Trevor Stephens

Architectural Works Full Portfolio

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Education

Masters of Architecture
Portland State University, Portland, Oregon
Summer 2014

Bachelor of Architecture
University of Central Florida, Orlando, Florida
Summer 2012

Associates of Arts Architectural Design
Valencia Community College, Orlando, Florida
Summer 2009

Experience

Senior Draftsman
Bay Meadow Architectural Millwork
Longwood, Florida
2007 - present

Model Designer / Builder
Baobob Advisors LLC
New York City, New York
2012

Skill Set

Proficiency with AutoCAD, Revit, Adobe Photoshop, Illustrator, InDesign, Rhinoceros 3D, Grasshopper, 3Ds Max (with Vray), SketchUp, and manual design / drafting methods.

Computer productivity, graphics, Microsoft office products and Internet applications capable.

Experience with wood working, welding and automobile mechanics.

Awards

Distinguished Design from the AIA Orlando and YAF for Fire Station #4 (pages 10-17)

Contact

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Phone: 407-617-9860
Web: http://issuu.com/trevorstephens

References

Thomas Mcpeek, Professor at UCF
Email: tom@agerpoint.com

Robert Copenhaver, BMA Millwork
Email: robygc@gmail.com

Adobe Photoshop Adobe Illustrator Adobe inDesign

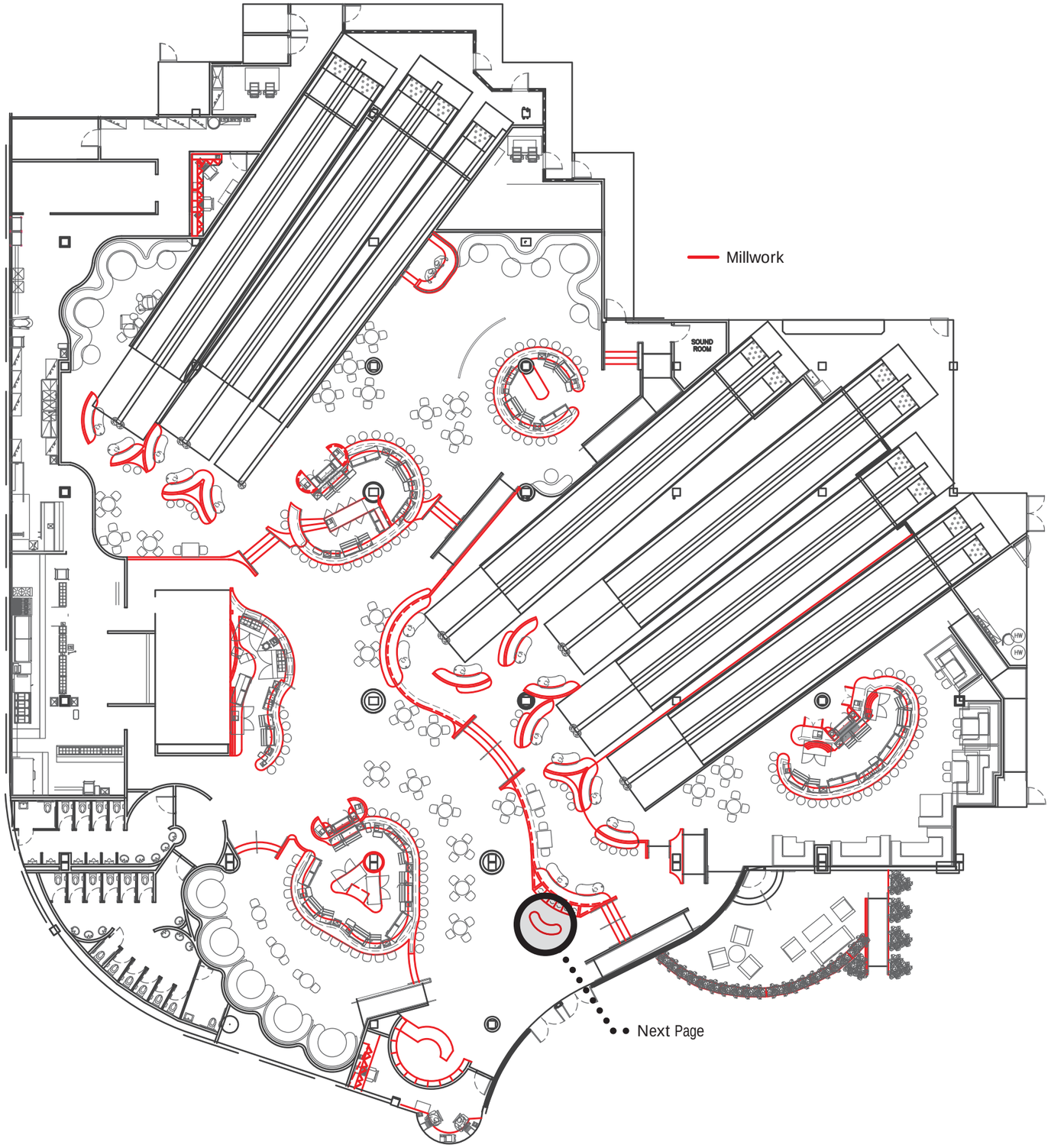
Bay Meadow Splitsville

Professional Work

- Fire Station # 4
- Wave Chair
- Virtual Orlando
- Low Rise Mixed-Use
- High Rise Mixed-Use
- Morphology Research Studio
- Outside In Studio
- Pickathon Design Build
- Multicultural Center Studio
- Thesis Preview
- Material Research

Professional Work

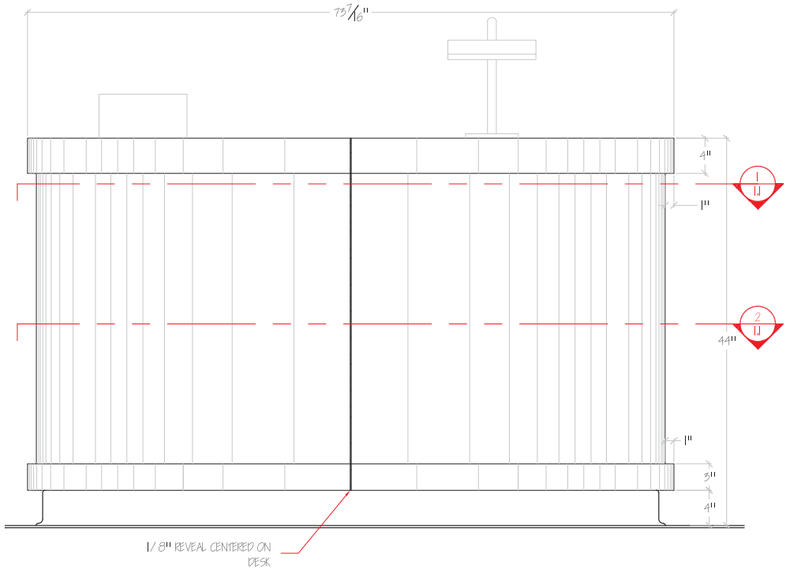
Splitsville: 2008
Location: Miami, FL
Position: Senior Draftsman
Company: Bay Meadow Architectural Millwork



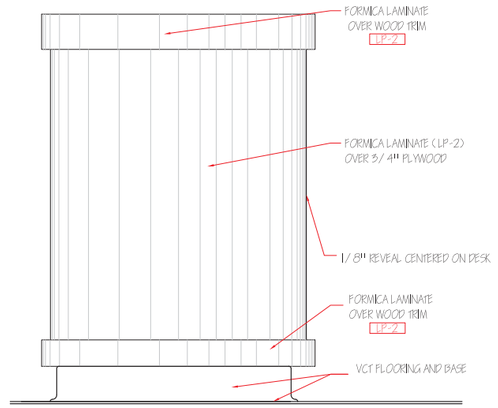
The Building is in the middle of downtown Miami at sunset place mall. This bowling ally contains high end millwork and metal fabrication. The bowling alley houses 13 bowling lanes, 5 bars, a sushi bar, a shoe rental, bowling ball displays, a dj booth, seating throughout, and a reception desk all of which was detailed and built in house at BMA Millwork.

As a draftsman on a two person drafting team, we were tasked to convert the architectural drawings into shop drawings that could be handed to our carpenters to build in shop. This bowling alley / bar / restaurant is a unique place for any of those three types.

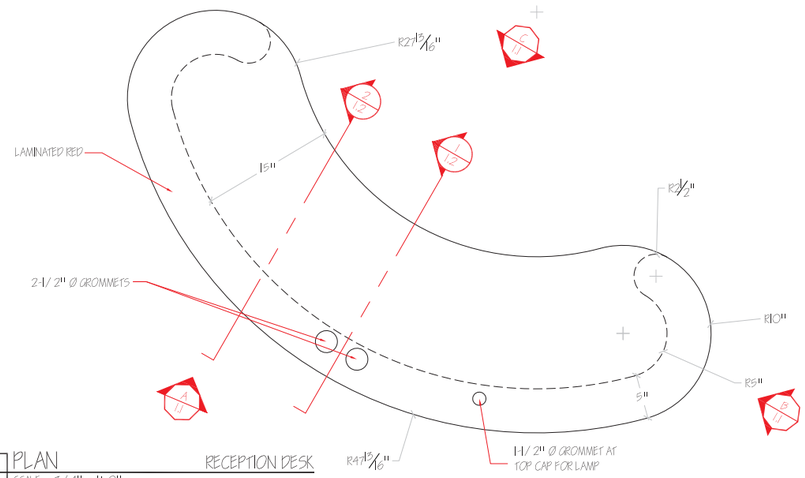
The following pages are the plans, elevations, sections, and details of just the hostess stand that is highlighted near the bottom middle (the red little bean) along with many photos for a visual reference..



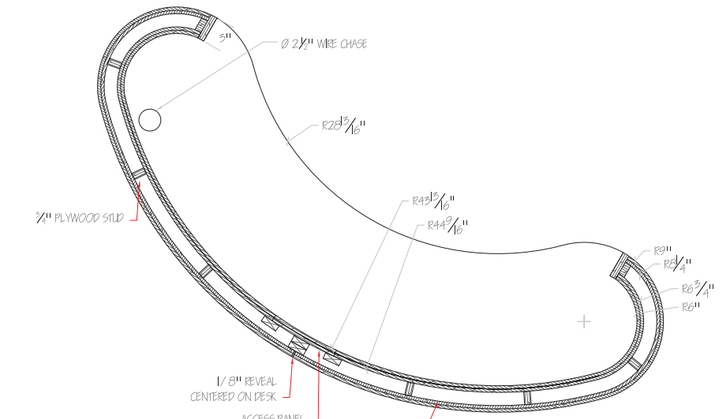
A / LJ ELEVATION RECEPTION DESK
SCALE: 3/4" = 1'-0"



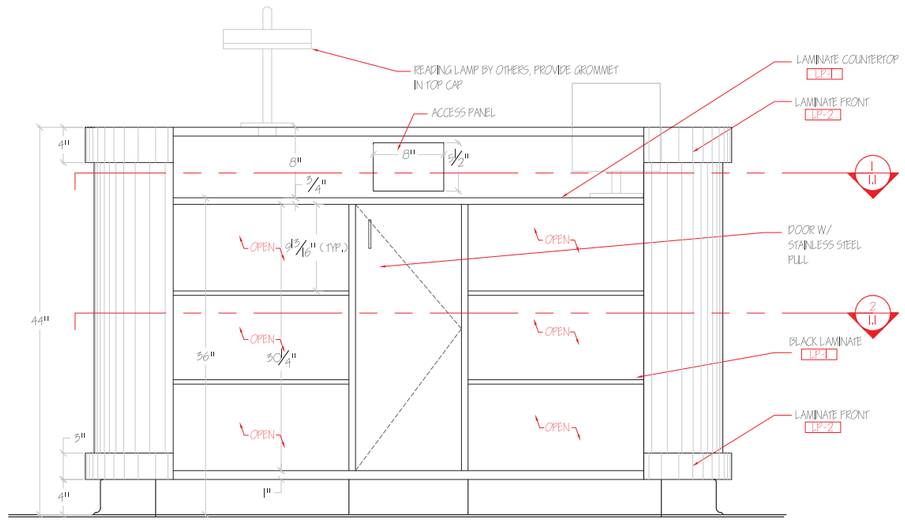
B / LJ ELEVATION RECEPTION DESK
SCALE: 3/4" = 1'-0"



1 / LJ PLAN RECEPTION DESK
SCALE: 3/4" = 1'-0"



1 / LJ PLAN SECTION
SCALE: 3/4" = 1'-0"



C / LJ ELEVATION RECEPTION DESK
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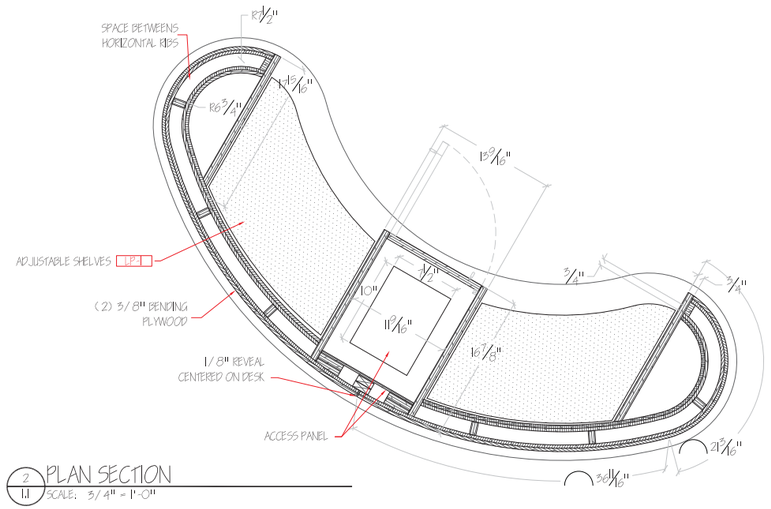

2 / LJ PLAN SECTION
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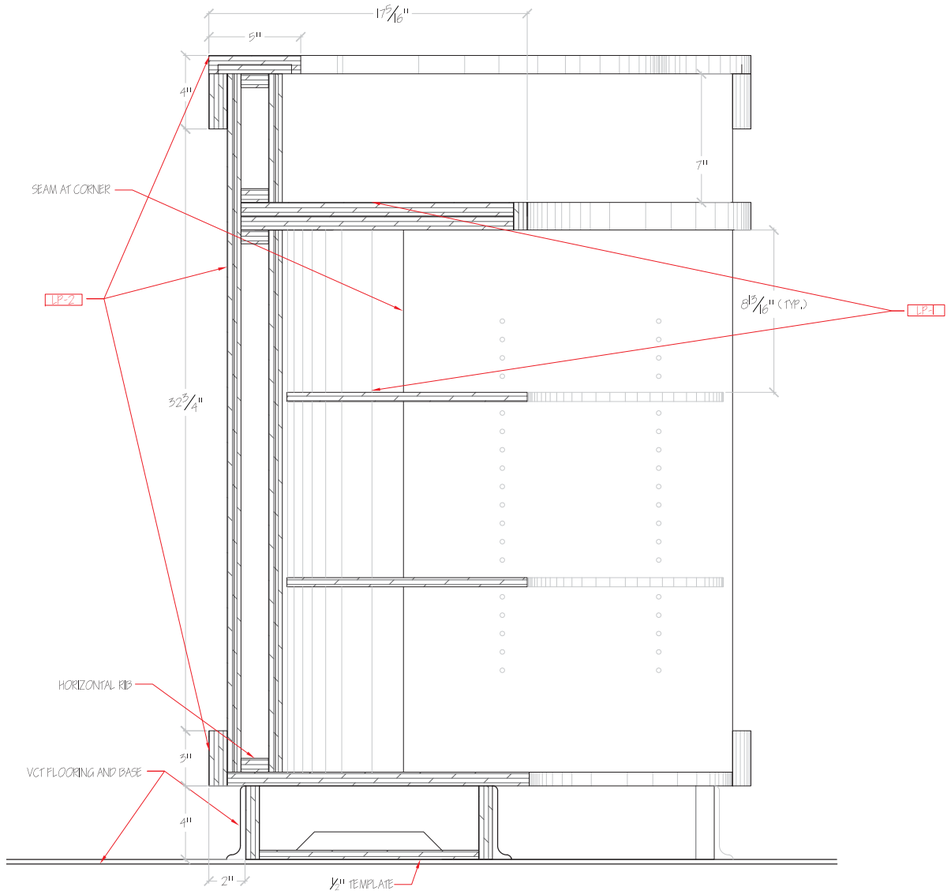

2 / L2 SECTION RECEPTION DESK
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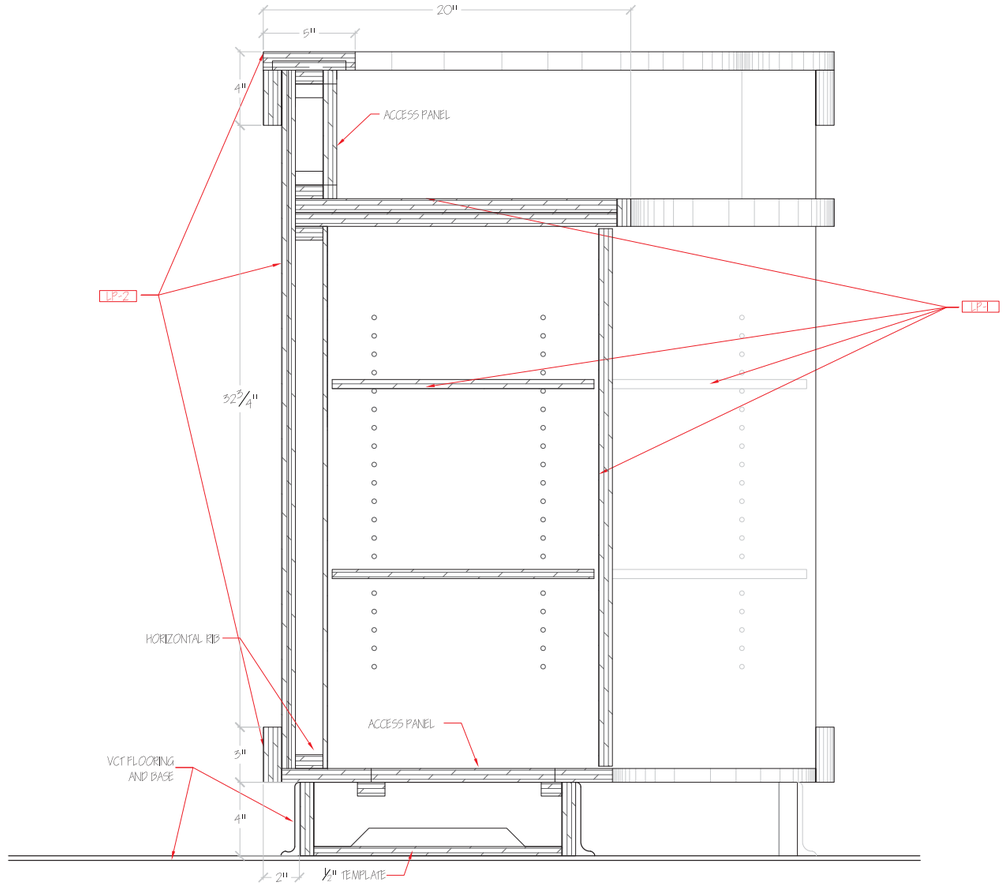


1 / L2 SECTION RECEPTION DESK
SCALE: 3/4" = 1'-0"

AIA Orlando

YAF YOUNG ARCHITECTS FORUM

Professional Work

Fire Station # 4

Wave Chair

Virtual Orlando

Low Rise Mixed-Use

High Rise Mixed-Use

Morphology Research Studio

Outside In Studio

Pickathon Design Build

Multicultural Center Studio

Thesis Preview

Material Research

Fire Station #4

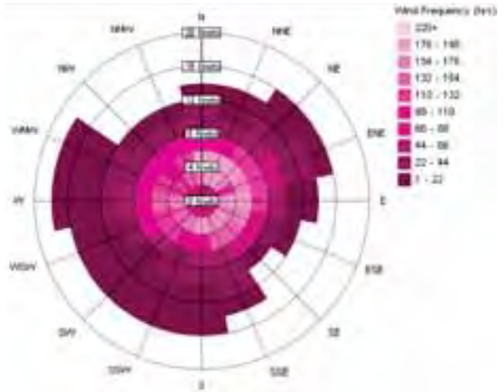
Design Studio 6: 2011
Professor: Thomas McPeek
Location: Orlando, FL
6 Weeks Awarded Distinguished Design AIA 2011

Carbon Neutral and
off the city grid

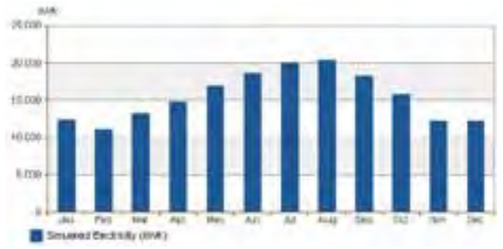
Fire Station number 4 in Orlando Florida is one of the older stations in central Florida with a very large service area in the city. This station is also one of the smaller stations and since it was built in 1955, needs an upgrade the facilities to accommodate more people in the surrounding area. The fire station will receive an entire remodel to bring it up to todays sustainability standards while giving a rotating shift of at least 10 fire fighters a home 24 hours a day, 7 days a week, 365 days a year.

Constant multi-directional wind patterns require a specific kind of turbine

Wind Study: Frequency Distribution



Electricity Consumption:



Ground Floor

Second Floor

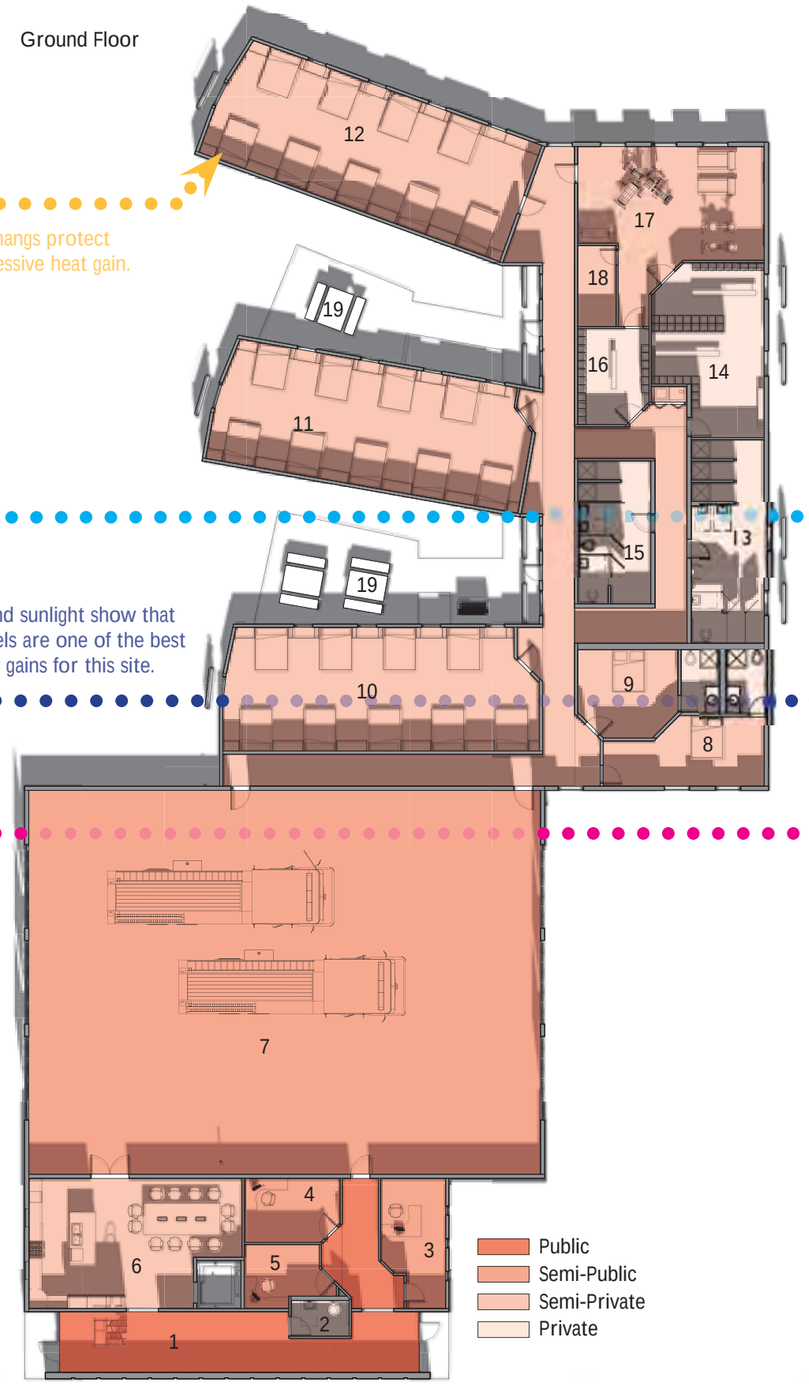
Large overhangs protect against excessive heat gain.

Reclaimed water off the roofs drain into biomass filtration tanks for later uses

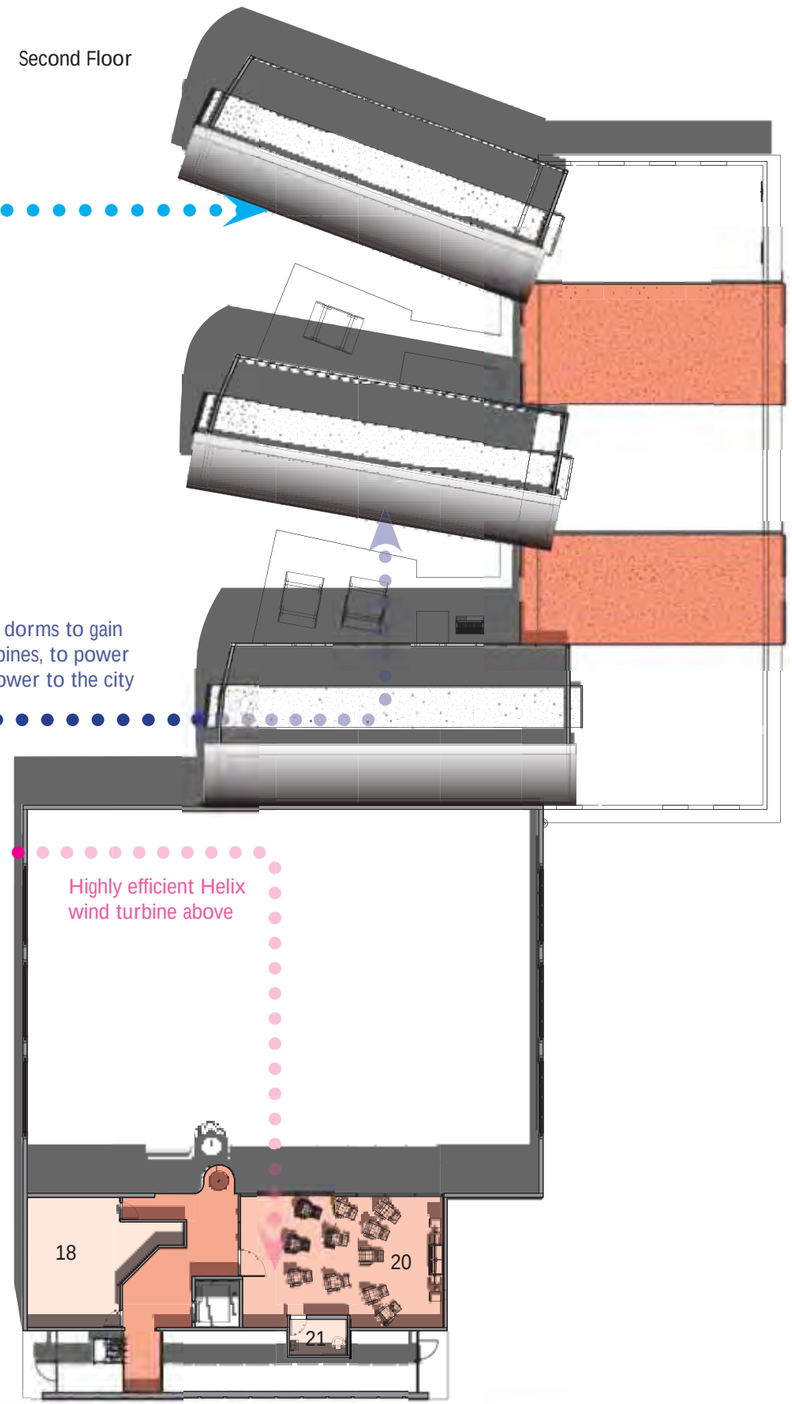
Year round sunlight show that solar panels are one of the best electricity gains for this site.

Photo voltaic Membranes cover the dorms to gain enough energy, along with wind turbines, to power the station and even return some power to the city

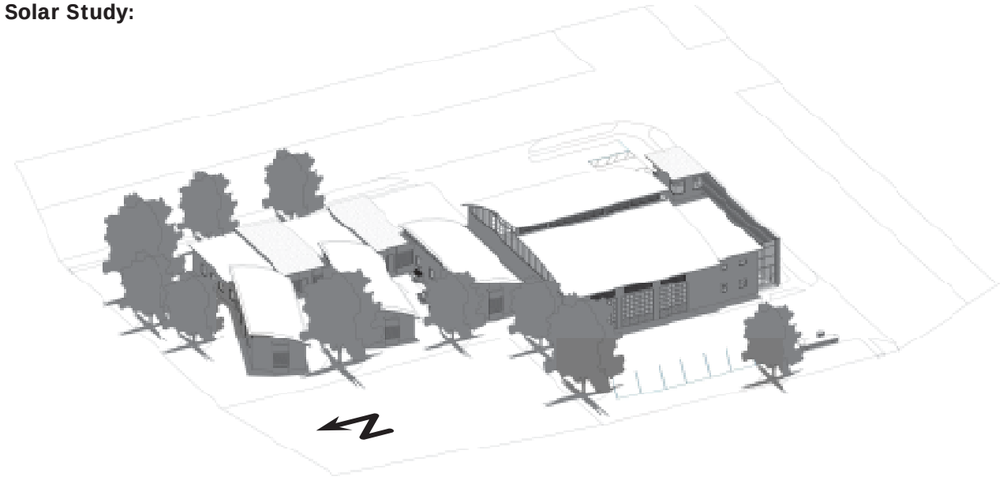
Highly efficient Helix wind turbine above



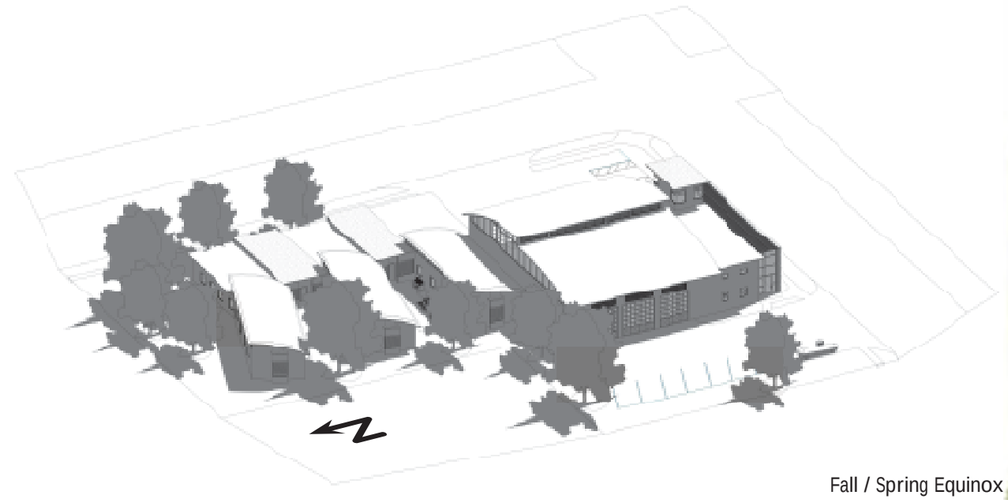
1. Entrance / Atrium
2. Public Restoom
3. Office 1
4. Office 2
5. Office 3
6. Kitchen / Dining
7. Apparatus Bay
8. Chiefs Dorm
9. Lieutenants Dorm
10. Dorm A
11. Dorm B
12. Dorm C
13. Men's Restroom
14. Men's Locker Room
15. Women's Restroom
16. Women's Locker Room
17. Fitness Room
18. Storage
19. Outside Deck
20. Day Room
21. 2nd Floor RR



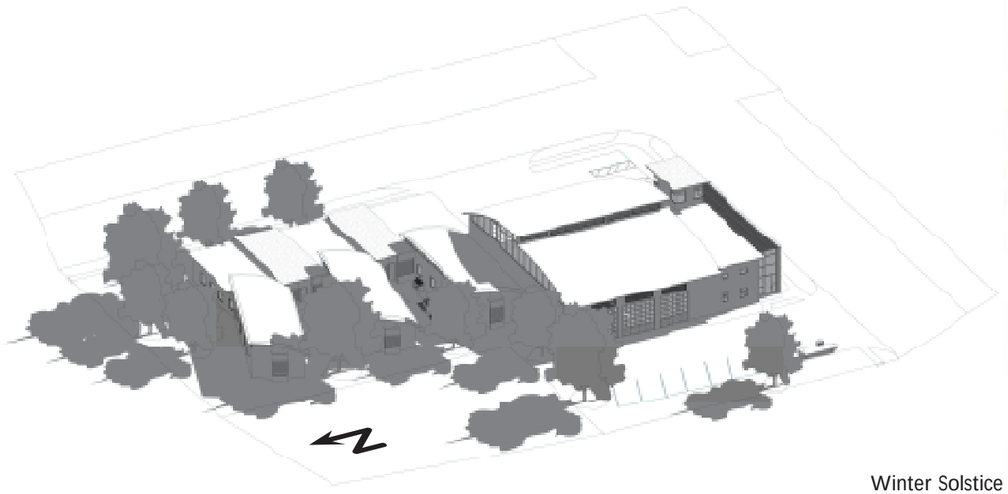
Solar Study:



Summer Solstice

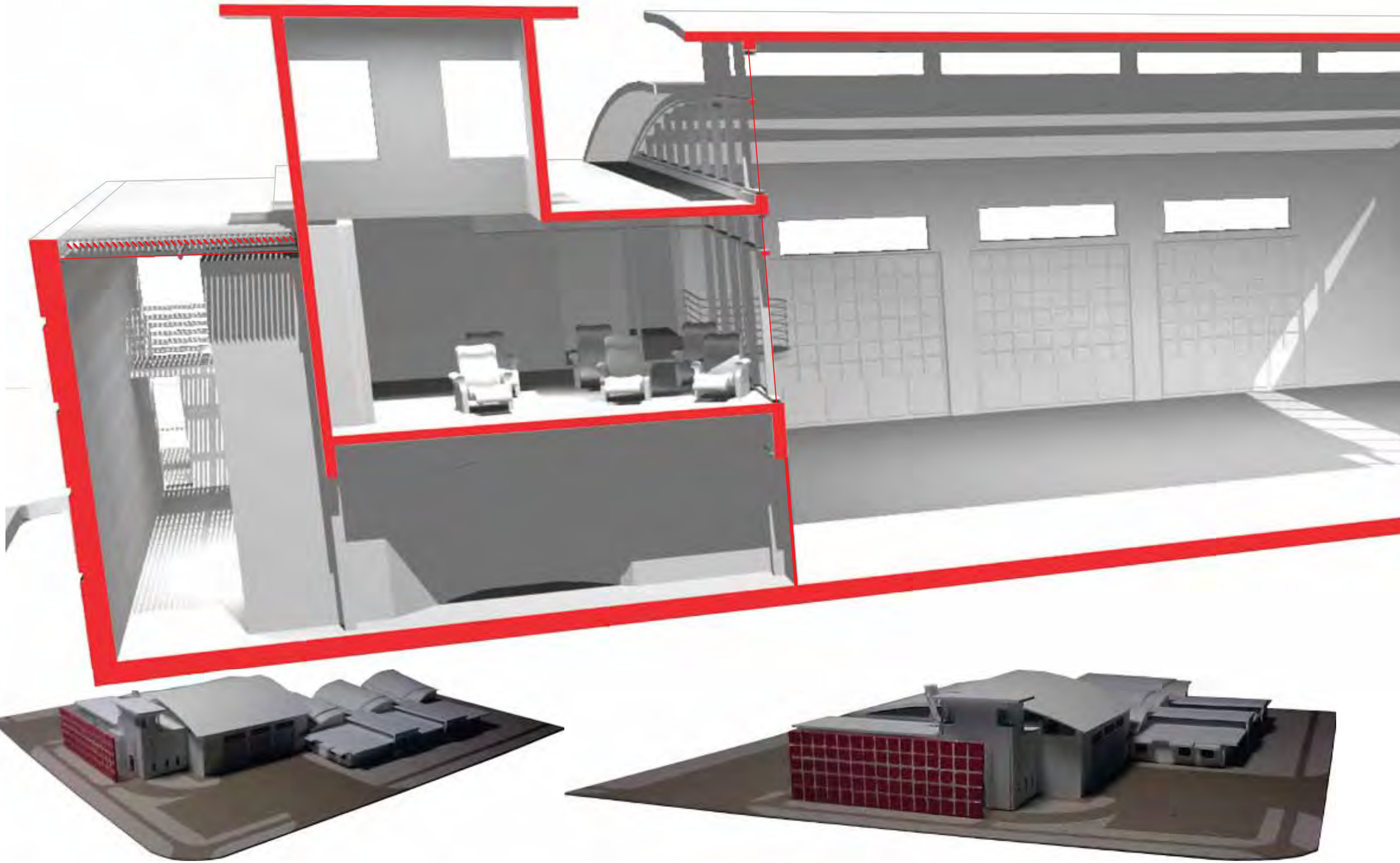


Fall / Spring Equinox



Winter Solstice

The design is focused around creating a building that utilizes as many passive sustainable techniques as possible. The swooping of the roofs channel air and light into the interior spaces while not overheating the station. Clerestory windows are in key locations to bring in light, while shaded enough to block unwanted heat gains from the sun. There are also additional sunshades throughout the building to help where direct sun would enter the spaces.



In section it is easier to see how the light may enter some spaces early on in the day (as shown) while inhibiting the light in other spaces. This is also evident in the simulated afternoon sun on the model below.

This project was picked along with the top student from each design studio at UCF for a competition held by the AIA Orlando chapter and the YAF for our school to exhibit some new work to gain attention to the new architecture program. This was an open showing end of the year event showcasing art, architecture, engineering, robotics, and computer graphics. This project received a Distinguished Design Award and local recognition for a possible new fire station design.

Wave Chair

Professional Work

Fire Station # 4

Virtual Orlando

Low Rise Mixed-Use

High Rise Mixed-Use

Morphology Research Studio

Outside In Studio

Pickathon Design Build

Multicultural Center Studio

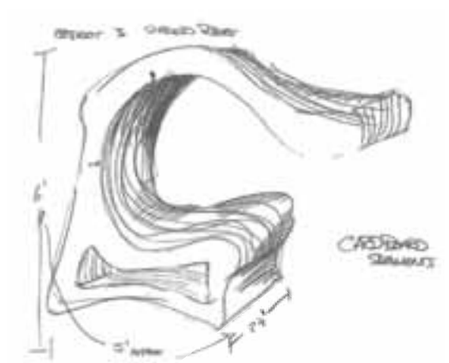
Thesis Preview

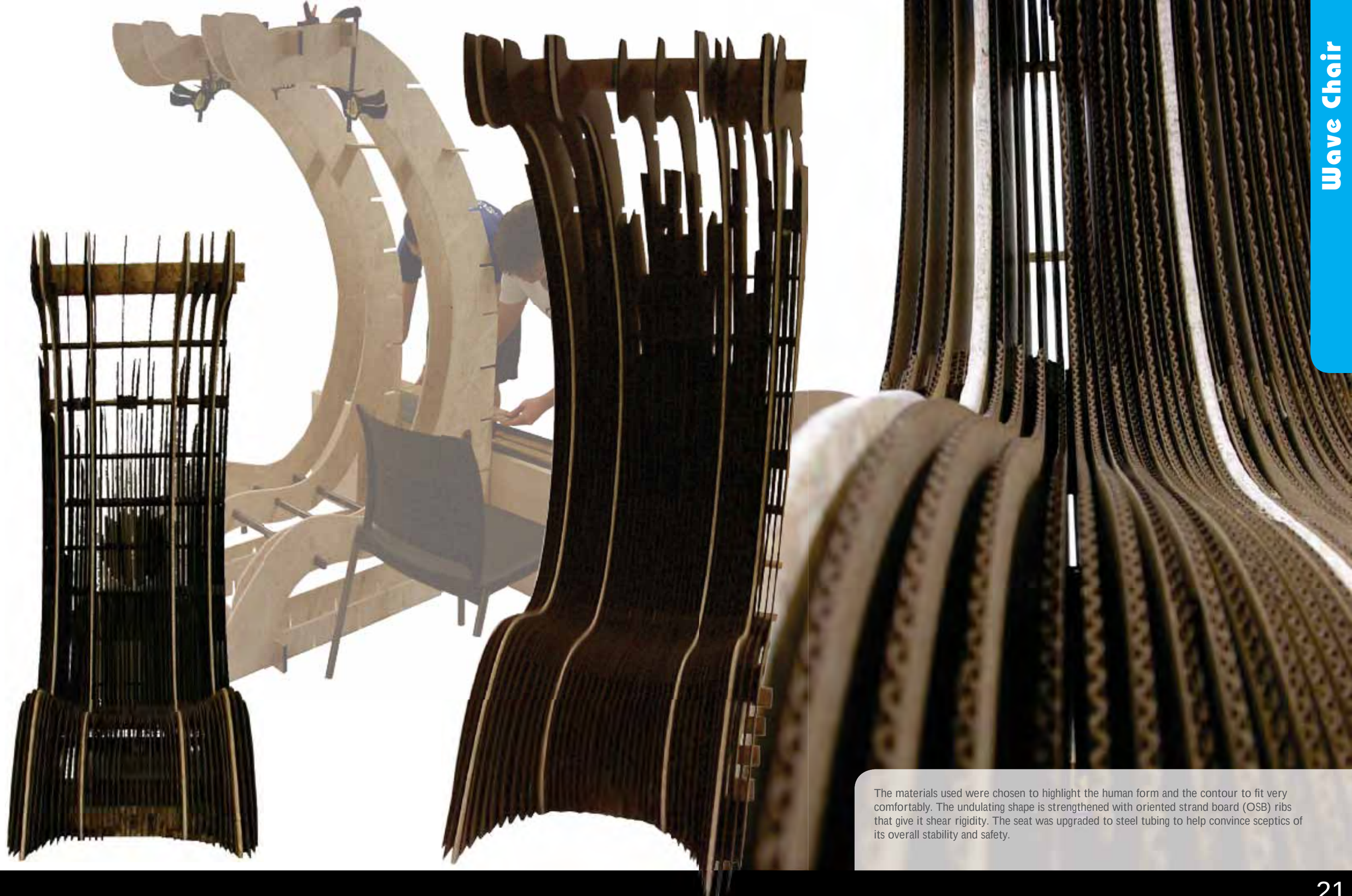
Material Research

Wave Chair

Digital Fabrication: Spring 2011
Professor: Thomas McPeek
Location: Orlando, FL
Group Project: Designer / Lead Builder
3 Weeks

The Wave Chair is the final project for a fabrication class at UCF where a four person group digitally creates a sketch of a furniture installation done by a fellow student. This shape is then 3D modeled and designed to be laser cut and fabricated for use in the large lobby space on campus.





The materials used were chosen to highlight the human form and the contour to fit very comfortably. The undulating shape is strengthened with oriented strand board (OSB) ribs that give it shear rigidity. The seat was upgraded to steel tubing to help convince sceptics of its overall stability and safety.

Professional Work

Fire Station # 4

Wave Chair

Virtual Orlando

Low Rise Mixed-Use

High Rise Mixed-Use

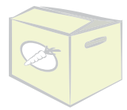
Morphology Research Studio

Outside In Studio

Pickathon Design Build

Multicultural Center Studio

Thesis Preview



Material Research

Virtual Orlando

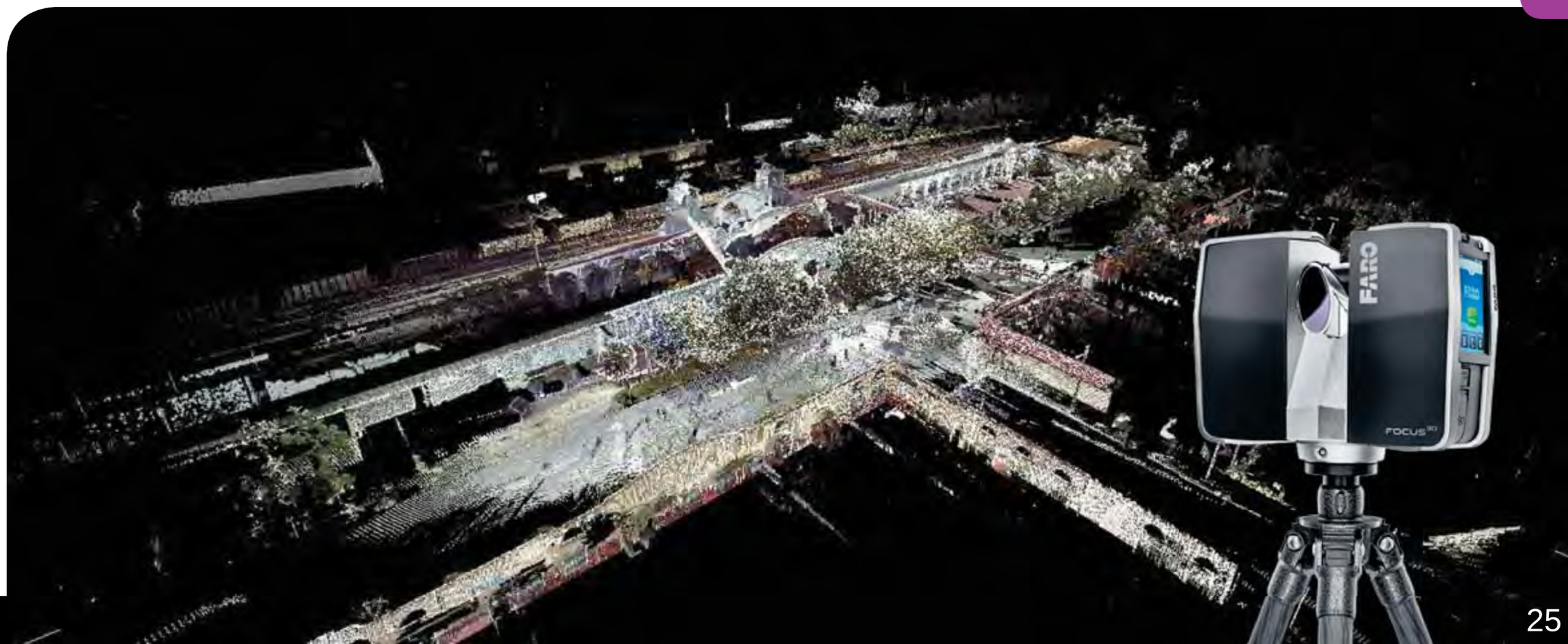
Guided Research: 2011
Professor: Dr. McPeek
Location: Orlando, FL
Four Person Team Research

6 Weeks

Virtual Orlando is a project that the GIS department of Orlando Floridas city hall and local architects wanted to start to digitally map all of downtown Orlando. This was the first 2 semesters of an ongoing project that categorized thousands of files and 3D models from various sources that the city hall collected over a decade. These 3D files could be CAD drawings of a building, or full 3D models including BIMs. As the project gained momentum, a Faro 3D scanner was purchased to begin scanning multiple historic buildings from around Orlando that didn't already have any digital files. The group first scanned the Sligh Blvd Amtrak Station just adjacent to downtown Orlando (as seen in the below diagram).

To 3D scan a building, the scanner must completely circle a building so there arent any "shadows" that the laser eye cant see. Each scan takes approximately 3 minutes each. In this time the laser is scanning just short of a million points every second. This model also includes a camera so colors can be painted onto each point of a point cloud, giving it a photo like experience (above). The white orbs seen throughout the images are reference points when stitching the multiple scans together to make a large cloud that can later be 3D modeled.

Rhinoceros 3D Autodesk AutoCAD SketchUp Pointools FARO 3D Laser Scanner


FARO
FOCUS 3D

Professional Work

Fire Station # 4

Wave Chair

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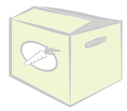
Thesis Preview



Material Research

Low Rise Mixed-Use

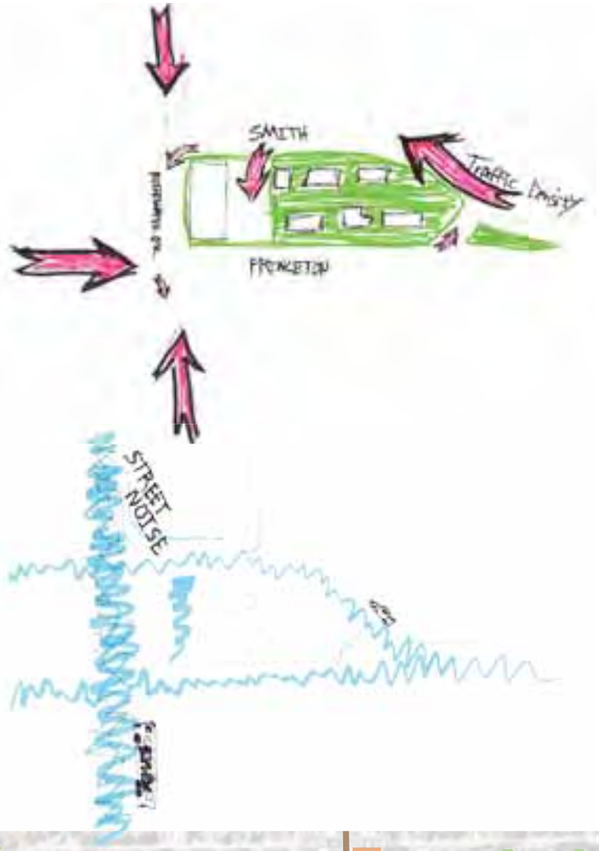
Design Studio 7: 2011

Professor: Dr. Thomas McPeek

Location: College Park, FL

4 Weeks

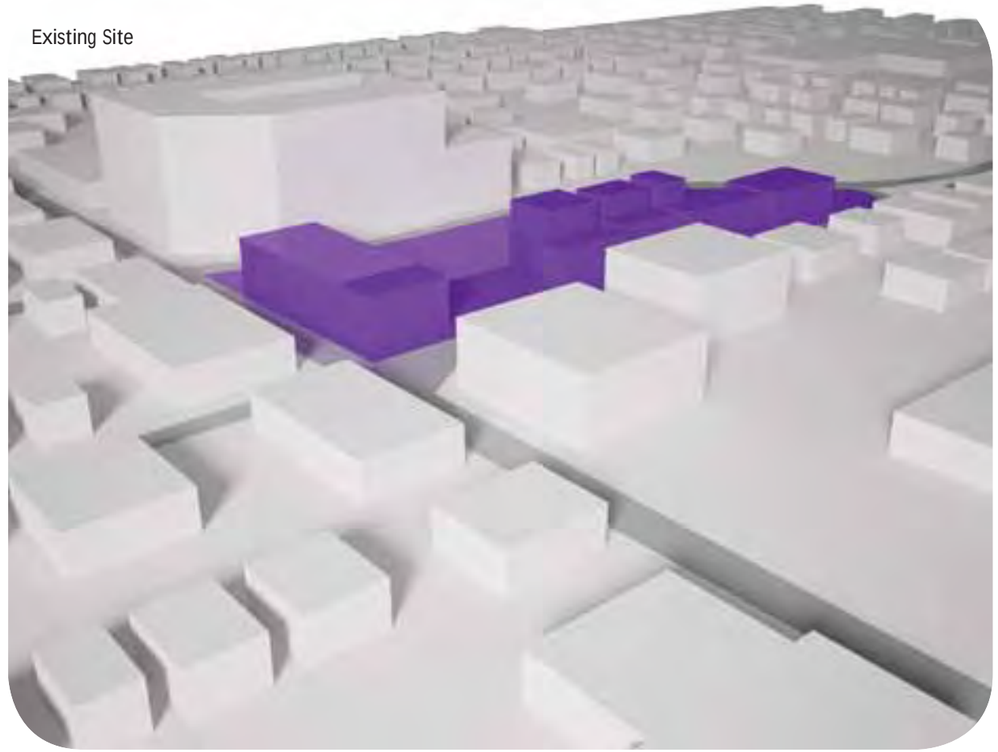
Partners: Andrea Saenz , Natalia Zea, Suhey Rojas

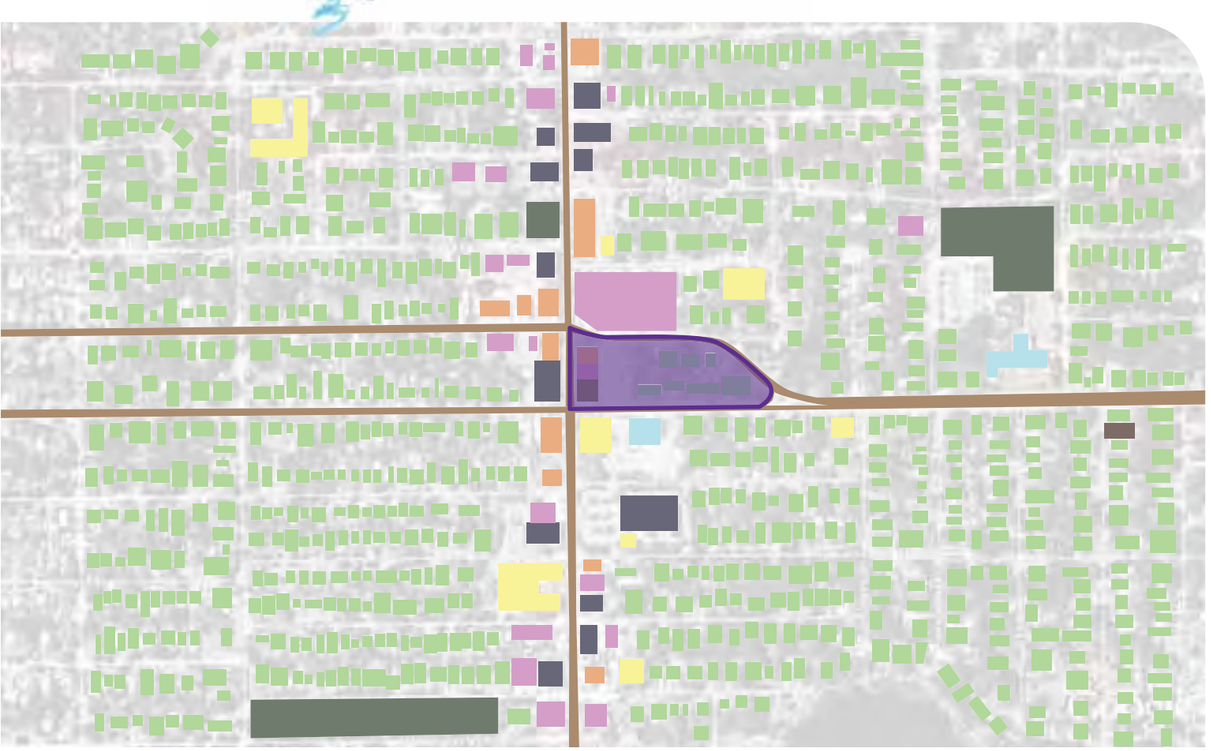


This site is located in the center of a growing city in central Florida called College Park. The intersection is the heart of the city and the developer is looking for new and interesting ideas to further develop the area. Currently there is a Walgreens on the main street front and single family homes behind it on the block.

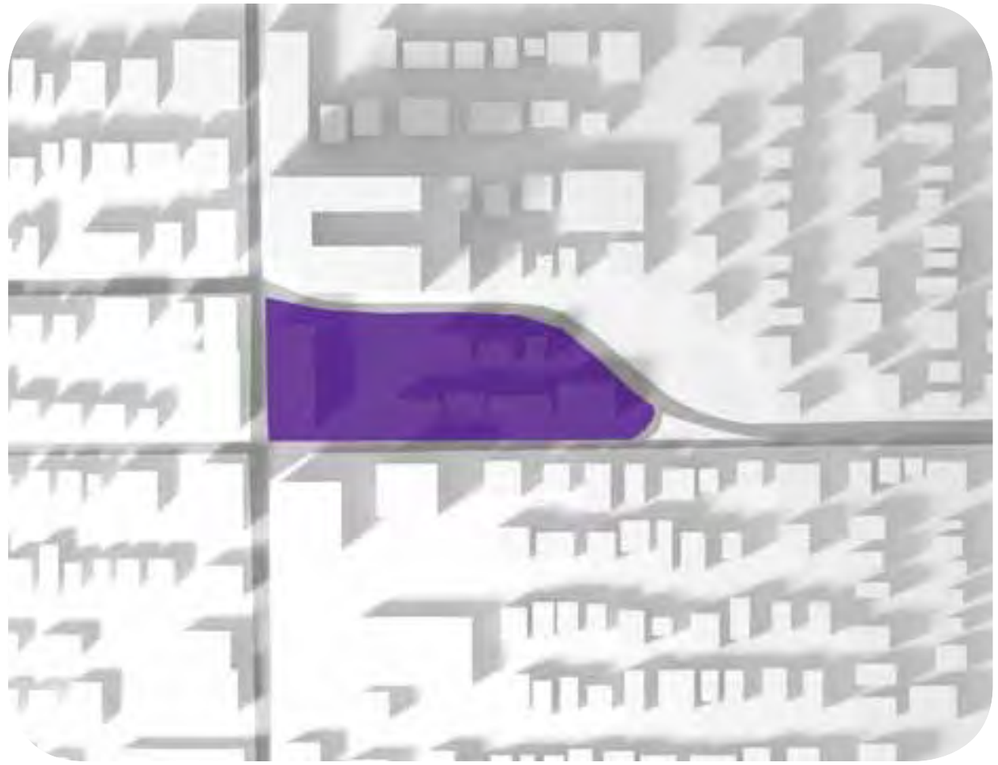
The final design will be a phasing project over 10 years that will eventually use up the lease for the Walgreens and build in its place as a final phase. This lot will become a campus of sustainable buildings with green space connecting the different buildings including a parking garage (Natalia), a multi use retail building with a hotel and movie theater (Andrea), an office building (Suhey), a residential building (Trevor), and a commercial space with retail (Andrea).

Existing Site

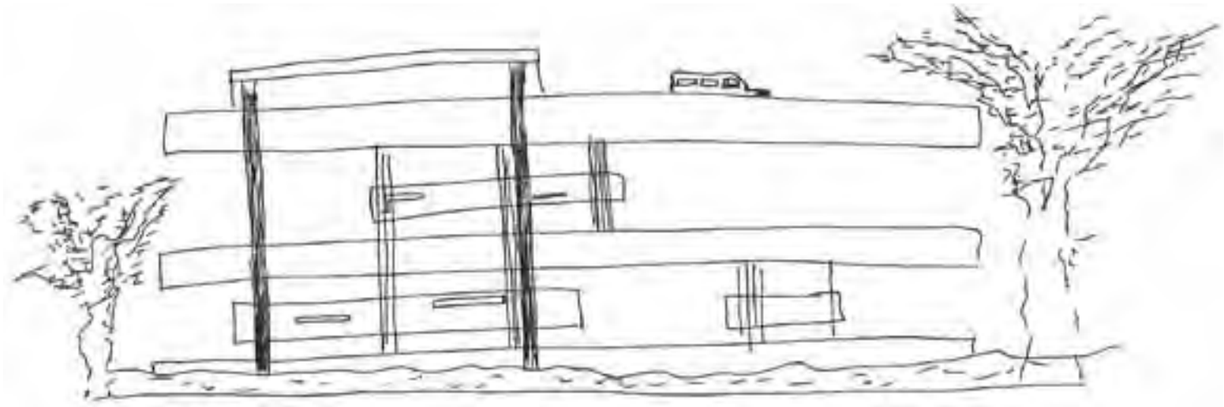


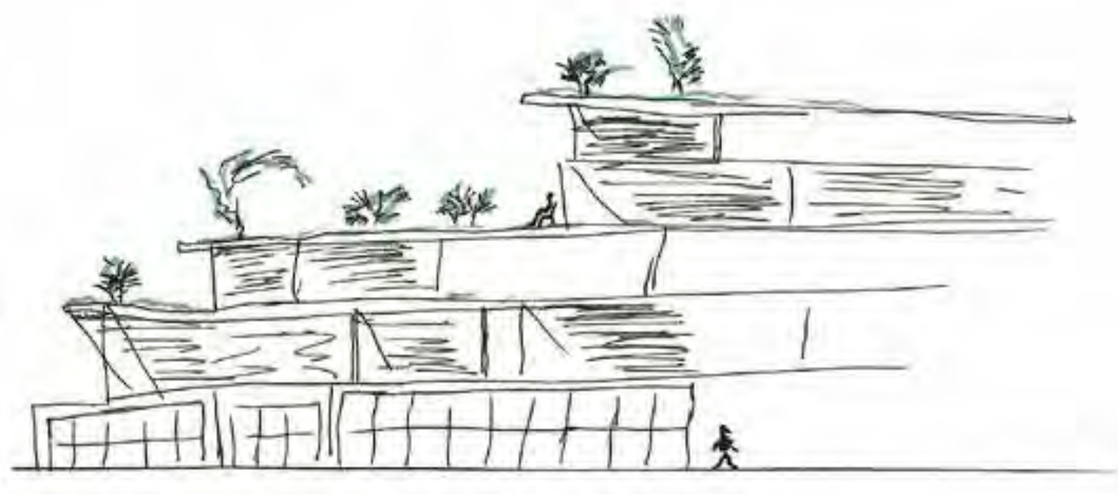


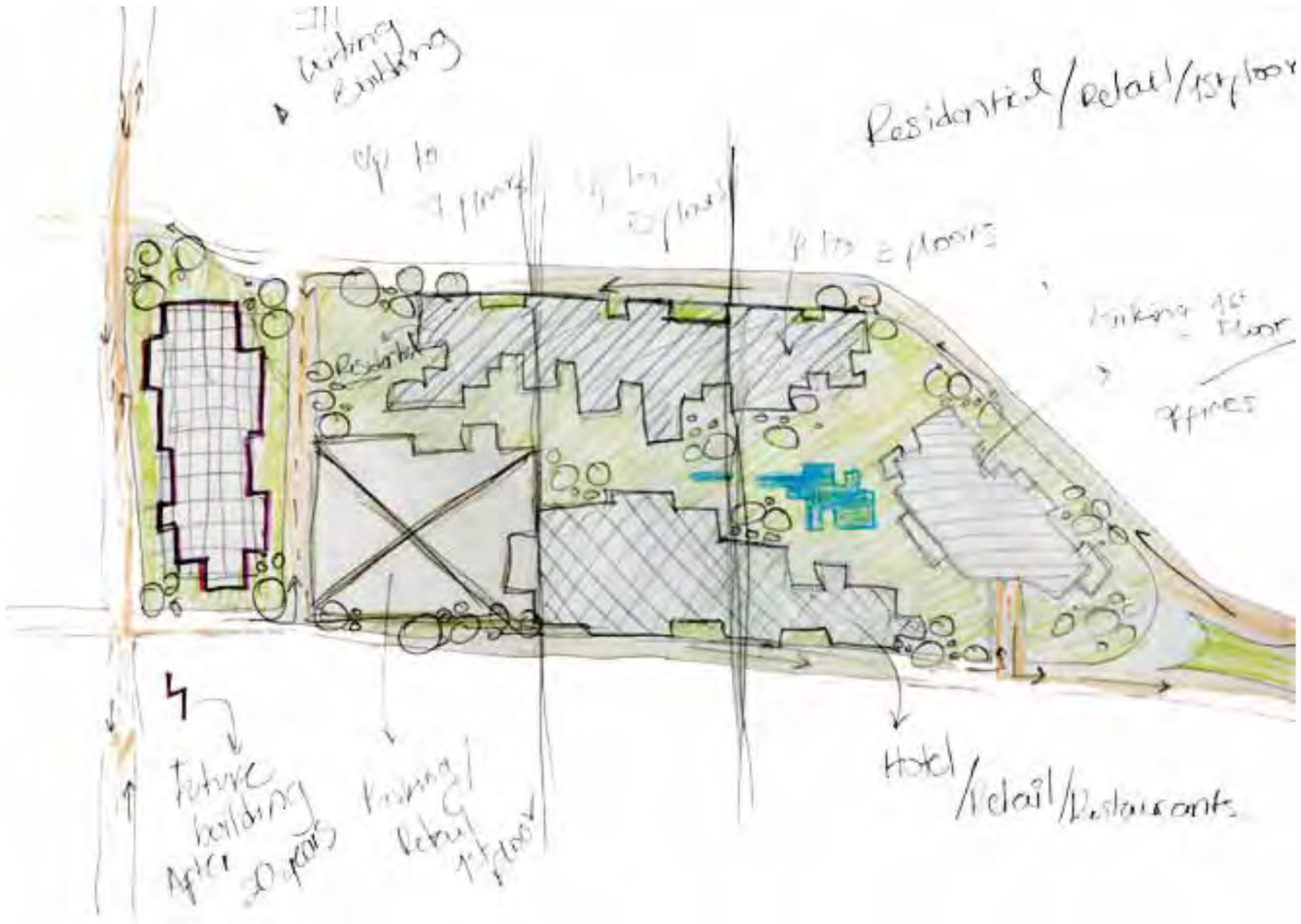
- Parking
- Single Family
- Education
- Mass Transit
- Medical
- Recreation
- Religion
- Restaurants
- Retail
- Other Commercial
- Entertainment
- Hotel



Autodesk Revit | Autodesk AutoCAD | Rhinoceros 3D | Autodesk Impression | SketchUp | Autodesk 3Ds Max | V-Ray







Early sketches show the new campus shape of the block with movement spaces throughout and a water feature along with vegetation.

Rain collectors are used for natural irrigation and grey water

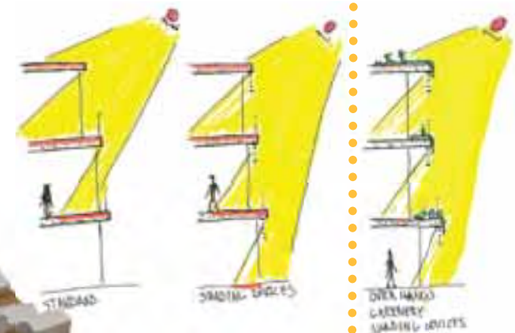
Large windows allow for plenty of year round natural day lighting

Solar panel arrays provide year round power

Large overhangs protect against excessive heat gains.

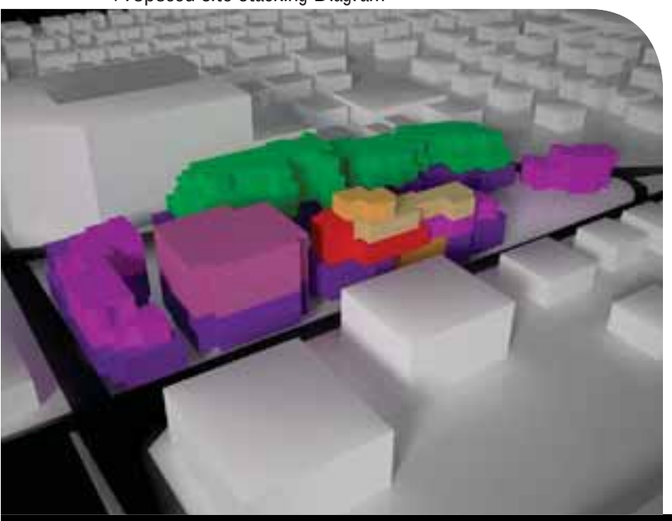
All balconies incorporate green roofs for insulations and human comfort.

Grey water is used in the plumbing and laundry.



The project, based on the developer and owner, needed to be as sustainable as possible using as many passive design elements as possible in the unforgiving Florida environment. Many aspects were included into the Residential building, along with the offices and retail.

Proposed Site Stacking Diagram

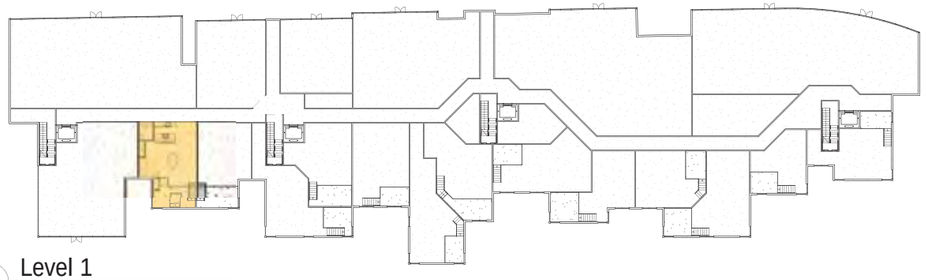


- Parking
- Single Family
- Education
- Mass Transit
- Medical
- Recreation
- Religion
- Restaurants
- Retail
- Other Commercial
- Entertainment
- Hotel

Phase 3 - Year 5

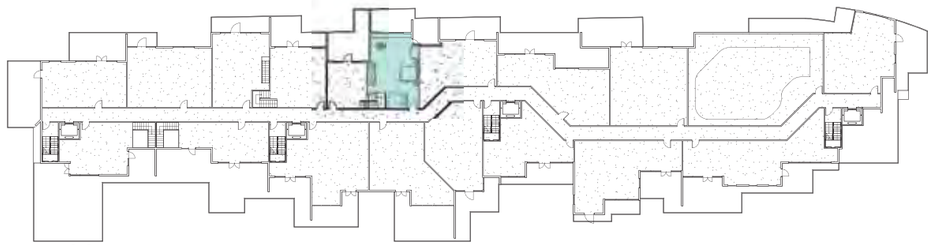
Phase 4 - Year 10

There is 1.5X the green space atop buildings compared to their footprint



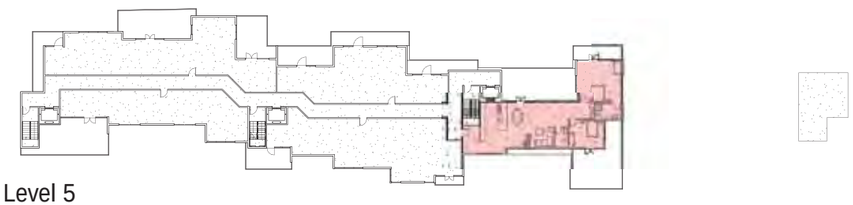
1 Level 1
1/64" = 1'-0"

2 Level 2
1/64" = 1'-0"



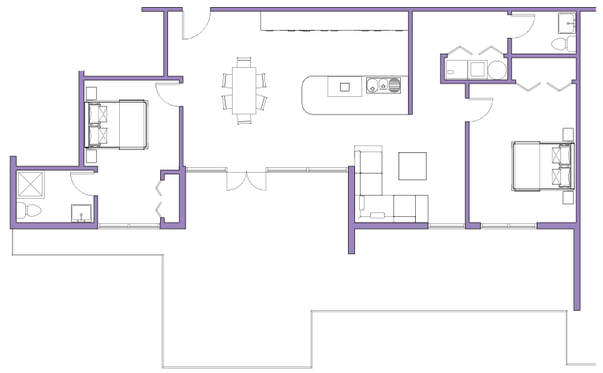
3 Level 3
1/64" = 1'-0"

4 Level 4
1/64" = 1'-0"

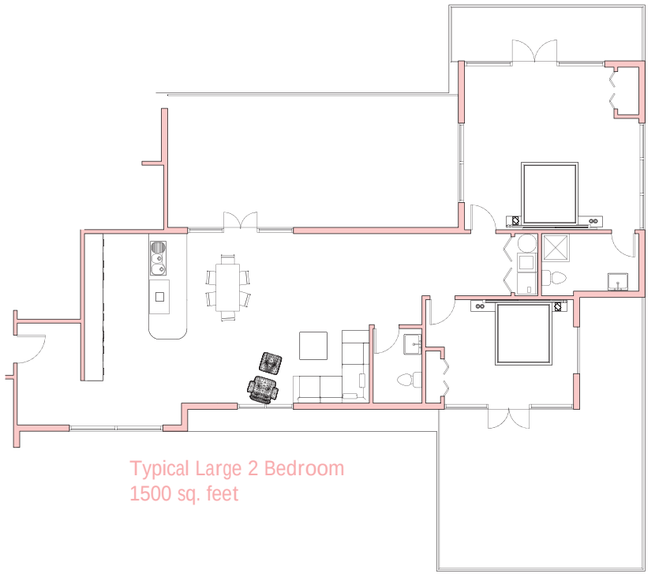


5 Level 5
1/64" = 1'-0"

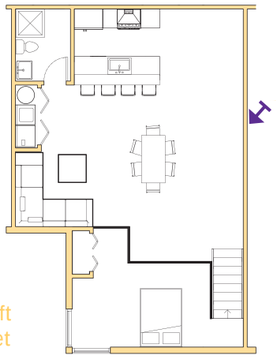
The residential building used sustainability as a central design feature. The buildings green spaces and green roof terraces overall are one and a half times the footprint of the building. This allows the earth to help cool the residential units, along with making a more human friendly design. This is achieved by having large overhangs to block the summer sun, and an extensive eco roof to filter rain water for re use in the building. The many units range in area from 800 ft^2 to 1,500 ft^2. The units are designed to be upper scale condos, lofts, and condo style townhouses nearly all of which have terraces.



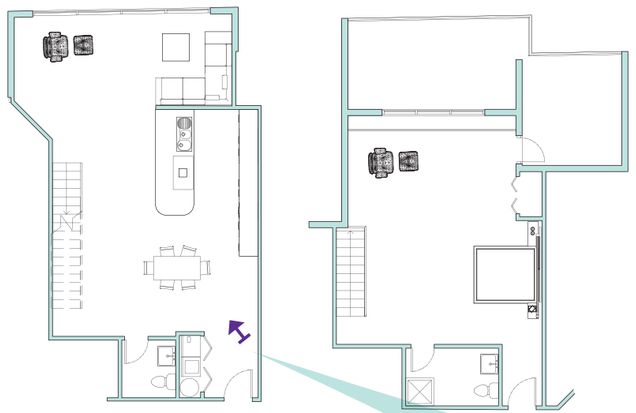
Typical 2 Bedroom
1000 sq. feet



Typical Large 2 Bedroom
1500 sq. feet



Typical Loft
800 sq. feet



Typical Town House
1200 sq. feet

Professional Work

Fire Station # 4

Wave Chair

Virtual Orlando

Low Rise Mixed-Use

High Rise Mixed-Use

Morphology Research Studio

Outside In Studio

Pickathon Design Build

Multicultural Center Studio

Thesis Preview

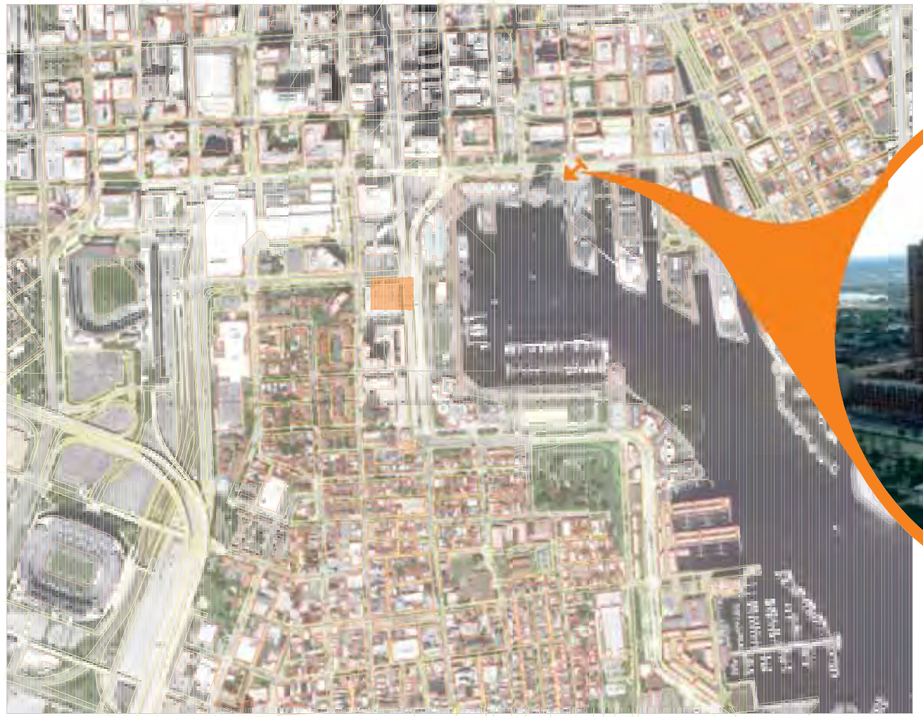
Material Research

High Rise Mixed-Use

Design Studio 7: 2011
Professor: Dr. Thomas McPeek
Location: Baltimore, MD
Partner: Andrea Saenz

8 Weeks

The site for this project is located on the last remaining vacant lot off the bay at the inner harbor of Baltimore Maryland. It is directly adjacent to a large park, shopping mall, and harbor. The site is a very large measuring at 330 feet wide (East West) by 260 feet tall (North South). The site is also on the edge between a largely commercial and retail area of the inner harbor and the residential area with row houses on every street. This makes for a perfect location for a mixed use building with residential, commercial, retail, and a hotel.



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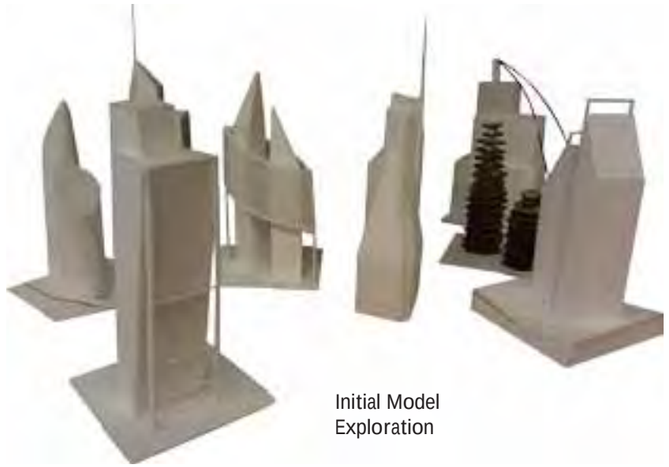
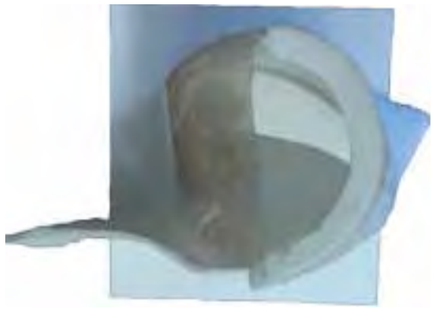


Initial Model
Exploration

Initial study models were produced to see what the class had in mind for high rises. Each student was to make atleast 10 models that the class would then choose which was working the best as a study model. This is also when groups would be made up based on how the best models worked together and could be combined to create a new form.

Initial Form



A couple models were merged with this model to create this new form to work off of. This form would become the basic shape of the building with more explorations to inform the design.

ASPECTS OF DESIGN

Urban Farming

Green Terraces

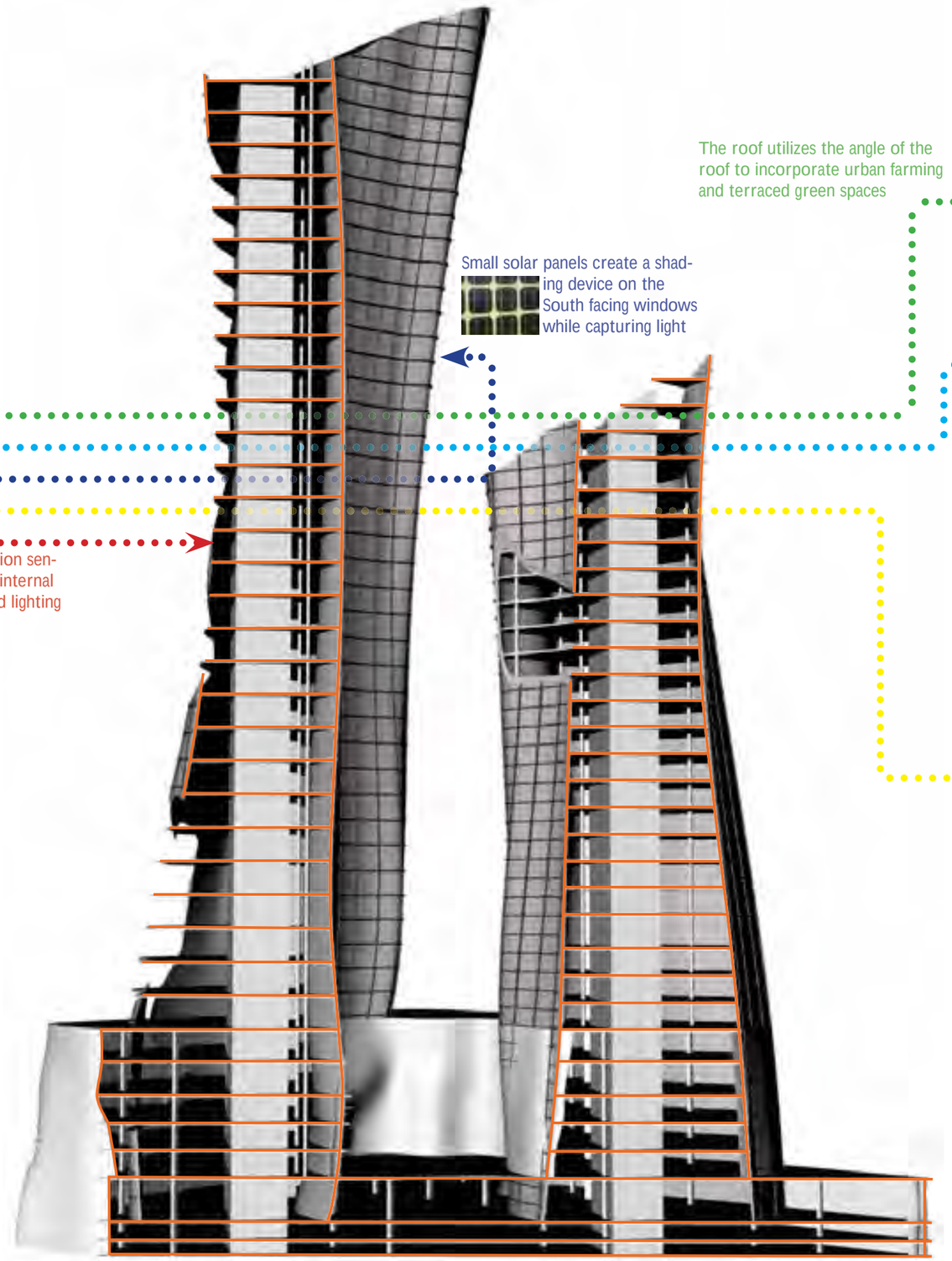
Drainage through the roof waters all of the terrace gardens

Double skin facade with balconies between helps control internal comfort

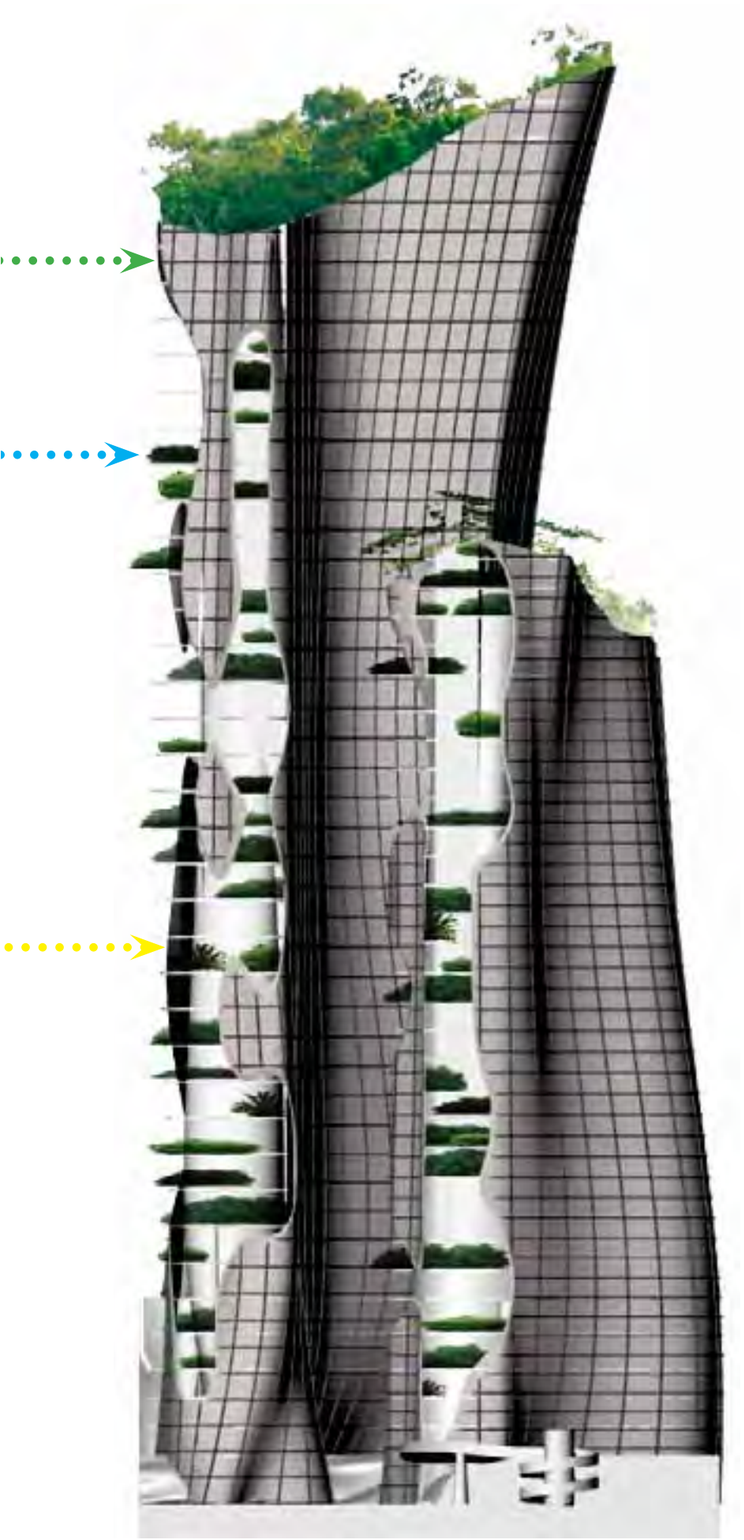
Rooms use motion sensors to control internal temperature and lighting

The roof utilizes the angle of the roof to incorporate urban farming and terraced green spaces

Small solar panels create a shading device on the South facing windows while capturing light



Structural System

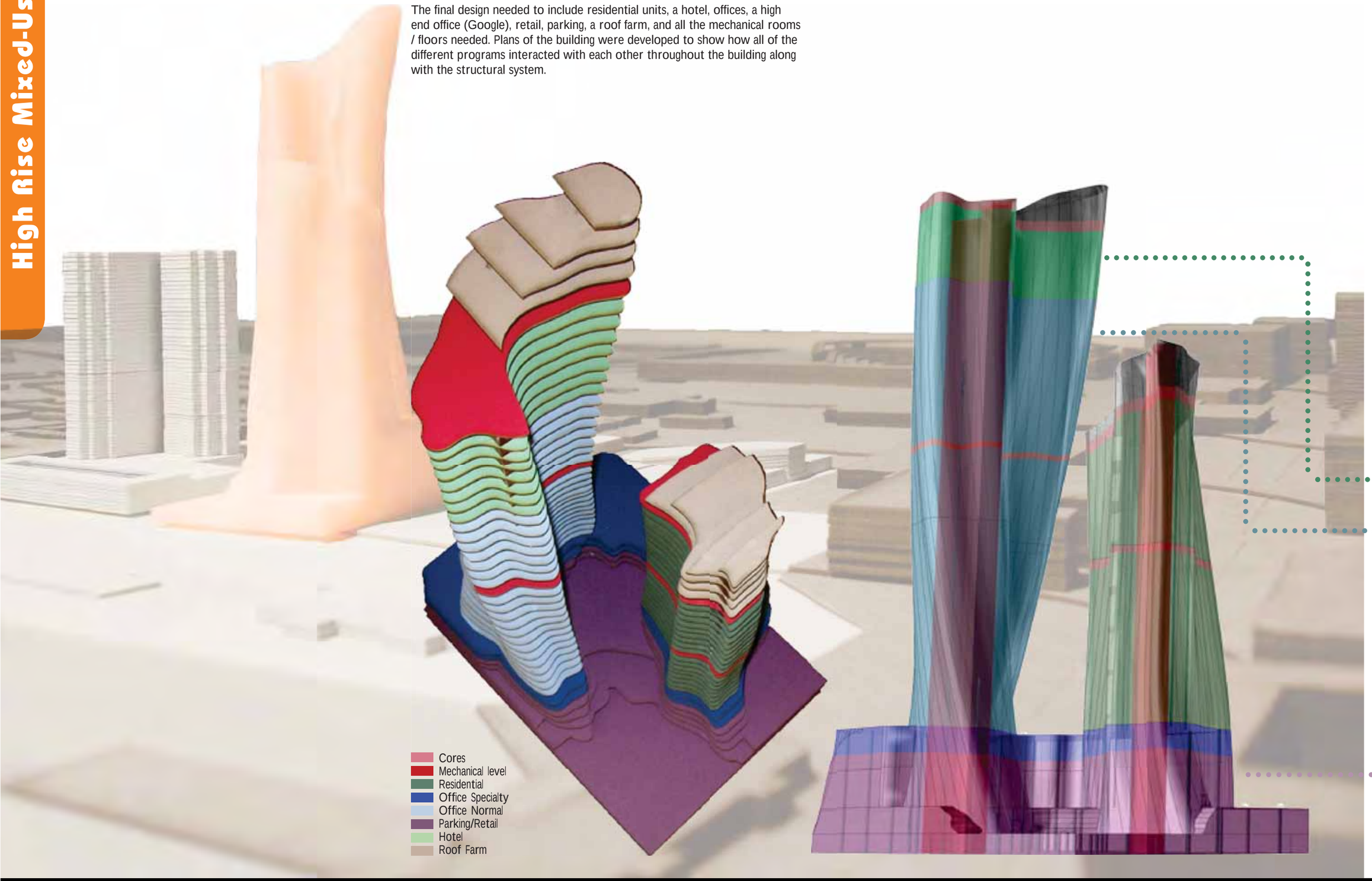


The final design needed to fit into the city while being unique to the area. The building also needed to reach over Light Street that was to the East of the site and touch down with a pedestrian bridge.

The contour of the building was designed to react to each other while allowing daylight to penetrate entirely into the building while the double skin would shade excessive heat gains. The terraces could allow green spaces to climb up the building to extend up to the roof farm that could help feed and water the inhabitants of the building.

High Rise Mixed-Use

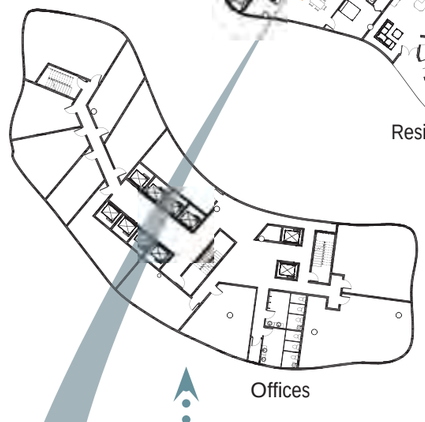
The final design needed to include residential units, a hotel, offices, a high end office (Google), retail, parking, a roof farm, and all the mechanical rooms / floors needed. Plans of the building were developed to show how all of the different programs interacted with each other throughout the building along with the structural system.



Autodesk Revit Autodesk AutoCAD Rhinoceros 3D Autodesk Impression SketchUp Autodesk 3Ds Max V-Ray

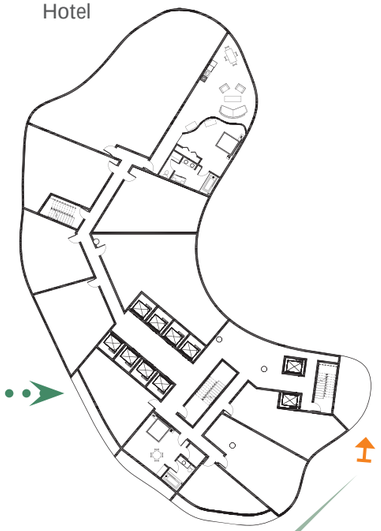
High End Offices

Residential



Offices

Hotel



High End Offices

Typical Single
Family Residence

Typical Hotel

Professional Work

Fire Station # 4

Wave Chair

Virtual Orlando

Low Rise Mixed-Use

High Rise Mixed-Use

Morphology Research Studio

CLICK HERE to view on ISSUU

Outside In Studio

Pickathon Design Build

Multicultural Center Studio

Thesis Preview

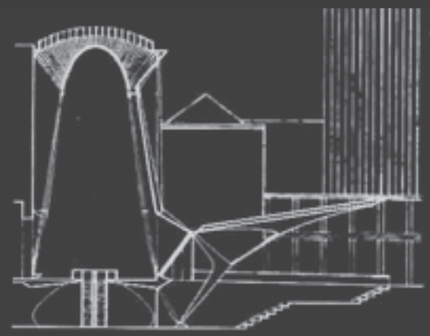
Material Research

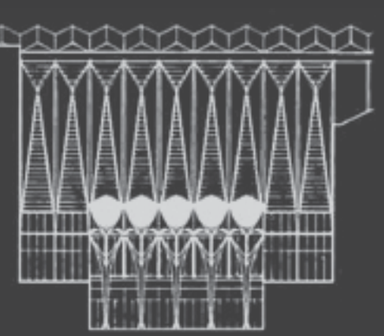
Morphology Research Studio

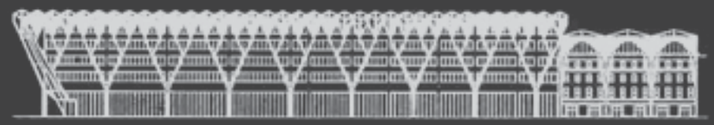
Design Studio 8: 2012
Professor: Dr. Carlos Barrios
Location: Orlando, FL

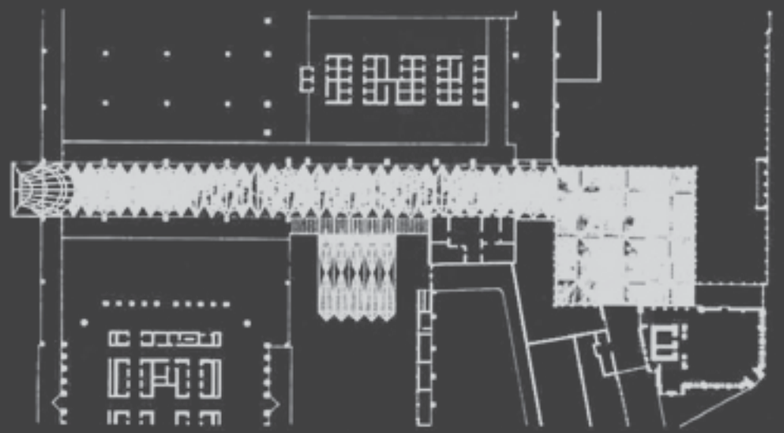
14 Weeks

Part 1: Reconstruction









We were first tasked to find a Santiago Calatrava building that we wanted to spend the semester investigating. I chose the Allen Lambert Galleria at the BCE Plaza in Toronto. It is a long Corridor that bisects four buildings with an adjoined atrium which was all designed by Calatrava. The galleria has been considered the “crystal cathedral of commerce” because of its grandeur being 85 feet tall, 45 feet wide, and 360 feet long.

Autodesk Revit Autodesk AutoCAD Rhinoceros 3D Grasshopper SketchUp Autodesk 3Ds Max V-Ray

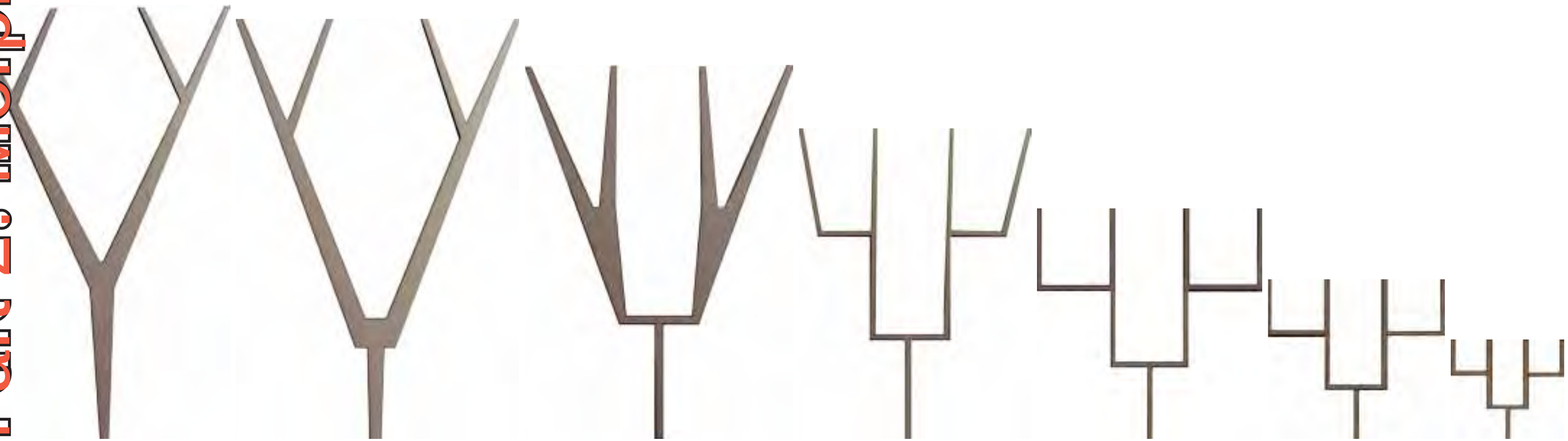
Part 1 was to research and reconstruct the building of our choosing. I started by making a scale model of one section of the galleria which is 1:60. There was 9 sections comprised of the tree structure and a set of corresponding arches that are connected using a metal grid.

As part of the first step I built a study/research model to show how the structure of the arches are supported and how the entire building section is built. I left half of the model unbuilt so all of the separate elements could be easily seen.

Part 2: Morphogenesis

Part 2 of the project is the find the morphological source of the specified building. The morphological source is the most fundamental unit that governs the design of the original structure and is the most basic form of the structure or building. This is found by breaking down the original structure by simplifying the separate elements and combing them to create a cube structure that becomes the fundamental unit.

The fundamental unit/ source needs to be completely ambiguous, so once I have the basic form of the structure combined I need to translate and rotate the elements to make it entirely symmetrical so it can be tessellated to create the basic source.



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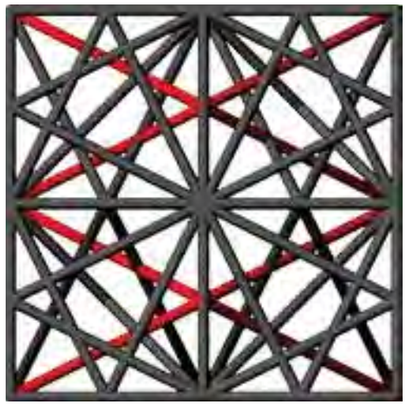
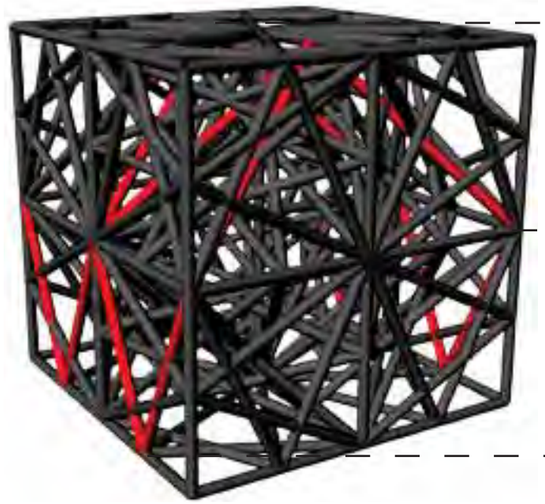
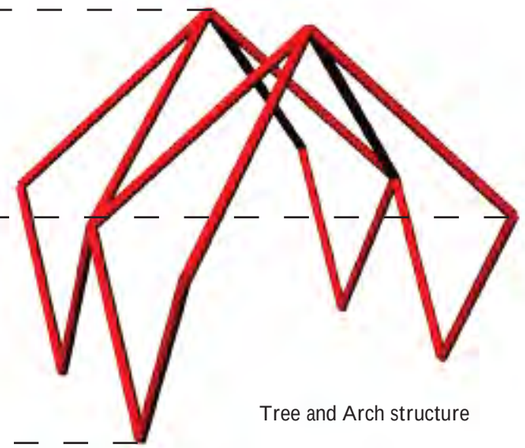
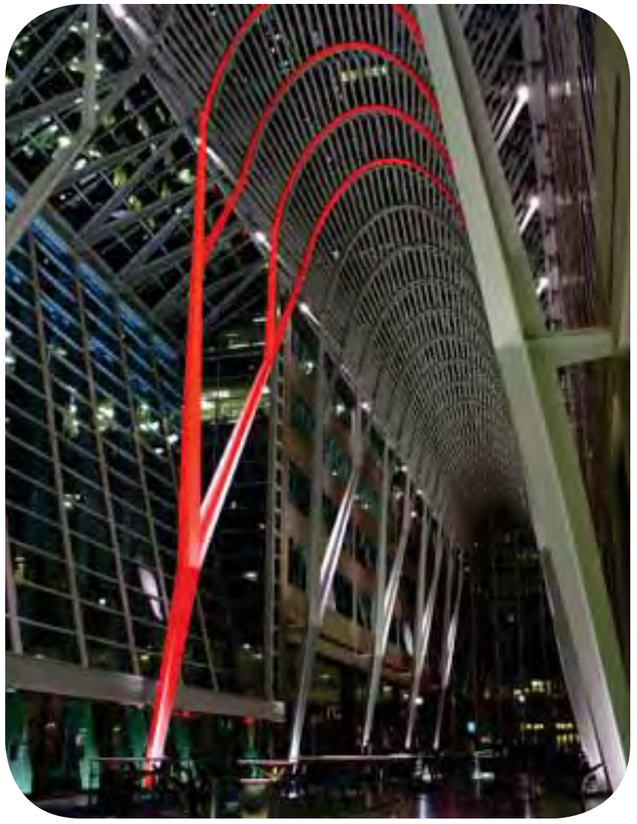
Top



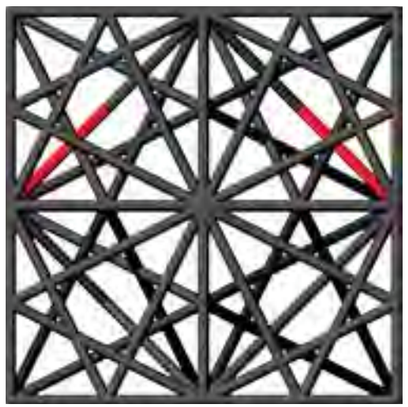




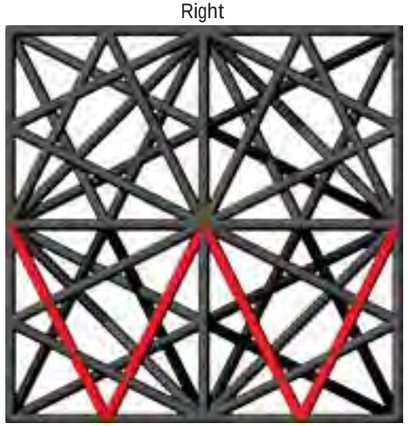
Tree and Arch structure



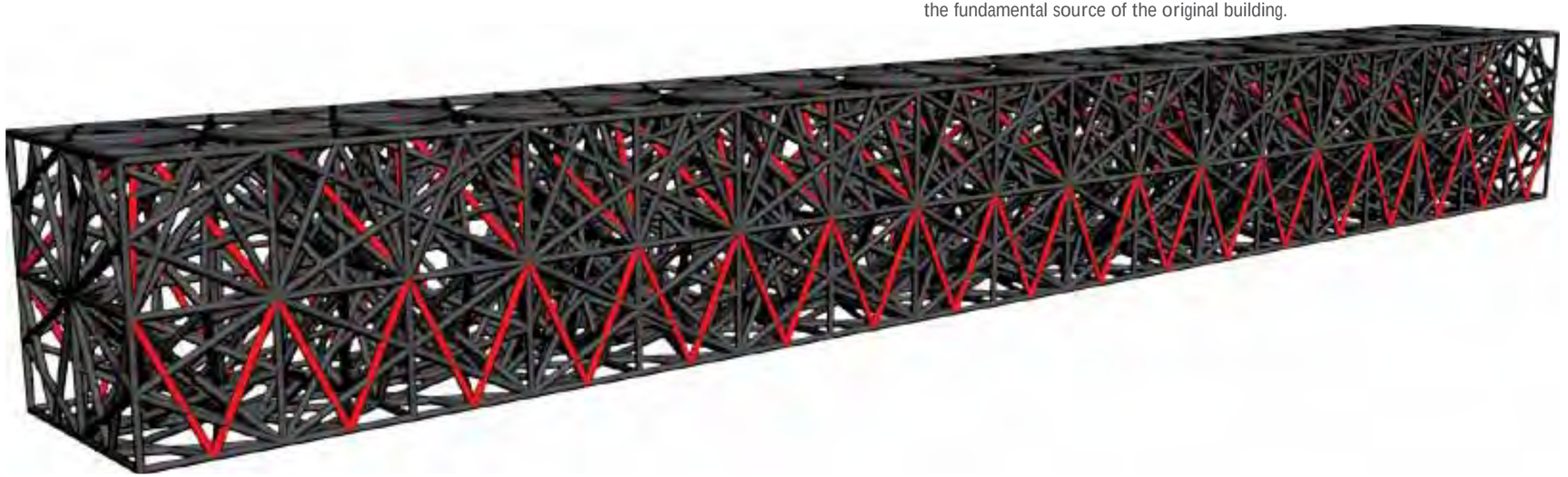
Front



Right



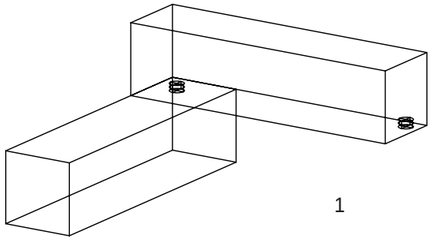
The base unit can now be tessellated by shifting it nine times to create the fundamental source of the original building.



Metamorphosis

Part 3: Mass Customization

using shape grammar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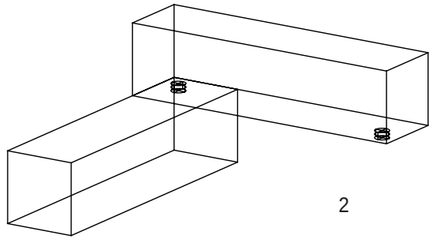
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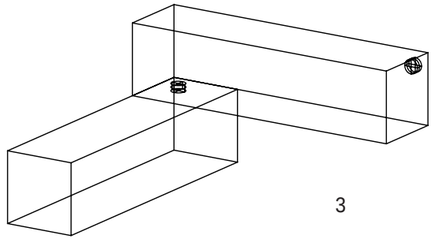
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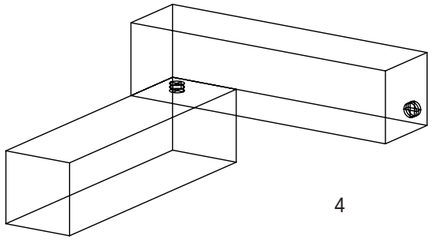
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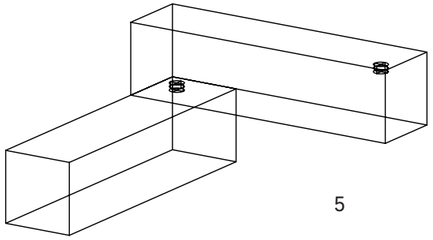
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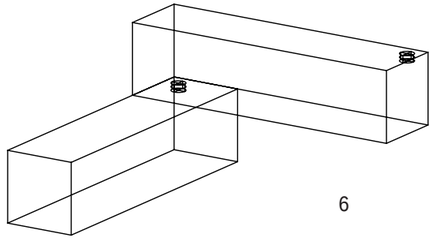
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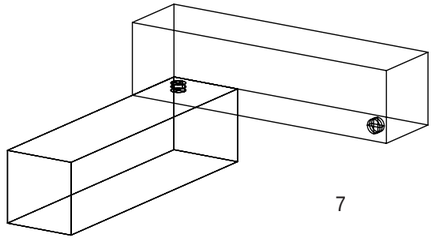
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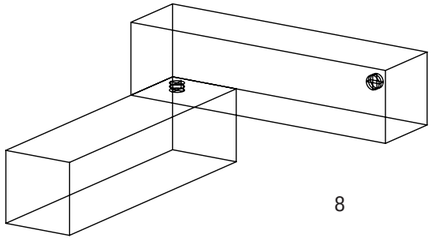
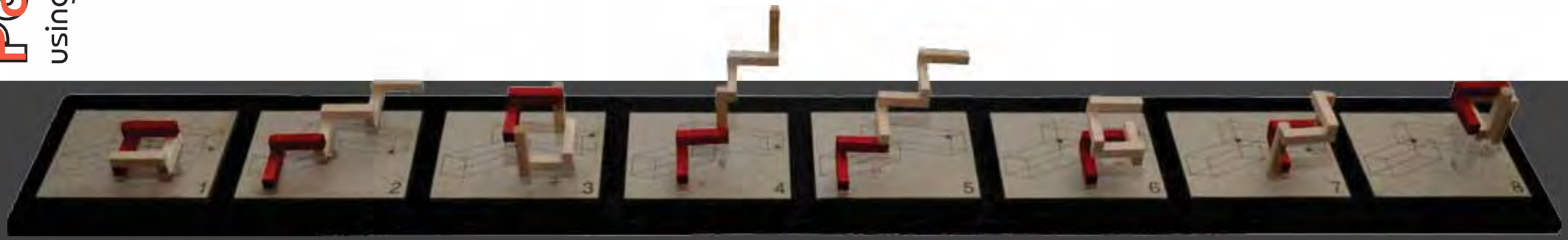

8

Now that I have found the fundamental source, I now am going to work backwards to create an original design for part 4. I am going to use a method of translation created in the early 1970s that uses the relationship of shapes to create a new design called Shape Grammar. I wanted to design residential housing using shipping containers but didn't know how to start. When using the translation language that I created with the shape grammar rules I came up with 16 original rules of translation of six or less containers.



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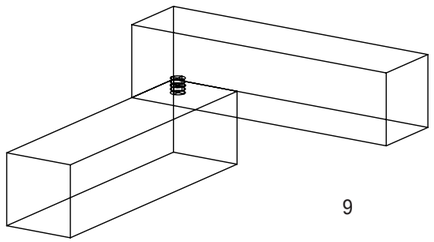

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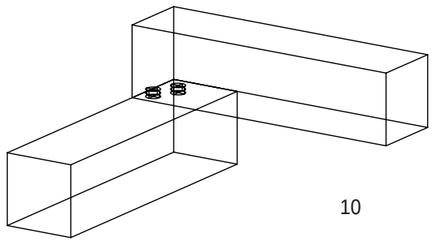

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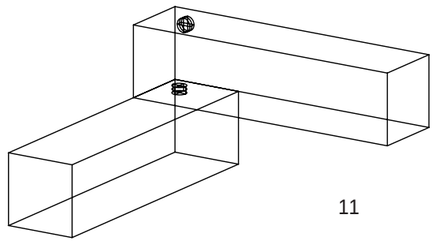

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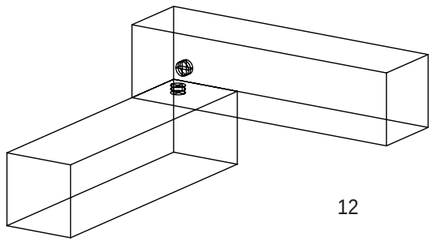

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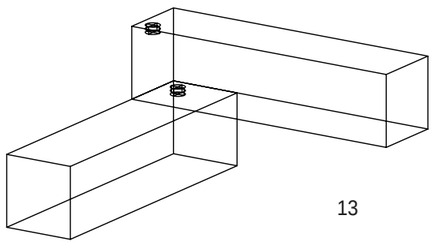

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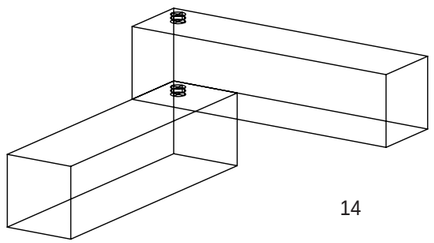

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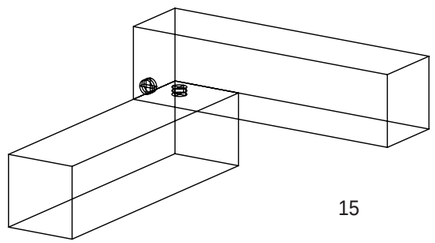

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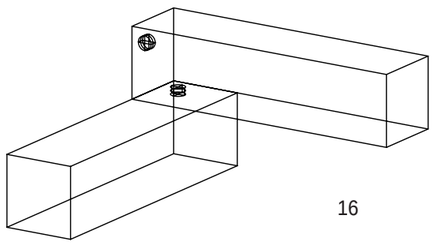
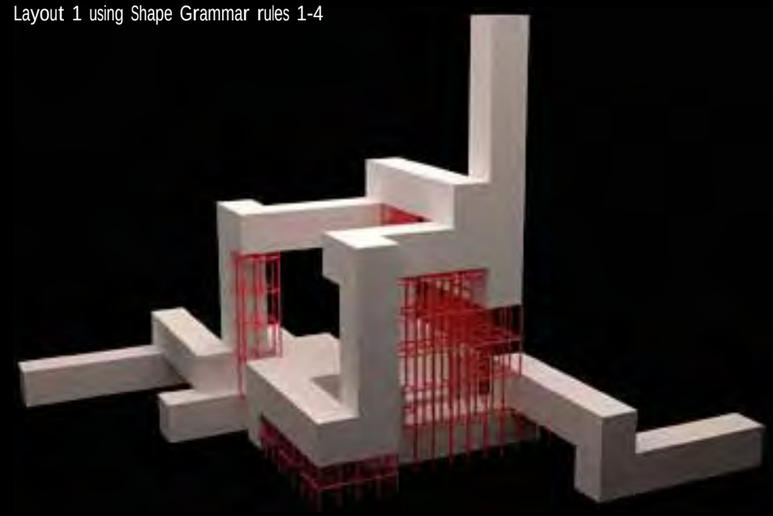


16

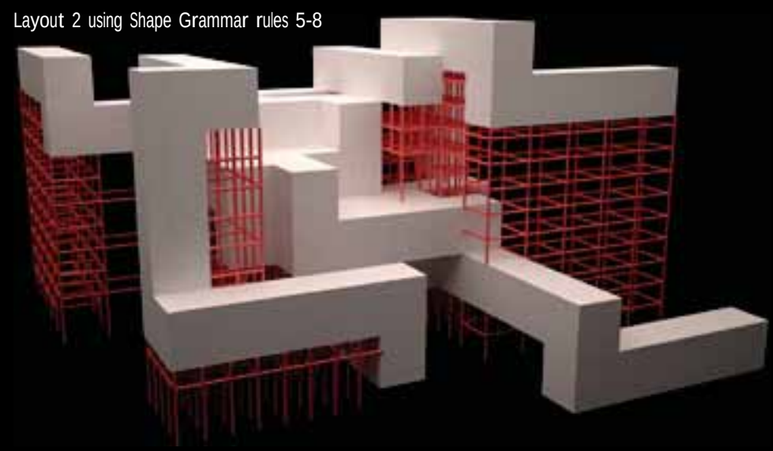
I merged four rules to create four different layouts that can be put into different types of locations for specific purposes. This language of combinations can ultimately be used to create a structure that fits in any scenario with as many units or sized housing that is needed. I am using my base unit from my Calatrava building to create a structural system to support my new design of shipping containers.

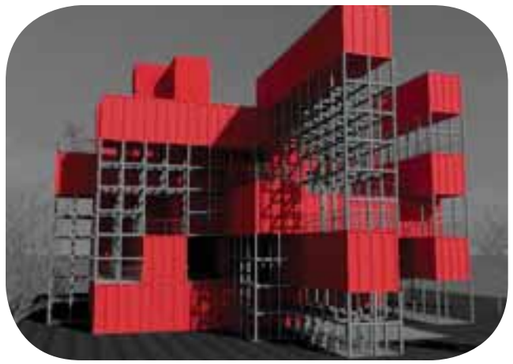
Part 4: Design

Layout 1 using Shape Grammar rules 1-4

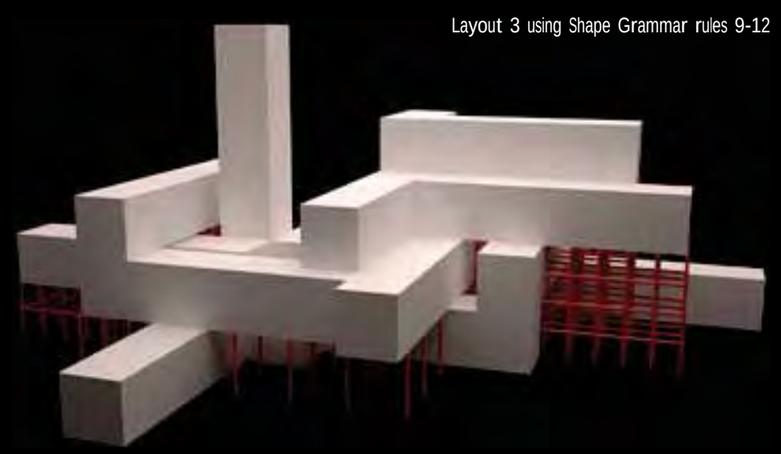


Layout 2 using Shape Grammar rules 5-8

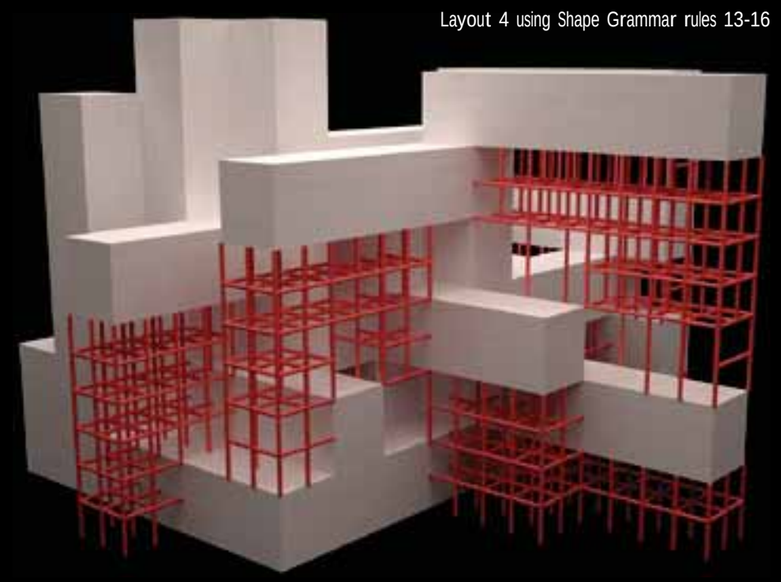


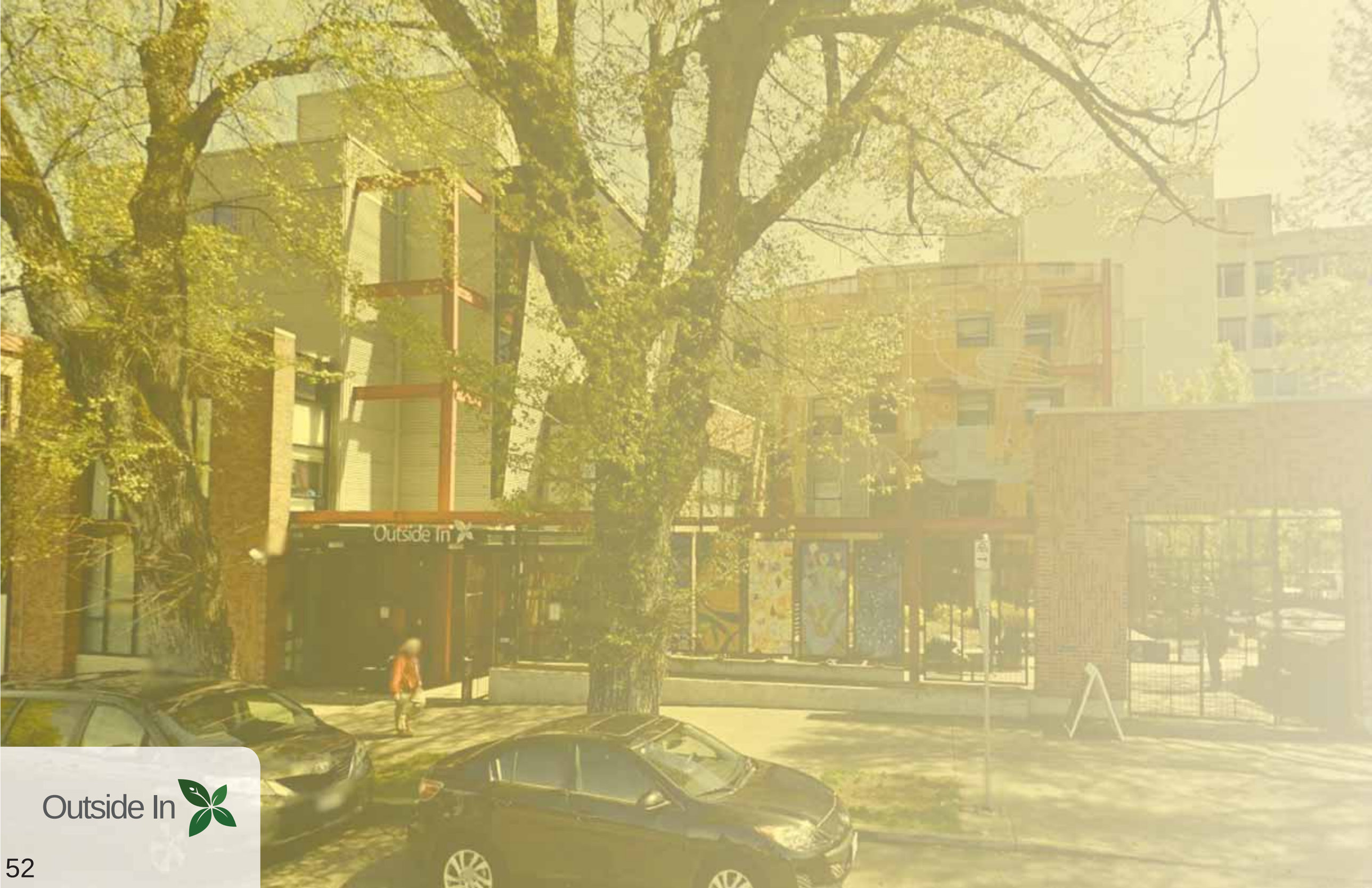


Layout 3 using Shape Grammar rules 9-12



Layout 4 using Shape Grammar rules 13-16




Outside In

Professional Work

Fire Station # 4

Wave Chair

Virtual Orlando

Low Rise Mixed-Use

High Rise Mixed-Use

Morphology Research Studio

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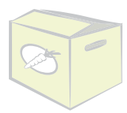
Pickathon Design Build

Multicultural Center Studio

Thesis Preview



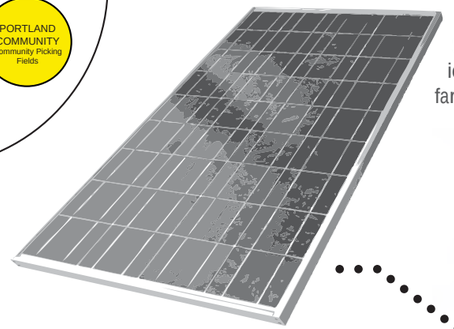
Material Research

Outside In Studio

Design Studio 581: Winter 2013
Professor: Sergio Palleroni
Location: Portland, OR

10 Weeks

The activation of the rural Sauvie Island brings Portlanders to a more remote rural location that wouldn't be visited by the everyday person. This site provides people with a daily produce market and a self pick greenhouse. This farm will also aid with the Portland CSA that delivers produce to houses along with the off site Outside In homes. The Outside In youth will come to these farms and build the greenhouses and ADUs to temporarily live while working on retreat. They will come here after they complete the temporary housing through Outside In.



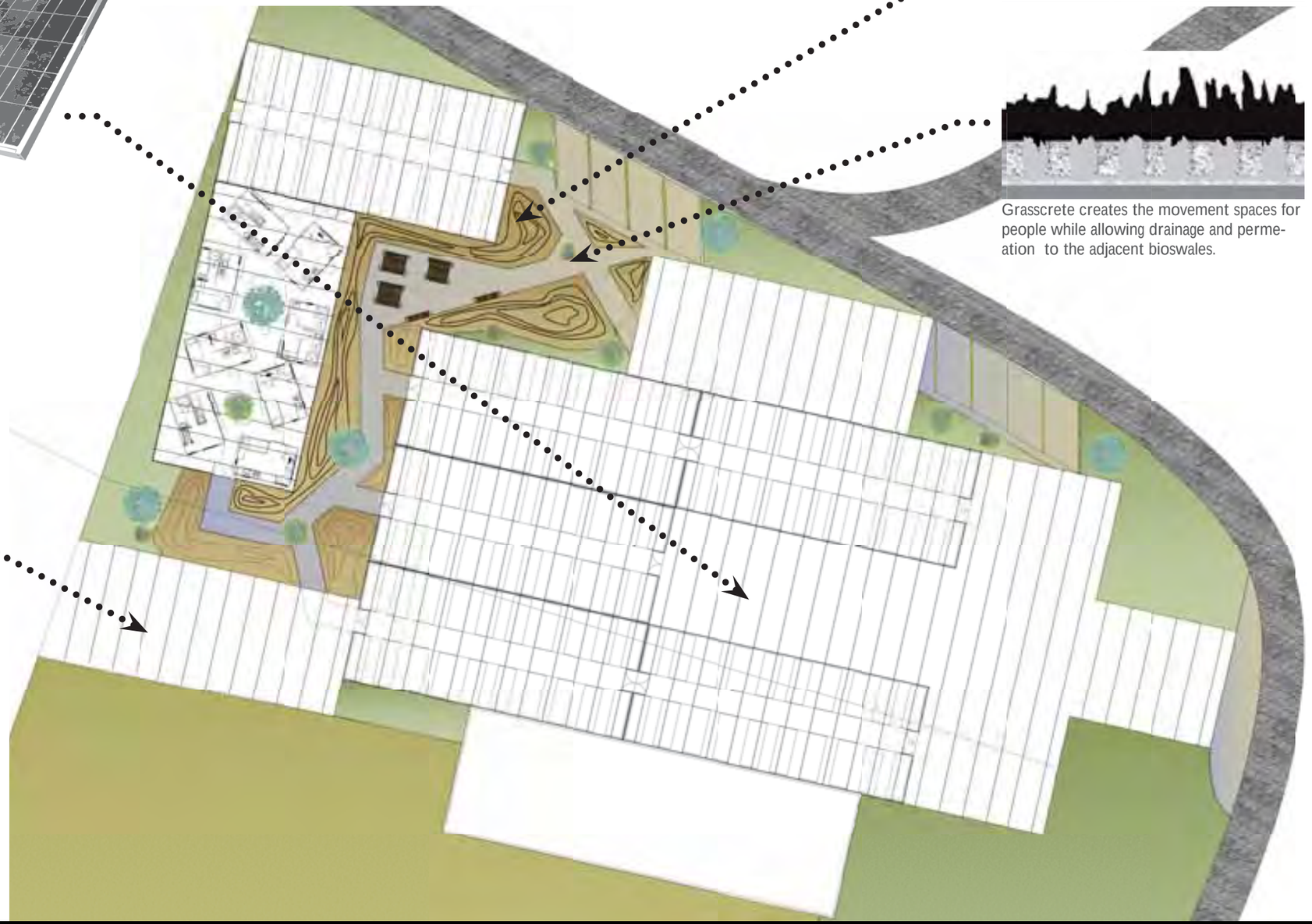
Solar panels cover the majority of the pavilions south facing peaks to power the entire farm and some of its surrounding area.

SITE & SUSTAINABILITY

Bioswales filter water runoff slowly throughout the site so that the vegetation, gravel and sand filters the water so it can be used in the greenhouses.

Grasscrete creates the movement spaces for people while allowing drainage and permeation to the adjacent bioswales.

Rural farming from Outside In workers brings people to Sauvie Island while living on a temporary retreat between housing.



The activation of the site that was once vacant will bring the large biking community and weekend produce pickers to a new location that filters production to Portlanders. Greenhouses and production pavilions fill the site along with a greenhouse that is loaded with ADUs.

Autodesk Revit | Rhinoceros 3D | Autodesk Impression | SketchUp | Autodesk Autocad

SITE ACTIVATION

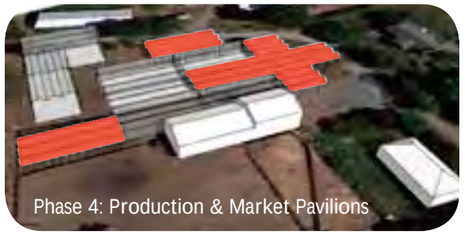
Vehicular traffic from Portland enters from the West where the one bridge accesses the Island. There are many parking spots off of the access road along with street parking. Weekend **bicyclists** have plenty of bike racks at the main entrances to the site along side of the market, production center, and the ADUs. The **bicycle couriers** leave the site from the production center to head to Portland to produce markets and Outside In houses and buildings.

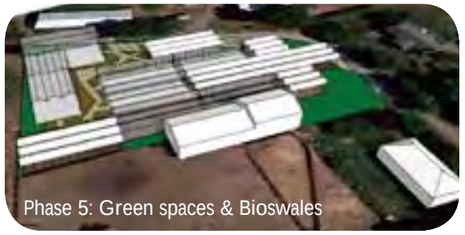
SITE SEQUENCES


Phase 1: Existing House & Barn


Phase 2: ADU Greenhouse

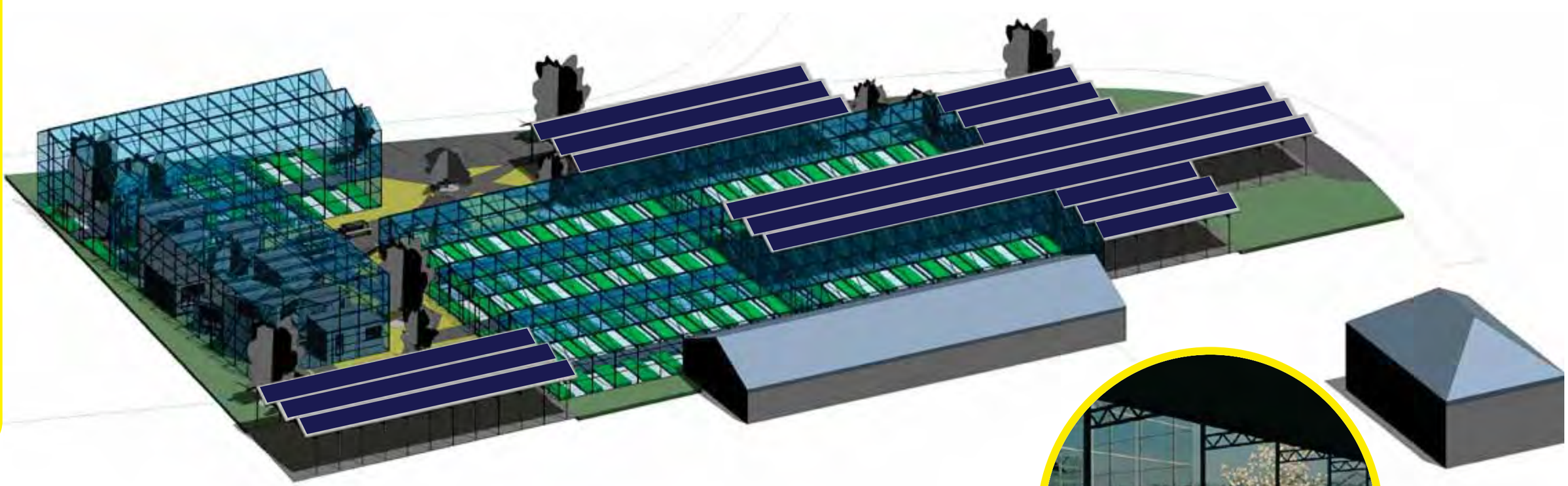

Phase 3: Additional Greenhouses


Phase 4: Production & Market Pavilions


Phase 5: Green spaces & Bioswales

Outside In Studio

Outside In Studio



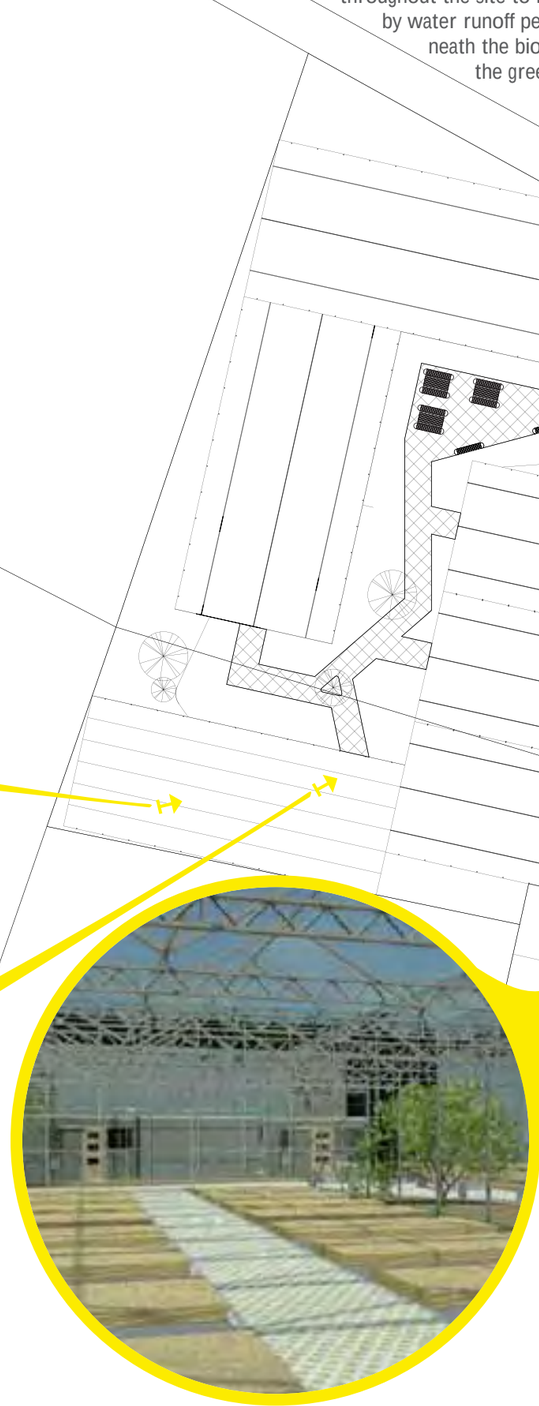
Outside In transitional retreat housing and farming is based off of a farmland that is on the south end of the Island. The site is empty and adjacent to an existing stock yard and barn. The Outside In youth will come here and build their greenhouse that holds the 150 ft.^{2} additional dwelling units. With the larger environmental envelope lightweight cheap ADUs can be constructed inside of this large Greenhouse with minimal cost and materials since they do not have to be conditioned for the elements. The basis of operation is completed, more greenhouses along with production pavilions including a market structure for daily produce markets.

All of the youth housing will be constructed in the greenhouse along with the greenhouse itself. All of the buildings are designed to be built and assembled by semi trained Outside In youth/ employees. These structures are also easily disassembled so they can be built on any farm once their previous partnership is over or they need to expand to a different site. This can also allow the workers to continue to expand and assist the existing farmers on Sauvie Island.

GREEN-HOUSE-PRODUCTION: A NEW FORM OF RURAL DEVELOPMENT

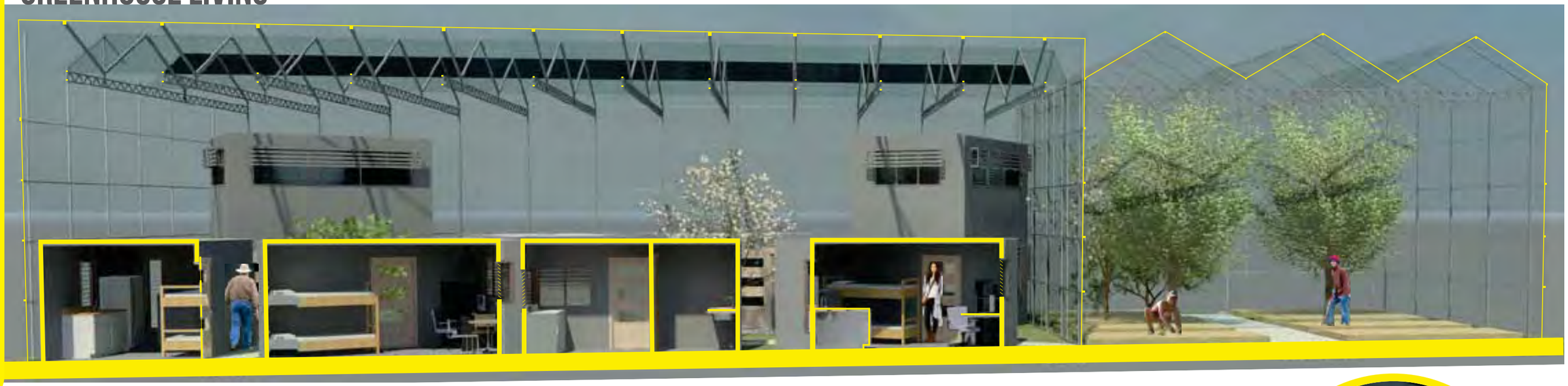
Views of the site looking around at the movement spaces and production lines for the farm land show the many sustainable aspects of this site. Bioswales and grasscrete are used throughout the site to filter and collect water to be used in the greenhouses. This happens by water runoff permeating through the vegetation and soil to piping that runs underneath the bioswale fields. This is collected through a pump system that is fed into the greenhouses.

The Outside In youth move from transitional housing to this rural farm retreat. This can be the transition between the XY housing and house 2 home or a commons house. The youth that come through here will be competent with work and show competency with staying clean. This is a post recovery work facility that helps teach the youth about farming and gardening.

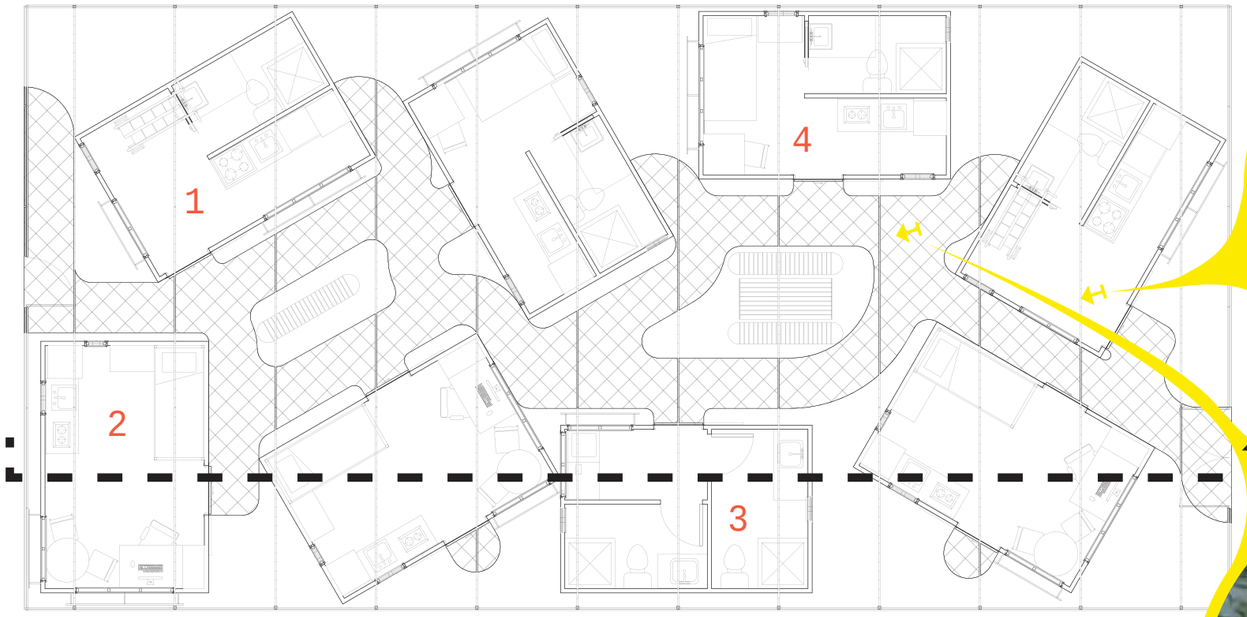


Sauvie Island is a weekend bike destination along with many farms that people can go and pick their own produce. This site will accommodate both of these programs with large greenhouses for year around farming and convenient markets for those who want to just buy their food.

GREENHOUSE LIVING



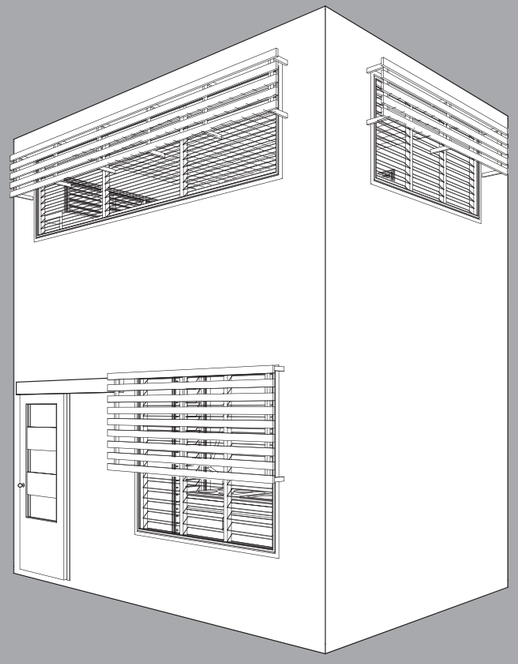
The greenhouses and additional dwelling units (ADUs) are built with lightweight inexpensive materials for ease of building and low cost. The units are designed so they can be built and disassembled so the farm can move to different locations for optimal farming throughout the year. The greenhouse structure can also gain additional space for more housing so more Outside In workers can be on site if needed.

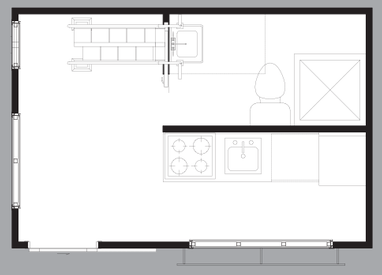


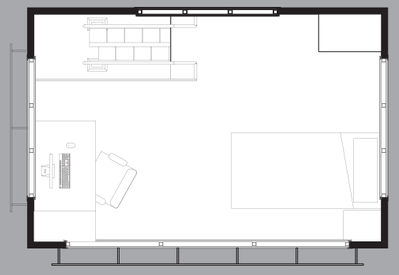
Looking out of the second floor at a courtyard.

The large greenhouse filled with interchangeable ADUs based on the four right plans

LIGHT SHEDS COMMUNITY





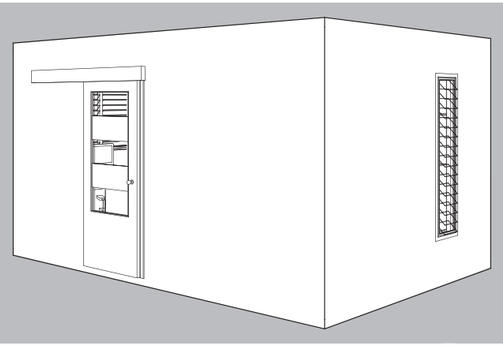


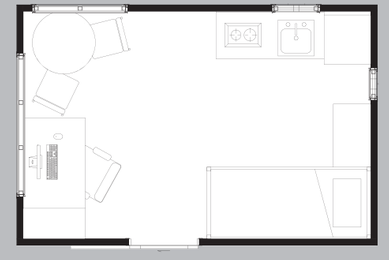
1

2 story single bed loft including bath and kitchen. Larger unit with more privacy for individuals.

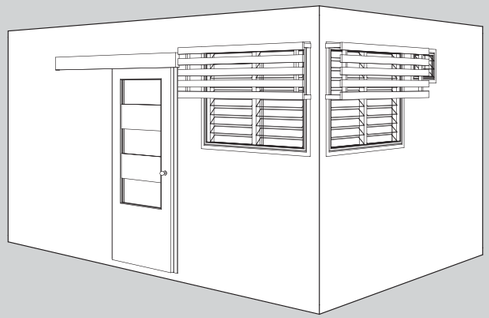
2

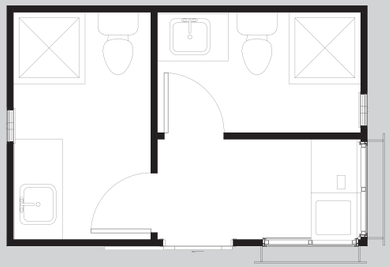
This unit has a two bed bunk with a small kitchenette and dinning area. Smaller unit with multiple residents.





Outside In Studio



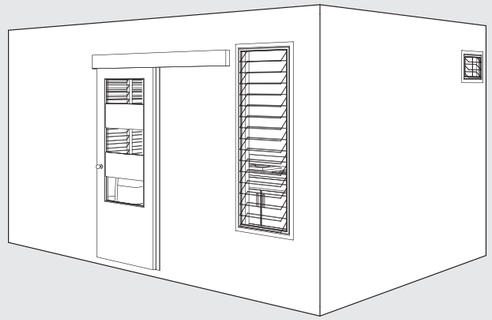


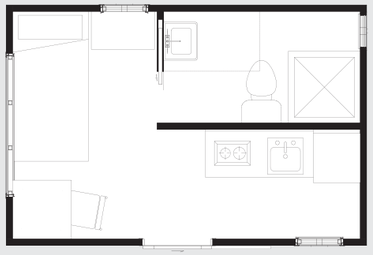
3

Wash room and Laundry AS. Since some units do not have bathrooms this unit provides them.

4

Small single bed unit with kitchenette and bathroom. Workspace included with small plan.





BAMBOO GARDEN

PICKATHON 2013

Professional Work

Fire Station # 4

Wave Chair

Virtual Orlando

Low Rise Mixed-Use

High Rise Mixed-Use

Morphology Research Studio

Outside In Studio

Pickathon Design Build

Multicultural Center Studio

Thesis Preview

Material Research

Pickathon Design Build

Design Studio 580: Fall 2012
Professor: Travis Bell
Location: Portland, OR

10 Weeks

The Pickathon Design Studio is the continuation of a third year undergraduate design studio. This project was to create an entry gate to a local Portland music festive called Pickathon. The event is an annual music festival that is spread over a three day weekend in August. The festival grounds is on private and called Pendarvis Farm located in Happy Valley, Oregon.

The previous studio finalized a material and design language of the entry gate with many different iterations throughout the class. From this basis, the Graduate design class would refine the design through unique and iterative models with bamboo as its main material.

The bamboo will actually be cut and harvested from a local garden which contains over 300 varieties of bamboo, making it the most diverse in the country.

The Bamboo Garden paired up with the studio to , teach harvesting and bamboo construction techniques, harvest all of the bamboo needed for the project, and shipping to Pendarvis Farm. The harvesting took three days where the same class cut down and moved almost 700 canes ranging from 15 to 40 feet tall with diameters from 1 to 4 inches.

BAMBOO GARDEN

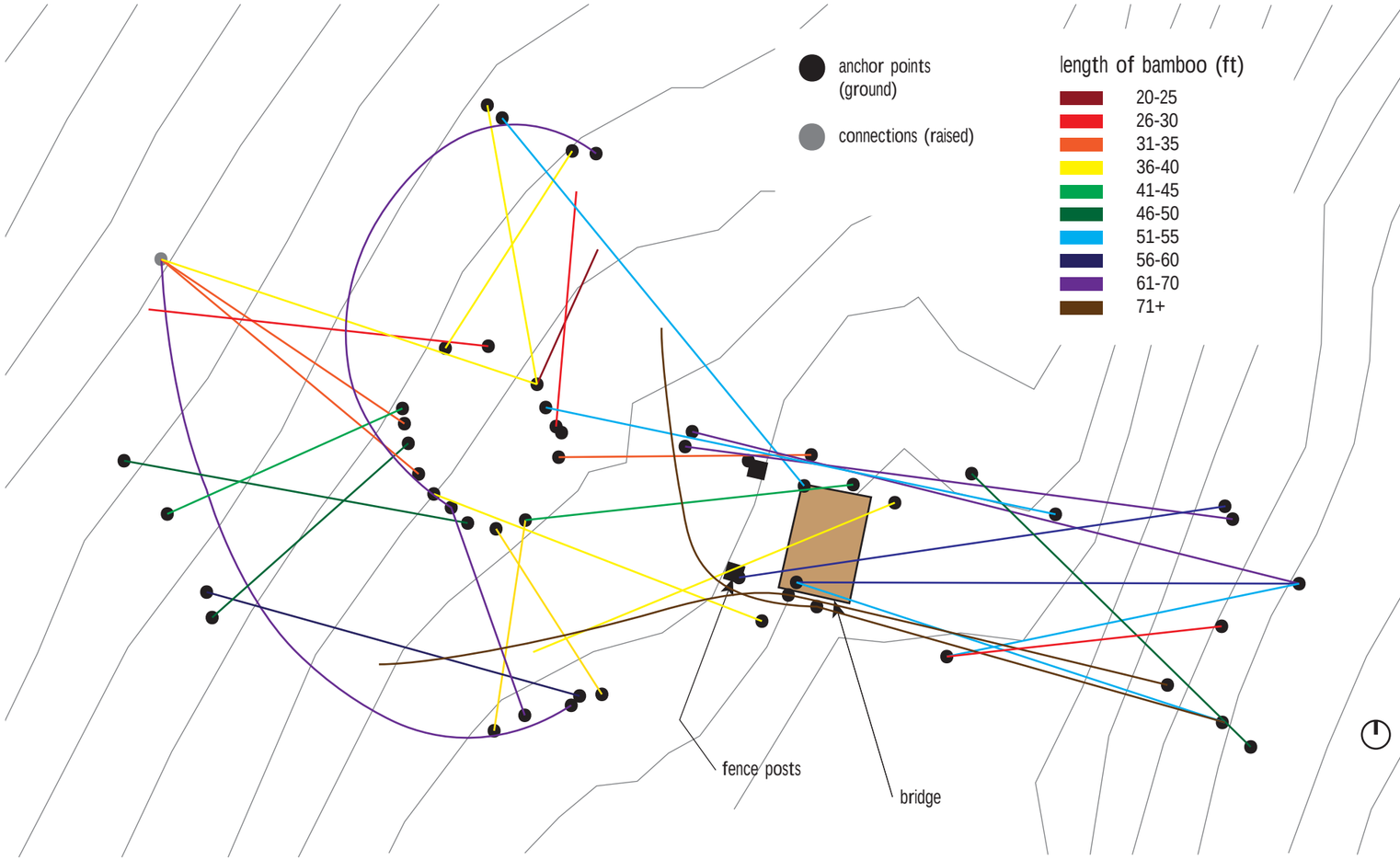
The design section of this project including testing of the materials that were going to be used. The uncured bamboo canes were rubbery and would split at certain angles and bends. These canes would be bundled in staggered groups using traditional oriental bamboo knots.

The best parts of all the models were combined and re imagined into a final model on a contoured topography model based on satellite elevations and site measurements. The spans and diameters of cane runs were determined for each unique span and color coded for construction.

Sketches with some of the aspects of all the models combined.

Many tools were needed for the building of the project. The site is a long narrow path less than 10 feet wide and over 50 feet long. The path moves between wooded areas surrounding a small creek and a small flat bridge. The spans were bundled and measured in a make shift tarp tent to keep the sun off of students and slow the curing or the canes.

The runs were then carried to the opening and threaded through other runs to rest in its final place. Due to modeling errors the final structure was altered to best fit through vegetation and other canes to minimize soil damage. The canes were help in place into the ground by sliding them over rebar and lashing the larger runs together with bicycle inner tubes that were donated by a local bike shop.



The final entry gate actually was one of three overall structures that were built. The founder of Pickathon enjoyed the bamboo experience so much that he had us build the Camp Host (luggage drop off and “front desk” structure), the Water Bar (a structure to house a tap system for free water fill ups), and tables made out of bamboo for two of the food venders. The other two structures used some tensile fabric sheets that the rest of the festival used to bring the same shape devices into the PSU structures. The blue was the Water Bar and the green was the Camp Host. The final experience was breathe taking.

Professional Work

Fire Station # 4

Wave Chair

Virtual Orlando

Low Rise Mixed-Use

High Rise Mixed-Use

Morphology Research Studio

Outside In Studio

Pickathon Design Build

Multicultural Center Studio

CLICK HERE to view on ISSUU

Thesis Preview

Material Research

Multicultural Center

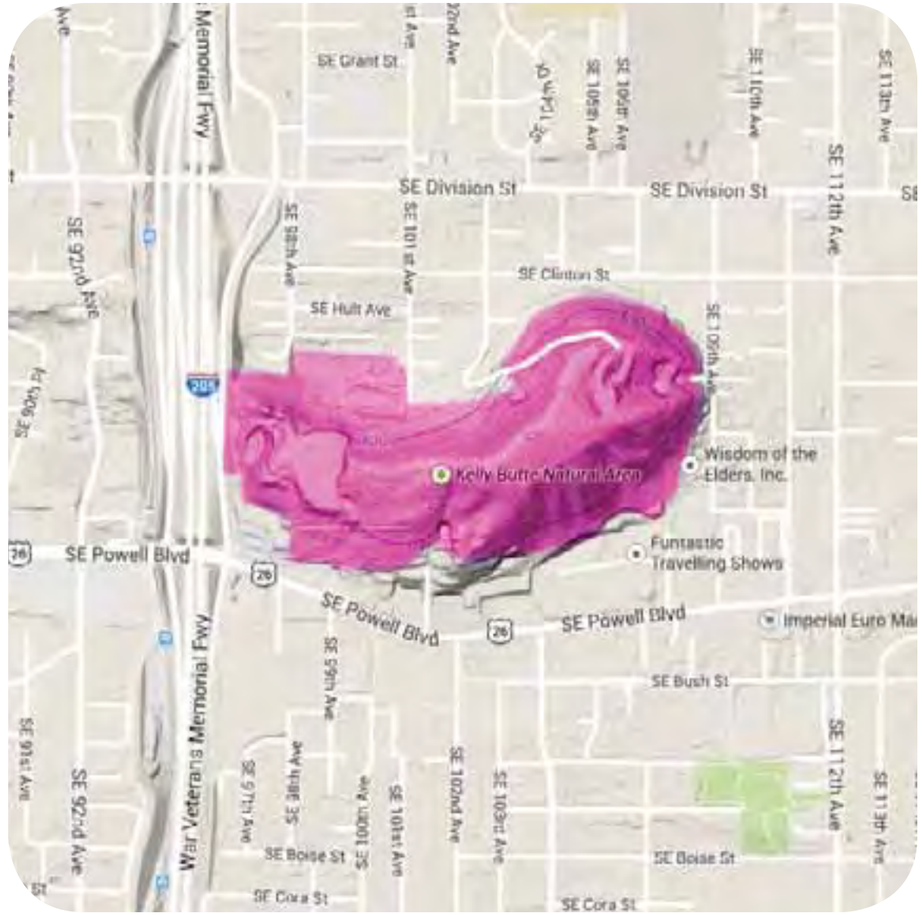
Design Studio 9-10: 2012-2013

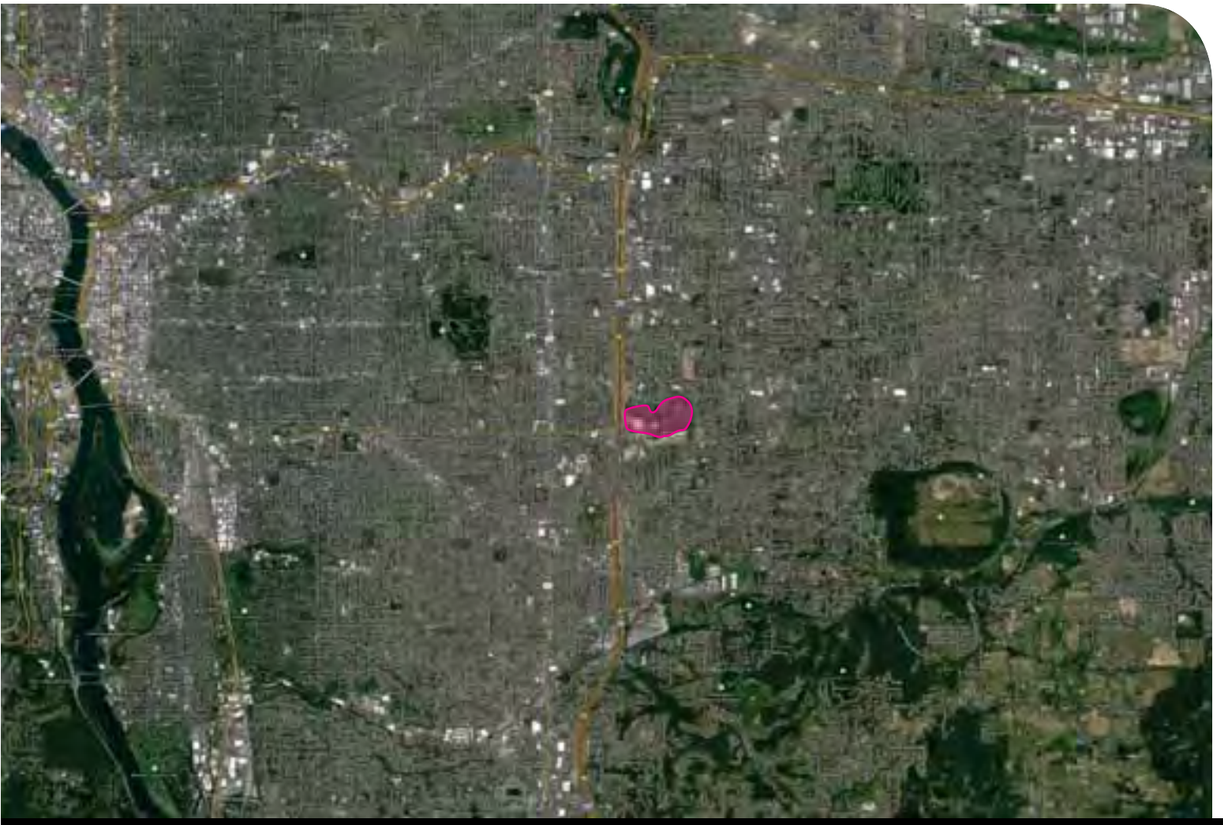
Professors: B.D. Wortham Galvin, Cory Griffin

Location: Portland, OR

20 Weeks (2 quarters)

The multicultural center is a relatively new phenomenon to the world. In the past, groups have produced singular cultural centers for their individual culture. This creates separation in our new US culture that is a melting pot of everything. On top of this separation is another avenue, which is Portland's culture. It is not singular, so the new era of cultural center should address this directly. So why not make a building that celebrates the culmination and combination of all the cultures. This center should still teach and pass down culture to younger generations of their heritage, while giving East Portland a place to enjoy culture and its people as a whole.

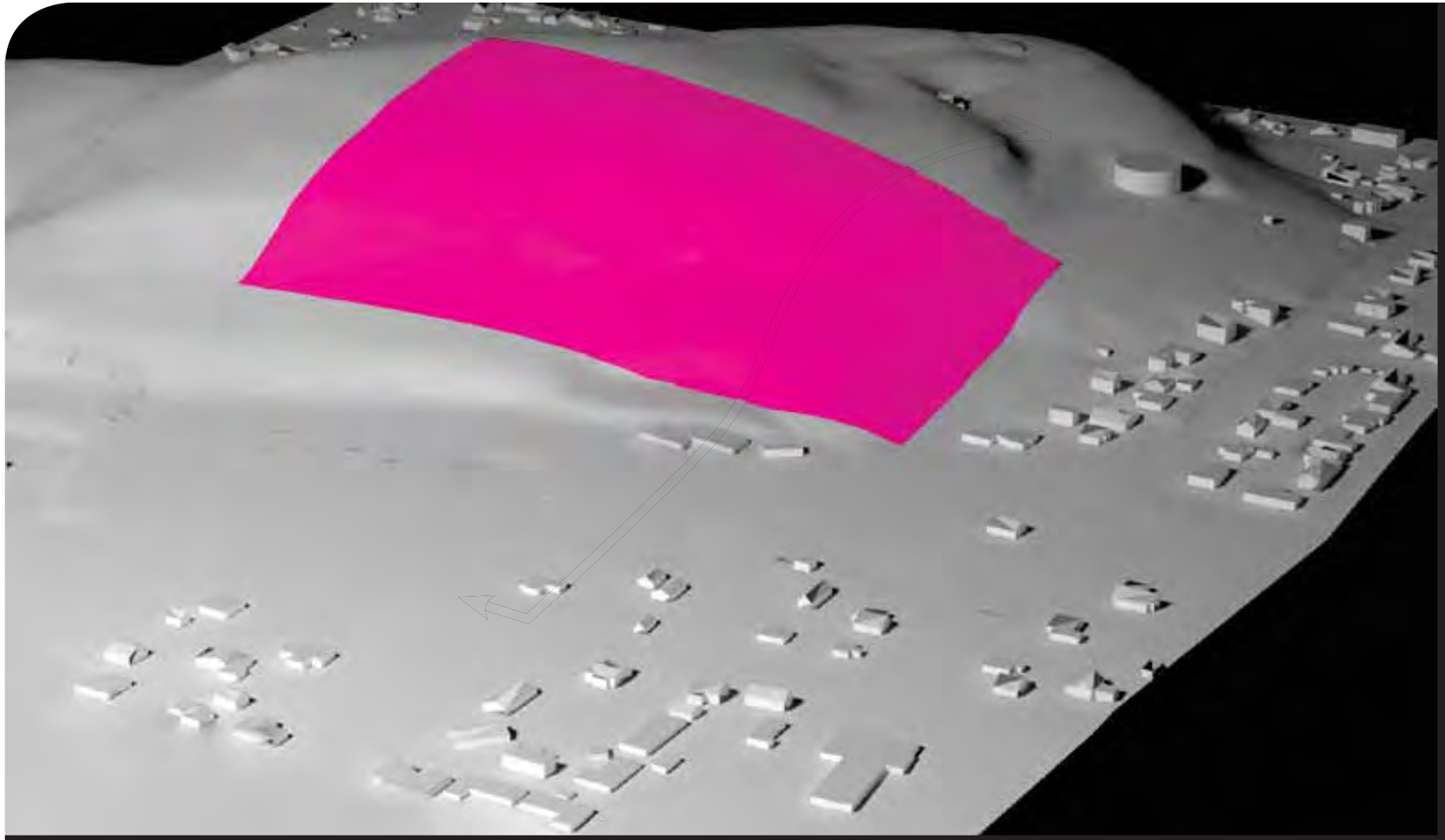




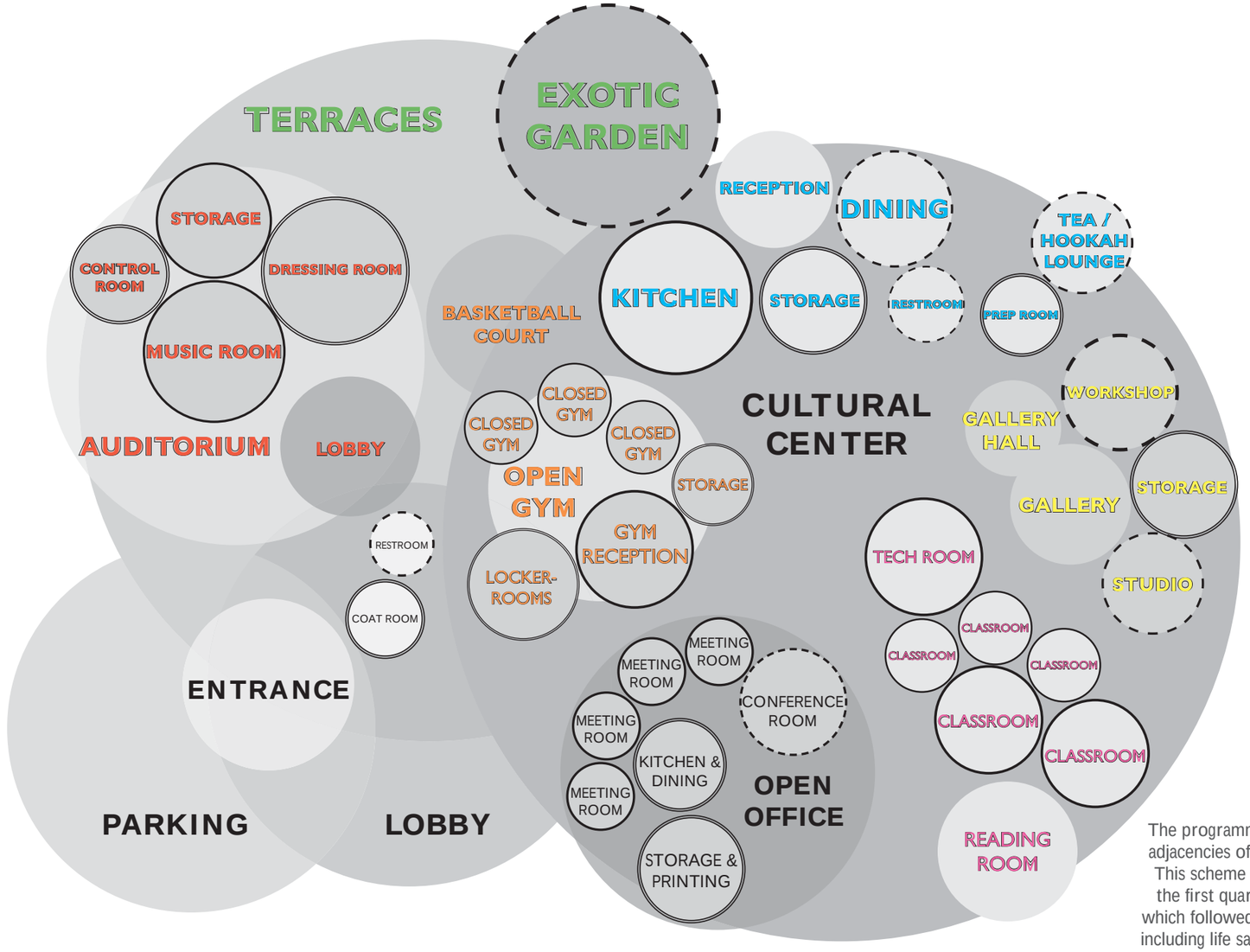
This site was selected for many reasons including public transportation, near by schools or civic buildings, and size / topography. Part of Portland's culture is knowledge and sustainability. So the center should portray itself in a light of sustainable design while teaching the users of why and how the building and every day life should be as sustainable as possible.

As seen on the right page, the site has a large topography change of over one hundred feet from street level just to the first floor of the center (not shown in this 3D model). This elevation change will assist in creating a brown field for water purification.

Autodesk Revit Autodesk AutoCAD Rhinoceros 3D Autodesk Impression SketchUp Autodesk 3Ds Max V-Ray



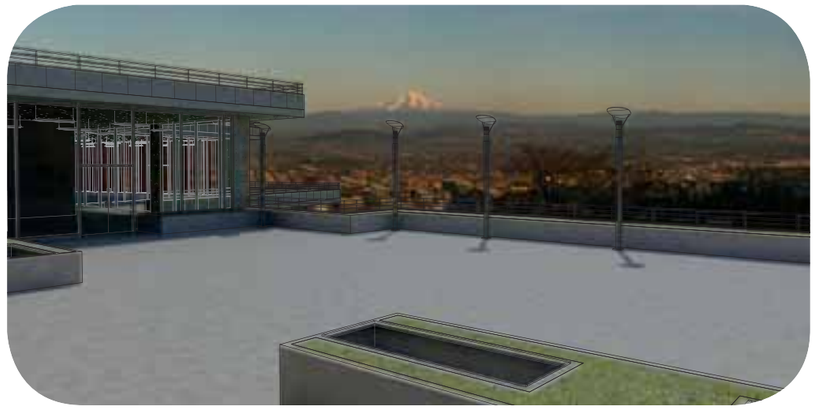
This location, having a very diverse topology, has many features that could be conducive of a unique and site specific design. The site is southerly located with ample sun, vegetation and cross winds due to its location and elevation. The section shows roughly how tall the site is and how its location gives a fantastic view of Southern Portland. This site could bring in many different possibilities that the other flat sites would not be able to have. The main access is a funicular on the southern side and an access road extension from the north for loading and additional handicap parking. The large scale of this site brings in many more possibilities that otherwise would not be able to be utilized.



Public
Semi - Public
Semi - Private
Private

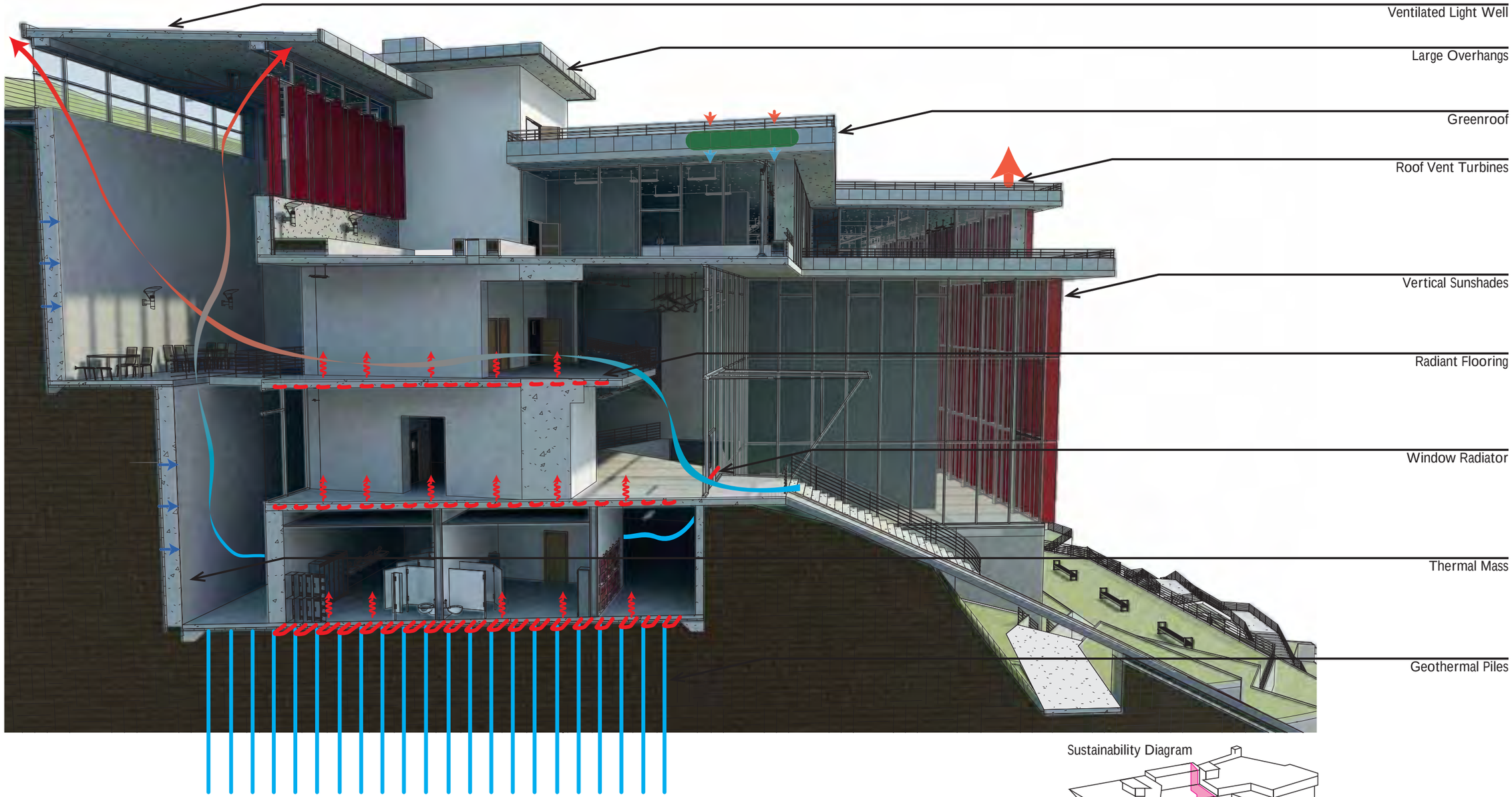
The programming of the building starts to show some of the adjacencies of the spaces that will work together in a design. This scheme was the most successful of three by the end of the first quarter which carried over to the detailing quarter which followed. This produced many Revit plans and sections including life safety/ egress, mechanical, structural, occupancy, enclosure system, and other detail drawings.

SPACE	AREA ft²
ENTRANCE	1,333
COAT ROOM	105
RESTROOMS (8)	1,256 overall
LOBBY	2,383
AUDITORIUM	13,957
CONTROL ROOM	139
DRESSING ROOM	393
MUSIC ROOM	1,377
STORAGE	1,125
RECEPTION	963
KITCHEN	1,484
DINING	1,870
STORAGE	355
RESTROOMS	663
TEA/HOOKAH LOUNGE	2,240
PREP ROOM	836
CLASSROOM SM (3)	390 each
CLASSROOM LG (2)	765 each
TECHNOLOGY ROOM	708
READING ROOM	3,100
OPEN OFFICE SPACE	5,795
MEETING ROOM (4)	1,377 overall
CONFERENCE ROOM	623
STORAGE & PRINTING	758
KITCHEN & DINING	591
EXOTIC GARDEN	10,286
TERRACE (2)	5,247 overall
GALLERY HALL	519
GALLERY	1,867
STUDIO	955
WORKSHOP	429
STORAGE	112
GYM RECEPTION	2,142
LOCKERS	1,466
OPEN GYM	4,872
CLOSED GYMS (3)	645 each
STORAGE & MECH.	220
PARKING	9 / 2 spaces
OVERALL	60,256 int.

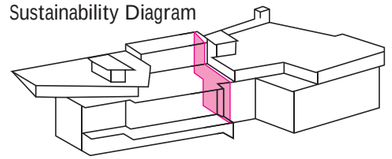


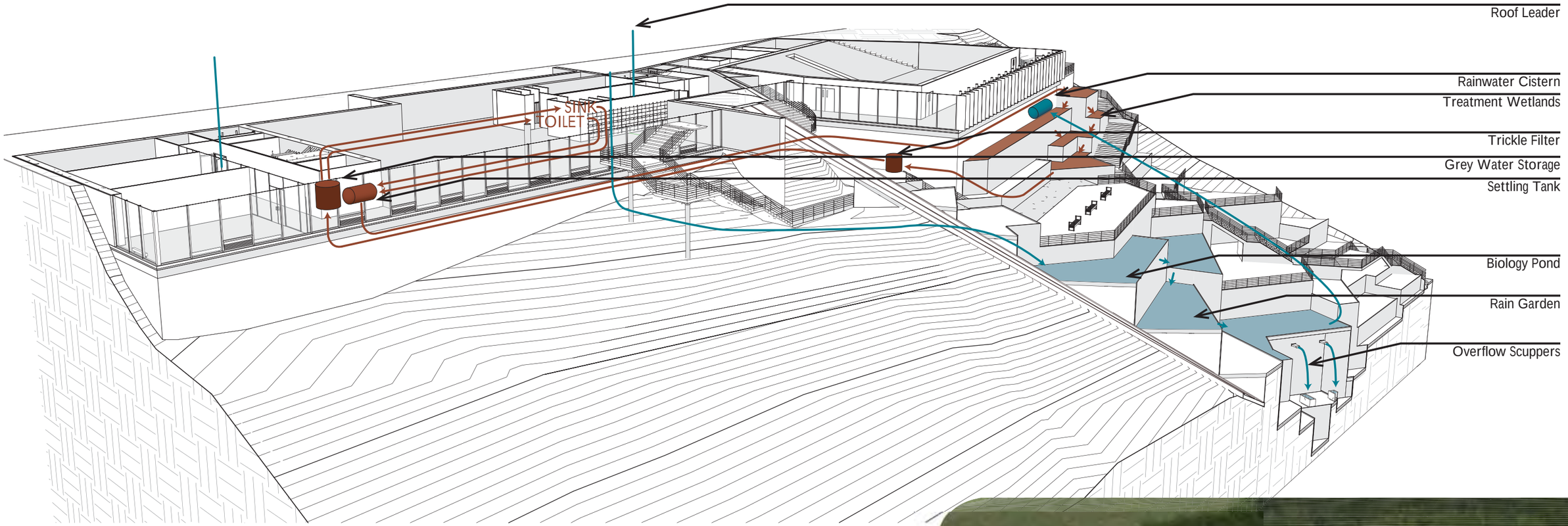
DANCING GARDENING EXERCISING COOKING LEARNING PAINTING

Multicultural Center

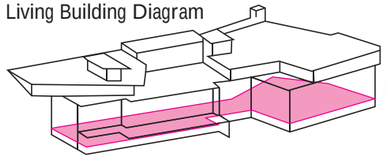


Sustainability Diagram



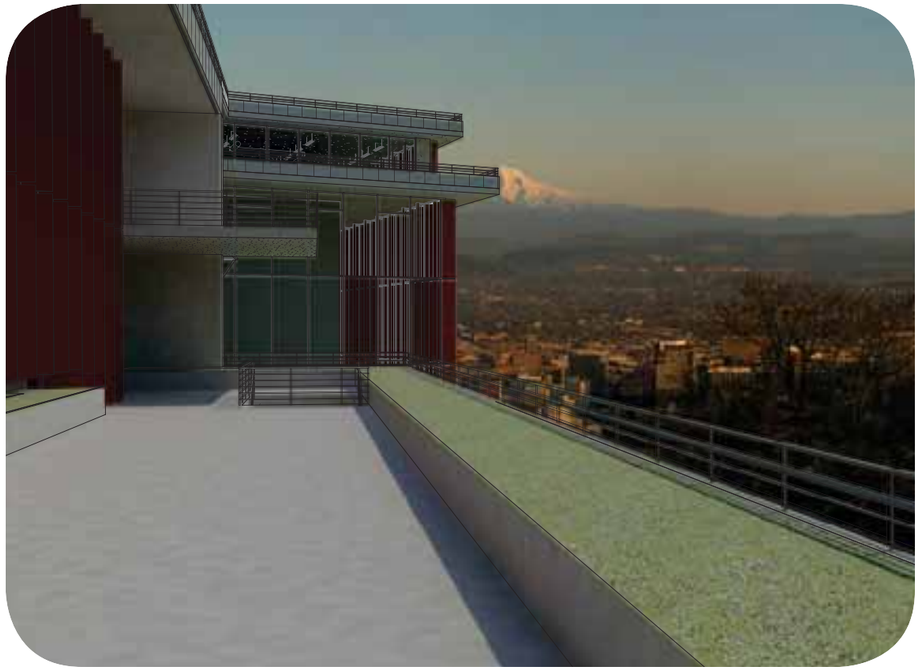


Living Building Diagram

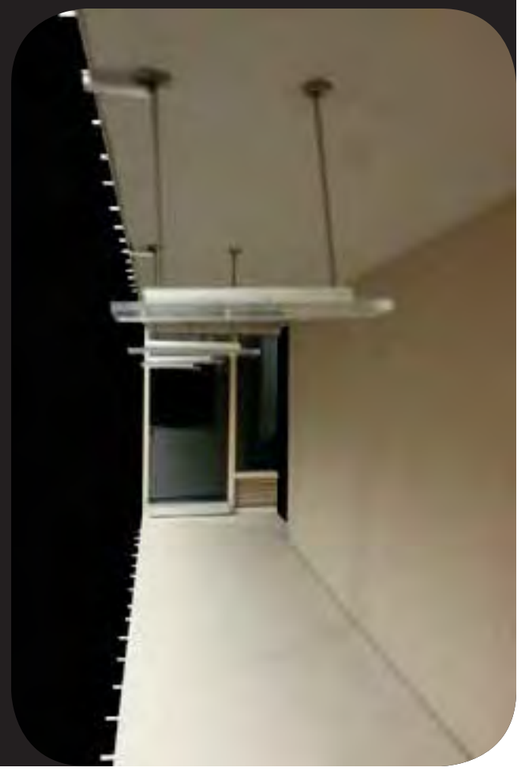


The 2 diagrams show how many sustainable aspects were put into the design, which made this project as close to a living building as possible. The funicular tram drives up the hill showcasing some of the sustainable aspects of the bioswales and filtration ponds.

Multicultural Center



The section model helps show some of the hidden systems inside the building. This includes elements like the greenroof , curtain wall ventilation and heating, electrical, radiant flooring, HVAC DOAS, drop ceilings with fire sprinklers, and the entire enclosure system.



Thesis Preview

Design Thesis Studio: Fall '13, Winter & Spring '14
Professor: Clive Knights
Advisors: Aaron Whelton & Daniel Lajoie
Location: Portland, OR

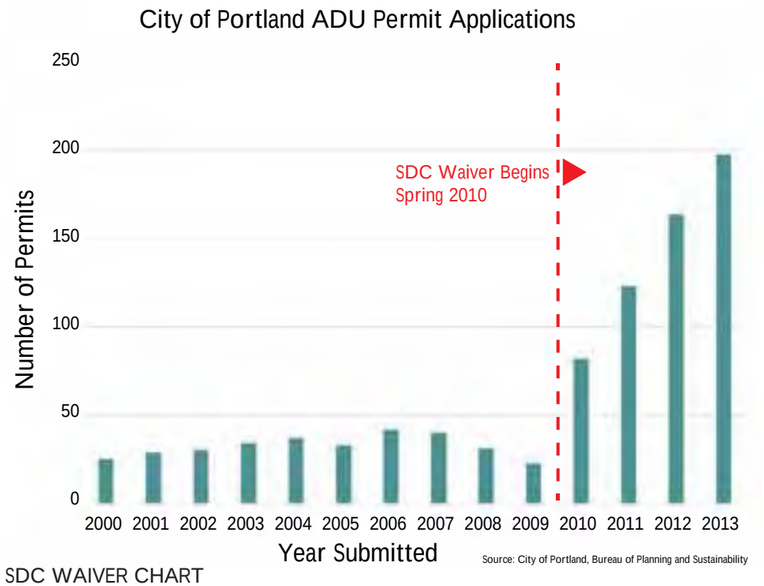
30 Weeks

Question: How can architecture densify Portland with accessory dwelling units (ADUs) while giving clients a new way to design using parametric design and mass customization?

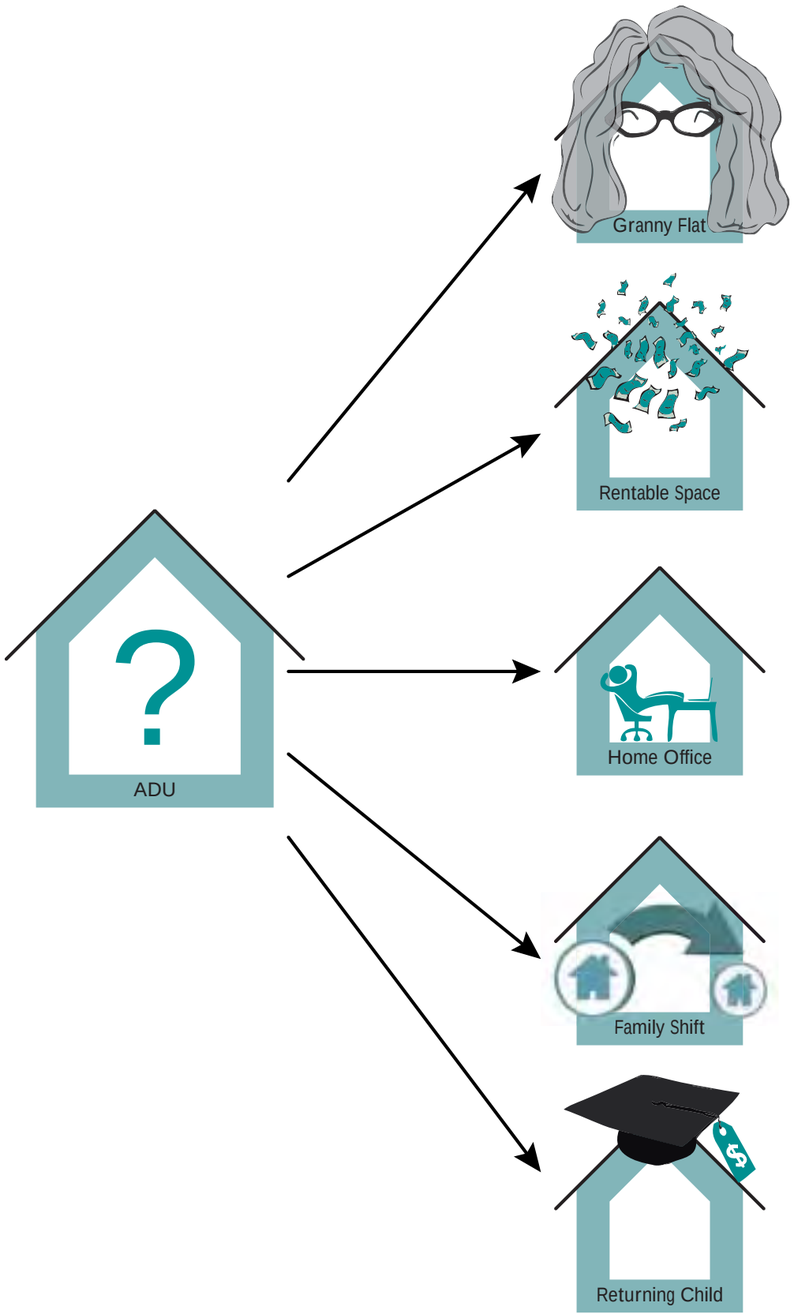
This thesis will be exploring the design and construction of accessory dwelling units (ADUs) using parameter based design tools to give the user / home owner a new method to create their own ADU. As a growing city, East Portland has many under utilized spaces in single family residential neighborhoods that can be utilized with ADUs. As people are wanting or needing these smaller houses, how can people cheaply and efficiently make their own house that is just right for them? Using parametric design, an architectural designer can create multiple iterations of a project very quickly. These dwellings can also have many other layers of controls called parameters to design more specifically for each site so the final product can fit people's needs better than traditional design practices. These parameters would be set based on a owners needs for the ADU, the ADUs materials and layout, the main house on a lot with its auxiliary structures, and the actual site itself.

The web user interface (next page) makes it so a person can pick specific rooms and options available to their specific site. These rooms will be narrowed for the user by the parameters that dictate a final design. Manipulations to parameters such as site dimension, solar orientation, and adjacencies in the script will create tens, and even hundreds of iterations of these ADUs that each site is looking for.

The project will dictate the weight of different parameters and what questions/ options are useful to a design that can be set as parameters. The use of multiple sites and users is key for showing how the owners input, along with location, dictate a specific design. These designs will be altered to fit each location and then compared to show how the iterations changed based on their specific parameters.

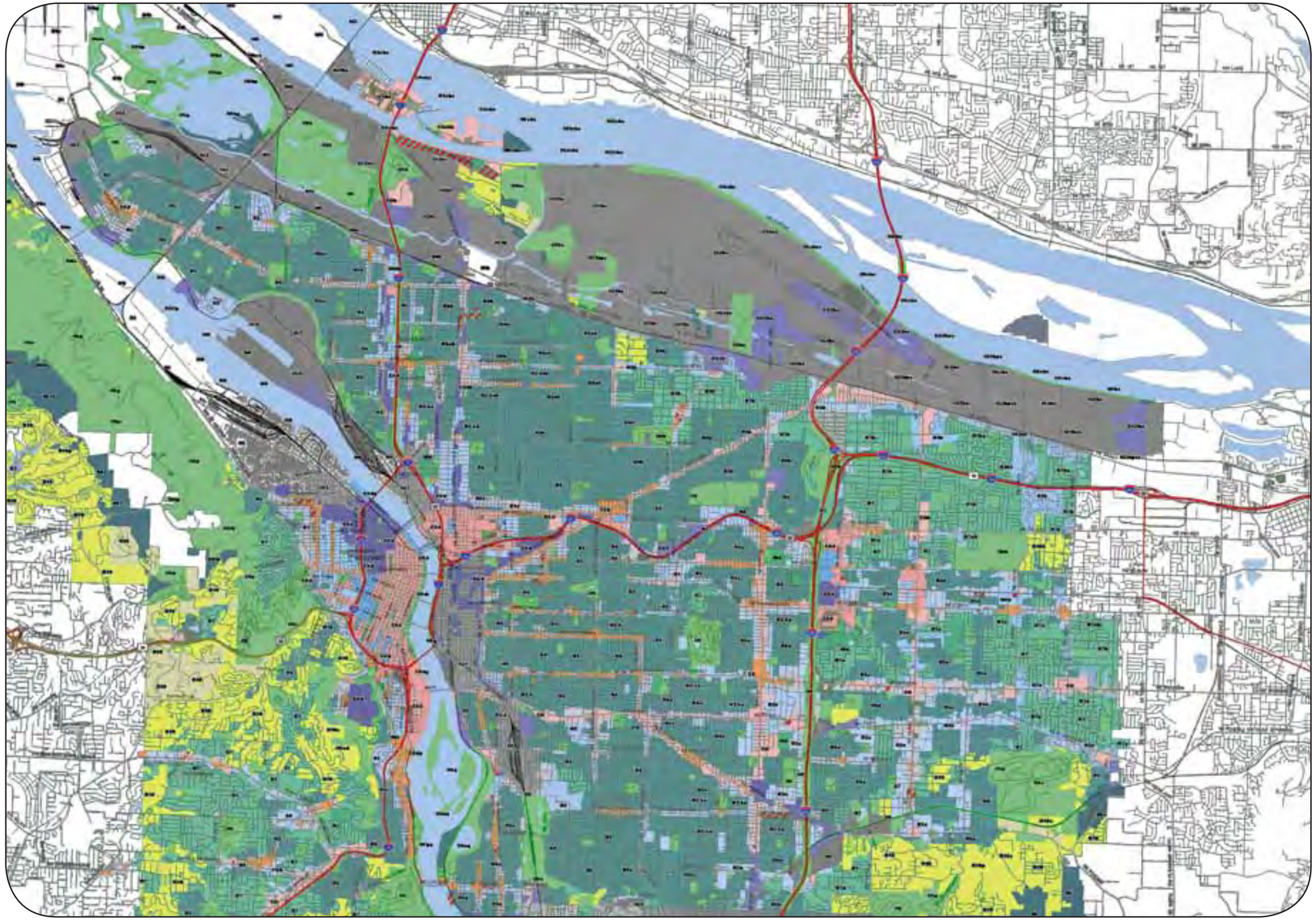


SDC WAIVER CHART



COMMON ADU TYPES

SketchUp Autodesk AutoCAD Autodesk Revit Rhinoceros 3D Grasshopper



ZONING MAP FOR PORTLAND

RESIDENTIAL ZONING

R1 — (medium density multi)
- 1-4 Stories

R2 — (low density multi)
- duplexes, townhouses
- row houses
- 1 lot per 2,500ft²

R3 — (low density multi)
- townhouses on large sites

RH — (high density multi)
- uses FAR

RX — (high density multi)
- uses FAR

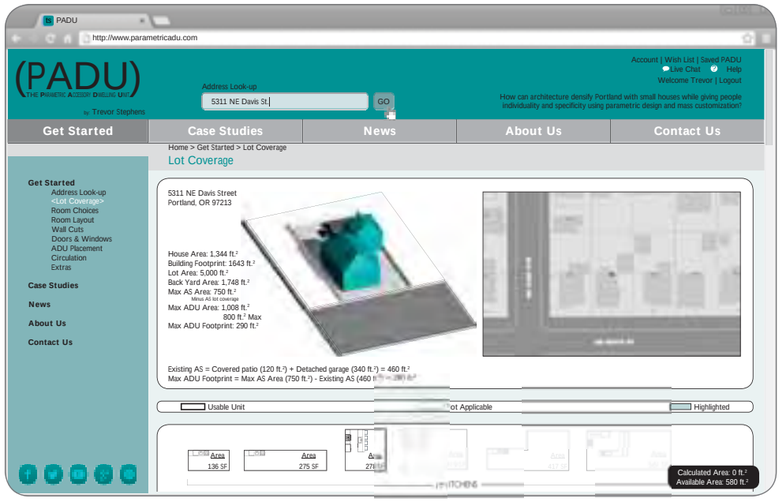
IR — (high density residential & institutional)

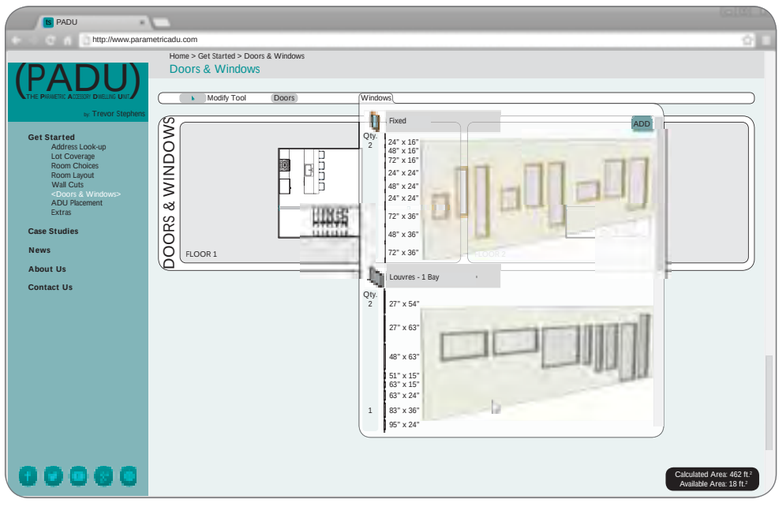
I — (institutional)

ADU ALLOWED ZONES

R2.5 — (single dwelling)
- max height 35 ft [2]

R5 — (single dwelling)
- ADUs not included in min. /max. density

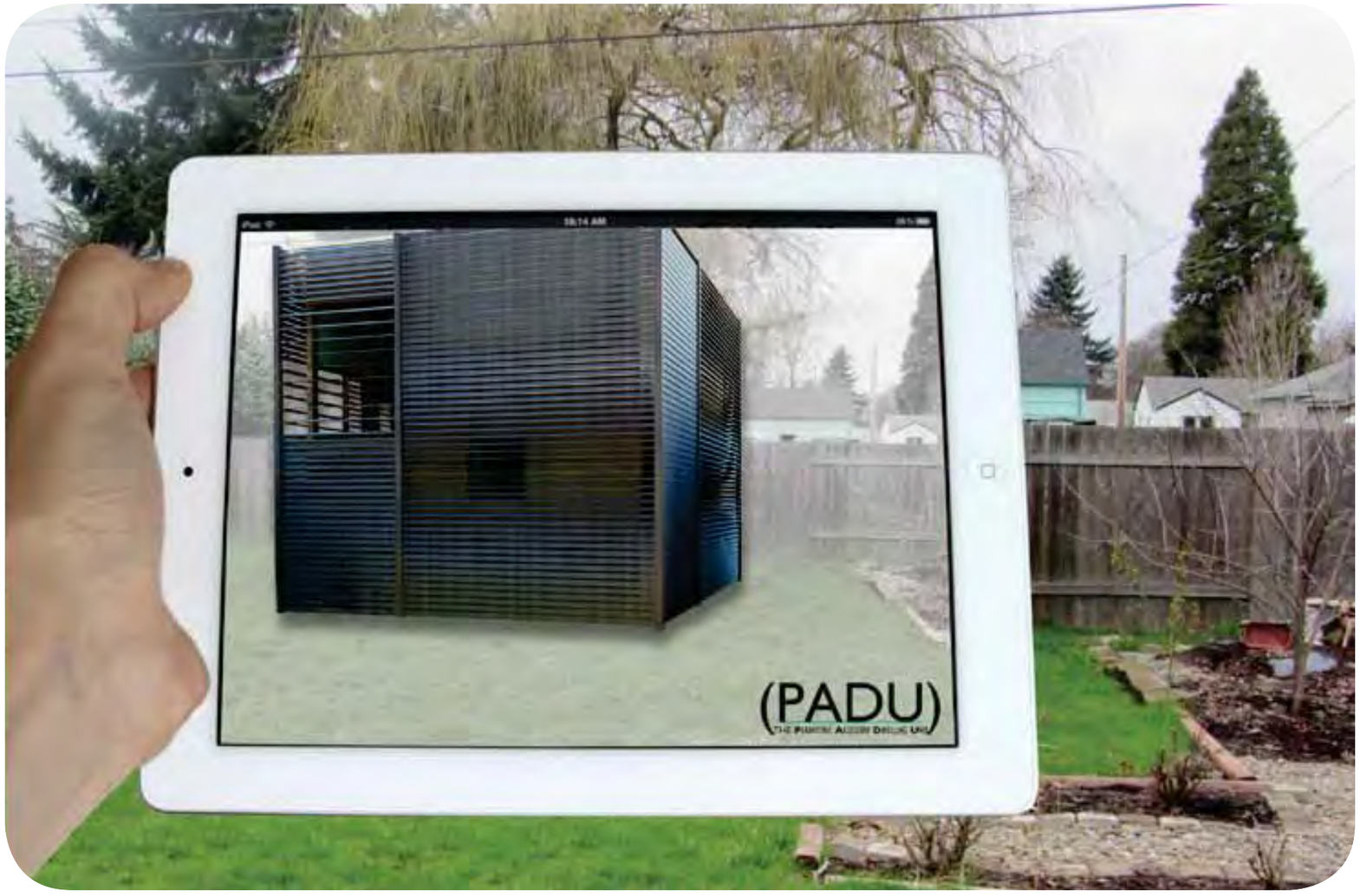




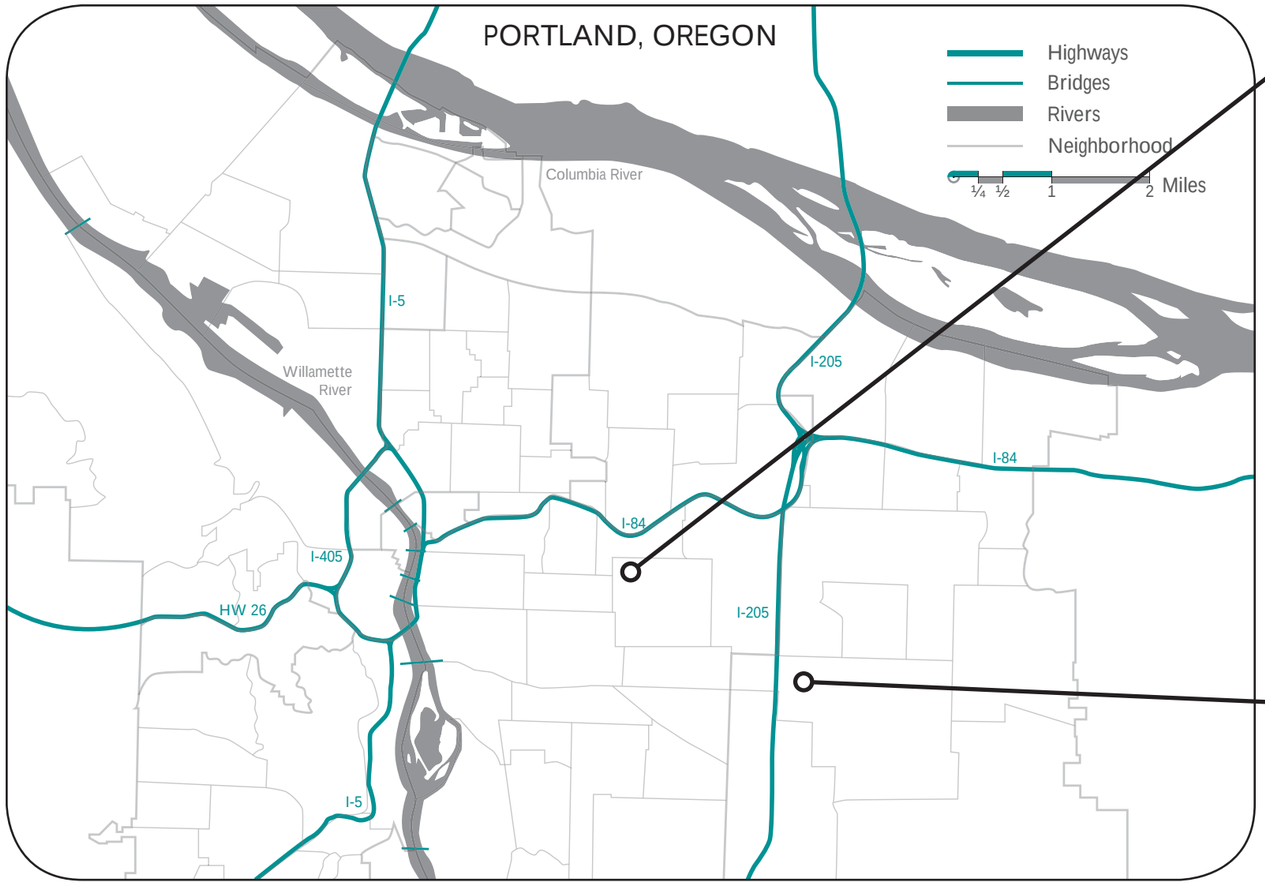
This interface is a website that will give the user for PADU a place to set up and design their own PADU. The website is where the parametric nature of this project emerges. The parameters chosen by the architectural designer will dictate how a site allows and narrows the selection from each category of units. This will allow a user to pick what kind of spaces and sizes they want in their PADU. Currently, there are hundreds of modular room designs that fit together as a system of interchangeable, interlocking parts that are designed by the architect. The user, once all of the units are selected, can arrange them how they see fit, based on the set parameters of the program. The user will then create a doors and windows layout based on adjacencies, what room it is in, and how much light will enter that space. This website also allows the user to pick how the PADU fits on their site.

The architectural designer will then input the design into Grasshopper (a parametric modeling plugin for Rhinoceros 3D) where they will run a script that will create a brise soleil system of louvres. These louvres are set at specific angles that will shade the walls and windows while allowing views of the yard and surroundings with an adjusted amount of light for comfort in the PADU.

The web site to the left partially goes through the process of one of the six designs covered in the full thesis book. A final part to the web interface is an augmented reality app that shows the new PADU in place based on the devices accelerometer and GPS telemetry.



Two sites were selected based on owner occupied housing and housing density to show the diversity of Portland's housing and lot sizes. The two that were chosen show a typical sized house and lot for the city of Portland. Additionally, the two sites are oriented in two different directions (North and South) so that solar orientation can be factored into the parameters and show how it effects the design. The sites also have a size diversity as well with house square footage and the space that an ADU can be built in the yards. This includes one flat site and one with a topography change.



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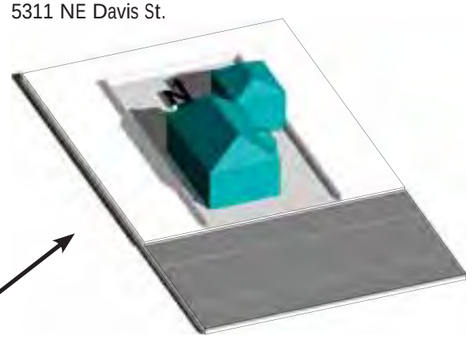
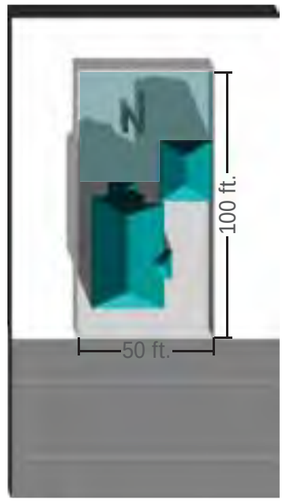
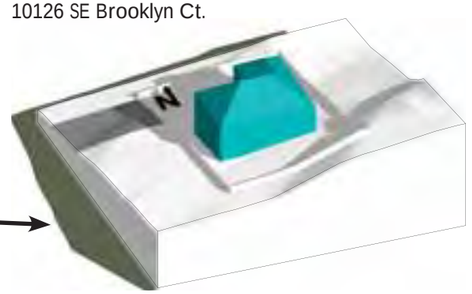
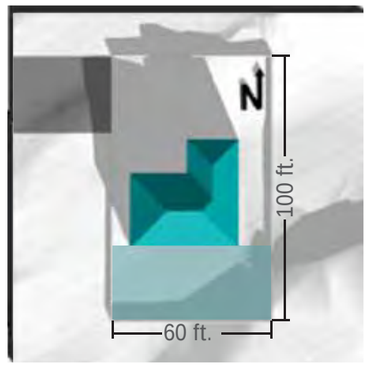
5311 NE Davis St.





SITE 2
10126 SE Brooklyn Ct.



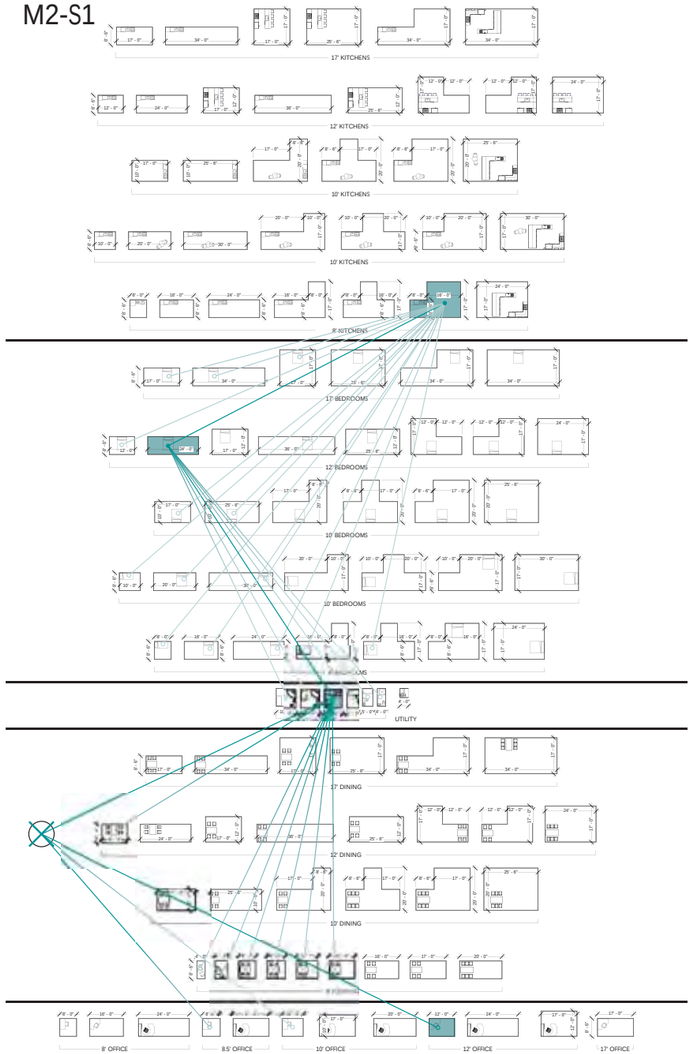


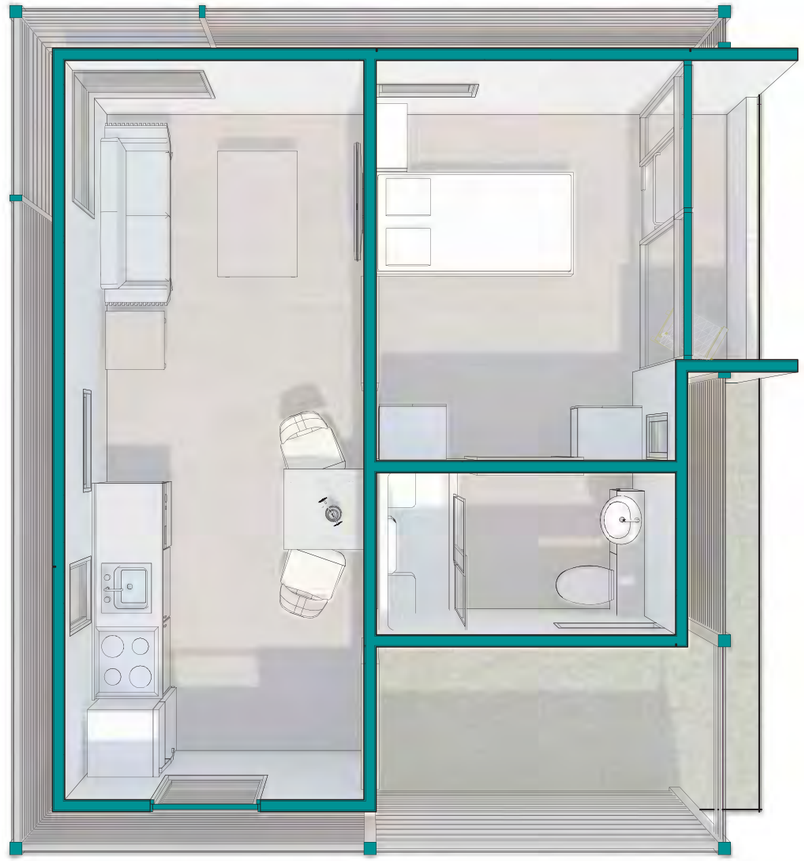
Site 1 ADU 2

This proposed PADU is for a “client” that designed a granny flat for their mother in law. The PADU is only one story since the grandmother is unable to climb many stairs. The spaces are for a single person with very few guests. The focus of this PADU is around the kitchen and dining room since the grandmother enjoys cooking.

SketchUp Autodesk AutoCAD Autodesk Revit Rhinoceros 3D Grasshopper

M2-S1





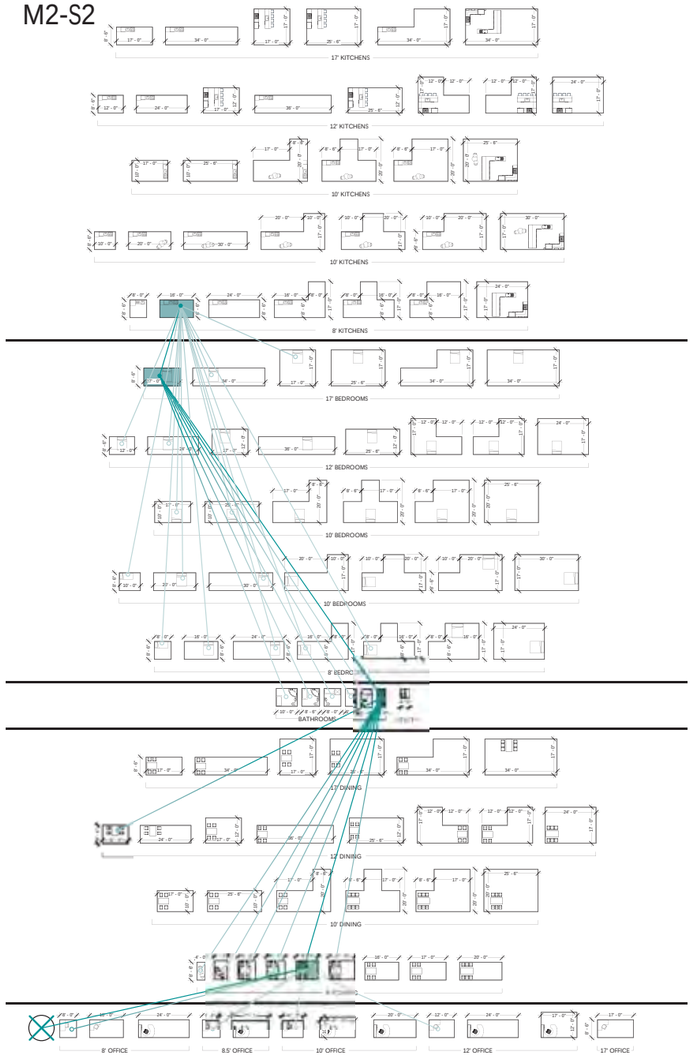
PADU H2 - S1 Floorplan 1
¼” = 1’-0”

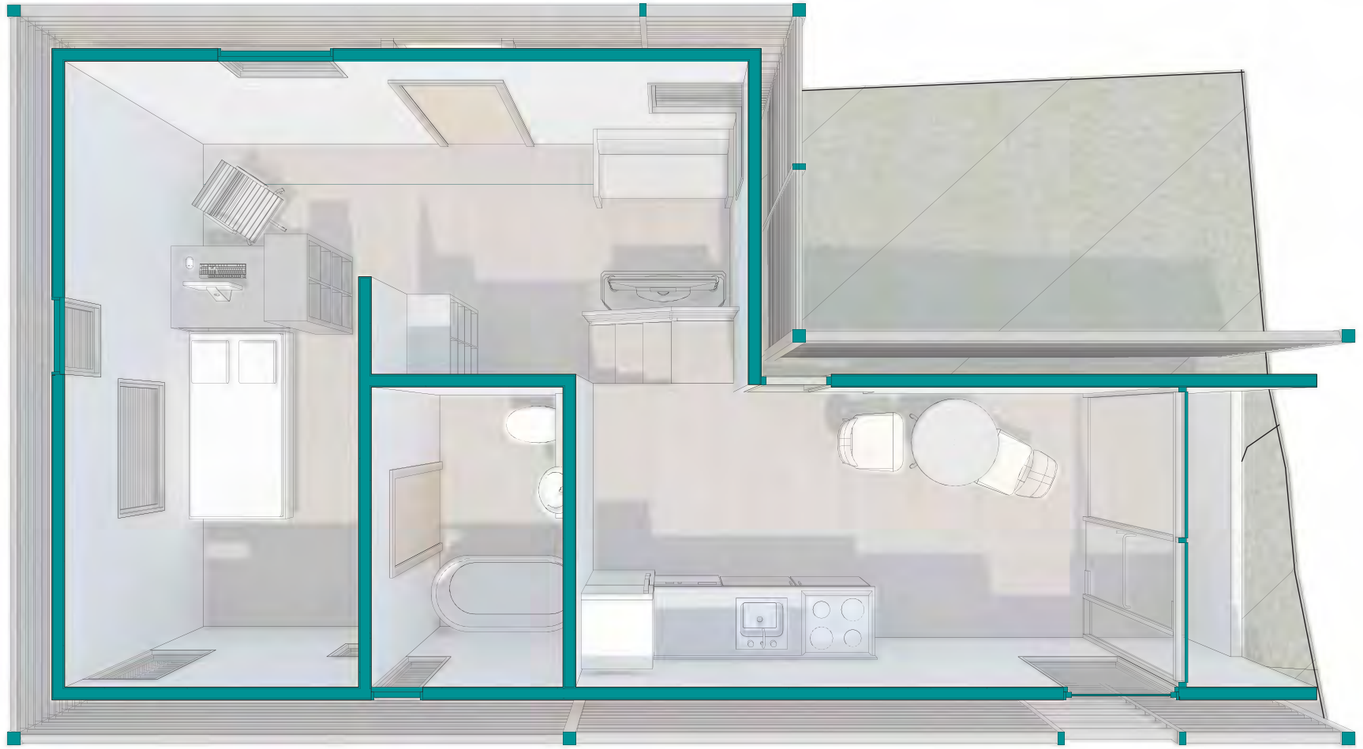
PADU H2 - S1 Section
¼” = 1’-0”

Site 2 ADU 2

This proposed PADU is for a “client” that designed a granny flat for their mother in law. The PADU is only one story since the grandmother is unable to climb many stairs. The spaces are for a single person with very few guests. The focus of this PADU is around the kitchen and dining room since the grandmother enjoys cooking.

SketchUp Autodesk AutoCAD Autodesk Revit Rhinoceros 3D Grasshopper





PADU H2 - S2 Floorplan 1
¼” = 1’-0”

PADU H2 - S2 Section
¼” = 1’-0”

CLEANTECH CHALLENGE

OREGON BESTFEST

Portland State UNIVERSITY

COMMUNITY ENVIRONMENTAL SERVICES

NEW SEASONS MARKET

Professional Work

Fire Station # 4

Wave Chair

Virtual Orlando

Low Rise Mixed-Use

High Rise Mixed-Use

Morphology Research Studio

Outside In Studio

Pickathon Design Build

Multicultural Center Studio

Thesis Preview

Material Research

Material Research

Advanced Materials 510: Summer 2014
Professor: Margarette Leite
Location: Portland, OR
Partners: Reid Weber, Kevin Chavez

9 Weeks

THE PROBLEM

EACH DAY!

EVERY YEAR **AMERICANS** CREATE

1.5 MILLION **TONS**

OF WAXED CARDBOARD **WASTE**

THAT AMOUNTS TO **ONE CUBIC MILE** OF WAXED CARDBOARD WASTE

THAT EQUALS

MILLION mtCo2e

WHICH HAS THE **SAME CO2** OUTPUT OF OVER

1,000,000

PASSENGER VEHICLES

1 MILE³

EIFFEL TOWER

GROCERY

A **SINGLE** GROCERY STORE AVERAGES

133 WAX CARDBOARD BOXES A **DAY**

THIS MATERIAL ENDS UP IN **LANDFILLS** OR **COMPOST PILES**

BUT BECAUSE THEY ARE **COATED** WITH **WAX** TO RESIST WATER, IT CAN TAKE UP TO

50 YEARS

FOR THEM TO **DECOMPOSE**

November 1

20

THAT IS WHY **NOVEMBER 1ST, 2014** ALL WASHINGTON, CLACKAMAS AND MULTNOMAH COUNTIES WILL BAN WAXED CARDBOARD FROM THEIR COMPOST PILES

THE SOLUTION

WITH

SHREDDIT

GREEN BUILDING PRODUCTS

REPURPOSE **WASTE** INTO VIABLE **PRODUCTS**

THAT REQUIRE **LOW** PROCESSING

LANDFILL

DIVERTED

UPCYCLED

TO CREATE

LOOSE FILL INSULATION

PANELIZED INSULATION

SHREDDED BALE

SAVING **RECOURSES**

SAVING **WATER**

SAVING **ENERGY**

Today Is 1 Monday July

= 6

ALL **223** PORTLAND GROCERY STORES AVERAGE ENOUGH WAXED CARDBOARD BOXES **EVERY SINGLE DAY...**

...TO INSULATE **SIX** AVERAGE SIZED PORTLAND HOMES

IN ONE YEAR THE GROCERY STORES IN PORTLAND ALONE COULD INSULATE

2,200

HOMES WITH **SHREDDIT**

SketchUp

Autodesk AutoCAD

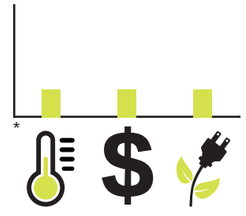
EXPANDED POLYSTYRENE

Manufacturer: Insulfoam
Product: R-Tech
Dimension: 4’ x 8’ (3/8” - 5”)
R-Value: R-6.7 / 1”
Cost: $1.09 / ft²
Embodied Energy: 39.87 mJ/ft²

Notes: The energy efficiency of Foam-Control® Plus+™contributes credits to LEED certified projects. EPS contains no ozone depleting agents and is recyclable.

FIBER GLASS BATT

Manufacturer: CertainTeed
Product: AccoustaTherm
Dimension: 6.25” roll
R-Value: R-3 / 1”
Cost: $0.71 / ft²
Embodied Energy: 1.12 mJ/ft²



Notes: Enhances acoustical and thermal performance of interior and exterior walls and suspended ceiling systems.

CELLULOSE

Manufacturer: National Fiber
Product: 6” Cel-Pak
Dimension: Loose Fill
R-Value: R-3.8 / 1”
Cost: $1.05 / ft²
Embodied Energy: 1.52 mJ/ft²

Notes: Cel-Pak Cellulose Insulation using over-issue newsprint (daily newspapers that went unpurchased), paper drive paper, and other high-quality recycled paper

WAXED CARDBOARD

Manufacturer: ShreddIt
Product: Loose Fill
Dimension: Loose Fill
R-Value: R-4 / 1”
Cost: $0.80 / ft²
Embodied Energy: 1.17 mJ/ft²

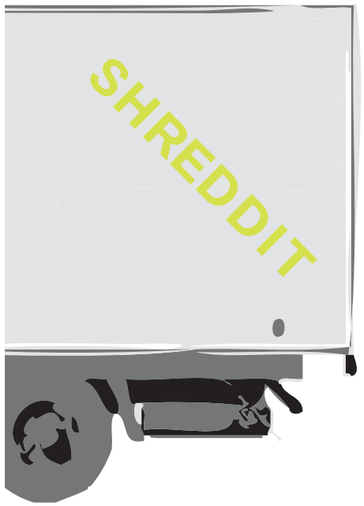
Notes: Almost entirely recycled content

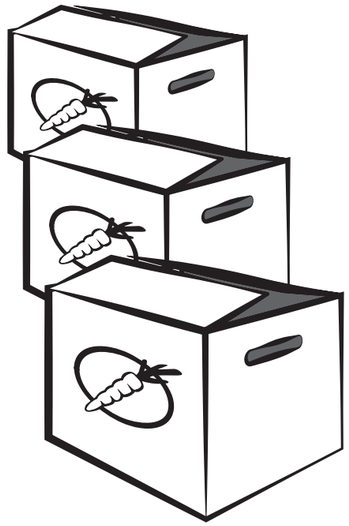
* bar graphs are relative to each other

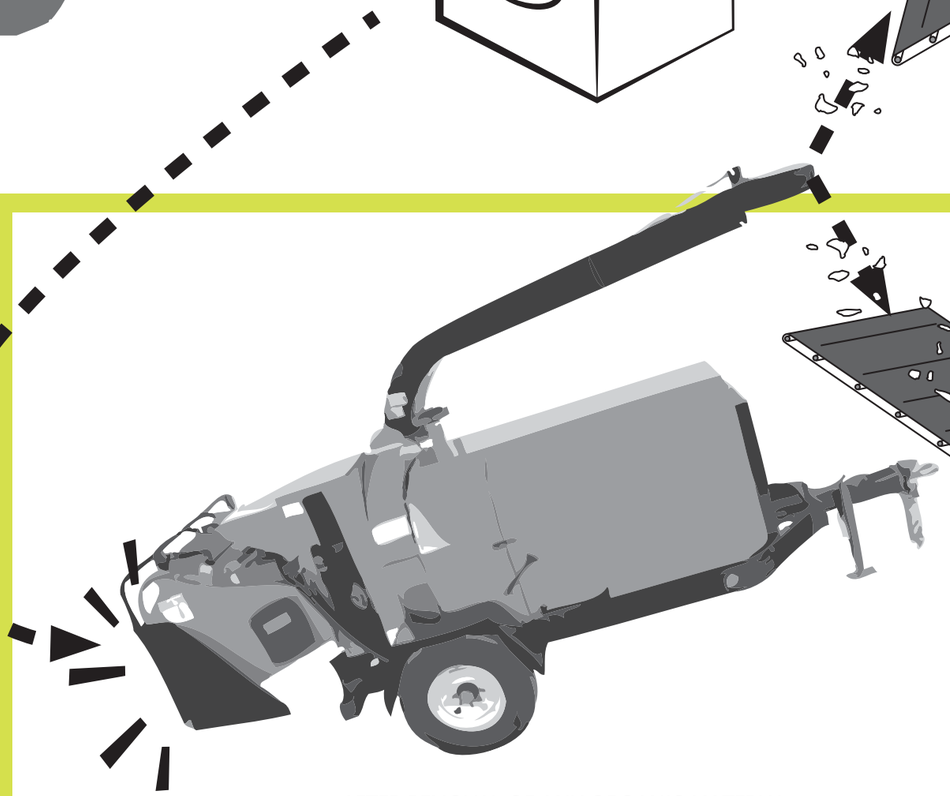
Material Research

THE PROCESS

WAXED CARDBOARD BOXES ARRIVE FROM **LOCAL** GROCERY STORES





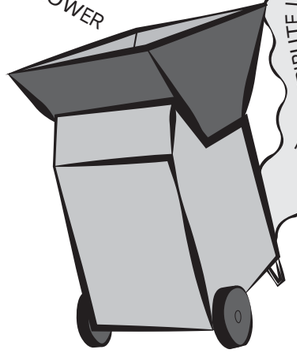


AFTER REMOVAL OF ANY ORGANIC MATERIAL, THE BOXES ARE S H R E D D E D

ADDITIONAL FIRE RETARDENT

THE **FIRE RESISTANT** MATERIAL IS PACKAGED AND SENT TO THE BUILDING SITE

THE PACKAGED MATERIAL IS FED INTO A BLOWER



TO DISTRIBUTE IT THROUGHOUT THE HOUSE

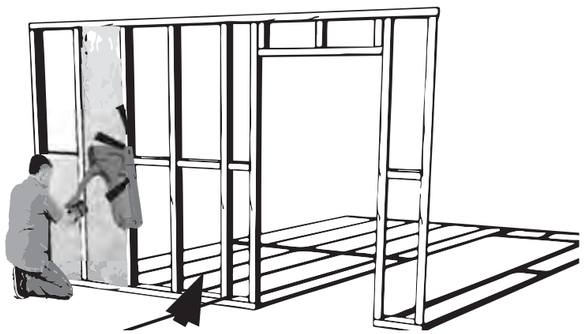
LOOSE FILL INSULATION

PANELIZED INSULATION

BUILDING CERTIFIED FLAME RETARDANT FIRE BLOCK

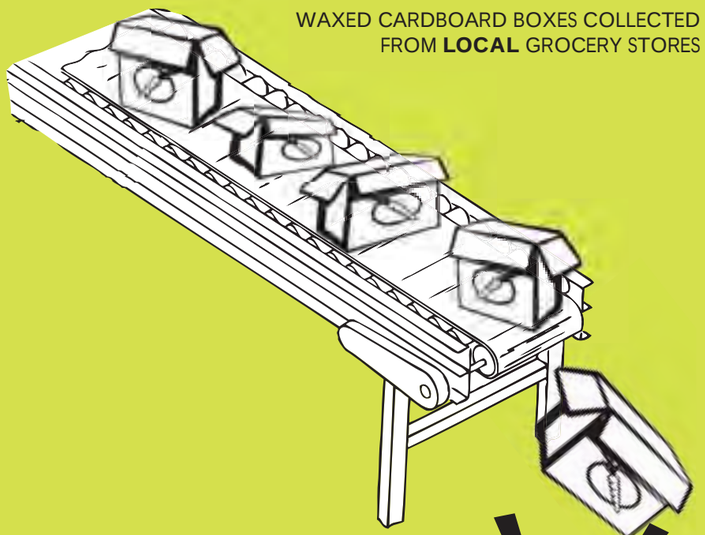
SEWN POCKET DESIGN HELPS **STABILIZE** THE SHREDDED WAXED CARDBOARD AND **PREVENTS SETTLING**

WORKERS ARE NOT EXPOSED TO HARSH OR DANGEROUS CHEMICALS, UNLIKE MORE COMMON INSULATIONS

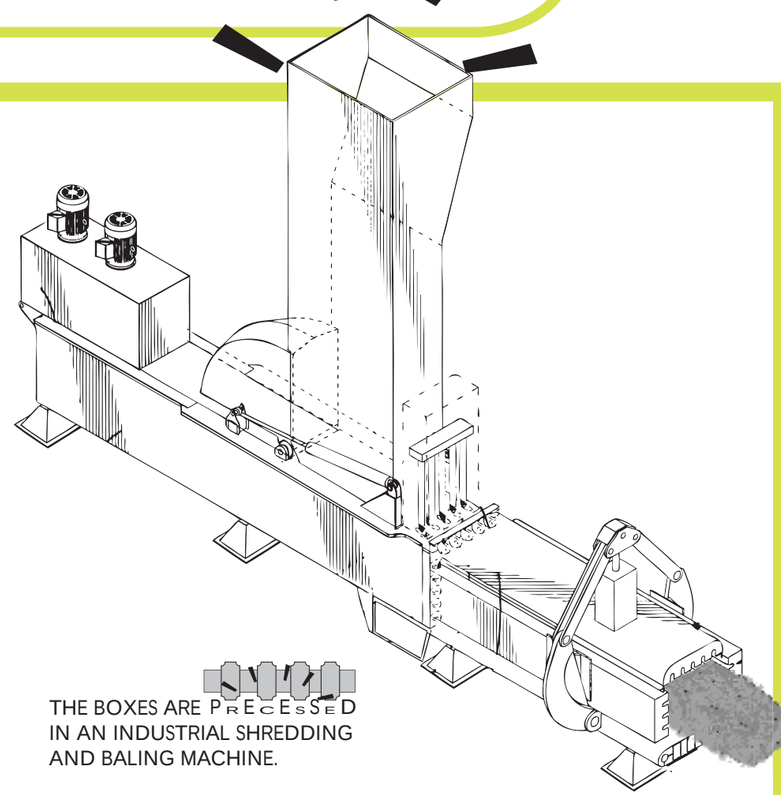


PANELIZED INSULATION CAN BE INSTALLED WITH **BASIC HAND TOOLS**

SHREDDED BALE

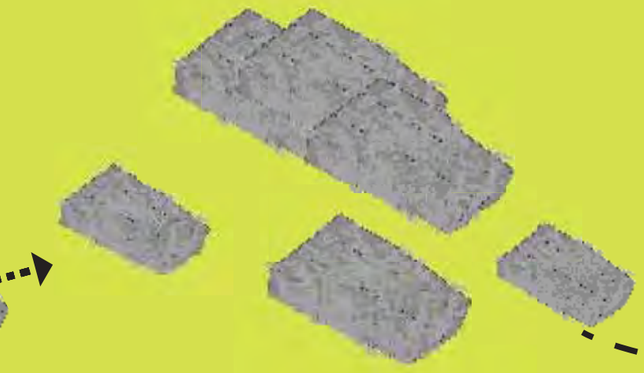


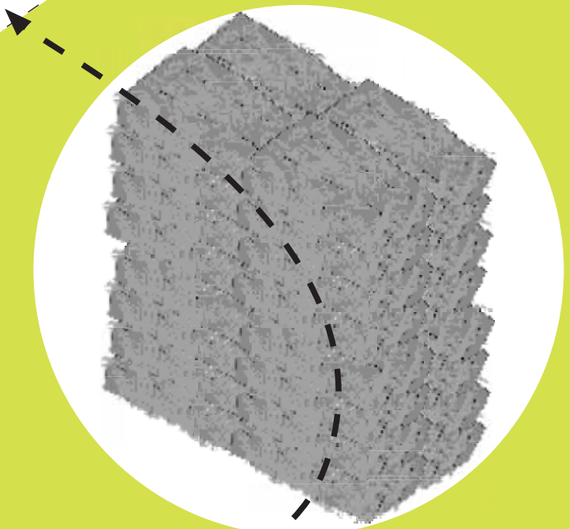
WAXED CARDBOARD BOXES COLLECTED FROM **LOCAL** GROCERY STORES



THE BOXES ARE PRECESSED IN AN INDUSTRIAL SHREDDING AND BALING MACHINE.

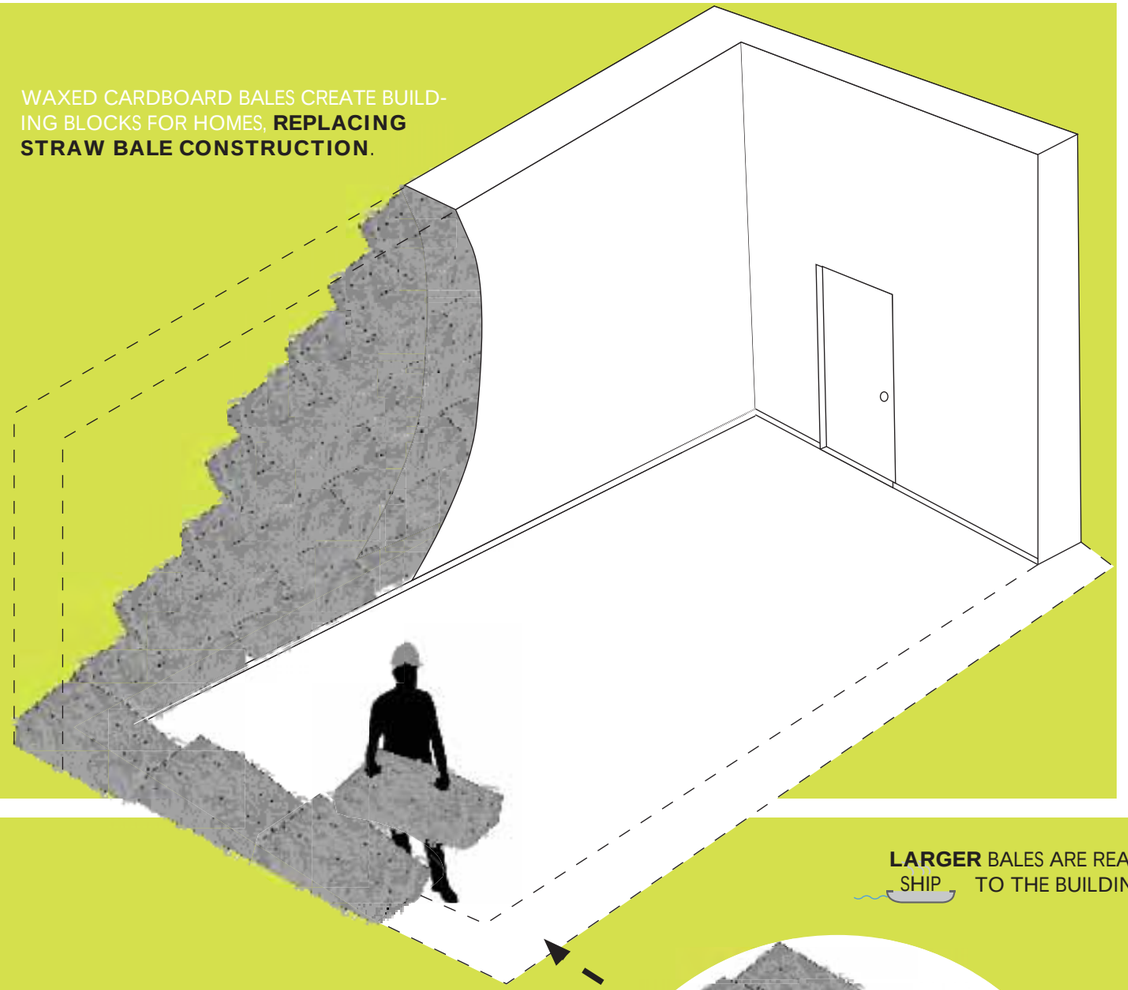
THIS PRODUCES SMALL BALES OF WAXED CARDBOARD.





LARGER BALES ARE READY TO SHIP TO THE BUILDING SITE

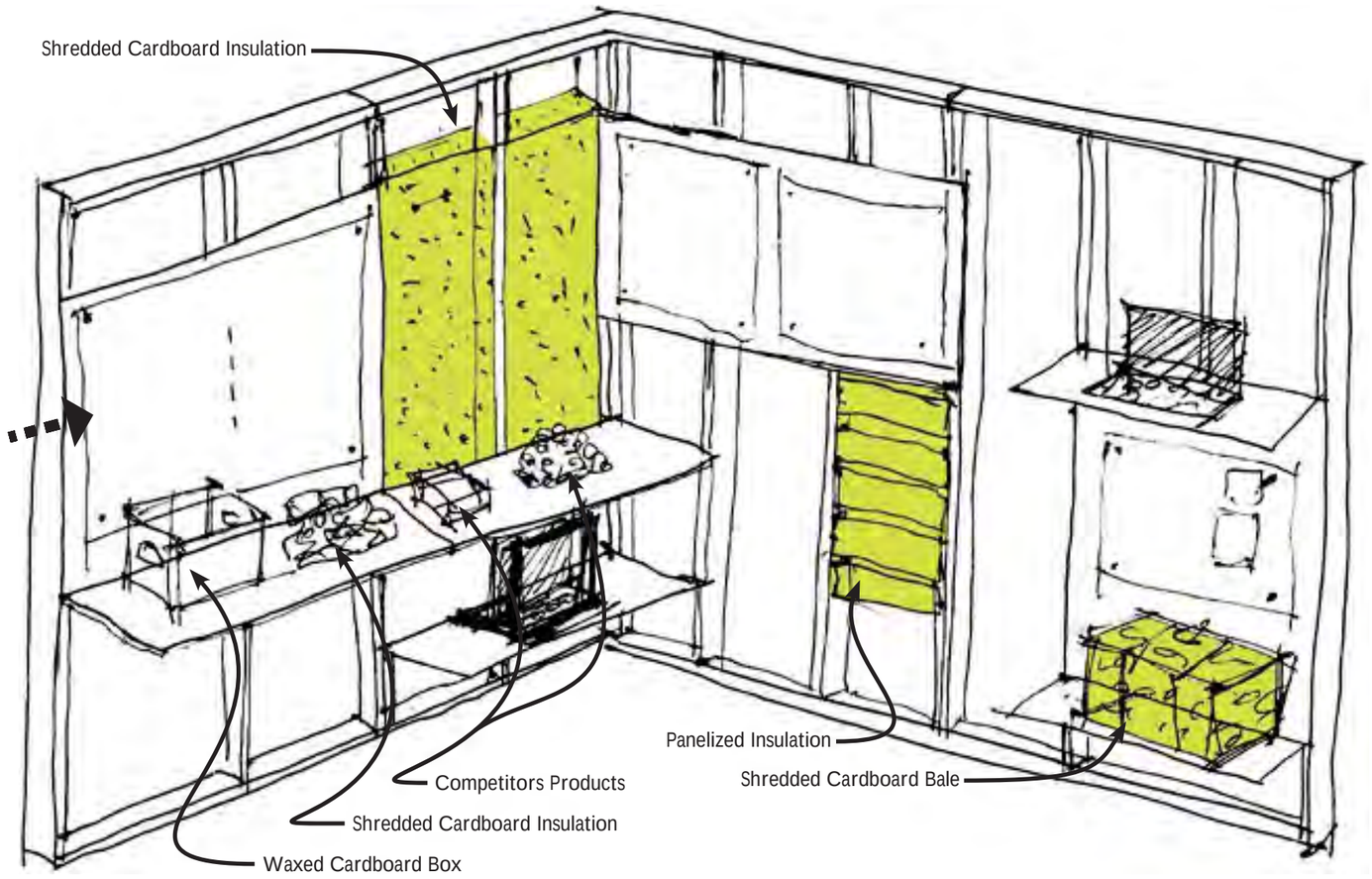
WAXED CARDBOARD BALES CREATE BUILDING BLOCKS FOR HOMES, **REPLACING STRAW BALE CONSTRUCTION**.



The above pictures show early stages of shredding the cardboard into usable sizes. Since money was a factor in this project, from our original grant worth $2,500 that we won, we went with a rented wood chipper to do all of our shredding. Two passes of shredding made the pieces small enough to be used as loose fill insulation. The size matters due to the blowers used to disperse the material into a house.

This project started as a class that explored alternative materials that could have a second like as a building material. This could have been any item including: electrical plate covers as a window shade device, PVC pipes stacked to make green wall planters, PDX airport carpet as a modular green roof / green wall growing medium, etc. (below 2 pictures).

My waxed cardboard as loose fill insulation (not visible in pictures) was picked from the class as a viable product to move forward with as a group. This product received almost immediate attention from different groups around Portland as a possible product to help minimize the problem that many companies are having to deal with.



BEFORE

AFTER

The left two pictures show untreated waxed cardboard during an initial fire test that we performed in house at PSU. The right two pictures show the new fire treated material that even with a 3,500 degree blow torch could only barely light. This flame would instantly extinguish when the torch was removed, showing that the fire retardant works.

Team SHREDDIT

The previous info graphics were display at Oregons BEST FEST 2014. Shreddit is the group / company name of our group that moved forward with the competition by being one of seven finalists of the Cleantech Challenge.

OREGON BESTFEST

CLEANTECH CHALLENGE

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