

# Buddy Holly Center Plaza





“I’m not trying to stump anybody... It’s the  
beauty of the language that I’m interested in.”



Studio Context

Site Context

Group Work

Programming- Goals & Objectives

Case Studies

Inventory

Programming

Goals & Objectives - Heath Barfield

Goals & Objectives - Olivia Sievers Ross

Goals & Objectives - Surinder Aulakh

Site Analysis

Heath Barfield

Olivia Sievers Ross

Surinder Aulakh

Concept Plan

Heath Barfield

Olivia Sievers Ross

Surinder Aulakh

Design - Heath Barfield

Design - Olivia Sievers Ross

Design - Surinder Aulakh

Landscape Performance Benefits

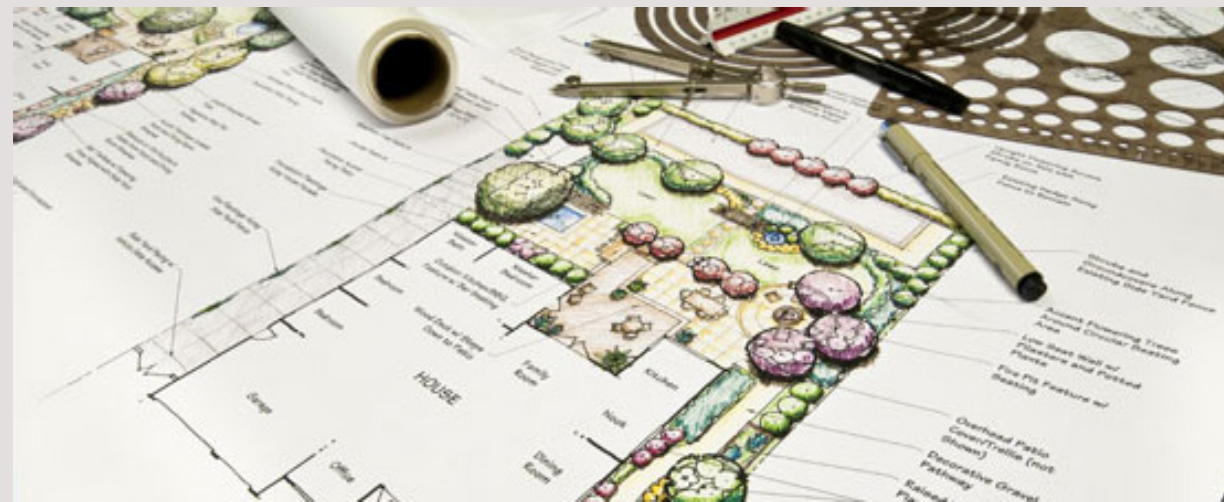
Heath Barfield

Olivia Sievers Ross

Surinder Aulakh

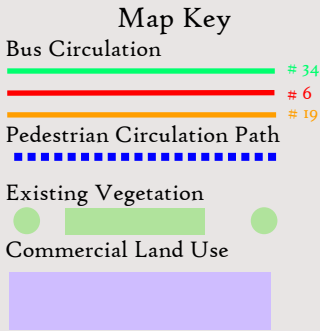
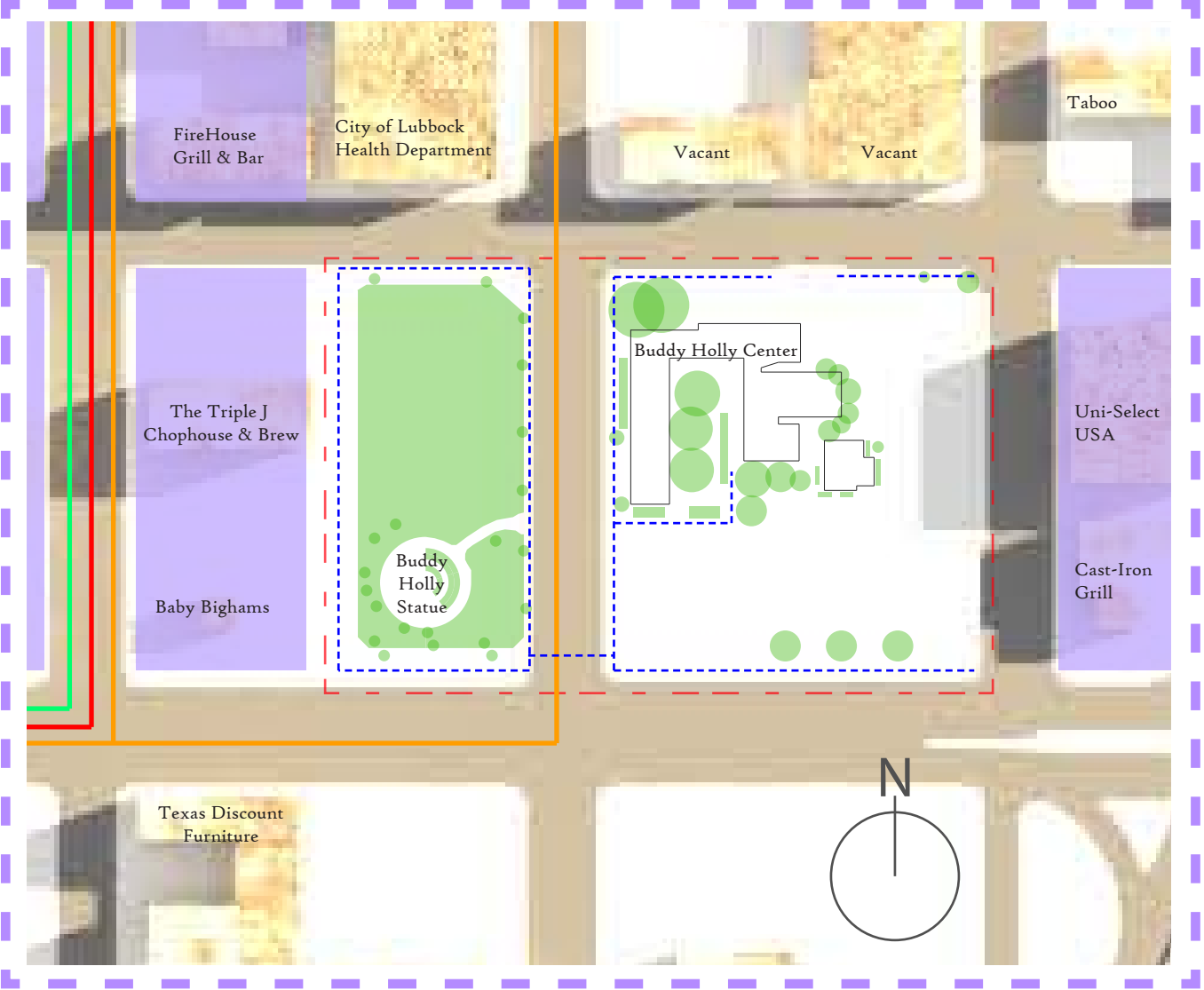
Works Cited

Comprehension of physical, cultural and ecological issues at diverse scales allow for a designer to enrich the built environment with communal and social spaces. Enhancement and design decisions for the Buddy Holly Center are established with proprietary evidence. Site Inventory is a process which the designer uses to assess the context and Site Analysis is the interpretation of the forces influencing a site. Conceptual design is an iterative process which entails the designer to test, make and repeat until a refined design emerges. The methodologies implemented during the design development range from sketches, models, doodles, etc., thus, leading into finished documents.





“The Buddy Holly Center, a historical site, has dual missions; preserving, collecting and promoting the legacy of Buddy Holly and the music of Lubbock and West Texas, as well as providing exhibits on Contemporary Visual Arts and Music, for the purpose of educating and entertaining the public. The vision of the Buddy Holly Center is to discover art through music by celebrating legacy, culture and community.”





# Cherry Creek North

Designer: Design Workshope, Inc

Location: Filmore Plaza Denver, Colorado Size: 78 Acres (16 Blocks)

20 new “Art and Garden Spaces,” which contain signature art features, benches, tables and chairs, create distinct areas throughout the district, enrich the pedestrian experience, and encourage people to relax and linger.

160 pedestrian light poles, 12 benches, 10 trash receptacles, and 2,450 cubic yards of organic materials from the existing street were donated to local communities for reuse.

More than 53 new street signs, 37 street identification banners, 46 new marketing banners, 17 new parking directory signs, and 21 new free-standing directory map structures enhance navigation and walkability in the District.





Watch Factory Plaza

Designer: Richard Burck Associates

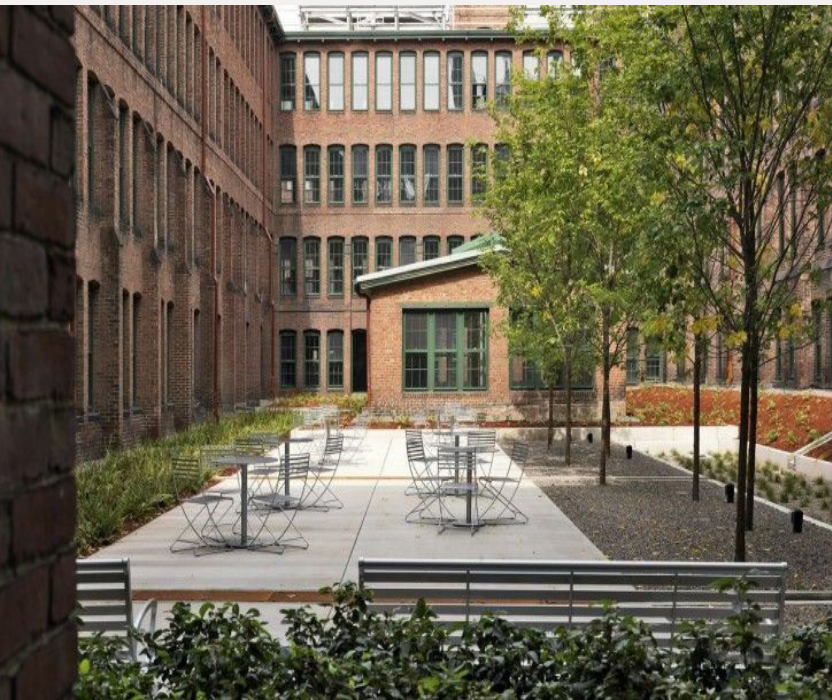
Location: 185 Crescent Street Waltham, Massachusetts

Size: 12 acres

Cobblestone runnels elegantly direct and runoff from roof gutters into rain gardens, offering a visual display of the storm water management process.

The rain gardens were planted with Pennsylvania Sedge; they include a rubber liner and pipe that discharges the cooled and filtered runoff into the Charles River.

Recreational equipment storage in the Robbins courtyard provides residents with 8 racks for kayaks and 45 spots for bikes, available on a first-come, first-served basis.



Underwood Family Sonoran Landscape Laboratory

Designer: Ten Eyck Landscape Architects, Inc.

Location: 1040 N Olive Road, University of Arizona Tucson, Arizona

Size: 1.2 acres

An accessible, sunken court serves as outdoor classroom and gathering space and retains runoff during desert storm events.

The court is composed of permeable stabilized decomposed granite and framed by cast-in-place concrete seat walls of varying heights.

Storm water runoff is reduced by 2 desert arroyo ‘micro-basins’ and the lower patio with a 5,500-gallon retention capacity total. Native Mascagnia macroptera vines climb 50 feet up a scrim on the building’s southern exposure reducing solar heat gain and blurring the lines between architecture and landscape. A bosque of native mesquite (Prosopis velutina) creates dappled shade in the entry plaza.





Site inventory is one of the beginning steps in the design process for landscap architecture.  
This is a collection of data that is a major influence on the design and planning decisions  
Site inventory includes abiotic, biotic, and cultural data.

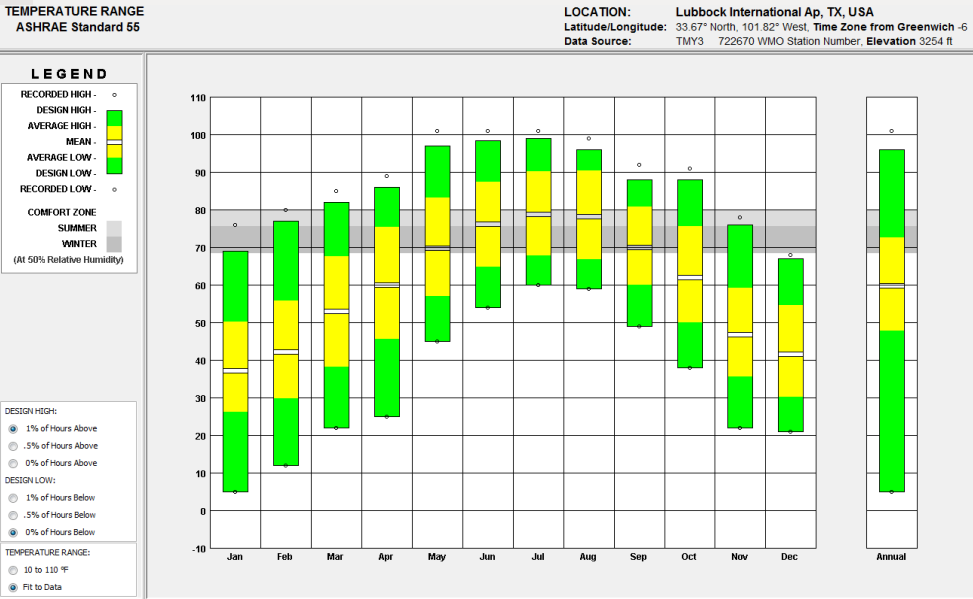
Soil (Abiotic)

The soil of the site is 100% urban soil and not prime farmland.

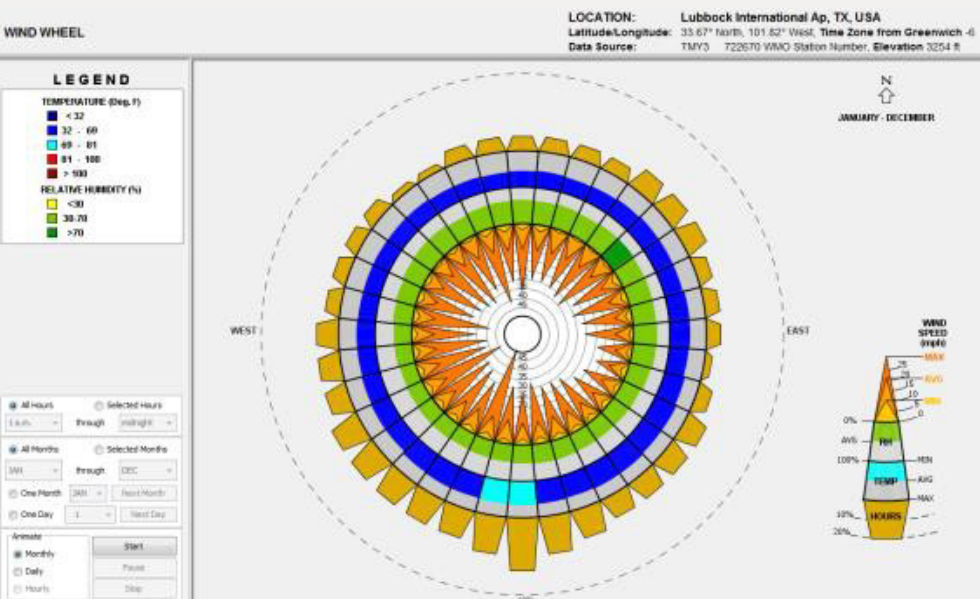
Topography (Abiotic)

The topography of the site lacks is mostly flat and lacks enough elevation change to mention.

Climate (Abiotic)



Temperature Range





# Wildlife (Biotic)

The vertebrates and invertebrates of Lubbock represent a typical urban assemblage. European pigeons, grackles, doves, song birds, raccoons, and domestic animals are some that are regularly found in the city limits. An assortment of migratory birds and waterfowl seasonally augment the year-round residents.

# On-site Vegetation (Biotic)

- Trees

Vitex agnus-castus

Quercus sp.

Ulmus sp.

Pinus sp.
- Grass

Assemblage - Small Plants

Assemblage - Trees with Small Plants
- Small Plants

Red/Yellow Yucca

Hesperaloe parviflora

Boxwood Buxus

Santolina Grey

Santolina chamsecyparissus

Nandina domestica

Indian hawthorn

Raphiolepis indica

Artemisia (powis castle)

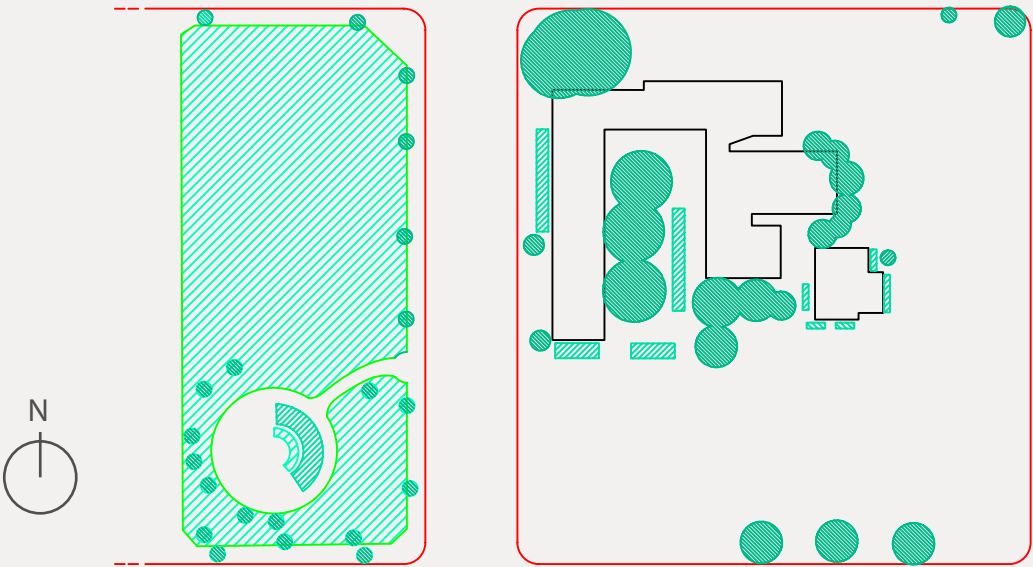
Creeping Juniper

Juniperus horizontalis

Elaeagnus

Inland Sea Oats

Chasmanthium latifolium



# Historical Significance (Cultural)

The eastern portion of the site served as the Lubbock stop on the Fort Worth and Denver South Plains Railway Depot. This station served as a stop for trainscarrying passengers and trains carrying freight. The building was designed in the Spanish Renaissance Revivial style as was much of Lubbock.

# Water Restrictions (Cultural)

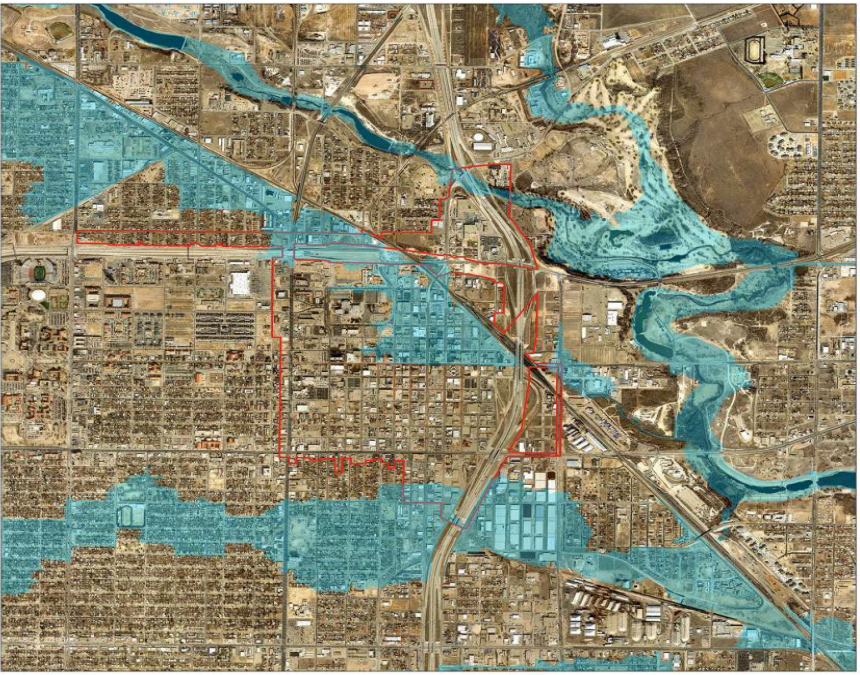
- Stage 1 Water Restrictions

Can water on Tuesday & Friday only

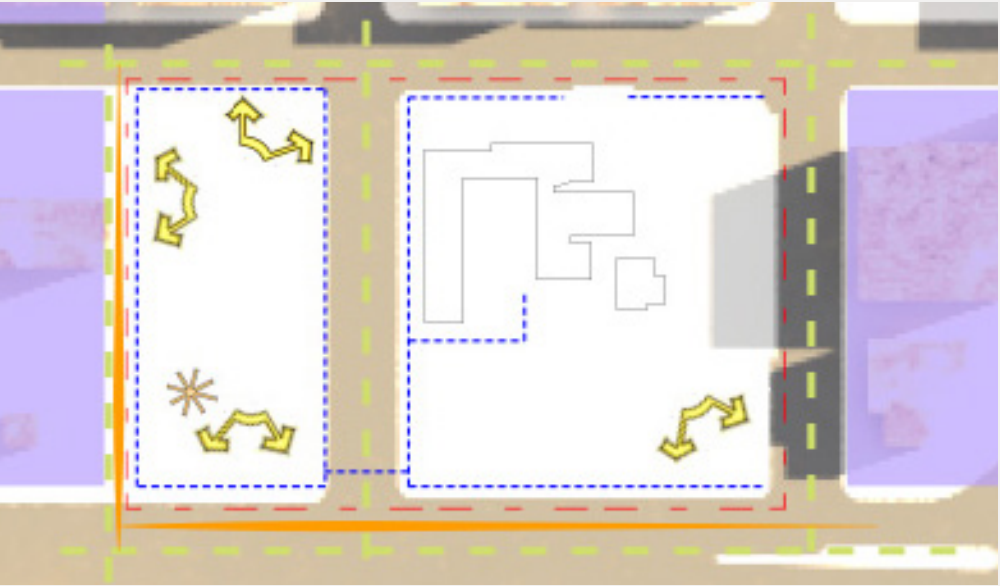
Need a New Landscape Variance Request to establish new plants (good for 3 weeks)

# Hydrology (Abiotic)

The site has massive surface drainage resulting in frequent ponding and flooding with torrential rains.



# Existing Site Conditions



- Map Key

Noise corridor

Pedestrian Circulation path

Project Limit Line

Vehicular Circulation

Buddy Holly Statue

View to adjacent businesses

Commercial Land Use



# Goals & Objectives

Programming is one of the initial steps in the design process for a project.  
The programming of a site defines the project's goals and objectives.  
It determines the proposed site usage and special features by describing values and desired outcomes, in addition to, the actions required to achieve those goals.

Program: Goals and Objectives  
Site: Buddy Holly Center Plaza  
Address: 1801 Crickets Avenue, Lubbock, TX 79401  
Group: Surinder Aulakh, Heath Barfield, Olivia Sievers Ross  
Instructor: Dr. Yi Luo

Goal 1: Improve public appeal to the Center, thereby increasing visitation  
Objective 1: Create additional well-designed, functional social areas  
Objective 2: Improve existing social areas by improving functionality, flow, and design  
Objective 3: Improve aesthetics of entire site  
Objective 4: Create outdoor educational spaces

Goal 2: Provide noise reduction for the site  
Objective 1: Add vertical planes in key locations

Goal 3: Improve existing pedestrian circulation and safety  
Objective 1: Relocate pedestrian crosswalk connecting the two sections of the Center  
Objective 2: Implement traffic-calming measures that will reduce traffic speeds

Goal 4: Improve sustainability of site  
Objective 1: Reduce amount of lawn  
Objective 2: Use only drought-tolerant plants focusing on natives and naturalized species  
Objective 3: Use rainwater for irrigation

Goal 5: Address drainage and flooding  
Objective 1: Design overhead structures with green roofs to delay rain runoff  
Objective 2: Implement rainwater collection to reduce amount of rain runoff  
Objective 3: Create elevation changes or swales to redirect flow of water

Goal 6: Improve thermal comfort  
Objective 1: Add overhead structures in key areas  
Objective 2: Plant additional trees  
Objective 3: Create resting areas under shaded areas

Goal 7: Improve vehicular circulation  
Objective 1: Reduce quantity of entrance driveways  
Objective 2: Relocate main entrance driveway so as not to interfere with pedestrian circulation  
Objective 3: Add directional signage effectively positioned



Parking lot is dangerous and lacks clear direction



Improved visual aesthetics from sidewalk and street will increase interest and visitation



Adding overhead planes will increase thermal



Use of drought-tolerant plants have social and economic benefits



Program: Goals and Objectives  
Site: Buddy Holly Center Plaza  
Address: 1801 Crickets Avenue, Lubbock, TX 79401  
Group: Heath Barfield  
Instructor: Dr. Yi Luo

- Goal 1: Improve public appeal to the Center, thereby increasing visitation  
Objective 1: Create additional well-designed, functional social areas  
Objective 2: Improve existing social areas by improving functionality, flow, and design  
Objective 3: Improve aesthetics of entire site  
Objective 4: Create outdoor educational spaces  
Objective 5: Add children’s interactive space  
Objective 6: Repurpose existing interactive exhibit into memorial wall

- Goal 2: Provide noise reduction for the site  
Objective 1: Reorientate memorial site

- Goal 3: Improve existing pedestrian circulation and safety  
Objective 1: Redesign pedestrian crosswalk connecting the two sections of the Center  
Objective 2: Implement traffic-calming measures that will reduce traffic speeds

- Goal 4: Improve sustainability of site  
Objective 1: Use only drought-tolerant plants focusing on natives and naturalized species

- Goal 5: Address drainage and flooding  
Objective 1: Implement rainwater collection to reduce amount of rain runoff  
Objective 2: Create elevation changes or swales to redirect flow of water

- Goal 6: Improve thermal comfort  
Objective 1: Add overhead structures in key areas  
Objective 2: Plant additional trees  
Objective 3: Create resting areas under shaded areas

- Goal 7: Improve vehicular circulation  
Objective 1: Reduce quantity of entrance driveways  
Objective 2: Relocate main entrance driveway so as not to interfere with pedestrian circulation  
Objective 3: Add directional signage effectively positioned



Visual interest and direction between sections of the site can be improved upon



Improve existing pedestrian circulation between the museum and memorial



Improve thermal comfort by adding shade features as well as new planting design.



Manage storm water runoff to prevent flooding while achieving a visually pleasing space.



Program: Goals and Objectives  
Site: Buddy Holly Center Plaza  
Address: 1801 Crickets Avenue, Lubbock, TX 79401  
Student: Olivia Sievers Ross  
Instructor: Dr. Yi Luo

Goal 1: Improve public appeal to the Center, thereby increasing visitation  
Objective 1: Create additional well-designed, functional social areas  
Objective 2: Improve existing social areas by improving functionality, flow, and design  
Objective 3: Improve aesthetics of entire site  
Objective 4: Create outdoor educational spaces

Goal 2: Provide noise reduction for the site  
Objective 1: Add vertical planes in key locations

Goal 3: Improve existing pedestrian circulation and safety  
Objective 1: Implement traffic-calming measures that will reduce vehicle speeds  
Objective 2: Clearly designate crosswalks, thus increasing drivers’ awareness of pedestrians and creating a safer environment  
Objective 3: In a safer location, create an additional pedestrian crosswalk as the primary connection between the two sections of the Center  
Objective 4: Create clearly defined paths throughout site

Goal 4: Improve sustainability of site  
Objective 1: Reduce amount of lawn  
Objective 2: Use only drought-tolerant plants focusing on natives and naturalized species  
Objective 3: Use rainwater for irrigation

Goal 5: Address drainage and flooding  
Objective 1: Design overhead structure(s) with green roof(s) to delay rain runoff  
Objective 2: Implement rainwater capture measures to clean and reduce amount of rain runoff  
Objective 3: Create elevation changes or swales to redirect flow of water

Goal 6: Improve thermal comfort  
Objective 1: Add overhead structures in key areas  
Objective 2: Plant additional trees  
Objective 3: Create resting and social areas under shaded areas

Goal 7: Improve vehicular circulation  
Objective 1: Relocate main entrance driveway so as not to interfere with pedestrian circulation  
Objective 2: Add directional signage effectively positioned  
Objective 3: Reduce quantity of entrance driveways



Unattractive on and off site views can be improved



8 driveways confuse visitors and creates a lack of direction



Over 30,000 feet square of lawn requires much maintenance, time, and cost.



Stormwater runoff creates flooding adjacent to buildings, in the parking lot, and on the streets. On site rain capture can help reduce runoff.



The site has many locations that can house additional social spaces



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Group: Surinder Aulakh  
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- Goal 1: Improve public appeal to the Center, thereby increasing visitation  
Objective 1: Create additional well-designed, functional social areas  
Objective 2: Improve existing social areas by improving functionality, flow, and design  
Objective 3: Improve aesthetics of entire site  
Objective 4: Create outdoor educational spaces

- Goal 2: Provide noise reduction for the site  
Objective 1: Add vertical planes in key locations

- Goal 3: Improve existing pedestrian circulation and safety  
Objective 1: Redesign pedestrian crosswalk connecting the two sections of the Center  
Objective 2: Implement traffic-calming measures that will reduce parking lot speeds

- Goal 4: Improve sustainability of site  
Objective 1: Reduce amount of lawn  
Objective 2: Use only drought-tolerant plants focusing on natives and naturalized species  
Objective 3: Use rainwater for irrigation  
Objective 4: Reduce impervious surface and replace with permeable pavers

- Goal 5: Address drainage and flooding  
Objective 1: Implement rainwater collection to reduce amount of rain runoff  
Objective 2: Create elevation changes or swales to redirect flow of water

- Goal 6: Improve thermal comfort  
Objective 1: Add overhead structures in key areas  
Objective 2: Plant additional trees  
Objective 3: Create resting areas under shaded areas

- Goal 7: Improve vehicular circulation  
Objective 1: Reduce quantity of entrance driveways  
Objective 2: Relocate main entrance driveway so as not to interfere with pedestrian circulation



Address Pedestrian circulation and Safety



Improving Thermal Comfort of Park space



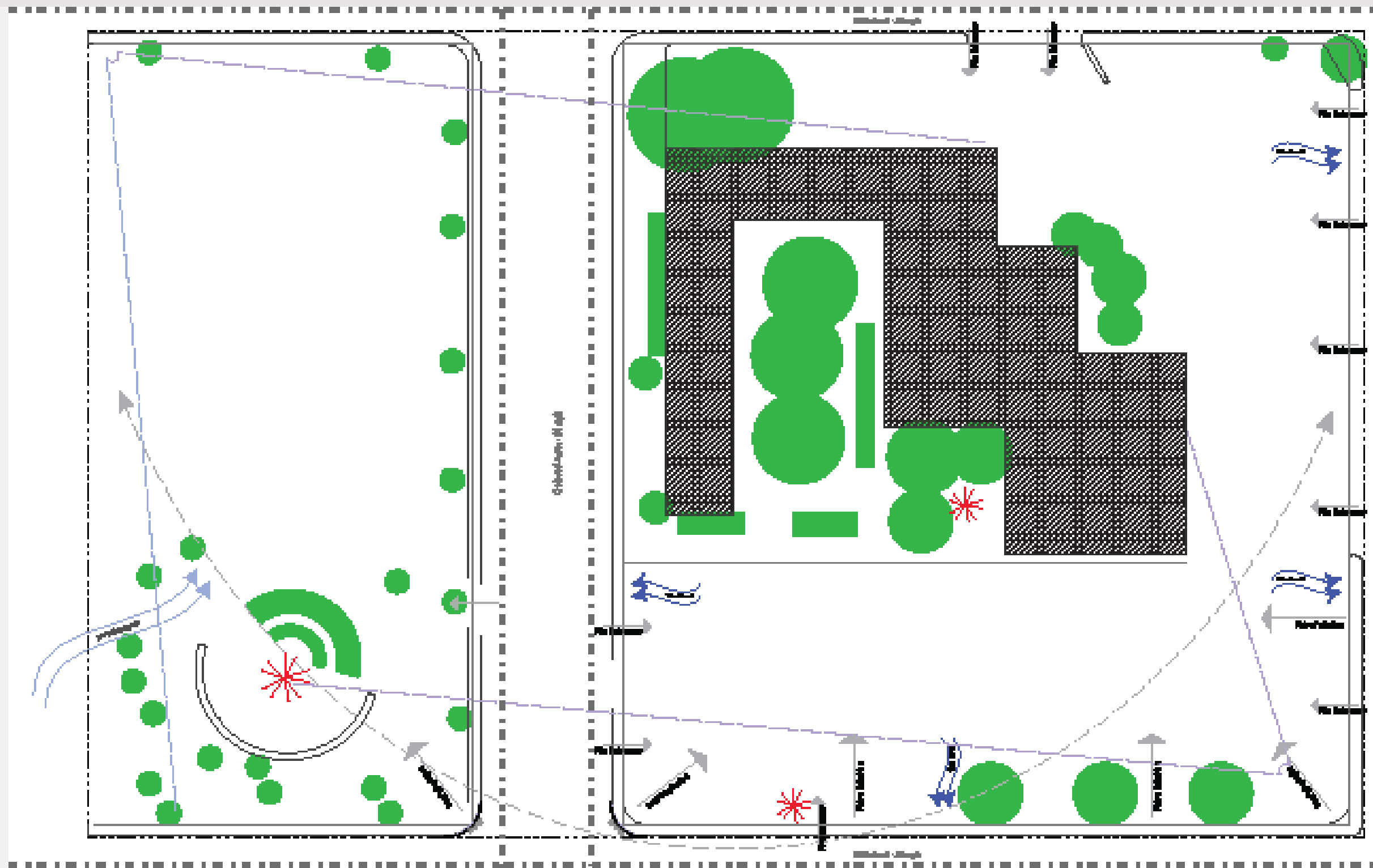
Noise reduction and designated driveway entries



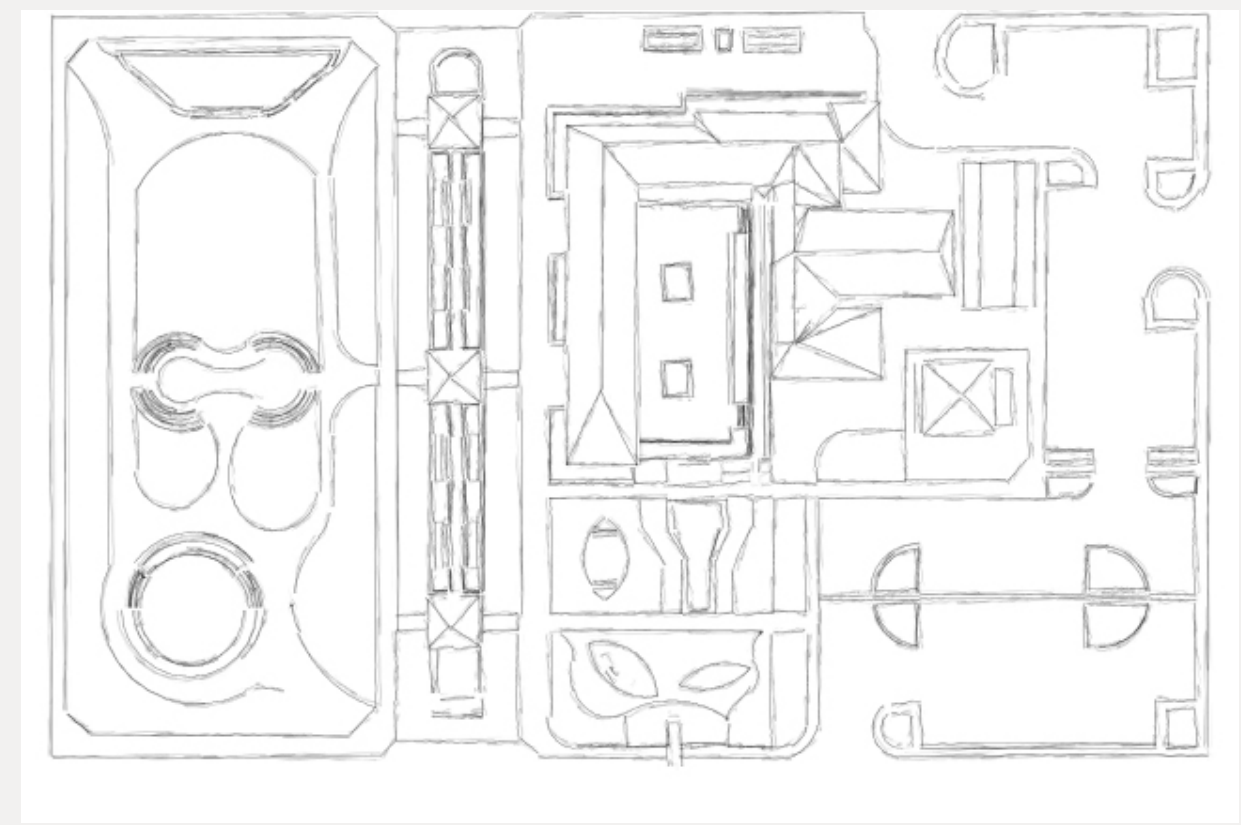
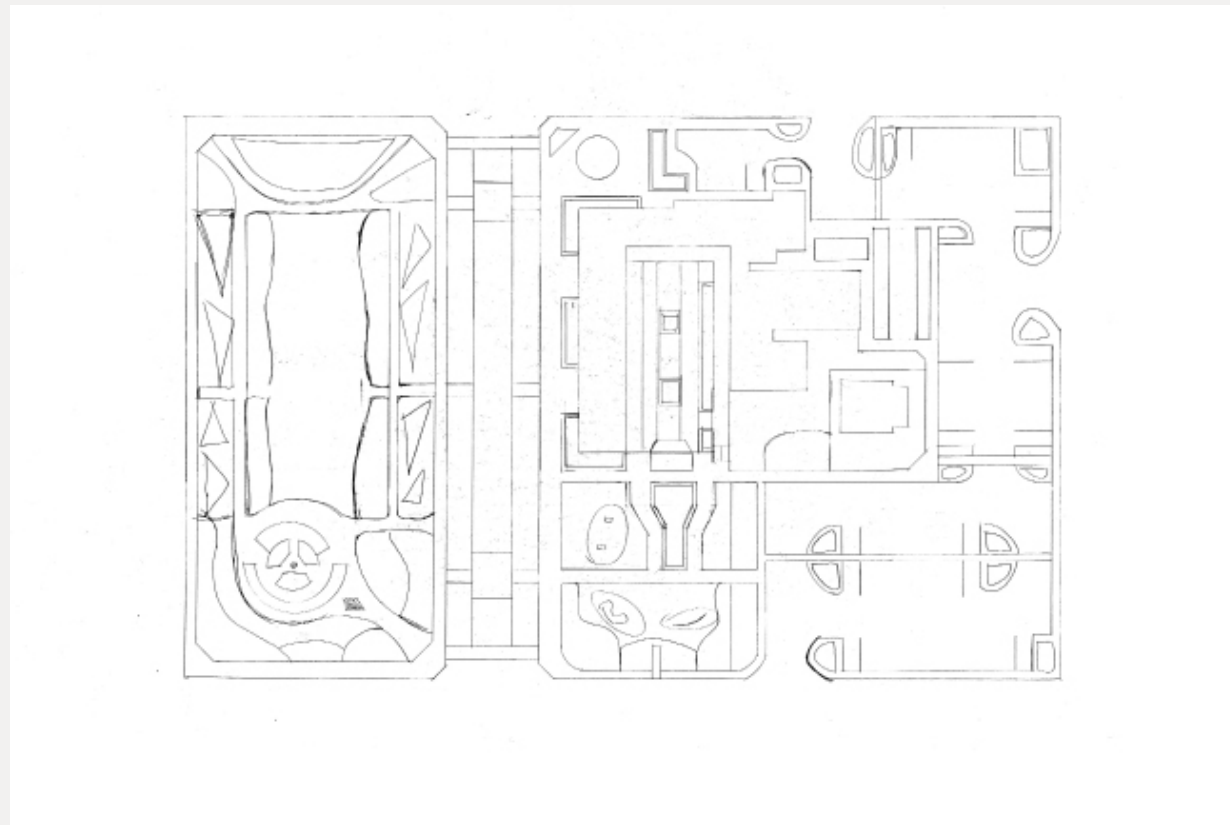


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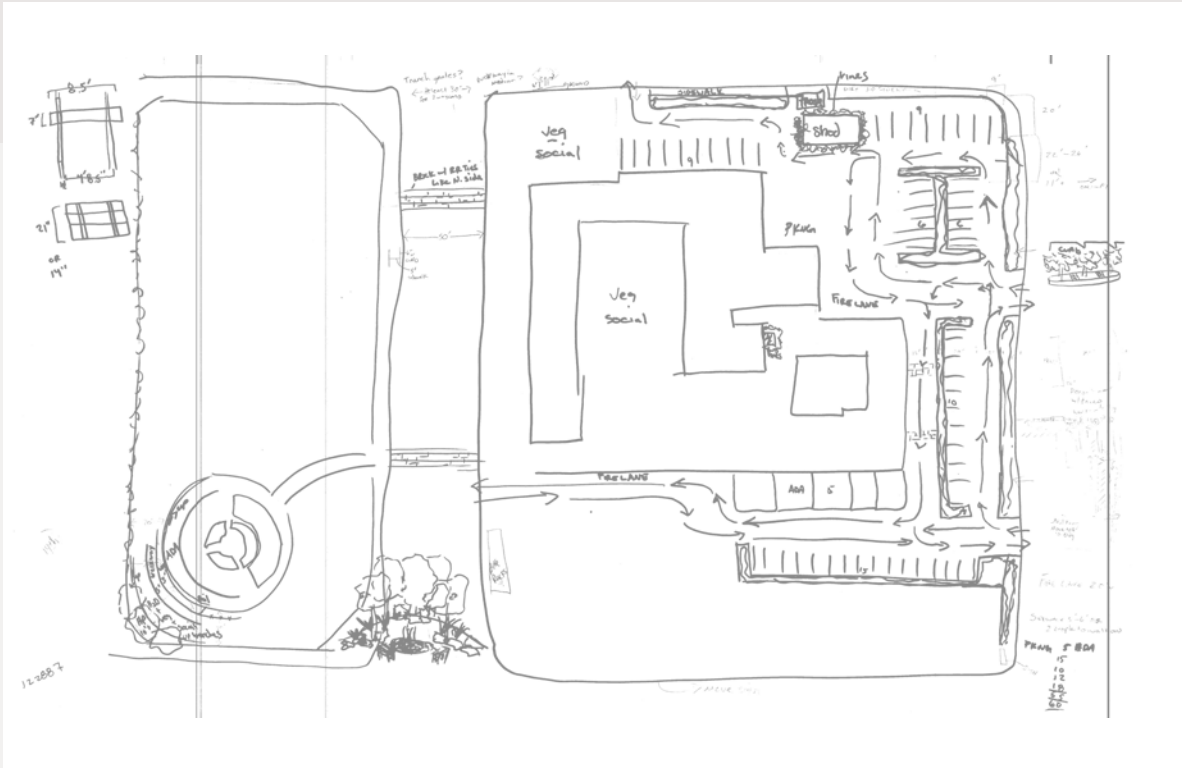
Ross  
LARC 2402





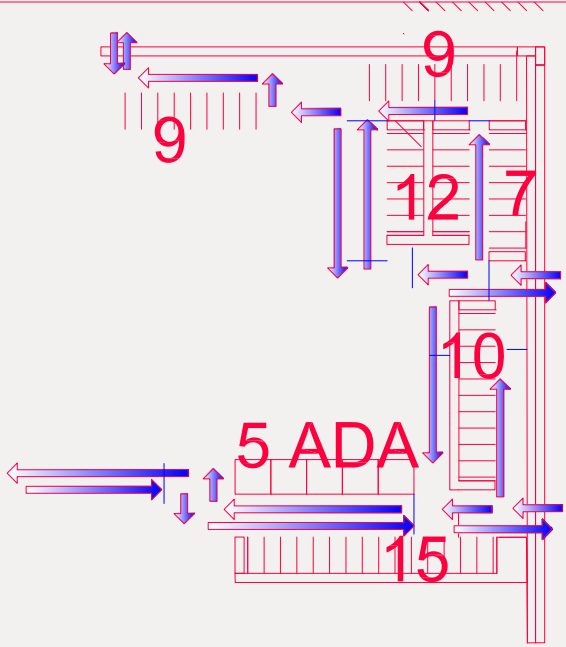


Concept Plan I



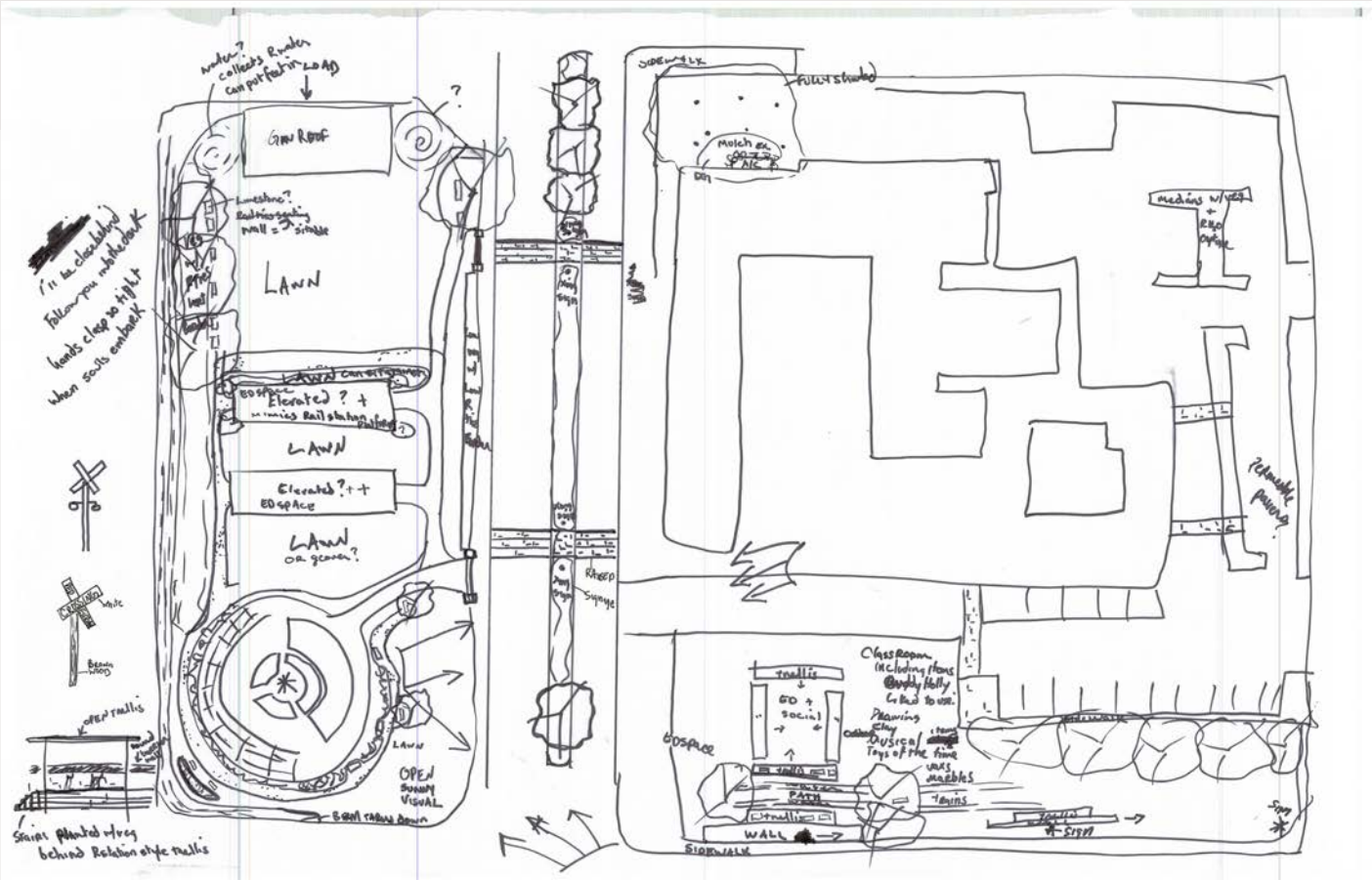
The first concept plan included teasing out parking flow, circulation, elevations of potential key areas, and object dimensions.

Parking Concept



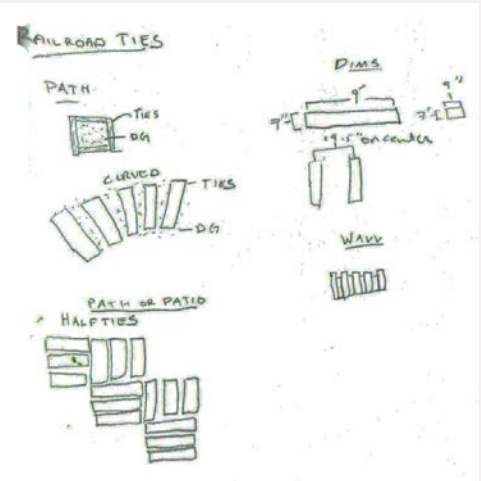
This was the second iteration for parking. I used this method in order to make sure there were enough spaces and that traffic flowed well while adhering to parking code.

Concept Plan II



This concept plan incorporated some ideas I had about the historical aspect of the railway station. I found the old tracks onsite an inspiration, as well as, the architecture.

Materials Concept



In order to continue the historic feel of the existing site, I wanted to use railroad ties for planting borders, fences, and possibly walkways in the redesign.

Contextual Reference



Interstate 27 serves as a connecting factor for Southern and Northern Lubbock.

Abstract Diagram

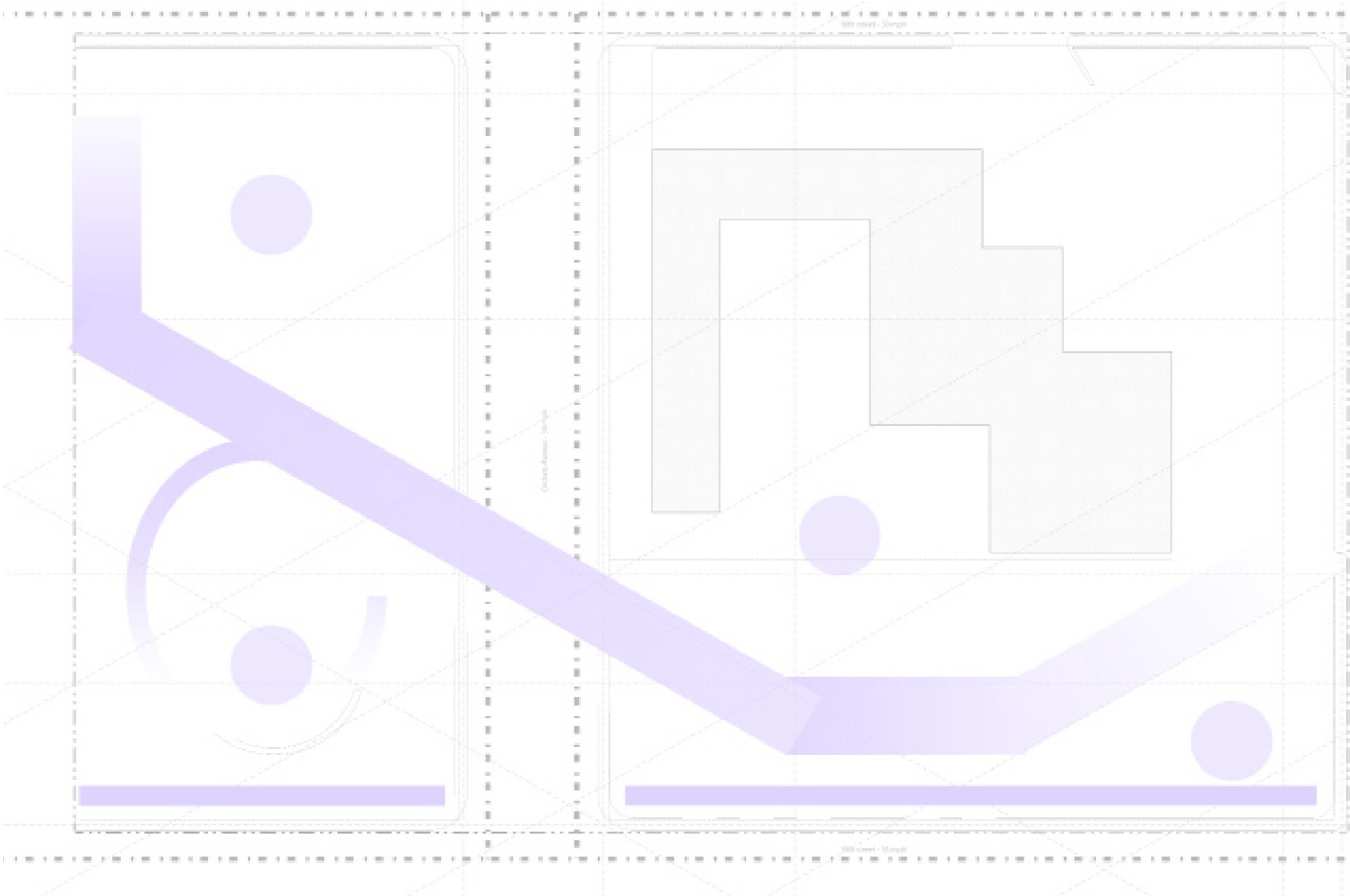


Diagram is extracted from the forces acting of the site, moments of multiple circulatory interjections and the procession through the site. The idea of the proposal is an extension of the West Texas Walk of Fame.



Site Design

The main focus of this design is to bring music back to the site by incorporating various sound features that allow people who visit the Buddy Holly center a truly unique experience. A xylophone, Whisper Wall, and an echo tube where placed at the entrance of the complex in order to bring in people by creating an interesting space. To achieve this design some of the parking lot had to be converted to open space for the new outdoor features. By doing so I was able to redirect the flow of traffic by eliminating the amount of entrances/exits to the site controlling vehicular circulation within the parking area. Adding a median to Crickets Ave would create a bridge to help gap pedestrian circulation to the memorial site in addition to providing a few outdoor seating areas shade by over head sails. Various plantings were added to the site in order to control the excess of storm water runoff while also creating an aesthetically pleasing garden scape. The green-space in front of the stage remained the same to accommodate for future concerts, outdoor classes, or any other activity that this site could facilitate.





Bird's Eye View



Section B-B'

Eye Level View



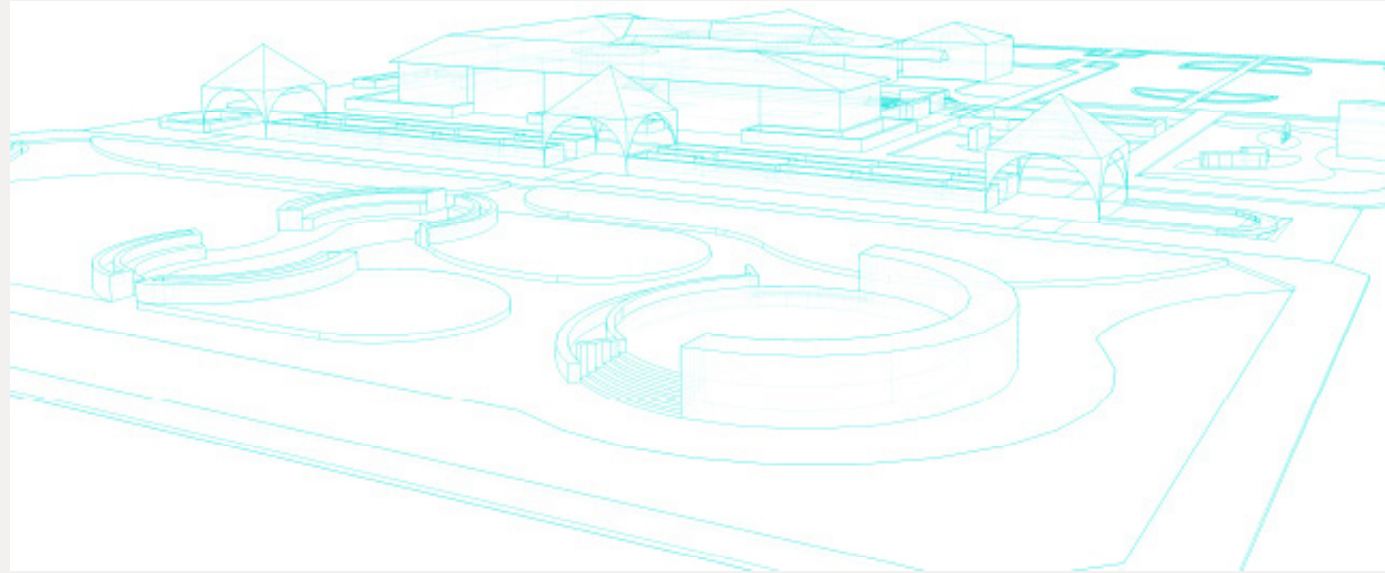
Eye Level View



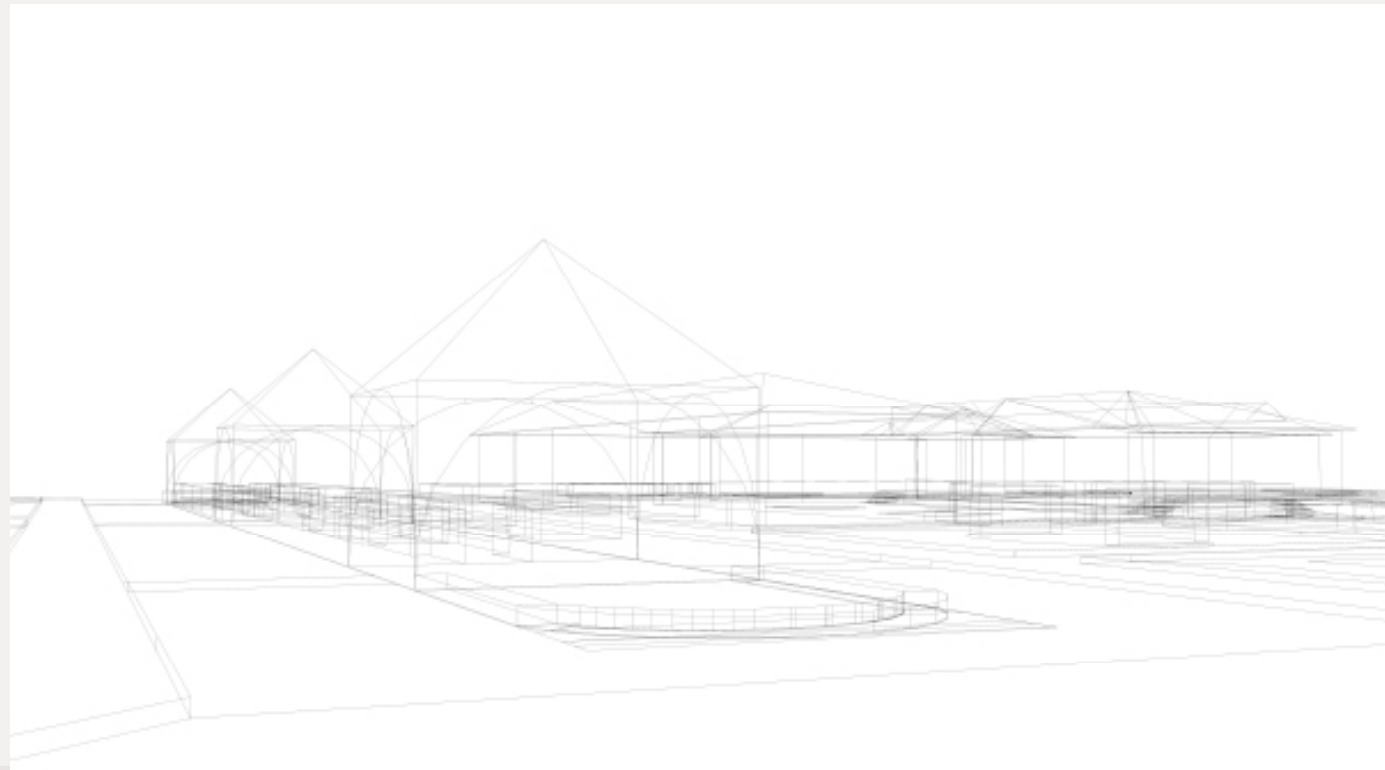
Section A-A'



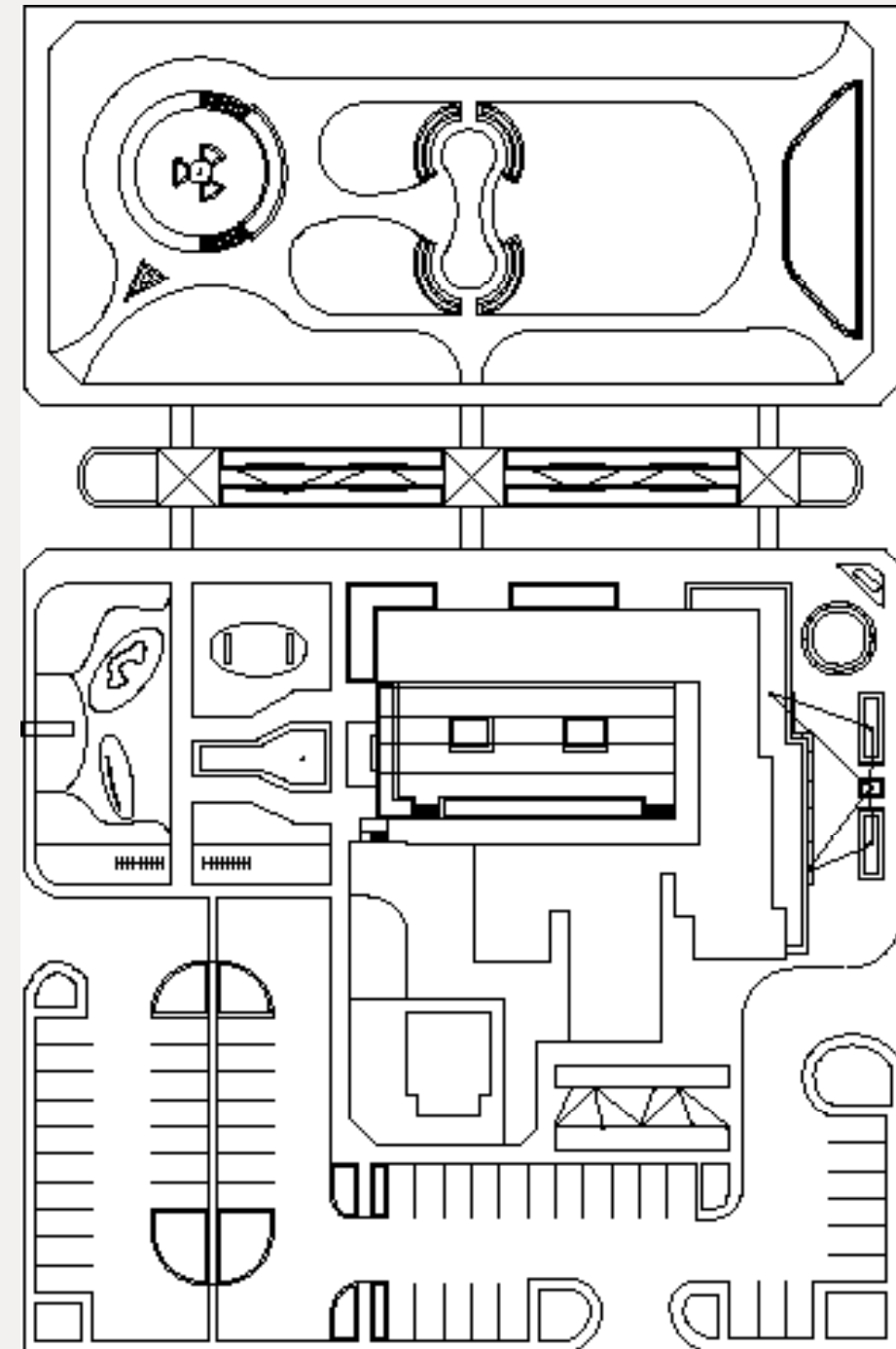
Concept Diagram 1



Concept Diagram 2

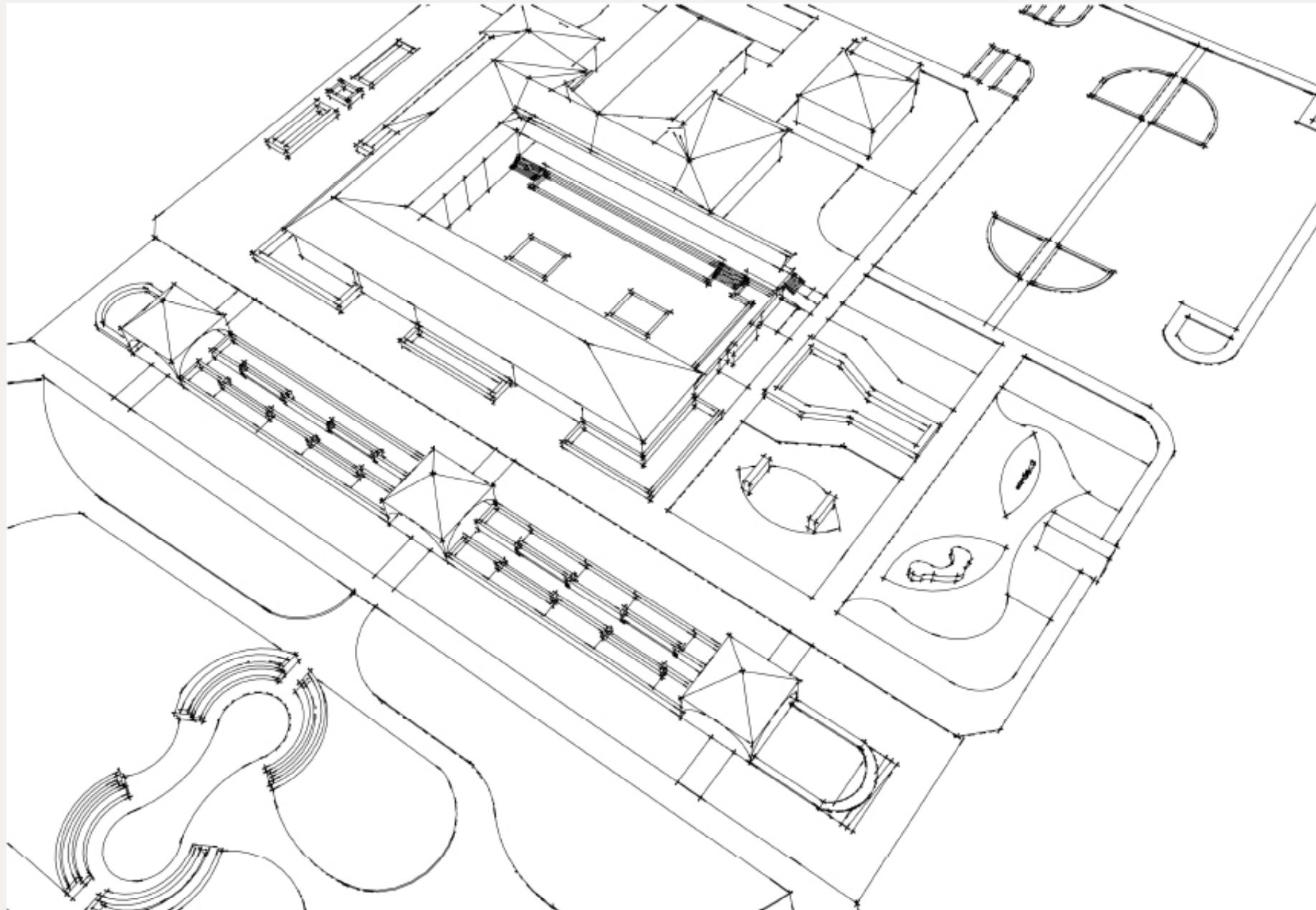


Concept Diagram 3

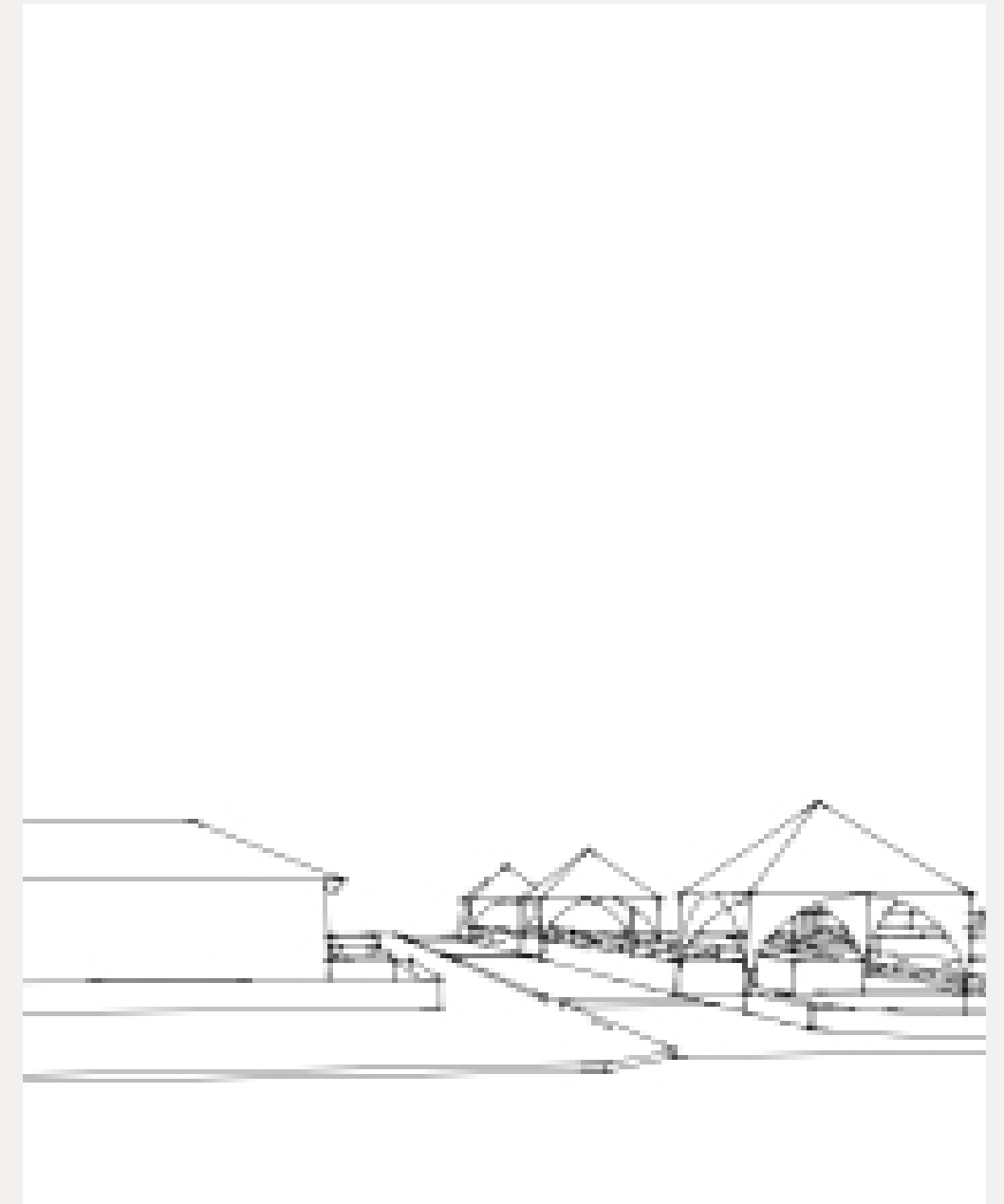




Concept Diagram 4



Concept Diagram 5



# Design Narrative

My design process, utilized for the Buddy Holly Center Plaza redesign, began with a comprehensive look at programming which resulted in site-specific goals and objectives. Through careful analysis of collected site inventory I was able to explore and develop design objectives that utilized available opportunities and minimized or eliminated site constraints.

This diligent use of analysis drove my entire process. It was evident from several site visits that there was a lack of linkage between the Center and the Buddy Holly statue. Informal interviews with Center visitors confirmed this. Many were unaware that the two entities were indeed part of a whole. I was also concerned about safety. I felt that there were dangerous conditions exacerbated by poorly defined automobile and pedestrian circulation on the site. In addition, it was apparent that microclimate modification in the form of shade plantings and structures were needed to make the site more comfortable and appealing to visitors. I addressed all of these inventory and analysis issues in my design.

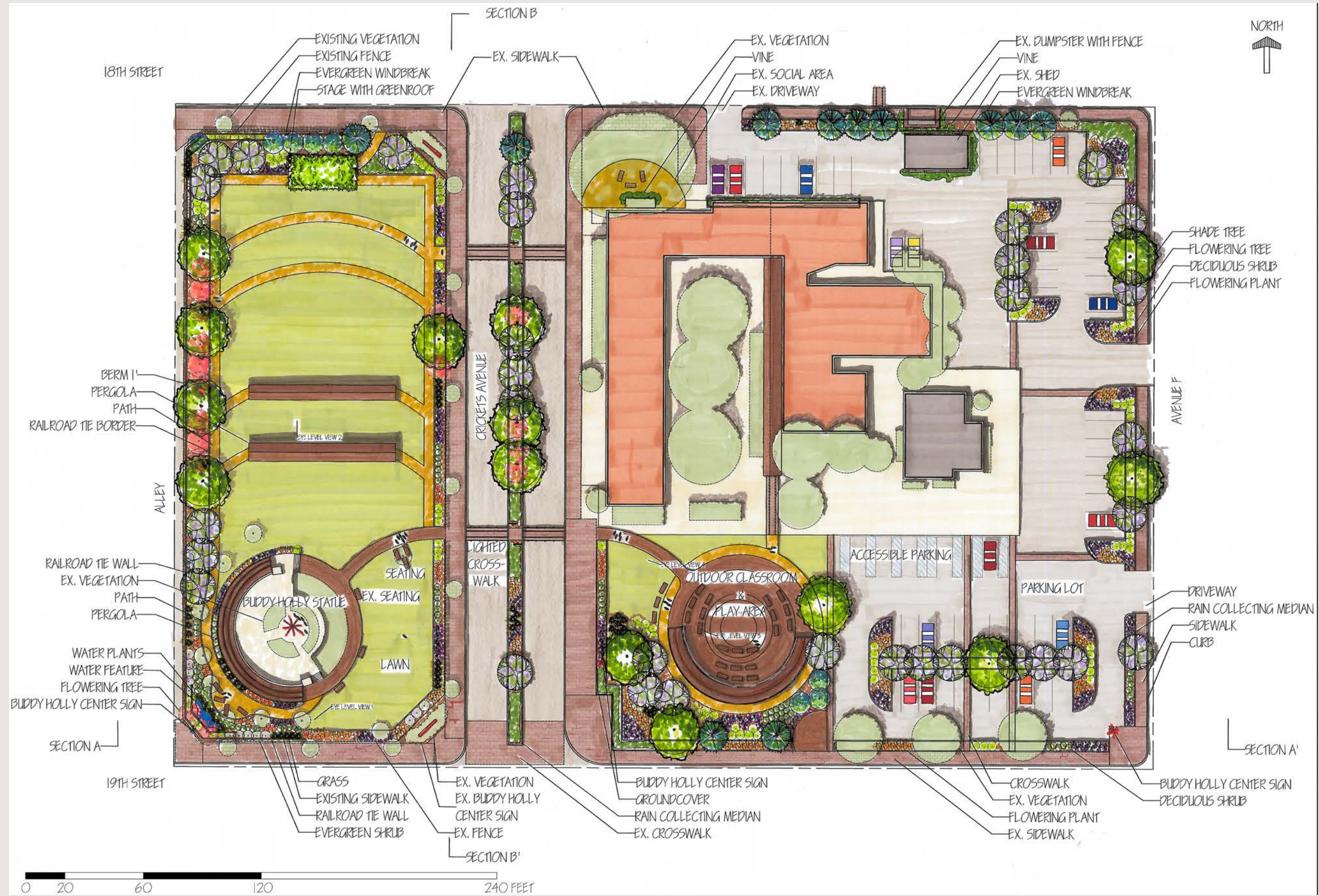
Further, I was particularly interested in the context of the site. To honor the historic railroad station aspect of the Buddy Holly Center, I chose to bring the appropriate contextual clues to the railroad past into the design by utilizing railroad ties as edging for landscape and walkways. I brought architectural elements from the center across to the statue area and repeated forms in order to bring unity to the design. I wanted to address noise and smell concerns on the site, so I utilized plantings, land form modification, and architecture to mitigate these issues. In addition, I wanted to deal with storm water runoff while addressing circulation. I utilized planted medians that function as small bio-retention zones that clean and slow down storm water runoff from the site.

## Bird's Eye View





Site Plan





Section Views



Section A-A'



Section B-B'





# Eye-level Views

View 1  
Looking south-  
west towards  
the water fea-  
ture in a shady,  
semi-private  
social area



View 2  
Looking north  
from under the  
shade of a per-  
gola serving  
dual purpose  
as a social area  
and for watch-  
ing music



View 3  
Looking north-  
west from the  
outdoor educa-  
tional center



View 4  
Looking west  
from the  
Center toward  
the Buddy  
Holly statue





# Site Plan



Scale | 1" = 1/32"

## Project Narrative

Contextually derived elements are composed to create experiential moments. These moments are expressions of the Legacy of Buddy Holly and extrapolations of Lubbock's urban development.





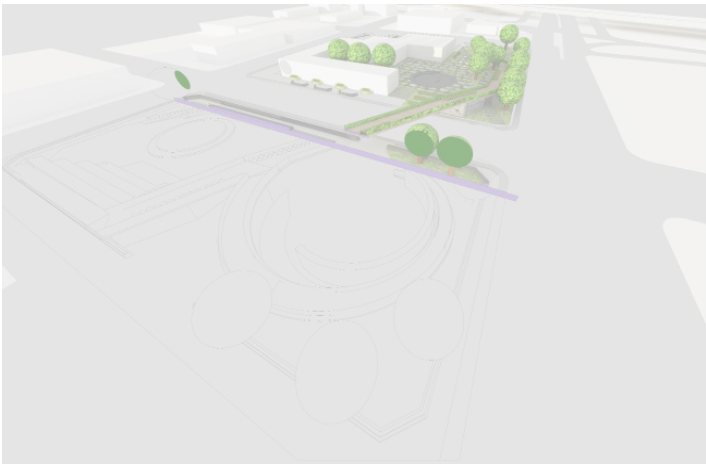
# Section



## Transverse Sectional Perspectives



Cut 1 of 4



Cut 2 of 4



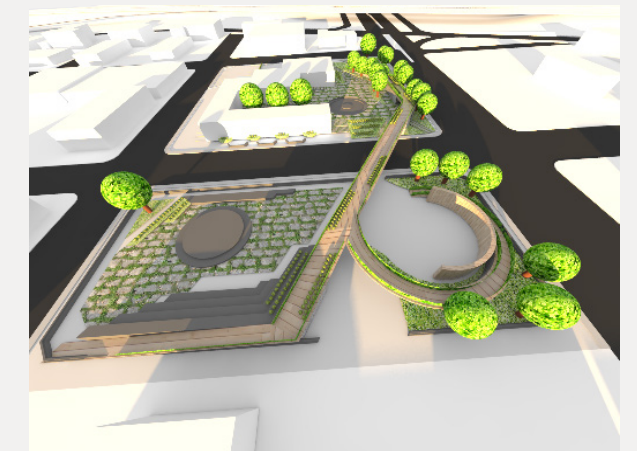
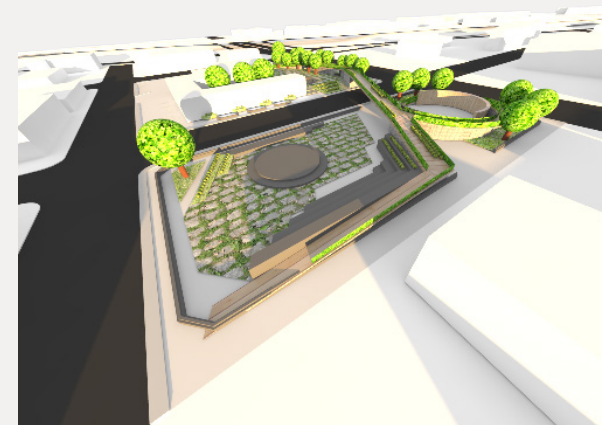
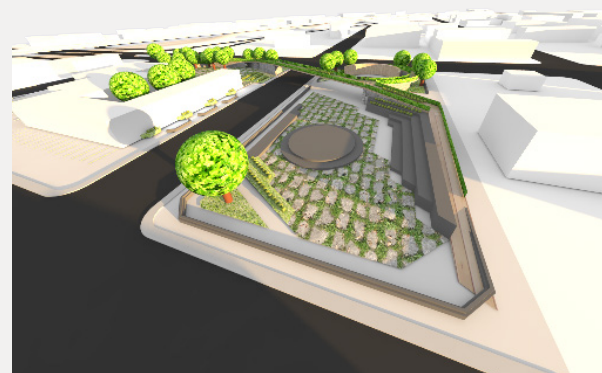
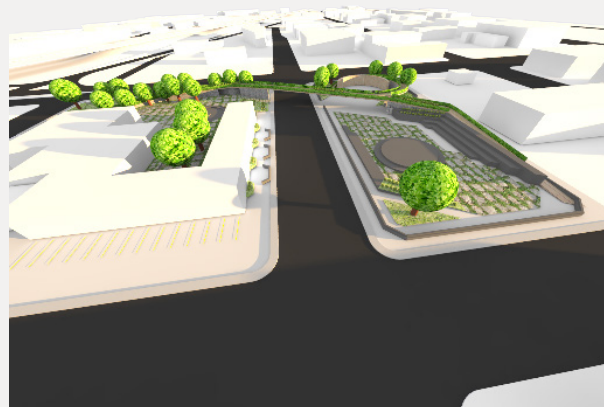
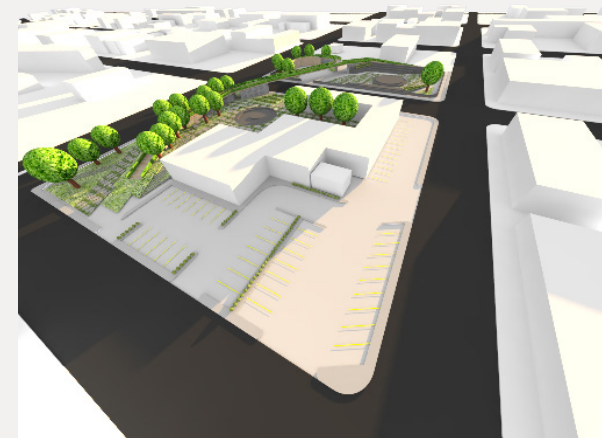
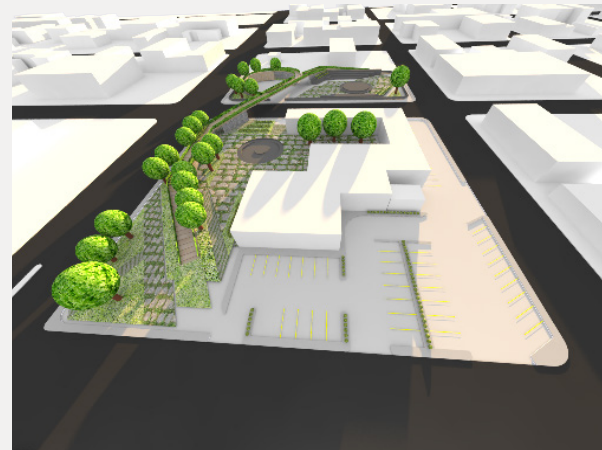
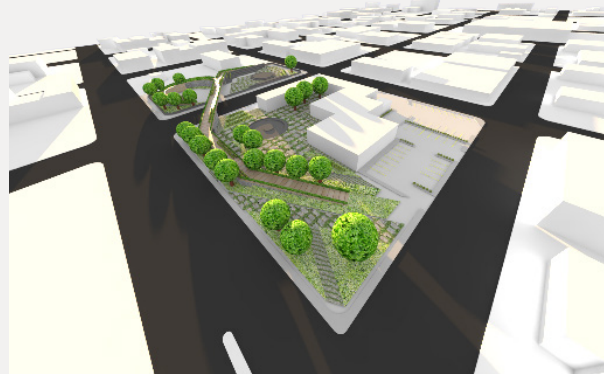
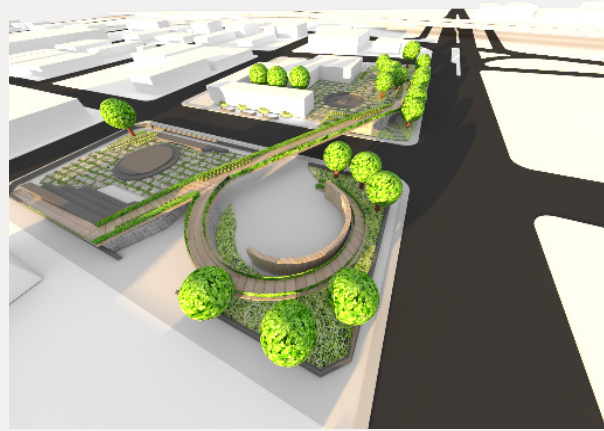
Cut 3 of 4



Cut 4 of 4

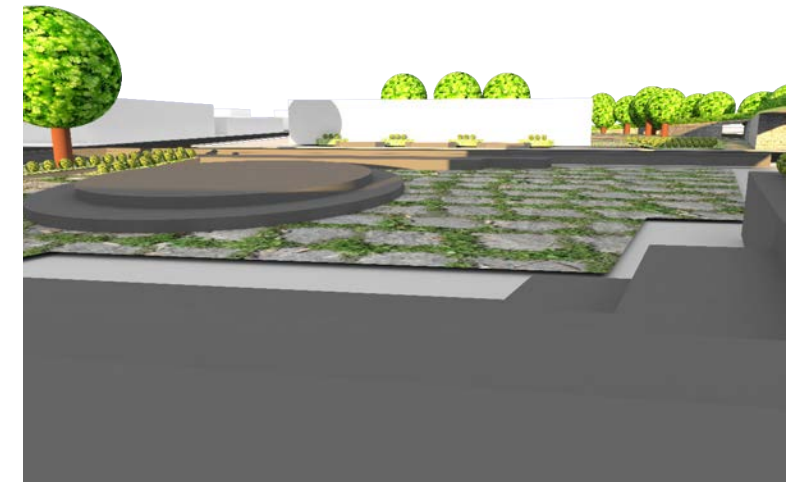
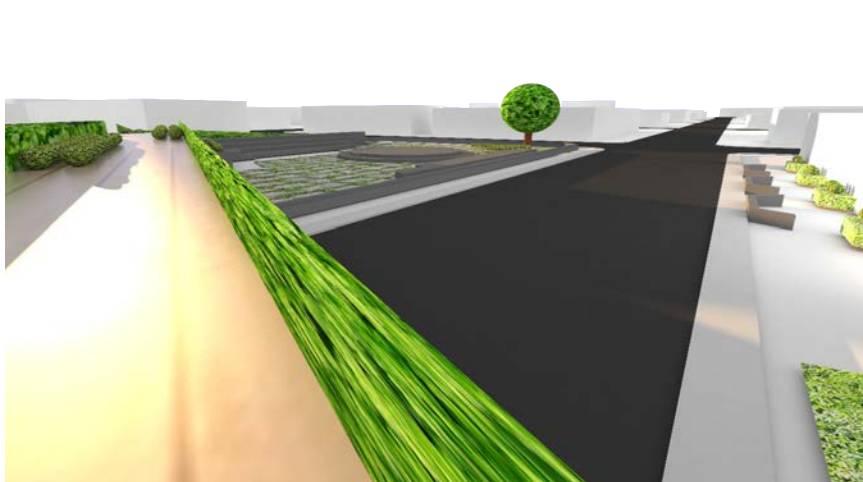
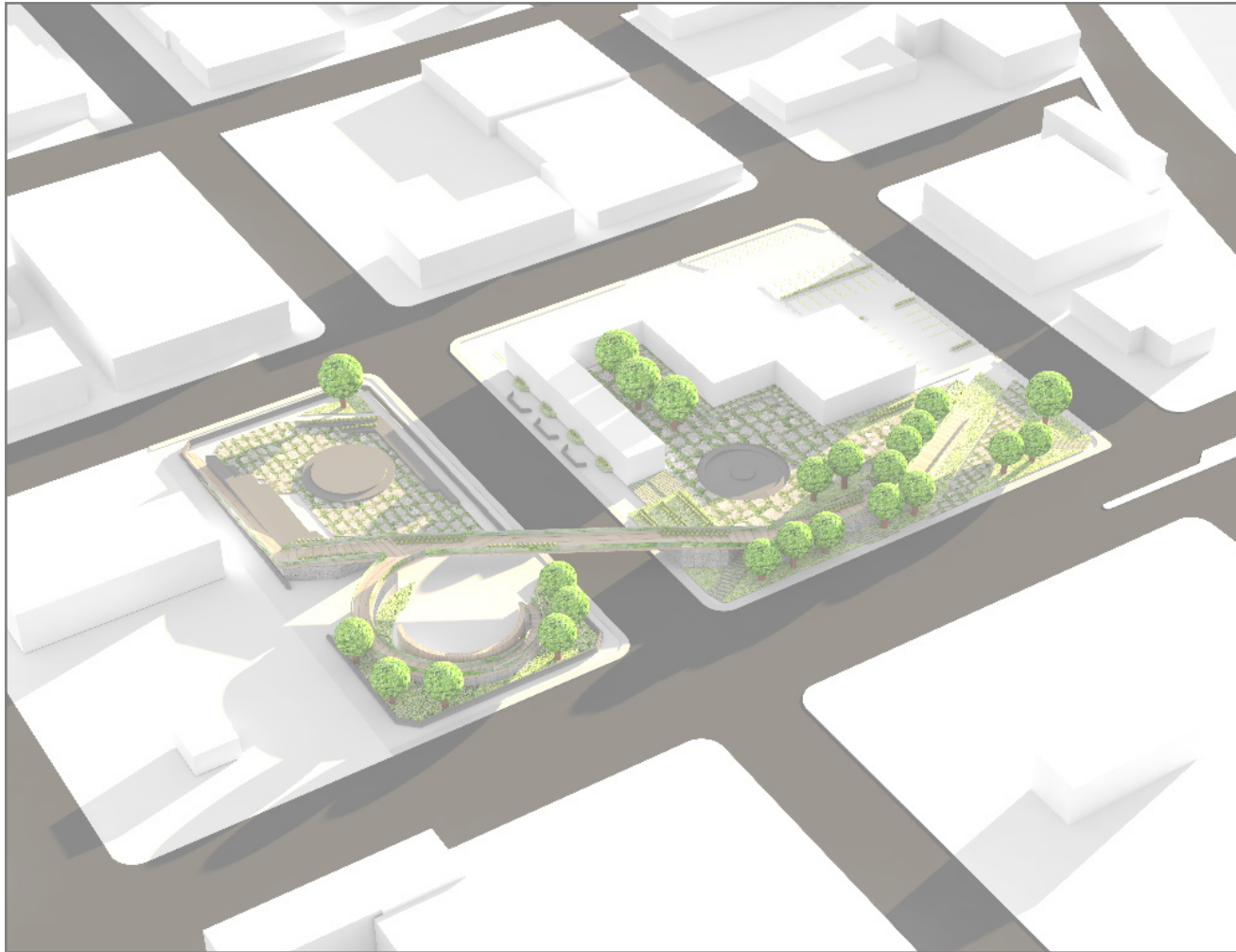


## Bird's Eye Series





## Bird's Eye and Eye Level Renderings





Landscape Performance Benefits

The following information is based off the benefits of the proposed Buddy Holly design and uses the landscape performance benefits calculators in order to determine the environmental, economic, and social benefits that were implemented to the site. According to the National Tree Benefit calculator I was able to determine that based off the planting design of my site plan that the yearly overall benefits will be \$46,833 according to the 231 trees added to the site. According to the storm water calculation the amount of storm water runoff that will be intercepted is 295,948 gallons of runoff and will remove 107,698 pounds of carbon from the atmosphere. The design will also conserve up to 24,377 kilowatt/hours of electricity by reducing the amount of heat absorb onto the site, slowing down windings reducing the amount of heat lost, and by cooling the air due to evapotranspiration which cools the air by using solar energy. The calculator did not have all the plants that I choose to place on my site as part of my design so I had to use generic broadleaf deciduous trees and broadleaf deciduous evergreen trees. This could change the amount of money, energy, storm water management, and carbon removal that would typically be removed by certain tree species. Here is one example of the cost break down per tree:

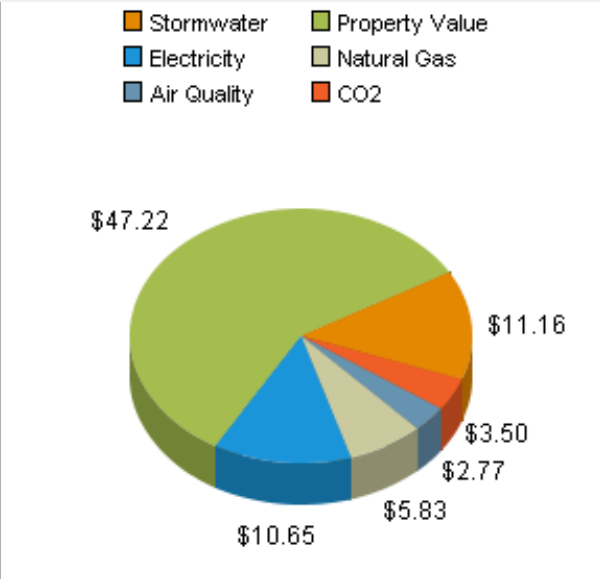
Breakdown of your tree’s benefits

This 20 inch Broadleaf Evergreen Large Other provides overall benefits of: \$81 every year.

While some functional benefits of trees are well documented, others are difficult to quantify (e.g., human social and communal health). Trees’ specific geography, climate, and interactions with humans and infrastructure is highly variable and makes precise calculations that much more difficult. Given these complexities, the results presented here should be considered initial approximations—a general accounting of the benefits produced by urban street-side plantings.

The social benefits of the site are calculated based off the amount of social space added to the site according to the square footage. By adding almost 2812.67 additional square feet to the site for purely social interactive areas increase the amount of social interaction taking place on site. These will allow a larger variety of activities and area for people to gather. It will also establish the site as a prominent cultural feature for the Lubbock area which will increase site visitation which was one of the goals I wished to achieve.

The economic value of the site I feel is clearly established using the National Tree Calculator by addressing the cost benefits gained by adding more vegetation to the site and by reducing the amount of heat/electricity used by the site. Based on these calculations of my design I can conclude that the main goals for increasing site visitation, reducing environmental impact, and generating revenue to the site was achieved.

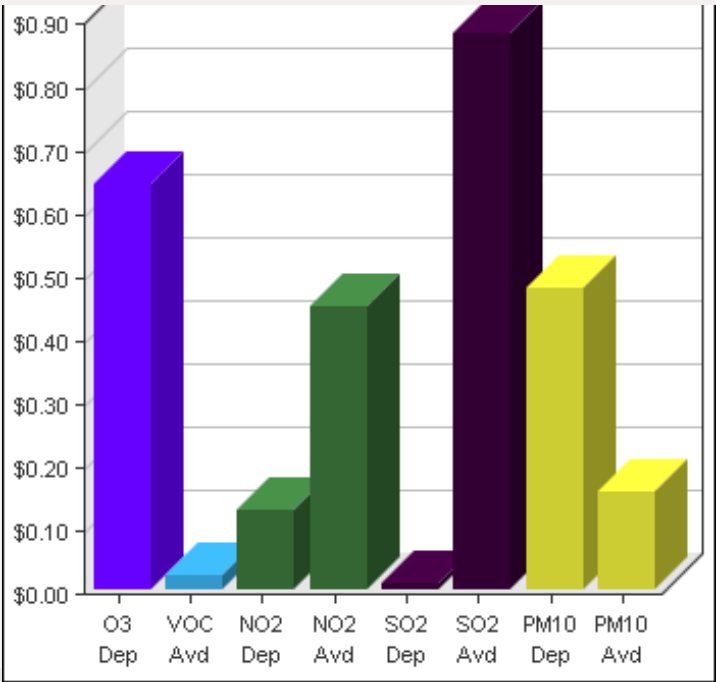
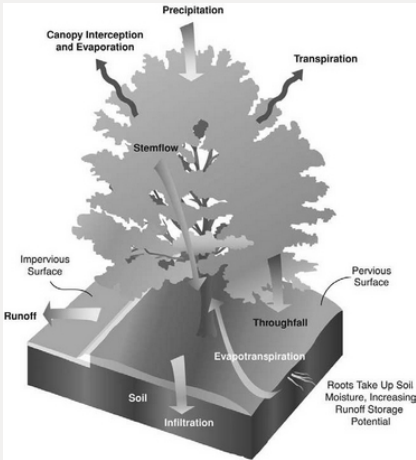


Benefits of trees do not account for the costs associated with trees' long-term care and maintenance. If this tree is cared for and grows to 25 inches, it will provide \$95 in annual benefits.  
Broadleaf Evergreen Large Other  
Broadleaf Evergreen Large Other

“Dep” stands for deposition. This is your tree absorbing or intercepting pollutants. “Avd” stands for avoided. This is your tree lessening the need for creation of these pollutants in the first place by reducing energy production needs.  
Air quality benefits of your 20 inch Broadleaf Evergreen Large Other shown in the graph at left.

- Air pollution is a serious health threat that causes asthma, coughing, headaches, respiratory and heart disease, and cancer. Over 150 million people live in areas where ozone levels violate federal air quality standards; more than 100 million people are impacted when dust and other particulate levels are considered “unhealthy.” We now know that the urban forest can mitigate the health effects of pollution by:
- Absorbing pollutants like ozone, nitrogen dioxide and sulfur dioxide through leaves
  - Intercepting particulate matter like dust, ash and smoke
  - Releasing oxygen through photosynthesis
  - Lowering air temperatures which reduces the production of ozone
  - Reducing energy use and subsequent pollutant emissions from power plants

It should be noted that trees themselves emit biogenic volatile organic compounds (BVOCs) which can contribute to ground-level ozone production. This may negate the positive impact the tree has on ozone mitigation for some high emitting species (e.g. Willow Oak or Sweetgum). However, the sum total of the tree’s environmental benefits always trumps this negative



Landscape Performance Benefits  
Social, Economic, and Environmental Benefit Calculations

Social, economic, and environmental benefits can be reaped by a retrofit design for the Buddy Holly Center. The Landscape Performance Series Benefits Toolkits, at <http://landscapeperformance.org/benefits-toolkit>, help translate intangible benefits into tangible benefits.

One of the social benefits for the Buddy Holly Center is an addition of well-designated social areas. These social spaces benefit not only to the visitors of the Center, but the public and city as well. The space allows for family, individual, and classroom usage. A total of 35,709 ft<sup>2</sup> was specifically designated as social space. The area can be used for recreation, entertainment, or education.

The economic benefits associated with the redesign are very beneficial. According to the National Tree Benefit Calculator at <http://www.treebenefits.com/calculator>, there is an annual cost benefit of \$2,791 for the addition of 55 trees. There are three major tree species used in the redesign. 31 Desert Willows (*Chilopsis linearis*) will be added with an 18” trunk. Each Desert Willow provides \$14 overall benefits per year. Each of the 14 Shumard Oaks (*Quercus shumardii*) with 20” trunks yield an annual \$144 cost benefit. The 11 Junipers (*Juniperus* species) with 15” trunks provide \$31 overall benefits per year.

According to the National Stormwater Management Calculator there will be an 82% increase in construction and maintenance total life-cycle. Site impermeable area is reduced by 56.5%, a green roof and vegetation filter strips are implemented thus drastically decreasing stormwater runoff and increasing cost benefits. With this, annual green benefits are \$6,996 and annual life cycle benefits are \$221,678 NPV.

Benefits		
	Annual Benefits (\$)	Life Cycle Benefits (\$, NPV)
	Green Benefits	Green Benefits
Reduced Air Pollutants	5	143
Carbon Dioxide Sequestration	3	95
Compensatory Value of Trees	6,875	217,852
Groundwater Replenishment	45	1,435
Reduced Energy Use	43	1,357
Reduced Treatment benefits	25	795
Total	6,996	221,678

A major benefit of the redesigned site is the positive environmental impact of the area. The environmental benefits include a decrease of stormwater runoff and carbon footprint, in addition to, conservation of electricity and reduction of oil and natural gas usage.

The National Tree Benefit Calculator determined that 41,702 gallons of stormwater runoff will be intercepted with the addition of 55 trees. Each Desert Willow intercepts 288 gallons of stormwater runoff annually. Each Shumard Oak intercepts 1,835 gallons and each Juniper intercepts 664 gallons of stormwater runoff annually. The National Stormwater Management Calculator at <http://greenvalues.cnt.org/national/calculator.php> reflects a 430.2% decrease in stormwater runoff. According to the calculator at <http://greenvalues.cnt.org/national/calculator.php>, overall benefits, and pre-retrofit versus post-retrofit comparisons are listed below:

Coefficients and Runoff					
	Predevelopment	Conventional	Green	Predevelopment to Conventional Difference (%)	Conventional to Green Difference (%)
Average Annual Rainfall					
Total Runoff (in)	13.21	12.92	9.98	-2%	-23%
Total Runoff Volume (ft³)	164,509	160,828	124,314	-2%	-23%
Cumulative Abstractions (in)		1.22	3.48		185.83
90% Storm					
Total Runoff (in)	0.39	0.3	0	-22%	-99%
Total Runoff Volume (ft³)	4,822	3,767	45	-22%	-99%
Cumulative Abstractions (in)		0.5	0.13		-74.36
CN	91	88	68		
Initial Abstractions (in)		0.27	0.94		252.21

According to the Green Roof Calculator at [http://greenbuilding.pdx.edu/GR\\_CALC\\_v2/grcalc\\_v2.php#retain](http://greenbuilding.pdx.edu/GR_CALC_v2/grcalc_v2.php#retain), a 7.2” increase in evapotranspiration and a 60% decrease in rain runoff was determined with a 35’ x 17’ (595 ft2) stage that will be constructed. Below shows the results for usage of a 100% new green roof versus a dark roof, no irrigation, conditions are similar to El Paso, Tx, growing media depth of 2 inches, and leaf area index of 1:

	Average Sensible Heat Flux to the Urban Environment (W/m²)	
	Dark Roof	100% Green Roof System
Annual Average:	61.6	58.8
Summer Average:	54.1	58.1
Summer Daily Peak Avg.:	-120.2	128.1

	Annual Roof Water Balance (in)	
	Conventional Roof	100% Green Roof System
Precipitation:	6.0	6.0
Evapotranspiration:	—	7.2
Net Runoff (2):	6.0	0.1

According to the National Tree Benefit Calculator, there will be an atmospheric carbon reduction of 41,003 pounds. Using the Construction Carbon Calculator at <http://buildcarbonneutral.org>, a net embodied CO2 of 305 metric tons was approximated as shown below:

Total Square Feet	11.896
Stories Above Grade	1
Stories Below Grade	0
System Type	mixed
Ecoregion	Great Plains
Existing Vegetation Type	Previously Developed
Installed Vegetation Type	Shrubland
Landscape Disturbed (SF)	7,000
Landscape Installed (SF)	15,000

According to the National Tree Benefit Calculator each Desert Willow conserves 63 Kilowatt/hour of electricity and reduces oil or natural gas consumption by 3 therms. Each Shumard Oak conserves 227 Kilowatt/hour of electricity and reduces oil or natural gas consumption by 7 therms. Each Juniper conserves 69 Kilowatt/hour of electricity and reduces oil or natural gas consumption by 3 therms.

With the redesign of the Buddy Holly Center, there are many social, economic, and environmental benefits including cost savings, a decrease of stormwater runoff and carbon footprint, as well as, conservation of electricity and reduction of oil and natural gas usage.



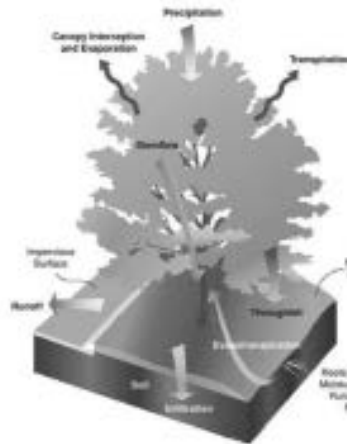
## Landscape Performance Benefits

1|The benefactor of utilizing Shumard Oak trees in this proposal provides the developer a monetary benefit. This design implements 21 Shumard Oaks to maximize the opportunity of producing saving.



This 24 inch Shumard oak provides overall benefits of: \$206 every year. While some functional benefits of trees are well documented, others are difficult to quantify (e.g., human social and communal health). Trees' specific geography, climate, and interactions with humans and infrastructure is highly variable and makes precise calculations that much more difficult. Given these complexities, the results presented here should be considered initial approximations—a general accounting of the benefits produced by urban street-side plantings.

2| Implementation of an imbedded Storm water harvesting system, beneath a vegetative walkway, accompanied by with Shumard Oaks allows the proposal to create a natural readapted used for rain water.



Your 24 inch Shumard oak will intercept 7,718 gallons of storm water runoff this year.

Urban storm water runoff (or "non-point source pollution") washes chemicals (oil, gasoline, salts, etc.) and litter from surfaces such as roadways and parking lots into streams, wetlands, rivers and oceans. The more impervious the surface (e.g., concrete, asphalt, rooftops), the more quickly pollutants are washed into our community waterways. Drinking water, aquatic life and the health of our entire ecosystem can be adversely effected by this process. Trees act as mini-reservoirs, controlling runoff at the source.

Trees reduce runoff by:

Tree, C., & Tree Experts, D. (2014, February 12). National Tree Benefit Calculator. Retrieved May 4, 2015, from <http://www.treebenefits.com/calculator/ReturnValues.cfm?climatezone=Interior West>

- Intercepting and holding rain on leaves, branches and bark
- Increasing infiltration and storage of rainwater through the tree's root system
- Reducing soil erosion by slowing rainfall before it strikes the soil

3| An economic benefit produced from the use of Shumard Oaks is the incline in property value over time. The Buddy Holly Center is perceived as a historical remnant and the property is priceless but through the proposal it is enhanced slightly.



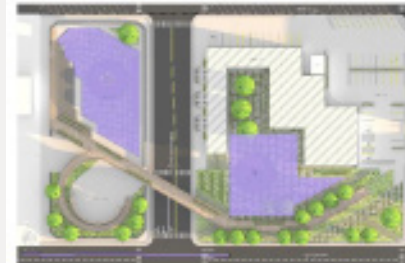
Located in front of a small commercial business, this 24 inch Shumard oak will raise the property value by \$148 this year.

Trees in front of single family homes have a greater property value benefit than those in front of multi-family homes, parks or commercial properties. Real estate agents have long known that trees can increase the "curb appeal" of properties thereby increasing sale prices. Research has verified this by showing that home buyers are willing to pay more for properties with ample versus few or no trees.

The 24 inch Shumard oak you selected will add 628 square feet of LSA this year.

In subsequent years it will add more, and the property value will increase accordingly

4| Calculations of readapting the under-utilized open spaces into designated social spaces increases opportunity of the social encounters in the boundaries of the site. The creation of spaces along the edge condition increases the interaction of a pedestrian with the site.



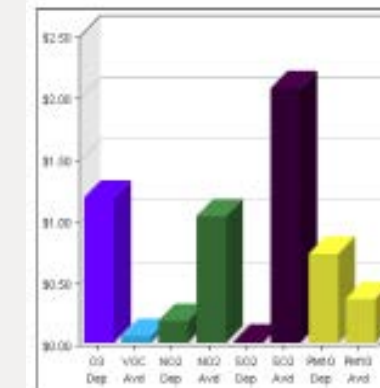
Entire Site Area| 15000

Designated Area to Social Spaces| 2500 Sq. Ft.

16 Percent Incline in spaces with socially interactive characteristics

Tree, C., & Tree Experts, D. (2014, February 12). National Tree Benefit Calculator. Retrieved May 4, 2015, from <http://www.treebenefits.com/calculator/ReturnValues.cfm?climatezone=Interior West>

5|Shumard Oaks increase the quality of air in the surrounding area and creates a micro-climate on the site. The acclimatized spaces naturally attract users from the city to benefit the reduction of toxins and pollutants.



Air quality benefits of your 24 inch Shumard oak shown in the graph at left.

Air pollution is a serious health threat that causes asthma, coughing, headaches, respiratory and heart disease, and cancer. Over 150 million people live in areas where ozone levels violate federal air quality standards; more than 100 million people are impacted when dust and other particulate levels are considered "unhealthy." We now know that the urban forest can mitigate the health effects of pollution by:

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