BASELINE DATA
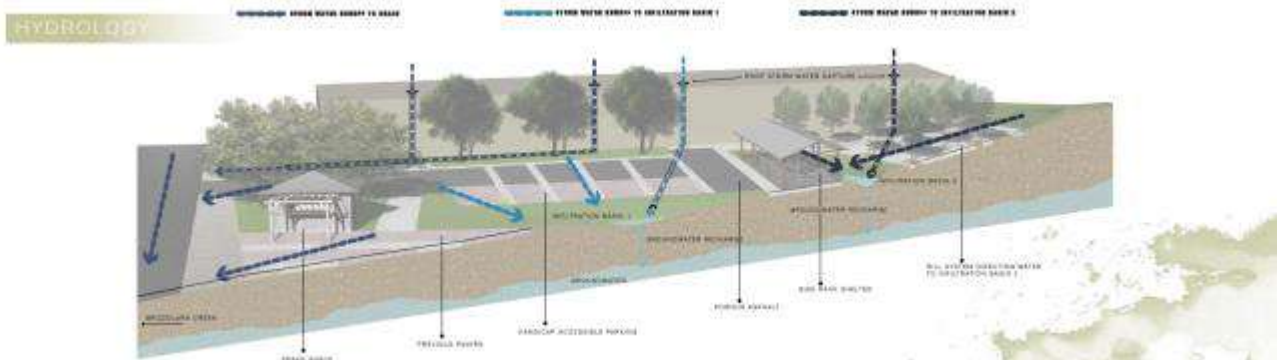### REVIEW, COLLECT, CALCULATE
PROJECT 2

image from: LA 402, fall 2014 student work

introduction

The second project in the technical module will focus on establishing baseline data for specific areas of campus. This project is intended for you to – get a handle on how campus landscapes are currently performing, understand basic methodology of calculating performance measures, and to tease out potential campus sites for future design efforts.

Before starting this work, it is important to understand that there are not simple or direct methods for calculating baseline data. While there are some helpful internet calculators to use, most of the work will rely on emulating methods established in the case studies. This work requires an ability to dissect case studies and an ability to work through problems to a point of resolution.

scope of work

Working in teams of two and threes (one team of three, five teams of two), you are to establish baseline data for a pair of campus sites. There are six pairs of sites and teams will select pairs on Wednesday.

STEP 1
Review your site(s) in person and refine site boundaries. Initial outlines on Google Maps are based on aerial maps only. Adjust boundaries to include peripheral areas, walkways, drainage paths or other aspects that make your site. Using an online map or resources available on Polylearn, create a precise outline for your sites. Use as accurate base map as you can find and take as accurate measurements as you can given the time constraints of the project.

STEP 2
Review the list of proposed metrics to evaluate as well as various methodologies for calculating performance. Review the Landscape Performance: A Guidebook for Metric Selection. Additional resources include review of the Case Studies, the Fast-Fact library or the LAF Guidebook. Select 4-6 metrics to analyze for both of your sites. Sites were paired to establish 'compare and contrast' scenarios across two projects.

STEP 3
Calculate performance. You are to keep a record of your methodology and your sources. Establish an estimate for the selected metrics and record the outcomes.

STEP 4

Create a simple graphic on 11x17 sheets. The first page should clearly identify your site, site boundaries and outcomes. Use subsequent pages to document the process and methods utilized.

deliverables + schedule
The following is required:
1. A 11x17 package as noted above..
2. Participation in the peer-review session on Monday, October 10th.

The following dates should serve as a guideline for your work:

Friday, October 7	Desk crits to review sites, preliminary metric selections and methodology
Monday, October 10	Peer-review session and desk crits.
Wednesday, October 12	Project due for presentation and discussion

project goals
1. to describe basic landscape performance metrics and methodologies.

2. to establish landscape performance baseline conditions for campus sites

metrics

Total Square Footage of Refined Site (Everyone Must complete these)
Square Footage of Individual Surfaces
  -Materials (Asphalt, Concrete, Lawn, Ground Cover, etc.)
  -Impermeable vs. Permeable
  -Hardscape vs. Softscape
  -Uses – Parking/Car/Bike vs. People/Social

Environmental Metrics

Plant Facts:
-Water Use (high, medium, low)
-Ecological Value (food, pollination, habitat, etc.)
-Lawn, Ground Cover, Shrubs, Trees (square footage or quantities)

Tree Facts:
-Storm Water
-Carbon Sequestration
-Shade
-Air Pollutant Removal

Water Facts:
-Annual Precipitation
-Annual Volume of Storm Water
-Average Storm Size
-Volume of Water in Average Storm Size

Transportation Facts:
-Automobile lanes and parking
-Bike Lanes and bike parking
-Walkways

Social Metrics

Recreational/Social Value:
-Seating
-Play / Recreation
-Study spaces
-Number of Visitors / Overall Use

Educational Value:
-Signage
-Teachable moments

Awareness, Access + Safety:
-Directional signage
-Lighting
-Accessible features

BASELINE DATA

SOCIAL METRICS

Seating: very limited, no benches along entire length of curb or shoulder

play/recreation: opportunity to incorporate animals in irrigation testing field, animal watching/birdwatching

Study spaces: Via Carta leads to botanic garden that has study spaces, none along road, not an ideal place for study space anyway due to high traffic and noise, safety concerns

Number of visitors/overall use: roughly 2,000 spaces, filled to near capacity on weekdays

TRANSPORTATION METRICS

2/3 lane road, one lane each way
consistent bike lane on both sides of the road
Site terminates at a bus stop
Feeds into 5 cross streets
4 Stop signs
16 Crosswalks
Multiperson sidewalks on both sides through entire site
Direct link to 3 parking lots, one with 95 spots, one with 60 spots, one with 15 spots
3 small bike racks, one large on site
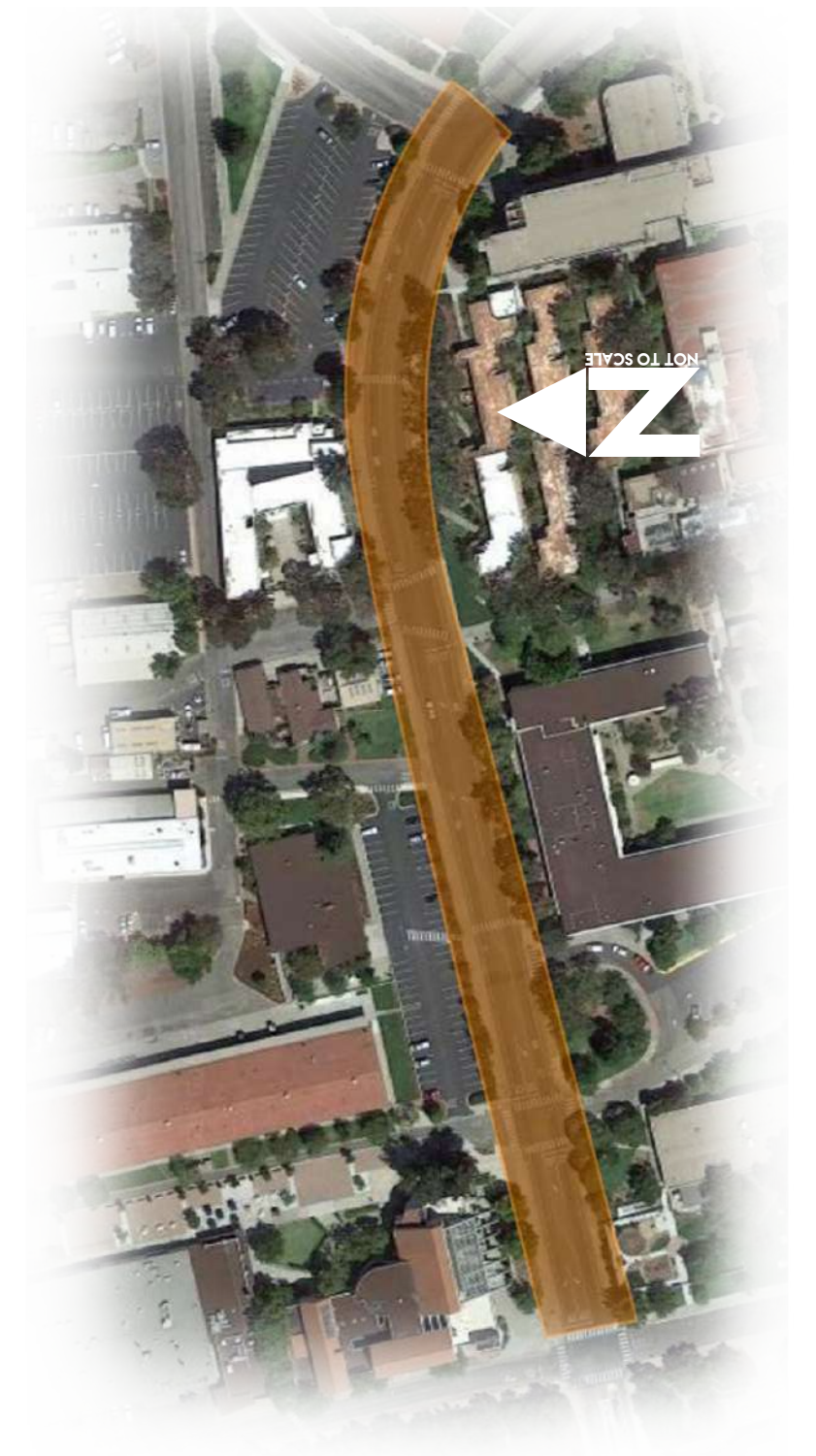
ENVIRONMENTAL METRICS

Water Facts:
Annual average precipitation: 19.02 inches
Volume of water in average storm: 0.13 cubic feet per second (cfs) rational method
Soil: Los Osos loam classified as very high surface runoff
1% annual flood hazard along via carta

PLANT METRICS

Plant Species: Manzanitas, Floss Silk Oaks, Protea Pincushion, California Sycamores, Jacarandas

Water Requirements: Low to Mid, primarily CA natives or similarly drought tolerant plants

NOT TO SCALE

ZACHARY STREED.RYAN CHASE

BASELINE DATA

SOCIAL METRICS

Seating: very limited, no benches along entire length of curb or shoulder

play/recreation: opportunity to incorporate animals in irrigation testing field, animal watching/birdwatching

Study spaces: Via Carta leads to botanic garden that has study spaces, none along road, not an ideal place for study space anyway due to high traffic and noise, safety concerns

Number of visitors/overall use: roughly 2,000 spaces, filled to near capacity on weekdays

TRANSPORTATION METRICS

2 lane road, single dividing line
Single bike lane, consistent through site
Site has one dead end for the public
Feeds into 2 cross streets
No Stop signs
2 Crosswalks
Single person/Dual sidewalk on one side, inconsistent and terminates before end of site

# ENVIRONMENTAL METRICS

Water Facts:
Annual average precipitation: 19.02 inches
Volume of water in average storm: 0.13 cubic feet per second (cfs) rational method
Soil: Los Osos loam classified as very high surface runoff
1% annual flood hazard along via carta

PLANT METRICS

Plant Species: Pines, Manzanitas, Chapparal Brush
Water Requirements: Low to Mid, primarily CA natives or similarly drought tolerant plants

N
NOT TO SCALE
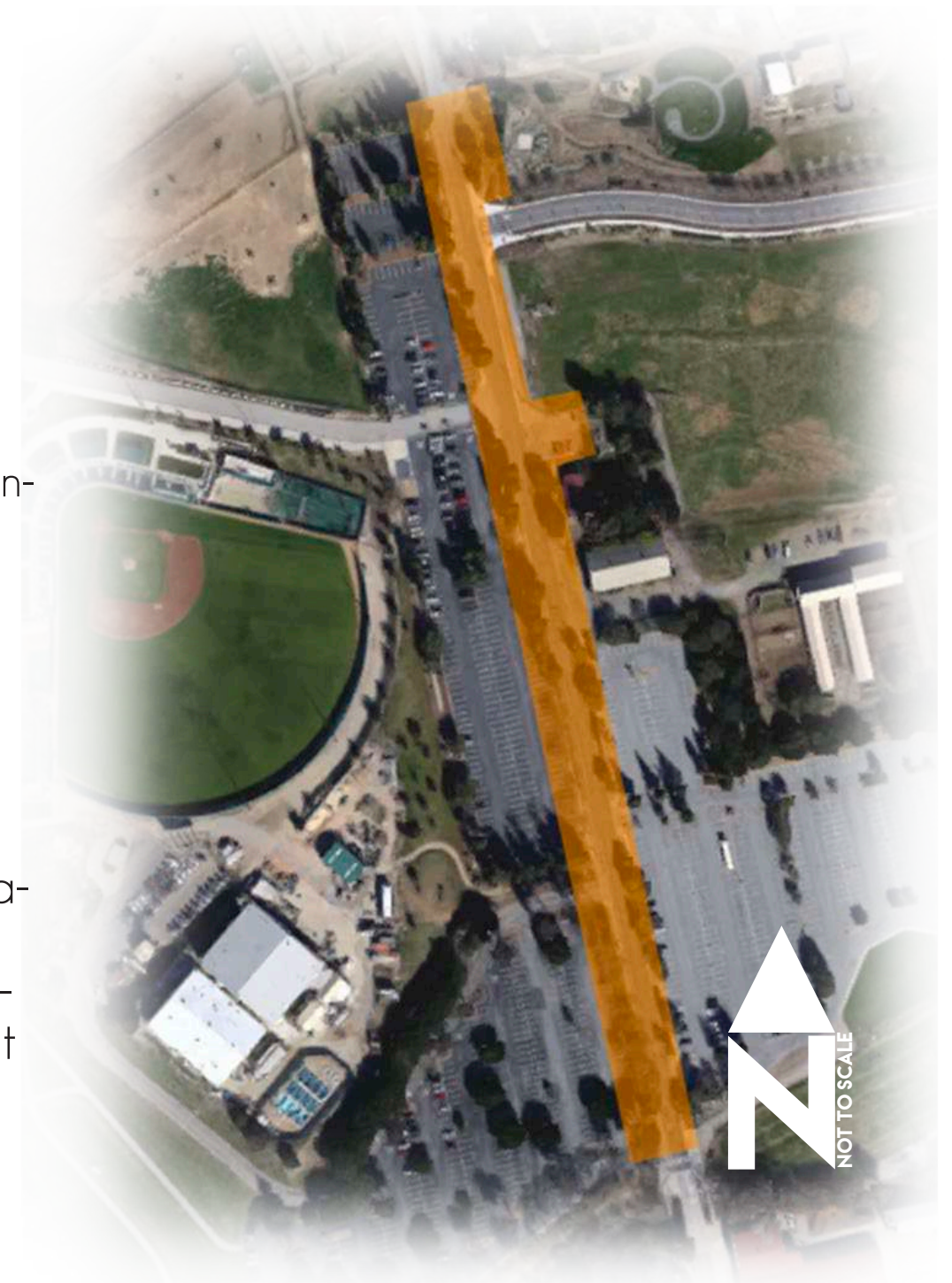
BASELINE DATA
PRECEDENTS IN LANDSCAPE PERFORMANCE

Two Study Sites: Campus Way & Mustang Way

Overall Metrics:

Total Square Footage: 126, 250 sq. ft.
      Campus Way - 18,750 South Perimeter: 107,500

Materials - Concrete, LID Lawn line edges, Tree Canopies

Surfaces - S.P. 70%/30% imp/perm | C.W. 58%/42% imp/perm

Hardscape vs. Softscape - 64% hard vs. 36% soft

Uses- Minimal parking, mostly used for tranportation via bike or
      car. No spaces for social gatherings

(1) Environmental Metrics:

Plant Facts:
- Water Use - Low
- Ecological Value - Trees for bird nests
- Lawn, Ground Cover - 25% Ground cover

Tree Facts:
- Storm Water - 1995 gal/yr
- Carbon Sequestration - 2,200 lbs CO_2
- Shade - Full Shade
- Air Pollutant Removal - Ozone, Nitrogen Dioxide, Sulfur Dioxide

Water Facts:
- Annual Precip - 20 in./yr
- Annual Volume of Storm Water - n/a
- Average Storm Size - 2in per storm
- Volume of Water in Avg. Storm Size n/a

Transportation Facts:
- Automobile lanes in parking- 1-lane, no parking
- Bike Lanes and Bike parking- bike lanes only
- Walkways- 2 sidewalks

(2) Environmental Metrics:

Plant Facts:
- Water Use - Low
- Ecological Value - Low
- Lawn, Ground Cover - Low

Tree Facts:
- Storm Water - n/a
- Carbon Sequestration - n/a
- Shade - n/a
- Air Pollutant Removal - n/a

Water Facts:
- Annual Precip - 20in./yr
- Annual Volume of Storm Water - n/a
- Average Storm Size - 2in. per storm
- Volume of Water in Avg. Storm Size - n/a

Transportation Facts:
- Automobile lanes in parking- 2-lane, minimal parking
- Bike Lanes and Bike parking - bike lanes, minimal parking
- Walkways - 2 sidewalks

(1) Social Metrics:

Recreational/Social Value:
- Seating - n/a
- Play/Recreational - n/a
- Study Spaces - n/a
- Number Visitors/Overall Use - low

Educational Value:
- Signage - n/a
- Teachable Moments - 1 instance

Awareness, Access + Safety
- Directional Signage - minimal
- Lighting - poor lighting, not safe at night
- Accessible Features - n/a

(2) Social Metrics:

Recreational/Social Value:
- Seating - low
- Play/Recreational - n/a
- Study Spaces - n/a
- Number Visitors/Overall Use - med

Educational Value:
- Signage - n/a
- Teachable Moments - med

Awareness, Access + Safety
- Directional Signage - low
- Lighting - poor lighting
- Accessible Features - even grade

Joe Ragsdale | LA 402 | Fall 2016
Nate Noblitt & Nathan Torres

Michael Lenahan
Ileana Konvisor

LA 402

Poly Canyon Village
Site 1
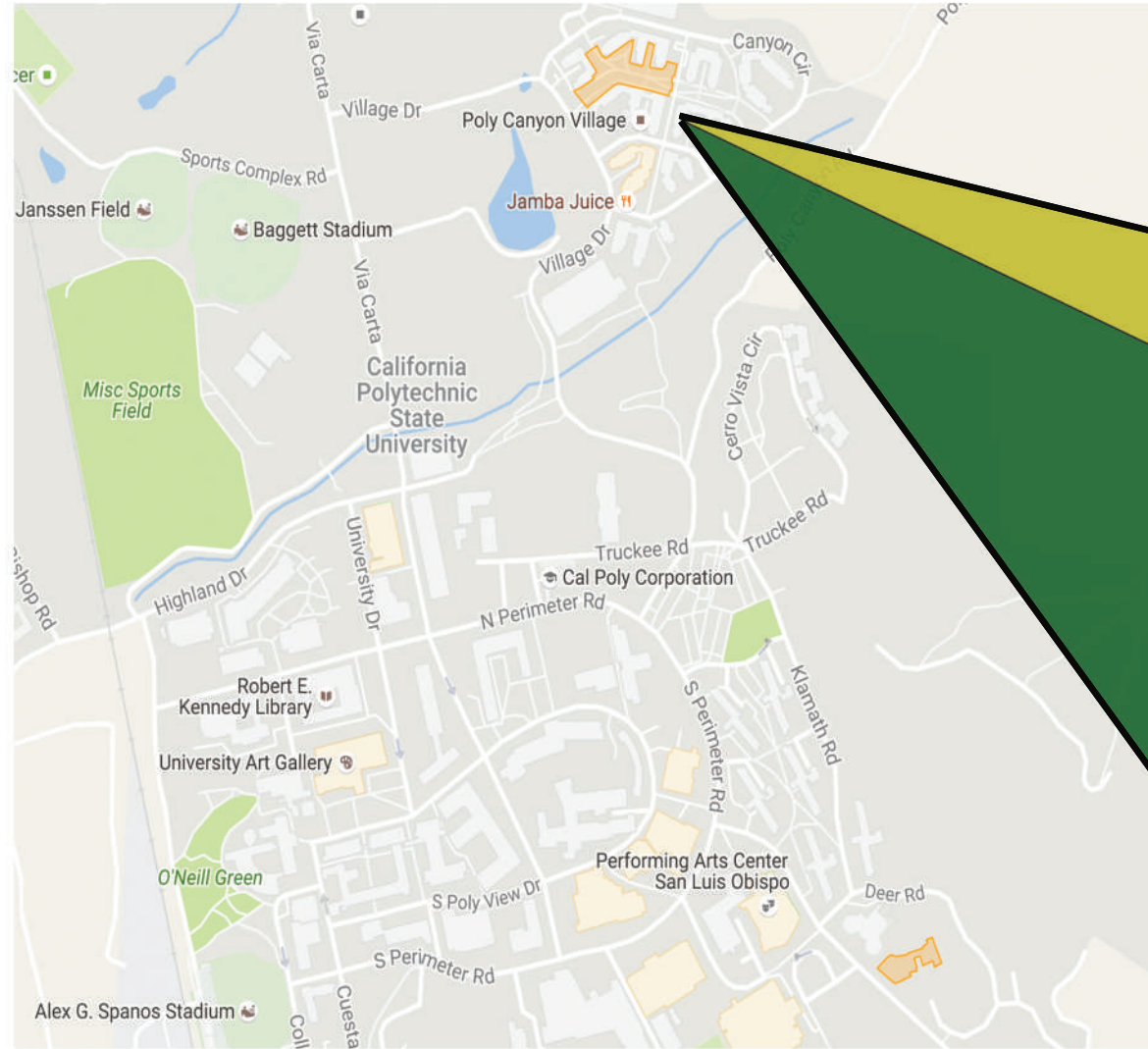
~**85%** Softscape

~**15%** Hardscape
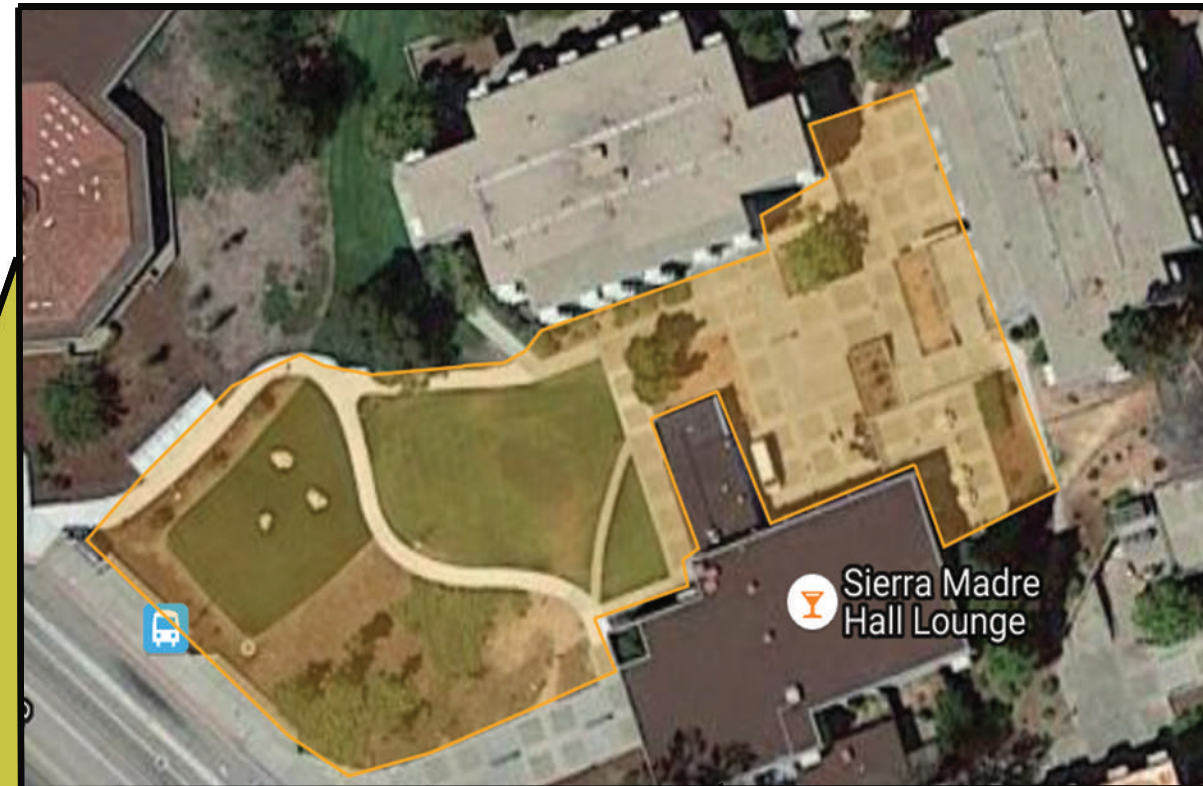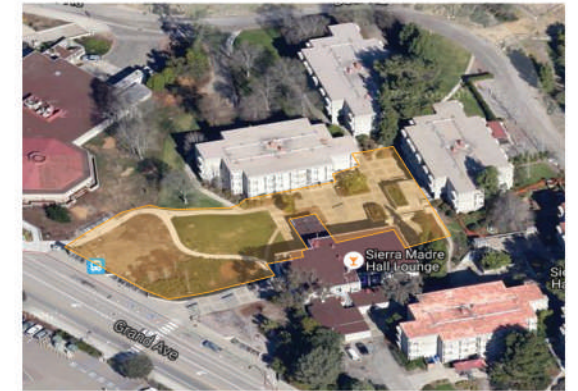
0% lawn space for seating

Over **1000** students living along the perimeter of the site

8 entrances to buildings

~**80%** of the time the site is used for walking by students

Sierra Madre Dorms
Site 2

90% of the time the site is used is student walking

~45% Softscape
~55% Hardscape

Most common material is **concrete**

~35% available lawn space

Climate:

San Luis Obispo recieves an average of 31 inches of rain per year.
Over the course of a year the temperature typically varies from 40°F to 79°F.
There is an average of 49 days of percipitation each year.
There is an average of .63 inches of rain per storm.

PCV Dorms

- Area of Site: 70,000 square feet
- Volume of rain: 180,833 cubic feet/year
- Volume of rain: 3,690 cubic feet/storm
- 25 trees on site
- 3 Storm Drains
- 1 Continuous Swale
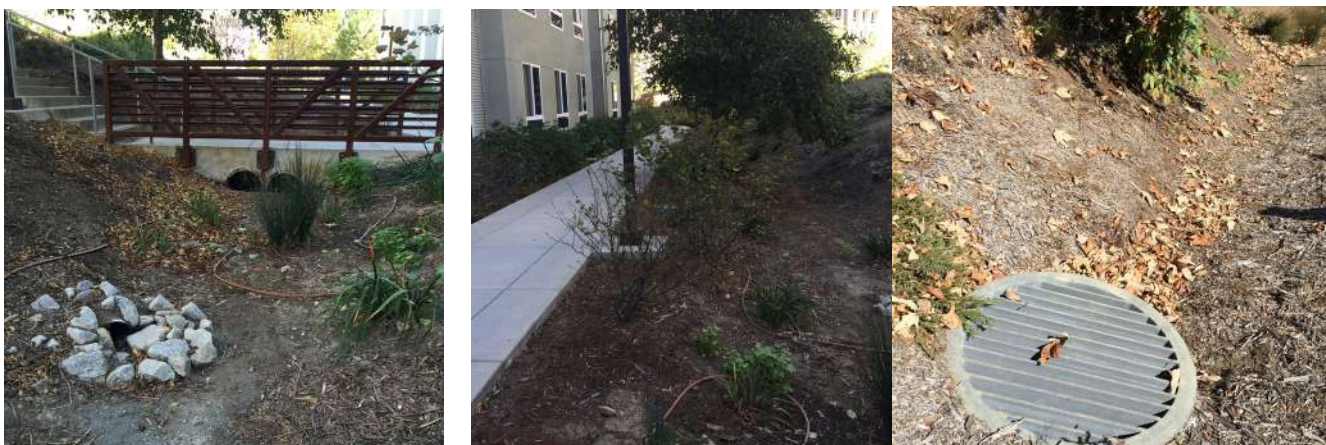
Sierra Madre Dorms

- Area of Site: 32,000 square feet
- Volume of rain: 82,667 cubic feet/year
- Volume of rain:1,687 cubic feet/storm
- 3 trees on site
- 5 Storm Drains
- No Swales

Plant Invantory
PCV Dorms

Heteromeles arbutifolia
Sunset Zones 5 - 9 and 14 - 24.
Exposure: Full Sun to Partial Shade.

Quercus agrifolia
Sunset Zones 7 - 9 and 14 - 24.
Exposure: Full Sun to Partial Shade.

Rhamnus californica
Sunset Zones   3a-10, 14 - 24.
Exposure: Full Sun, Deep Shade, Light Shade

Salvia clevelandii
Sunset Zone 8-9, 12 - 24
Exposure: Full Sun

Juncus patens
Sunset Zones 4-9, 14-24
Exposure: Sun or Shade

Arctostaphylos pacific mist
Sunset Zones 1 - 24
Exposure: Full Sun, Part Shade

Fremontodendron californicum
Sunset Zone 4 - 12
Exposure: Full Sun

Platanus Racemosa
Sunset Zones 4 - 24
Exposure: Full Sun

Plant Invantory
Sierra Madre Dorms

Callistemon speciosus
Sunset Zones 8 - 11
Exposure: Full Sun, Part Shade

Magnolia grandiflora
Sunset Zones 7 - 9
Exposure: Full Sun

Poa pratensis
Sunset Zones 7 - 10
Exposure: Full sun

Arbutus unedo
Sunset Zones 4 - 9
Exposure: Sun or Semi-shade
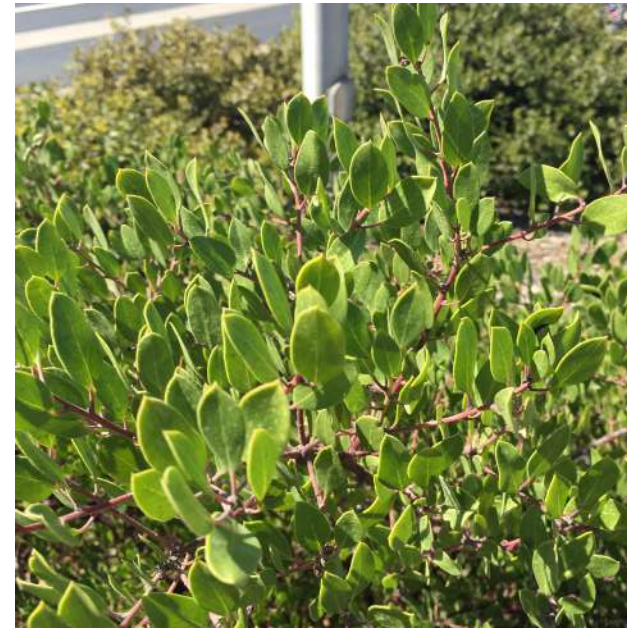

Aloe vera
Sunset Zones 7 - 10
Exposure: Full Sun

Liquidambar styraciflua
Sunset Zones 5 - 9
Exposure: Full Sun

Arctostaphylos pacific mist
Sunset Zones 1 - 24
Exposure: Full Sun, Part Shade

Pinus ponderosa
Sunset Zones 3 - 7
Exposure: Full Sun

Recreational/Leisure

Poly Canyon Village	Sierra Madre Dorms
2,670 residents housed total ~1000 of those residents live in buildings that border the site	Unknown number of residents total ~600 residents live in the buildings that border the site
0% lawn space for seating 3 Gathering Spaces 8 Benches 1 Bike Rack (fits ~10 bikes)	~35% of site is lawn space for sitting/recreational activity 6 Gathering Spaces - 2 softscape/4 hardscape 3 Benches 2 Bike Racks (~20 bike spaces)
Overall Use of Space: ~80% Students- Walking ~15% Housing Maintenance Use ~ 5% Students- Bikers	~ 90% Students- Walking ~ 10% Housing/Mainenance Use
~85% Softscape ~15% Hardscape	~ 45% Softscape ~ 55% Hardscape

Safety/Sustainability/Education

| Poly Canyon Village	Sierra Madre Dorms
- Pathway system can be misguiding, less efficient - Use of energy efficient outdoor lights - Some sinage for handicap access - Drip-line irrigation	- Pathways are more simple - High use of concrete, creates more risk of injury - Energy efficient outdoor lights - Some sinage for handicap

- Teachable moments on site include:
   - 1 nature sign about habitat
   - Study use of native plant and plant design
   - A Swale system
   - Learn about grade change regarding ADA
	- Some native plant use
	- Topography in softscape
	- Enough room in some parts to fit a classroom

1 Blue 911 call tower located just off the site 19 Light Poles 1 Educational Sign 8 Entrances to the connected buildings	0 Blue 911 call towers ~17 Light Posts 0 Educational Signs 6 Entrances to the connected buildings

METRICS

LANDSCAPE PERFORMANCE IN DEXTER LAWN & THE ENGINEERING LAWN AND PLAZA

LIBBY JACOBSON, BLAKE RAWLINGS, SILVIA VIOLA

LA 402

FALL 2016
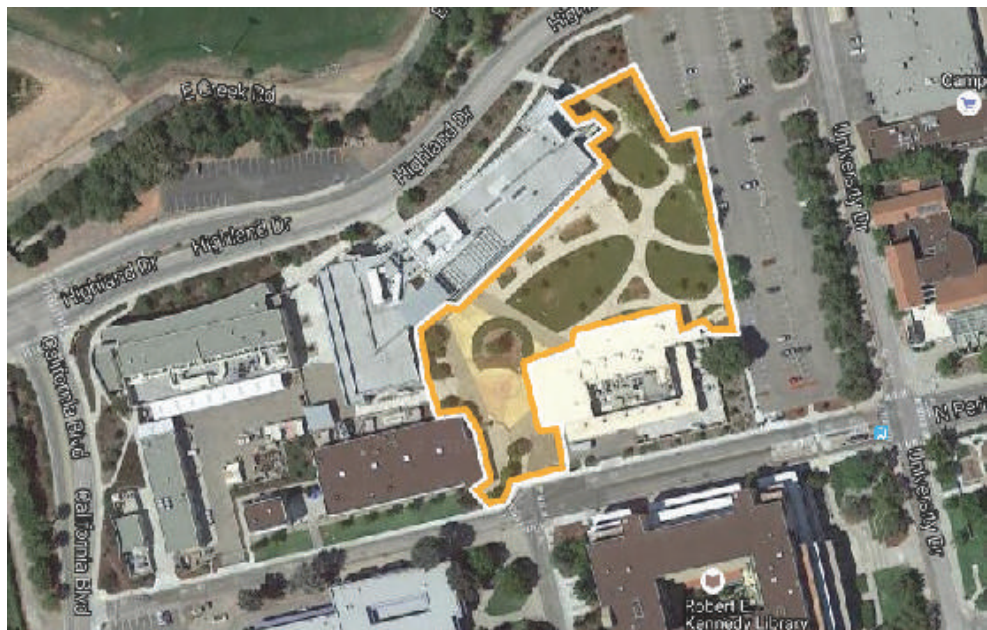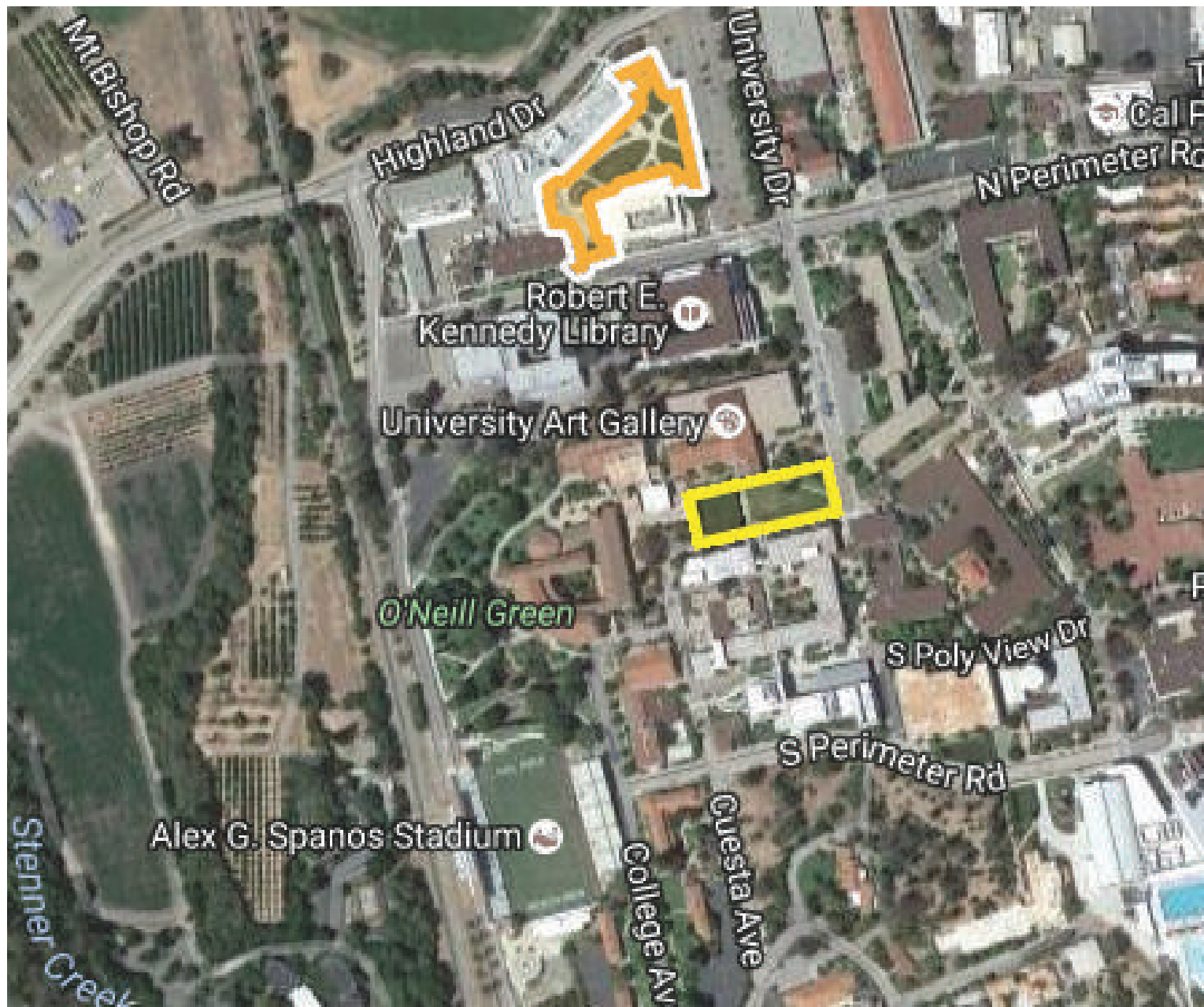
DEXTER LAWN

SOCIAL METRICS

Seating: 1 bench (3 people), lawn seating
Play/Recreation: Thursday Volleyball, frisbee, yoga, reading. Create your own activities.
Average Lawn Size: 10,716 sq ft (3 larger lawns)
Study Spaces: 0, create your own
Overall Use: Active space. People passing through constantly as well as hanging out for long periods of time.

Data Gathering Method: Observation, Google Maps

TRANSPORTATION

Bike parking: 0. No Bike Zone.
Walkways: 19,241 sq ft or 37% of the site, 4 walkways cut through lawn

Data Gathering Method: Google Maps and Observation

SQUARE FOOTAGE

Square Footage: 51,836.4 sq ft
Materials: Concrete, Brick, Grass
Grass: 32190.84 sq ft
Brick: 6664.68 sq ft
Concrete: 12980.88 sq ft
Hardscape: 38%
Softscape: 62%

Data Gathering Method: Google Maps

WATER FACTS

Annual Precipitation: 12.33"
Annual Volume of Stormwater: 52,218 ft cubed
Average Storm Size: 90% storm
Volume of water in average storm size: (depth x area) 3,878 ft cubed
Water Use: High due to frequent lawn maintenance

Data Gathering Method: National StormWater Calculator by the EPA found through the Landscape Performance Series.

TREE FACTS

Storm Water: 6,873 gal per year
Carbon Sequestration: 1.093 lb per year
Shade: 2,831 sq ft
Shrubs: N/A

Data Gathering Method: Tree Calculator by Landscape Performance Series

ENGINEERING LAWN AND PLAZA

SQUARE FOOTAGE

Square Footage: 80150.4 sq ft
Materials: Grass, Concrete
Grass: 32234.4 sq ft
Concrete: 47916 sq ft
Hardscape: 60%
Softscape: 40%

Data Gathering Method: Google Maps

SOCIAL METRICS

Seating: 5 tables, 9 benches, 1 seat wall
Play/Recreation: space for it, plenty of shady lawn area
Average Lawn Size: 6,795 sq ft (5 small lawns)
Study Spaces: plenty of shady lawn areas, tables and benches more in direct sun
Overall Use: Active, lots of potentials for outdoor study spaces

Data Gathering Method: Observation, Google Maps

WATER FACTS

Annual Precipitation: 12.33"
Annual Volume of Stormwater: 80,741 ft cubed
Average Storm Size: 90% storm
Volume of water in average storm size: (depth x area) 5,997ft cubed
Water Use: High due to frequent lawn maintenance

TRANSPORTATION

Bike parking: 8 racks
Walkways: 12980.88 sq ft or 38% of the site

Data Gathering Method: Google Maps and Observation

Data Gathering Method: National StormWater Calculator by the EPA found through the Landscape Performance Series.

TREE FACTS

Storm Water: 5,610 gal per year
Carbon Sequestration: 1588 lb per year
Shade: 3,092 sq ft
Shrubs: 04% or 3,291 sq ft

Data Gathering Method: Tree Calculator by Landscape Performance Series

LIBBY JACOBSON, BLAKE RAWLINGS, SILVIA VIOLA   LA 402   FALL 2016

Baseline Data.

Patrick Kelty - Kimberly Emmen - LA 402 - Fall Quarter 2016
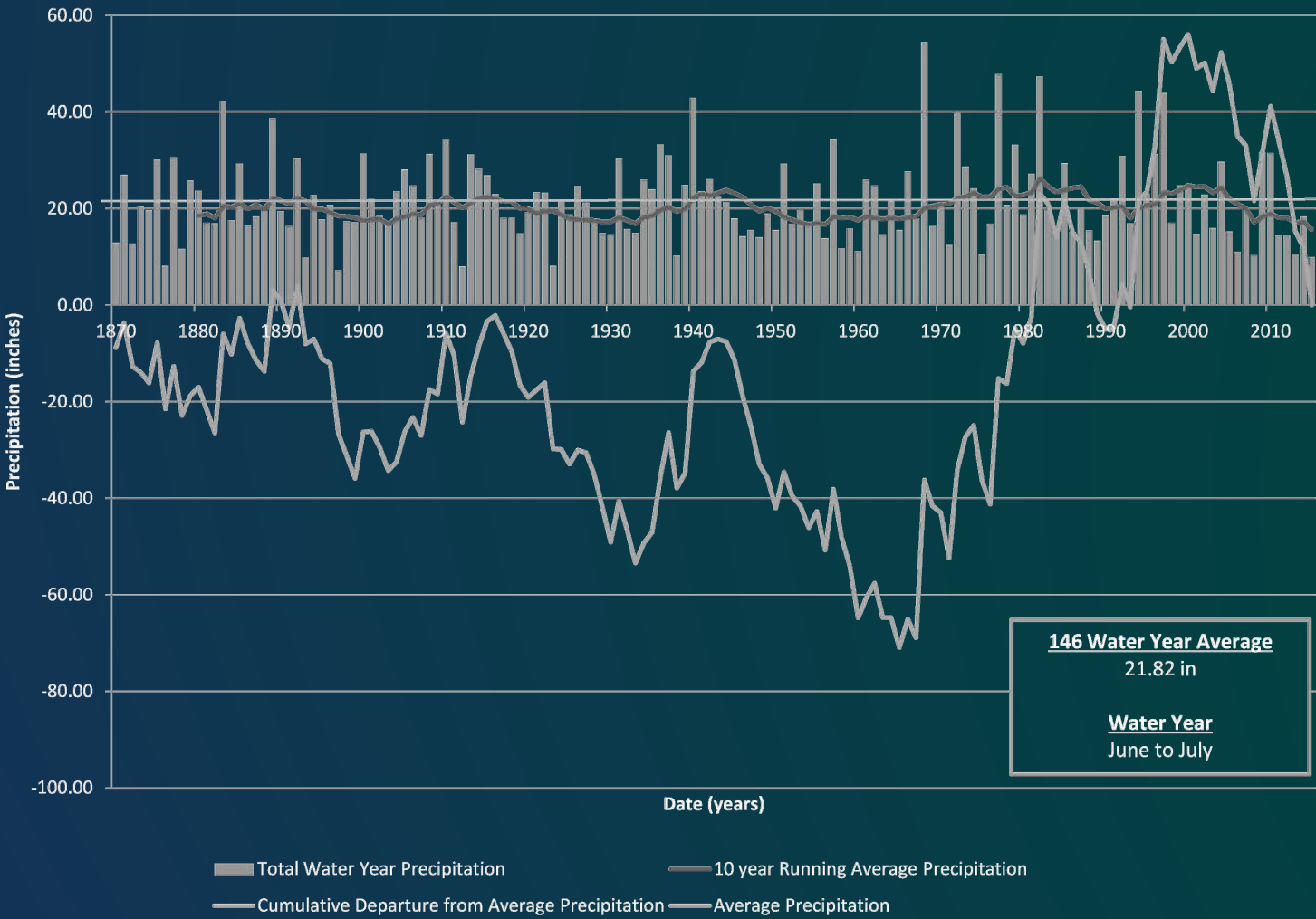
Introduction and Findings:

The campus sites for this technical module were two parkings lots; parking lot A is a staff parking lot located off of California Blvd near O'Neill Green and parking lot B is a general parking lot off of Via Carta near the John L. Merriam Irrigation Practices Field. Both parking lots were found to have a high percentage of impermeable paving. Storm water from both parking lots has the potential to add millions of gallons of polluted runoff into storm drains with outlets in Brizzolara Creek. The trees in both parking lots were of varying species and sizes, but overall it was noted that there were many older trees. According to the National Tree Benefit Calculator, older trees are less effective at capturing CO_2. The rainfall map (below) shows rainfall data over the past 146 years (1870-2015) collected and tracked by the Cal Poly weather station. It indicates that rainfall has fluctuated a great deal, but shows the average was 21.82 inches, with the past 5 years falling well below that average.

The Method:

The initial analysis was done by site visit survey, where we counted parking spaces (and types) and measured diameter of trees. We then analyzed the data collected to calculate base line metrics. The rainfall data was calculated using the Cal Poly Irrigation Training and Research Center website (http://www.itrc.org/databases/precip/) where we located a rainfall graph. The tree data was calculated using the National Tree Benefit Calculator (http://www.treebenefits.com/calculator/index.cfm   ). Each tree was calculated for its total CO_2 reduced in the atmosphere (which is a combination of sequestered and avoided) and the total storm water intercepted. It was also noted that there was no functioning irrigation at either parking lot, therefore the base line irrigation water usage is zero.

Historical Precipitation Data for Cal Poly San Luis Obispo - 1870 to 2015

146 Water Year Average
21.82 in

Water Year
June to July

Legend:
- Total Water Year Precipitation
- 10 year Running Average Precipitation
- Cumulative Departure from Average Precipitation
- Average Precipitation

Do The Math:

- **Annual Rainfall**   21.82 inches   (~1.82 ft.)

- **Annual Rainfall in volume**

PARKING LOT (A)   82,004 ft² Area
$$\times 1.82 \text{ ft annual rainfall}$$
149,247.28 ft³ (1 ft³ = 7.48052 gallons)
$$\times 7.48052 \text{ gallons}$$
1,116,447.26 gallons/annually

PARKING LOT (B)   201,088 ft² area
$$\times 1.82 \text{ ft annual rainfall}$$
365,980.16 ft³ (1 ft³ = 7.48052 gallons)
$$\times 7.48052$$
2,737,721.91 gallons/annually

- **TREES** — TOTAL CO_2 REDUCED IN ATMOSPHERE (combo of sequestered + avoided)
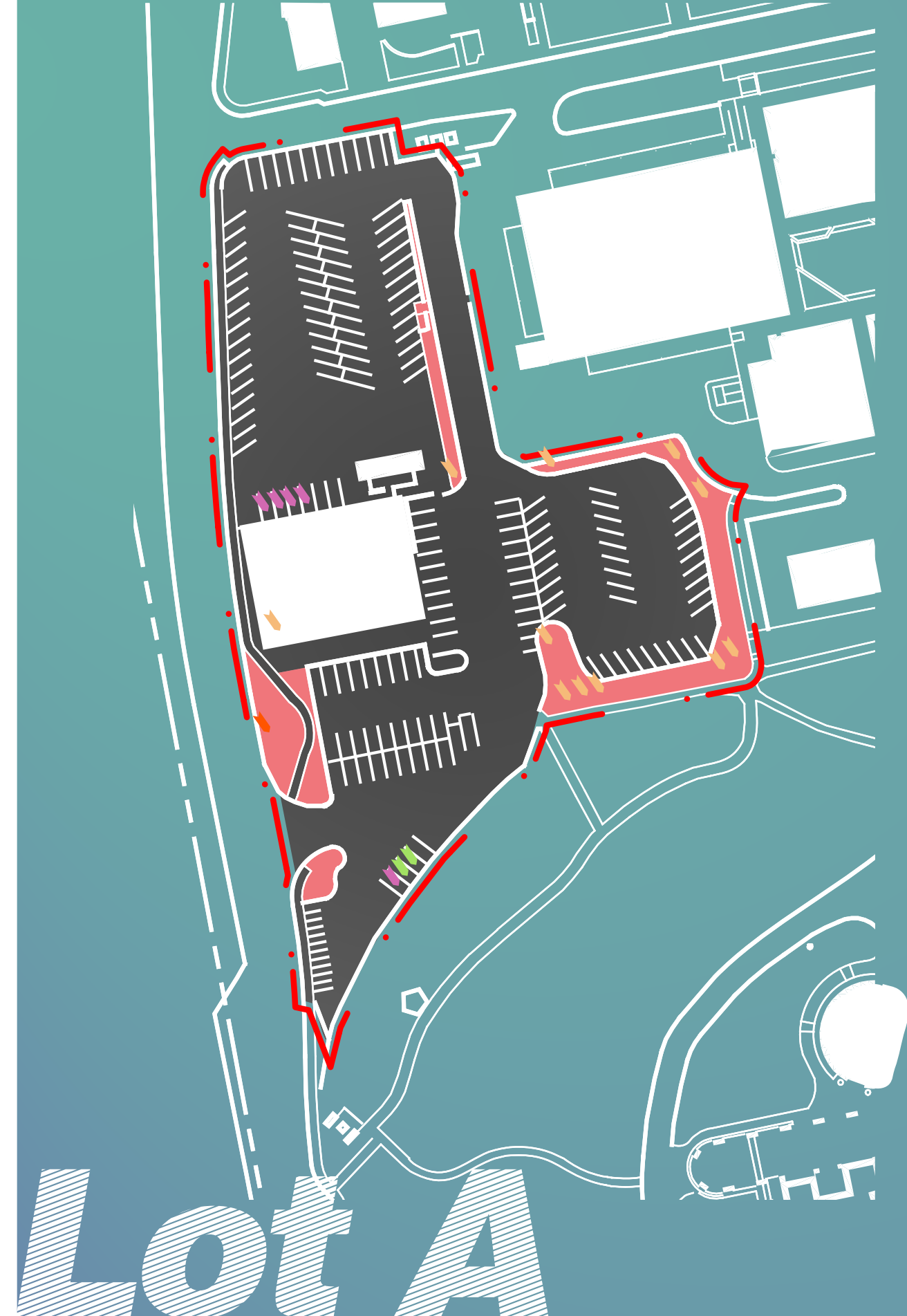
PARKING LOT (A)   2,820 lbs./annually
PARKING LOT (B)   11,993 lbs./annually

- **TREES** — STORM WATER INTERCEPTED

PARKING LOT (A)   19,606 gallons/annually
PARKING LOT (B)   53,788 gallons/annually

The Score So Far:

Parking low A sits on the western side of campus. The lot is characteristic of many parking areas on campus, being dominated by impermeable asphalt. Very little shade is available in the lot, with vegetated areas pushed to the edges. There are several large trees on the site however, some larger than 4ft in diameter. There is one historically significant tree on the western side of the lot which commemorates the 1906 Cal Poly graduating class.

82,004 sq.ft.	Total Surface
74,080 sq.ft.	Impermeable Surface
7,924 sq.ft.	Permeable Surface
1,116,447 gal. Annual	Rainfall
2,820 lb. Annual	CO_2 Sequestered
19,606 Gal. Annual	Storm Water Intercepted
0 sq. ft.	Irrigated
11	Trees
	Commemorative Oak
148	Parking Total
2	Guest Parking
5	Disabled Parking
0	Metered Parking
130	Staff Parking
11	Motorcycle Parking

Campus Map

Lot A

SCALE: 1" = 50'

N

Lot B

SCALE: 1" = 50'

N
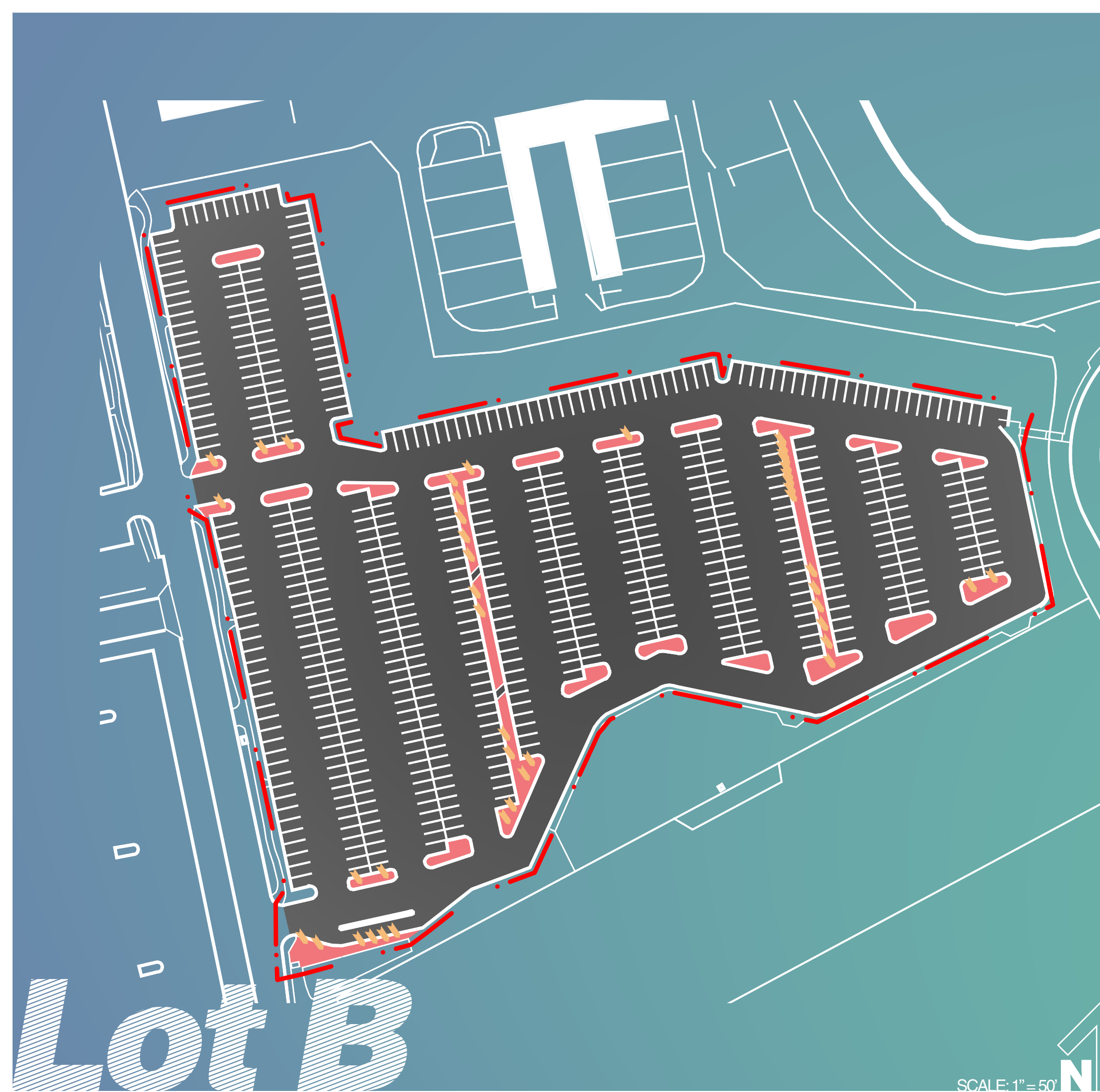
The Score So Far:

Parking lot B is part of Cal Polys more northerly parking areas, and shares use between commuting students, resident students, and faculty. Although there are vegetated medians in the lot they provide little shade. Existing irrigation infrastructure appears to be abandoned in place.

201,088 Sq. Ft.	Total Surface
74,080 Sq.Ft.	Impermeable Surface
1,573 Sq.Ft.	Permeable Surface
2,737,721 Gal. Annual	Rainfall
11,993 CO2	CO2 Sequestered + Avoided
53,788 Gal. Annual	Storm Water Intercepted
0 Sq. Ft.	Irrigated
45	Trees
535	Parking Total
0	Guest Parking
0	Disabled Parking
0	Metered Parking
52	Staff Parking
20	PCV Parking
463	General Parking

Campus Map

B

A