radha iyer

u. penn masters of architecture ‘28

iradha@upenn.edu | (425) 504 - 0511

collaborative work with Ella Matthews, Ian Zang
all drawings own

individual work

individual work

collaborative work with ehdd
all drawings own

collaborative design-build with studio + Prof. Steve Badanes

individual work

collaborative work with Jorge Burke, Oleh Fylyk

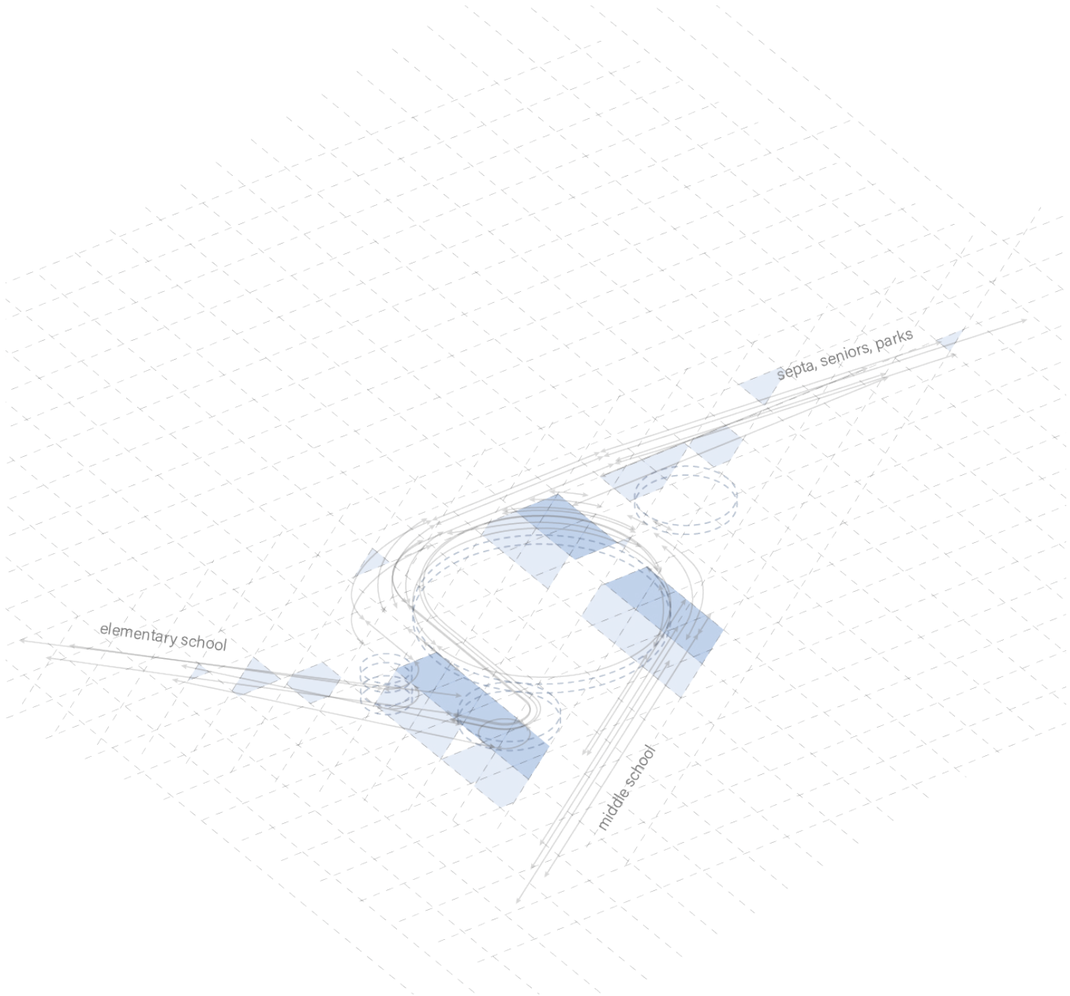
individual work

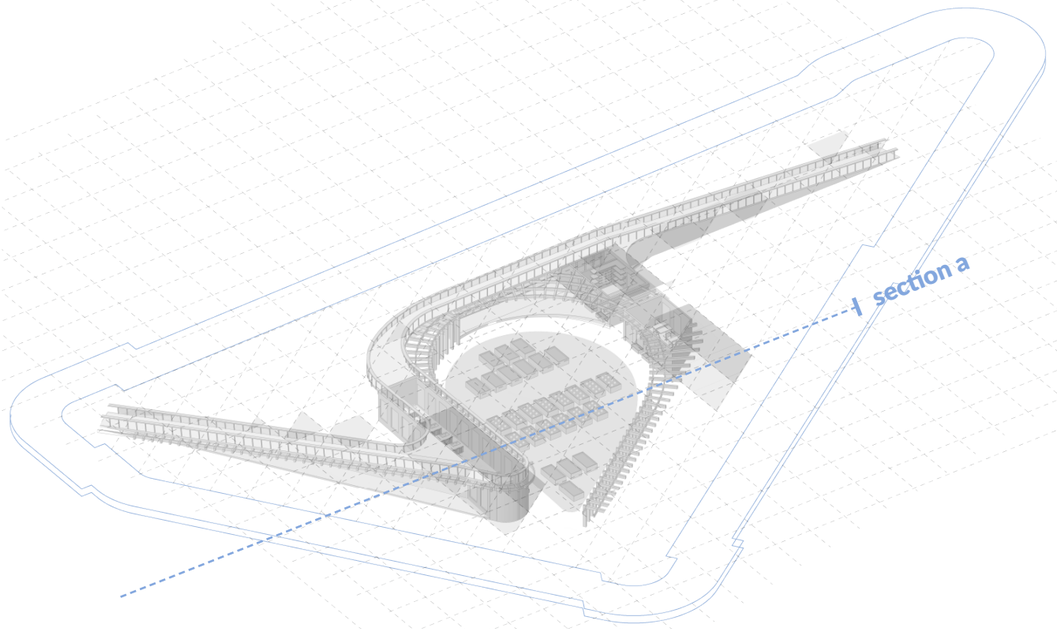
contents + credits

radha iyer

concept collage/diagram:
passing down a recipe

food and nature bring together generations: every child loves their grandmother's recipes and the smell of freshly picked herbs.





form-finding diagram:
the site + its occupants

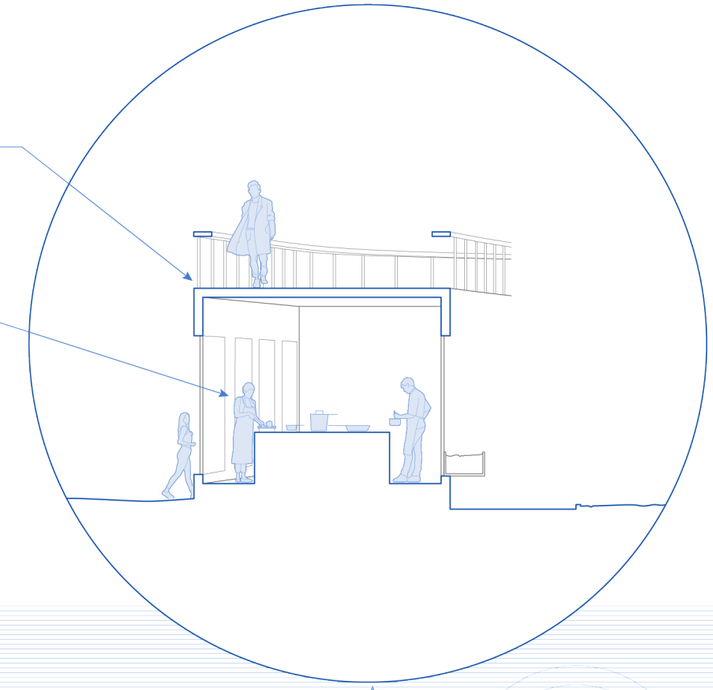
the community in the cobb's creek neighborhood around our site requested two things: an increase in programming for youth, and an increase in programming for seniors.

site axonometric diagram:
flowing around a garden

the competition prompt required that the enclosed structure have very little roof area to secure the site. we used ramps to do this in our project to create enclosure and avoid the fencing.

open after hours
for both young and old runners + birdwatchers

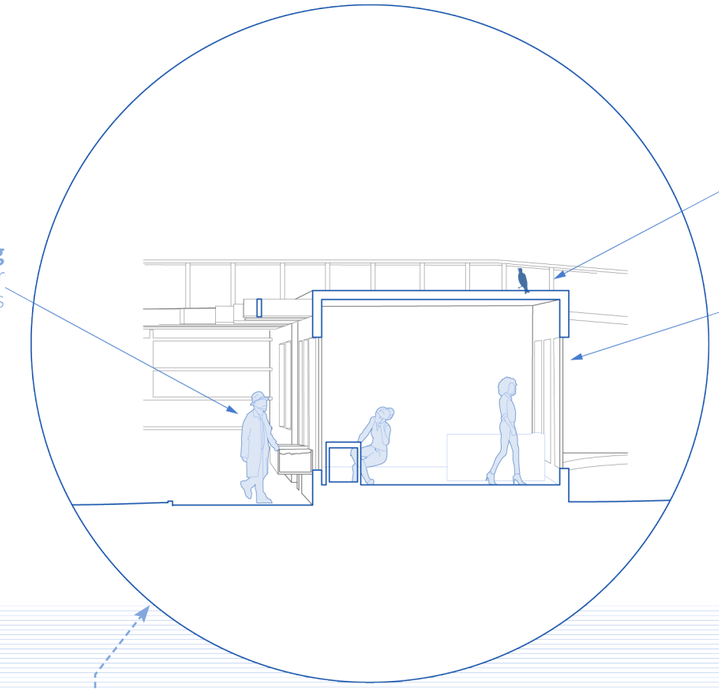
cooking classes here
for both children and seniors to learn recipes



accessible gardening
ada garden beds for persons with disabilities

rooftop habitat
for all the birds

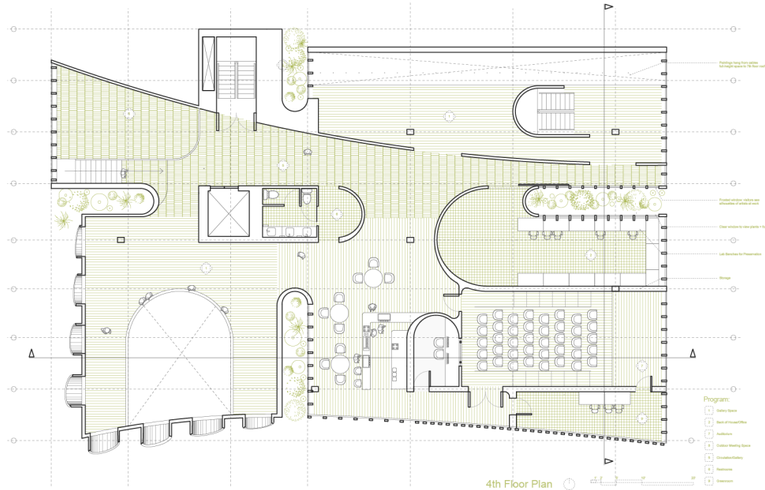
administration
office/work space



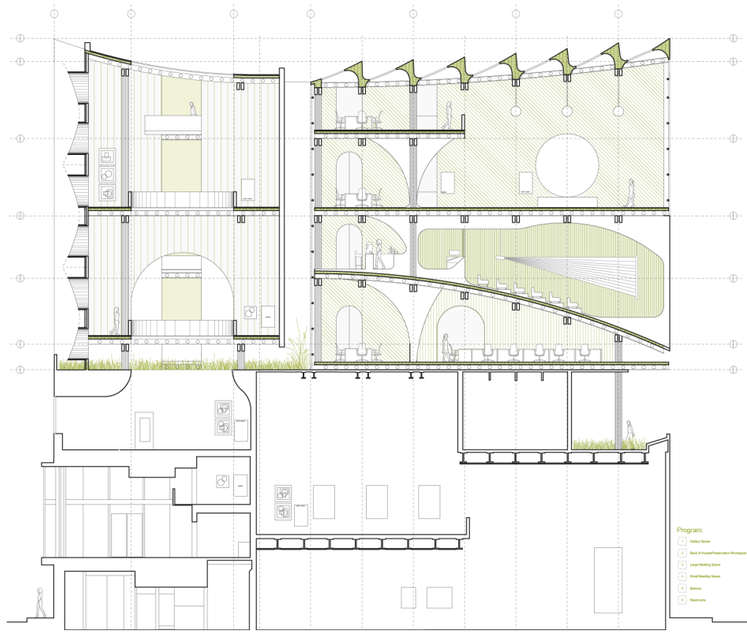
section a

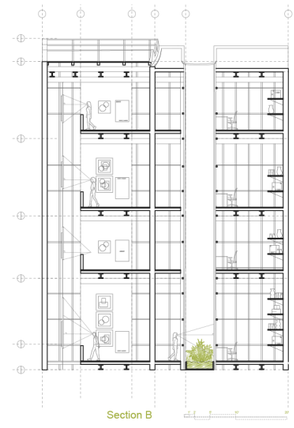
recipe

spring 2026



4th Floor Plan





Section B

cutting space with light:

a vertical extension to the institute of contemporary art. In plan and section, 5' circles divide space, 10' circles create smaller private spaces, 20' circles allow in light or create shared public spaces, shaping movement with light. Program includes back-of-house space for art preservationists, a multipurpose gallery/event space, and a small auditorium.

ica extension a vertical extension for the institute of contemporary art, Philadelphia.

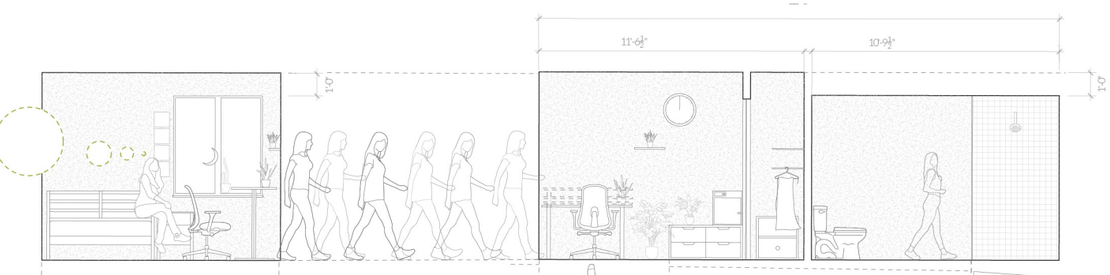
arch 521 fall 2025

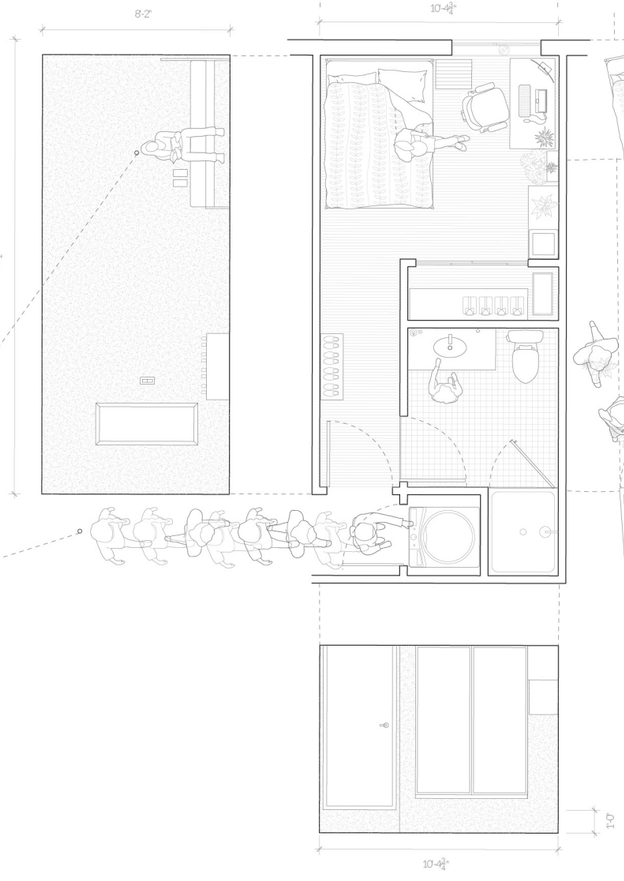
Radha Iyer
Homo Sapiens

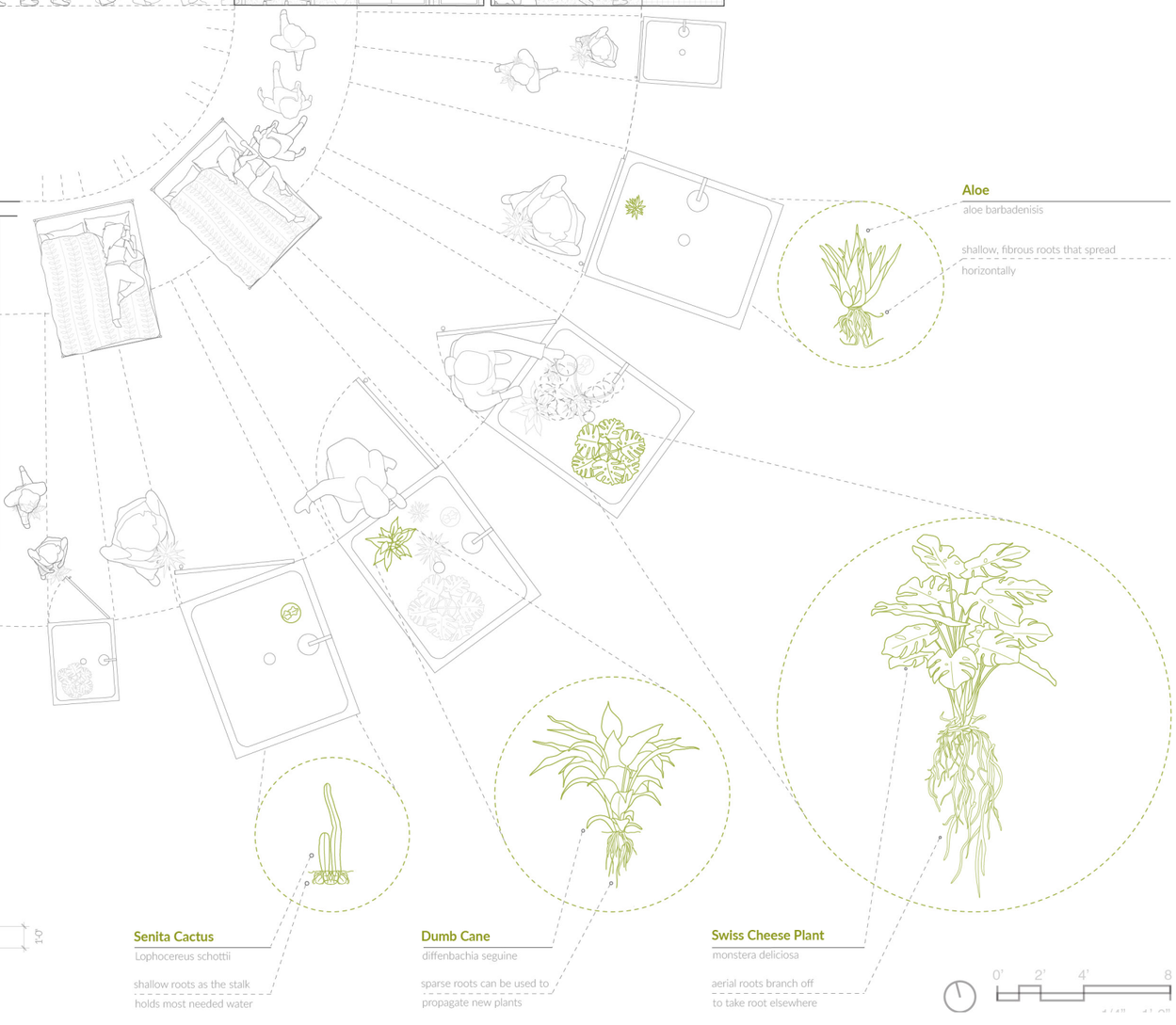
waters the plants
approx. once weekly

Paperwhite
Narcissus papyraceus

roots immediately pull water and nutrients, bulb stores energy.







Aloe
aloe barbadenisis

shallow, fibrous roots that spread horizontally

Senita Cactus
Lophocereus schottii

shallow roots as the stalk holds most needed water

Dumb Cane
diffenbachia seguine

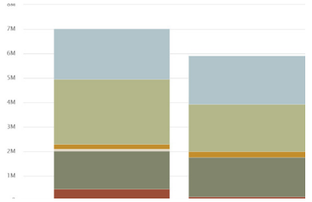
sparse roots can be used to propagate new plants

Swiss Cheese Plant
monstera deliciosa

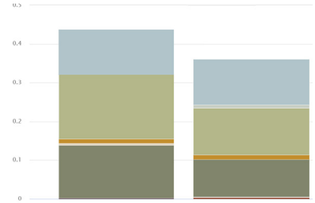
aerial roots branch off to take root elsewhere

watering the plants species in my apartment + their movement: a temporal study

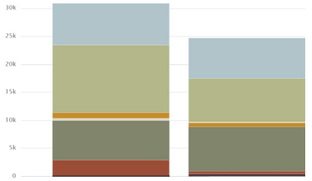
arch 521 fall 2025



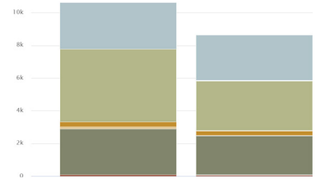
global warming: kg CO2e



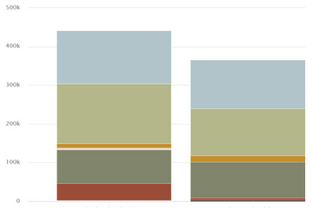
ozone depletion: kg SO2e



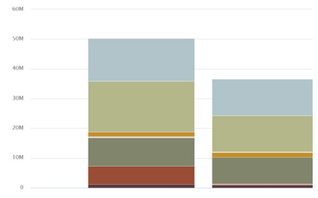
acidification: kg CF11e



eutrophication: kg Ne



tropospheric ozone: kg O3e



non-renewable energy use

what categories are here?

the six impact categories at left are ways our buildings contribute to the atmosphere/environment. the metrics are shown below each graph. there are more impact categories we can measure, LEED recognizes these six though.

LEED v4.1 M+R Credit: WB Life Cycle Assessment

the six graphs above show life cycle impact reduction by category (embodied carbon, ozone depletion, and so on) from the 75% SD to the 100% CD model.

ehdd usually contracts out all life cycle assessment work to a LEED consultant. in this first in-house life cycle study, I explored new ways of visualizing data. rendering + revit model in collaboration with ehdd, data + diagrams all my own work.

- foundation elements
- structural framing/slabs
- sheathing + flashing
- stairs
- exterior walls
- exterior windows

sfsu housing: lca a life cycle assessment in Revit + OneClick LCA visualized w/ Excel

ehdd + carbon leadership forum

above grade framing + slabs (superstructure)

reduction of floor-to-floor height

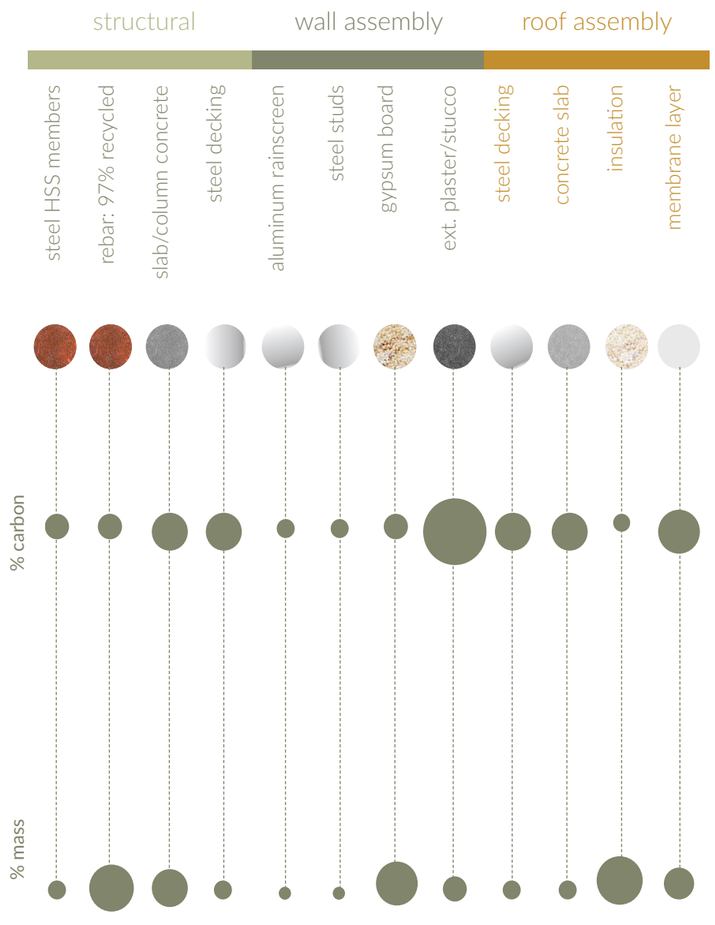
walls (rainscreen, shear walls, EIFS)

aluminum sheet changed to thin profile

roofing (membrane, insulation)

asphalt to modified bituminous membrane

material impact (% of building kgCO2e) vs weight

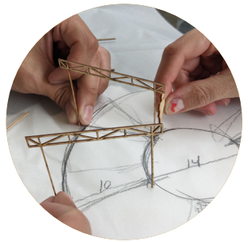


where can we cut carbon?

the graph at left is an alternate visualization of the largest reductions in embodied carbon (t CO2e) by building component.

and by which materials?

the graph at left vizualizes, in abstract fashion, the percent embodied carbon of each material compared to its percent mass in the building.



step 1. stick model

step 2. truss prefabrication

step 3. welding columns

step 4. panel prefabrication

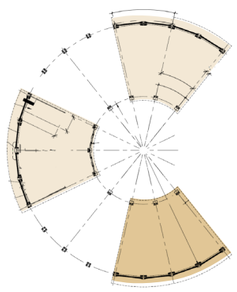
step 5. sitework

step 6. chunk assembly

step 7. connecting chunks

step 8. gravel + watering it in

step 9. celebration



program + the uw farm:

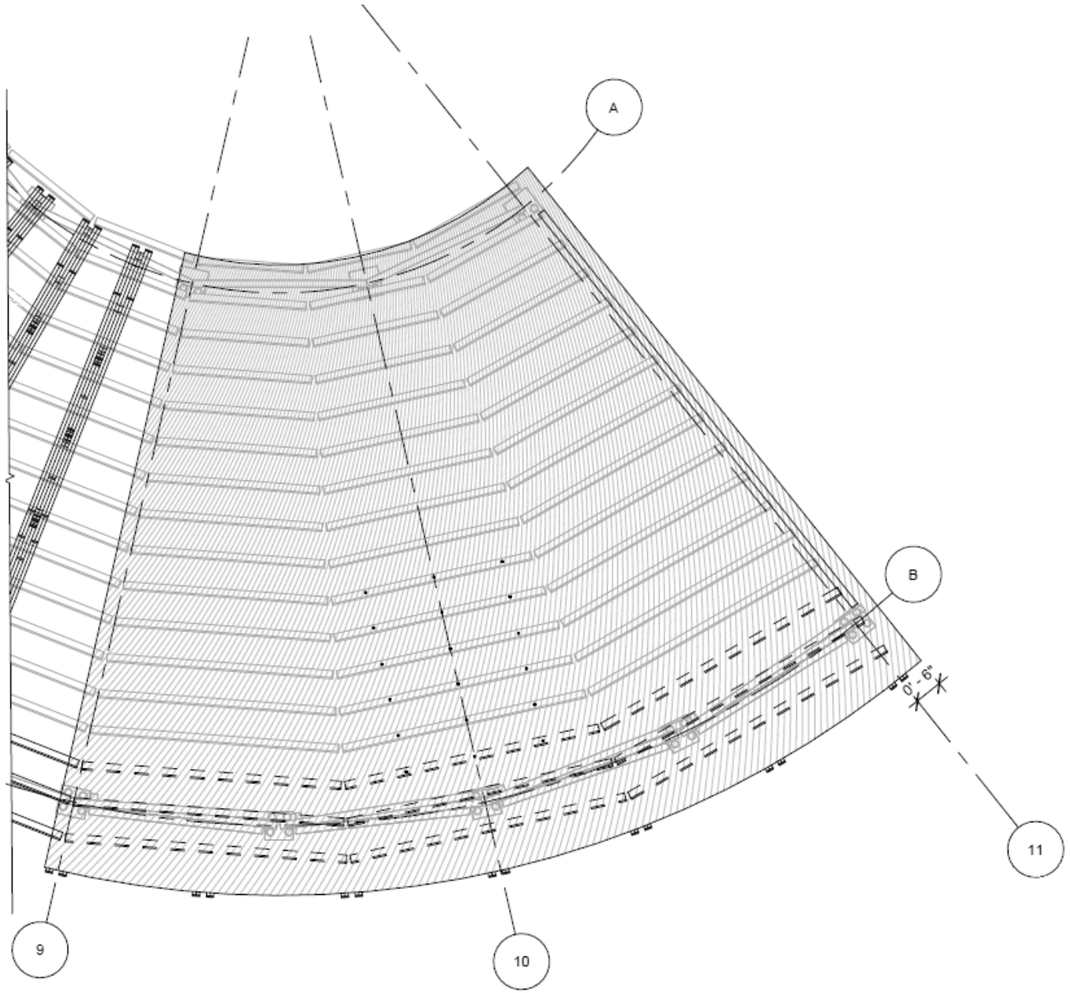
the campus urban farm at the univ. of washington requested our studio build a gathering space for classes and cooking as their programming expanded.

credits for studio work:

team of 16 students and 3 profs. my role was initial sitework coordination with the farm + roof detailing. the uw cultural kitchen, was completed in 12 weeks.

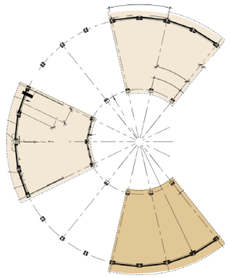
uw farm a cultural kitchen built over 10 weeks by UW's 2023 Nbhd. Design Build Studio

uw arch 402 spring 2023



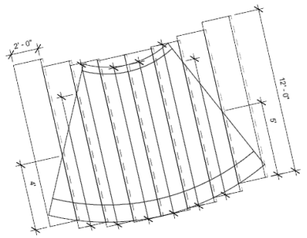
roof “segment” enlarged plan

three 120-sf wedges
two “trellis” spaces



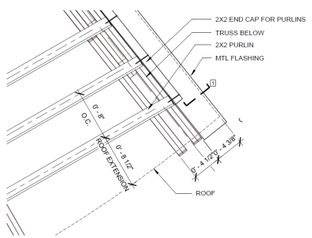
diagrammatic roof plan

alternating covered and
open spaces



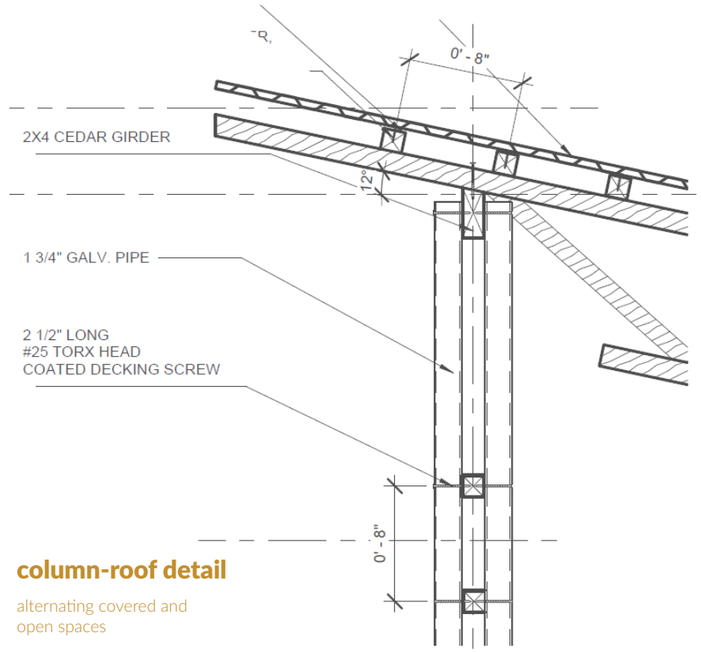
roof panel layout: nts

a way to tile 2' x 12' polycarbonate
panels for each segment



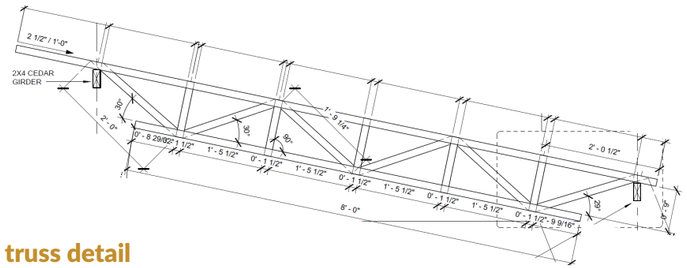
roof edge detail: nts

credit: caitlin truong, taylor sanville



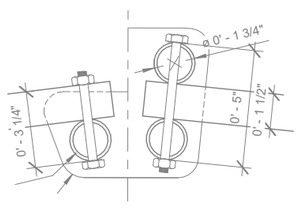
column-roof detail

alternating covered and
open spaces



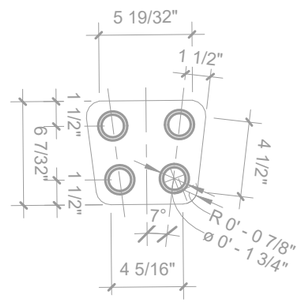
truss detail

credit: kana takagi



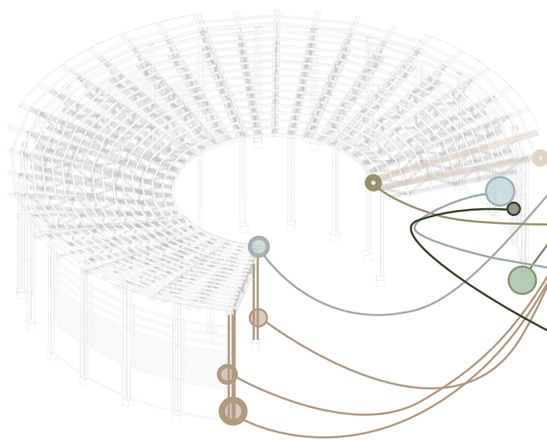
column details

credit: ian green



uw farm all details and drawings made using Revit.

uw arch 402 spring 2023



elements

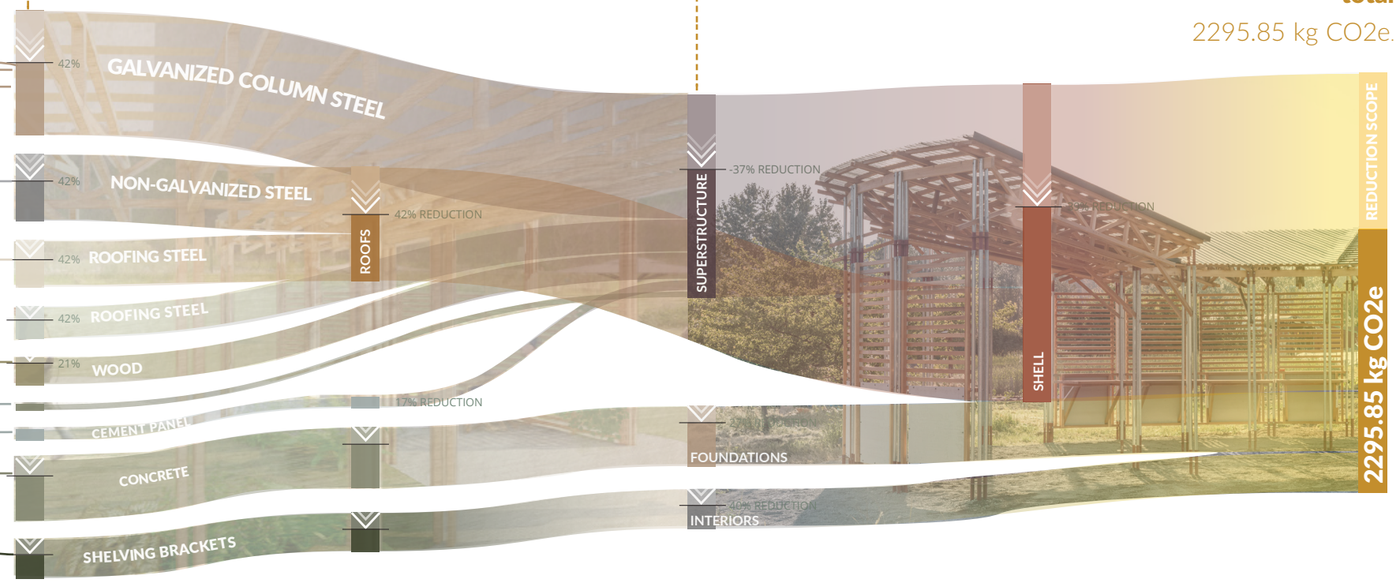
to stay within the budget we used chain-link-fence posts for columns. Exterior columns were comprised of four posts and interior columns two, welded together with plasma cut plates.

categories

the metal superstructure came out to roughly half the total carbon impact. poured concrete footings and stainless steel shelving brackets/fasteners were the rest- with potential for a 37% reduction.

total

2295.85 kg CO2e.



life cycle assessment 2:

all materials were procured locally from around the Seattle area, and as this was a design-build, we had granular control over what materials we were purchasing.

this study was done retroactively to see if we could have lowered emmissions further than we did. The galvanized column steel was the largest contributor to energy, and understandably so, as the structure was wood.

138 propane cylinders

50 trees growing 10 years

8 months straight of driving a car

uw farm

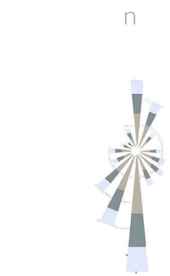
uw arch 402 spring 2023

uw farm rendering in Revit and Lumion, co-author Taylor Sanville

uw arch 402 spring 2023

environmental systems

arch 451 is UW env. systems. an environmentally responsive building begins by mapping the climate - sun, wind, rain, humidity.



wind speed/direction

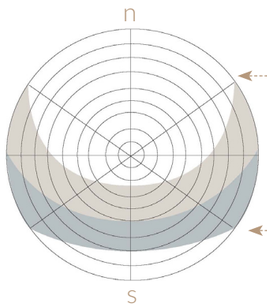
4-7 knots

7-11 knots

11-17 knots

wind speed + massing

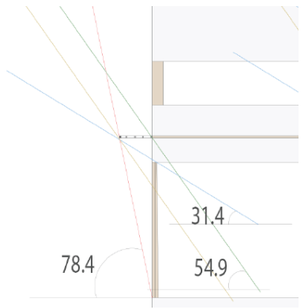
the winds that come primarily from the south and southwest inform our decision to curve the back wall of the adu.



sun paths

sun paths + design

the sun-paths inform the shading device designing shown below.



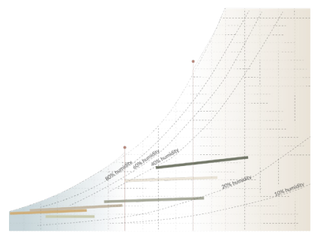
shading device design

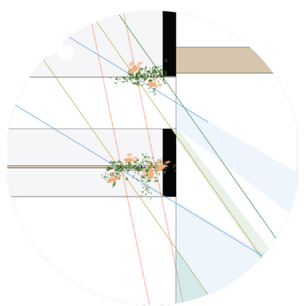
angles of shading trellis based off of sun altitude at solar noon, calculated using the following equation:

A - 90 - latitude + declination

december = 90 - 35.1 - 23.5 = 31.4
june = 90 - 35.1 + 23.5 = 78.4
sept = march = 90 - 35.1 = 54.9

temp/humidity





adaptive shading: plants

vegetation on a trellis is used to adaptively shade the glazing at the angles calculated above, as shown by diagram top right.

temperature + mass

the day-night temperature and humidity swings and the high temperatures indicated above point to a high-mass building..

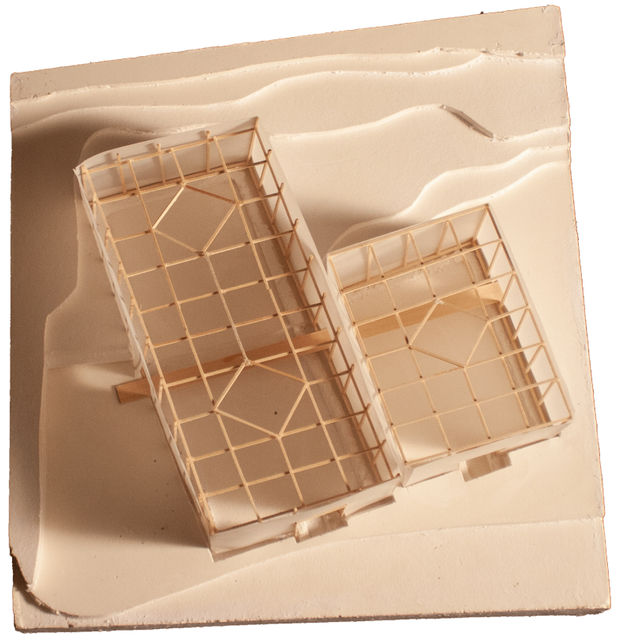
albuquerque adu

a climate responsive 650 sqft accessory dwelling unit designed for nm

uw arch 321 spring 2022

plaster base

wooden framework



wooden framework + trace shell (above), paper roofs (below)

credit for studio work:

plaster base formwork: self
plaster pouring: oleh fylyk
slats on outside: jorge burke
wooden framework: self

skeleton and skin

peter zumthor's shelter for roman ruins in chur, switzerland, encapsulates the ruins of a roman structure in a thin wooden skeleton wrapped with a skin of wood slats. A suspended aperture allows in light. a 1/16" massing model and a 1/2" scale section model.

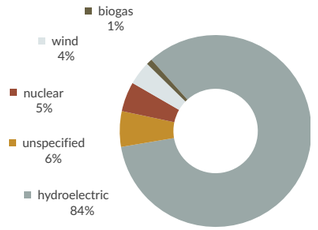
shelter for roman ruins

a tectonic precedent study in plaster, wood, and paper

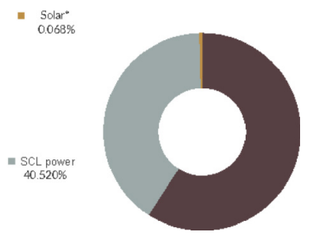
uw arch 300 fall 2021

energy consumption

obtaining accurate energy data for every building on campus was difficult as many still run on pneumatic controls. to counter this, we checked data for each building against others of the same age. energy consumption graphed at left.



seattle city light power mix



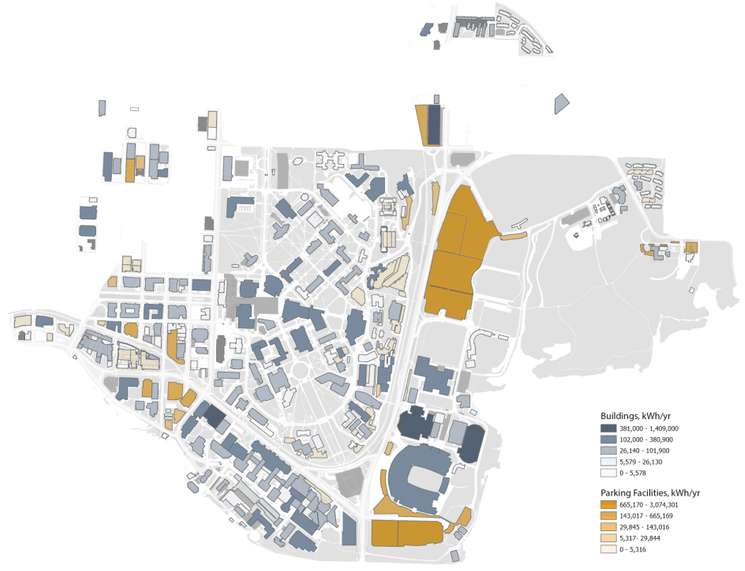
u. of washington power mix

the University's grid is heavily reliant on fossil fuels: transmission infrastructure caps the amount of electricity purchased from the city at roughly 40% of current power use (which will decrease as the university grows and demand increases further). the remainder of power is generated by the on-campus natural gas power and steam plant. Solar can offset this.

campus solar plan

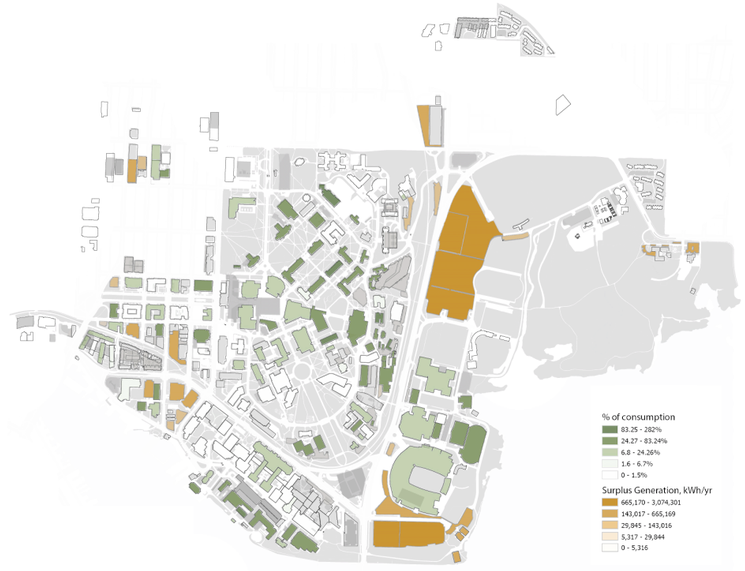
a comprehensive solarization plan made in GIS and Tableau.

uw urbdp 498 fall 2021



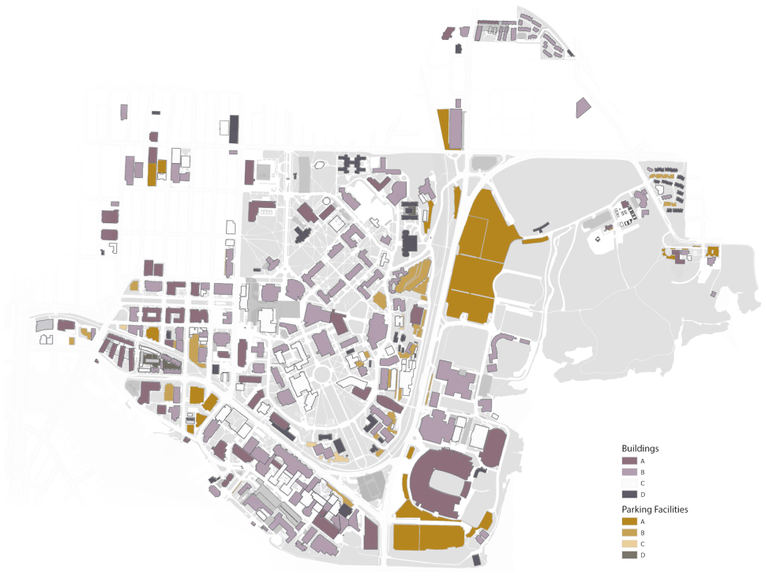
pv generation potential

the generation potential for each building is, mainly, a factor of total usable roof area and of shading. NREL's PVWatts system assissted in providing the data in this graph. note the higher generation numbers for parking lots - this is due to sheer area.



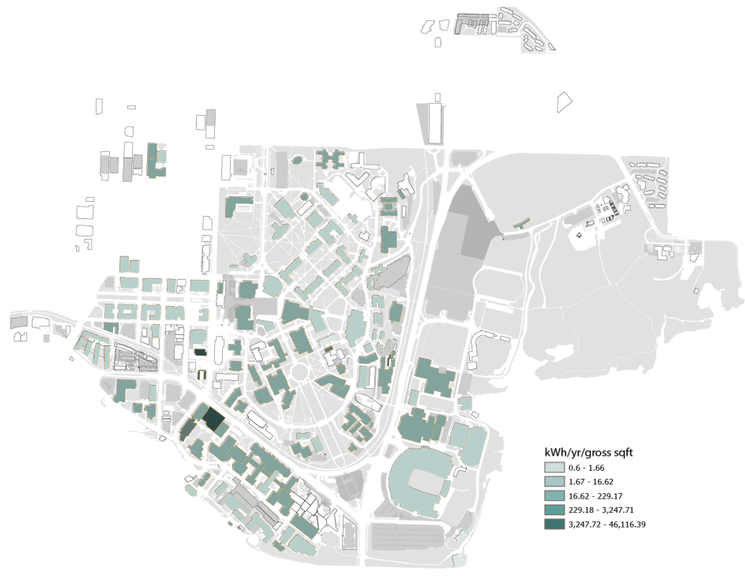
solar offset

solar generation potential relative to energy consumption is the solar offset. for buildings, where there are multiple stories of high consumption use, solar typically offsets less than 20% of full building energy use.



solar ranking

a factor of building roof age, date of completion, shading, historic designation, and roof area, the solar ranking of each building is shown at left. "A" buildings are ones on which construction of an array can begin immediately. "C" and "D" buildings are worse.



energy consumption

map intentionally re-iterated from previous page for emphasis.

obtaining accurate energy data for every building on campus was difficult as many still run on pneumatic controls. to counter this, we checked data for each building against others of the same age. energy consumption graphed at left.

campus solar plan

uw urbdp 498 fall 2021