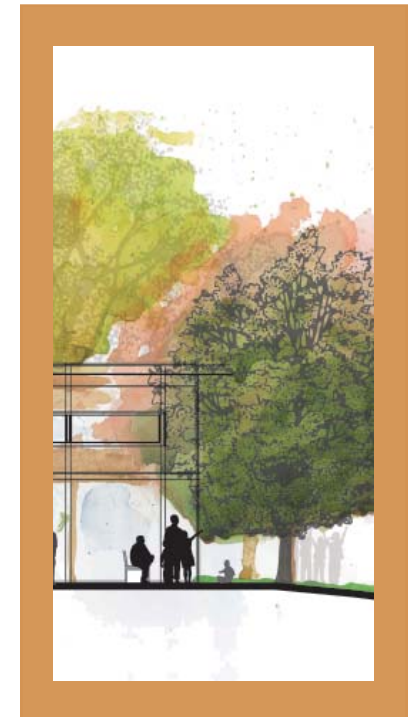
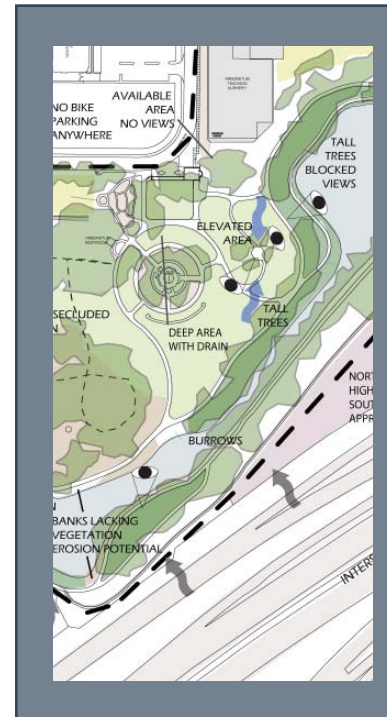
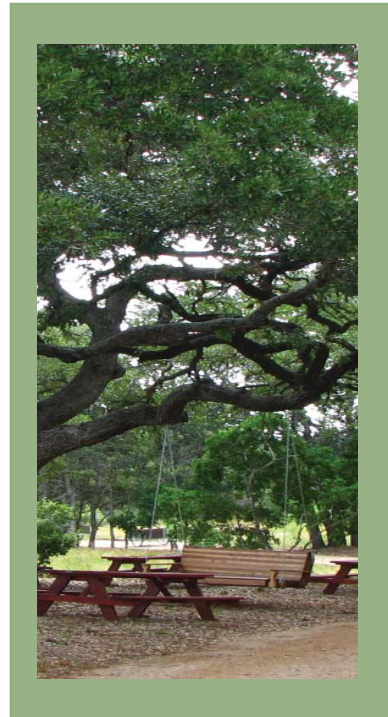
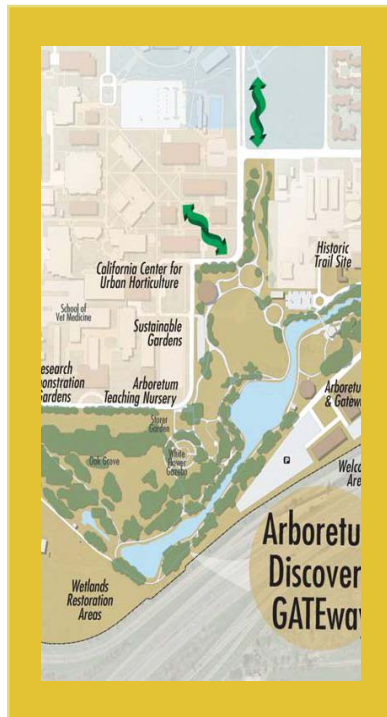


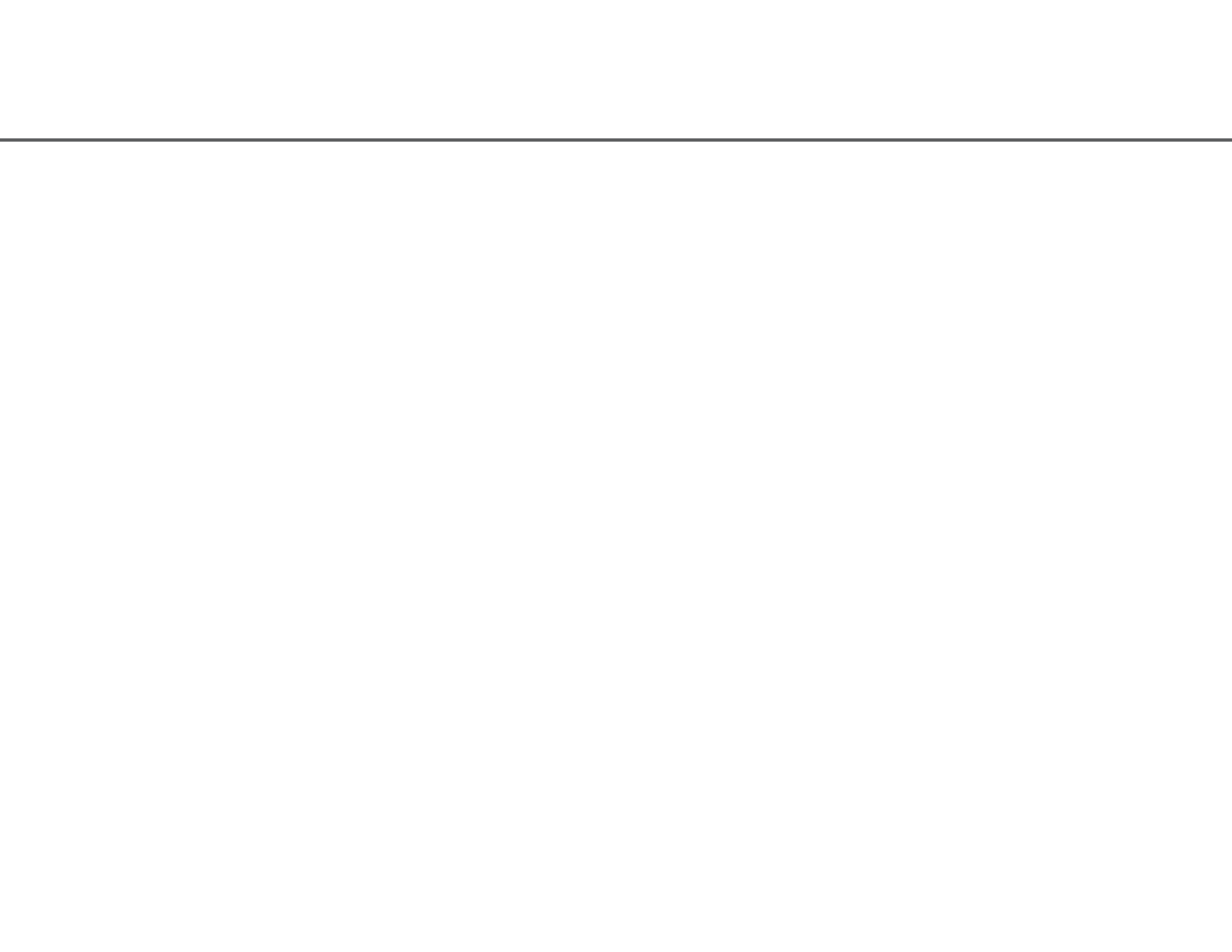
UC Davis Arboretum Discovery GATEway Masterplan



A Landscape Architecture Senior Project

Aimee Hendrie

June 8, 2012



UC Davis Arboretum Discovery GATEway Masterplan

Accepted and Approved by:

This senior project is presented by

Aimee Hendrie

June 15, 2012,

to the

Department of Landscape Architecture at the

University of California, Davis

in partial fulfillment of the requirements for

the degree of Bachelor's of Science in

Landscape Architecture.

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Abstract

This project serves as a suggested masterplan for the UC Davis Arboretum Discovery GATEway encompassing the west end of the UC Davis Arboretum. One of three new entry points to the UC Davis Arboretum, the focus of the Discovery **GATE**way (**G**ardens, **A**rt, and **t**he **E**nvironment) is to educate visitors and draw connections between the “designed” arboretum and the “natural” areas of the west end. The design includes a new pedestrian path system linking visitors and residents from the West Village, to the west end of the Arboretum, Putah Creek Reserve, and the larger campus in general. While highlighting existing features, the plan also includes a new entry feature, Interpretive Center, demonstration areas, parking, and more. The process in developing the masterplan included a review of historical information about the Arboretum, research on similar case studies, and the development of possible design solutions. Design elements of the Discovery GATEway highlight sustainability, habitat

development and protection, and the enjoyment and education of nature. Serving both the campus and regional community the Discovery GATEway will highlight the best UC Davis has to offer in hospitality and educational opportunities.

Dedication

To Mark and Lacey

The decision to go back to school full-time as a mother and a wife meant a lot of changes would have to take place on the home front. It meant cutting our income in half, downsizing our home, doing without, incurring debt, and many, many hours of not being available for family time. It meant three more years of putting homework first and family second. I am incredibly fortunate that I had your support. I want to thank you for all your love and encouragement and for picking up the pieces I let fall.

Lacey I am so sad that you thought on more than one occasion that I loved finals more than I love you. That has never been the case and there is nothing I love more than you.

Mark, you are simply the best and I am very lucky to have found you. Thank you for standing by me and my crazy-

ness during this venture.

To my folks

None of this would have happened if you hadn't instilled in me the love of plants and the environment which has taken me on this journey. You two were always there to give me the emotional support when I needed it, and to snap the whip when I needed that too. You have done so much for us and I can't tell you how much I appreciate it.

To my extended family

I could not have done this if you didn't help with Lacey on so many occasions. We went through lots of changes these past years and I know you didn't always support my decisions, but helped out for my families sake. Marianne, when I was ready to quit you were really encouraging and that meant a lot to me, thank you. Thank you for providing care for Lacey when we didn't know what else to do, I know it wasn't easy. You helped make this possible.

Acknowledgements

This project came about as a result of an LDA sponsored “Project Match” event attended by seniors and various interested parties with potential senior design projects. It was at this event that Ellen and I meet and she took a chance on me designing the Discovery GATEway. What an opportunity to integrate so many different aspects I learned about these past few years. Thank you for confidence in me and for bringing levity to what could be an overwhelming project.

Thank you to Steve Greco and Skip Mezger for serving on my committee and helping me find my way through this project. Gayle Totton, thanks for all the edits and suggestions.

Thanks to all my friends that have stuck by me during my time of retreat. You have been encouraging and accepting of my M.I.A. status. To all of you I raise a glass and look forward to our reunion.

And finally to my fellow classmates. You are a crazy crew that dealt with my mothering. Good luck to all of you where ever your pursuits take you.

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Unless otherwise noted, all images are the product of Aimee Hendrie

Motivation

The GATEway's Initiative

Located on the southern border of the UC Davis campus is a two mile long botanical garden known as the UC Davis Arboretum. While the Arboretum has always been a popular location for relaxation and learning for the campus and adjacent community, it is also becoming a destination for the larger region. With this understanding, the UC Davis Arboretum department



Figure 1. Arboretum Corridor Map. The UC Davis Arboretum runs the length of the southern part of campus. (Arboretum)

has been developing a program called the GATEways Initiative linking gardens, art, and the environment. Part of the vision for the Arboretum will remain focused on being a welcoming entry to the campus, but the Arboretum is also becoming increasingly geared toward serving as a learning laboratory and outreach point to connect the campus and region at large. The GATEways mission is “to demonstrate - in teaching landscapes, exhibits, and displays - some of the important ideas and complex issues UC Davis scholars are tackling, and to engage visitors through interactions with students, innovative uses of technology, and a range of learning opportunities, so that they become a vital part of the creative work and spirit of inquiry at UC Davis (UC Davis Arboretum, 2001).”

The Arboretum can already be considered the botanical jewel of the central valley, with an array of geographically or aesthetically themed and scientifically labeled gardens, open recreation areas, and formal and informal learning opportunities, but the envisioned improvements will further enhance the site. The

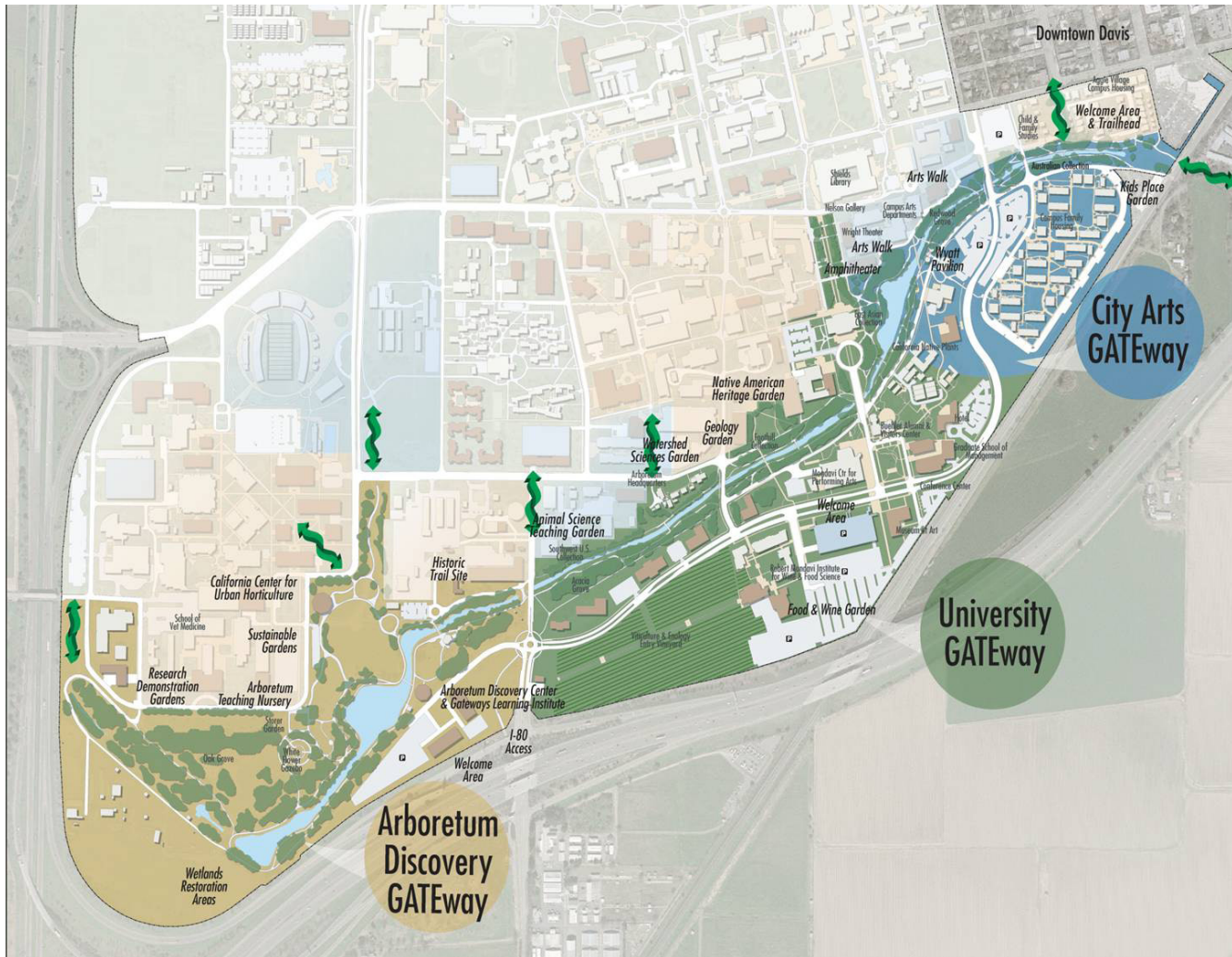


Figure 2. GATEway's Initiative Map. This illustration depicts the three main GATEway segments of the Arboretum, and how the segments would interact with the campus at large. (<http://ucdavismagazine.ucdavis.edu/issues/fallo8/graphics/ArboMap.jpg>)

long term project components include physical entry gateways, a visitor center, teaching landscapes and exhibits, art, and academic outreach centers. Three entry gateways and focus points have been identified to serve as primary entrances to the arboretum; the City Arts Gateway at the east end adjacent to downtown Davis, the University Gateway oriented toward the main physical entry to campus, and the Discovery Gateway at the west end near the teaching nursery and Shields Oak Grove. Each gateway will have its own look and feel while continuing to function as a united experience.

My Project

My project is the development of a conceptual master plan for the Arboretum Discovery GATEway on the west end of campus. This plan includes a new pedestrian path system linking residents from the recently developed West Village, as well as other visitors to the Arboretum, Putah Creek Reserve, and the campus in general. The focus of the Discovery Gateways is to edu-



Figure 3. Project Area. The red area indicates the project area covered by this masterplan. (<http://campusmap.ucdavis.edu/>)

cate visitors and draw connections between the “designed” Arboretum and the “natural” features of the west end of the Arboretum, while focusing on sustainability and ecological niches with the goal of encouraging further exploration of the Putah Creek Reserve.

My goals for the project are to help the Arboretum staff

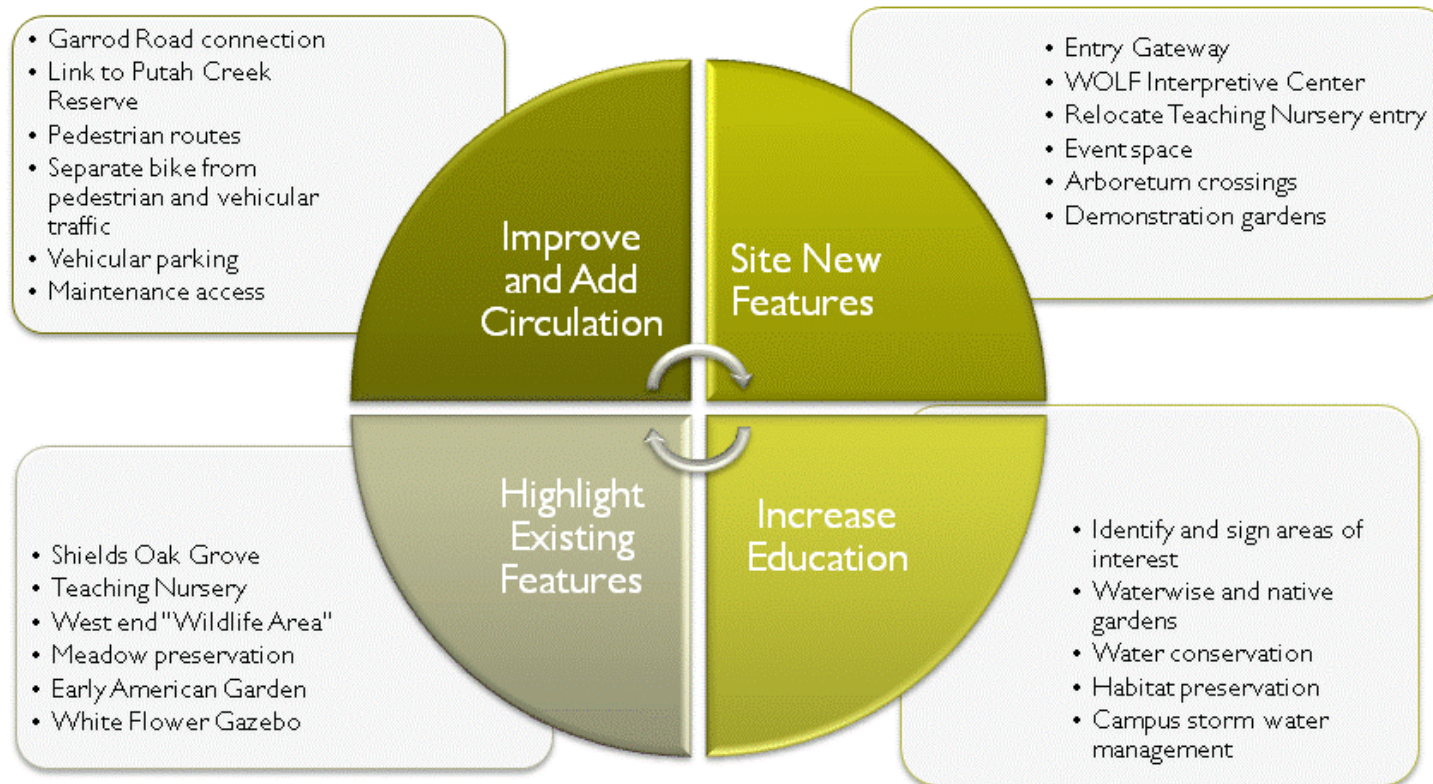


Figure 4. Project Scope of Work. These four areas are the key areas of integration for my project. (A. Hendrie)

understand the best physical locations for the new experiential hubs, design associated connections, highlight existing features, and to increase educational opportunities via signage.

Design considerations for much of the master plan are guided by the ecologically sensitive nature of a portion of the west end. Much of the western-most end of Arboretum is generally unexplored and is host to a diversity of wildlife that includes native ants, a fox den, coyotes, native turtles, otters, minks, and a variety of other species. One challenge was preserving habitat while drawing visitors in to explore and learn more about the local ecosystem.

A Brief History of the Arboretum

Creeks and rivers are fluid things; not only with regard to their contents, but the natural meander over time within their banks. Sometimes the movement of creeks and rivers is brought on by man, the repercussions of which are often felt over decades. Prior to the 1800's the Davis valley area was inhabited by the Patwin Indians, who lived and foraged near waterways connected to Putah Creek during the summer months. The European immigrants that came to the area were less tolerant of the natural flooding of Putah Creek than the Patwins. In 1870 they changed the creeks course permanently to a man made South Fork that bypassed Davisville and alleviated annual flooding of the area (Center for Design Research, 1999). Completely separated from Putah Creek, the original North Fork of the creek remains as part of the UC Davis Arboretum and a as reminder of this past. The South Fork continued to undergo manipulations of its course.

In 1905 the University Farm, an agricultural research institute arm of UC Berkeley, was developed near the North Fork of Putah Creek and used the waterway as the campus's drainage system, periodic dump, and, ironically, an open space amenity. As the ecology degraded and the campus and community began to value this resource, an effort was made in 1936 to rehabilitate this channel and establish formal stewardship of the heritage oaks and riparian habitat in what formally became the Arboretum (Center for Design Research, 1999). Over time additional obstructions were made to Putah Creek including the Monticello Dam and levees along the lower part of the Putah, completely severing the connection between the original channel and the South Fork of the creek, isolating the waterway in the Arboretum, stopping the flow of water. Currently the Arboretum waterway receives its water by serving as a storm water detention basin and drainage channel for the UC Davis campus.

While initial efforts were to restore the riparian habitat of

the creek, the idea was soon altered (due to the ecology of the waterway) and instead focused on a diverse planting of native California species along the Arboretum. During this early time, many of the plants were donated and cared for by faculty and students eventually developing into geographical collections along the two mile stretch of the Arboretum. In 1938 the Redwood Grove was planted and is now the largest cultivated redwood grove outside of their natural habitat on the northern coast of California and southern Oregon (MacArthur, 2000). This cultivation of native plant species was not typical for the time, when exotics were much in favor, but has resulted in the only collection of its type in the region. Collections such as these continued to develop over the decades and the prestige of the Arboretum grew drawing attention to its diverse botanical collection and becoming a recreational destination for campus.

As related to my project site and the development of the Discovery GATEway, one of the prominent collections in the western end of the arboretum is the Shields Oak Grove, planted



Figure 5. Shields Oak Grove. Entry to the UC Davis Shields Oak Grove. (A. Hendrie)

in 1962. As Emily Griswold, the Arboretum Sr. Museum Scientist, points out in *Shields Oak Grove Collection Analysis*, oaks are a dominant tree species in the northern hemisphere and the Californian landscape. Having become part of a national botanical oak collection, UC Davis is fortunate to have such a collection

to support its educational mission, providing a living classroom that is commonly utilized and integrated in coursework. As of 1999 the Shields Oak Grove contained 350 oak species from California, the Western U.S., Mediterranean, Mexico, Asia, Eastern U.S., and several artificial hybrids (Griswold, 1999). While this collection is of importance to oak enthusiasts and ecological educators, its significance is not well understood by the casual visitor. It is unfortunate that with a lack of convenient parking and its fairly remote location from the central entry to campus, this area is less frequented by visitors. Enhancing visitation to

this area is part of the Arboretum GATEways goal, but will need careful development that does not threaten the wildlife that inhabits the area.

Wildlife found in the area include a variety of native in-

sects, amphibians, birds, and mammals. Some species, such as the blue bird, are being encouraged to return to the area through the installation of appropriate nesting boxes. Other species, such as the native ant population, are found there naturally but are in danger from other competing ant populations, including Argentine Ants. Current irrigation and mulching practices in the Shields Oak Grove in particular are a threat to the ants' habitat and only proper habitat management will insure their survival (McLean, 2004).

Case Studies and Inspiration

Arboretums such as the one at UC Davis are relatively rare. To help with design ideas I looked for comparable arboretums and botanical gardens that were primarily affiliated with universities or wildlife areas and found two to use for case studies; the CSU Fullerton Arboretum, and the University of Texas at Austin's Lady Bird Johnson Wildflower Center and adjoining Mollie Stevens Zachry Texas Arboretum. Each of these case studies guided parts of the new master plan design.

CSU Fullerton Arboretum

Located on northwestern edge of California State University, Fullerton (CSU Fullerton) is the CSU Fullerton Arboretum. Established in 1979, this 26 acre botanical garden offers the campus and community opportunities for ecological, horticultural, and historical education in a very urban setting. The largest botani-

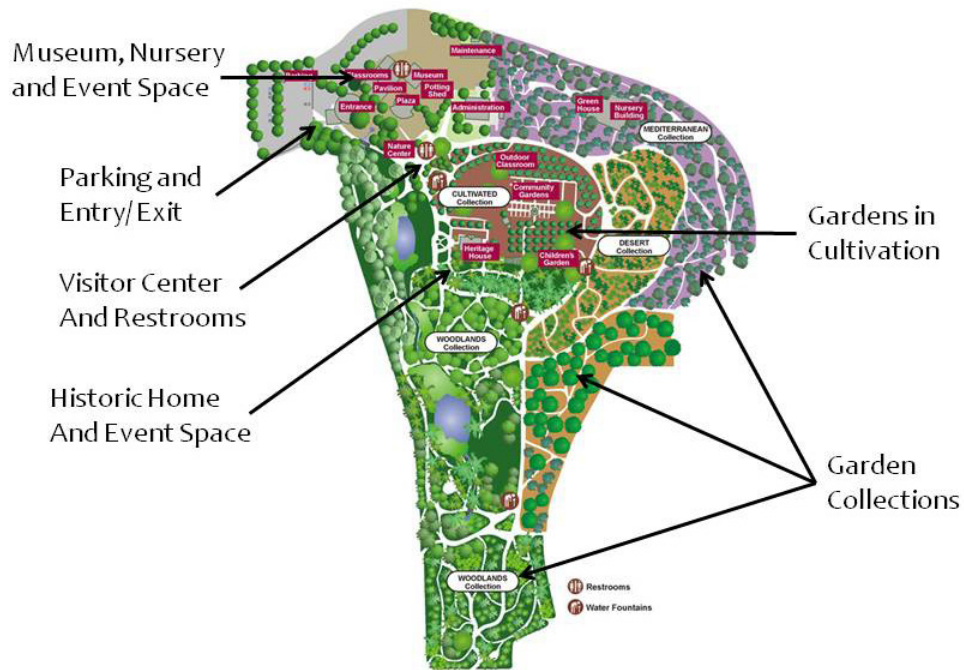


Figure 6. CSU Fullerton Arboretum Map. Pertinent areas of Interest that relate to the UC Davis Redesign are marked. (<http://www.fullertonarboretum.org/images/GroundsMap.jpg>)

cal garden in Orange County with over 4,000 plant species from around the world, the arboretum offers four themed collections (Mediterranean, desert, woodland, and cultivated), and a pond,

waterfall and stream complex that fosters an abundance of wildlife. In addition to the collections there are gardens that include a children's garden, wildflower butterfly garden, and a community garden (Fullerton Arboretum).

The Fullerton Arboretum is laid out in a very circuitous fashion with a grand stone entry that leads you past a waterfall and eventually to the nature visitors center. The simple visitor center offers maps, a collection of gifts for sale, information on various events taking place on the grounds, and a children's station offering educational coloring packets themed on plants and insects found in the arboretum. From this point visitors can go off in several directions; to the nursery, adjacent meeting space and museum, the Heritage House and outdoor event spaces, and finally to wind around to the various collections.

Figure 7. Fullerton Arboretum: Path Erosion. The only pedestrian path that leads to the pavilion space with the classrooms, museum, and nursery shows signs of erosion from irrigation and rain events. This decomposed granite path is not an ideal choice for this high use path. (A. Hendrie)



Figure 8. Fullerton Arboretum: Event Space. This event space is bordered on two sides by buildings, and on the third side by a bermed planting making for a nice and secluded space. (A. Hendrie)



My main interest in the Fullerton arboretum was looking at the circulation paths that connected the various spaces, the directional and informational signage, and the events spaces in relationship to the gardens. The decomposed granite paths wind between the different gardens effortlessly with effective directional signage at intersections. One consideration with this paving choice is erosion from rain events which left sloped walkways in less than desirable repair and moderately hazardous.

Like the UC Davis Arboretum, the Fullerton Arboretum runs a nursery that offers a variety of the species grown at the arboretum, including a number of native plants and collector plants that are for sale. Adjacent to the nursery, known as the Potting Shed, is a museum, classrooms, and covered pavilion. These facilities center around a decomposed granite plaza. The plaza abuts the covered pavilion space and is out of the way from much of the arboretum making this a semi private space where events can be held. In contrast to the seclusion of the plaza, the scenic gardens near the Heritage House (located in the middle of the arboretum)

are centrally located which caused half of the arboretum to be closed down during my visit due to a wedding taking place. It was unfortunate that visitors could not enjoy much of the grounds when large private events take place. This is a design flaw that will need to be considered when locating event facilities at the UC Davis Arboretum.

One of the strengths of the Fullerton Arboretum was interpretive signage. Throughout the arboretum, locator signs help visitors navigate throughout the arboretum, showing them their present location within the collection, adjacent collections, and great information about the plantings. Information can include regional maps about plant origins, regional distinctions, ecological significance, cultural plant uses, and why they may be appropriate plants for the Southern California region. Likewise the arboretum featured a number water-wise and native gardens along with signage describing the plantings and how they can be reconstructed in home gardens. This type of interpretive tool would be very helpful for the collections of the UCD Arboretum. This

MEDITERRANEAN COLLECTION

MORE THAN A PLACE
WARM SEA BREEZES, BLUE SKIES, BRIGHT FLOWERS—
 the word "Mediterranean" evokes the romance of countries whose shores lap the Mediterranean Sea—Spain, Italy, Greece, Turkey, North Africa. Many gardeners don't realize Mediterranean is more than a place, it's a climate. The hot dry summers and cool wet winters are common to five areas in the world. More than 25,000 species of plants are found in these five places, over half of which are found nowhere else.

WALK AROUND OUR MEDITERRANEAN GARDENS—
 they represent plants from all over the world—but we think you'll feel at home here. You should, because California is one of the five places worldwide with a Mediterranean climate.

5 PLACES WITH 5 THINGS IN COMMON

1. dry hot summers, cool wet winters
2. 10 to 40 inches of rainfall per year
3. western or southern coasts
4. located between 30 degrees and 45 degrees latitude, about half way from the equator to the North Pole
5. temperatures rarely below freezing

SURVIVING A SCORCHING SUMMER
 Even though they are separated by many thousands of miles, many Mediterranean plants have evolved similarly. They have many strategies for coping with the hot dry summers of one they live. Maybe you can use some of the same techniques yourself!

TAKE IT OFF
 When the season heats up, many of us respond by peeling off layers of clothing. Mediterranean plants do the same thing, shedding leaves when it becomes too hot.

HIDE OUT IN THE SHADE
 Mediterranean plants include many that grow high bushes or dense underground stems. Here, away from the sun's heat and dryness, they store water and nutrients.

PUT ON A PROTECTIVE SCREEN
 Many Mediterranean plants have thick, leathery or hairy leaves that resist losing water. Heat curls the tiny leaves, smaller pores open to the air, but they also have a protective waxy coating.

MINIMIZE YOUR EXPOSURE
 Animals graze food in the spring, scattering their seeds and doing so only during wet dry periods. Some plants have leaves that stand straight up, leaving little surface to bake in the sun.

WEAR LIGHT COLORS
 Many Mediterranean plants have pale grey-green leaves that absorb less light heat than darker green leaves.

INTERPRETING SIGNS ORIENTED BY THE GROUND OF THE FULLERTON ARBORETUM

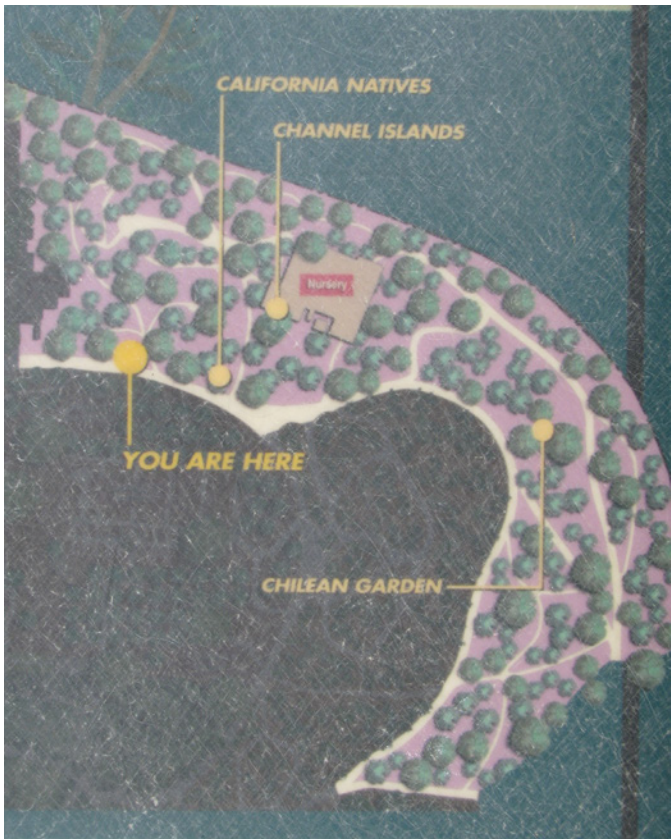


Figure 9. Fullerton Arboretum: Directional Signage. Directional signage is located throughout the arboretum guiding visitors between collections and providing information about the plants in the collections. (A. Hendrie)



Figure 10. Fullerton Arboretum: Informational Signage. Signs such as these accompany many of the plantings illustrating how the plants can be incorporated into home environments. (A. Hendrie)

signage was very effective in enhancing the visitor experience and could serve as a model for new signage at the UC Davis Arboretum, assisting visitors in navigating through the collections and learning how they can incorporate the plant and design functions in their own gardens.

Lady Bird Johnson Wildflower Center and Mollie Stevens Zachry Texas Arboretum

My second case study was the Lady Bird Johnson Wildflower Center and Mollie Stevens Zachry Texas Arboretum located in Austin, Texas. These two connected sites serve as good case study for university affiliated arboreturns dedicated to native and water efficient plantings

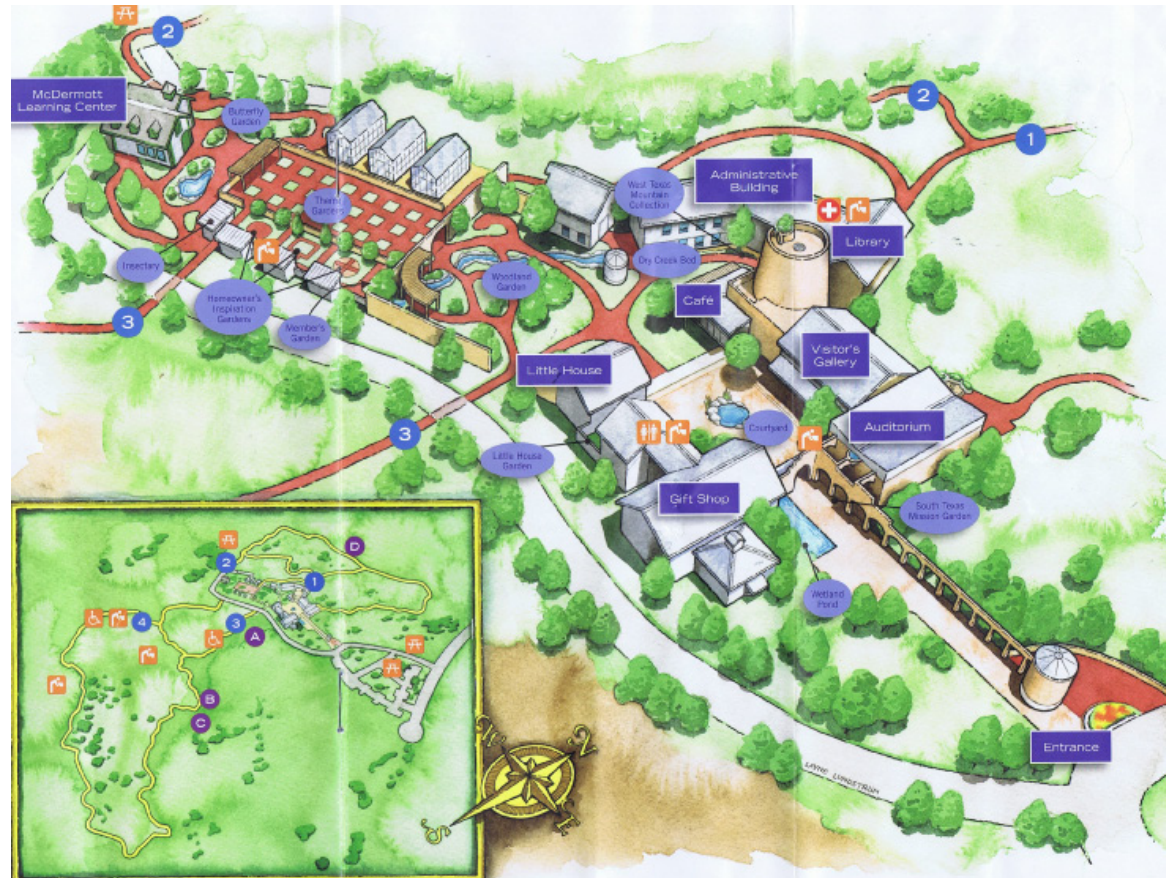


Figure 11. Lady Bird Johnson Wildflower Center Map. The Wildflower Center consists of a main area with demonstration gardens and outer hiking trails that lead visitors through ecological demonstrations. (Lady Bird Johnson Wildflower Center Visitor Brochure)



Figure 12. Lady Bird Johnson Wildflower Center: Sustainable Design. The Wildflower Center architecture is derived of the vernacular of the area and uses locally mined stone and adobe. Regular features of the Center are cisterns capturing rainwater from the heavy infrequent rains. (A. Hendrie)

and oaks. The Lady Bird Johnson Wildflower Center started as a research station for native Texas Wildflowers and eventually became a satellite of the University of Texas at Austin with demonstration and educational facilities for the public. With much of the land left in a natural state, the main facilities provide a contained learning environment, with an auditorium, home demonstration beds, an insectary, and assorted native gardens. School groups tour the facility to learn about the geological differences of the Texas landscape and how the related soils affect the types of plants that flourish across the state.

The facilities of the Wildflower Center serve as a model of not only beautiful architecture, but of sustainability and attention to the vernacular of the area. Using local stone and tin roofs, the design draws from the Mexican, Native

American, and ranching influences of the Austin area. In such a dry and often inhospitable climate, there is a real focus on providing relief from the extreme heat and capturing every drop of rain for reuse. Giant cisterns and waterways are labeled with conservation signage that highlight the importance of minimizing water use for landscapes.

The visitor center and interpretive center have much to offer visitors. With a café, gift shop, auditorium, nursery that has sales twice a year, and visitor hall. The visitor hall is a very spacious, naturally lit facility that provides simple displays featuring flowers picked daily from the grounds to help visitors identify flowers found on the grounds. There are also displays on the geology of the region and the wildlife found at the Center. The Wildflower Center also offers a children's exploration room and a separate garden sized for young explorers.

When looking toward the future development of the WOLF Interactive Center at the west-end of the Arboretum, the



Figure 13. Lady Bird Johnson Wildflower Center: Architecture. Large overhangs made of tin provide needed shade and harken to the ranching barns of the area. (A. Hendrie)



Figure 14. Lady Bird Johnson Wildflower Center: Patio. Functional areas are nestled to maximize use of the patio. Trees and seating provide resting areas for visiting groups. (A. Hendrie)



Figure 15. Lady Bird Johnson Wildflower Center: Entry Feature. The entry feature to the Wildflower Center is a large stone cistern connected to an aerial aqueduct. (A. Hendrie)

sustainable and vernacular focus of the Wildflower Center can serve as a model of appropriate practices. In our drought prone climate, harvesting rainwater would be a great opportunity for education and practical use at the arboretum facilities. Large building overhangs and open patio areas could be used almost

year round, suiting our climate and providing maximum opportunities for use.

The newest addition to the Wildflower Center is the Mollie Stevens Zachry Texas Arboretum, a native oak collection with



Figure 16 & 17. Lady Bird Johnson Wildflower Center: Visitor Center. The visitor center is a bright and airy room that hosts rotating displays that highlight local ecology and the flowers currently blooming on the grounds. (A. Hendrie)



a mile long walk through the oaks. While in the early stages of development, many oaks currently are found along the walk. Added to the loop will be a Hall of Hero's planting featuring 27 oaks that come from direct lineage to significant trees in Texas history.

One of the most enjoyable features along the walk is a picnic area under a cluster of oaks referred to as the "Cathedral of the Oaks". This area abuts a major meadow feature where visitors will be allowed to picnic and engage in passive recreation after the spring bloom has finished and the grounds have been mowed down for the season (Marcus, 2012). This unique experience by the user, being encouraged to interact in a more lengthy stay, is an approach that I would suggest the UCD Arboretum embrace. The Shields Oak Grove is an amazing feature that could be more



Figure 18. Mollie Stevens Zachry Texas Arboretum: Pathways. The path through the arboretum is sensitive to root zones of the oaks it meanders through. (A. Hendrie)

utilized if the public were drawn in and encouraged to sit and enjoy its offerings.



Figure 19 & 20. Mollie Stevens Zachry Texas Arboretum: Cathedral of the Oaks. In the shade of the Cathedral of the Oaks visitors find picnic tables and swings. (A. Hendrie)



Process

Project Method

In the development of a master plan for the Arboretum Discovery Gateway, multiple analyses were undertaken including an existing features analysis, site analysis, and sensitivities analysis. Utilizing this information, and consultation with my committee, an initial concept plan was developed with suggested locations for the required features of the project. Drawing from influences of my case studies, the concept plan was further refined into the proposed master plan for the Discovery Arboretum.

PRODUCED BY AN AUTODESK EDUCATIONAL PRODUCT



UC DAVIS ARBORETUM DISCOVERY GATEWAY EXISTING CONDITIONS

AIMEE HENDRIE 4/3/12

Existing Features

Conducting the existing site analysis included reviewing aerial photos of the west end of the arboretum and evaluating features such as roads, canopy cover, and adjacent features in order to develop an appropriate base map from which to work. I was fortunate that the campus's landscape architect was willing to share the AutoCad base map from which to work and add features and paths.

The next step was assessing the site on foot and cataloging ground features such as present plant collections, uncultivated land, informal paths, and hardscape features such as buildings,

formal pathways, and parking areas.

Figure 21. (Opposite) UCD Arboretum: Existing Conditions. Utilizing aerial and on site visits an analysis of existing conditions was developed. (A. Hendrie)

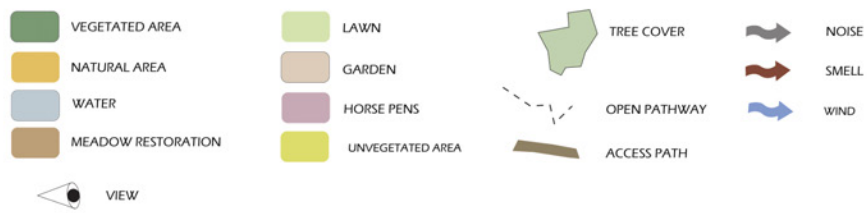
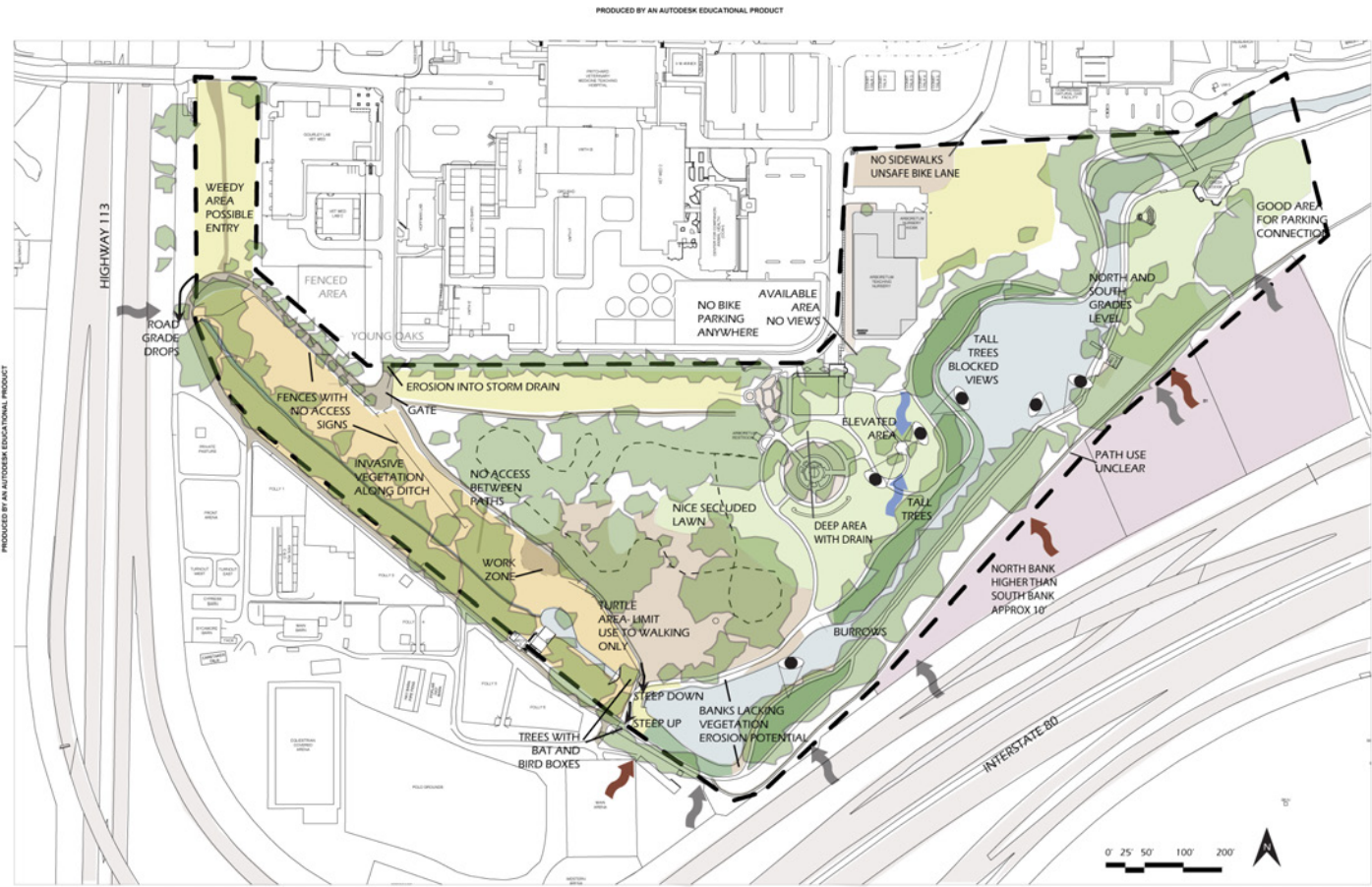
Site Analysis

Once the existing features were mapped a thorough site analysis was undertaken. This site analysis noted views, sounds, smells, wind, and habitat areas. Significant findings that should be addressed in the final plan included the following.

Analysis Results

- An area of erosion at the equestrian center entry that affects water quality in the Arboretum waterway.
- Confusing signage near the drainage channel indicating no entry.
- Potential area for bike and vehicular movement south of Garrod Drive, east of Highway 113, and west of some of the vet hospital facilities.

- Turtle habitat that includes the drainage channel and part of the meadow restoration area.
- Killdeer nesting areas along with the native ant habitat area; both necessitating a lack of irrigation.
- A multitude of owl, blue jay, bat, and swanson hawk's nesting boxes.
- A lack of bike and vehicle parking in the west end of the Arboretum.
- Poor entry into the Shields Oak Grove; limited to a single marked entry near the restroom.
- Optimal views toward the Putah Creek Lodge and back across the main lawn south of the gazebo from the mounded area south of the teaching nursery.



UC DAVIS ARBORETUM DISCOVERY GATEWAY SITE ANALYSIS

AIMEE HENDRIE 4/3/12

Figure 22. UCD Arboretum: Site Analysis. Indicated on this map are the most significant observations of the site during the spring and early summer seasons. (A. Hendrie)

- A lack of drop off zone for tour groups or disabled individuals visiting the Storer Garden or Shields Oak Grove area.
- A lack of amenities; benches, trash cans, water fountains, and directional signage.
- Ample amounts of lawn that can be converted into demonstration garden area.
- Noise from Highway 113 and Interstate 80.
- Smells emanating from the Equestrian Center.
- Several areas currently not under any cultivation that can be used to enhance the arboretum.

Sensitivities Analysis

The goal of this analysis was to determine if there were areas of the project site that should be given greater consideration when developing the programming for activity centers and circulation paths. I outlined three levels of sensitivity that range from high to low based on current use, wildlife supported, and maintenance implications.

The area deemed most sensitive resided primarily along the drainage channel and water pump station. While the plant life in this area was mostly invasive species, the waterway provides habitat for a number of animal species such as fox, minks, coyotes, native ants, killdeer, and turtles. Introducing people to this area in unmitigated ways could jeopardize the animals residing in this area. It is ironic then that this area is also subject to periodic flood control maintenance in the channel that has the potential of severely harming habitat areas for some of the

species.

Areas evaluated as moderate includes primarily the Shields Oak Grove, meadow restoration areas, and the creek areas. These areas are sensitive to compaction and erosion as a result of high traffic or improper maintenance. These areas are also considered habitat areas, but with the exception of the meadow conversion, have been under the same general management for many years and have continued to support their ecological communities in harmony with visitors to the Arboretum. The one separate area of medium sensitivity would be the entry way to the Equestrian Center. The gravel road to the Equestrian Center has a tendency to migrate dirt and sediment into the street, which gets washed into the creek during the rainy season. This influx of sediment into the waterway is something that needs to be addressed with the new design.

The last areas include those listed as low sensitivity. These consist primarily of undeveloped/uncultivated land and areas that

are highly cultivated into lawn and botanical collections. I chose to include most cultivated collections in the low sensitivity category because they generally include perennials and woody shrubs that can either be moved, or are generally easy to propagate and reestablish if necessary. It is not uncommon for the collections to evolve over time and therefore, while not unimportant, seemed less sensitive than the Shields Oak Grove.

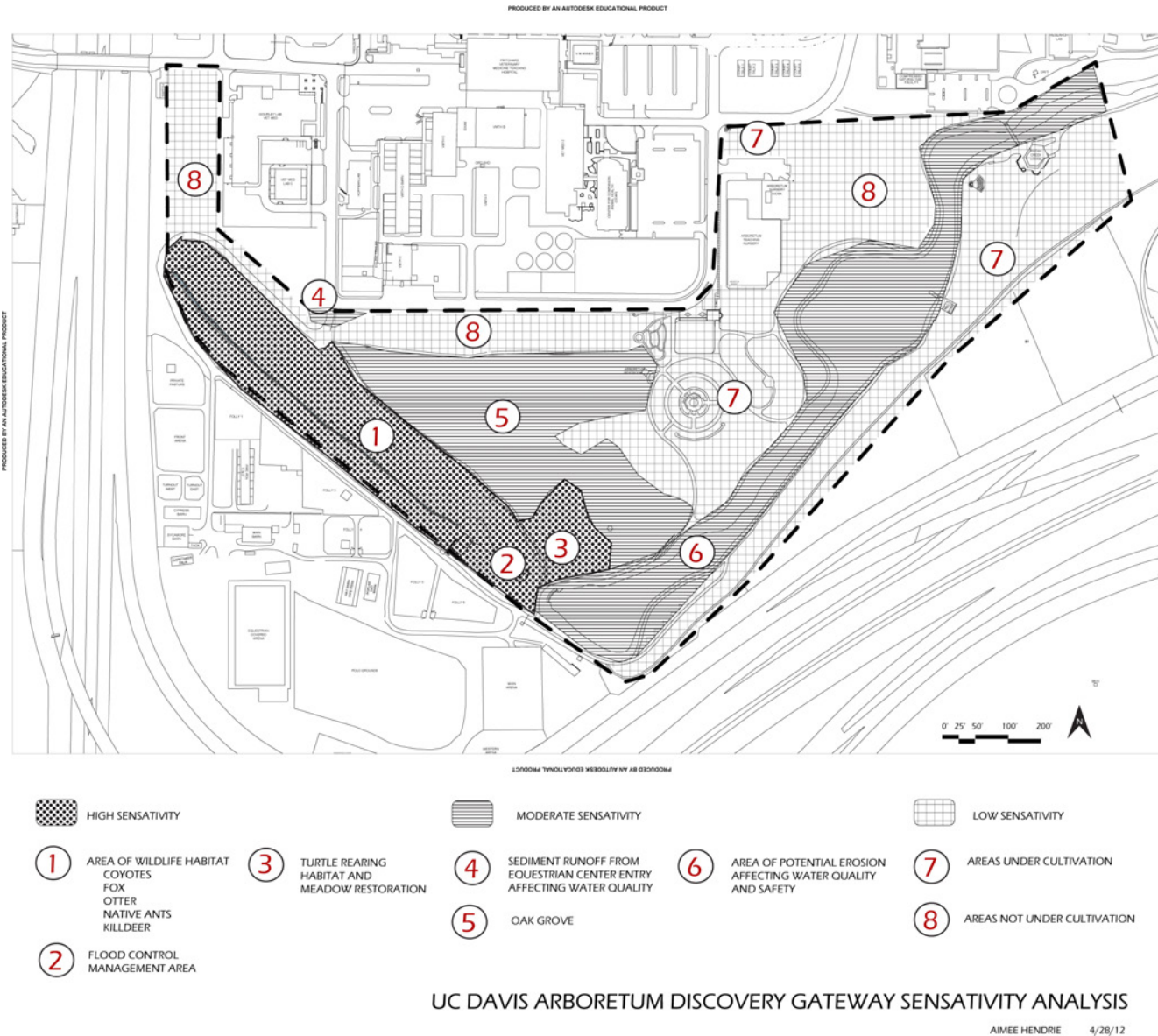


Figure 23. UCD Arboretum: Sensitivities Analysis. This analysis has the potential to be a contentious analysis. While the designations made were not arbitrary, some may argue that the high and medium sensitive areas should be evaluated into one category due to potential development effects on the oaks and the creek. However, given the amount of current use and intrusion by man I decided to differentiate the levels of sensitivity. (A. Hendrie)

Product

The Plan

The proposed master plan for the Discovery Gateway aimed to improve and add circulation, site new features, highlight existing features, and increase education. It was my goal to provide a design that mimicked the historic meandering nature of the Arboretum, yet provided for semi-structured spaces that flowed easily from one to the next, without any dominating or diminishing the other. I wanted to create a balance between drawing people in and yet discouraging them from impeding restoration efforts.

During this process I learned just how important the Arboretum is to people and how protective they become of the various spaces. While I made an effort to be sensitive to these strong spacial attachments, in the end I determined it was more important to design with the long term goal in mind and what made the most sense functionally in 25-50 years and not get trapped by the short term restrictions. This may not result

in the most affordable solutions, fitting neatly within present budgets, but instead require additional fund-raising or grant procurement to develop features such as the WOLF Interpretive Center. I believe that the bike connections will be implementable with the money currently available for development.

The following sections will take you through the six main features of the plan; Discovery GATEway entry feature, pedestrian and bikes routes, the WOLF Interpretive Center, parking, the drainage channel wildlife area, and points of interest and signage.

Figure 24. Discovery GATEway Masterplan. The new master plan provides for improved parking access, bike and pedestrian access, an interpretive center, and assorted teaching gardens and demonstration areas. (A. Hendrie)



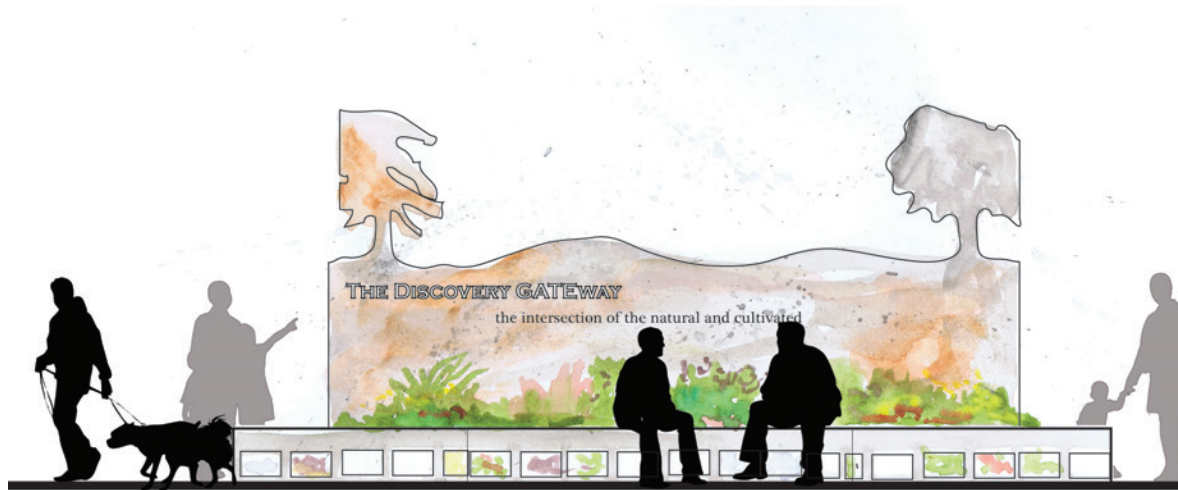
The Gateway Feature

The Gateway can be generally categorized as the entry feature to the west end of the Arboretum. The question was “where is the entry?” With numerous entries from all directions it seemed logical to place the “Gateway” at the intersection of the multiple action centers.

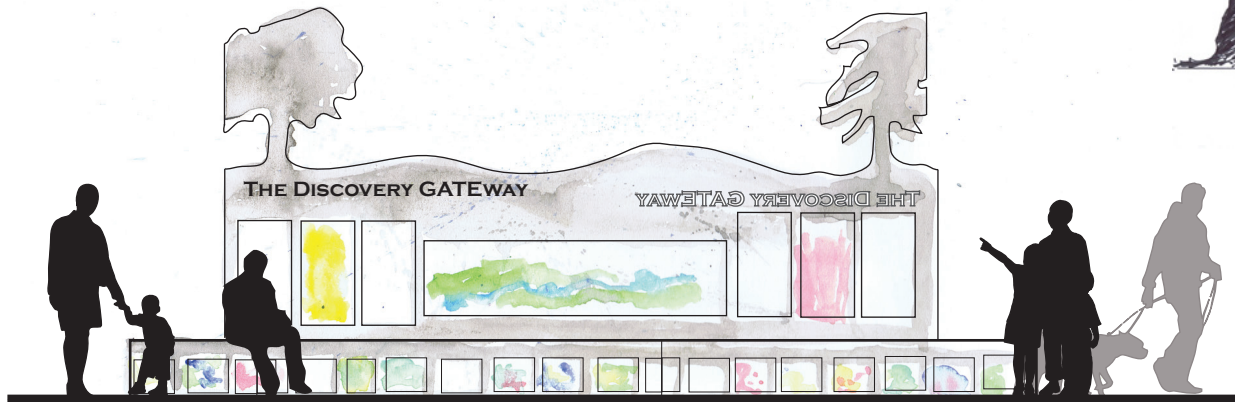
The feature itself is really quite simple and highlights the discovery nature of this area while serving as a signpost for visitors. Made of thick metal, the “sign” runs the length of a free form seating planter. The inclusion of seating is important as there are frequent visitors with limited mobility that need to rest while they are waiting to be toured through the Arboretum. This seating area makes for a welcoming place to stop and discover. I envision the western exposure of the sign to be allowed to weather and tarnish while the eastern exposure will display signage with a map of the area, along with more detailed call outs

highlighting the Discovery GATEway’s features. The shape of the sign will mimic the view to the west between the canopies of the Shields Oak Grove and the row of Italian Stone Pines.

The funnest feature of the sign will be its own revelations. When viewed from the west one can read “Discovery Gateway: The intersection of the cultivated and the natural” which will be cut through the sign. The same words will be printed on the eastern side. Additional quotes or silhouettes of birds, animals, flowers, and insects, could be cut through the sign to bring further interest to the sign. The revelation would be that as the sun moves to the west and shines through the sign, the words will be projected on the ground on the east side. The projection would be temporal, changing with the time of day and seasons. Children would love trying to figure out where the words come from, further stimulating the sense of discovery. This feature of the sign would be most effective in the early evenings during the summer once the sun has passed over the tree canopy, and all winter long when the trees are defoliated.

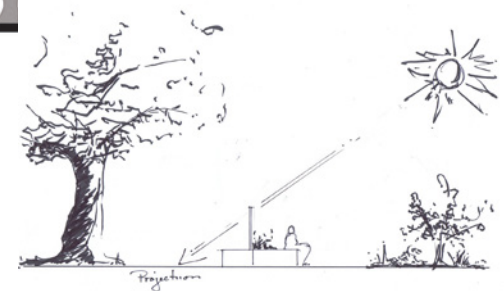


View Looking East Toward GATEway Feature



View Looking West Toward GATEway Feature

Figure 25. GATEway Entry Feature. Incorporating a planting bench and Discovery GATEway informational signage, the entry feature provides a dynamic display. The west side features a simple identifier and planting bed. The east side provides information signage describing the features of the GATEway area. (A. Hendrie)



Pedestrian and Bike Routes

Circulation is one of the hallmark features of a landscape design. How people flow via foot, bike, or auto, through a space really determines how well it functions. For any public space, such as a university campus, this flow is extremely important. When possible it is best to separate the modes of movement to avoid unnecessary congestion and improve safety, thereby encouraging a sense of comfort and enjoyment.

In the west end of the Arboretum there are presently several areas of hazard, or that simply lack the necessary improvement. They are as follows.

Improvement Needs

- Bike and pedestrian movement from Garrod Drive to the campus and arboretum along Garrod Drive are subject to

autos and large trailers traveling at dangerous speeds on the road. Currently there are no bike lanes and limited pedestrian paths along Garrod Drive.

- Pedestrians and cyclists share paths around the Arboretum's waters edge and through the Gazebo and Storer Gardens, encouraging potential crashes as walkers move erratically stopping to look at things.

- Entry into to the Shields Oak Grove is not clear. There is one formalized entry to the path system that moves throughout the collection. Visitors are unsure how to access the path and cross areas that are being restored or planted. Multiple entries can be incorporated to encourage visitors.

The new master plan design provides for many of these needs with the addition of new pathways and the redesignation of some existing pathways. The addition of a new bike lane off of

Garrod Drive will allow a much needed separation of bike and vehicular traffic. When developing the new bike path from Garrod, I



evaluated the current use of the area which includes the main entry to the Equestrian Center. I began my site analysis in the

early spring and it was evident that the Equestrian Center entry had problems of its' own, especially after a rain event. After rains, vehicles would track significant amounts of mud and gravel from the gravel driveway onto Garrod Drive itself. This sediment deposition on the road is then washed off into the stormwater system

Figure 26. Sculpture Meadow Bike and Pedestrian Path. Nestled between the Shields Oak Grove and a row of Italian Stone Pines is a native grass meadow with perennial wildflowers and sculptures by students and local artists. This view looking west borrows scenery from the distant mountains. (A. Hendrie)



and ultimately into the creek causing, amongst other things, a sediment load build up in the drainage channel. The most efficient way to address this was relocate the Equestrian Center entry along with the development of the new bike path. By doing this, I also created a safer biking situation where the horse trailers and cyclists are no longer sharing the same path.

When considering the separation of pedestrian and cyclist traffic, I was fortunate that portions of both the north and

south banks near the creek had existing high and low paths that could be designated for pedestrian (the lower path) and cycling use (the higher path) with limited impedance. While some cyclist may not enjoy being diverted away from the waters edge, it is thought that most cyclists are using the arboretum for recreation purposes and will still find the paths a peaceful, auto-free setting. There are several short stretches where this separation was just not possible. In these situations the paths were widened to allow users more space for movement.



The circulation for the Shields Oak Grove was relatively straight forward. There

Figure 27. Bike Entry from Garrod Drive. This is a sketch of what the new Equestrian Center entry and bike path from Garrod might look like. With hedgerows on the west side to provide cover for animals and oaks planted between the vehicle and bike paths. (A. Hendrie)

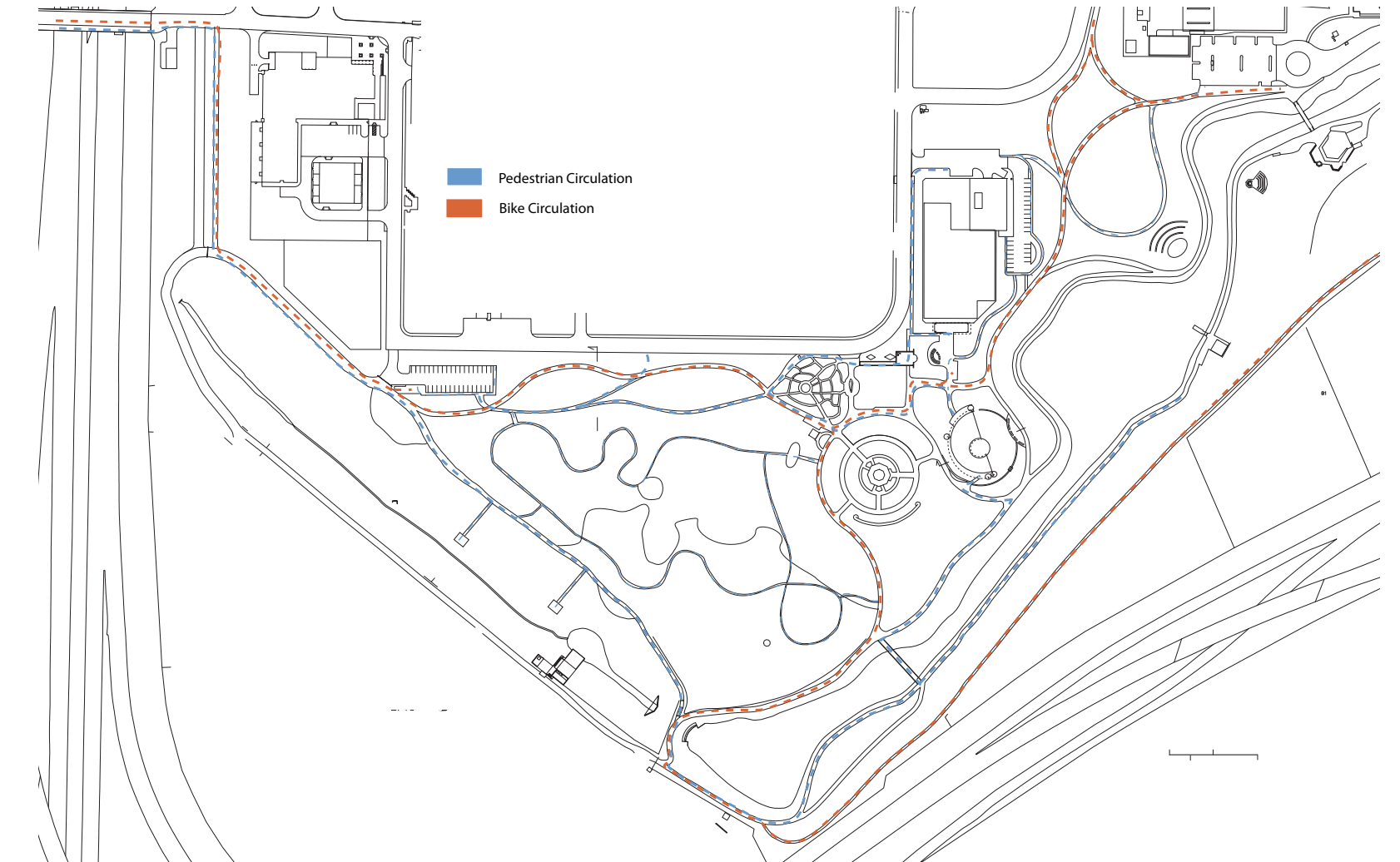


Figure 28. Pedestrian and Bike Circulation Route. Auto, pedestrian, and bike circulation routes were kept separate as much as possible to ensure the users safety. When it was necessary to combine bike and pedestrian paths, the paths were widened to accommodate users. (A. Hendrie)

were areas where natural openings between trees presented opportunities to connect to other paths around the area. This increase in accessibility was important to me because the setting is something one would not readily find in urban environments. Finding yourself under a canopy of oaks is something few may experience without participating in activities in nature. I also happen to be one that finds anxiety in knowing where I can walk and where I cannot. Having clear paths of entry and exit is important to my comfort in cultivated areas such as the Arboretum.

The final feature of the new bike circulation paths is the addition of bike parking. Currently there is no bike parking at this end of the Arboretum. To address this I developed three parking areas that are positioned across the Discovery GATEway area; near the west end vehicle parking lot, adjacent to the Storer Garden and restrooms, and across from the WOLF interpretive Center entrance.

WOLF Interpretive Center

The WOLF Interpretive Center is an idea of the Arboretum Staff as a means of creating a hub that will be used to orient visitors to the Arboretum and serve as an educational facility that contains indoor/outdoor classrooms for hands on learning. The facility would further serve to educate on sustainability and water issues, and how these relate to urban and natural environments.

Finding the ideal location for the WOLF Center was harder than anticipated. With some existing development funding already in hand, the Arboretum staff are eager to build and have identified a potential location directly outside of the south side of the Teaching Nursery. When developing the overall site, it seemed important to me to look at the long run, 25 to 50 years ahead, and to think about what this center may ultimately be used for. When taking this approach the logical site for me was one



Figure 29. WOLF Interpretive Center Section. Looking from west to east, the WOLF Interpretive Center is a moon shaped building that creates an intimate patio and events area. The surrounding grounds can be developed into demonstration and educational gardens. Directly off the existing walking path on the east side is a seating area that looks through the trees and off toward the Putah Creek Lodge. (A. Hendrie)

that had plenty of space to develop demonstration and educational gardens around it, have pleasing views both in and out, use the site to maximize passive heating and cooling, and be a sought after event space. With this final thought in mind the space I choose was at the top of the small knoll, looking east across the creek toward Putah Creek Lodge (reference Figure 30 on page 42 for location).



Figure 30. WOLF Center View. From the current seating area at the top of the knoll one can see across the water to the Putah Creek Lodge. (A. Hendrie)



In its' current form, the knoll consists of lawn and a small seating area under a few trees located at the top of the incline. From this seating area you can look between two stands of trees across the widened portion of the creek toward the lodge on the opposite shore. Not wanting to lose the feel of this space, the building was designed around a central courtyard located on the existing area. The courtyard would be bordered to the north, south, and west by the building and on the eastern side by trees. With the exception of a small lawn adjacent to the patio, the rest of the grounds would be shaped into educational gardens such as butterfly, humming bird, sensory, and ethnobotanical gardens. There are many possibilities to create gardens tailored to the education mission of the Discovery Gateway that could soften the exterior view of the center and keep it from dominating the area in general.

Figure 31. Discovery GATEway Activites Hub. This detail shows the relationship of the key activity spaces with each other within the west end of the Arboretum. (A. Hendrie)

The proposed building is envisioned to be a simple timber frame structure that mimics those of the Gazebo, the Putah Creek Lodge, and the Wyatt Pavilion. A pitched roof with large overhangs on the western and southern facing exteriors would keep the summer heat at bay, but allow winter sun to penetrate the glass walls and warm the interiors. Cisterns strategically located around the building could collect winter and spring rains and be used to supplement watering the gardens. A great educational opportunity, the cisterns could be designed to emphasis the water cycle in Northern California and our delicate water situation.

Parking

A serious issue for this area of the Arboretum is a lack of parking for visitors and especially those with limited mobility. Currently there are only a few curbside parking spaces on Garrod Drive just south of the large animal vet hospital. With the increased use of the Arboretum, parking must be provided and special attention must be paid to elderly or mobility challenged

visitors for which there is currently no parking. This is an unacceptable situation. In the new design I have provided two parking lots as close to the central Discovery GATEway activities centers as possible, without detracting from the serene nature of the area.

Utilizing the original entry to the equestrian center, I placed a parking lot at the west end of Sculpture Meadow. By replacing the original equestrian center entry with a permeable



Figure 32. Equestrian Center Entrance. Sediment from the gravel driveway is carried by vehicles into the street. This is further enhanced after rain events. (A. Hendrie)

paving system we can solve the sediment deposition issue in the street, but also utilize an area that is currently under utilized for parking. The view of the parking lot could be buffered by large plantings of Ceanothus, Toyon, or other large native shrubs.

The second parking lot would be located on the east side of the teaching nursery. Users of this lot could readily access the WOLF Interpretive Center, the Storer Garden, and a proposed amphitheater to the west of the parking lot.

The final addition is a drop off zone north of the Discovery GATEway feature and adjacent to the Storer Garden. On several occasions while I have been working in the gardens in this area, or involved in Arboretum tours, I have witnessed groups being dropped off in this location. This is the only ADA accessible ramp in the area. However, due to the nature of the road vehicles dropping off here remain fully in the lane of traffic. This poses a serious hazard because the road bends sharply to the north and visibility around the corner is not always clear. When east bound vehicles

veer around the parked vehicle into oncoming traffic there is a real potential for a head on collision. By removing the last Italian Stone Pine, a drop off zone is created that allows vehicles to pull out of the road and unload. This drop off zone is enhanced by utilizing a contrasting pervious paving that gently slopes up to the sidewalk allowing maximum movability and visibility for visitors.



Figure 33. Drop off Zone. Visitors being dropped off at the Storer Garden cause a hazard as vehicles pass the parked buses and cross into oncoming traffic. (A. Hendrie)

Drainage Channel Area

The drainage channel area at the far west end of the Arboretum serves primarily as the storm water overflow catchment area. It is at this location where the pump resides that carries excess water from the Arboretum waterway to the South Fork of Putah Creek. With the exception of occasional maintenance, this area has been left alone and allowed to take on a “wild” nature.

Currently, this area is home to a number of animal species that would not normally be found in an urban or semi-urban environment. Along this channel there is a fox den, coyotes, otters, minks, turtles, and a wide range of birds. One can also find native ants in the unirrigated areas near the maintenance trail at the top of the east bank.

My first thoughts about this area was to suggest the removal of all of the invasive species that hug the waterline and re-

store it to a native riparian habitat. Instead however, it seemed appropriate to use this area as an invasive species educational opportunity. With the addition of two spur trails into the canopy along the channel, I propose look out spots that house informational signage about the plants and animals here. Visitors could then be directed to the Putah Creek Reserve to experience a native riparian habitat. This link between nature taking over a cultivated area and nature itself, is one that should be targeted as part of the Discovery GATEway. Signage opportunities will be dis-



Figure 34. Overflow Pond. At the base of the overflow pumps roosts have been carved into the banks for young Western pond turtles (A. Hendrie)

cussed in the next section.

While I am not eager to perform a total overhaul on the channel banks, I would suggest the installation of appropriate native vegetation on the tops of the banks to keep down the weeds that threaten restoration efforts on the opposite side of the trail. I would also suggest that a small area be retained as a loose gravel/soil space where the native ants can be kept away from irrigation and killdeer can continue to nest.



Figure 35. Turtle. Feeling quite at home this turtle uses the shallows cut into the banks. (A. Hendrie)

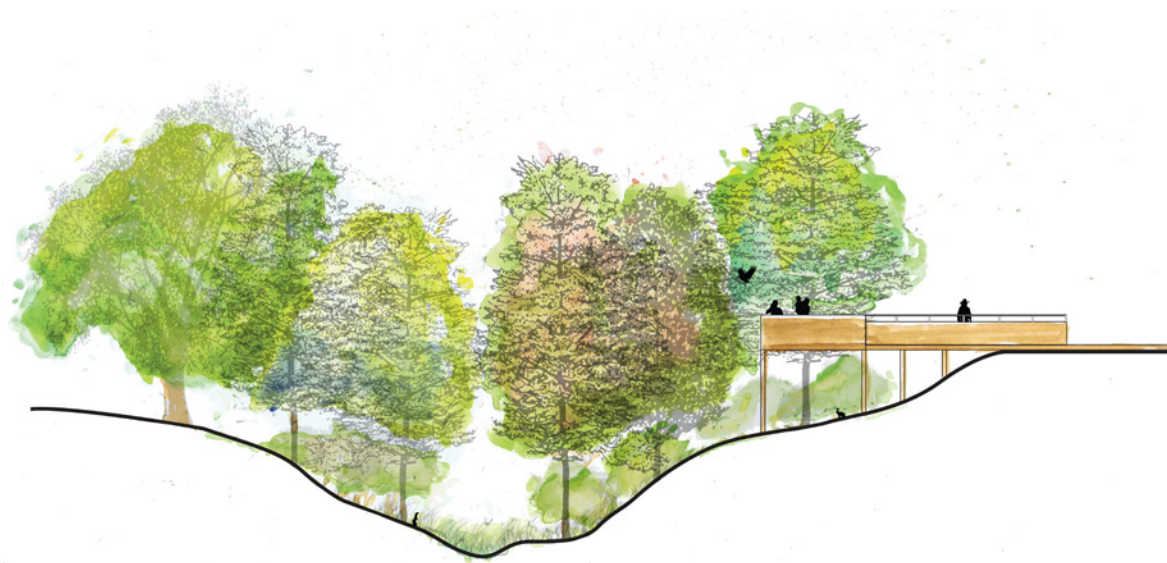


Figure 36. Drainage Channel Observation Deck. Extending into the Drainage Channel, observation decks could allow visitors a glimpse into this riparian habitat. (A. Hendrie)

While it may not be entirely possible, it would be ideal to keep cyclists from using this trail. It has been discovered by graduate students at UC Davis, that the Western pond turtle has been using this area for rearing their young. The turtles lay their eggs in the meadow at the top of the slope. When the baby turtles hatch they make their way across the trail and back into the drainage pond at the base of the pump. While pedestrians using this path would likely take care not to injure the baby turtles, cyclists may not notice them.

Points of Interest and Signage

The Discovery GATEway has unlimited opportunities to educate visitors. From environmental and ecological issues surrounding the water that comprises the waterway, to the habitats found in the Arboretum. But to the untrained or unknowing ob-

server these opportunities would likely go unnoticed.

Looking back at the CSU Fullerton Arboretum, locator and informational signage were prevalent and helpful, without cluttering the arboretum. Spaced appropriately throughout the collections, you could readily find a sign to help direct your way and learn about plants around you. For those unfamiliar with the space this was helpful.

I find that the west end of the Arboretum is currently lacking in good directional signage and these feature can be enhanced. There are no locator signs in the west end and visitors frequently ask passerby's for directions. The Shields Oak Grove entrance, Storer Garden, and White Flower Gazebo have well thought out interpretive signage that inform visitors about the significance of those areas, but again no directional signage.

With the future development of the Discovery GATEway, I

would suggest the addition of simple sign posts along the waters edge and at key intersections in the main area to help guide visitors. More elaborate signage with maps should be sited at the two parking locations, and would also be a part of the GATEway entry feature. This simple step would allow visitors to feel more confident in exploring the west end, and discourage the fear that



Figure 37. Bird and Bat Boxes. These boxes were spotted in the Arboretum in various locations. Moveable informational signage could be placed at the base of these trees to help visitors learn more about the animals they shelter. (A. Hendrie)

they may be trespassing or get lost.

Beyond directional signage, we should include more informational signage. On one walk I spotted three different types of nesting boxes. With the exception of a bat box (the image below with the long slat), I had no idea what type of birds these



were suited for. Simple moveable signs could be placed at the base of these trees with general information about the birds and bats.

Another important feature to sign would be the waterway and the pumps. Located at the very end of the waterway could be an interpretive sign that explains how water is directed to the creek and where it goes from there. The link between the



Figure 38. Stormwater Pumps. These pumps are located across the path from the main Arboretum water and pump water to the South fork of Putah Creek. Signage between these two locations could help educate visitors on stormwater practices. (A. Hendrie)

street and the creek is an important lesson in both water conservation and the potential effects in polluting our waterways. This is a hands on way for people to learn about the same stormwater system that is right outside their front doors.

Part of this water channel is what I have referred to as the drainage channel area. With the addition of observation platforms into the channel there is the opportunity for education about invasive plant species and their effects on wildlife areas. The dominance of *Ailanthus altissima* in the waterway illustrates the unintended consequences of our actions when we release non-native species in the wild. Showing photos of the Putah Creek Reserve, where restoration efforts have significantly reduced if not eradicated invasive plant species, would provide a good comparison and hopefully encourage visitors to go to the Putah Creek Reserve and experience it first hand. Again, making this connection informs people about the existence of the Reserve and that the public is welcome to visit it.

The next obvious signage potential in this area would highlight the wildlife that resides here and how some of these animals made their way to this cultivated environment. Likely migrating from the Reserve, animals move along roadsides to get from one patch to another. Providing safe areas for animals to migrate through is something that many rural areas no longer have. Along with the new Equestrian Center entrance and bike path, I proposed the addition of a hedgerow which would provide cover for the movement of a number of animal species and also serve as hosts plants for a beneficial insect species. Drawing the connection between the animals in the drainage channel and the hedgerow is yet another educational opportunity.

There are many opportunities for increased signage in the west end of the arboretum. Some of the signs should be permanent features and others can be temporary installations. The main goal of the Discovery GATEway, is and should be, drawing those important connections between the cultivated and the natural.

Conclusion

At the outset of this project I was very excited to have the opportunity to try and create a design that had the potential to be built on campus. During the process however, I realized how challenging designing for any public space could become. Various parties involved during consultation had competing ideas and interest that necessitated sensitivity during the design. The Arboretum has a long and somewhat sacred history when you talk to people. Various sites are “no go” zones in various terms; be it vehicles, people, or facilities. Certain views are not to be obstructed by vehicles or buildings. Gardens are cherished and personal.

Access to the west end of the Arboretum is a serious problem. If the Arboretum is going to invite the public to enjoy its’ offerings they must accept the fact that parking needs to be enhanced, and it cannot be pushed entirely out to the periph-

ery. It is a difficult balance to keep the Arboretum a peaceful retreat that is removed from cars, but also allow those with limited mobility unlimited access. In the same vein as vehicular access, the introduction of permanent buildings to spaces that were once lawn or viewing vistas will draw criticism for impeding on the openness and serenity of the Arboretum. To this I reply that when looking at the Discover GATEway and the Arboretum in whole, there still remains many areas for retreat. A well sited building does not have to dominate the space and can in fact blend in without being hidden.

Near the end of my design process, the originally discussed site for parking had been moved to a new location. This change affected how I envisioned the overall space. In the end I chose to accommodate some of those changes and not others. My design focused on practicality of function, aesthetics, and ultimately as a possibility of how the Arboretum could look and function in the future. It is not a vision that everyone will agree



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