking therefore becomes an important concept to campus design. Memorable places "create a sense of belonging." Experiencing this feeling with others therefore helps "create a feeling

of community'' (Kenney et al. 2005). By providing places that convey this message, then the quality of everyday life on campus is enhanced.

Mitigating Campus Issues

In recognition of several issues that hurt campuses across the country, Stefanos Polyzoides articulates that American campus traditions should be rediscovered when designing campus form (Polyzoides 1997). Such traditions include: interconnected open spaces, a cultivated landscape, a pedestrian district, typological unity, and stylistic variety. Interconnected open space stresses a network of open space as opposed to fragmented pieces of open space. A cultivated landscape is one that captures the environmental quality of the surrounding context in order to build its character. A pedestrian district decreases the influence of the car through compact architecture and places that are accessible on foot. Typological unity and stylistic variety emphasizes maintaining a common aesthetic while also strategically providing some visual variety of the campus façade. These traditions all strive to make the physical campus more meaningful and instrumental to its students, faculty, and staff.

Enhancing Academic Performance

According to Kenney, Kenney and Dumont, several studies show that specific landscape features have a direct influence on academic performance, which refers to grades and test scores (Kenney et al. 2005). Many of these features have been found to improve grades and help students learn more efficiently. Because the following design considerations reflect the design of the whole campus, they also help facilitate community interaction among their users.

Welcoming Environment

Provide a campus that promotes a student and teacher oriented learning environment. They should feel safe and welcome throughout the campus. Ways of doing this include: well-defined entrances or safe walking paths from building to building (Kenney et al. 2005)

Variety of Learning Spaces

Offer people a mixture of different learning spaces – with varying degrees of privacy (Kenney et al. 2005). This variety will appeal to more students, as they have options for where they desire to learn or interact. Public areas lend more opportunities for community interaction whereas quiet areas provide a place for students to "refresh

themselves" or have a "temporary escape" (Kenney et al. 2005).

Harmony with the Regional Context

The building and grounds should reflect the character of its surrounding context; therefore creating a visible harmony between the campus and the landscape (Kenney et al. 2005).

Outdoor Learning Environments

Incorporate classrooms within the outdoor landscape. The learning experience should be able to take place throughout the campus, not just indoors (Kenney et al. 2005).

Campus Spatial Typologies

A campus depends on a small number of spatial typologies to define its character. The individual designs of these spaces may vary but their functions are instrumental in creating a physical campus (Polyzoides 1997). Like the restorative landscape space typologies, these spaces will be used in the creation of the framework for design covered in the next chapter.

Patio: "A room-sized space, no more than twenty feet on one side, and is typically an outdoor extension of a single room" (Polyzoides 1997)

Courtyard: "a space not more than one hundred feet on one side, is enclosed within a building and is intended for exclusive use by a variety of rooms" (Polyzoides 1997)

Quadrangle: "a space not more than four hundred feet on one side, is distinct and finite, and is shared among many buildings" (Polyzoides 1997)

Green: "a space measured at the scale of the whole campus and which defines its ritual and symbolic center" (Polyzoides 1997)

Field: "a clearing dimensioned to accommodate athletic activities and is typically located on the edge of a campus" (Polyzoides 1997)

Building Types

Monumental Buildings: Prominently located buildings that do not serve a specific discipline. They typically have some symbolic importance; thus, they are the "most physically and spatially idiosyncratic buildings on campus." They may resemble the campus history and academic mission (Polyzoides 1997).

Academic Loft Buildings: The most common building type on campus. They tend to serve multiple disciplines and are regular in plan and section. Their exterior façades and form often shape outdoor landscape space. As the most common building, they are found in all parts of the campus (Polyzoides 1997).

Laboratory Loft Buildings: Buildings similar to the academic loft building, but serve the experimental science disciplines. They are "designed for unusually heavy requirements of mechanical supply and exhaust services" (Polyzoides 1997).

Residence Halls: Buildings that provide housing for student living. They are arranged similarly to houses or neighborhoods. (Polyzoides 1997).

Ancillary Buildings: Buildings and facilities needed to accommodate transportation and other infrastructure. Such buildings include: office lots, warehouse lots, or parking structures (Polyzoides 1997).

Spatial Types

In addition to typical building and spaces, there are also various spatial types designated in order to understand outdoor campus use. Because they resemble the qualities of a home, the spatial types are identified as such.

Home Base

The typical student most likely has a "home base" around which their daily campus activities take place (Cooper Marcus 1998). A study performed by Clare Cooper Marcus at the Berkeley campus asked roughly four hundred students on whether they could identify a home base. About 92 percent were able to recognize a space or building that they could call "home." This "home base" is typically the building of their major

department, where many or most of one's classes and other meetings may take place. Students have an inherent need to identify themselves with a place as a sense of belonging. This need results in the planning approach of viewing campus buildings as "houses" and the surrounding outdoor spaces as "front porches," "front yards," and "back yards" (Cooper Marcus 1998).

Front Porch

The "front porch" of campus outdoor space represents areas that signify a transition between a public area and a more intimate, private area. This type of transition occurs within the front porch of a house, where people transition from an outdoor "public life of community" and a "smaller social group (usually a family)" (Cooper Marcus 1998). Often times, these types of campus spaces are entryways, such as the main entrances to campus or entrances to buildings. These spaces have high concentrations of use because of their intimate areas to converse, eat or study.

Front Yard

The "front yard" of a campus building resembles the front yard of a house. It is typically a "soft," green transition from public to private space. With many hardscaped
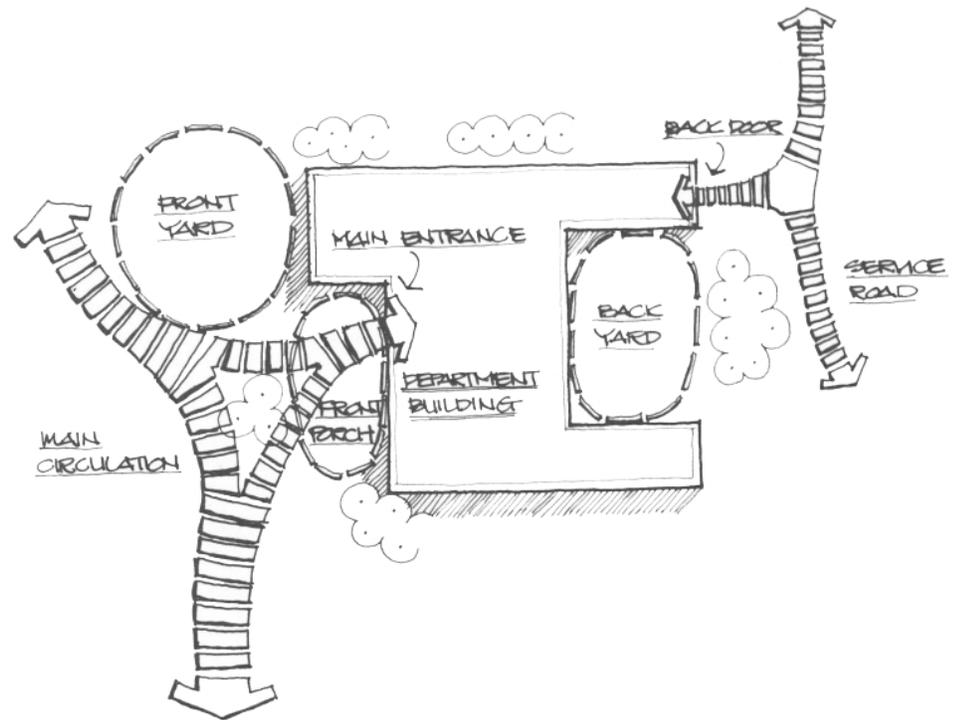
surfaces and spaces around campus, a change of environment is needed for students. A front yard is great for people to relax, sunbathe, sleep, gather, study, etc. This allows people to become familiar with their surroundings. Students will use these spaces as a relaxation spot or a "pass-through" space; thus allowing them to familiarize themselves with their surroundings. Such familiarity lets them identify a place as a "home base"

Back Yard

The "back yard" represents a more privatized area than the "front yard" or

"front porch." Like the back yard of a house, this area is separated from the public areas and may be fully or partially enclosed. This sense of enclosure and privacy will allow students or residents to gain a sense of territory. These spaces may often serve a specific department building or buildings.

Common Turf

Within a campus there are also spaces between buildings that are not tied specifically to a building. Recognized as "common turf," these areas may be of larger scale and are accessible to everyone. Such spaces include, parks, streets, or plazas.

Arizona State University Polytechnic Campus - New Academic Complex

Location:
Mesa, Arizona

Landscape Architect:
Ten Eyck Landscape Architects

Architect:
RSP Architects

Client:
Arizona State University

Status:
Built (2012)

Design Concept
This project incorporates surrounding regional characteristics and rainwater harvesting in order to revive the campus and establish new places for learning. It captures the qualities of the Sonoran desert within the outdoor campus spaces, and provides students and faculty a daily connection to nature.

Program Elements
The project implements a new desert mall, which includes a water-retaining arroyo along the major east-west pedestrian circulation, as the new heart of the ASU campus. Due to the need for stormwater solutions in the flood-prone area, native desert trees, shrubs, and cacti were used within the arroyo, which will slow run-off and retain water for onsite vegetation. Individual courtyards are created to accommodate the educational program in each building. The courtyards respect the individual microclimates created by the buildings. Among them are gathering spaces, outdoor classrooms, and transition spaces. The combination of native plants and judicious hardscape materials creates a cooler environment that provides additional comfort and social interaction for people.

Outcomes
The project helped the university shed its image as a former air force base, and created an attractive complex that propels students to use campus space as well as encourages additional student enrollment (which had increased 20 percent since completion). The innovative design strategies also connect the campus to its surrounding Arizona context, and help sustain the life of the desert.

Relevance to Project
Increasing Exposure to Nature
With past empirical studies finding the positive impact of exposure to nature, this project focuses on bringing people and nature closer together. This type of exposure, whether in large or small dosages, is known to relieve stress and improve concentration. With features such as increased tree coverage, intimate courtyards, open spaces, and a new desert mall, there are several opportunities for active or passive interaction with nature. A daily connection to the outdoor environment will spark a marked improvement on campus quality of life and on education.

Figure 2.13: Campus Site Plan (Copyright: Ten Eyck Landscape Architects Inc.; Used by Permission)

Incorporating Regional Characteristics

Much of the success of the project is attributed to the transformation of an aged Air Force base site into a vibrant Sonoran Desert campus for learning. The existing site was neither attractive nor functional as a place for learning. Its crumbling hardscapes dissuaded students from usage. By incorporating desert elements, such as vegetation and an arroyo, students become attracted to the campus. The familiarity of these characteristics helps them establish an emotional connection with the site, which is a necessary step to receiving any restorative benefits.

Figure 2.14: Transitional corridor through a courtyard (Copyright: Ten Eyck Landscape Architects Inc.; Used by Permission)
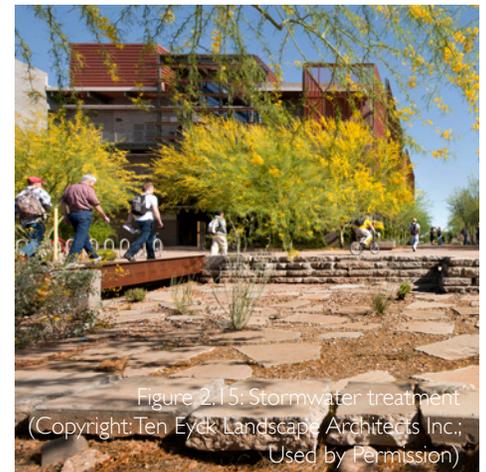

Figure 2.15: Stormwater treatment (Copyright: Ten Eyck Landscape Architects Inc.; Used by Permission)

Figure 2.16: Campus Mall (Copyright: Ten Eyck Landscape Architects Inc.; Used by Permission)

Figure 2.17: Campus Mall (Copyright: Ten Eyck
Landscape Architects Inc.; Used by Permission)

Relevant Design Components
Campus Mall

The pedestrian mall provides a primary path of circulation across campus. With this path, students are able to easily access neighboring buildings as well as the newly established courtyards. The use of decomposed granite, concrete, and offset planting helps reduce glare; therefore making it a cooler environment. As a primary path of circulation, more people are able to receive a daily experience with nature. Hence, the desert arroyo was incorporated, not only as stormwater treatment, but as a tool for students to receive its restorative benefits.

Figure 2.18: Restorative Space Diagram (by Author)

The Back Yard / The Front Porch

The project successfully creates a series of front porch and back yard spaces (as referenced by Clare Cooper Marcus). The form of the newly added buildings was used to shape semiprivate courtyards that serve their respective courtyards. The buildings provide an added sense of privacy for the courtyards; thus, making them back yard spaces. Along the campus mall, each building possesses front porch design elements, such as seating and shade, adjacent to the main entry. Here, students may sit and wait if they need a break from walking. The front yard space is loosely defined, making it accessible to more people.
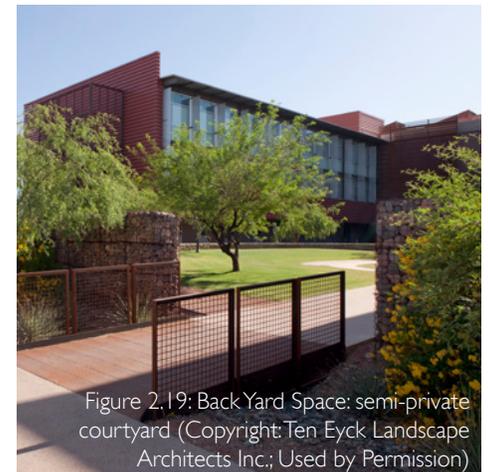

Figure 2.19: Back Yard Space: semi-private courtyard (Copyright: Ten Eyck Landscape Architects Inc.; Used by Permission)

Living Landscape Laboratory

Since the new courtyards serve their neighboring campus buildings, the project includes spaces recognized as living outdoor laboratories. These spaces combine green infrastructure with an outdoor classroom. Such green infrastructure includes features such as a riparian living sleep wall and an irrigation cistern. The quick access to the natural environment is meant to provide a restorative environment and supplement research and education.

Figure 2.20: Living Landscape Laboratory (Copyright: Ten Eyck Landscape Architects Inc.; Used by Permission)
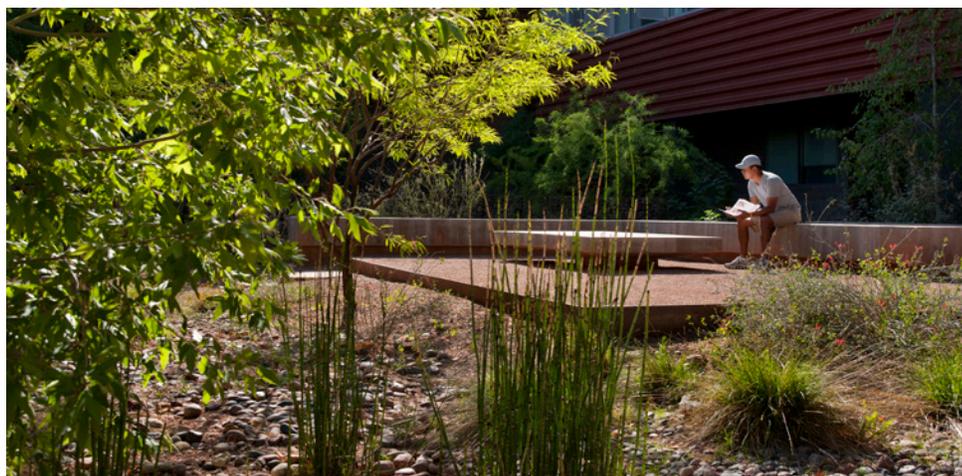
Natural Materials

The materials from the former Williams Air Force Base were repurposed for the outdoor campus spaces and parking areas. Harvested concrete paving was used for site furnishings and retaining walls. Existing river rock was used as freestanding walls within the courtyards to create separation of space and increased enclosure.

Figure 2.21: Repurposing of Natural Materials (Copyright: Ten Eyck Landscape Architects Inc.; Used by Permission)

Water

Harvesting water is important to the design concept of the site. In addition to the desert arroyo along the campus mall, native plants, living walls, and water features are used within the courtyards to create a natural, comforting Arizona environment. These water harvesting strategies are relaxing to the mind, and help support the academic activities that take place within the laboratories.

Figure 2.22: Water Feature (Copyright: Ten Eyck Landscape Architects Inc.; Used by Permission)

Figure 2.24: Bridge Outlook (Copyright: Ten Eyck Landscape Architects Inc.; Used by Permission)

Tertiary Paths

Within the independent microclimates and courtyards, many tertiary paths are used to bring people close to nature. Their defined edges help organize planting and guide sight lines. Narrower paths, coupled with the various degrees of tree coverage and enclosure, create an intimate environment. Areas with grade change feature footbridges to guide circulation. Footbridges are particularly restorative as it encourages people to stop and appreciate the views.

Figure 2.23: Tertiary Paths (Copyright: Ten Eyck Landscape Architects Inc.; Used by Permission)

restorative campus space typologies

In order to apply the typologies delineated by Marni Barnes, Clare Cooper Marcus, and Stefanos Polyzoides, some distillation needed to occur. Based on the descriptions for each, the typologies for higher education campuses and restorative landscapes were filtered under the classifications designated by Clare Cooper Marcus (shown right). This allowed for a better understanding of how restorative spaces may be applied within a campus setting. Cooper Marcus's campus outdoor space classifications were broken down into two main categories: common turf (large scale spaces) and home base (site scale spaces immediately surrounding buildings). Subcategories were used in the home base category: the front porch, the front yard, and the back yard. The typologies were placed according to the research gathered thus far, and how they fit within the categories. Not all restorative space typologies were used during this distillation because they were deduced to not fit within the typical campus environment.

The resultant typologies are shown in detail in the following pages according to these new classifications. For each typology, there is a textual description, a visual idea of what they can be, and listed characteristics from Kaplan's Understanding-and-Exploration preference model that are applicable. In addition, general design recommendations preface each main category and subcategory.

Restorative Landscapes

Landscaped Grounds

Landscaped Setback

Patio / Front Porch

Entry Garden

Courtyard

Plaza

Roof Garden

Roof Terrace

Healing Garden

Meditation Garden

Viewing Garden

A "Tucked Away" Garden

Higher Education Campuses

Patio

Quadrangle

Green / Lawn

Mall

Field

Campus Outdoor Spaces

Common Turf

Home Base

The Front Yard

The Front Porch

The Back Yard
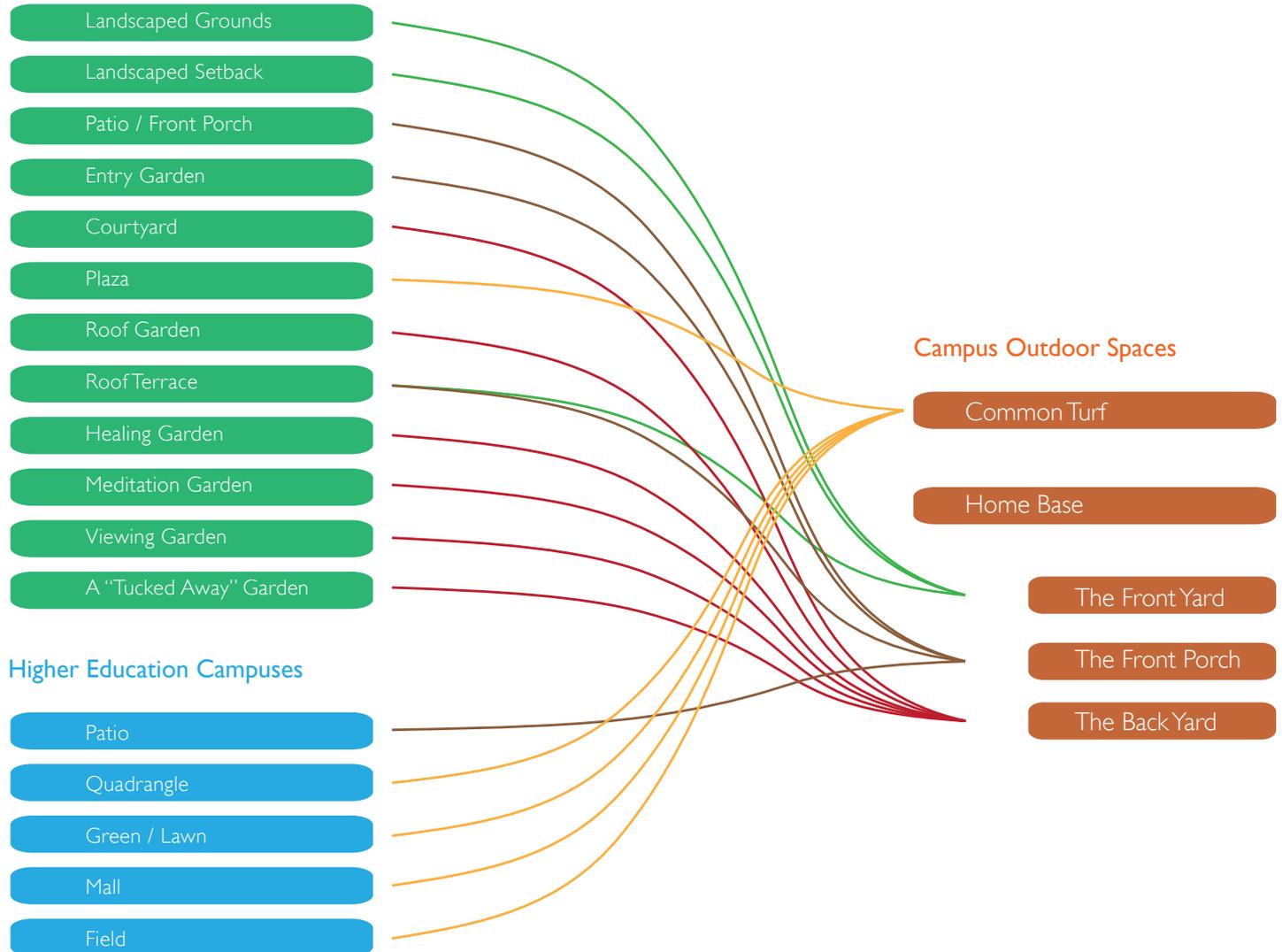
Figure 2.25: Restorative Campus Spatial Typology Classifications

common turf

General Design Recommendations

Considering the site conditions, provide a variety of "common turf" and "home base" outdoor spaces to accommodate the wide range of people on campus

Use excavated material on the site (Barnes et al. 1999)

Within cold to moderate climates, plan outdoor space with protected or high sun exposure (Barnes et al. 1999)

Minimize the amount of intrusive noise on site

"Park-Once" Principle: Students, faculty, and staff should be able to park once and not need their vehicle to travel around campus (Polyzoides 1997)

If possible, include potential users throughout the design process

Observe and study existing site patterns and behavior traces to understand what the site needs

Ensure that some outdoor spaces are separate enough from buildings that they are not perceived to be exclusively used by a specific department

In terms of wayfinding, provide adequate signage (such as campus maps) in order to minimize confusion and its subsequent stress

Outdoor space should be well-lit during the night hours of the day so that people will feel safe

plaza

Applicable Preference Model Characteristics: Coherence / Legibility

Similar to a quadrangle, a plaza is an outdoor space bounded by multiple buildings. It is a typically hardscaped space at a crossing of several pedestrian paths that provides a large space for gathering, community interaction, or circulation.

Figure 2.26: Bailey Plaza at Cornell University (by Michael Van Valkenburgh Associates, Inc.)(photo by Leigh McGonagle)

quadrangle

Applicable Preference Model Characteristics: Coherence / Legibility

This type of space is typically bounded by many buildings and is not more than four hundred feet on one side (Polyzoides 1997). They are often a major hub for students. They are typically significant crossing routes for pedestrian circulation. Quads, due to their large size, are able to accommodate a great amount of traffic.

Figure 2.27: Quadrangle at Elon University

green / lawn

Applicable Preference Model Characteristics: Coherence / Complexity / Legibility / Mystery

Set at the same scale (or larger) as a quadrangle, a campus green is also a prominent open space. It is typically a green area, such as a lawn, that is surrounded by the neighboring pedestrian routes. They are meant to be accessible, safe, and accommodating to a variety of users.

Figure 2.28: Campus Green / Lawn

mall

Applicable Preference Model Characteristics: Coherence / Complexity / Legibility

A campus mall represents a major pedestrian corridor that connects people to major buildings or other outdoor spaces.

Figure 2.29: Arizona State Polytechnic Campus Mall (Ten Eyck Landscape Architects)

field

Applicable Preference Model Characteristics: Coherence / Legibility

Like a campus green or lawn, a field is a large landscaped area open to all students. However, they are typically reserved for recreational activities, and may not be located in prominent areas of the campus.

Figure 2.30: Campus Field at Lipscomb University

home base - front yard

General Design Recommendations

Identify the main entry and its relationship to the main site circulation

Partial enclosure is needed to communicate a transition from outdoor to indoor space

Comfortable seating should be located to the side of the main circulation

Semiprivate and public space should be provided

Long benches should be avoided

If outdoor use is prohibited for most of the year, consider front porch elements just inside the main entrance of the building

landscaped grounds

Applicable Preference Model Characteristics: Coherence / Complexity / Legibility / Mystery

These spaces are extensive landscaped areas between buildings that may be used as a park or campus. It is the most spacious type of space of those listed, and is often used as a walking route between buildings, a setting for eating or waiting, and as a space for ambulatory patients. Because of its size, landscaped grounds may tie together several buildings to form a campus-like environment. Therefore, a variety of landscapes may be incorporated to serve all types of users. The cost of maintenance is potentially high, however, and spatial relationships may lack cohesiveness.

Figure 2.31: Landscaped Grounds at Shenandoah University

landscaped setback

Applicable Preference Model Characteristics: Coherence / Legibility

A landscape setback represents a landscaped area in front of the main entrance to a building that is not typically used but provides a visually pleasing setting to the entry. This space may resemble a residential front yard; hence, provide users with a comforting and familiar image. Offices and rooms within the building are also provided a degree of privacy from the public. Because it is not typically used, these spaces may confuse pedestrian and vehicular traffic in regards to the main entries and circulation.

Figure 2.32: Landscaped Setback – Rain Garden

roof terrace

Applicable Preference Model Characteristics: Coherence / Legibility

A roof terrace is a typically hardscaped area with some vegetation on the side of a building. The linear space forms a "balcony" for its building. Terraces provide more spatial opportunities by capturing space that might otherwise go unused. There is also potential for expansive views of other landscapes.

Figure 2.33: Roof Terrace at the Lincoln Center Plaza (New York, NY)

home base - front porch

General Design Recommendations

The site design should suggest through visual cues the notion of a front yard. This way, people may feel they can "claim a space"

Lawn space with full to partial sun should be considered

Seating should be provided to the edges of space to provide a sense of security

patio

Applicable Preference Model Characteristics: Coherence / Legibility

This type represents features at the main entrance that resemble the front porch of a house. The patio is often a combination of pedestrian and vehicular access with places to sit and wait for transportation. It provides a visual cue of the main entry. With careful planning, the seating may provide an amenity for users waiting for transportation. However, the amenity may lead to the front entry being overused or underused. Users may be too attracted to gather or they may be propelled to stay away if vehicular traffic is impeding.
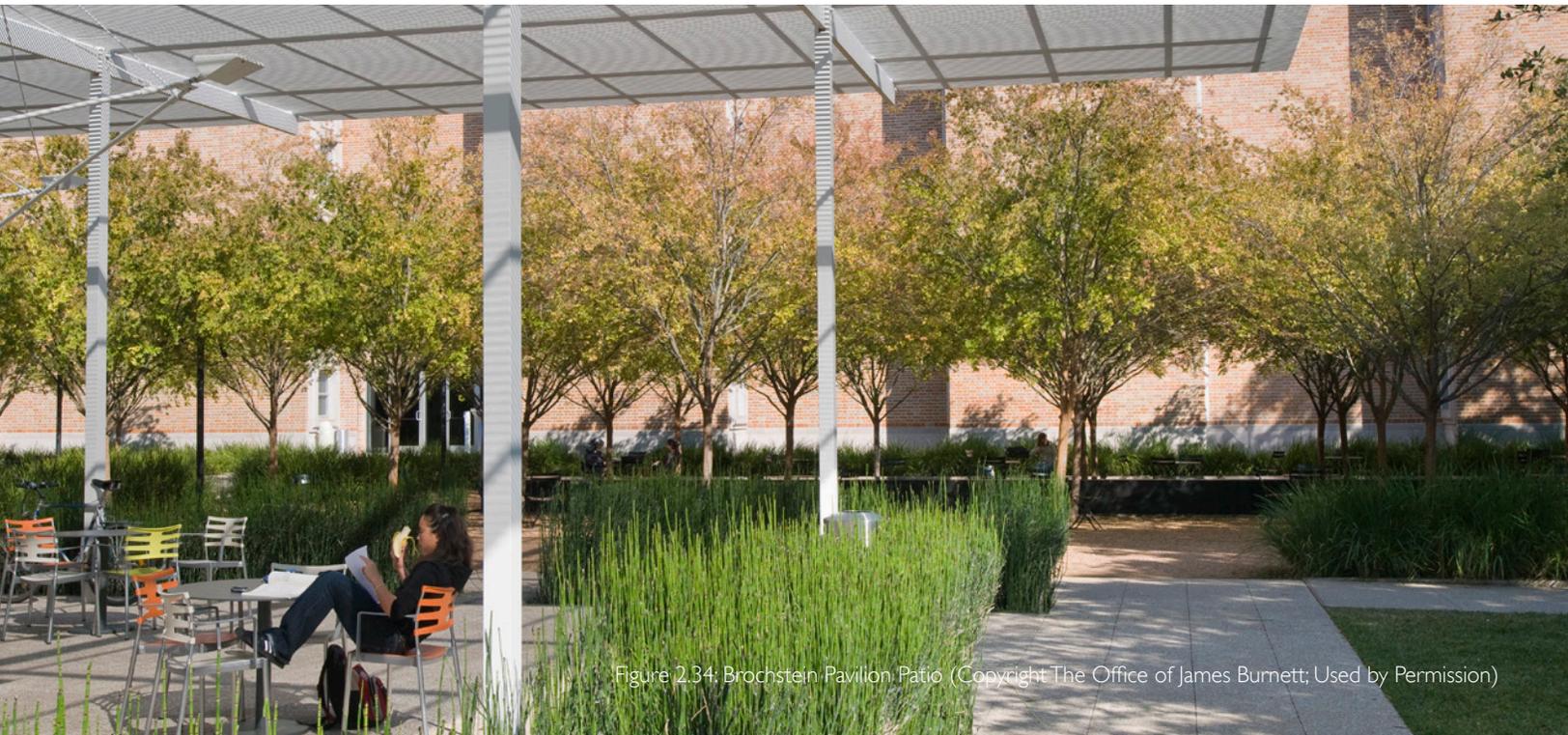
Figure 2.34: Brochstein Pavilion Patio (Copyright The Office of James Burnett; Used by Permission)

entry garden

Applicable Preference Model Characteristics: Coherence / Legibility

An entry garden is a green space adjacent to the main entrance that is designed for use, unlike a landscape setback. It provides similar functionality to a patio space, but features more garden elements. The garden is more aesthetically pleasing to the human eye as people enter the building.

Figure 2.35: Entry Garden
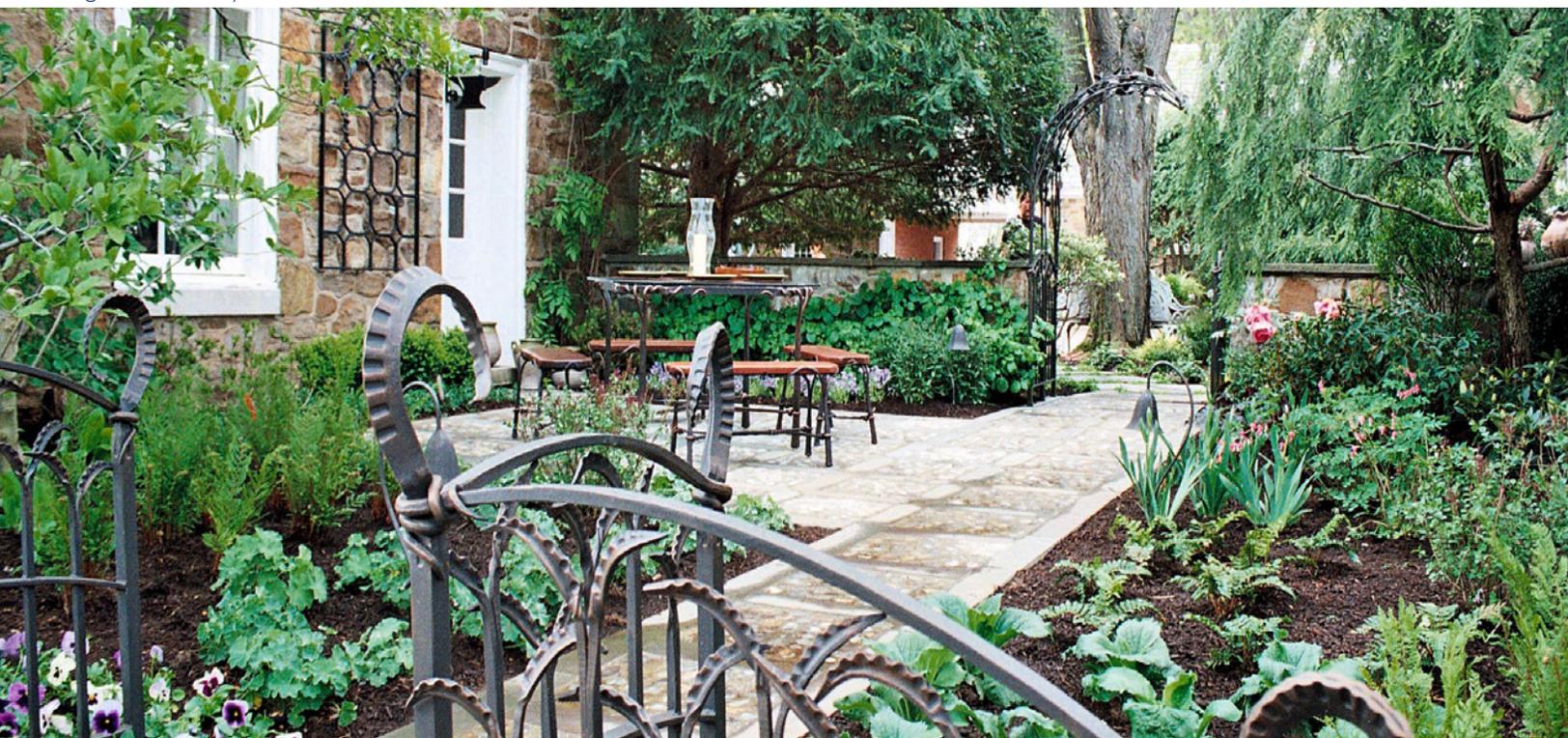
roof terrace

Applicable Preference Model Characteristics: Coherence / Legibility

A roof terrace is a typically hardscaped area with some vegetation on the side of a building. The linear space forms a "balcony" for its building. Terraces provide more spatial opportunities by capturing space that might otherwise go unused. There is also potential for expansive views of other landscapes.

Figure 2.36: Roof Terrace at Bethel College

home base - back yard

General Design Recommendations

The space should be away from major circulation and easily accessible to the building

The space should not typically be a pass-through or pass-by space; it should be inviting and enticing to be in

The space should be large enough for gatherings and events, but not so large that people feel exposed to the public

courtyard

Applicable Preference Model Characteristics: Coherence / Complexity / Legibility / Mystery

This space forms the "core" of a building complex. It has walls on all four sides and is typically immediately visible upon entry into the building. A courtyard is more private in comparison to "common turf" spaces, and is not as accessible to outdoor main circulation. It provides views and an attractive visual buffer for those inside the buildings.
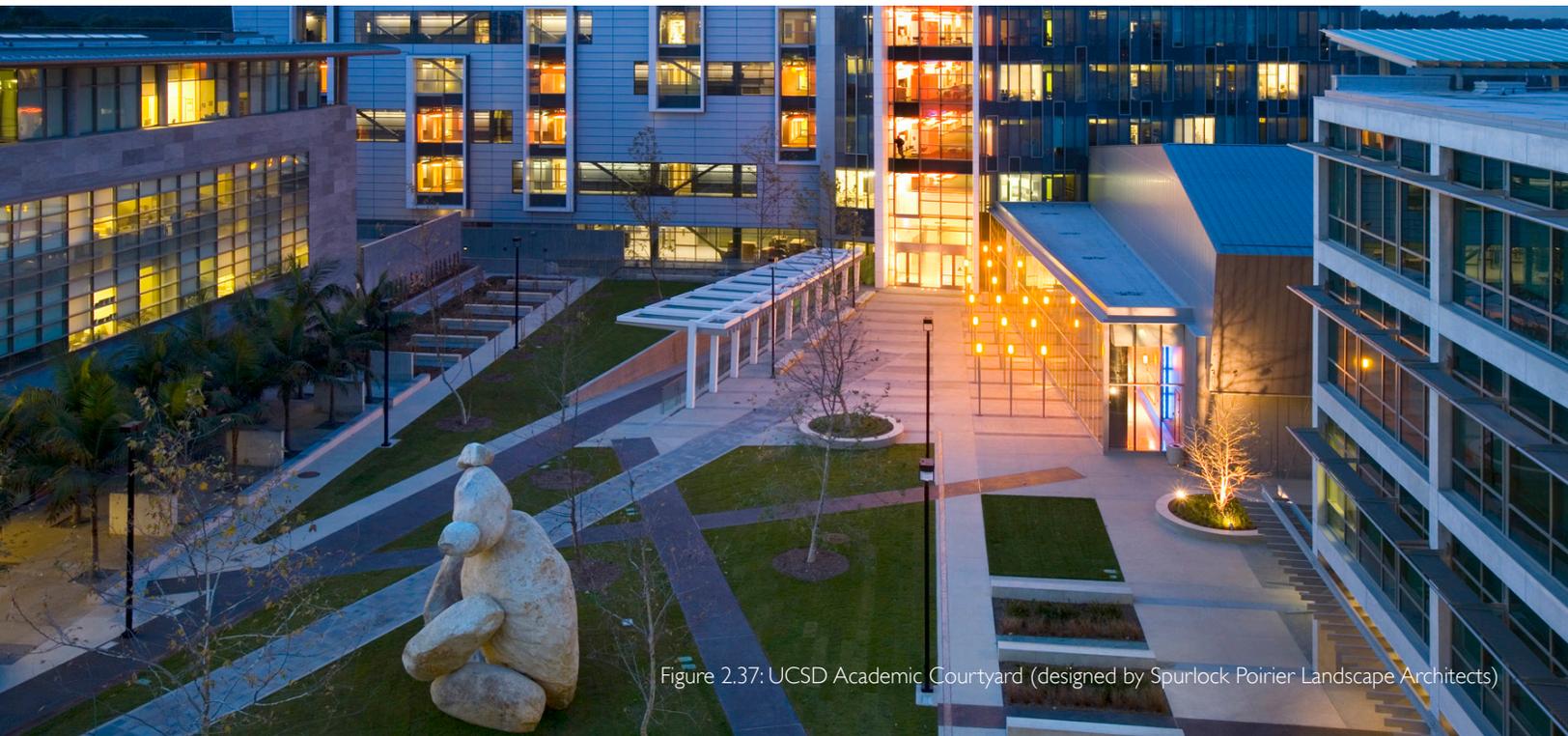
Figure 2.37: UCSD Academic Courtyard (designed by Spurlock Poirier Landscape Architects)

roof garden

Applicable Preference Model Characteristics: Coherence / Complexity / Legibility

A roof garden is an area on top of a building that is landscaped and designed for use by patients, staff or visitors. It maintains outward views in multiple directions. It provides a private space for those within the building, and not likely to be used by the public.

Figure 2.38: Roof Garden at New Lanark World Heritage Site

healing garden

Applicable Preference Model Characteristics: Coherence / Complexity / Legibility / Mystery

Healing gardens are indoor or outdoor garden spaces that are specifically designed for healing and recovery. This type of space is especially catered to the needs of the users of the building or landscape. People may expect that careful thought has been given to creating a therapeutic environment.

Figure 2.39: Healing Garden at Florida Hospital Celebration Health
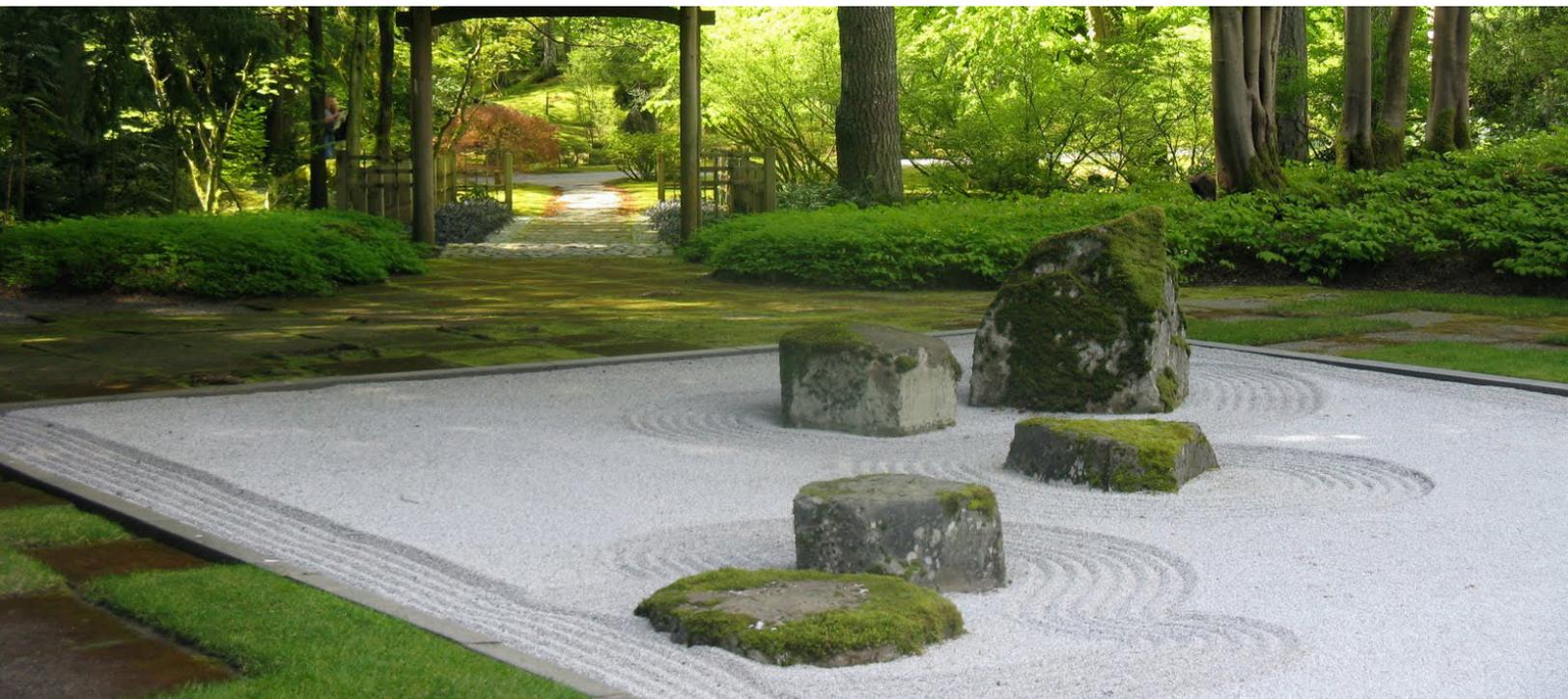
meditation garden

Applicable Preference Model Characteristics: Coherence / Complexity / Legibility / Mystery

A meditation garden is a small, quiet, enclosed space that is specifically labeled with signage as a place for contemplation. It is designed to be private, where noise intrusions and other distractions are minimized. Such as in the Nona Evans Restorative garden, planting palettes and textures are kept toned down in order to promote contemplation.

Figure 2.40: Meditation Garden: Japanese Zen Garden

viewing garden

Applicable Preference Model Characteristics: Coherence / Complexity

A viewing garden is a small garden that is not accessible but is viewable from inside the building. These spaces are ideal when space and budgets are limited. They bring light in to the building, provide attractive views for the interior rooms, and have low maintenance required.

Figure 2.41: Viewing Garden at Fort Worth Zoo
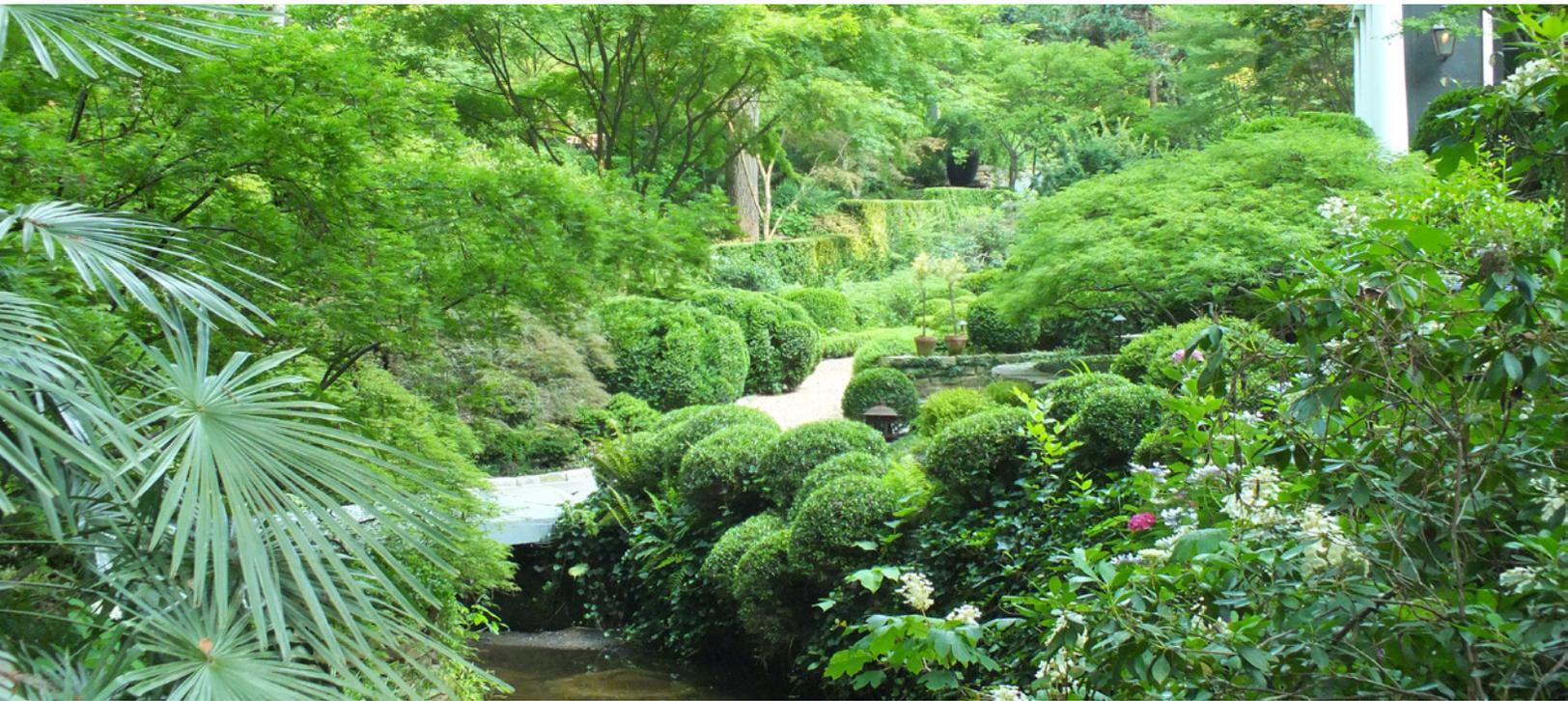
a "tucked away" garden

Applicable Preference Model Characteristics: Coherence / Complexity / Legibility / Mystery

This space is a garden that is set apart from the building but is reasonably accessible.
These spaces may use the "leftover" space of an outdoor landscape. Because of its location
somewhat away from the building, it may provide a welcoming environment that is separate
from the educational stressors that may occur indoors.

Figure 2.42: Tucked Away Garden at U.S. Japanese Gardens

design elements and relationships

Upon identifying spatial typologies for a restorative campus landscape, specific design elements and relationships were researched in order to discover how they can provide a restorative environment for people. Based on the literature and research, the following design components were determined to be central to creating a restorative campus environment. Some components may relate more to restorative design as opposed to campus design. However, each type of design possesses many similarities and overlap with one another, which were considered when compiling the list.

For each design component, there is a textual description detailing their preference model characteristics, restorative qualities, and design recommendations. The visuals that are provided for each element or relationship either illustrates a concept or shows what it may look like. The images themselves are a variety of photos and sketched vignettes.

The overall list will serve as a reference and helped guide design decisions (discussed in chapter, *Application*). In the forthcoming chapter, *Synthesis*, these design components are analyzed in relationship to the spatial typologies. The analysis comprises a framework for design that may be applied to higher education campuses.
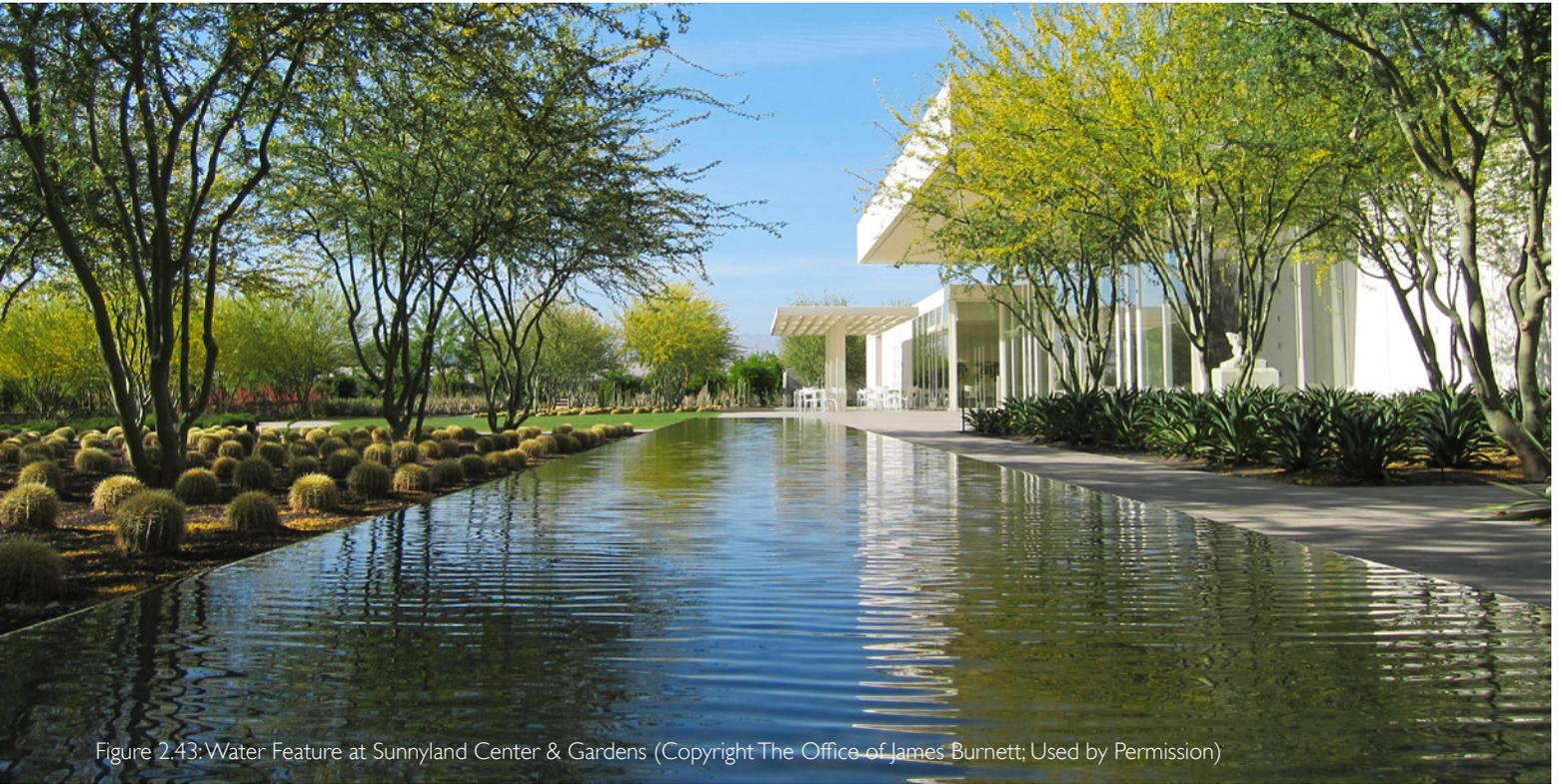
Figure 2.43: Water Feature at Sunnyland Center & Gardens (Copyright The Office of James Burnett; Used by Permission)

water feature

Site furnishing or landscape amenity that contains or incorporates a body of water

Applicable Preference Model Characteristics: Coherence / Legibility

Restorative Qualities

Water creates sounds that are soothing to people. Its ability to engage our hearing as well as our sight provides a great therapeutic benefit. Like certain plant palettes, water provides a positive distraction; therefore its strategic use can enhance the restorative environment significantly (Barnes et al. 1999).

Design Recommendations

While water can provide a largely restorative effect for people, it is not assured to be pleasing. The water's edge is especially important (Kaplan 1998). Unattractive features include flooding and polluted water. Natural forming edges, as opposed to hardscaped edges, are more pleasing to people; so ponds are generally enjoyed. When this is not an option, fountains are effective in a restorative setting. To receive the greatest benefit from water features, semiprivate seating should be provided for those desiring contemplation (Kaplan 1998).
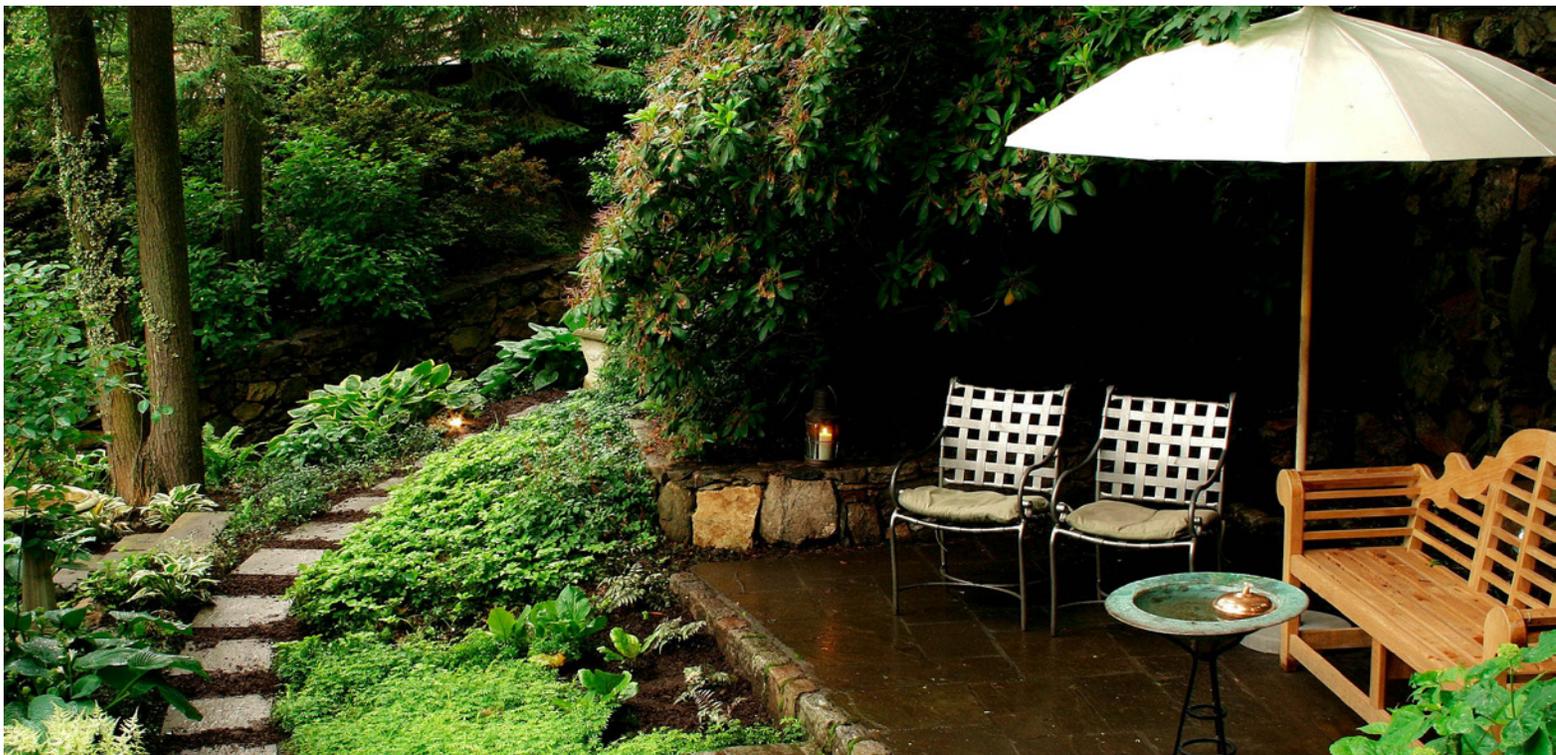
Figure 2.44: Balcony / Terrace (Photo by Elise Landscapes & Nursery)

balconies / terraces

Linear spaced hardscape with some garden elements; designed to capture views for users

Applicable Preference Model Characteristics: Complexity / Legibility

Restorative Qualities
Terraces are meant for semi-private use. They typically can be great places for people to eat and socialize or for quiet contemplation. The balcony-like nature will provide stimulating views out onto the landscape, such as into a garden (Barnes et al. 1999)

Design Recommendations
Terraces may provide effective "front yard" or "front porch" spaces, so its location adjacent to the front of the building is preferable. They should provide ample space for seating (Barnes et al. 1999).

Figure 2.45: Natural Materials (photo by Craig Terrell, Land Architects, Ann Arbor, MI)

natural & familiar materials

Materiality that resembles natural elements (such as wood or stone) or regional elements from the surrounding context

Applicable Preference Model Characteristics: Coherence / Legibility

Restorative Qualities

The choice of materials can enhance restoration. Natural materials will help users picture themselves within natural settings. This allows the mind to wander, such as through quiet fascination. Familiar materials can be soothing as well. Stressful students may feel some anxiety, so familiar elements can be reassuring. (Barnes et al. 1999; Kaplan 1998).

Design Recommendations

Consider materials for site furnishings. For example, wooden benches may provide a rustic image for the project. Ground textures can affect the coherence of the site as well. Smoother textures, such as hardscape paths or grassy areas, guide pedestrian circulation. Smoother textures often open up the potential for exploration. Rougher textures, such as rocks or other impediments, will deter potential circulation (Kaplan 1998).

Figure 2.46: Shade Structure

shade structures

Vertical elements that provide overhead protection

Restorative Qualities
People may feel that some overhead enclosure creates a sense of security and protection; thus, making the space more comfortable to be in (Barnes et al. 1999)

Design Recommendations
This overhead protection may be provided through a gazebo, garden house, trellis, or tree cover. There is an increased sense of protection when the structure is placed along an edge. This provides security to our back, the most vulnerable side (Barnes et al. 1999).

Figure 2.47: Sensory Engaging Plant Palette

Figure 2.48: Sensory Engaging Plant Palette

Figure 2.49: Sensory Engaging Plant Palette

sensory engaging plant palette

Plants and other vegetation that provide positive, stimulating distractions

Applicable Preference Model Characteristics: Legibility

Restorative Qualities

These types of plants allow people to "get away" as they provide a home-like environment. As positive distractions, the sensory appeal invokes an emotional response within people and brings a sense of relief (Barnes et al. 1999).

Design Recommendations

Consider and research plants that have strong fragrances or those that have inviting tactile qualities. These attributes will draw people closer. Plants whose foliage moves easily with the wind will draw people's attention to patterns of color, shadows, and light. In addition, the audible noise from the foliage also has a stimulating effect (Barnes et al. 1999).

Figure 2.50: Vegetative Planter

vegetative planter

Raised planting beds that contain vegetation

Applicable Preference Model Characteristics: Coherence / Legibility / Mystery

Restorative Qualities
Because they are raised, vegetative planters allow people to be closer to plants, whether it is for touching or smelling (Barnes et al. 1999). They can be a valuable definition of space that not only provides a buffer but makes the entire space more legible for people to understand. Legibility of a space will therefore create a comforting environment (Kaplan 1998).

Design Recommendations
Planters should be at a height of 2.5 feet for easy accessibility for people. This height is appropriate for seating to be implemented on the ledges of planters. These opportunities for seating may occur where otherwise may not be possible (Barnes et al. 1999).

Figure 2.51: Vegetated Buffer

Figure 2.52: Vegetated Buffer

Figure 2.53: Vegetated Buffer

vegetated buffer

Planted area or fixture that separates two spaces

Applicable Preference Model Characteristics: Coherence / Legibility / Mystery

Restorative Qualities

Since a variety of public and private spaces are needed on campus, a buffer is sometimes needed to create separation. The buffer will help students and faculty looking for a quiet space to study or contemplate. Depending on the vegetation, the buffer has the potential to engage the senses as well; thus, improving concentration for those within the private space (Barnes et al. 1999).

Design Recommendations

Provide vegetated buffers so that people who may be neighboring a building do not feel they are intruding the privacy of those indoors. Also place a buffer nearby private outdoor spaces to offer some protection from intrusions (such as noise) (Barnes et al. 1999).

Figure 2.54: Arizona State Polytechnic Campus Native Vegetation (Copyright: Ten Eyck Landscape Architects Inc.; Used by Permission)

native vegetation

Plants and greenery that naturally grows and thrives within the region

Applicable Preference Model Characteristics: Legibility

Restorative Qualities

Native vegetation will thrive within the project's site. Using them will help create a sense of place; thus making the place more comfortable for people to be in. People whom are native to the region may recognize them as well (Barnes et al. 1999).

Design Recommendations

Provide native vegetation so that the landscape can thrive with less maintenance. Depending on the design intent, provide native vegetation along major pedestrian flows, within small study areas, or where moderate volumes of traffic may congregate. It should also be considered in areas of drought or limited sun.

Figure 2.55: Views

views

Applicable Preference Model Characteristics: Coherence / Complexity / Legibility / Mystery

Restorative Qualities

A mere view from a window has proven to have therapeutic benefits for patients and students (Ulrich 1999; Barnes et al. 1999). Views within the landscape have similar, if not increased, benefits when captured. Views increase awareness of the spaces available to the people. This awareness can provide quiet fascination, contemplation, as well as a level of mystery.

Design Recommendations

Open views to wildlife (Barnes et al. 1999). Views to birds and wildlife are reassuring to people.

Where a distant view can be seen, make sure that seating is located to view the scene and planting frames the view (Barnes et al. 1999).

Consider views of densely vegetated areas or defined edges. Too little or too much vegetation can influence the scene preference (Kaplan 1998).

Create interesting views from within interior spaces
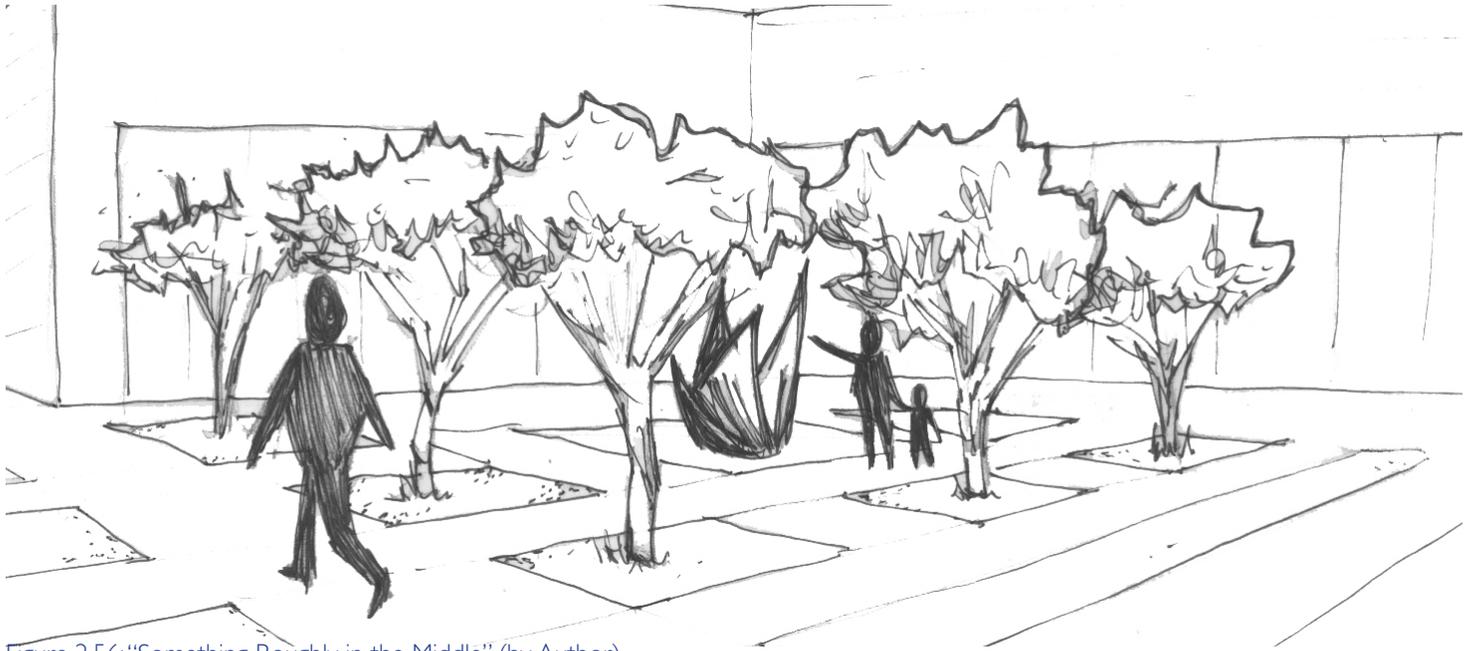
Figure 2.56: "Something Roughly in the Middle" (by Author)

landmarks

Distinctive nodes in the landscape that are instrumental to wayfinding

Applicable Preference Model Characteristics: Legibility

Restorative Qualities

Landmarks are restorative because of their effectiveness in wayfinding. They represent memorable features that are uncommon throughout the landscape. Their uniqueness breeds familiarity and orientation for users. Therefore, a sense of control is maintained, and stress and fear of getting lost is decreased (Kaplan 1998)

Design Recommendations

Landmarks will often be placed on a focal point to help facilitate wayfinding. They should be placed "roughly in the middle" of a public space so that it attracts people toward the center. To best help orienting, landmarks should be distinctive and in harmony with their surroundings. Too little or too many will cause confusion. Structures, such as a gazebo, or natural features, such as a tall free-standing tree, are examples of what a landmark could be (Kaplan 1998).
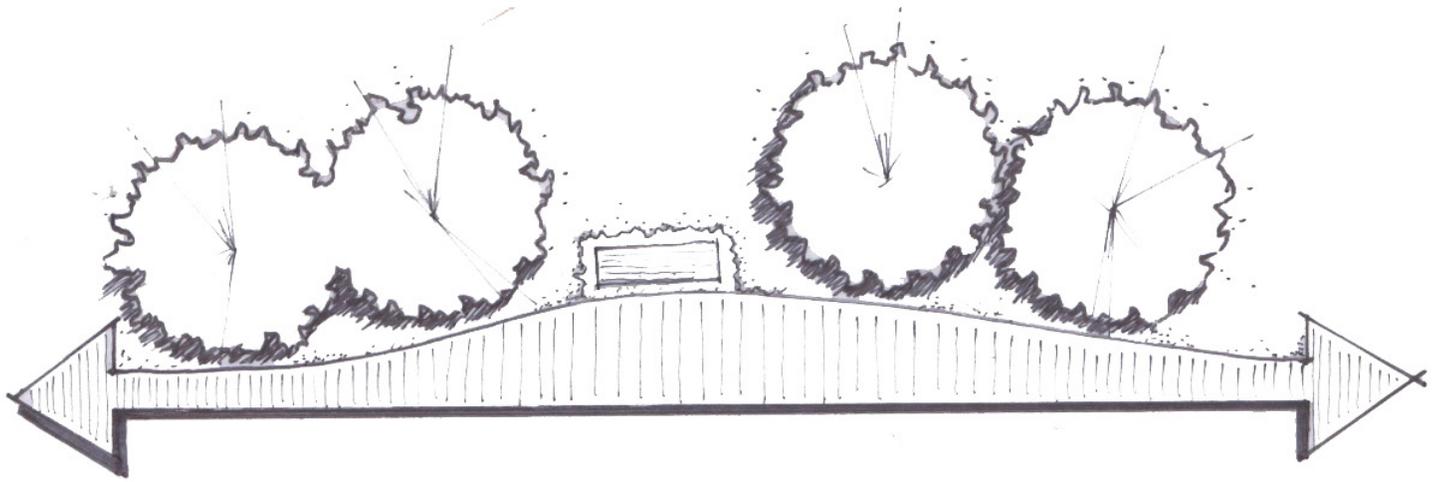
Figure 2.57: Path Widths (by Author)

paths / pathways

Applicable Preference Model Characteristics: Coherence / Legibility / Mystery

Restorative Qualities
Walking paths are especially restorative for people whom are repeatedly in sedentary conditions, such as students or patients. They provide opportunities for physiological or psychological restoration, such as through contemplation and exercise.

Design Recommendations
For smaller spaces, two types of walking should be accommodated: a brisk walk and a contemplative stroll (Barnes et al. 1999). A brisk walk includes circular routes, smooth surfaces, resting places, a mix of sun and shade, and changing views. A contemplative stroll includes similar characteristics, but narrower paths and more mystery included (Barnes et al. 1999).

For public areas, like courtyards or terraces, space should be provided so that walkers do not impede on the space occupied by those seated (Barnes et al. 1999).

Paths should connect goals or nodes, which should not be more than a few hundred feet apart. Provide for security, safety, and interesting walkways (Tyson 1998).
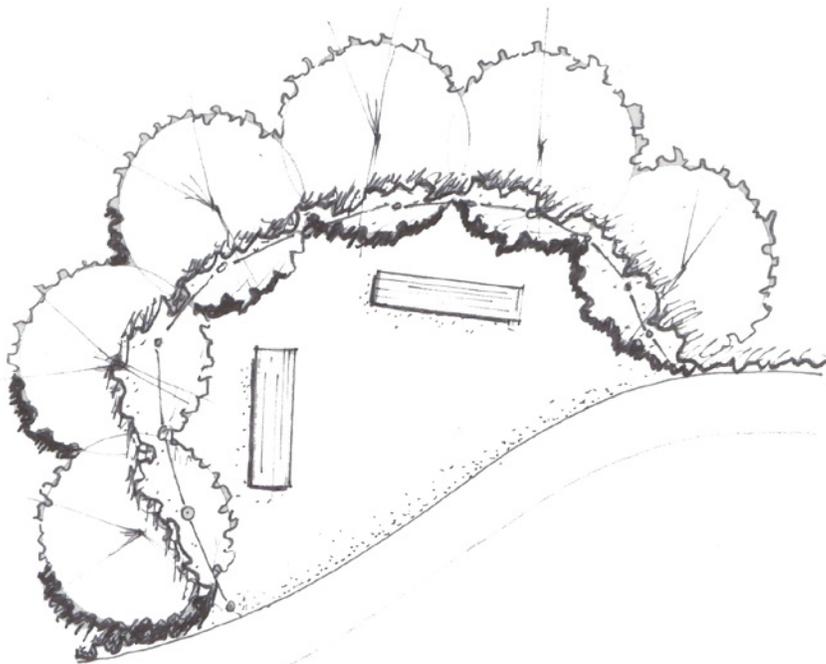
Figure 2.58: Seating Alcoves (by Author)

Figure 2.59: Seat "Back" (by Author)

seating variety

Offer many types of seating as well as in various forms

Applicable Preference Model Characteristics: Coherence / Legibility

Restorative Qualities

Studies have shown that people prefer a variety of seating options. These options make outdoor spaces more accessible and comfortable to live in. Seating allows for opportunities of rest and contemplation (Barnes et al. 1999).

Design Recommendations

Carefully plan out spots for seating. "If the spot is right, the most simple kind of seat is perfect" (Tyson 1999). Cooler climates should have seating that face the sun and are protected from the wind. Hotter climates should have seating that put people in the shade and open to the summer breeze. In both instances place them nearby activities (Tyson 1999).

Provide a sense of enclosure around the seating so that people can have some degree of privacy. Use planting or walls to create an enclosure. People enjoy something placed behind their back for a sense of security (Barnes et al. 1999).

Informal and formal seating should be provided to accommodate different uses, such as studying, people watching, and waiting (Cooper Marcus 1998). Movable seating, while not always applicable, may be a desirable possibility.

Figure 2.60: Tree Places (by Author)

trees

Applicable Preference Model Characteristics: Coherence / Complexity / Legibility / Mystery

Restorative Qualities
Scenes with large trees are highly preferred because they provide shade and shelter as well as environmental benefits (carbon sequestration, increased energy efficiency, etc.) (Kaplan 1998).

Design Recommendations
Dense foliage, dark environments, and a single planted tree tend to be undesirable (Kaplan 1998). Large, mature trees are preferred; therefore, mature trees should be saved on site (Barnes et al. 1999; Kaplan 1998).

Plant them according to their nature to form enclosures, avenues, squares, groves, etc (Tyson 1999).

Ensure that trees or other plant materials form a natural boundary for such spaces in the vertical and/or horizontal plane, without creating total visual isolation (Cooper Marcus 1998).

gateways & entryways

Openings in a partition that divides a space. Whether natural or constructed, gateways provide access to what lies ahead

Applicable Preference Model Characteristics: Legibility / Mystery

Restorative Qualities

Gateways may act as landmarks and help with orientation. It communicates to people that there is something more to see (Kaplan 1998). They can anticipate what that experience may be, whether immediately or for another time. While gateways increase coherence and legibility, the partial views that they provide engage the user and add a level of mystery. Thus, they can help environments be more desirable (Kaplan 1998).

Design Recommendations

Campus entries and gateways should be placed where the majority of students will enter on foot (Cooper Marcus 1998).

Pleasant subspaces for waiting, eating, and casual studying, should be provided (Cooper Marcus 1999).

First time visitors may have a hard time with orientation, so gateways should have some signage or visual communication to help with wayfinding (Cooper Marcus 1998; Kaplan 1998).

Limiting visual access to what lies ahead can create a heightened sense of mystery (Kaplan 1998).
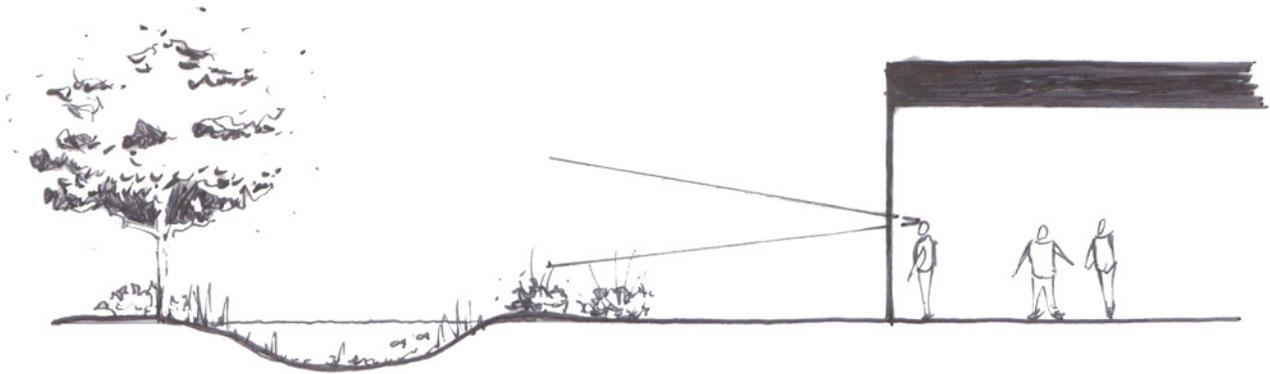
interior-exterior connections

Establishing spatial or experiential relationships between the indoor and outdoor environments

Applicable Preference Model Characteristics: Legibility / Mystery

Restorative Qualities

Views to the outdoors can complement the use of the physical outdoor space. The views create a relationship between the two spaces and encourage outdoor experience. It adds mystery for those indoors to find out what is outside. Spatial elements may be shared as well. This continuity will provide a holistic experience that may be comforting.

Design Recommendations

Consider design recommendations from "Views"

Provide a panoramic view. This will provide some extent for people indoors. This type of view can engage imagination and fascination (Kaplan 1998; Barnes et al. 1999)
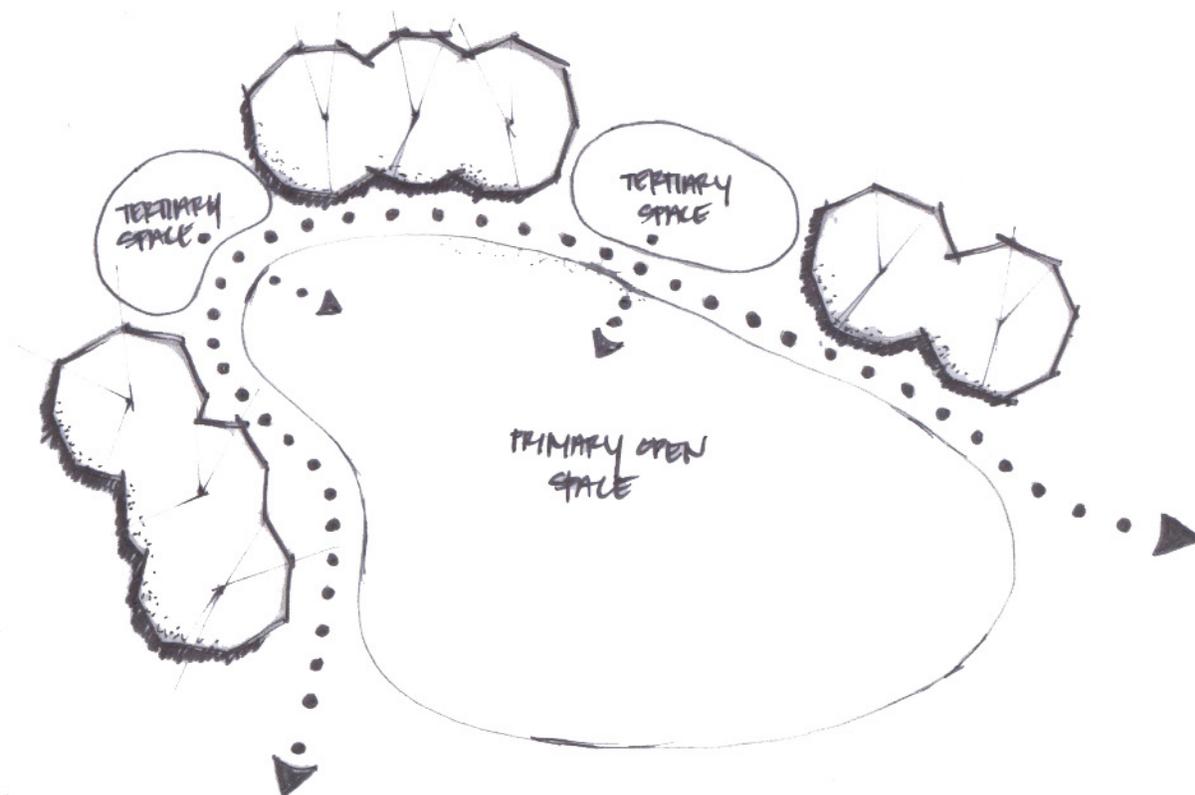
Figure 2.63: Open Space Hierarchy (by Author)

interconnected open space

Creating a fluid network of outdoor spaces

Restorative Qualities

People who live and work in academic settings depend on the definition of a network of campus places to enrich both their daily lives and their senses of identity (Polyzoides 1996). Since campuses are built incrementally, once one space or portion is created, the larger campus is affected. Having interconnected open space creates an identity for the campus (Polyzoides 1996). This identity allows students to build a connection with the campus and encourages its use.

Design Recommendations

Establish a network of outdoor campus space. Because campuses are typically formed incrementally, be sure to consider the existing surrounding outdoor space and maintain a connection.
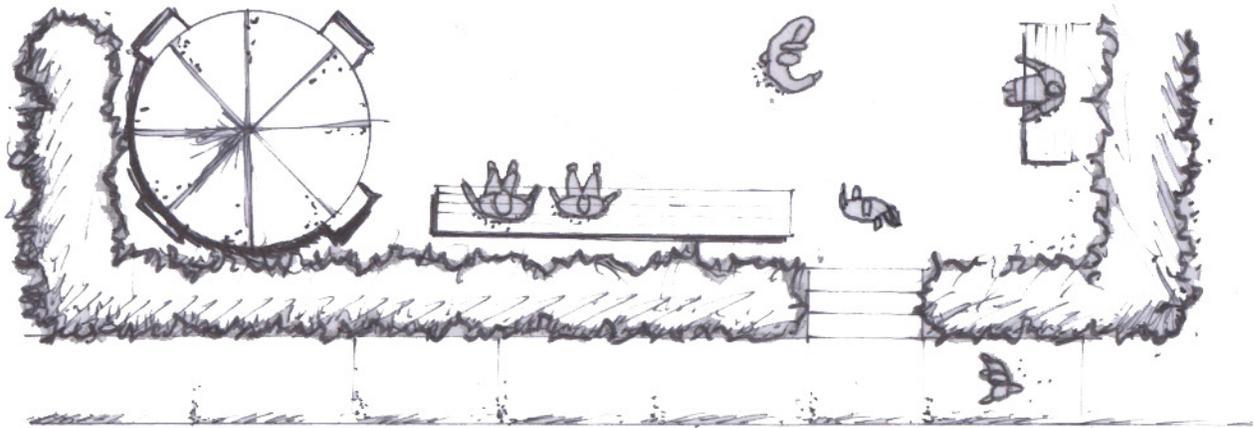
Figure 2.64: Activity Pockets (by Author)

public vs. private spaces

Providing a variety of spaces that range in levels of privacy

Restorative Qualities

Campuses have users of all ages and types. Therefore, a variety will help accommodate all types of people, from social to private. Depending on location the spaces may provide opportunities for quiet contemplation, studying, socializing, eating, etc. The various amount of spaces will make the campus more accessible to students, faculty, and staff (Barnes et al. 1999; Cooper Marcus 1998).

Design Recommendations

Provide at least one space where people can "get away"

Consider the "Front Yard," "Front Porch," "Back Yard," and "Back Door" of a campus building. These types of campus spaces resemble a residential home. The frontal area of the building is more public and open for social interaction. The back area is typically an area where people can "claim" and have some private use (Cooper Marcus 1998).

Establish a hierarchy of spaces to create different levels of privacy. When designing a space, create a smaller subsequent space that looks onto it and forms a natural back for it. Every person who takes a natural position (with their back to the "back") will be looking out toward some larger view (Tyson 1999).

PROCESS

PRELIMINARY
RESEARCH

→ THERAPEUTIC DESIGN
  • THEORIES
  • DESIGN STANDARDS
  • HISTORY

→ • MARNI BARNES
  • CARE COOPER MARCUS
  • ROGER ULRICH

→ SCIENTIFIC RESEARCH
  • "NATURE IS GOOD"
  • ART RESTORATION
    THEORY
  • EXPERIMENTAL STUDIES

→ PSYCHOLOGICAL BENEFIT
→ STEPHEN KAPLAN
→ WILLIAM SULLIVAN ?
  FRANCIS KUO
→ THE POETICS OF SPACE

investigation 03
project methodology

REVIEW
- COMPILE RESEARCH
- FIND RELATIONSHIPS
- ANY NEW TOPICS TO RESEARCH?

OTHER ASSIGNMENT

▷ LAR 704: ASSIGNMENT 3

▷ PLAN 600: COMMUNITY PAPER (SMA

▷ LAR 647: INTERNSHIP REPORT PRES

methodology

Topical Research & Literature Review

Crucial to this project is understanding the design principles that guide restorative landscape design and campus design. Because the two are not typically used together, it is important to understand the philosophies that characterize their design. Both restorative landscape design and campus design have a rich background and history. Because of this, topical research included precedent studies that informed the later stages of the design process. Through the studies, design elements and strategies were analyzed to show what is successful or unsuccessful for stress mitigation or attention restoration. Precedents include: Arizona State Polytechnic Campus, the Ulfelder Healing Garden, and the Elizabeth and Nona Evans Restorative Garden. In all, research sought to answer supplementary research questions, such as the following:

What are the challenges and needs of higher education students, faculty, and staff?

How can reduced stress promote learning inside and outside of the classroom?

What qualities of restorative landscapes are suitable for higher education campuses?

Are restorative landscapes sufficient in meeting the changing needs of higher education campuses?

To what extent is the exposure to nature and biophilic design already considered within campus design?

As shown in the previous chapter, *Research*, the resultant research and literature was gathered and synthesized in a literature review that provided a background to this project.

Inventory and Analysis

After topical research began, base information and site inventory for the Center For Design Research and Lawrence, Kansas was gathered. Base information was collected from the Office of Design and Construction Management in the form of AutoCAD data and previous digital drawings. Through initial site visits, site inventory information was collected as well as site photos. Once compiled, the information was analyzed under the lens of the gathered research.

Creation of Framework for Design

The synthesis of the topical research and

site analysis informed the creation of a framework for design. This framework serves as guidelines that inform future design decisions. Factors and design elements from within restorative and campus design were gathered. Stephen Kaplan's "understanding-and-exploration" framework from his book, "With People in Mind," was a key source. His approach to creating restorative landscapes was adopted during the initial design of the framework. Other sources that were instrumental to developing this framework include: Marni Barnes and Clare Cooper Marcus, who focus on therapeutic design, Katie Johnson, who composed a diagram of the typical restorative landscape design process, and Stefanos Polyzoides, who focuses on campus design in America.

Significant guidelines were gathered by identifying spatial typologies thought to be most relevant to creating restorative campus landscapes as well as the specific design components and relationships that may define them. Several common relationships were found; thus resulting in the typologies and design components listed in chapter 2, *Research*. Relationships and overlap were then identified to determine which qualities and spaces are most suitable for higher

education campus spaces. This was done in the form of a matrix, in which the specific design components and relationships were compared with the spatial typologies. With careful consideration to the gathered research and principles, an order of priority was established so that the specific design components that are instrumental for each spatial typology could be identified. Creating this matrix and resultant priority of design elements allowed for a reference model that will inform the design of campus spaces. The goal was to establish a framework that may be applied to universities other than the Center for Design Research at the University of Kansas.

Application: Master Planning & Site Design

The design framework was then applied to the design of the landscape of the CDR. The design itself took place at two scales: master plan and detailed site scale. The master plan development will utilize many of the campus design principles that were studied as well as those established in the design framework. The program for the project included: a new building for the Office of Design and Construction Management, additional buildings for classrooms or research, outdoor classrooms, open green space, and an added connection to a proposed bike lane. After the master plan was created, detailed site design took place. Here, the focus was creating restorative spaces for the neighboring buildings and infrastructure that were established in the master plan. The design framework guided design decisions to insure that the landscape may be deemed restorative.

Project Production & Design Communication

During this stage, final production took place. The design work to this point was evaluated to determine if the design framework and site design answers the research questions and achieves the goals that were mentioned previously. It also dictated how the project information was communicated. Final graphics were designed to reflect the intentions of the project and express the research question that was explored, the methodology, and the outcomes.

DESIGN ELEMENTS & RELATIONSHIPS >> RESTORATIVE LANDSCAPE >> DESIGN RECOMMENDATION
PROGRAM

· DESCRIPTION
· PREFERENCE MODEL
· RESTORATIVE QUALITIES

· ILLUSTRATES WHICH
ELEMENTS CAN BE
APPLIED TO EACH
TYPOLOGY

· ADDITIONAL DESIGN
RECOMMENDATIONS
· MASTER PLAN
SCALE
· SITE PLAN SCALE

synthesis

04

framework for design

framework philosophy

The research gathered within the literature review provided the basis for a framework for implementing restorative landscapes within higher education campuses. Using principles from campus design and restorative landscape design, this framework is applicable to this project as well as other similar project sites. Two primary influences within this framework were Stephen Kaplan's Understanding-and-Exploration preference matrix (mentioned earlier) and Katie Johnson's diagram for designing restorative spaces (shown right) (Johnson 2002). Each were adapted and applied in the creation of the framework. Johnson's diagram, though stated for healthcare settings, may be applied elsewhere, given that the needs of users on the project site are understood. Within the diagram, in which the typical process for designing restorative spaces is depicted, the expected benefits, spatial typologies (physical elements), and experiential elements are identified and compared in order to distill the ideal characteristics of a restorative campus landscape.

This delineated process provided the basic structure for this framework. The physical and experiential elements and their respective benefits were researched and collected (shown in Research). All together, they formed a compilation of characteristics in which designers may understand what could make a restorative landscape. The next step involves their application within design, which is discussed later in the chapter.

Benefits ———————— Experiential Elements ———————— Physical Elements

Characteristics of an Ideal
Outdoor Restorative Space

Apply to Your Landscape

Make Recommendations for
Change (Design)
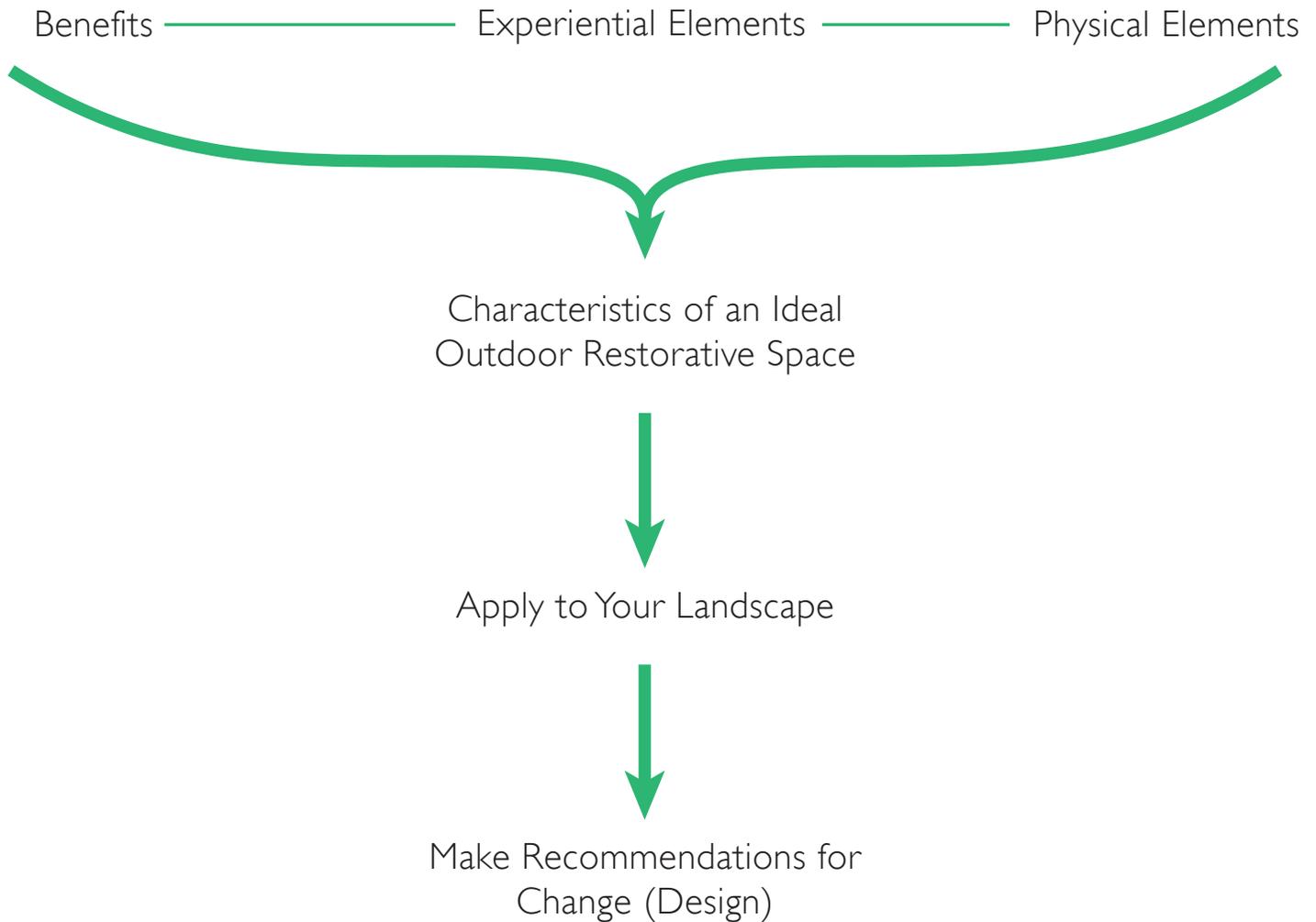
Figure 4.01: Adapted Design Process Diagram (by Author)

Expected Benefits

Experiential Elements

Restorative Landscapes

Stress Relief
Increased Sense of Control
Restoration of Directed Attention

Decreased Aggression

Reduced Mental Fatigue

Social Support

Physical Exercise

Higher Education Campuses

Increased Academic Performance

Increased Campus Use / Attraction
Reduced Campus Sprawl /
Suburbanization

Increased Community Interaction

Restorative Landscapes

Place Identity / Compatibility

Engaging Fascination

"Temporary Escape" / "Getting Away"

"View from the Window"

Higher Education Campuses

Welcoming Environment

Harmony with Regional Context

Functional Outdoor Learning Environments

Interconnected Open Spaces

Cultivated Landscape

Pedestrian Landscape

Typological Unity & Stylistic Variety

framework anaylsis

This analysis was used to understand how the individual components (that which make up the characteristics of a restorative campus landscape) relate to one another. The creation of this model began by identifying the major benefits, experiential elements, and physical elements that are especially important to this framework. These elements were therefore compiled for campus design and restorative landscape design within each category. The expected benefits include those that are instrumental to the typical design of their respective disciplines. The experiential elements identified here include the necessary

restorative qualities (identified within Restorative Landscape Design Research and Psychological Research in *Research*) as well as important campus design concepts defined by Polyzoides and other resources. Kaplan's preference model was also used to illustrate the informational factors that each element possesses. They provide additional depth to Johnson's model and serve as a reference to identify the design recommendations laid out in Kaplan's book, *With People In Mind*. Lastly the physical elements included the healing garden spatial typologies created by Marni Barnes and Clare Cooper Marcus as well as the campus

spatial typologies laid out by Stefanos Polyzoides.

The next step was to make the connections outlined within Johnson's diagram. Each connection shown within the diagram signifies a relationship among restorative landscape design, campus design, their spatial types, or Kaplan's preference model. In understanding the factors laid out in this diagram, designers may be aware of how components of both campus and restorative landscape design relate to one another. The many connections illustrated within this diagram depict the many relationships that

Physical Elements

Restorative Landscapes

Coherence

Complexity

Legibility

Mystery

- Landscaped Grounds
- Landscaped Setback
- The Front Porch
- Entry Garden
- Courtyard
- Plaza
- Roof Garden
- Roof Terrace
- Healing Garden
- Meditation Garden
- Viewing Garden
- A "Tucked Away" Garden

Higher Education Campuses

- Patio
- Courtyard
- Quadrangle
- Green
- Field
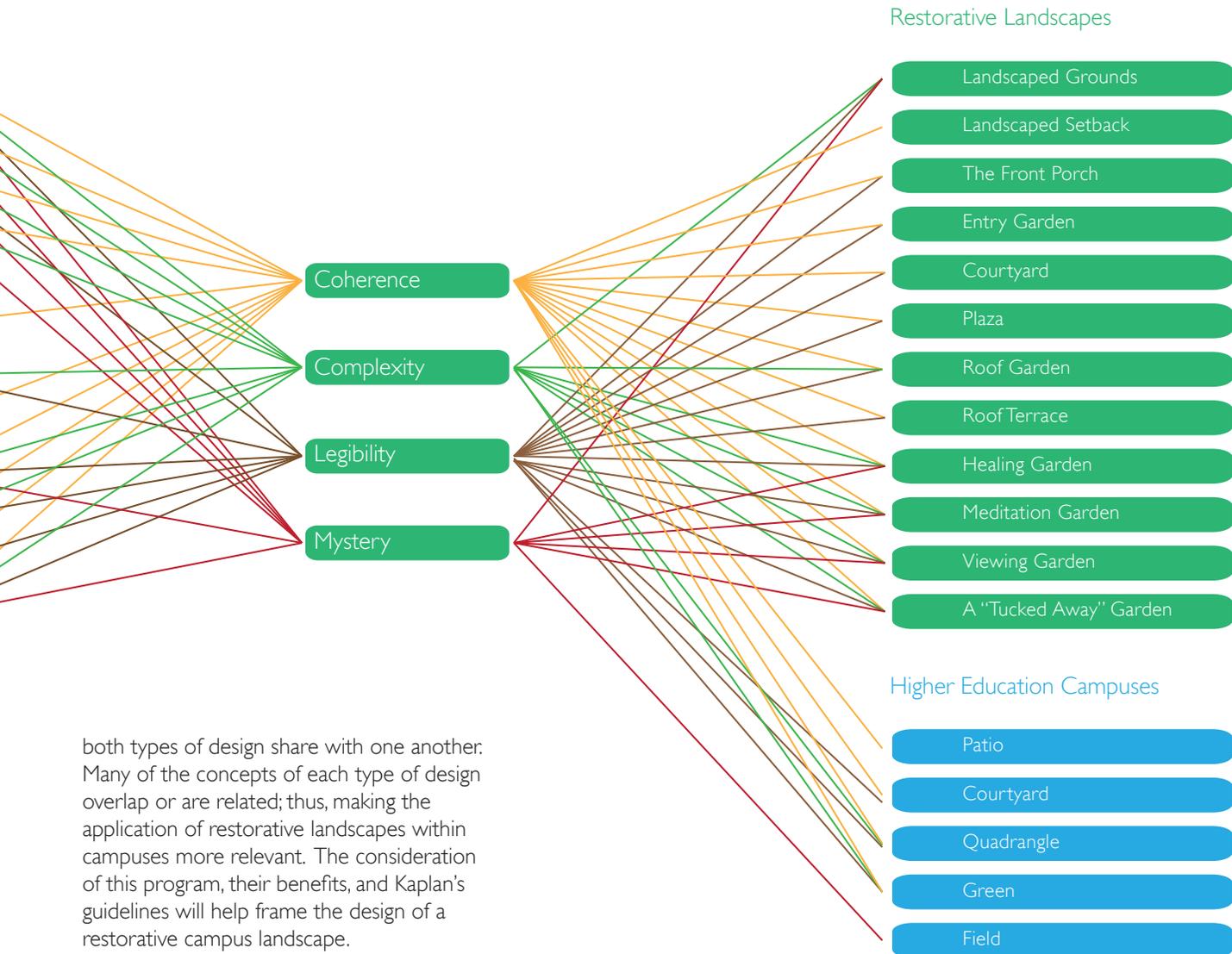
both types of design share with one another. Many of the concepts of each type of design overlap or are related; thus, making the application of restorative landscapes within campuses more relevant. The consideration of this program, their benefits, and Kaplan's guidelines will help frame the design of a restorative campus landscape.

Figure 4.02: Framework Analysis Diagram (by Author)

typology classifications

As mentioned earlier in the literature review, the typologies were classified in to several categories (shown again to the right). This was an important step in establishing a framework for restorative campus design. Cooper Marcus's concepts regarding "common turf" and "the home base" helped apply the concepts of restorative environments to specific concepts within campus design. These classifications are reiterated to demonstrate its importance to the framework and how it lead to the creation of a framework matrix.

Restorative Landscapes

Landscaped Grounds

Landscaped Setback

Patio / Front Porch

Entry Garden

Courtyard

Plaza

Roof Garden

Roof Terrace

Healing Garden

Meditation Garden

Viewing Garden

A "Tucked Away" Garden

Higher Education Campuses

Patio

Quadrangle

Green / Lawn

Mall

Field

Campus Outdoor Spaces

Common Turf

Home Base

The Front Yard

The Front Porch

The Back Yard
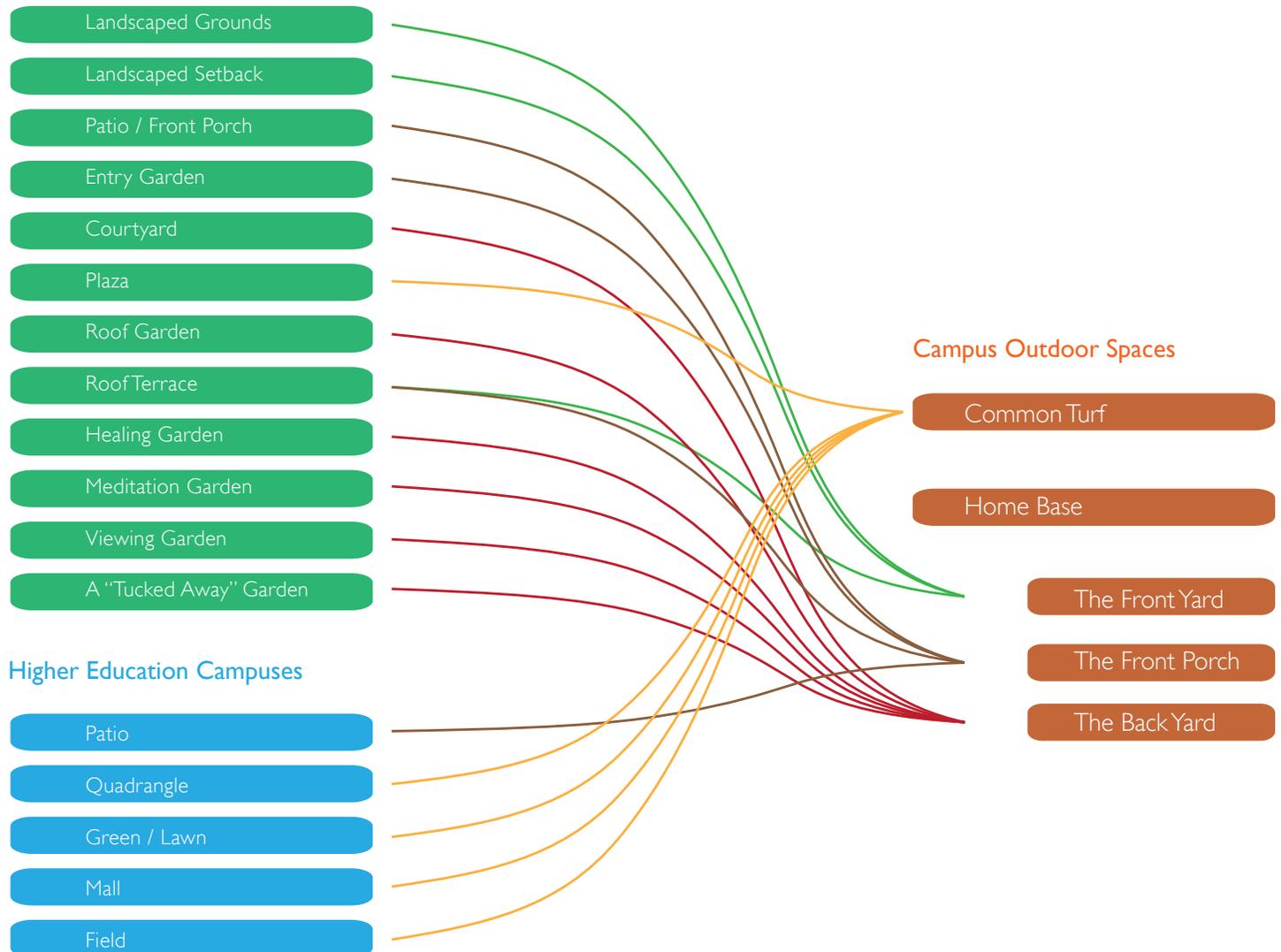
Figure 4.03: Restorative Campus Spatial Typology Classifications (by Author)

Figure 4.04: Framework Matrix (by Author)

Legend

High Importance ♦ (red diamond)

Moderate Importance ● (orange circle)

Low Importance ■ (yellow square)

No Importance (blank)

framework matrix

Beyond the typical characteristics of a restorative campus landscape, there needs to be a method or strategy of how they are applied within a project. The matrix (shown right) depicts that potential application. It compares the design elements and restorative typologies discussed in *Research*, and delineates a hierarchy of importance for each. Since not all of the design elements are crucial to each spatial typology, it was important to discover where they were applicable. Each design element or relationship was rated from no importance to high importance for each restorative space typology. The analysis spawned this matrix, which served as a reference and informed the design decisions discussed in the next chapter.

Restorative Landscape Typologies — **Design Elements**

Restorative Landscape Typologies	Landmarks	Balconies / Terraces	Natural / Familiar Materials	Shade Structures
Common turf				
Quadrangle	●	■	■	■
Green	■		♦	■
Field	■		♦	■
Plaza	●	■	■	●
Mall	●	■	♦	■
Home Base				
The Front Yard				
Landscaped Grounds	♦	■	♦	●
Landscaped Setback	■	■	●	
Plaza	●	■	■	●
The Front Porch				
Patio	■	■	●	♦
Entry Garden	●	■	●	●
Roof Terrace	■	♦	●	■
Backyard				
Courtyard	●	■	♦	♦
Healing Garden	●	■	♦	■
Meditation Garden	●	●	♦	●
Viewing Garden	♦	■	●	
Tucked Away Garden	♦	■	♦	■
Roof Garden	●	♦	●	●

Legend: ♦ High Importance, ● Moderate Importance, ■ Low Importance, blank No Importance

Sensory Engaging Plant Palette	Vegetative Buffer	Vegetative Planter	Native Vegetation	Water Features	Paths / Pathways	Seating Variety	Trees	Interconnected Open Space	Interior-Exterior Relationships
	■	■	●	■	◆	■	■	◆	●
■	■	■	◆	■	■	●	■	◆	◆
■	■		◆		■	■	●	●	■
■	●	●	■	■	■	◆	●	◆	◆
◆	●	●	◆	●	◆	■	■	◆	◆
●	●	■	◆	●	◆	●	◆	◆	■
■	◆	●	●	■			■		◆
■	●	●	■	■	■	◆	●	◆	◆
■	■	●	■		●	◆	■	■	◆
●	◆	●	■	●	●	●	■	●	◆
●	■	◆	◆	■	■	●	■	■	●
●	◆	●	◆	●	●	◆	◆	■	◆
◆	◆	◆	●	◆	◆	◆	●	■	◆
■	◆	●	●	◆	■		◆	■	■
	■	●	◆	■			■		◆
◆	◆	■	●	■	◆	◆	●		■
◆	●	●	◆	●	●	◆	■		◆

restorative landscape
site inventory & analysis

In order to apply these gathered concepts, site inventory and analysis needed to take place for the project site. Ultimately, the physical landscape dictates what design decisions take place, so it is important to understand its characteristics. Doing so will allow for the proper application of the design framework. The following site inventory and analysis was performed under the lens of a restorative landscape. The information gathered was used to understand how a restorative campus landscape can be created.
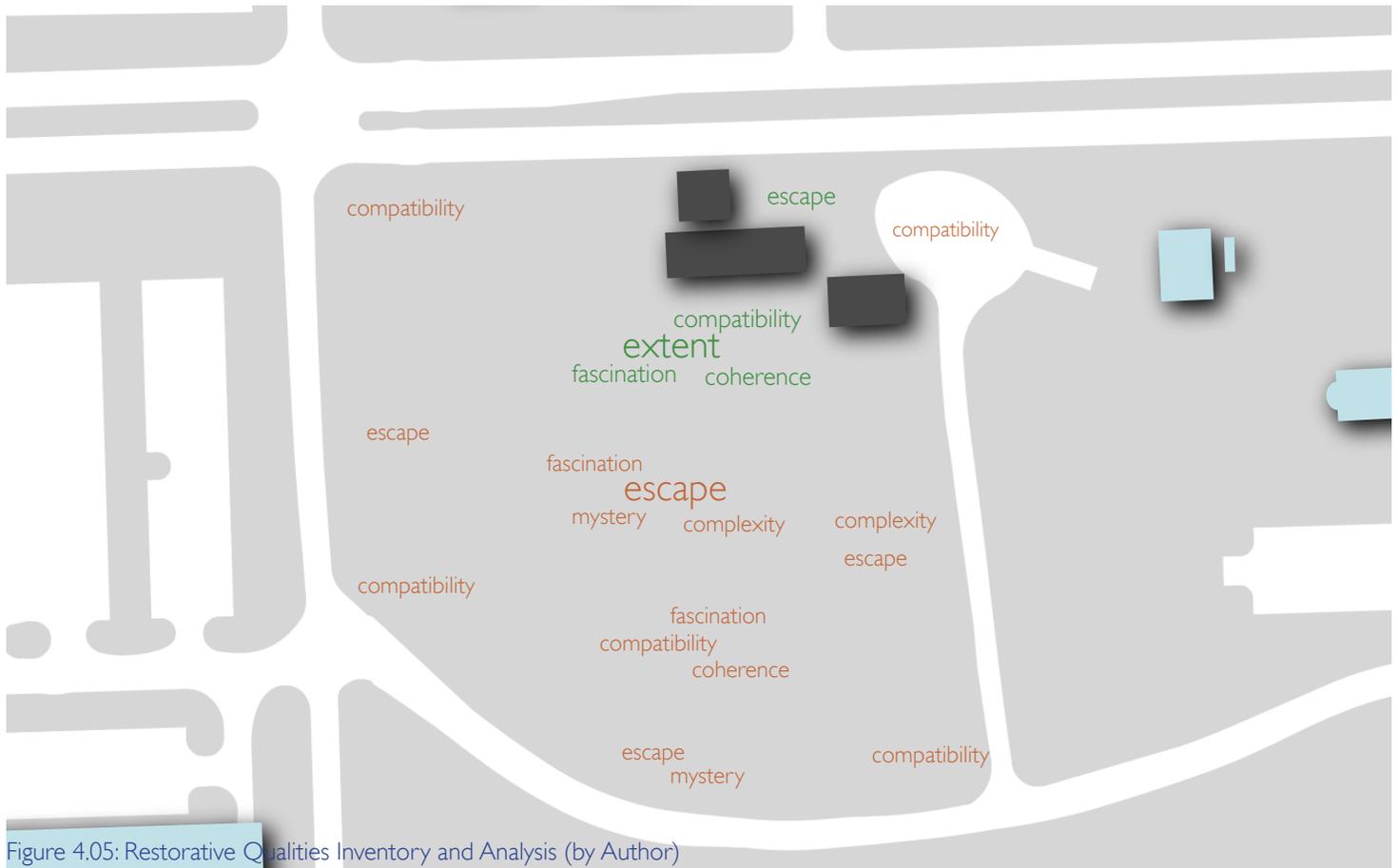
Figure 4.05: Restorative Qualities Inventory and Analysis (by Author)

restorative landscape characteristics

Crucial to the development of a new restorative landscape space is an evaluation of the site's existing and potential restorative qualities. Based on the research discussed earlier, the site's restorative qualities were identified. The specific qualities being used included Roger Ulrich's four characteristics of a restorative experience ("fascination", "escape", "extent", and "compatibility") and Stephen Kaplan's Preference Model ("coherence", "complexity", "legibility", and "mystery"). These qualities were located in the diagram above. It highlights where specific restorative qualities occur or where they could potentially occur (given the site conditions).

The primary restorative quality to protect within the design of this site was its existing opportunities for providing "extent." The existing buildings lie upon the high point of the site; thus, offering more views than anywhere else on site. This will allow the mind to wander in fascination as well as create "coherence" and "compatibility" for people there.

Legend
Present Characteristic ————
Potential Characteristic ————
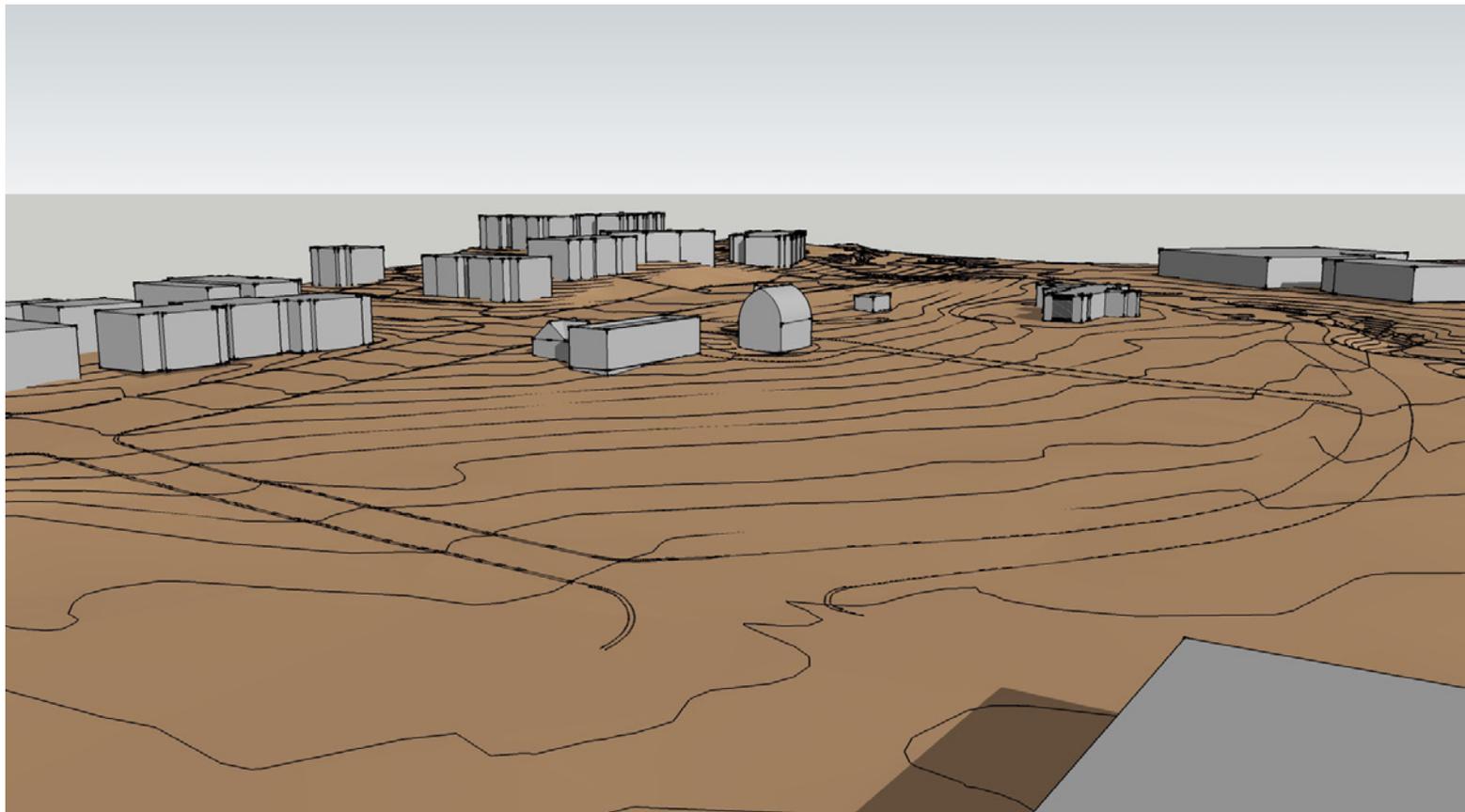
Figure 4.06: Existing Topography (by Author)

topography

As previously mentioned, the existing buildings site atop the high point of the site. The landscape maintains a steadily decreasing grade change as it reaches further South. Grades are steep in the immediate area south of Bob Billings Parkway. The figure above shows the site's 2-foot contours. In all, there is roughly thirty feet in grade change from the northeast corner to the southwest corner of the site.
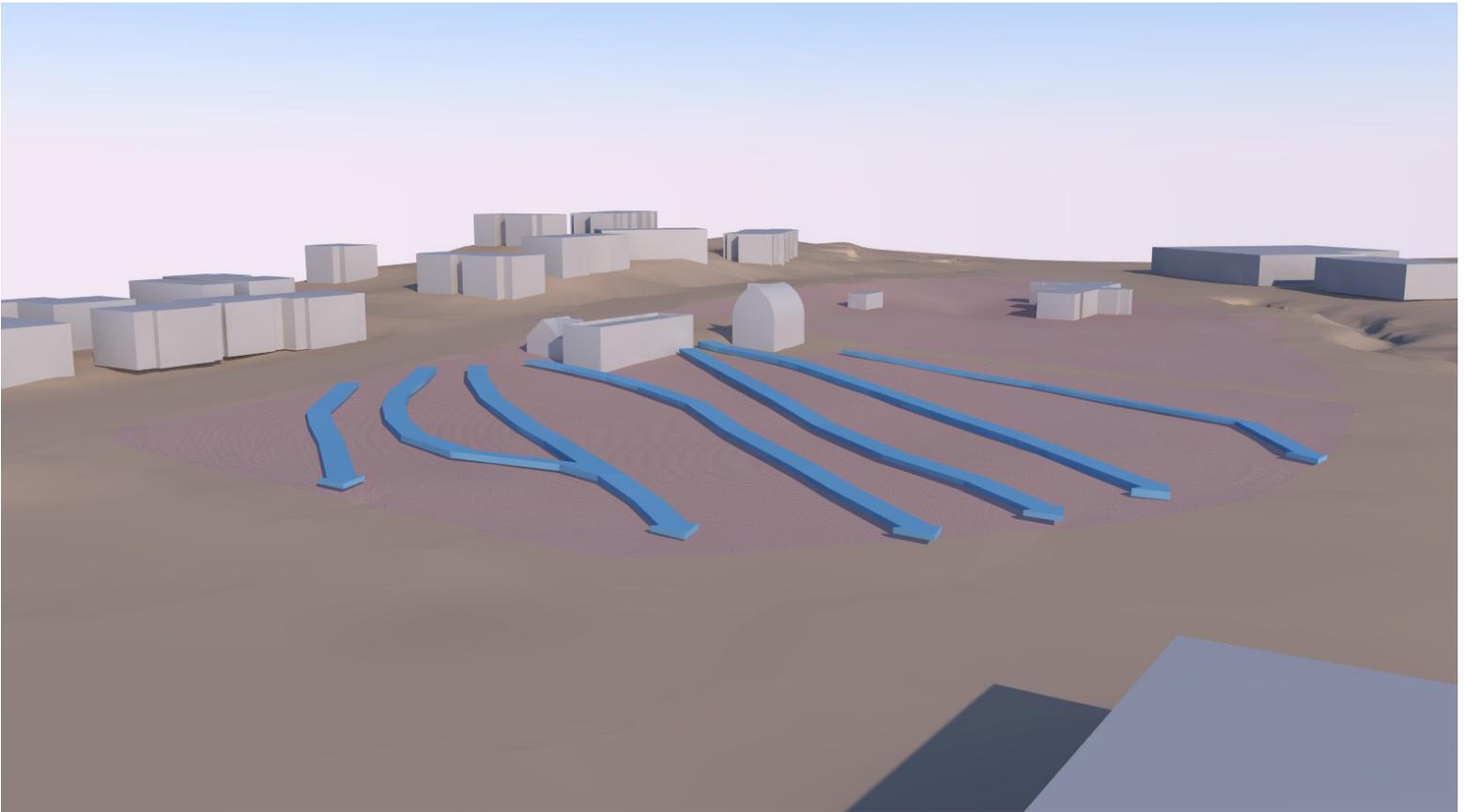
Figure 4.07: Existing Stormwater Runoff Patterns (by Author)

stormwater runoff

Since the site maintains a somewhat steady grade change, drainage patterns typically run south or southwest. The current watershed leads runoff between the CDR and the barn on site. Capturing stormwater is an important task that may help create a sustainable environment as well as provide many restorative benefits.

Legend

Drainage Pattern
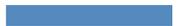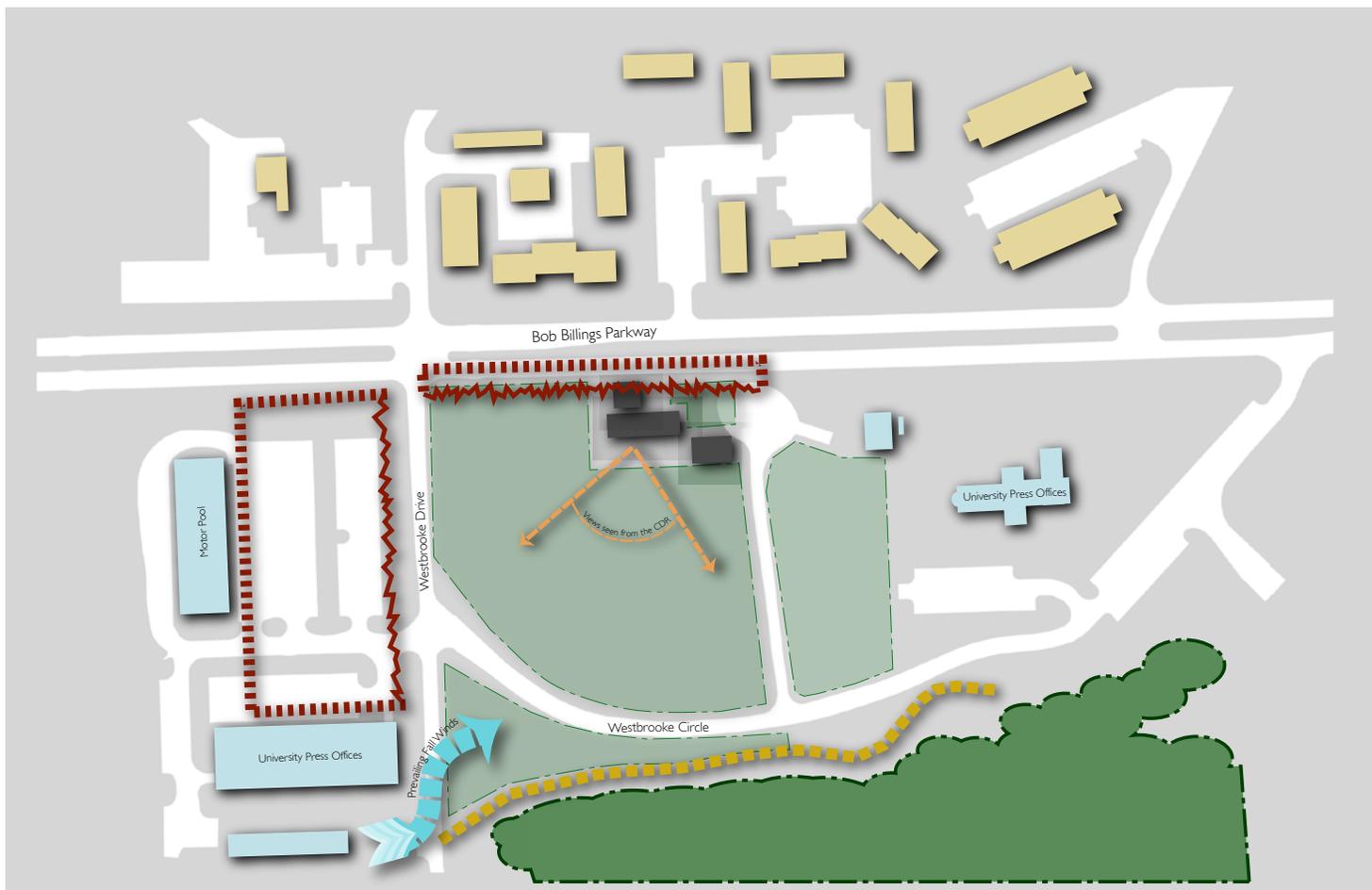
Figure 4.08: Important Site Factors (by Author)

important site factors

This diagram highlights site characteristics that were important to consider during the design process. The most notable factors were the expansive amount of open space and the vehicular noise generated from Bob Billings Parkway. Though the open space represented the amount of unused land, it was also an opportunity for expansion of the campus. The great amount of space allowed for more solutions during the design process.

The other issue was noise. The neighboring parkway was originally created for campus sports attendees to quickly access the stadium or arena. With the potential for much traffic, there is a noticeable amount of noise generated by passing vehicles. In order to create a restorative environment, intrusive sounds should be mitigated. While there were other site factors on site, these represented the site factors that influenced the restorative design of the site.

Legend

Visual Buffer
Open Green Space
Areas / Sources of Noise
Riparian Area

Residential Buildings
University Buildings
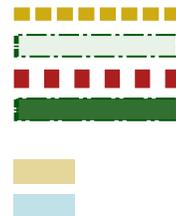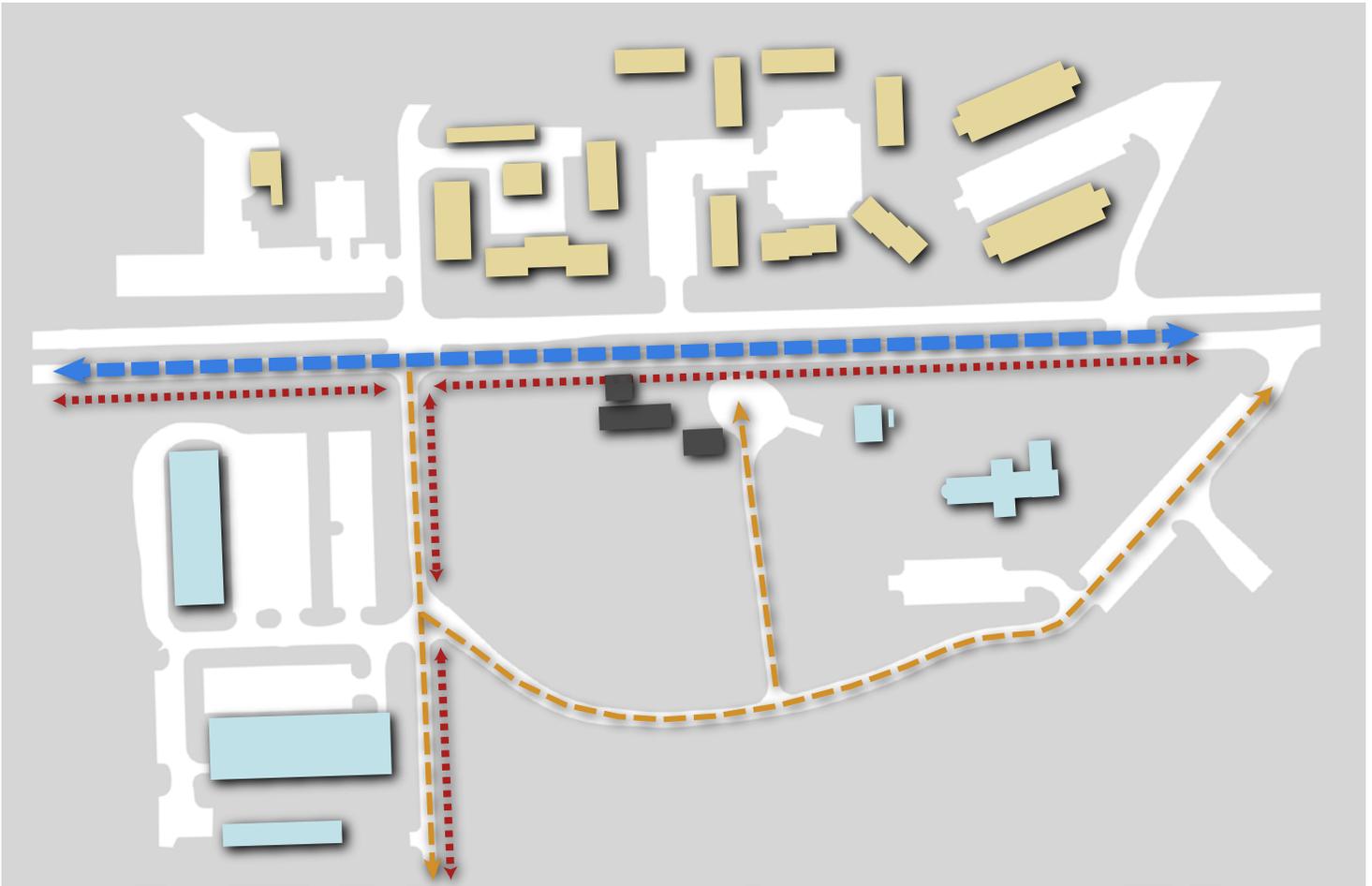
Figure 4.09: Circulation Diagram (by Author)

circulation

Another factor kept in mind during the design process was the existing site circulation. Vehicular access to the building wraps around the site boundary. With vehicles inevitably surrounding the site, controlling noise pollution becomes more important.

There is currently a lack of sidewalks on or leading up to the site; therefore limiting pedestrian access. However, a proposed shared path lane that runs along Bob Billings Parkway is being implemented in spring 2013. Accommodating this future use within the design therefore becomes important.

Legend

Primary Vehicular Circulation

Secondary Vehicular Circulation

Lack of Pedestrian Access
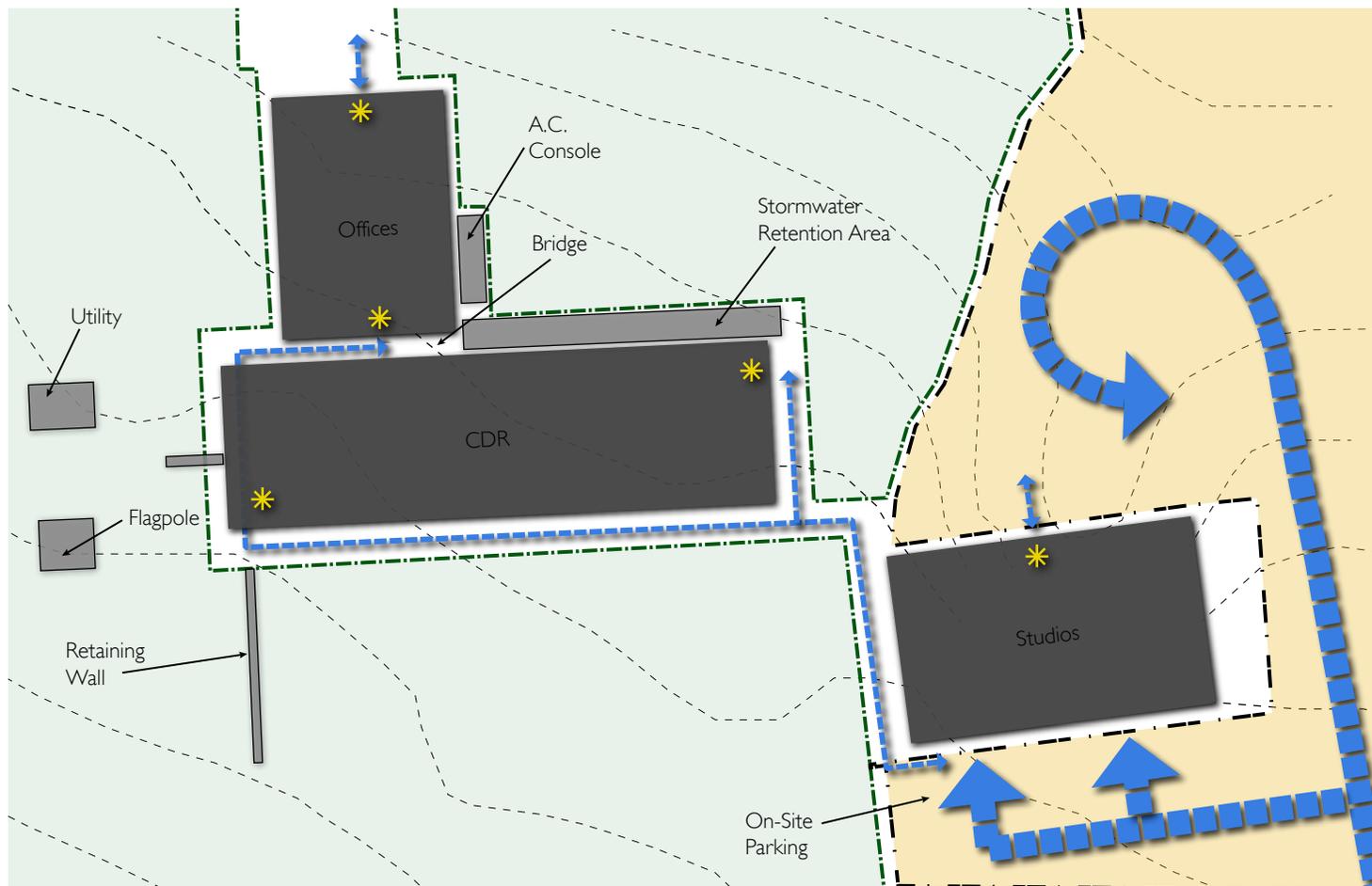
Figure 4.10: Back Yard Site Inventory (by Author)

existing site scale inventory

Since there is little development on site, inventory was taken at a site scale as well. Pedestrian circulation is dependent on vehicular access. Users currently drop off others within the dirt paved circle or they park on the south side of the barn where there are limited spots available. Inventory also identifies existing infrastructure, such as the windmill, the cistern, and the stormwater collection spouts along the north façade of the CDR.

Legend

Vehicular Circulation

Pedestrian Circulation

Open Green Space

Dirt Road

Building Entrance
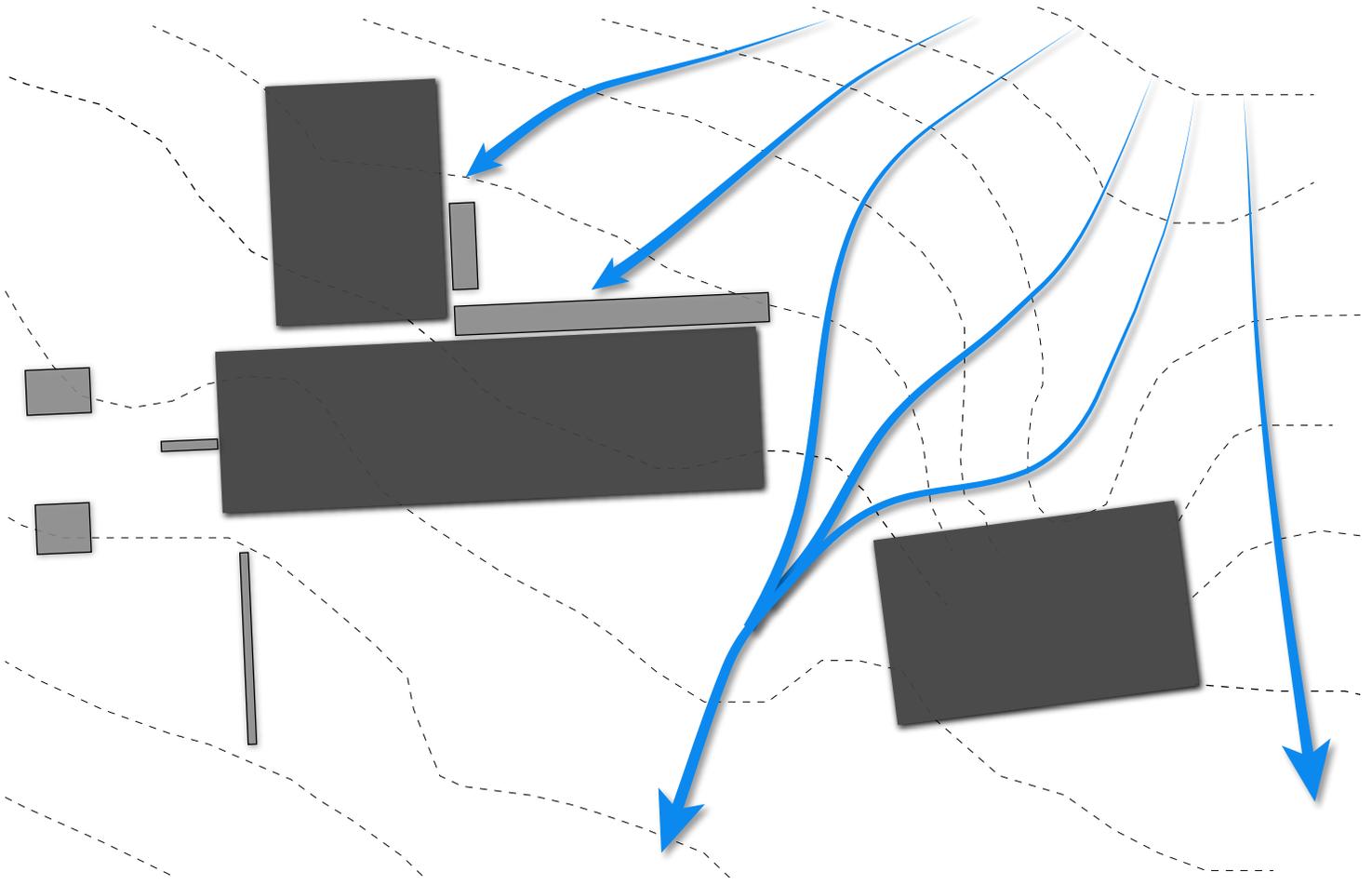
Figure 4.11: Back Yard Hydrology Patterns (By Author)

existing site scale hydrology

As mentioned earlier the drainage patterns on site follow the gradual grade change towards the southwest. A local watershed exists between the the CDR and the barn. Other runoff is collected through an underground cistern and building downspouts so that water can be reused within the CDR facility itself.

Legend

Drainage Pattern
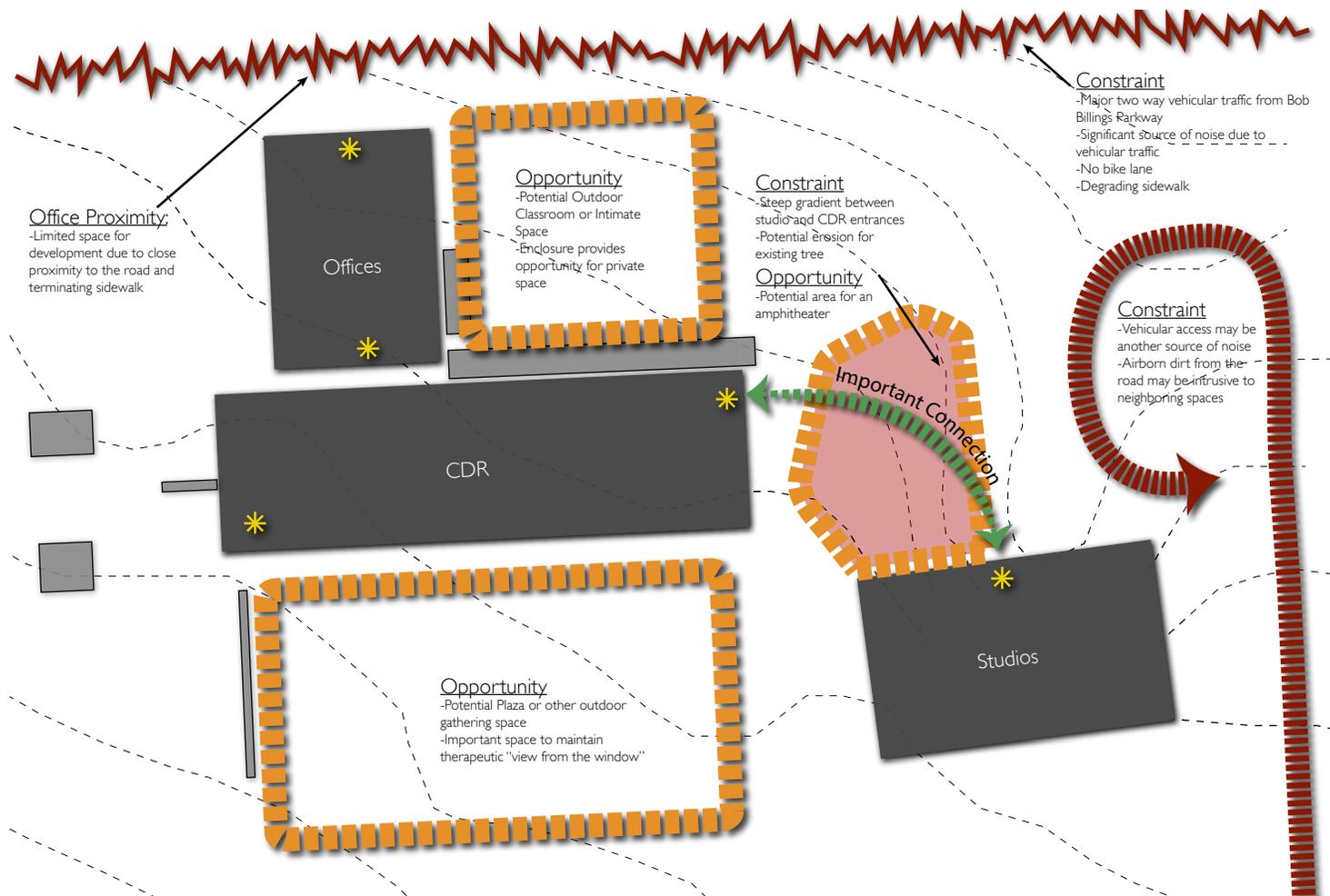
Figure 4.12: Back Yard Opportunities & Constraints (By Author)

Office Proximity:
-Limited space for development due to close proximity to the road and terminating sidewalk

Opportunity
-Potential Outdoor Classroom or Intimate Space
-Enclosure provides opportunity for private space

Constraint
-Steep gradient between studio and CDR entrances
-Potential erosion for existing tree

Opportunity
-Potential area for an amphitheater

Constraint
-Major two way vehicular traffic from Bob Billings Parkway
-Significant source of noise due to vehicular traffic
-No bike lane
-Degrading sidewalk

Constraint
-Vehicular access may be another source of noise
-Airborn dirt from the road may be intrusive to neighboring spaces

Opportunity
-Potential Plaza or other outdoor gathering space
-Important space to maintain therapeutic "view from the window"

Offices

CDR

Studios

Important Connection

site scale opportunities & constraints

Since the landscape immediately surrounding the existing buildings is of the most concern to the DCM, it is important to understand the opportunities and constraints within the landscape. Vehicular noise from Bob Billings Parkway remains a large concern, as it negatively impacts the restorative effect of the outdoor environment. Establishing a connection between the CDR and barn studios remains an issue due to the steep grade change between them. Mitigating the issues highlighted and taking advantage of the opportunities will create a more successful design solution.

Legend
Opportunity
Constraint

Back Yard
-Applicable Typologies: "Tucked Away" Garden,
 Healing Garden, Courtyard

-Semi-private space bound by buildings

-Potential space for gathering from within
CDR

Front Yard
-Applicable Typologies: Landscaped
Grounds
   * Back Yard Spaces are applicable as well
     (i.e. healing garden)

-Will serve the existing barn studios

-Potential space for "getting away"

Front Porch
-Applicable Typologies: Patio, Roof Terrace,
Entry Garden

-Transition space between buildings

Front Porch
-Applicable
Typologies: Patio,
Roof Terrace

-Potential Outdoor
dining space

Figure 4.13: Back Yard Typology Analysis (By Author)

typology analysis

An initial typology study was also done to inform design decisions. Given the landscape,
"front yard," "front porch" and "back yard" areas were identified. Because the site is
accessible from the main entrance to the barn and a side entrance to the CDR, spaces for
both a "front yard" and "back yard" were found (as opposed to only "back yard"). For each
space, important factors were noted and possible typologies that may be applied through
the design.

application **05**

site design

design narrative

The design concept was created upon completing site analysis for the site. After considering the site's existing restorative qualities, it became a focus to maintain the Center for Design Research and the foundational qualities established by former owner, Harold Chamney, as the heart of this part of campus. Recognized by many to be an innovative farmer, the CDR was created to build upon those innovative practices and continue Chamney's legacy. The idea behind the site design of this project is to further build upon it and establish this area as the "Research and Design District" for the West Campus at the University of Kansas.

spatial organization

With a large open site, the design for this project could go in several directions. Several design alternatives, such as orthogonal and organic organizational patterns, were explored before a radial organization was chosen.

With a radially organized spatial pattern, the design focuses on maintaining the site's existing restorative qualities and extending them throughout the project's area. It was therefore important to maintain the site's opportunities for creating "extent" in one's mind. This meant protecting its existing views and creating more opportunities to experience "extent." To do this, open space was maintained on the south side of the CDR. Using the radial organization, extrusion of sight lines and other forms helped create building form and other landscaped space, where the framework typologies were applied. The goal of the radial organization was to maintain opportunities for perceiving "extent" while also creating a legible campus.

Figure 5.01: Spatial Organization (by Author)

Legend

Restorative Landscape Space

Campus Building

Parking Area

master plan

The master plan is result of the research and careful consideration of design elements laid out in the design framework. The spatial organization allowed for interconnected open space to take shape while also providing a series of other semi-private and private smaller spaces. With the knowledge of all the literature gathered thus far, the design features listed to the right, were implemented in order to create a restorative campus environment.

Legend - Design Features

a Center for Design Research

b Existing Studios

c Graduate Studios

d Proposed DCM Building

e Proposed Research Facility

f Permeable Paving

g Bioretention Pond

h Infiltration Basins

i Rain Garden

j Amphitheater

k Entry Sign

l Entry Plaza

m Shade Structure

n Sound Wall

Bob Billings Parkway

Westbrooke Drive

Westbrooke Circle

k
e
n
n
a
b
j
g
e
f
e
i
l
h
c
m
h
h
f
d

design features

New Campus Buildings

To accomplish the goal of establishing an expanded campus, several new buildings were proposed. Their program and building type were chosen according to the building types identified by Polyzoides. Among the new buildings are three laboratory lofts, an academic loft, and a monumental building. The laboratory lofts include a new research facility that will work in conjunction with the Center for Design Research (CDR) and a new office building desired by the Office of Design & Construction Management (DCM). The new academic loft will expand upon the studios within the barn. While the design and science fields are well represented, the monumental building will represent an office building that will anchor the pedestrian entry to the site.

Bioretention Pond

In order to appeal to the innovative character of the Chamney Farm, new strategies for stormwater collection were implemented to create a sustainable environment. One of the main strategies is a new bioretention pond that is located just south of the CDR. In addition to slowing and capturing potential stormwater runoff, the pond will act as a landmark for its surrounding buildings. Since water features are notably restorative for their visual aesthetic and calming sounds, the pond will be the main feature for the restorative campus typology mentioned on the next page.

Infiltration basins

Infiltration basins are another stormwater collection strategy that are located in various subspaces on site and within the parking lot medians. They are depressed planting areas that are strategically located to capture stormwater runoff. They were used in place of typical planting areas so that more water could be collected.

Permeable Paving

Also helpful to stormwater is the use of permeable paving in the parking lot. This type of paving will allow stormwater to slow down and penetrate the surface. This will decrease the amount of runoff (and subsequent pollutant materials) that will make its way back to the

water supply. In addition, this will provide more opportunities for people to interact with nature.

Amphitheater

An amphitheater will accommodate the various programs associated with the surrounding buildings. It may be used as a classroom, a gathering space, an eating place, etc. By placing it nearby the CDR, people within the amphitheater will have opportunities for views, extent, or a small escape.

Sloping Lawn

Within the new campus green, the northern lawn will feature an angled slope to allow for more informal seating. Similar to a roof terrace, this will provide a relaxing place to gather, eat, study, or relax, while providing views and small opportunities for experiencing "extent."

Entry Sign

An entry sign was also used to welcome pedestrians to the campus. Familiar materials native to Kansas were used so that pedestrians may feel more welcome and compatible to the campus.

Sound Wall

A sound wall was used on the North side of the site to block out noise from the adjacent parkway. Because the wall sits on a higher elevation than the space it protects, a 5 foot wall was deemed appropriate to block out noise. In addition, various plantings will be planted along the façade of the wall in order to refract some of the noise.

Rain Gardens

Rain gardens are implemented within both parking lots to act as a landscape setback or vegetative buffer for cars or pedestrians.. Within this garden, there are native plants that will thrive throughout the seasons as well as look attractive for on-goers.

framework typologies

The final framework plan demonstrates the restorative campus spatial typologies that were used within the design of the project. Each space will be described in the following pages.

legend - framework plan

Common Turf:

a   Campus Green

Home Base, Front Yard:

b   Landscaped Grounds

c   "Roof" Terrace

Home Base, Back Yard:

d   Courtyard

e   Healing Garden

Home Base, Front Porch

f   Patio

g   Entry Garden

Bob Billings Parkway

Westbrooke Drive

d

f

e

f

c

g

b

f

d

a

Westbrooke Circle
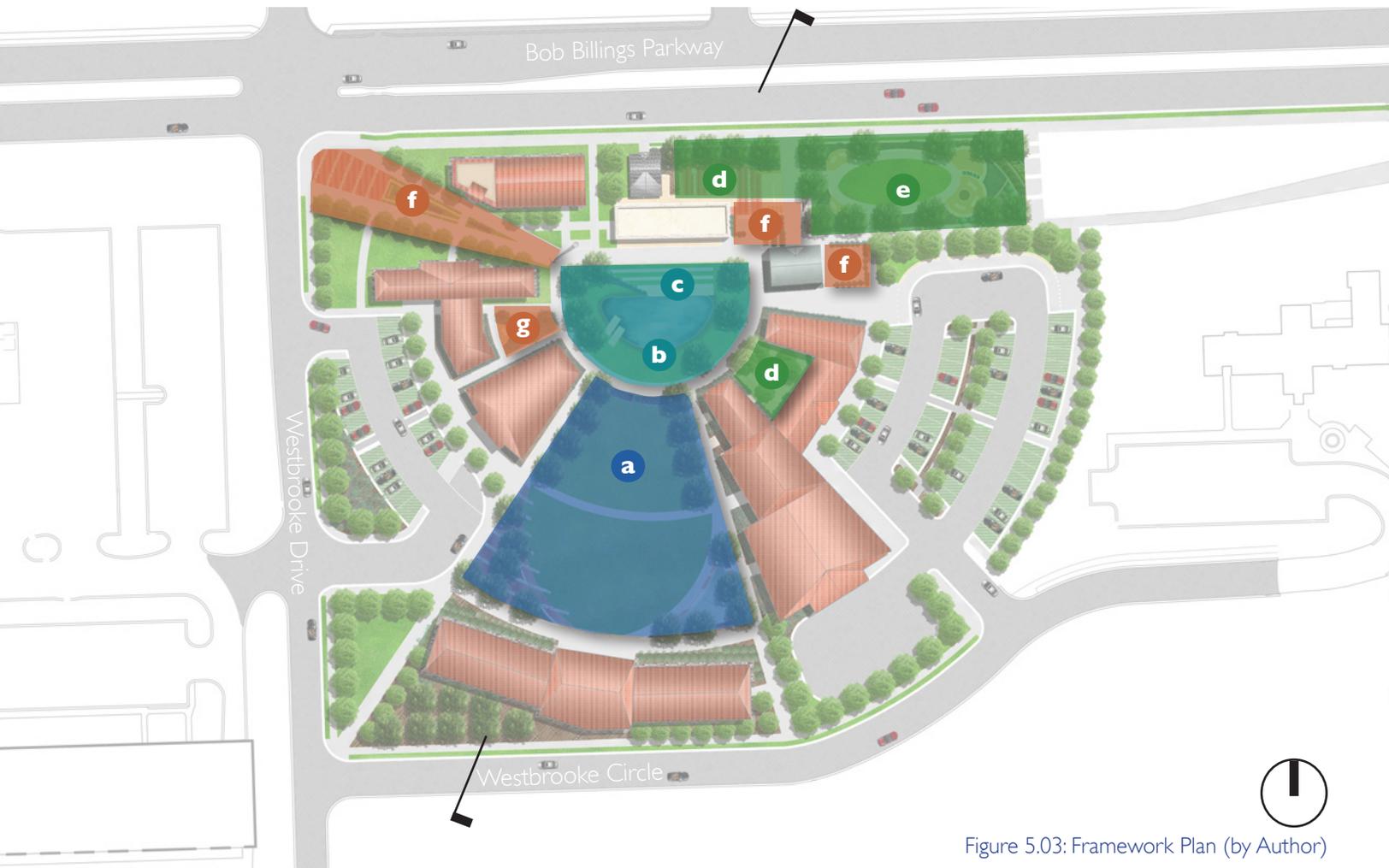
Figure 5.03: Framework Plan (by Author)

back yard -
courtyard

front yard -
landscaped grounds

common turf - campus green
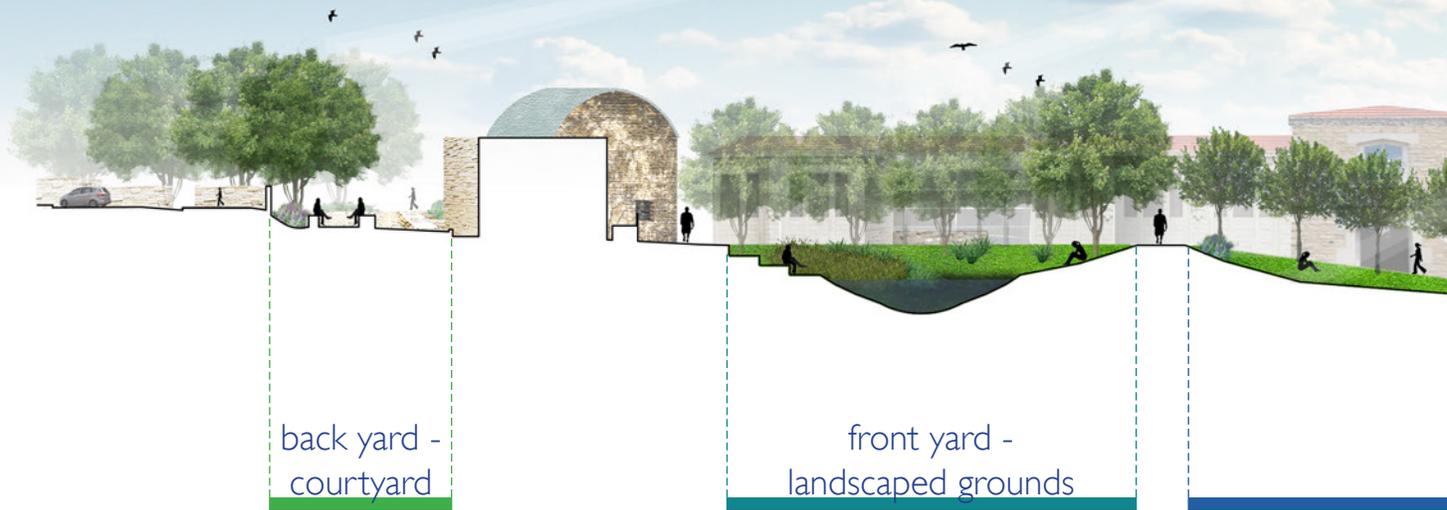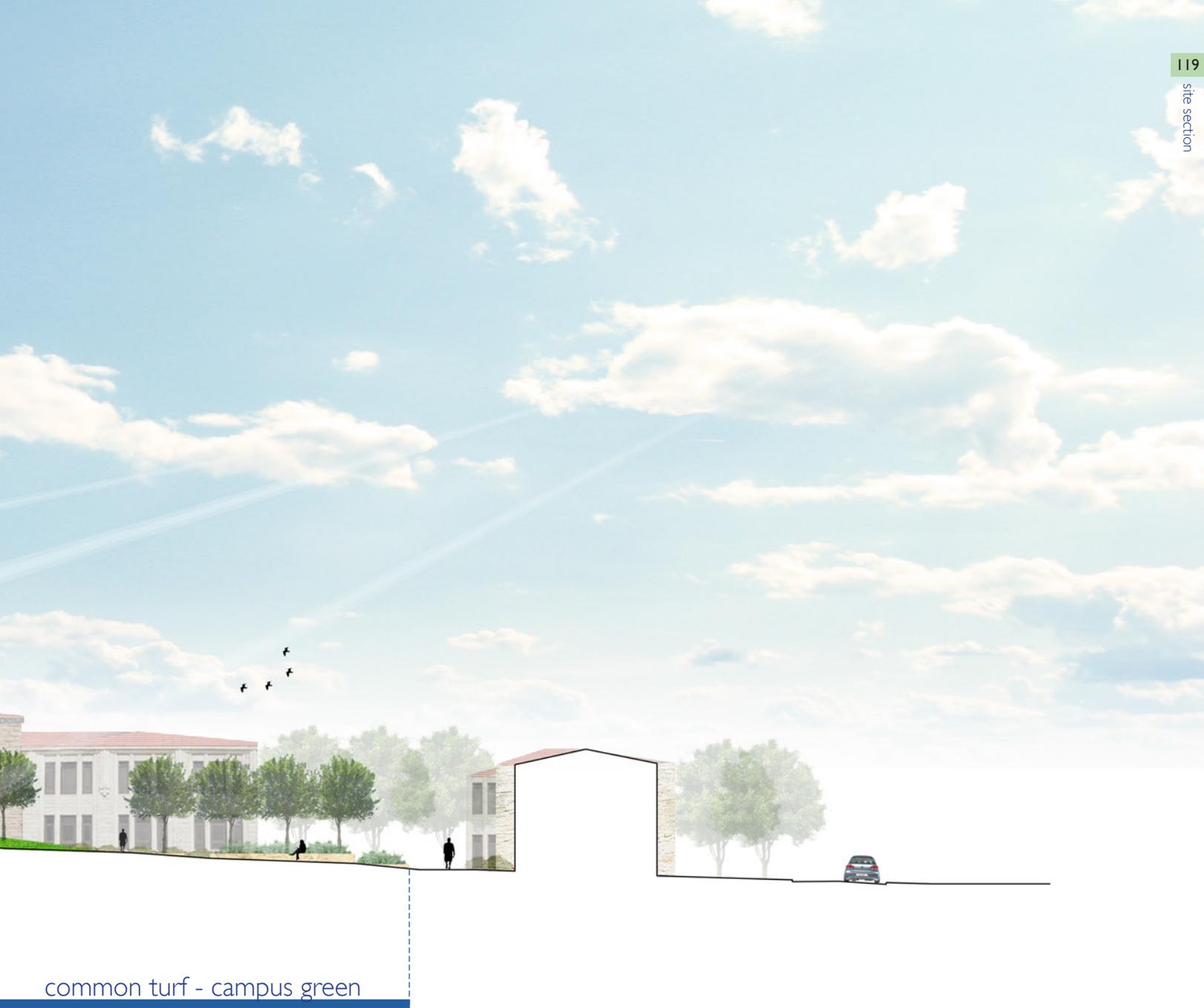
Figure 5.04: Site Section (Looking East) (by Author)

common turf - campus green

The design features one primary common turf typology: a campus green. It was used to incorporate a large public gathering area for everyone. Its overall shape was formed from the radial organization pattern described earlier. It features a downward sloping lawn so that people may rest while having some view of other people or the rest of the site. The buildings that front the green include: the proposed DCM building, the new proposed studio building, and the proposed research facilty.

Paths

Paths were shaped to accommodate small subspaces as well to connect goals, destinations, and building entries on site.

Natural / Familiar Materials

Common throughout the space are limestone seat walls and furniture. Accent paving within the plaza and patio features a red brick pattern to represent the character of a typical campus building.

legend - design elements

a Paths

b Interconnected Open Space

c Natural / Familiar Materials

d Seating Variety

e Vegetative Planters

f Native Vegetation

g Entry Plaza

h Shaded Structure

Primary Space
Tertiary Space
Circulation
Building Entry
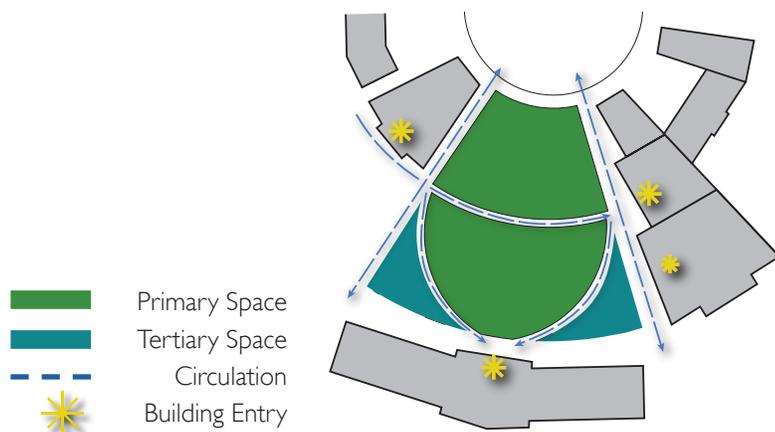
Figure 5.05: Campus Green Design Diagram (by Author)

Figure 5.06: Campus Green Detail Plan (by Author)

legend - design elements

a Vegetative Buffer

b Vegetative Planter

c Interconnected Open Space

d Paths

e Trees

interconnected
open space

As a "common turf" area, the campus green is meant to be accessible by everyone. Vertical elements, such as trees, were used along the eastern and western edges of the space in order to maintain the view corridor coming from the higher elevated areas.

Figure 5.07: Campus Green Sloping Lawn (by Author)

Figure 5.08: Campus Green Entry Plaza (by Author)

entry plaza

To accommodate vehicular dropoff and pedestrians waiting for transportation, an entry plaza was incorporated as a subspace within the campus green. It features terraced seat walls with infiltration basins to collect stormwater runoff. Here people can wait for their transportation, or gather to socialize.

legend - design elements

a Vegetative Planter

b Native Vegetation

c Tree Places

d Seating Variety

e Natural / Familiar Materials

Figure 5.09: Campus Green Shade Structure (by Author)

shade structure

Another subspace was included on the east side of the green: a sheltered patio. Here people can eat, study, sit, or take refuge from the sun. The space features dining tables for eating and vegetated seat walls as well. The shade structure will provide people with a sense of enclosure and privacy, while still having a view of the campus green.

legend - design elements

a Vegetative Planter

b Path Width

c Shade Structure

d Native Vegetation

e Seating Variety

f Trees

g Natural / Familiar Materials

home base - the front yard

The "front yard," represented by a landscaped grounds, is located at the heart of the radial organization pattern. It was chosen for its variety of private and semi-private use. Though the front yard is a public space, this space possesses more privacy and intimacy than a campus green. The experience here is meant to be contemplative and bring people closer to the natural environment.

Paths

In order to keep the space highly accessible, a main path circulates around the entire space, making wayfinding easier. Six of the seven buildings can immediately access this path.

Native Vegetation

To aid with bioretention, native moisture-tolerant vegetation is used. These types of plants will thrive in wet conditions; therefore, providing year-round interest.

legend - design elements

a Paths / Pathways

b Water Feature / Landmarks

c Native Vegetation

d Interconnected Open Space

e Seating Variety

f Balconies / Terraces

Primary Space
Tertiary Space
Circulation
Building Entry
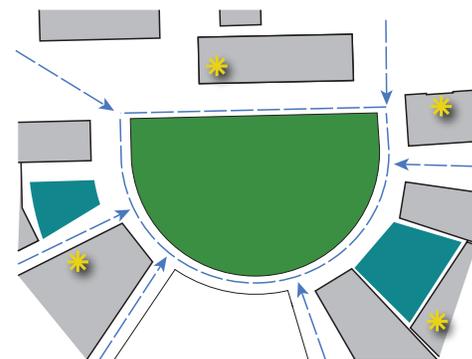
Figure 5.10: "Front Yard" Design Diagram (by Author)

Figure 5.11 "Front Yard" Detail Plan (by Author)
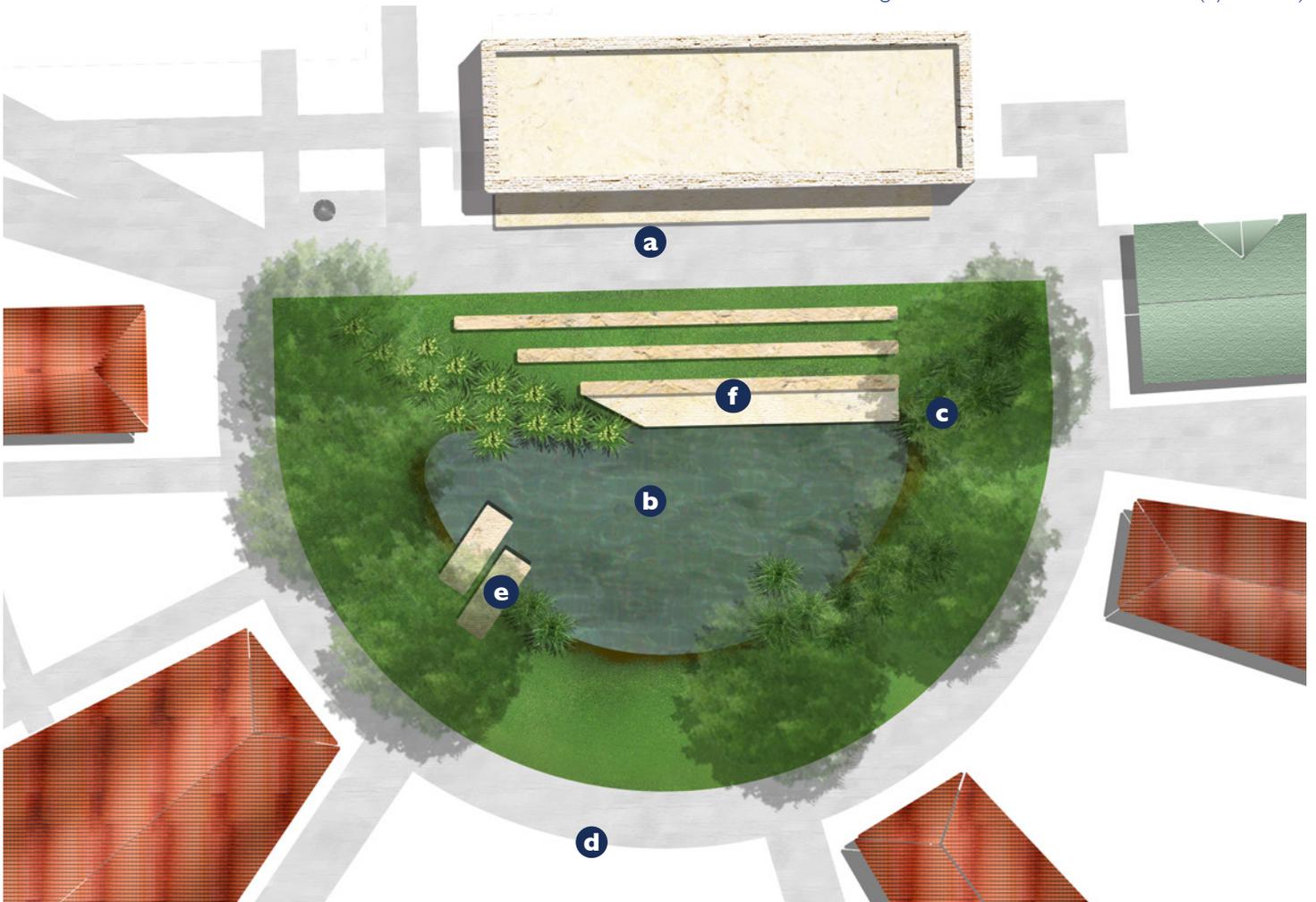
legend - design elements

a Balconies / Terraces

b Water Feature

c Interior / Exterior Connections

d Native Vegetation

e Seating Variety

f Trees

water feature

The main feature of the landscaped grounds is the bioretention pond mentioned earlier. Water provides an attractive, calming environment. Its primary purpose is to provide a contemplative experience, whether they are within the space, walking by, or viewing from a window.

roof terrace

An amphitheater creates a roof terrace adjacent to the pond. This provides formal seating so people can appreciate the view of water or enjoy a class outdoors.

Figure 5.12: "Front Yard" Perspective (by Author)

home base - the front porch

As a transition space, the "front porch" of the site is represented by an entry sign that greets pedestrians to the campus. The space will act as a gateway and frame the walk leading to the rest of the campus. Accent paving is used to provide some interest to the entry sign. Views are framed by the neighboring buildings and newly planted trees to invoke curiosity and guide pedestrians to the rest of the site.

Seating Variety
Small seating alcoves are placed along this walk to provide a patio-like setting that serves the buildings or the front porch itself.

Trees
Trees are planted along the walk to create "tree places" for the seating alcoves. They provide the shade that is typically provided within a patio.

legend - design elements

a Seating Variety

b Entryway / Gateway / Landmark

c Trees

d Native Vegetation

e Natural / Familiar Materials

Tertiary Space
Circulation
Building Entry
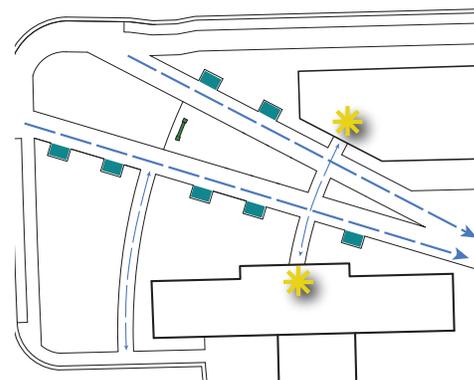
Figure 5.13: "Front Porch" Design Diagram (by Author)

Figure 5.14: "Front Porch" Detail Plan (by Author)
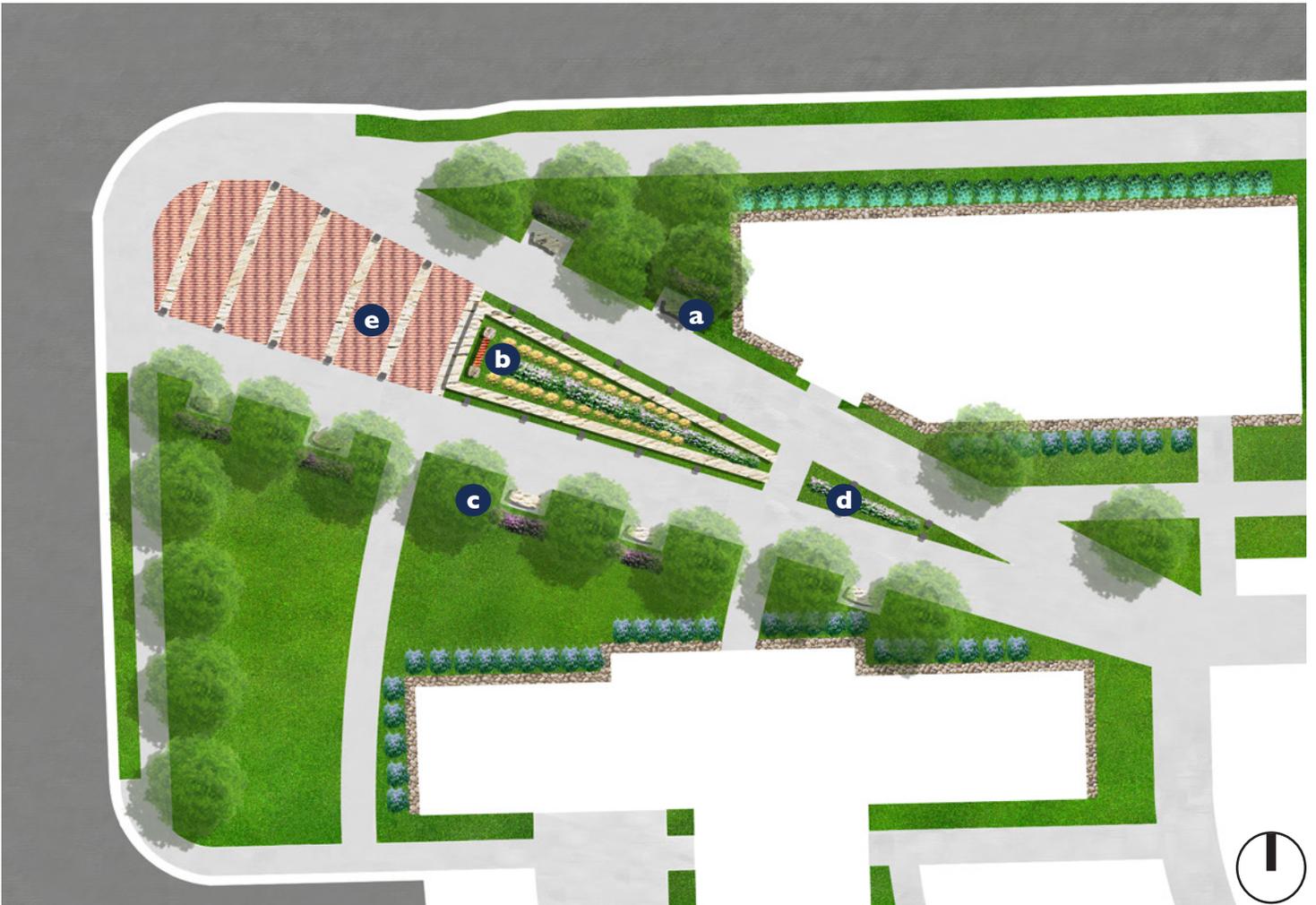
legend - design elements

a Entryway

b Natural / Familiar Materials

c Views

d Native Vegetation

e Seating Variety

f Trees

entryway

The entry sign communicates to pedestrians where they are going. This communication will help people determine their compatibility. The sign itself is made of brick and limestone materials, both of which are typical on the KU main campus. It sits atop a vegetated planter, which extends to provide additional seating areas.

home base - the back yard

The landscape north of the existing buildings represents their "back yard." Due to the terrain, two typologies were able to be applied. Each typology was able to fit the needs and desires of the CDR and the DCM.

A sound wall was used along the northern edge of the "back yard" to mitigate the vehicular noise from Bob Billings Parkway. With the wall, the space immediately North of the CDR fit the description of a courtyard space. Needing a small space for people in the CDR to spill out and gather, the DCM asked that the design address this need. This hardscaped space provides seating in the form of limestone seat wall, which is divided to create some separation of space if people wish to have some sense of privacy.

East of the barn is a healing garden that features central lawn space. A semi-circular path circulation around this green space is utilized to allow for aimless wandering. This is especially important during peak times of stress. People looking for a brisk contemplative walk may walk the path continuously without having to worry about wayfinding.

legend - design elements

a Balconies / Terraces

b Vegetative Planter

c Vegetative Buffer

d Native Vegetation

e Natural / Familiar Materials

f Trees

g Seating Variety

h Interconnected Open Space

i Water Feature

j Sensory Engaging Plant Palette

Primary Space
Tertiary Space
Circulation
Building Entry
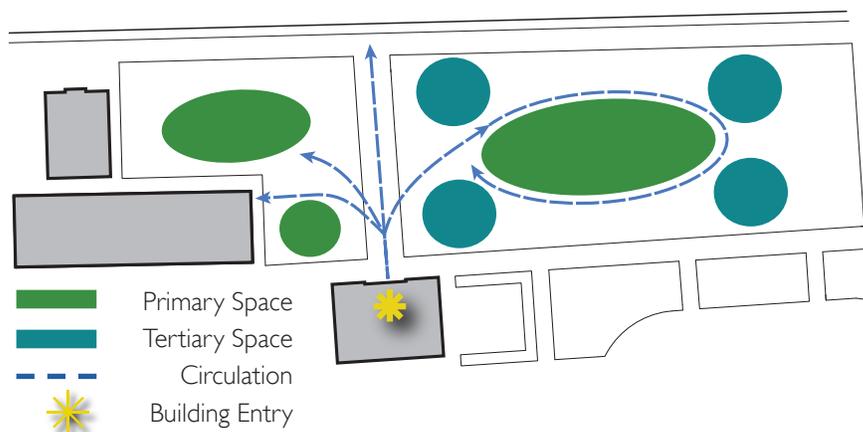
Figure 5.16: "Back Yard" Design Diagram (by Author)

Figure 5.17: "Back Yard" Detail Plan (by Author)

Figure 5.18: "Back Yard" Healing Garden (Looking East) (by Author)

sensory engaging plant palette

The healing garden features a plant palette that engages each of the senses. As one walks through the garden, they will experience various sights, smells and sounds. Vegetation was chosen according to their color, texture, size, fragrance, and other miscellaneous stimulating qualities. They are planted along the walk so that people may have an opportunity to experience the stimulating effects throughout their experience within the space. Native vegetation was also used so that the vegetation will thrive more persistently throughout the year. A sensory engaging plant palette was important to this space in order to create an immediate experience with nature. Such contact will create a relaxing, stress-reducing environment for students within the existing studios.

legend - design elements

a   Sensory Engaging Plant Palette

b   Natural / Familiar Materials

c   Interconnected Open Space

d   Paths

e   Seating Variety

f   Trees

Figure 5.19: "Back Yard" Healing Garden (Looking West) (by Author)

seating variety

As the "back yard" to the existing buildings, a variety of private areas and seating arrangements need to be provided. This will provide opportunities for eating, studying, conversing, or relaxing. To do so, various seating alcoves were provided around the central open green space. The semiprivate alcoves will provide a sense of enclosure and shade while also maintaining a view of the primary space. The lawn provides informal seating that is open to the sun.

As mentioned earlier, vegetated seat walls (shown on page 139) are provided within the courtyard to promote close contact with nature. The seat wall itself features partitions that provide two different seating spaces, each of which has a limestone table to accommodate their needs.

legend - design elements

a Seating Variety

b Sensory Engaging Plant Palette

c Vegetative Buffer

d Interconnected Open Space

e Paths

f Trees

Figure 5.20: "Back Yard" Patio (Looking North) (by Author)

balconies / terraces

With various degrees of grade change on this site, several balconies or terraces were used as retaining walls. Terraced planters (shown above) were used along the slope between the barn and the CDR. They will provide a pleasing entry experience while also provide seating through its seat walls. The terraces form a small patio or transition space between the buildings.

Along Bob Billings Parkway, a sound wall was incorporated to mitigate vehicular noise intruding on to the site. The sound wall is also a retaining wall that helps establish the proposed elevation of the site.

legend - design elements

a Seating Variety

b Natural / Familiar Materials

c Vegetative Planter

d Native Vegetation

e Balconies / Terraces

Figure 5.21: "Back Yard" Courtyard (Looking Northwest) (by Author)

natural / familiar materials

A combination of natural and familiar materials was used throughout the "backyard." Similar to the entryway within the "front porch," limestone and brick paving materials (shown above) were used to provide familiarity, and to create a welcoming environment. Dense native plantings were also used to provide some enclosure and "soften" the courtyard. These types of materials create a comfortable setting; thus, allowing for more opportunities for restoration throughout the "back yard."

legend - design elements

a Seating Variety

b Natural / Familiar Materials

c Water Feature

d Vegetative Planter

e Trees

evaluation 06
project conclusions

conclusions

Project Conclusions

As mentioned earlier, restorative landscape design is a growing trend, but is largely applied to healthcare environments due to its therapeutic benefits (Thwaites et al., 2006). Much of the literature reflects this notion. Despite this, many of the concepts and design strategies can be used elsewhere, such as within higher education campuses. Current campus planning primarily deals with engaging student communities and promoting social interaction (Kenney et al., 2005). Given the current issues and research with campus design, there remains a need for better performing campus landscapes. Universities and other higher education institutions can be high stress environments due to the potentially rigorous curricula that students might engage. They are environments that are highly susceptible to "information overload." With much of the work and time spent indoors, the outdoor campus landscape remains crucial to mediating the psychological and emotional rigors that students must endure. Increasing exposure to nature through restorative landscape design can help mitigate the stress and improve student well-being on campus.

Limitations

Throughout the past year, several factors imposed some limitations on the scope and depth of the project. First was the lack of transportation to the project site and the DCM. Given that both locations were roughly an hour and a half away from Kansas State University, there was limited time spent on the project site, as well as limited face-to-face contact with stakeholders.

A second challenge for this project was the timeframe. For this project, the emphasis was on applying the literature, with an original conceptual framework, to the site design efforts, and not on developing a specific plant palette for the design proposals. Given more time, greater detail in planting and architectural elements could have been addressed.

Recommendations for Further Research

As a result of this entire process, much was learned about the restorative design process and the depth of instinctive human behavior. The research yielded a framework for creating a restorative higher education environment. The design process allowed for

a test of its application to a site. Therefore, some conclusions and recommendations were deduced:

First, in order to understand if the design of a restorative landscape is successful, a post occupancy evaluation (POE) should take place. Due to the nature of this project, a POE could not occur. After design and construction is completed however, a POE might be done and we could begin to understand what works and what does not. For example, some people may not interpret or experience the spaces of this design as intended by the designer. A POE of the design would help us understand how people actually use and interpret the site. The goal would be to learn more about human behavioral patterns, and how our designs can aid their well-being.

Second, Cooper Marcus's classifications or typologies presented a great way of applying restorative landscape typologies. The framework was particularly strong in applying them to landscapes surrounding the buildings. Although these may be the prime locations for their application, campus planning extends beyond these spaces. More research can be done to examine the possibilities of their applications within the

master planning stages or the design of the "common turf."

Lastly, within the framework itself, the typologies that were gathered should not be limited (in their application) to the classifications to which they were assigned. This means that several landscape spaces formed between campus buildings may represent a back yard or front yard. For instance, the front yard spaces implemented on the CDR site may, after time, be interpreted as a back yard. Such types of spaces are not clearly defined within the framework, and should be further evaluated in the future.

Taking quantitative measures similar to the empirical work done by psychologists in years past would help to prove the validity of the framework. The design recommendations of this project were made after many hours of research and deduction. The next step would be to evaluate the designs and whether they achieve their goals in terms of the actual experience. Such measures could reinforce the design decisions of this project and confirm that the designs are indeed restorative for the people using them.

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Fig 2.42. Source: U.S. Japanese Gardens. Digital Image. http://usjapanesegardens.files.wordpress.com/2012/05/dscf0363.jpg (Accessed April 22, 2013). Last modified May 30, 2012.

Fig 2.43. Source: Diers, Dillon. The Office of James Burnett. Digital Image. http://www.asla.org/2012awards/images/largescale/576_15.jpg (Accessed April 22, 2013).

Fig 2.44. Source: Elise Landscape and Nursery. Digital Image. http://www.elisenursery.com/images/terrace.jpg (Accessed April 22, 2013).

Fig 2.45. Source: Terrell, Craig. Land Architects, Inc. Digital Image. http://www.landarcs.com/wp-content/uploads/Roberts_0017.jpg (Accessed April 22, 2013).

Fig 2.46. Source: Savanna School District. Digital Image. http://www.savsd.k12.ca.us/Bond Project photos-Cerritos/RibbonCutting/Cerritos front close up copy.jpg (Accessed April 22, 2013).

Fig 2.47. Source: Lulu Landscaping. Digital Image. http://4.bp.blogspot.com/_r05gfCTXf54/TO_CI79ri0I/AAAAAAAAHL4/PrxqcJvZClM/s1600/IMG_7621.JPG (Accessed April 22, 2013).

Fig 2.48. Source: Berkeley Butterfly Blog. Digital Image. http://2.bp.blogspot.com/_Dn1xf8jGJY0/TGFxb6srhBIAAAAAAAAAu8/s1k06BAcda8/s1600/009.JPG (Accessed April 22, 2013).

Fig 2.49. Source: Blue Heron Landscapes. Digital Image. http://bhld.files.wordpress.com/2012/07dsc08947_0922-e1342005866531.jpg (Accessed April 22, 2013).

Fig 2.50. Source: My New Space. Digital Image. http://www.mynewspace.co.uk/content/2012/11/2Roof.terrace.design2.jpg (Accessed April 22, 2013).

Fig 2.51. Source: AvantGarden DC. Digital Image. http://avantgardendc.files.wordpress.com/2010/03/asla-green-roof3.jpg (Accessed April 22, 2013).

Fig 2.52. Source: My Weeds are Very Sorry- Blogspot. Digital Image. http://4.bp.blogspot.com/_tqQRxH8Ixu4/TENIJGaG1GI/AAAAAAAADtg/w15AV12f0Ng/s1600DSC02841.JPG (Accessed April 22, 2013). Last modified July 18, 2010.

Fig 2.53. Source: Serbagunamarine. Digital Image. http://www.lymefield.com/garden-centre/files/2010/11/Hedge.jpg?84cd58 (Accessed April 22, 2013).

Fig 2.54. Source: Timmerman, Bill. Ten Eyck Landscape Architects Inc. Digital Image. http://www.asla.org/2012awards/
        images/largescale/199_03.jpg (Accessed April 22, 2013).

Fig 2.55. Source: Blog Virtuemart Templates.org. Digital Image. http://img.xzoom.in/29processed/field and bench
        landscape.jpg (Accessed April 22, 2013). Last modified March 11, 2013

appendix

key literature

The following literature includes several significant resources that were discovered during the Fall 2012 semester. A synopsis of each of the key sources is provided. These sources, among others, provided the foundation for this entire project (which includes the proposal document and final book document). They were especially important during the creation of the design framework, as they guided the deductions of the spatial typologies and design components. Given the knowledge from these sources, I was able to find other key literature during the Spring 2013 semester.

Healing Gardens: Therapeutic Benefits and Design Recommendations
Clare Cooper Marcus and Marni Barnes
Chapter 1: Introduction: Historical and Cultural Perspective on Healing Gardens

Summary:

As part of the their book, Barnes and Cooper Marcus provide an introduction to healing landscapes. This introduction includes background information on the necessity for healing gardens and the impact they have on people. To begin the chapter she describes the term, "healing," as a "beneficial process that promotes overall well-being." This healing provides three enhancements to well being (especially within a healthcare setting). They include: "relief from physical symptoms or awareness of said symptoms;" "stress reduction and increased levels of comfort for an individual dealing with the emotionally and physically trying experiences of a medical setting;" facilitation of an "improvement in the overall sense of well-being." The term, "garden," refers to "any green outdoor space" within a space that is intended for use by people. Within a garden, healing effects are increased when the design is able to support other "sought after activities beyond the basics of being in a plant filled space."

Stress reduction is also emphasized through access to nature. Accessibility to nature or gardens is noted as an antidote to stress. They tested a great number of people in healthcare settings and found that a majority reported a positive mood change as a result of spending time within nature. Students were also tested in their studies and many also preferred outdoor environments when stressed.

The main point:
People have an innate preference for experiencing nature, especially during times of stress. This is because nature provides opportunities for "healing." Through experiences of nature, such as gardens, then people will then experience improved overall well-being.

Marcus, Clare Cooper, and Marni Barnes. 1999. *Healing Gardens: Therapeutic Benefits and Design Recommendations*. Hoboken: John Wiley & Sons.

Healing Gardens: Therapeutic Benefits and Design Recommendations
Roger Ulrich
Chapter 2: Effects of Gardens of Health Outcomes: Theory and Research

Summary:

Through this chapter, Ulrich provides insight of how experiencing nature is beneficial for people. He writes that people who have lost control over events or situations are more susceptible to stress. Stress, refers to the "process of responding to events and environmental features that are challenging, demanding, or threatening to well-being." It can be manifested as anxiety, depression, or under-stimulation. As a common issue for people, stress relief has been identified as the most consistent perceived benefit of experiencing nature. Ulrich refers to this experience of nature as a "temporary escape," where people are actively coping with stress and recouping their sense of control. The "escape" refers to temporary avoidance of, for example, "work stresses, interpersonal conflicts, or the monotony of day-to-day routines." His past tests and experiments have found that nature "fostered greater psychological restoration indicated by larger reductions in negative feelings" (fear, anger, etc). It sustains interest and attention more affectively.

Theories that he has studied, as well as those he has developed, suggest that certain characteristics, such as "verdant plants," water sounds, "spatial openness," or parklike spaces, are particularly affective for "healing" opportunities. Opportunities to regain control include: designing spaces for privacy as well as variety. These types of spaces will provide options and facilitate site use. Such design considerations, he says, will help trigger restorative responses, which should naturally occur within a person's first few minutes of engaging the space.

There are also considerations that impose negative effects, or "distractions," on people. These distractions are typically invasive and can induce additional stress among people. Such distractions include: urban noise (traffic, overhead noise), smoking, sunlight (too much exposure), and ambiguous design features (such as artwork that does not appeal or is misinterpreted).

Main Point:

Stress is a significant issue for people. Healing gardens, or other forms of experiencing nature, are instrumental towards mitigating that stress. It offers people a "temporary escape" from the rigors of everyday life.

Ulrich, Roger. 1999. "Effects of Gardens of Health Outcomes: Theory and Research."
In *Healing Gardens: Therapeutic Benefits and Design Recommendations*, edited by
Marni Barnes and Clare Cooper Marcus. Hoboken: Wiley & Sons, 1999.

Therapeutic Landscapes: The Dynamic Between Place and Wellness
Allison Williams
Chapter 5: Place Identity and Therapeutic Landscapes: The Case of Home Care Workers in a
Medically Underserviced Area

Summary:
Therapeutic landscapes are typically designed for healthcare environments. Much of the
literature regarding such the design of these landscapes reflects that. This chapter by Allison
Williams opens the possibility of the design of therapeutic spaces in other environments.
She says they "can also be used in the maintenance of health and well-being." This can be
done through the examination of place-identity, defined as "the fit that exists between one's
self identity and one's place-location."

Williams's claim relates to the design philosophy defined by Barnes and Cooper Marcus.
It places an emphasis of the connection between the user and the site. Place identity
serves as a "cognitive backdrop" to how people perceive and experience their surrounding
environments. This is also akin to Barnes's concept of "filtering," in which human perception
of space is influenced by past experience. If one's "filters" or place identity induces a
peaceful coexistence between the person and the space, then it is deemed a therapeutic
landscape.

Sense of place is another theme that is mentioned. Therapeutic landscapes, whether they
provide healing or not, generally have a strong sense of place. Williams says that it "defines
the identity, significance, meaning, intention, and felt value given to a place, often a result of
experiencing it over time." A strong sense of place brings "existential insidedness," where
a place is experienced unknowingly but meaningfully. On the opposite end, placelessness
leads to a lack of connection between the user and the site. This bond between people
and the landscape is also recognized as "topophilia." Williams argues that place and human
experience are naturally connected to each other, which encourages their interaction. The
cultural or physical attributes can either enhance or decrease the fit between the person
and the place. Therefore, "community attachment research" can help determine the place
identity of a locale area. This is something to be aware of when designing therapeutic
landscapes.

Main Point:
Williams emphasizes that there is an innate connection between people and the
environment. This connection is recognized as place identity. The greater the connection, or
fit, that takes place, the stronger sense of "healing" or restoration will take place. When this
occurs, a landscape is subsequently deemed therapeutic.

Williams, Allison. 1999. "Place Identity and Therapeutic Landscapes: The Case of Home
        Care Workers in a Medically Underserviced Area." In *Therapeutic Landscapes: The
        Dynamic Between Place and Wellness*, edited by Allison Williams. Lanham: University
        Press of America, Inc.

The Restorative Benefits of Nature: Toward an Integrative Framework
Stephen Kaplan

Summary:

Within his article, Stephen Kaplan studies how people develop stress and how it is mitigated. As a psychologist, his approach is more scientific than the previously mentioned research. The article focuses on the restorative benefits of nature, particularly wilderness or wilderness-like environments that are seemingly untouched by human activity. His findings provide a basis for the many design theories of therapeutic design, such as Barnes or Thwaites.

His theory, called the Attention Restoration Theory (A.R.T.), focuses on human attention. Either voluntary or involuntary, attention is a primary source for stress and fatigue. Direct attention, or voluntary attention, requires effort and plays an integral role in achieving focus. Because of this effort, the human mind becomes easily susceptible to fatigue, which can bring harmful effects to human well-being. For this reason, directed attention is instrumental to healthy human functioning. On the other end, involuntary attention requires no effort, and is operated by the unconscious mind. When this type of attention is used, it allows restoration of direct attention. Kaplan's studies aim to find more efficient ways of restoring directed attention.

Another major aspect of his experiments is the relationship between nature and restoration. He recognizes four essential components that make up restorative environments. The first, "being away," is essentially the same concept as the "temporary escape" that Ulrich describes in his article. It refers to the natural inclination that natural settings are preferred destinations for restorative opportunities. The second, "fascination," refers to objects that inspire people to think about other things. The third, "extent," refers to land that enriches people with a feeling of being in a "whole other world." The last component is "compatibility," which is the same concept as Williams's idea of place identity. It represents the fit that people feel between themselves and their environment.

The latter half of the article focuses on integrating a framework for restorative environments. It emphasizes understanding how stress works, what types there are, and the effects that it has. Two major factors that lead to stress are: harm and resource inadequacy. Each may lead to negative impacts on behavior, performance, or overall well-being. Kaplan's studies reach into specific processes of stress development, which, as Barnes and Cooper Marcus state, is valuable to know when designing therapeutic landscapes.

Main Point:
Kaplan's studies provide an understanding that is necessary for achieving proper integration of restorative landscapes. Its main argument is that stress can occur within any environment. Thus, the benefits of restorative environments become crucial to maintaining healthy lives.

Kaplan, Stephen. 1995. "The Restorative Benefits of Nature: Toward an Integrative Frame-
        work." *Journal of Environmental Psychology*. no. 15: 169-182.

With People In Mind
Stephen Kaplan, Rachel Kaplan, and Robert Ryan

Summary:
Within this book, Kaplan expands upon the theories and framework that he laid in place in the previous article. With the help of Rachel Kaplan and Robert Ryan, they write about specific design strategies of natural areas that will aid in attention restoration. They build upon Kaplan's theory, stating that environments and their design are insufficient in supporting vital and daily human needs. Their specified strategies are mentioned in order to find an "optimal arrangement" for natural areas, much like what Thwaites argued in the previously mentioned article.

This book supplements Kaplan's previous article well. By providing strategies to accomplish restoration, his arguments (which were quite comprehensive) are better digested. It provided context from a design standpoint. Much like Barnes and Cooper Marcus stated, Kaplan writes much about the information that the environment exchanges with its users. It is central to design because it involves "finding out people's concerns as well as providing information to make their outdoor experiences satisfying." The challenge of information exchange is understanding the various "mental maps," or "filters," as mentioned by Barnes. Each individual's mental maps are different. For example, people appreciate knowledge that advance their own, but avoid information that is upsetting. Because of this, the components of restorative landscapes ("being away," fascination, extent, compatibility) are important to provide.

The rest of the book states their "understanding-and-exploration" framework., which provides design recommendations that help create a restorative environment. Their studies have found human preferences for certain aspects of natural environments. Human preferences is broken down into four parts: coherence, complexity, legibility, and mystery. Coherence (order) and complexity (richness) are the preference for two-dimensional scenes of nature, such when viewing environments through a window. Legibility and mystery are preferred when people are physically present within an outdoor space. Areas that provide a sense of mystery, such as curved paths, are preferred in many cases. Mystery tells people that there is something more to see; therefore, providing a level of fascination. Design considerations for each preference are then explained throughout the book, and will inform the direction of the impending framework for restorative campus landscapes.

Main Point:
The purpose of this book is to explore design elements that supplement restoration. Restoration can improve human well-being, relieve stress, and reduce mental fatigue. Understanding how people receive the "information" that the environment exchanges with them is instrumental to implementing restorative landscapes to wilderness areas.

Kaplan, Stephen, Rachel Kaplan, and Robert Ryan. 1998. *With People in Mind: Design and Management of Everyday Nature*. Washington D.C.: Island Press.

Restorative Urban Open Space: Exploring the Spatial Configuration of Human Emotional Fulfillment in Urban Open Space
K. Thwaites, E. Helleur, I.M. Simkins

Summary:
This article analyzes past landscape theories to argue for the restorative properties of the environment. He begins by examining Richard Forman's book, Land Mosaics, which states that over 90 percent of land has been dominated by human activity. Forman argues that the land is a mosaic comprised of patches, corridors and matrices. This identification suggests that there is an optimal arrangement of land, which can improve biodiversity, environmental sustainability, and the achievement of human needs.

The article then transitions into the relationship with restorative landscapes. It references research done by Stephen Kaplan and Roger Ulrich, who were mentioned earlier. Before speaking about the history of restorative landscapes, the article claims that this type of design has not been fully explored or applied. The application of these landscapes can be crucial to urban environments, where stress and mental fatigue are high. Kaplan's research therefore becomes central to the argument of the article. Urban environments are a large source of what Kaplan defines as information overload, a major source for stress. Kaplan's studies have drawn strategies to help mitigate this effect, many of which can be applied to areas other than wilderness settings. Such findings can help to find the "optimal arrangement" for environments outside of healthcare settings.

The rest of the article explores strategies specific to urban settings and how restorative landscapes can be applied.

Main Point:
Thwaites, Helleur, and Simkins argue for the potential application of restorative landscapes in other environments. Their design is currently typical within hospital and healthcare environments, but not as prevalent elsewhere. By thinking of other environments beyond healthcare as a vital part of human functioning, then integration of these landscapes can be achieved. This "optimal arrangement" will improve human well-being through the mitigation of stress and mental fatigue.

Thwaites, K, E Helleur, and I.M. Simkins. 2006. "Restorative Urban Open Space: Exploring the
        Spatial Configuration of Human Emotional Fulfillment in Urban Open
        Space." *Landscape Research*. 30. no. 4: 525-547.

Biophilia, Health, and Well-being
Judith Heerwagen
In Restorative Commons: Creating Health and Well-being through Urban Landscapes

Summary:
In this chapter, Heerwagen discusses the biophilic design approach, and how the experience of nature can be harnessed to equip more people with the benefits that it provides. She expands upon the research mentioned earlier, such as Barnes and Ulrich, and offers more research background of what characteristics of the outdoors invoke a restorative experience.

The article emphasizes that "contact with nature is a basic human need: not a cultural amenity, not an individual preference, but a universal primary need." She begins the article by referencing the historical preference and reliance on the benefits that nature provides. For thousands of years, humans have depended on landscapes for natural resources and designs for rejuvenation and healing. The historical context provides evidence for the need of biophilic design.

As part of the larger volume, Heerwagen contributes to the idea of "restorative commons" by noting the relationship between nature and well-being. "Restorative commons" refers to an approach to create urban areas as "nature-rich" environments so that overall well-being will improve, not just those within healthcare settings. This concept creates a value for nature and the environment that will enable sustainable communities, says Heerwagen.

Heerwagen goes on to identify distinct characteristics that are known to bring restorative benefits to people. They include: sunlight, outdoor green space, gardens, heraclitean motion (soft patterns of movement), variation of natural elements, discovered complexity, multi-sensory experiences, and transformability. Heerwagen builds onto the design philosophy laid out by Barnes and Cooper Marcus. These elements are valuable to be aware of when designing restorative landscapes.

Main Point:
The goal of biophilic design is "to create places imbued with positive emotional experiences—enjoyment, pleasure, interest, fascination, and wonder—that are the precursors of human attachment to and caring for place." The qualities of nature provide humans opportunities for restoration. It should be harnessed to create better environments and sustainable urban communities.

Heerwagen, Judith. 2011. "Restorative Commons: Creating Health and Well-being through Urban Landscapes." In *Biophilia, Health, and Well-being,* edited by Lindsay Campbell and Anne Wiesen. Newtown Square: USDA Forest Service.