Urban Agriculture as a Civic System
Rainier Beach | Seattle
University of Washington Landscape Architecture 503 Studio Spring 2017

AQUA-CULTIVATION
3 PRODUCTIVE AND EDUCATIONAL TRAILS

A SHADY RESTING SPOT
In the summertime, the "Production Dining Nook" receives soft, dappled light through leafy hops that grow over the structure. This semi-private space allows for visitors to bring their own snacks or dine on meals produced by the adjacent tapas restaurant made from the surrounding vegetable planter boxes.

LIGHT IT UP!
At night and during the cooler months, lights line the structure to provide a cozy and safe space to socialize and relax.

FOOD FOREST LIBRARY IN RAINIER BEACH
Main Nodes

FROM THE GROUND UP
GINA CHRISTOFANELLI 6.5.2017

POLLINATOR NETWORK
POLLINATOR NETWORK SYSTEM IN RAINIER BEACH

Learning Garden for the kids and adult to learn about the urban agriculture and pollinator’s habitat.

DAYLIGHTING RAINIER BEACH
ANDREW BADGETT | 6.5.2017

Building a Resilient System

Phase 1 Phase 2 Phase 3
Small-scale green roof
Woonerf street design
Bio-swales off Rainier Ave.
Visual representation of Mapes Creek
Small orchard planted
Transform Safeway into Food Innovation Hub
Green houses on roof and parking lot
Social/Flexible spaces located on pedestrian nodes
Expanded green roof
Expanded orchard
Open pedestrian path to apartments and Director St.
Daylight Mapes Creek in parking lot

Productive Green Roof
Daylight Mapes Creek
Public Orchard
Edible Pedestrian Trail
Flexible Social Spaces
Garden Workshops
Clean Stormwater
Edible Path in Chicago
Sausala Creek Restoration in Oakland, CA
Chicago Urban Horticulture Green Roof on McCormick Building

VA Learning Gardens Image
“The best place to realize the environmental, economic, and equitable benefits of a more local system of agriculture may not be in some rural or exurban location, but in and among the places we pass by daily on our way to work, home, school, commerce and recreation.”


The design process and proposals address issues of social justice and environmental health, and envision multiple benefits of:

- healthy food and environments,
- ecological learning,
- community-building
- evolving beauty

The studio got underway with a simultaneous immersion into urban agriculture processes, practices or typologies; Seattle-based urban agriculture precedents, and thematic analysis of the Rainier Beach neighborhood. The first two weeks involved touring 12 sites, in which each student developed a guide for a site. Each student also investigated and presented as a poster one of the following: healthy soil; water and irrigation approaches; pollinators, climate and micro-climate considerations; permaculture principles and practices; raised beds and containers; in-ground planting; vertical planting typologies; canopy planting; and animals. These served as references to inform subsequent design proposals. Thematic analysis of the neighborhood was enriched by prior research undertaken by this year’s MLA Capstone Studio addressing the Rainier Beach Urban Farm and Wetlands and “maker” initiatives. Our understandings were enriched by visits to neighborhood sites and meeting with community representatives.

Looking to a more resilient future in the face of climate change and food production as ecological infrastructure, this graduate studio explores where and how urban agriculture may be practiced in Seattle’s Rainier Beach neighborhood, notably on civic landscapes, as a system of productive landscapes. This neighborhood serves as an ideal context, with site- and community-based efforts towards growing healthy food, including the evolving Rainier Beach Urban Farm and Wetlands, the Rainier Beach Learning Garden, Thistle P-Patch, school gardens, the Rainier Beach Food Innovation District, and the Seattle Department of Parks and Recreation’s Good Food Program through the Rainier Beach Community Center.

Image Source: UW Center for Urban Horticulture
https://botanicgardens.uw.edu/center-for-urban-horticulture/gardens/uw-farm/
Resonating with Darrin Nordahl’s proposition, students identified a site and/or route(s) that serve community uses today for learning, play, growing food, gathering, shopping, working, or traveling. The existing urban agriculture sites and the Rainier Beach Food Innovation District, as well as the new light rail station and other civic landscapes, anchor a network of proposed sites as productive landscapes, developed by the following students:

Rainier Beach Urban Farm and Wetlands + Beer Sheva Park + Rainier Beach High School
Sujing Sun

Rainier Beach Learning Garden + South Lake High School meadow
Yuchia Chan

Mapes Creek path (52nd Ave S) + Safeway site + street ends
Drew Badgett

Neighborhood crossroads: sites on S. Henderson St flanking Rainier Ave S.
Margot Chalmers

Rainier Beach Branch Library
Shan Huang

Rainier Beach Community Center
Anran Liu

Potential Food Innovation District development at Rainier Beach Light Rail Station
Gina Christofanelli

Power line corridor + Chief Sealth Trail at Rainier Beach Light Rail Station, extending from Thistle P-Patch
Aaron Parker

Power line corridor + Chief Sealth Trail extending south of Henderson to 51st Ave S.
Yuxi Jin

The students’ designs are envisioned in relation to each other, affording community and ecological synergies and a more cohesive identity across the neighborhood. The design proposals and “maker” elements of the ongoing MLA Capstone Studio for Rainier Beach Urban Farm and Wetlands also were integrated where relevant. The design proposals evolved through an iterative process, with peer and instructor conversations, and with guest reviewers taking part in concept, schematic, and final design reviews/conversations. These proposals also were displayed at the Rainier Beach Urban Farm and Wetlands as an addition to the MLA Capstone Studio’s "Maker" event and design exhibition on Saturday, June 3. The proposals presented in this booklet are intended as catalysts for continued community dialogue and action around the ways in which urban agriculture may grow as an integral, essential and enriching part of our urban fabric and everyday life.

—Julie Johnson, Associate Professor

Image Source: Google Maps (student project sites highlighted)
THANK YOU!

FROM THE SPRING 2017 UW LARCH 503 URBAN AGRICULTURE STUDIO

Julie Johnson, Associate Professor
Drew Badgett, Margot Chalmers, Gina Christofanelli, Shan Huang, Yuchi Jan, Yuxi Jin, Anran Liu, Sujing Sun, and Aaron Parker

Studio Booklet Design + Development: Margot Chalmers

SPECIAL THANKS TO THOSE WHO MET WITH US AND OFFERED INSIGHT:

Community Organization Representatives

Belinda Chin, Seattle Department of Recreation
Cayce James, Seattle Office of Planning and Community Development
Chris Hoffer, Tilth Alliance
David Sauvion, Food Innovation District, Rainier Beach Action Coalition
Gretchen DeDecker, Seattle Public Schools
Katie Bang, Seattle Department of Parks and Recreation
Maren Neldam, Tilth Alliance
Nat Mengist, Tilth Alliance
Robert Scully, Seattle Office of Planning and Community Development
Sue Gibbs, Friends of Rainier Beach Urban Farm and Wetlands
Vienna Wong and members of the Rainier Beach High School Green Team
Yun Pitre, Seattle Department of Neighborhoods

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Meredith Sessions
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Lori Tang
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University of Washington

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Jeff Hou, Landscape Architecture
Gundula Proksch, Architecture
Iain Robertson, Landscape Architecture
Ben Spencer, Landscape Architecture
MLA Capstone 2017 Studio
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URBAN AGRICULTURE TYPOLOGIES

University of Washington’s Seattle Youth Garden Works Urban Farm

Image: Julie Johnson
PERMACULTURE: PRINCIPLES AND PRACTICES

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URBAN AGRICULTURE TYPOLOGIES | SYSTEMS

PERMACULTURE: Addresses the development of agricultural ecosystems intended to be sustainable and self-sufficient. Permaculture is a creative design process based on whole-systems thinking informed by ethics and design principles that feature on the site. This approach guides us to mimic the patterns and relationships we can find in nature and can be applied to all aspects of human habitation, from agriculture to ecological building, from appropriate technology to education and even economics. The techniques and strategies used to apply these principles vary widely depending on the location, climate and conditions and resources that are available. The methods may differ, but the foundations to the holistic approach remain constant.

Hugelkulture: Utilized raised beds and woody material to provide nutrients and moisture retention for growing plant and developing micro-ecosystems. As the years pass, the organic material degrades and the soil becomes rich with nutrients.

Agroforestry: “Land-use systems and practices in which woody perennials are deliberately integrated with crops and/or animals on the same land management unit. The integration can be either in a spatial mixture or in a temporal sequence. There are normally both ecological and economic interactions between the woody and non-woody components on agroforestry.” (The World Agroforestry Center)

Biointensive Farming: Most life in nature occurs at the interface of soil, water, air, and sun. This practice of soil preparation practices create growing beds with more surface area to maximize the effect of nature’s life processes. Double-dug beds, with soil loosened to a depth of 24 inches, aerate the soil, facilitate root growth, and improve water retention. The health and vigor of the soils are maintained through the use of compost. Close plant spacing is used to protect soil microorganisms, reduce water loss, and maximize yields. Companion planting facilitates the optimal use of nutrients, light and water, encourages beneficial insects and creates a vibrant ecosystem within the garden. Open-pollinated seeds also helps develop diversity and acclimatized cultivars.
WATER AND IRRIGATION APPROACHES

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URBAN AGRICULTURE TYPOLOGIES | SYSTEMS

1. STORMWATER HARVESTING

Stormwater harvesting system consists of collecting, delivering and recusing. When there is too much water, it will be captured in detention or retention wetlands, which may contain a cistern underground for overflow and reuse.

- **Detention**: provides only flood control with dry ponds. The pond is intended to drain the stormwater within a period to make the volume available for the next storm event.
- **Retention**: holds a permanent pool of water and are referred to as wet ponds. Usually a retention pond is constructed because of a high groundwater table (in other words, the groundwater is near the surface of the earth).

**Catchment Characteristics**

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<th>Infiltration Capacity</th>
<th>Runoff</th>
<th>Annual Runoff</th>
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<tr>
<td>100,000 sq ft</td>
<td>5,000 gpcd</td>
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**Irrigation System**

Irrigation areas include the Assemble Gardens and the green roofs along the sides of the stairway.

**Small Intervention**

Self-water small containers could be made with recycled bottles. It can be designed as gardening holders or vertical green walls.

2. IRRIGATION SYSTEM FOR CONTAINERS

Poor drainage will slowly kill the plants. Usually one watering per day is usually adequate. Self-watering containers is the easier way to keep the soil moist. They have a reservoir at the bottom and the moisture wicks up into the soil. Some of these pots only need watering once a week or even once every two weeks and your plants stay healthy and strong. It is a great solution. Matches can also be placed on top of the soil mix to reduce water loss.

3. FOR IN-GROUND FIELD

**Main Approaches**

- **Open Trench**: is the cheapest way to irrigate the garden, but it will evaporate extremely and waste too much water.
- **Drip Irrigation**: use pipes and sprinklers to water the vegetation with time control.
- **Underground Irrigation**: helps deliver water immediately to the depth where the plants grow. It’s no water loss because all the water reaches the roots.

**System Overview**

- **Irrigation Zones**: include all soil and plants.
- **Irrigation Timing**: timing is critical for optimal water use and efficiency.
- **Irrigation Equipment**: includes hoses, nozzles, timers, and controllers.

**Sources**


SUJING SUN | 4/10/2017
Soil is so much more than dirt! The key to happy plants is healthy soil, and a lot more goes into it than you might think. Soil provides plants with stability, it is the source by which most plants get their water, air and nutrients. Different plants have different soil requirements, for our purposes we will focus on what soil grows the best fruits and vegetables.

**Soil Texture and Composition**

![Soil Texture Chart]

- **Sandy Loam**
- **Silt Loam**
- **Clay Loam**
- **Clay**
- **Sandy**
- **Silt**

**Material Recycling and breakdown**

- **Composting**
  - For best results, there should be 3 parts carbon and one part nitrogen for compost piles.
  - **Carbon Materials:** Dried leaves, straw, nut shells, woody materials, newspapers, sawdust.
  - **Nitrogen Materials:** Food scraps, grass clippings, coffee grounds, plants, manure, bread.

**Soil Texting**

- **Water holding capacity**
  - Clayey: High
  - Sandy: Low

- **Nutrient holding capacity**
  - Clayey: High
  - Sandy: Low

- **Cr ust formation potential**
  - Clayey: High
  - Sandy: Low

- **Drainage build-up**
  - Clayey: Yes
  - Sandy: No/sometimes

- **War ming in spring**
  - Clayey: Slow
  - Sandy: Fast

**Nutrients and Fertilizers**

- **Primary Nutrients/ Macronutrients**
  - **Nitrogen**
  - **Phosphorus**
  - **Potassium**

- **Secondary Nutrients and Micronutrients**
  - **Macro Nutrients:**  N, P, K, Ca, Mg, S, B, Cu, Zn, Fe, Mn, Mo
  - **Micro Nutrients:**  Fe, Co, Cu, Zn, Mn, Mo, B, Mg
Pig In The City: Urban Animal Husbandry

UW LARCH 503 Community Design Studio
Urban Agriculture Typologies | Systems

Goats, Pigs, Rabbits: Housing Options

Honey Bees

Many Urban Hive Design Options:

- "Elevated Risers" - Glass observation windows
- "Beehive Design by Steve Jones" - Hive is accessible, helpful for easy viewing
- "Sidewalk" - Hive is accessible, helpful for viewing
- "Beehive Design by Jim Bevan" - Simple and cheap, can substitute for a beehive, or wood tray for Maggie
- "Beehive Design by Jim Bevan" - Simple, accessible, size

Seattles Requirements

- Bees are allowed outdoors when registered with the City Department of Agriculture
- Space required: 10 hives per 400 sq. ft.
- Nest Boxes: Must be kept clean, sealed, no entry from the roof
- Roosts: Perch space (per hive): 25 cm (10 in)
- Feed and Water: Must be kept off the ground to prevent contamination
- Invader Protection: Metal fencing to prevent access

Goats and Chickens can cohabitate well together, with proper accommodations. Goats cannot access chicken feed. Chickens can eat goat parasites.

Goats and pigs can cohabitate well together, with proper accommodations. Goats must not access chicken feed. Chickens can eat goat parasites.

How can I create a friendly space for honey bees?

- Create a water source
- Plant pollinator-friendly plants
- Encourage others to plant bee-friendly and to avoid pesticides

What do my chickens need?

- Space (reduces stress, disease, fighting)
- Nest Box, Perch: 3.5 sq. ft. (3.5 sq. ft.
- Meat Section: 1 sq. ft. (1 sq. ft.
- Ventilation + Light: Adjustable ventilation near ceiling of the coop in cold weather

Indian Runner ducks are land ducks that may co-inhabit with chickens.

- Meat Breeds:
  - Buy, Pekin, Anadons

Keep in mind:

- A 10 feet distance from chicken runs is recommended.
POLLINATORS + CLIMATE AND MICROCLIMATE CONSIDERATIONS AND STRATEGIES

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Bees
- Bees are well documented pollinators in the natural and agricultural settings. They are a prime group of pollinators present to garden areas and wooded edges. Numerous bees, such as bumblebees and honeybees are common, and they are often seen on flowers that attract bees.

Butterflies
- Butterflies are the primary pollinators present in garden areas and wooded edges. Numerous butterflies, such as Monarch Butterflies and Swallowtails, are common, and they are often seen on flowers that attract butterflies.

Wind
- Wind is a major factor in flower pollination. Butterflies, bees, and flies do not depend on wind for pollination. Some trees and shrubs, however, do have flowers that are pollinated by wind.

Increase Flower Diversity
- Support native flowers and shrubs that bloom all season.
- Riff areas near the garden or farm can be ideal sites for pollinator gardens.
- Plant wildflower or gardens along boulevard or meadows.
- Highlight habitats and gardens with signage.

Provide Nest Sites
- Support native flowers and shrubs that bloom all season.
- Riff areas near the garden or farm can be ideal sites for pollinator gardens.
- Plant wildflower or gardens along boulevard or meadows.
- Highlight habitats and gardens with signage.

Reduce Impact of Mowing
- Retain woody shrubs with pithy stems for nesting.
- Retain trees that provide pollen, nectar and shelter for pollinators.
- Provide access to soil surface for nesting.
- Retain some branches or logs for nesting resources.
- Add nesting sites like nestling blocks or bee boxes.

Avoid Herbicides and Insecticides
- Minimize herbicide application to enhance floral resources.
- Minimize pesticide use beside pollinator habitats.

Plants for Pollinators

http://pollinator.org/discoveryposter2013
http://pollinator.org
https://www.thedrastic.com

YUCHIA JAN | SPRING 2017
POLLINATORS + CLIMATE AND MICROCLIMATE CONSIDERATIONS AND STRATEGIES

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STRUCTURES FOR POLLINATORS

Hummingbird Feeder
Bat Box
Bee Box
Butterfly Feeding Table
Pollinator Patch
Bug Hotel

INFRAS Tructures TO EXTEND GROWING SEASON

Rowcover Fabric
Cloches
Cold Frames
Hoop Houses
Greenhouses
PVC Hoop Tunnels

Soil
- pH
- Soil texture
- Soil composition
- Nutrients
- Drainage

Soil Microclimates

Water
- Soil drainage
- Humidity
- Grading and runoff
- Shelter from (or exposure to) rain
- Exposure to drying wind or sun
- Location of water table, surface water, and streams
- Competing plants that might hug the available water

Groundwater, basins, and related beds can be used to warm the soil and allow for earlier planting, but they need to be monitored during drought. Windbreaks, shade trees, cloth and stormwater, and water features all have an impact on the surrounding area and can be incorporated into your garden design not only as decorative features, but as a way to grow the plants you want.

Weather
- Shade from trees and buildings can reduce light in part of the yard.
- On a sloping lot, higher elevations will be warmer than lower ones.
- The direction of lot is oriented makes a difference, with south-facing yards receiving more intense sunlight than north-facing yards (in the northern hemisphere). Eastern exposures are perfect for plants needing partial sun, while western exposures can be harsh and windy.

- Cold Tunnels: Low-lying areas with poor circulation frequently collect cold air and dampness, particularly if the soil is poorly draining. These areas tend to be the first to freeze, so the best way to find them is to note patches of frost on fall and spring mornings.
- Heat Sinks: Pavement, stone, and buildings can absorb heat that radiates to surrounding areas. Notice the drier soil, or special plants with heat damage. Plantings around heat sinks need to be heat and drought tolerant.
- Seasonal Variations: Deciduous trees can create sunny areas in winter and shady areas in summer. Northern exposures can be shaded during the winter, and southern exposures can be downright scorching in summer.

The climate in this area is classified as a Mediterranean climate, which means it is characterized by mild, wet winters and dry, hot summers. The average temperature in the area ranges from 10°C (50°F) in January to 24°C (75°F) in July. The average precipitation is around 800 mm (31 inches) per year, with the majority falling in the winter months. The area is prone to occasional droughts, especially in the summer months. The area is also subject to occasional thunderstorms.

Washington Climate Chart

The climate here is influenced by the oceanic and continental climates, resulting in mild temperatures throughout the year. The area is also subject to occasional storms, which can bring heavy rain and strong winds. The area is also prone to occasional droughts, especially in the summer months. The area is also subject to occasional thunderstorms.

http://www.wte3.com/weather/washington/washingtonweather.html
http://www.weather.com/weather/weatherunderground/com
IN-GROUND PLANTING TECHNIQUES | ANNUALS + PERENNIALS

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URBAN AGRICULTURE TYPOLOGIES | SYSTEMS

ANNUALS + PERENNIALS | In nature, edible plants are usually found secluded by species. In fact, they thrive when surrounded by a variety of other edible and ornamental plants as well as a healthy mix of insects and animals. Gardening can use these relationships to create more productive and aesthetically pleasing arrangements.

ANNUALS + PERENNIALS BASICS

WHAT IS AN ANNUAL?
Plants that perform their entire life cycle from seed to flower to seed within a single growing season. All roots, stems and leaves of the plant die annually. Only the dormant seed bridges the gap between one generation and the next.

WHAT IS A PERENNIAL?
Plants that persist for many growing seasons. Generally the top portion of the plant dies back each winter and regrows the following spring.

IN GROUND TECHNIQUES

NO-TILL AGRICULTURE
Just like the name suggests, no-till agriculture does not require tilling the soil between harvests. This method increases organic material and water intake while making more resilient, erosion resistant soils.

INTEGRATED PEST MANAGEMENT (IPM)
Unlike typical practices that rely on pesticides, IPM seeks to remove shelter, food, and water that attracts the pests in the first place. By tracking and using methods to capture or repel pests, this system seeks to greatly reduce the amount of pesticides required.

PERMACULTURE
A system that utilizes natural processes and patterns in the local ecosystems. Besides focusing on the natural world, it also pulls from social design principles. Its ideal is working with nature that has expanded beyond just growing food.

BIODYNAMIC AGRICULTURE
Building off of the permaculture and organic farming techniques, biodynamic agriculture takes it a step further by incorporating solar and lunar patterns to determine best planting methods. It also uses herbal and mineral additives to bolster soil health.

COMBINING ANNUALS + PERENNIALS

COMPANION PLANTS
Plants don’t live in homogeneous societies, rather they create symbiotic relationships with others around them. Utilizing these benefits can lead to a healthier, more productive garden.

ADDING WILDLIFE AND AESTHETIC VALUES
Production is typically the primary concern of edible gardens but this can and should be layered with plants that create habitat for local wildlife/insects.

Aesthetics is another aspect that shouldn’t be ignored. Designing for beauty year around can make a garden into a consistent amenity rather than a dirt patch during winter.

SOURCES:
http://www.no-till.org/understanding/understanding_no_till_agriculture.php
http://www.biorural.com/permaculture/permaculture.html
http://www.osidc.com/tips/cover_cropping.html
http://www.garden.org/article/using_companion_plants_in_your_garden.html
RAISED BEDS AND CONTAINERS

UW LARCH 503 COMMUNITY DESIGN STUDIO
URBAN AGRICULTURE TYPOLOGIES | SYSTEMS

Raised beds have become very popular and almost all vegetables can be grown in containers. They can work well in urban spaces, especially where soil contamination is a concern, where digging into the ground isn’t an option, or where people are especially picky about how a garden looks.

Raised beds are easy to work and often require less maintenance and container choices are limitless.

DESIGN APPROACHES

Height, Depth, Width

Raised beds can mean warmer, less compacted soil and a commensurate increase in soil quality with a just six-inch rise.

It’s possible to increase soil depth without building the bed higher, by the technique known as “double digging.” This technique lightens and aerates the lower layer of the soil, in essence giving your plants a deeper layer of topsoil in which to grow.

The width of a raised bed is a matter of comfort and preference. Four feet seems to have become the recommended standard, because most people can still weed and tend plants at a two-foot reach, but not much beyond.

Gardening from a wheelchair usually requires a higher but narrower bed.

BENEFITS AND LIMITATIONS

Benefits

- The garden looks neat. The walls keep soil in place, and pathways can be kept cleaner.
- They require less bending to work on the plants, but a 12 inch wall does not help much for us tall folk.
- They can be used in areas that have very poor soil, contaminated soil or no soil at all. Containers are small raised beds.
- They warm up quicker in spring, allowing earlier planting.
- They can be great for people with a disability.
- Different beds can hold different types of soil allowing you to match soil to crops.
- Drainage can be better in areas with very poor drainage, but raised beds can also cause drainage problems.
- Bottoms can be screened to keep gophers and voles out.
- Helps keep kids and pets from stepping onto plants.

Limitations

- You have to buy soil, unless you have high spots in your yard that you want lower.
- They cost money to build.
- Soil dries out much faster in summer.
- Requires more watering.
- Less sustainable since you need to buy and transport walls and soil.
- There is some concern about chemicals leaching from the material used to build the walls.
- Soil gets warmer, which is not good for roots, except in early spring.
- Perennials need to be harder since a raised bed gets colder in winter.
- The rows between beds need to be wider if you plan to use a wheelbarrow with taller walls.
- Drip irrigation is more difficult to install.
- Soil cools down quicker in fall.

SOURCES:

http://gardening.solutions.ifas.ufl.edu/
http://www.gardenfundamentals.com/
http://www.garden-planting-tips.com/
http://www.planetnatural.com/
http://cantheasq.com/
http://veganslivingofftheland.blogspot.com/
VERTICAL FARMING

DEFINITION
Vertical farming is the practice of producing food in vertically stacked layers, such as in a skyscraper, used warehouse, or shipping container. The modern idea of vertical farming use indoor farming techniques and controlled-environment agriculture (CEA) technology, where all environmental factors can be controlled.

EXTRA ENERGY NEEDED
During the growing season, the sun shines on a vertical surface at an extreme angle such that much less light is available to crops than when they are planted on flat land. Therefore, supplemental light would be required in order to obtain economically viable yields. (Wikipedia)

SOURCES:
VERTICAL FARMING

VINES (LIGHT HEIGHT)
http://www.bhg.com/gardening/plant-dictionary/vine/
http://www.gardeners.com/how-to/trellis-supports-for-climbing-plants/5600.html

DEFINITION
An espalier is a plant that has been trained to grow in a flat plane against a wall, fence, or trellis.

SPECIES
https://en.wikipedia.org/wiki/Species_choices

TECHNIQUES OF MAKING ESPALIERS
https://deepgreenpermaculture.com/diy-instructions/espaler-supporttrellis/

SUPPORTING STRUCTURES OF VINE & SHRUBS
Arches
Flat Trellises
Cages and Ladders
Arbors
Obelisks, Tripods and Teepees
 Privacy

SCALE
- OPERATION
- SIGHT LINE

ADULTS
- CHILDREN
**CANOPY: ORCHARD & FOOD FOREST**

**UW LARCH 503 COMMUNITY DESIGN STUDIO**
**URBAN AGRICULTURE TYPLOGIES | SYSTEMS**

**Definition**

An orchard or food forest is a gardening technique or land management system, which mimics a woodland ecosystem by substituting edible trees, shrubs, perennials and annuals. Fruit and nut trees make up the upper level, while berry shrubs, edible perennials and annuals make up the lower levels.

**Canopy:** In biology, the canopy is the above-ground portion of a plant community or crop, formed by the collection of individual plant crowns. In forest ecology, canopy also refers to the upper layer or habitat zone, formed by mature tree crowns and including other biological organisms (epiphytes, lianas, arboreal animals, etc.).

**Central Principles & Feature**

A Garden of Potentials

Layers of the Forest

Plants That Work Together

Choose a Forest Garden Strategy

**Processes and Relationship**

**How we got started—from Beacon Food Forest**

<table>
<thead>
<tr>
<th>Steps</th>
<th>Permaculture Principles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1: Find the land</td>
<td>Observe and interact.</td>
</tr>
<tr>
<td>Step 2: Find a core group of dedicated believers.</td>
<td>Integrate rather than segregate.</td>
</tr>
<tr>
<td>Step 3: Introduce the BFF Concept to the Community</td>
<td>Use and value diversity.</td>
</tr>
<tr>
<td>Step 4: Create a relationship with the landlord and begin negotiations.</td>
<td>Use and value renewable resources and services. Apply self regulation and accept feedback.</td>
</tr>
<tr>
<td>Step 5: Create leverage</td>
<td>Creatively use and respond to change.</td>
</tr>
<tr>
<td>Step 6: Continuous Outreach and Community Engagement.</td>
<td>Use edges and value the marginal.</td>
</tr>
</tbody>
</table>

**Precendent: Beacon Food Forest**

The goal of the Beacon Food Forest is to bring the richly diverse community together by fostering a Permaculture Tree Guild approach to urban farming and land stewardship. By building a community around sharing food with the public, we hope to be inclusive to all in need of food.

The Food Forest is set to include an Edible Arboretum with fruits gathered from regions around the world, a Berry Patch for canning, glazing and picking, a Nut Grove with trees providing shade and sustenance, a Community Garden using the 4x4-patch model for families to grow their own food, a Gathering Plaza for celebration and education, a Kid’s Area for education and play and a Living Gateway to connect and serve as portals as you meander through the forest.

The Beacon Food Forest started in 2009 as a final design project for a permaculture design course. The 5+ acre site is located in the Beacon Hill neighborhood to the west of Jefferson Park, 2.5 miles from downtown Seattle. Phase One (1.75 acres) is complete, and we are now planning for Phase Two (1.75 acres).

**Sources**

http://beaconfoodforest.org/
http://www.ecologidesign.com/
Which urban agriculture precedents did we study?

1. Nathan Hale Horticulture Gardens and Greenhouse (Jane Addams Middle School)
2. Meadowbrook Community Garden and Orchards
3. Tilth Gardens--Good Shepherd Center Community Learning Garden + Children’s Garden
4. UW Farm--Seattle Youth Garden Works Urban Farm
5. Alleycat Acres--24th & Main, 26th & Marion planting strips
6. Danny Woo Community Garden
7. Bradner Garden Park
8. Beacon Food Forest
9. Tilth Garden--Rainier Beach Learning Garden
10. Orca K-8 School Garden
11. Rainier Beach Urban Farm and Wetland
1. NATHAN HALE HORTICULTURE GARDENS + GREENHOUSE (JANE ADAMS MIDDLE SCHOOL)

Size: ¼ acre lot, 105’x30’ greenhouse

Type: Educational Horticulture Garden and Urban Farm

Harvest from greenhouse production and ground garden plots, and will sell the production to residents and raise money

- Raised garden bed hugelkultur
- Rainwater harvesting
- UW Botanic Garden participates in the Garden-based Restoration and Outreach Workshops
2. MEADOWBROOK COMMUNITY GARDEN + ORCHARDS

Size: 7 acres

Type: **Urban Food Gardening-Community Gardens**

maintenance by volunteers, the harvest will be donated to the Community Shelter Meal when available.

- permaculture practice: using wattle in wet ground as aesthetic fences, edible hedge
- plant native bulb-blue camas (which was once a diet staple of early Americans, prior to European arrivals) to welcome neighborhood
- checkerboard pattern with donated bamboo posts
- City Fruit organization hosted the city-wide orchard tour

Top row and bottom right images from Meadowbrook Community Care
https://www.mc-care.org/mccare/
3. TILTH GARDENS: GOOD SHEPHERD CENTER COMMUNITY LEARNING GARDEN + CHILDREN’S GARDEN

Type: Community Learning Garden & Children’s Garden

The garden is dedicated to teaching organic gardening and sustainable landscape techniques.

- Year-round gardening
- Fruit producing
- Permaculture design and rainwater harvesting
- Composting
- Native plants and soil building techniques

http://www.seattletilth.org/
4. UW FARM: SEATTLE YOUTH GARDEN WORKS URBAN FARM

Size: 1.5 acre

Type: **Student-powered urban horticulture and urban farm**

The UW Farm Expansion is a project of the UW Student Farm in partnership with Youth Garden Works program by (non-profit organization). Food can be found in kitchens throughout the University of Washington campus.

- Seattle Tilth program for homeless and underserved youth, participate in all aspects of a farm-to-market operation.
- ‘Farm to Table Dinner’ workshop on site
- Public art
5. ALLEYCAT ACRES: PLANTING STRIPS ON 24TH + MAIN ST AND 26TH + MARION ST

Type: **Community Garden**

Work with public spaces and private landowners to transform plots of land into community farms. It is a community drive project, no individual plots, serving the community nearby.

- Reconnect people, place, and produce by building a network of community run farms
- Linear raised bed along the street

(Source: https://www.google.com/maps)
6. DANNY WOO COMMUNITY GARDEN

Size: 1.5 acre

Type: **Community Garden**

Community garden for elders making Chinatown International District as a cultural hub.

- Chicken House
- Fruits and vegetable producing
- Outdoor cookery
- Terrace farm
- Toolshelter
- Gathering space
7. BRADNER GARDENS PARK

Size: 1.5 acre

Type: Community Garden P-patch

The Seattle P-Patch Program established a community garden on the site in 1987 to provide gardening space for Mien immigrants from Laos

- year-round vegetable gardening
- raised beds,
- plants that attract beneficial insects, swale gardening
- soil building techniques, and water-wise drip irrigation.
- a bounty of art, creative arbors,
- a unique and beautiful pavilion,
- a prominent wind vane.

map source: https://www.pinterest.com/pin/391039160125116300/
8. BEACON FOOD FOREST

Size: 0.6 acre

Type: Permaculture Design Course Final Project

The goal is to bring the richly diverse community together by fostering a Permaculture Tree Build approach to urban farming and land stewardship. The food is available to visitors.

- Edible fruit and nut trees berry patch, community garden (vegetables, fruits, and flowers)
- bee hives (pollination and honey)
- accessible raised beds,
- demonstration gardens,
- public art.

map source: http://beaconfoodforest.org/project/
The garden offers hands-on and science-based learning chances. People at all ages can join in all stages of growing including preparing soil, harvesting, cooking and eating. Classes are available online as well.

- Raised beds
- Rain garden
- Tool shed
- Perennial edibles Native plant garden
10. ORCA K-8 SCHOOL GARDEN

Type: Educational Garden

Orca’s longstanding garden and environmental education program that helps kids learn about science while digging in the dirt.

- Raised beds
- Rain garden harvesting
- Vine structure
- Outdoor classroom
11. RAINIER BEACH URBAN FARM AND WETLANDS

Size: 8.25 acre

Type: Urban Farm and Wetland

Seattle’s largest urban farm. Community members of all ages volunteer and participate in the educational programs, learning to grow food organically and restore the natural wetlands habitat that runs down the middle of the farm, while supplying fresh food for the community.

- commercial kitchen
- outdoor classroom
- improved access trails
- Wetland restoration work
LEFT: The Rainier Beach neighborhood is designated as an Urban Village in the City of Seattle Comprehensive Plan.
HISTORICAL HIGHLIGHTS

8,000 BC – 10,000 years ago
FIRST HABITAT
What is now Rainier Beach neighborhood has been inhabited since the end of the last glacial period.

1870
TRAIL
-There is a trail through the valley that led to the villages on salt water at Elliott Bay and the estuarial Duwamish River.
The trail became the route for driving livestock to the town of Seattle.

1890
ATLANTIC CITY PLAN
-Clarence D. Hillman (1870-1935), who developed much of the area, named Atlantic City.
-He included a park area on the cove, built a pier, bath house, boat house, picnic facilities.

1894
REAL ESTATE BOOM+RAILWAY
-Real estate boom
-The trail became the route of the Seattle and Rainier Beach Railway

1937
TROLLEY ENDED+BOOM
-Trolley service ended in the neighborhood
again during and after World War II.
The route became Rainier Avenue S.

1950s
WATER POLLUTION
-With a sewer outfall near the beaches of Atlantic City Park
and dramatic collapses in water quality.

1960s
CLEANUP WATER
-the neighborhood benefited greatly with the Metro cleanup
of Lake Washington.
-Rainier Beach community is a wide range of ethnic groups
and nationalities.

SOURCES:
http://www.rainiervalleyhistory.org/stories/articles/rainier-beach-station
http://www.historylink.org/File/3116
https://en.wikipedia.org/wiki/Rainier_Beach,_Seattle
http://www.rainiervalleyhistory.org/stories/articles/rainier-beach-station
http://www.historylink.org/File/3116
IMPORTANT EVENTS:

Pritchard Island:
Prior to the lowering of Lake Washington, Pritchard Island was seen as highly important by the Olmsted Brothers, who were designing a parks and boulevards plan for the city.
In 1917 the lowering of Lake Washington connected Pritchard Island to Seattle Lands. In 1927 Dunlap Slough was drained, expanding the land further. The land was owned by Alfred J. Pritchard between 1900 and 1934, when the city acquired the land for a park.

Sources:
Hydrology

Source: King County Data Portal, Hydrology (Hydro) + Recreation (Recreaten) + Transportation (Transportation) + Planning (Planning) + Recreation (Recreaten) + Property (Property) + Transportation (Transportation) + https://www5.kingcounty.gov/gisdataportal/

Historic Shoreline Map

Data from: King County Data Portal, Planning (Planning) + Recreation (Recreaten) + Property (Property) + Transportation (Transportation) + https://www5.kingcounty.gov/gisdataportal/

Hydrological Features

Important Events:
Mapes Creek Restoration:
In 2012 work began to restore 400 feet of Mapes Creek in the Rainier Beach Neighborhood. The goal was to restore habitat for juvenile Chinook salmon. The project was designed by Landscape Architecture Firm SVH and was completed in 2014.

Lake Washington:
In an effort to connect Lake Washington to the Puget sound the Hiram M. Chittenden locks (Ballard Locks) and the Montlake cut were constructed. Work on the Montlake cut began in 1909. It was this connection with Lake Union which dropped Lake Washington by 9 ft. The drop in water levels cut off the water supply to the Black river which connected Lake Washington to the Duwamish River and the Black River dried up. Lake Washington was no longer a part of the Green River/ Duwamish River watershed and is now a part of the Cedar River/Lake Washington watershed.

Sources:
DEMOGRAPHICS: ETHNICITIES

2010
Rainer Beach

White: 22.61%
Asian: 36.13%
Black or African American: 11.51%
American Indian or Alaska Native: 0.08%
Hawaiian or Pacific Islander: 0.00%

Seattle

White: 74.53%
Asian: 12.72%
Black or African American: 7.03%
American Indian or Alaska Native: 0.81%
Hawaiian or Pacific Islander: 0.50%

2015
Rainer Beach

White: 25.07%
Asian: 28.93%
Black or African American: 38.72%
American Indian or Alaska Native: 0.81%
Hawaiian or Pacific Islander: 4.01%

Seattle

White: 69.92%
Asian: 14.21%
Black or African American: 7.23%
American Indian or Alaska Native: 0.89%
Hawaiian or Pacific Islander: 0.35%

SOURCES:
http://www.socialexplorer.com/
DEMOGRAPHICS: EDUCATION

2010
Rainer Beach
Completed Master's Degree: 21.31%
Completed Bachelor's Degree: 55.18%
Some College or More: 19.52%
Less Than High School: 3%

Seattle
Completed Master's Degree: 15.31%
Completed Bachelor's Degree: 33.48%
Some College or More: 40.06%
Less Than High School: 11%

2015
Rainer Beach
Completed Master's Degree: 23.87%
Completed Bachelor's Degree: 59.84%
Some College or More: 19.37%
Less Than High School: 3%

Seattle
Completed Master's Degree: 17.64%
Completed Bachelor's Degree: 26.82%
Some College or More: 46.68%
Less Than High School: 14.48%

SOURCES:
http://www.socialexplorer.com/
“Seattle is a city where much of the population enjoys comfortable to very high incomes, yet roughly one out of seven Seattleites has an income below the poverty line. In Seattle, the poverty rate for people of color is more than two and a half times that for whites. High rates of poverty among single-parent families, disabled people, and other demographic groups reveal additional disparities in the well-being of Seattle residents.”

– Seattle 2035 Comprehensive Plan

We need to make investments in park facilities and programs to reduce health disparities by providing access to open space and recreational activities for all Seattle residents, especially marginalized populations, seniors, and children.

– Seattle City Council

Using the City’s “Income and Poverty” mapping layer allows us to take into consideration priority areas for future parkland acquisition and/or facility development.
DEMOCRAPHICS: CRIME

SOURCES:
CRIME IN SEATTLE NEIGHBORHOODS

Pioneer Square Area  1/1/2017 - 4/6/2017


Woodland Park Area  1/1/2017 - 4/6/2017
DEMOGRAPHICS: DENSITY

MAP AND DATA SOURCES:
Seattle.gov: Seattle Parks and Recreation
Created by Rodney Young, City of Seattle Department of Parks and Recreation

Using the State’s ‘Small area population’ estimate, which is more up-to-date than the 2010 census and more robust than the American Community Survey population data, allows us to identify areas for consideration for future parkland acquisition and/or facility development. In the image below, the darker the color, the higher the percentage of population per acre in 2016.
Plans are underway to address the connections West to East, from the light rail station to Beer Sheva Park. This street crosses four main neighborhood “Pearls” (Station Area, Beach Square, Rose Street, and the Historic District (next to the marina). The plan is to celebrate major intersections and make the pedestrian experience safe while promoting the culture and character of the neighborhood.

SOURCE:
LIGHT RAIL DEVELOPMENT PLAN

The station area is also a focus for the community's hopes for development: "Amend development regulations to enable higher density residential and mixed-use development within 1/4 to 1/2 mile of the light rail station. The objectives are to: encourage development that is beneficial for the community by creating employment opportunities; offering housing affordable across a range of incomes; and creating a destination "entry" to Rainier Beach. Ideas of desired development include: apartments; community college; incubator businesses, potentially linked to the Urban Farm; and live/work spaces." The plan recommends an 85-foot height limit in mixed-use and commercial areas, raising the C-65, NC-40, and LR3 zones that predominate in the station area today. (theurbanist.org)


SOURCE:
https://www.theurbanist.org/2016/10/07/rainier-beach-updates-its-neighborhood-plan/
Food Innovation District

EXISTING ASSETS:

Community has collaborated with Seattle Tilth to establish Rainier Beach Urban Farm and Wetlands.

Southeast Effective Development (SEED) has released 5000 sq ft building nearby 5 Director Street, that is being converted into the Rainier Beach Farm and Food Hub to house a number of local food production and distribution operations (Seattle Tilth, Juicebox, Seattle food Co-op, Seattle Farm Co-op, and Rainier Beach Action Coalition).

The light rail is at a nexus of several regional manufacturing and industrial areas.

Multi-ethnic Rainier Beach provides a valuable and untapped resource to establish international food culture and trade in the neighborhood. A range of trades could be established with Seattle's vibrant restaurant and mobile food vendors.

Rainier Beach has excellent access to the regional transportation infrastructure.

LOOKING FORWARD:

Proposed program spaces providing a full range of employment and business development opportunities for Rainier Beach residents in a 104,550 sq ft multipurpose facility consisting of two structures near the light rail station.

The building(s) will be a hub for:
- Distribution
- Aggregation
- Value-added Production
- Education/Training
- Business Incubation
- Co-packing
- Tasting
- Research and Development

SOURCES:
http://www.rbcoalition.org/category/action-areas/growing-food-to-develop-healthy-industry/
COMMUNITY GROUPS: RAINIER BEACH URBAN FARM AND WETLANDS
Project Sites:
Rainier Beach Neighborhood

Neighborhood Map (left): Healthy Laps
Base Image Map: Google Maps
Sujing Sun
Aqua-Cultivation
To design a new urban agriculture public space involving more neighborhood nearby, this site includes the resources from Rainier Beach Urban Farm and Wetland, Beer Sheva Pak and the open space in front of the Rainier Beach High School. The vision of this design is to create a productive and educational place for the community nearby, relieving their environmental and food justice issues, upgrading their living standard and awareness of nature.

This public destination around Lake Washington is designed as three overlapped trails in themes of FOOD EXPLORATION, HABITAT LEARNING, AND HYDROLOGY STUDY. Through the aqua-cultivation experiences derived from the green and blue resources on the site, the public space is activated to involve the Rainier Community nearby as an outdoor classroom, an observation platform of nature, and an exploration toolkit to study smart water use.

+ RAINIER BEACH URBAN FARM AND WETLAND
+ BEER SHEVA PARK
+ RAINIER BEACH HIGH SCHOOL
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**THE FOOD EXPLORATION TRAIL** embraces the land use of Rainier Urban Farm and Wetland, developing several types of urban agriculture, such as TERRACE GARDEN, POLLINATOR HEDGE, OPEN TRENCH IRRIGATION, VINE STRUCTURE, FRUIT FOREST. Uniquely, the AQUAPONICS HOUSE is a new threshold of future agriculture with self-sufficient technology. The TERRACE GARDEN with a GATEWAY OVERLOOK enhances the connection between the farm and the community. (This design physically includes the work from 2017 MLA Capstone Studio of maker space, ADA raised beds and outdoor classroom with asterisk reference.)
THE HABITAT LEARNING TRAIL keeps a natural wetland area continuing the wetland system to the Pritchard Island Beach wetland, connecting the natural protective water shed with Lake Washington. Along the boardwalk to experience the wetland system, there are several rest spots to observe the nature and wild species, such as the DUCK HOUSE, BIRD OBSERVATION, SALMON HABITAT. From woodland to grassland to wetland, many native animals will attract students, tourists and photographers, etc. Especially, the ECO-KAYAK-TOUR is proposed in the future to have fun in such an ecosystem.
• THE HABITAT LEARNING TRAIL keeps a natural wetland area continuing the wetland system to the Pritchard Island Beach wetland, connecting the natural protective watershed with Lake Washington. Along the boardwalk to experience the wetland system, there are several rest spots to observe the nature and wild species, such as the DUCK HOUSE, BIRD OBSERVATION, SALMON HABITAT. From woodland to grassland to wetland, many native animals will attract students, tourists and photographers, etc. Especially, the ECO-KAYAK-TOUR is proposed in the future to have fun in such an ecosystem.

• THE HYDROLOGY STUDY TRAIL links the community to harvest with water and save extra runoff to recharge in the dry seasons. Hopefully in the future, this public space will be as an outdoor classroom for the students and communities to learn about the storm water management skills and different kinds of irrigation techniques, such as AQUAPONICS, OPEN TRENCH IRRIGATION, Drip Irrigation, and permeable pavements, bioswale, low-impact parking lots, etc. From the experiences, the community will understand the importance of smart use water and be aware to reuse for irrigation to encounter with the climate change.
AQUAPONICS HOUSE

AQUAPONICS IS THE FUTURE OF FOOD PRODUCTION. THESE SYSTEMS CAN SYMBIOTICALLY GROW PLANTS, FISH, AND GOURMET FUNGI TOGETHER USING ONLY 5-10% OF THE WATER USED WITH IN-SOIL METHODS. FOOD IS GROWN IN DENSE RAISED BEDS WITH WATER AND MEDIA INSTEAD OF SOIL. ONE PUMP CAN RUN AN ENTIRE FARM, ALLOWING GRAVITY TO PULL WATER FROM BED TO BED; DRASTICALLY REDUCING ANY UTILITY BILL.
The Goals

- Reveal natural amenities to strengthen local identity and improve neighborhood aesthetic.
- Enable local economic opportunities that allow existing businesses to grow.
- Create a resilient food system that's good for our community by using food grown and consumed in the neighborhood.
- Foster development of new diversity in the neighborhood.
- Provide affordable opportunities for residents of all ages.

The People

- Why choose this site?
  - Close to park access
  - Easy access to core businesses
  - Access to light rail or streetcar
  - Proximity to frequent bus service
  - Proximity to a public health facility
  - Proximity to a park
  - Access to fresh produce
  - Median household income

The Land

- What needs can this site potentially meet?
  - Park access
  - Gathering place
  - Neighborhood gathering place

Why choose this site?

- Historical significance: Rainier Beach was a landing ground for Native American people who came together to dance, perform, and come together.

Analyzing Impacts on Displacement and Opportunity Related to Seattle’s Growth Strategy

- Displacement risk index
  - High: Areas with high displacement risk
  - Low: Areas with low displacement risk

Income and health: Areas with high income and health are at a lower risk of displacement.

Growth and Equity

- Median rent
- Proximity to regional job center
- Low English-speaking ability
- Racial or ethnic diversity

Access to opportunity index

- Manufacturing & Industrial Center
- Expanded Urban Village Boundary
- Manufacturing & Industrial Center
- Figure 4
- Median household income

Current Mapes

- 5 - 15% increase
- >15% increase

Recent Daylighting

- Piped Portion
- Site selection map

Rainier Beach
Highlighting Existing Nodes

Currently on site there are three main intersections where pedestrian traffic changes direction, enters the space, or stops and rests.

Discovering Productive Areas

The most promising spaces for urban agriculture are the roof of the Safeway, 52nd Ave north of Rainier Ave S., and the pedestrian path connecting Henderson and Rainier Ave.
Discovering Productive Areas

The most promising spaces for urban agriculture are the roof of the safeway, 52nd Ave north of Rainier Ave S., and the pedestrian path connecting Henderson and Rainier Ave.
Linking Routes and Destinations
This site is at the heart of the area’s local amenities. By creating a network of pedestrian friendly paths, the right of way is given back to the residents and becomes an amenity itself.

Connections
Safe, Simple Access to Local Amenities
Open Path to Neighboring Community
**Restoring Water**

Many creeks used to flow through Rainier Beach but there is only one that remains and it flows through pipes underneath the pedestrian path and parking lot. By revealing the creek in the parking lot and paying homage to the flow of water through the pedestrian path, this natural amenity comes to the surface.

**Mapes Creek**
Revealing a Green Network

Nodes

Production

Connections

Mapes Creek

Green Roof on Safeway

Safe, Simple Access to Local Amenities

Day-lit Section

Local Greens Path

Open Path to Neighboring Community

Artificial Day-lit Section

Orchard

Green Houses

LIBRARY

FARM CO-OP

COMMUNITY CENTER

GROCERY

HOUSING

HIGH SCHOOL

RB URBAN FARM AND WETLAND

COMMUNITY CENTER

LIBRARY

FARM CO-OP

COMMUNITY CENTER

GROCERY

HOUSING

HIGH SCHOOL

RB URBAN FARM AND WETLAND
Phase 1
- Small-scale green roof
- Woonerf street design
- Bio-swales off Rainier Ave.
- Visual representation of Mapes Creek
- Small orchard planted

Phase 2
- Expanded green roof
- Expanded orchard
- Open pedestrian path to apartments and Director St.
- Daylight Mapes Creek in parking lot

Phase 3
- Transform Safeway into Food Innovation Hub
- Green houses on roof and parking lot
- Social/Flexible spaces located on pedestrian nodes
Building a Resilient System

**Phase 1**
- Small-scale green roof
- Woonerf street design
- Bio-swales off Rainier Ave.
- Visual representation of Mapes Creek
- Small orchard planted

**Phase 2**
- Transform Safeway into Food Innovation Hub
- Green houses on roof and parking lot
- Social/Flexible spaces located on pedestrian nodes

**Phase 3**
- Expanded green roof
- Expanded orchard
- Open pedestrian path to apartments and Director St.
- Daylight Mapes Creek in parking lot

**Productive Green Roof**
**Edible Pedestrian Trail**
**Flexible Social Spaces**
**Public Orchard**
**Clean Stormwater**

**Daylight Mapes Creek**

**Garden Workshops**

**Sausala Creek Restoration in Oakland, CA**

**Chicago Urban Horticulture Green Roof on McCormick Building**

**VA Learning Gardens**
Shan Huang
Food Forest Library in Rainier Beach
Urban Scale Contexts

Green Space & Topography

Civic and Commercial Facilities

Vision
Site Scale | Connection to the surroundings

- Rainier Beach Library
- Community Center
- Parking Area
- Pathway
- Rainier Beach Urban Farm and Wetland
- S Henderson St
- Rainier Ave S

Existing Conditions
Existing Conditions
Master Plan

Legend
- Feature paving
- Entrance spiral stairs
- Roof garden
- Feature play structure
- Roof garden planter
- Food forest
- ADA ramp
- Tree house
- Backyard
- Feature slide
- Parking lot

Before After
D1: 3 ft
Disconnection
Inaccessibility
Uncomfortable experience

D2: 16 ft
Connection
Accessibility
Comfortable experience

Feature paving
Entrance spiral stairs
Roof garden
Feature play structure
Roof garden planter
Food forest
ADA ramp
Tree house
Backyard
Feature slide
Parking lot

0 10 50 100 ft
N
FOOD FOREST LIBRARY IN RAINIER BEACH

Problems & Solutions

Before

- Disconnection
- Inaccessibility
- Uncomfortable experience

After

- Connection
- Accessibility
- Comfortable experience
FOOD FOREST LIBRARY IN RAINIER BEACH

Main Nodes

- Entrance Feature Planter
- Roof Garden
- Backyard
- Tree House
- Food Forest

Main Nodes: Entrance Spiral Stairs
Main Nodes: Entrance Spiral Stairs
Main Nodes | Roof Garden
Main Nodes | Food Forest
Main Nodes | Roof Garden
Main Nodes | Tree House
Main Nodes | Food Forest
Main Nodes | Food Forest
FOOD FOREST LIBRARY IN RAINIER BEACH

Planting Design | Species research

Heartnuts (Juglans ailantifolia)
Height: 45-65 feet
Spread: 45-65 feet
Growth: fast

moist, well drained soils, sand and clay loam

Apple tree (Malus spp.)
Height: 10-25 feet
Spread: 10-15 feet
Growth: fast

Pear tree (Pyrus spp.)
Height: 12-20 feet
Spread: 10-20 feet
Growth: fast

acidic, moist, well drained soils

Big-leaved lupin (Lupinus polyphyllus)
Height: 4 feet

light soil, low alkaidal or sweet cultivars

Blueberries (Vaccinium spp.)
Height: 4-6 feet
Spread: 3-4 feet
Growth: slow to medium

acidic, drought tolerant soil

Plum tree (Prunus spp.)
Height: 10-35 feet
Spread: 10-20 feet
Growth: medium

acidic, alkaline, loamy, well drained, wide range soils
FOOD FOREST LIBRARY IN RAINIER BEACH

Planting Design | Section

- **Apples (Malus spp.)**
  - Height: 10-25 feet
  - Spread: 10-15 feet
  - Growth: fast
  - Moist, well-drained soils

- **Pear tree (Pyrus spp.)**
  - Height: 12-20 feet
  - Spread: 10-20 feet
  - Growth: fast
  - Acidic, moist, well-drained soils

- **Heartnuts (Juglans ailantifolia)**
  - Height: 45-65 feet
  - Spread: 45-65 feet
  - Growth: fast
  - Moist, well-drained soils, sand and clay loam

- **Big-leaved lupin (Lupinus polyphyllus)**
  - Height: 4-6 feet
  - Spread: 3-4 feet
  - Growth: slow to medium
  - Height: 4 feet

- **Blueberries (Vaccinium spp.)**
  - Height: 4-6 feet
  - Spread: 3-4 feet
  - Growth: slow to medium
  - Height: 4 feet

- **Plum tree (Prunus spp.)**
  - Height: 10-35 feet
  - Spread: 10-20 feet
  - Growth: medium
  - Acidic, drought tolerant soil
  - Light soil, low alkaloidal or sweet cultivars

- **Big-leaved lupin (Lupinus polyphyllus)**

- **Blueberries (Vaccinium spp.)**
Margot Chalmers

Urban Agri-Suture: Revitalizing a Concrete Desert
The neighborhood provides ample opportunities to recreate, yet lacks food production space. The proposed plan responds to this need by creating multifunctional space for a high level of food production.

Currently, fast vehicular traffic dominates the site making pedestrian travel unpleasant and potential dangerous. The proposed plan slows traffic through the insertion of raised crosswalks and vegetation, and creates pleasant and alternative pedestrian throughways.
SLOW TRAFFIC

YIELD

PROVIDE SIDEWALK INTEREST

INCREASE PEDESTRIAN ACCESS AND SAFETY

GATHER PEOPLE TOGETHER

PROVIDE SPACE TO GROW SOCIAL CONNECTIONS

REPLACE PAVEMENT WITH VEGETATION

CREATE AN INVITING SPACE

PRODUCE CULTURALLY RELEVANT FOODS

SUTURE

RETAI

FRACUTURE
CONCEPT: SUTURE

This design transforms semi-vacant commercial space into a public-private hybrid landscape. It brings together the diverse populations that reside in the Rainier Beach neighborhood through a productive, multi-functional landscape that functions on a human scale.

Provide a unifying factor for Henderson Street. Link communities, spaces, and individuals together.

Insert life and activity into the paved monotony of the site’s urban framework to create a more viable and livable space.

Bring Henderson street down to the pedestrian scale by slowing traffic and providing interest and purpose to the site. Transform unused private space into a destination for the public.
EXISTING SITE CONDITIONS

A + B: OPEN SPACES
An open lawn is sheltered by berms and surrounded by vegetable, fruit and livestock production. Unprogrammed yet buffered spaces allow for multiple simultaneous uses of the space.

PAUSE, TRANSITION AND SHELTER
Sheltered bus stop and market space allow for rest, socialization, rain water reuse and food production.

LAYERED CANOPIES
Flexible seating patio sits underneath hops production and provides drying space for food truck and farmers’ market customers.

PRODUCTION NOOK
Seating is nestled between espalier fruit trees and vegetable beds for a more private feel.

SHIFTING VIEWS
Pedestrians stroll between a buffer of fruit trees on a rolling berm and productive beds, the meandering path shifts one’s focal point from the busy street to site details.

STREET INTEREST
Chickens, visible from the street, offer a bridge between the site and the street. Poultry provide dynamic, year-round interest and an opportunity to draw a diversity of families into the site.

C: PRODUCTIVE ART
Gabion herb pillars collect water and utilize tree irrigation bags to provide drip irrigation for herbs. Vertical plantings provide olfactory and tactile experiences for visitors of all heights.
A SHADY RESTING SPOT

In the summertime, the “Production Dining Nook” receives soft, dappled light through leafy hops that grow over the structure. This semi-private space allows for visitors to bring their own snacks or dine on meals produced by the adjacent tapas restaurant made from the surrounding vegetable planter boxes.

LIGHT IT UP!

At night and during the cooler months, lights line the structure to provide a cozy and safe space to socialize and relax.
Visitors enjoy a winding path through berms that separate the busy street from the space, allowing pedestrians to focus on site details. Structures allow hops vines form a thick canopy over flexible seating. Visitors may utilize the space to eat lunch from the neighboring food trucks, weekly farmers markets, and locally-run restaurant. At night and in the winter, these structures would feature strings of lights to enliven the space and provide a sense of safety. During the summer, weekend concerts could be held in the neighboring parking lot.
FUTURE EXPANSION

ZONED FOR MIXED USE:
Potential conversion to apartment buildings to capitalize on lake and mountain views

SITE REMAINS COMPLETELY PUBLIC AND ABUTS APARTMENT BUILDING

SCENARIO A: BUILDING EXPANSION

FACILITATE CONNECTIONS BETWEEN PUBLIC, SEMI-PUBLIC, AND PRIVATE OPEN SPACE

ORIGINAL SITE REMAINS PUBLIC

SEMI-PUBLIC COMMUNITY + INDIVIDUAL GARDENING PLOTS FORM A BUFFER BETWEEN PRIVATE AND PUBLIC SPACE

PRIVATE OUTDOOR SPACE SURROUNDS THE BUILDING. THIS MAY TAKE ON RECREATION OR RELAXATION PROGRAMMING
Anran Liu
Be the Driver
BE THE DRIVER

ANRAN LIU | 2017
UW LANDSCAPE ARCHITECTURE 503 STUDIO
Yuchia Jan
Pollinator Network System in Rainier Beach
The project site is located behind the Rainier Beach Community Center and next to the South Lake High School which can be the important educational space for the urban agriculture and learning garden of the pollinators to the resident in this community.

Connecting the three different nodes which are the Powerline Corridor, Learning Garden and Beer Sheva Park to form the pollinator network system in the Rainier Beach Community. These nodes are all in the 1 mile radius circle of the pollinator flight distance which means it can provide the comprehensive migrate system for the pollinators in the Rainier Beach.
Without the actions of pollinators, agricultural economies, our food supply, and surrounding landscapes would collapse.

Learning Garden
Educate the public why essential about the pollinators and how to protect them.

Urban Farming
Planting food not only for human but also pollinators.

Pollinator Sanctuary
Create a core pollinator habitat from the human disturbance.

Community Engagement
The residents in the community can share part of their home yard or garden as the pollinator habitats.
These two diagrams show the plants which are able to attract the pollinators and the flight height about different pollinators.
Learning Garden:
The planting bed can not only plant the vegetables and crops on it but also be the multifunctional outdoor classroom, each planting bed have the sitting space so that children can sitting or kneel on it and observe the plants and pollinators from the planting area as well as adults are able to plant the crops from the outside of the planting bed.

Class room & Pavilion:
These two pavilions provide multifunction in the community, they can use as the gathering space, exhibition area, tool storage space or even the office for the community group. Moreover, there walkable green roof enable people to observe the pollinators in the canopy layer.

Raising Table:
The colourful pavement and the raising table can not only slow down the speed of the cars but also provide a significant and attractive hint of the entrance for people to find the learning garden.

The learning garden is the educational community garden to teach people the knowledge about the pollinator species, habitats, lifecycle... etc. Besides, people can learn which plants are the pollinator attractive plants to attract the pollinators so that they can plant this species of the plants in their private yard or garden.
The structures which planting the flower to attract the pollinator become to the significant hint to remind people here is the learning garden. Follow these gigantic structures, you can find the home of the pollinators!

Go through the ramp, people can go to the green roof garden and observe the pollinators in the canopy layer. There are also have three structures erect around the ramp, which provides the different perspective when people walking through the ramp.

Children and adult can all learn about the knowledge of the pollinators in this learning garden. With different scales of the facilities, they are able to learn from the food resources to the ideal habitats for the pollinators.

This pavilion can be the exhibition area to display the data, photos and all kinds of the information associated with the pollinators. People in this area are able to further understand about what kind of the lovely creatures live in their community garden and yard!

The bigger pavilion can be the office for the community group or organization, such as “Good Food.” It can also open to be the place to hold the community event or activities.
There are several kinds of the facilities in the learning garden provides people with a wonderful chance to not only get close to the pollinator habitat but also learn about the urban agriculture. Even the pattern on the paving also represents the flight path of different pollinators so that when children in the learning garden, they can mimic themselves as the pollinator to learn about these creature’s habit!
The pavilions, walkable green roof and the wide green lawn create a totally different space with the learning garden. These pavilions can be the gathering space to host the community events, working office or the outdoor classroom. People are able to observe the pollinator habitat in the canopy layer so that they can have a chance to experience the different learning environment.
With the different high of the design, these structures can attract different kinds of the pollinators depend on their flying height and pattern. Besides, these structures can not only planting or hanging the plants on them to attract the pollinators but also can be as the art installations in the Rainier Beach community.

Planting Bed

The planting bed provide multiple functions in the learning garden. It can be the outdoor classroom for children or adults to learn about the knowledge of the pollinators. Moreover, the step around the planting bed can be not only the platform for kids to easily access the planting but also for people to sit. Last but not least, the flower-shaped pavilions are able to be the shelter when people need to work during the raining time.
This planting bed has the blossom-shaped of the structures which enable the vines or other plants to climb on it in order to attract the pollinators in the different layers. Besides, the funnel-shaped design of the structures can also have the irrigation system to collect the rain water for the planting bed.

The transparent Bee box lets people who come to the learning garden have a wonderful chance to observe the honey bee’s nest closely and easily. On the other hand, the green roof also plants some flowers which are able to attract the honey bees, mason bees and bumble bees.
Learning Garden for the kids and adult to learn about the urban agriculture and pollinator's habitat.
The night view of the entrance to the learning garden, the structures can also have the illumination system.
Food Innovation District
City Light Transmission Corridor
Thistle P-Patch
Paradise Baptist Church
Somali Community Center
Rainier Beach Library
Dunlap Elementary
South-Shore K-8 / Rainier Beach
Seattle Farm Co-op
Rainier Beach High
Beer Sheva Park
Rainier Beach Urban Farm and Wetland
THISTLE P-PATCH

• Companion planting with trees
• Integrated pest management
• Chickens for fertilizing
• Chickens for food production

ORCHARD AND CHICKEN PASTURE

RAINIER BEACH URBAN GARDEN
“BUG” HUB

• Focusing on community gardening
• Utilizing existing mound for beds
• Providing a structure for communal use and meal prep.
• Integrating companion planting and using pollinator attractors
• Establishing more than 50 beds
• Using the structure to capture water to be used in beds and wetland production
• Future solar installation
• Wind harvesting for power

TERRACED OPEN SPACE GATHERING

• Large open turf area
• Terracing to optimize space
• Adjacent parking lots for trucks
• Community gathering and markets

FOREST AND FOOD LEARNING AREA

• Using the hillside to layer plants
• Permaculture companion planting
• Schools and group education
• Integrating Hugelkultur swales
The ‘forest and food learning area’ focuses on permaculture practices and integrates youth play throughout the site promoting food literacy.

Huglekulture utilizes woody materials buried in mounds to slowly release nutrients and retain moisture for healthy forest growth.
Gina
Bus Stops
P-Patch
Zoning
Rainier Beach station will be a major landing point in the community and initiatives here could branch off and inspire development.
The Urban Village development area is planned to become much more dense than the existing neighborhood.

TRANSPORTATION

- Bus Stops
- Routes to School
- Bike Routes
- Sidewalks
- Site/ Rainier Beach light rail Station

OPEN SPACE

- P-Patch
- Thistle P-Patch
- Parks
- Existing Urban Agriculture
  - Nathan Hale High school
  - New School
  - Rainier Beach Urban Farm and
  - wetlands
  - Rainier Beach High school

SITE LOCATION

- Site Boundary

Existing Site
Conditions

Copious amounts of paving
Source: Gina Christofanelli

Empty and unused lots
Source: Gina Christofanelli

Single Story buildings- Lots of buildings for sale
Source: Gina Christofanelli

Large amount of canopy cover on steep slopes, but not easily accessible
Roof Top connections

Ground Connections

Building Connections

Roof tops yield support street level venues

The productive rooftops can be seen from street activating as advertisement for the shops.

Stores are easily accessible for the street and the Light Rail station brings a steady flow of customers.
Existing Buildings, Green Space, pavement and trees

Proposed Buildings, Paving, and reaming mature trees, and open space
**SPRING**

In spring the roof top gardens will prepped and seeded for the productive season.

The bamboo will be harvested on a 3-5 year cycle in the spring.

**SUMMER**

Things are in full Force in the summer, The roof tops will be activated while the weather is desirable to be outdoors.

**FALL**

Fall is the time to harvest and begin to get the roof tops ready for winter. It is also a great time for seed harvesting.

**WINTER**

In the winter the bamboo stays green and continues to be attractive to on lookers passing by or from inside. The unproductive gardens will not be visible as this is the period when these gardens will be most unsightly.
Productive Bamboo gardens with planter benches.
On the roof top of the cut your own flowers, flower shop
Nowadays, there are more and more buildings in the modern cities. Citizens living in the city have less opportunities to have their own land to farm or plant, especially living in the multi-family apartments. Based on the needs of farming and planting of residents and planning of local government, I designed a “Agricultural Ribbon” in Rainier Beach Community for residents to farm, plant, raise livestocks and bees and to provide chances for them to touch the nature and learn from agriculture.
MASTER PLAN

SITE ONE
POLLINATOR GARDEN

COMMUNITY GARDEN

SITE TWO
ORCHARD

COMMUNITY GARDEN

SITE THREE
PASTURE

COMMUNITY GARDEN

SITE FOUR
PASTURE

GATEWAY

TYPES

POLLINATOR GARDEN

COMMUNITY GARDEN

ORCHARD

PASTURE

NEEDS

http://lucyarnold.com

FLOWERS

SHED

PATHS

TOOLS

IRRIGATION

BEEs

http://ucanr.edu

PARKING LOTS

PATHS

SHED

BY-PRODUCTS

Basemap source: WAGDA
The Kwanzaa Community Garden Tool Shed, north Minneapolis, 2013 | by Daniel Kerkhoff

http://nacgarden.tumblr.com

http://www.missginsu.com/labels/queens.html

http://squamishcan.net/squamish-can-grow-community-garden/

Six hidden gardens where weary city dwellers and visitors can slip in for a quick sip of nature, or linger through an afternoon

http://www.soleburyorchards.com

FRUIT TREES
WHEAT
CORN
THANK YOU!

- From the LARCH 503 Urban Agriculture Studio

Aran Liu, Sujing Sun, Yuchia Jan, Shan Huang, Aaron Parker, Gina Christofanelli, Margot Chalmers, Drew Badgett, Yuxi Jin, Julie Johnson, and our Studio Mascot, Fezzik