

1) Project Information

- Project Title: Ground Patchwork
- Location (City / State / Country): Fisherville, Grafton, MA, US
- Completed Year: 2022 Project Size: 9.3 acres
- Submitter's Role: Individual work

2) Summary Statement

Based on the Blackstone River's interweaved history of industry and nature, this project aims to use geotextile technology to rehabilitate the Blackstone River and apply a dynamic growing system to the site to achieve the aim of healing the contaminated soil and bringing back the resilient ecosystem. This project also used a series of textile weaving, netting skills to explore the possibilities of applying textile to landscape and building connections between natural forces and landscape representation.

3) Narrative

Rivers are layered landscapes that represent how many communities have interacted with the land, natural resources, and one another. Shifting values regarding stewardship, control, extraction, and restoration have become physically represented in the environment through river shaping, both intentional and unintentional. The project's focusing site Fishersville mill is situated on the Blackstone River watershed which has interwoven history of industry and nature. The Fishersville mill is an abandoned mill burned down in 1999. The fire released over 100 years' worth of contaminants into the air, soil, and water.

This project reconsiders the relationship between textiles and landscape architecture practices to address, reconcile and interpret the complex ecological and cultural histories of Blackstone River. The goal of the project is through the study and practice of geotextile to rehabilitate the polluted land along the Blackstone River and apply a dynamic growing system to the site to heal the contaminated soil and bring back resilient ecosystems. By calling on people back to land's green vision and participating in the process of healing the ground, the pre-industrial polluted ground will be hopefully renewed and in the process redeem the healthy ecosystem.

The concept of ground patchwork came up with the process of learning textile technology, through weaving the ground the isolated parcel will be reconnected by the different types of planting patterns. The planting patterns typologies have diverse practical and aesthetic values, for instance, the 10' pattern in the central area is used for soil building and the functions of the 5' pattern along the riverside are erosion control and soil reinforcement. As for fabrication, a community workshop will be held to teach residents how to weave the planting pattern and install them on the site, community members can choose their favorite patterns and do the weaving, after the workshop, the whole site will be filled with diverse ground patchwork. The plant species with deep root systems will be planted on the pattern to remediate soil, the ground healing is a dynamic process that will start from weaving to growing, healing, and spreading. In the proposal, the pattern will be modified by nature and time, and be decomposed, so the plants can expand to other spaces and heal more ground.

TITLE: REGENERATING THE GROUND

SUMMARY: This project delves into retrofitting dying commercial land with a high-intensity urban regenerative agriculture system. By learning the principles of regenerative agriculture, the project aims to replace the depressed urban property with regenerative farmland and couple animals and crops to improve the site's soil health and bring the healthy ecosystem back. The proposal for the 120-acre site includes aquaponic greenhouses, crops coupled with chicken tractors, rotational grazing, and agroforestry. The outcome of the project offers an approach that shows agriculture can coexist with development and blurs the boundary between the urban and rural. It not only addresses the increasing demand for food but also brings a regenerative lifestyle for people.

NARRATIVE: Soil is alive with living organisms such as worms, fungi, insects, bacteria, and organic matter. Because nutrients and minerals, making it a perfect planting medium and self-sustaining ecosystem. Many years ago, before human civilization come to the earth, our planet was filled with fertile soil. To preserve crops or provide nutrients, we frequently introduce extra compounds into these unique ecosystems through the way we use land. Pollutants released from factories, commercial lands and other industrial agriculture activities can also travel long distances and reach soils, where they become diluted and are temporarily stored. When pollutants have a negative impact on human health or the environment, soil, a component of land, is called contaminated. With the development of the city, the tillable land is gradually decreasing. How to feed more people with limited land in the future is an urgent issue.

New England is blessed with a mosaic of productive agricultural landscapes. These agricultural landscapes also sustain valuable wildlife habitats, provide flood control and act as an enormous carbon sink. Farmland in New England declined significantly in the 20th century as agricultural land was abandoned and developed into urban and suburban sprawl. In 1930 there were about 14 billion acres of farmland, by 2017 there were only 4 billion acres left. New England lost almost 70% of farmland in the past 80 years. John Dobberstein has claimed that due to our current development and agricultural practices, there are only 60 harvests left. In order to meet future food needs, we are likely going to have to look to non-traditional agricultural sites and alternative agricultural practices.

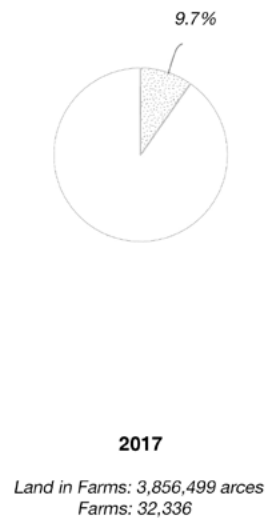
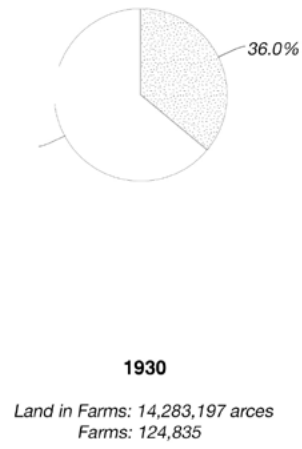
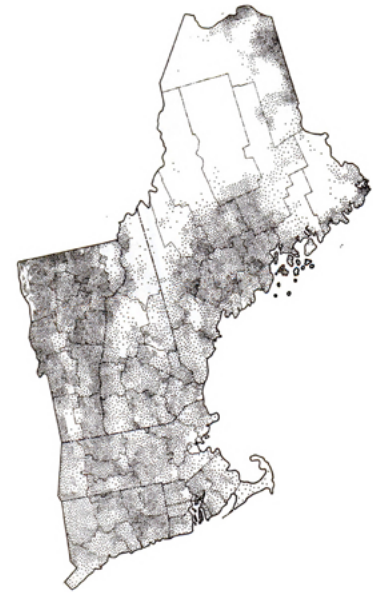
This project delves into retrofitting dying commercial land with a high-intensity urban regenerative agriculture system. By learning the principles of regenerative agriculture, the project aims to replace the depressed urban property with regenerative farmland and couple animals and crops to improve the site's soil health and bring the healthy ecosystem back. The proposal for the 120-acre site includes aquaponic greenhouses, crops coupled with chicken tractors, rotational grazing, and agroforestry. The outcome of the project offers an approach that shows agriculture can coexist with development and blurs the boundary between the urban and rural. It not only addresses the increasing demand for food but also brings a regenerative lifestyle for people.

▼ Warwick Mall built on a pre-agricultural land in 1970

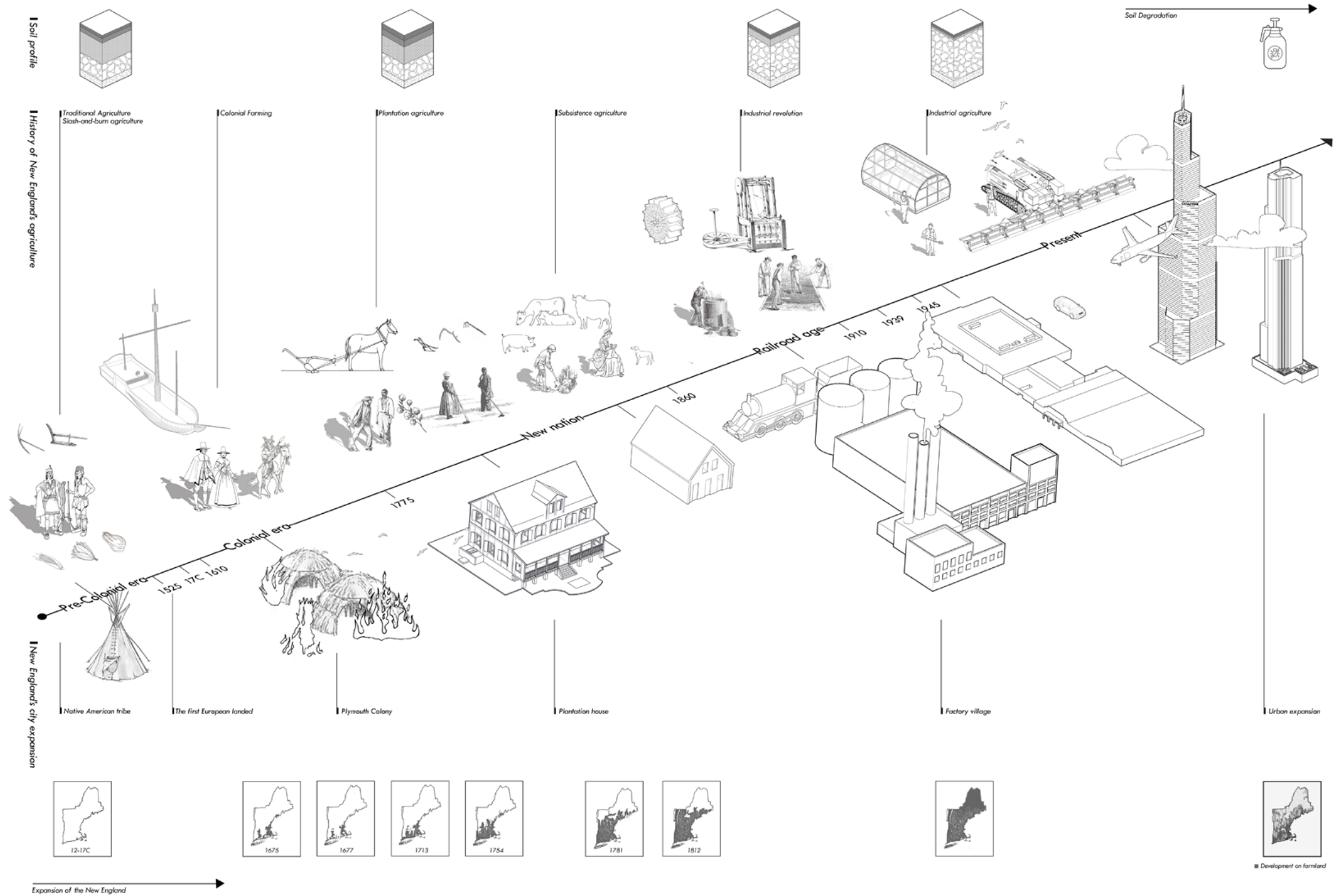


REGENERATING THE GROUND | Disappearing farmland in New England

CENSUS OF AGRICULTURE IN NEW



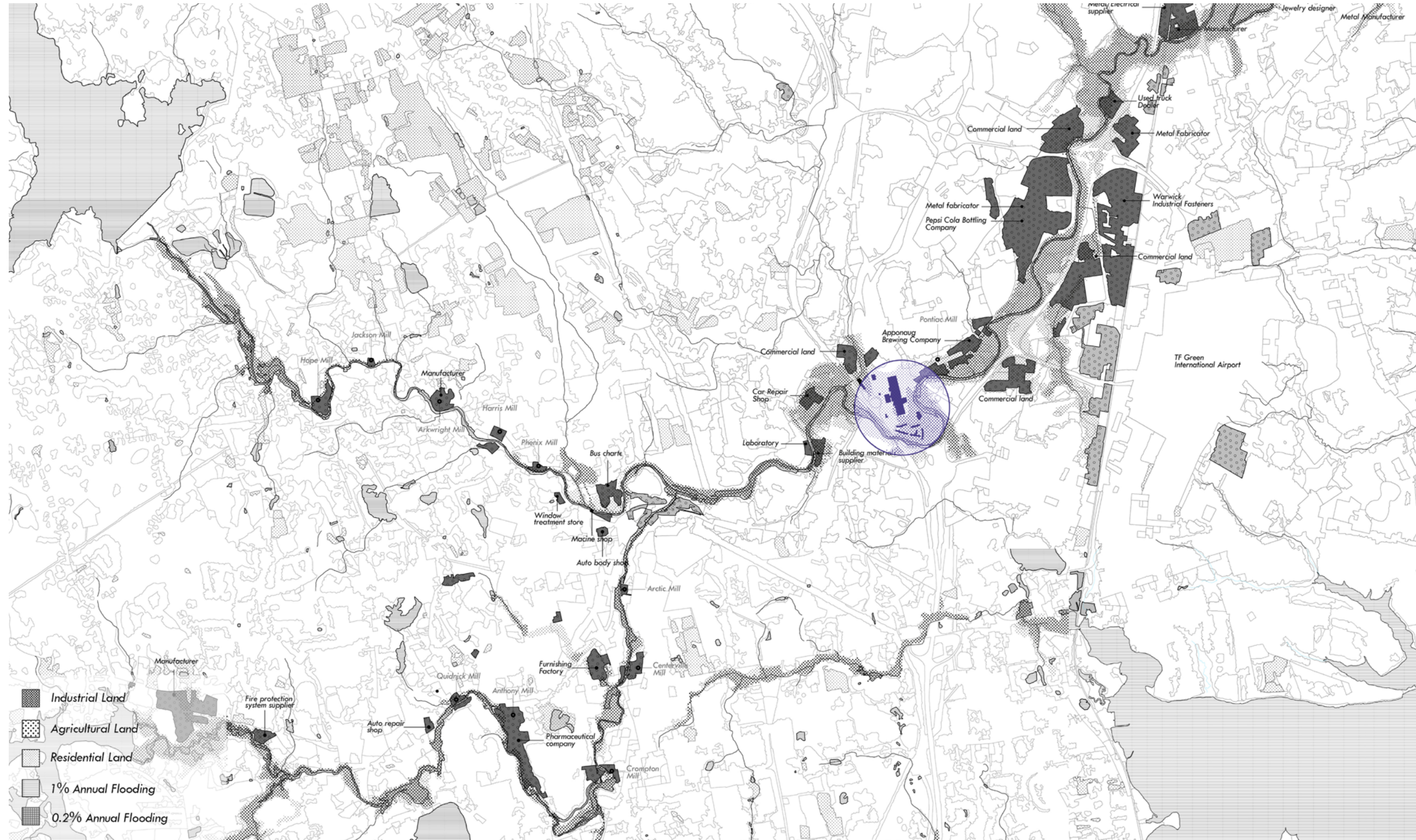
TIMELINE



Agricultural activity in New England changed with the city development, from industrial revolution to deindustrialization, lots of agricultural land and nutrients in the soil are lost as urban highly developed use.

REGENERATING THE GROUND | Main issues in Pawtuxet River Watershed

PAWTUXET RIVER WATERSHED



EXISTING ISSUES



Because of the history of industrialization at Pawtuxet River, most current and historical factories are concentrated along the river, this urban fabric make people's daily lives far from the river and also threaten the ecosystems here.

REGENERATING THE GROUND | Warwick Mall Flooding and Soil test

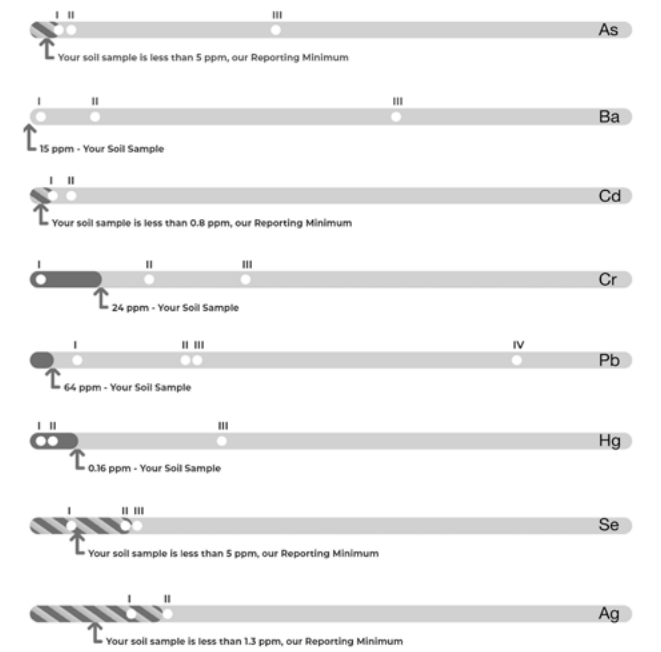
WARWICK MALL FLOODING



SOIL TEST



Heavy metal test



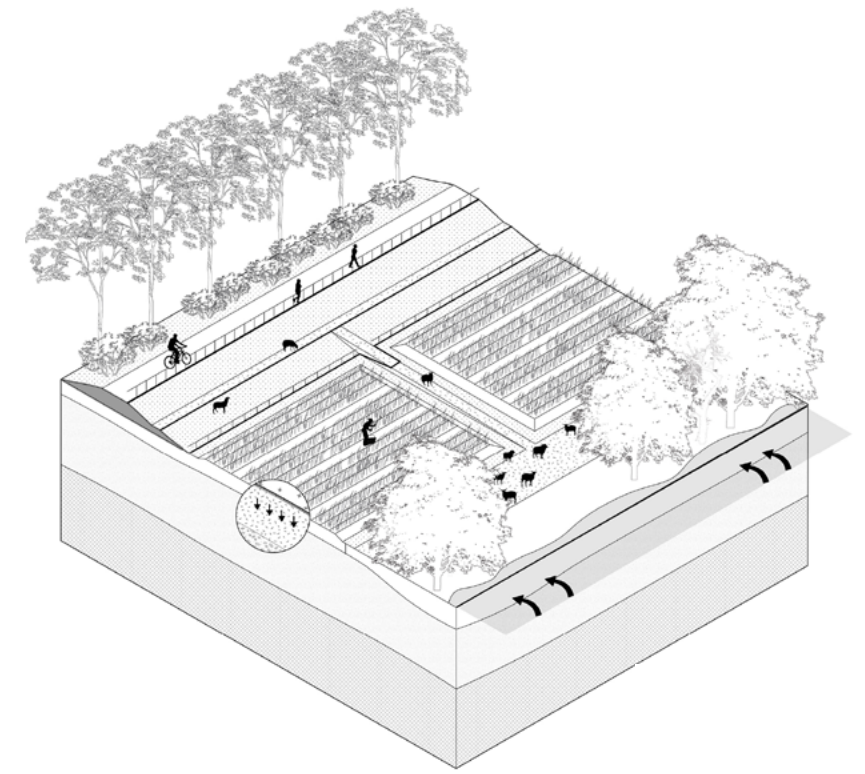
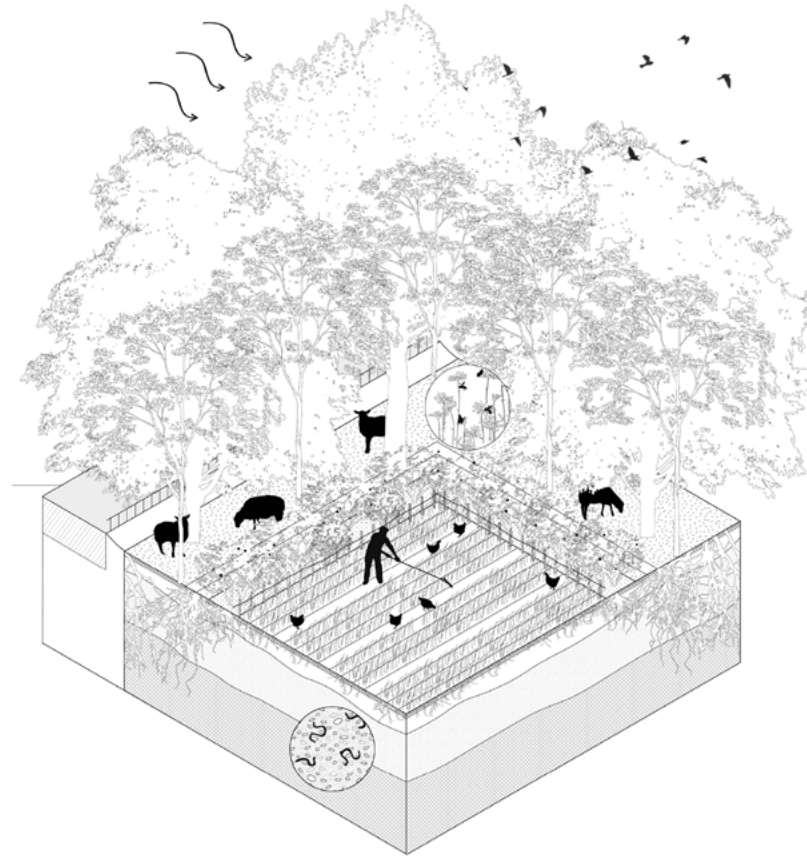
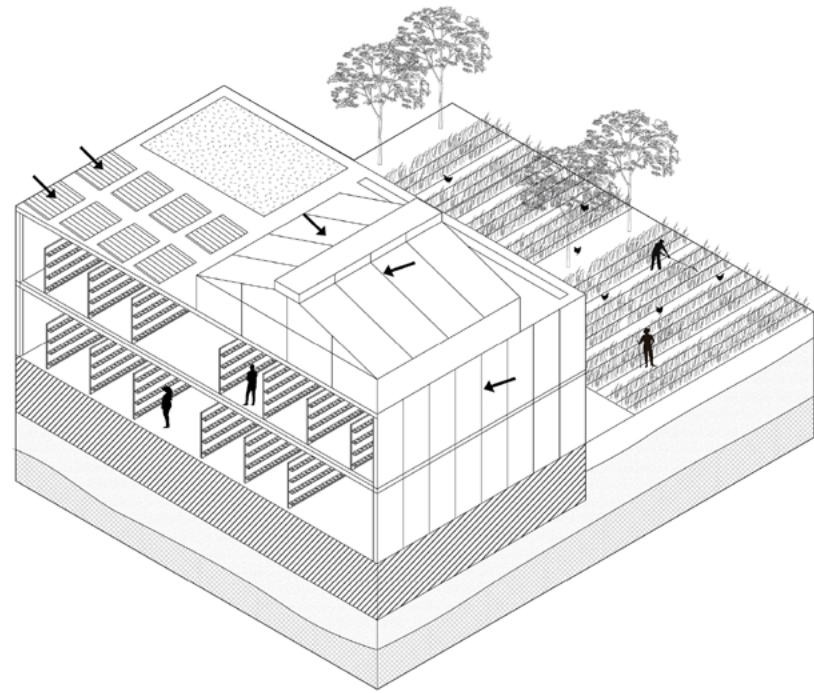
Conclusion

From the report, there is no metals tested exceeded levels commonly found in soils in the United States and the detectable lead level is lower than the safe level for food crops and gardening with children.

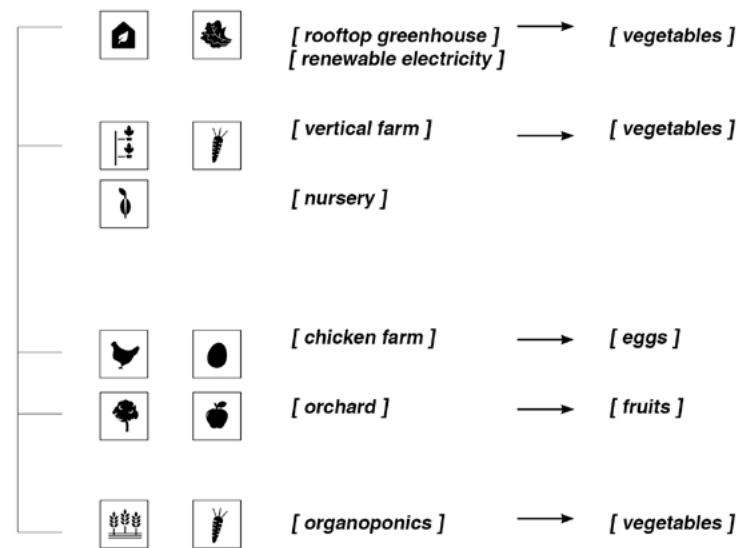
The soil test report is from Rx Soil <https://app.rxsoil.com/>

Pre-existing elevated river levels and saturated soil conditions combined rain to produce flooding along the Pawtuxet River in 2010. The Warwick Mall was under 2 feet of water. Flooding not only caused economic losses, but also threatened ecosystems of Pawtuxet River.

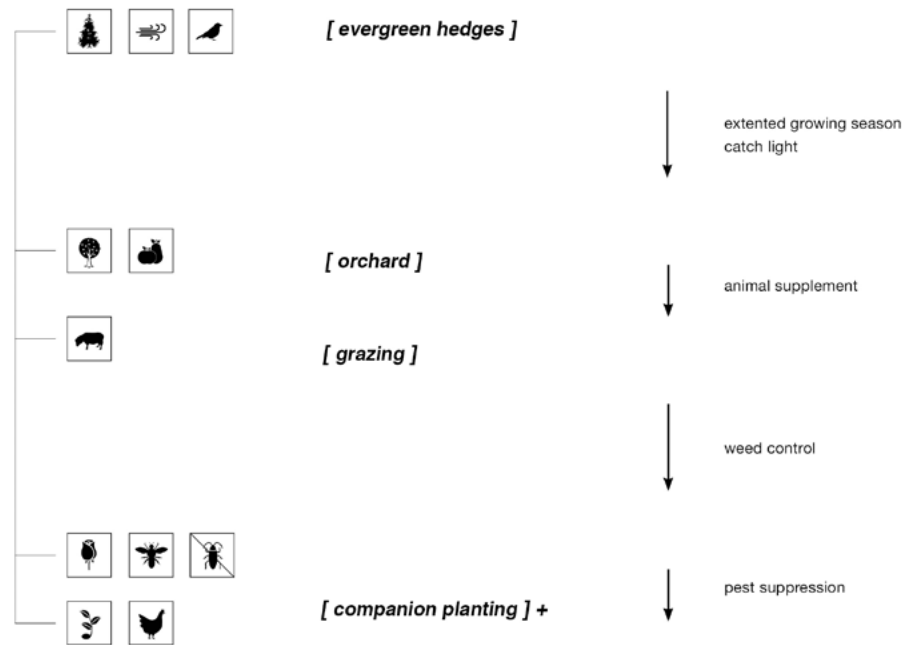
REGENERATING THE GROUND | Design principles



1. Restort the productivity



2. Remediate the soil

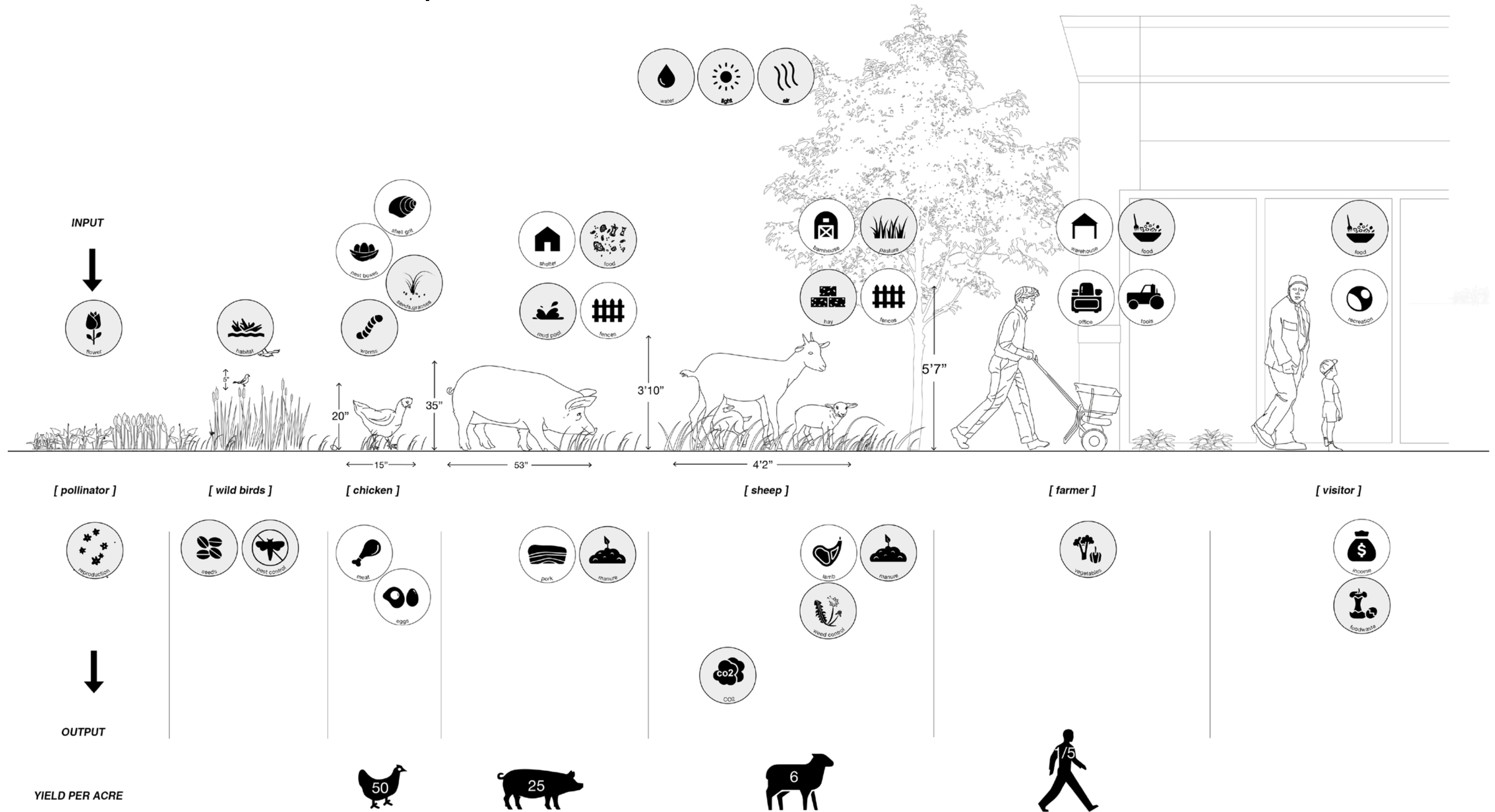


3. Reduce flooding



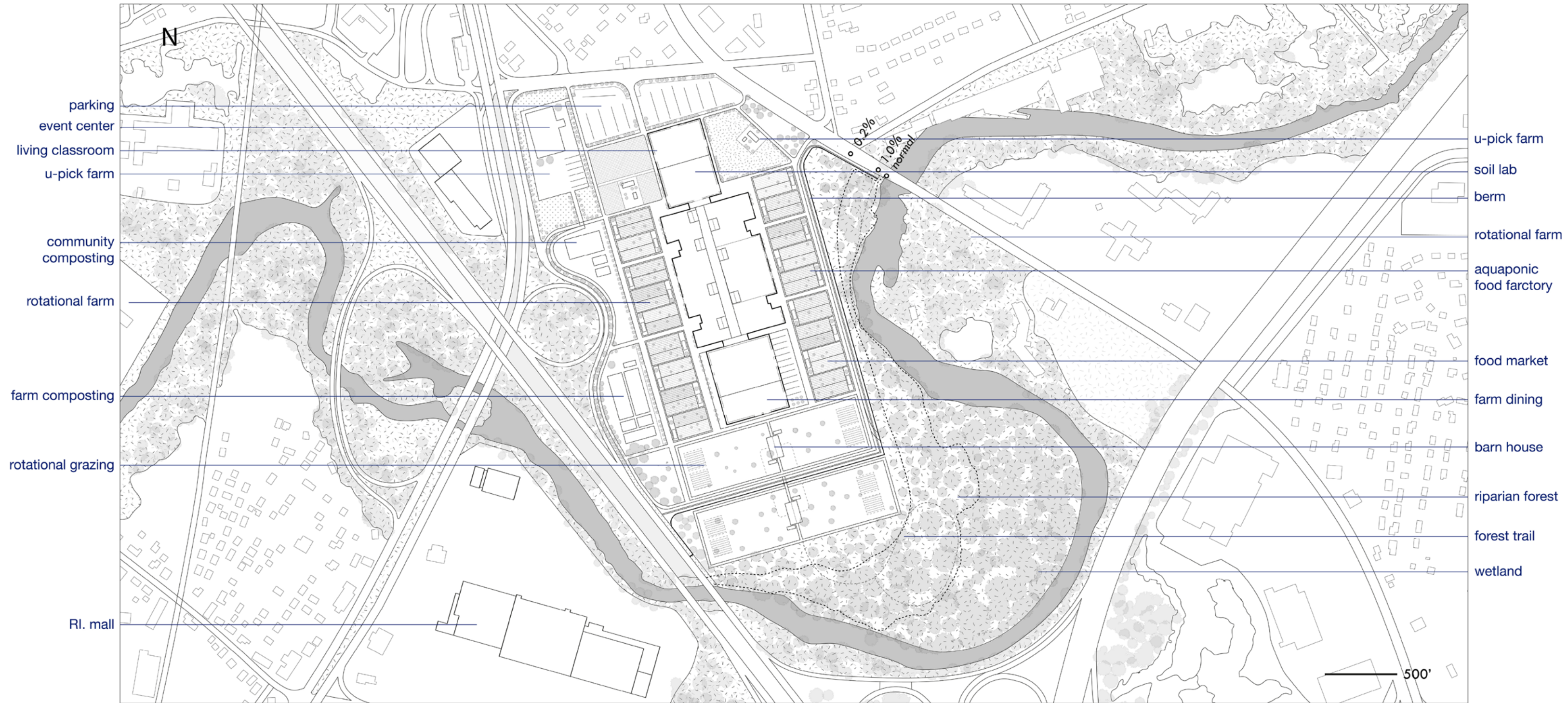
To respond to the three main issues, the design principle will include these three parts, restoring productivity by intensive indoor vertical farm; Protecting the site from a 500-year flood through berm system; Remediate soil by regenerative practice.

REGENERATING THE GROUND | Functional analysis



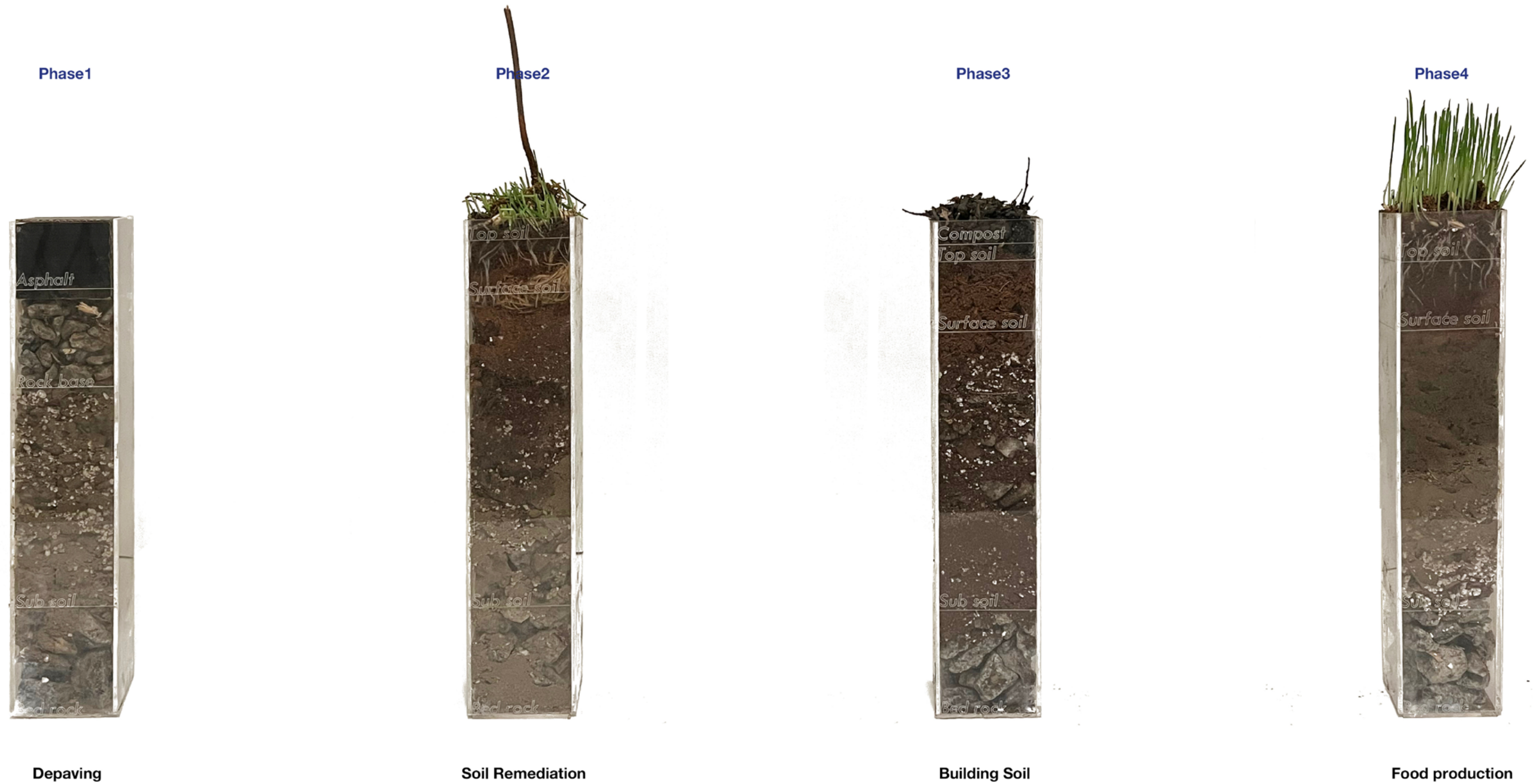
In regenerative agriculture, each element performs different functions, and important functions are also supported by many elements. In order to let the whole system, work more efficiently, the functional analysis will clarify the input and output of each element.

REGENERATING THE GROUND | Master plan



The zoning is decided by the intensity of service and flooding situation, the whole site is briefly divided into 5 parts. The community activities center, the food factory, crop rotational farm, the berm system, and the riparian forest.

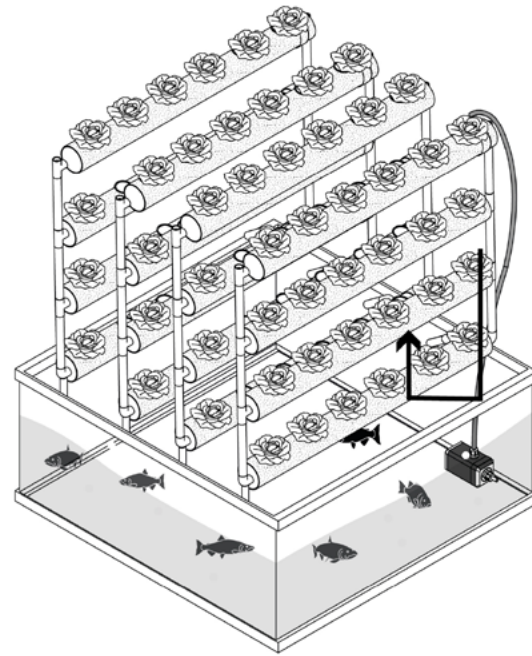
REGENERATING THE GROUND | Phase models



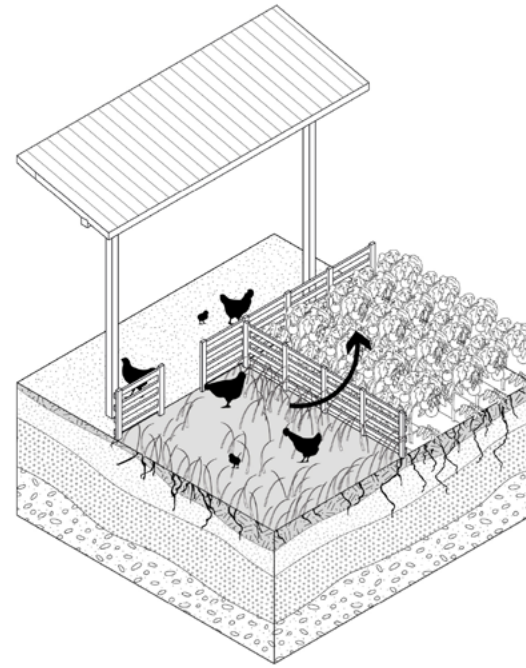
The soil section model shows four site-development stages. First, remove the impermeable surface, then remediate the soil. After gaining healthy soil, compost is applied to enrich it, and crops and animals will be introduced to the site.

REGENERATING THE GROUND | Regenerative farm typology and community engagement typology

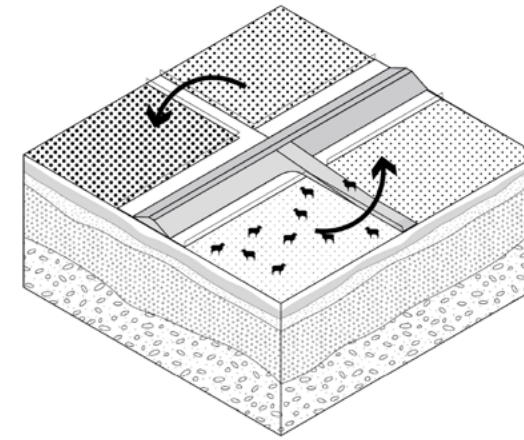
Regenerative farm typology



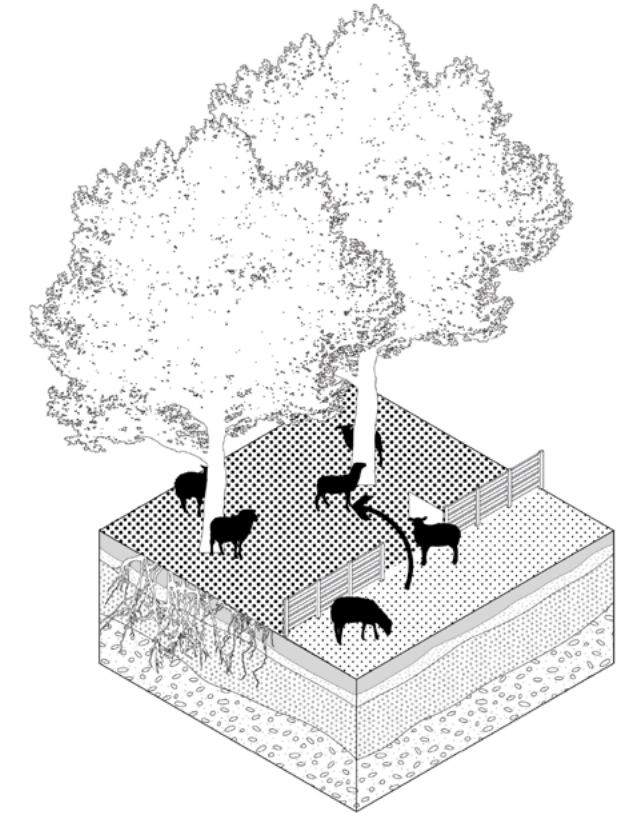
1.aquaponic system



2.crop rotation

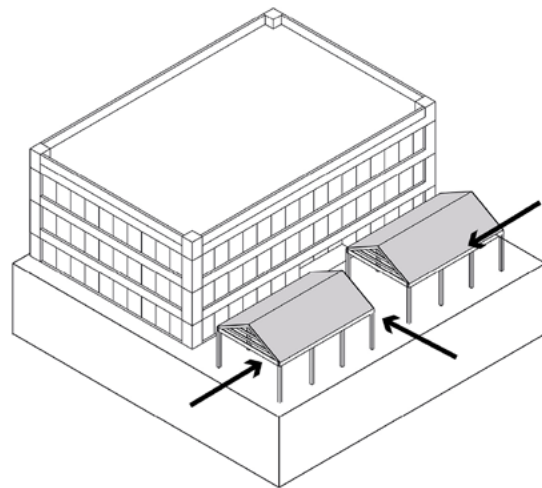


3.rotational grazing

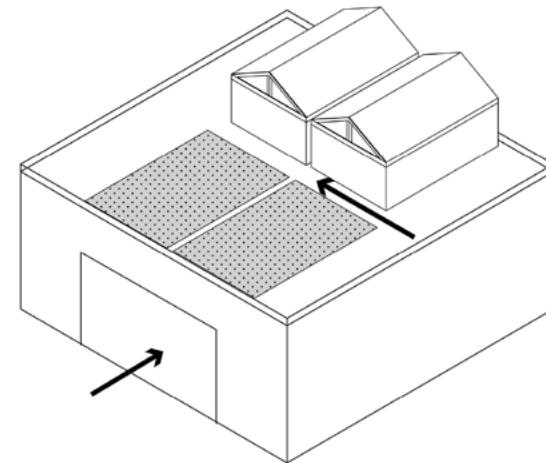


4.agroforestry

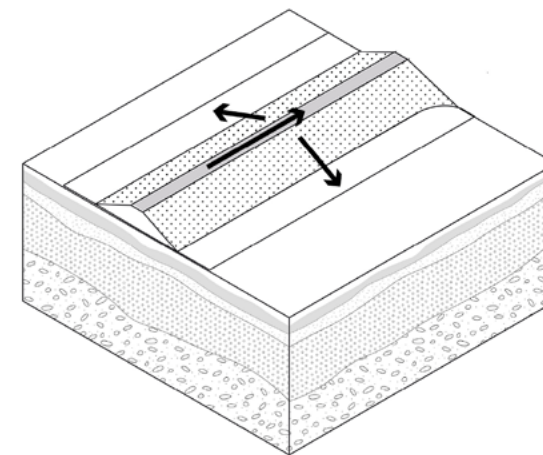
Community Engagement typology



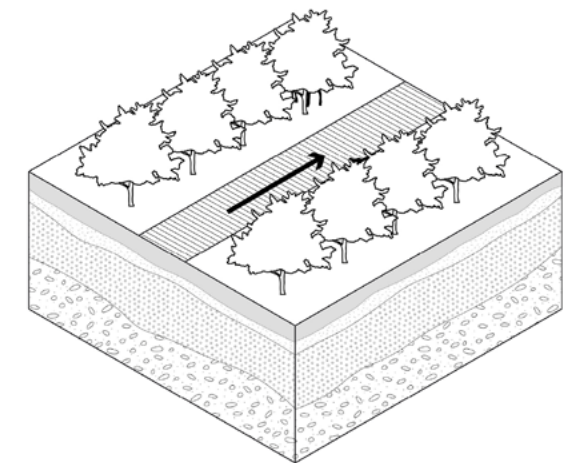
1.front community center



2.rooftop open farm



3.berm walk



4.forest trail

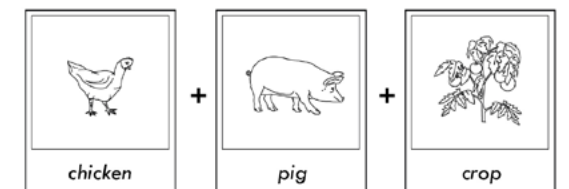
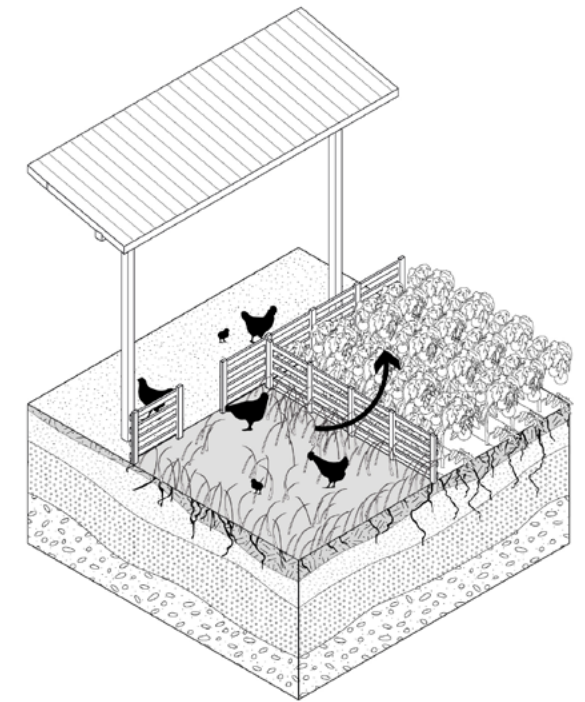
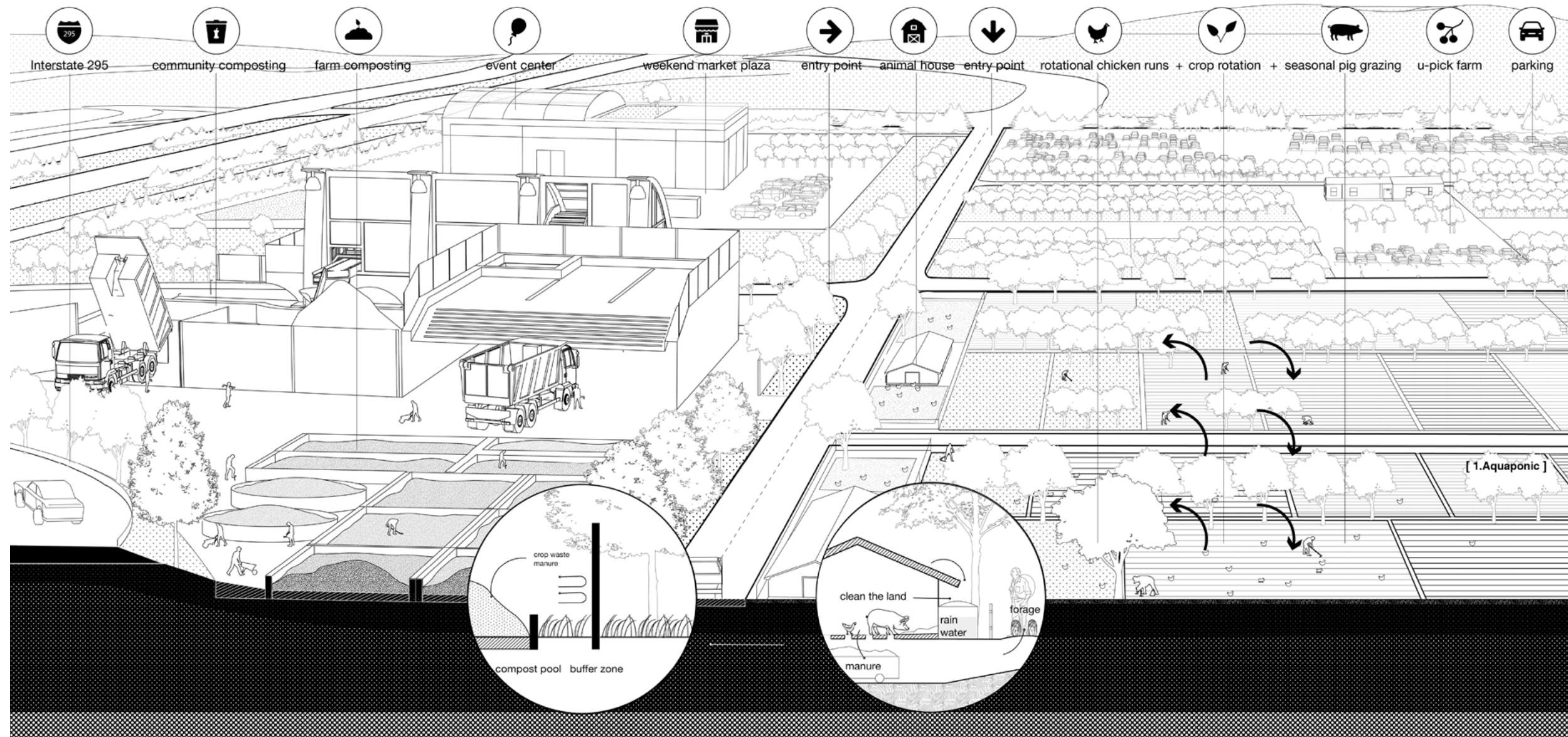
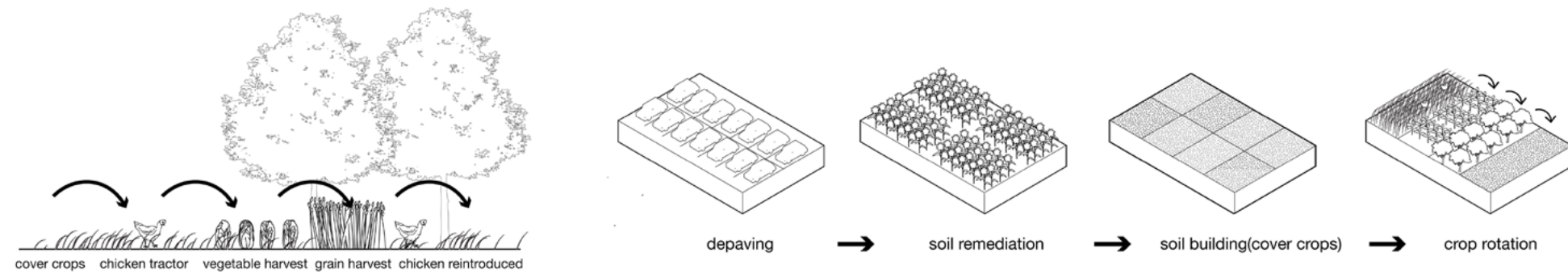
Regenerative practice is one of the priorities of the proposal, In conventional agriculture, crops and livestock production are typically kept separate. Regenerative agriculture combines them in circular ecosystems; essentially, the animals feed the plants, and the plants feed the animals.

REGENERATING THE GROUND | Regenerative farm practice: 1. crop rotation

Regenerative farm practice:

1. crop rotation

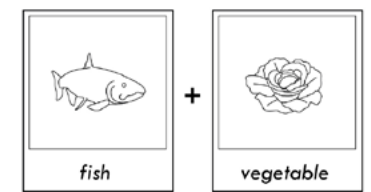
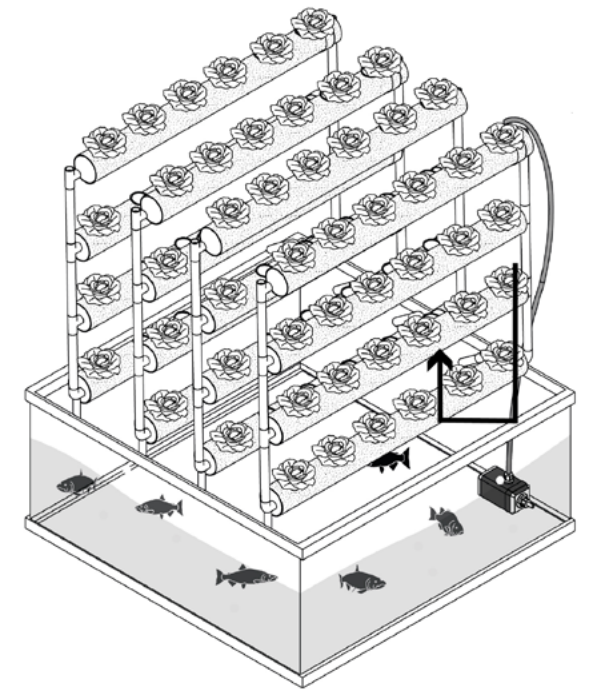
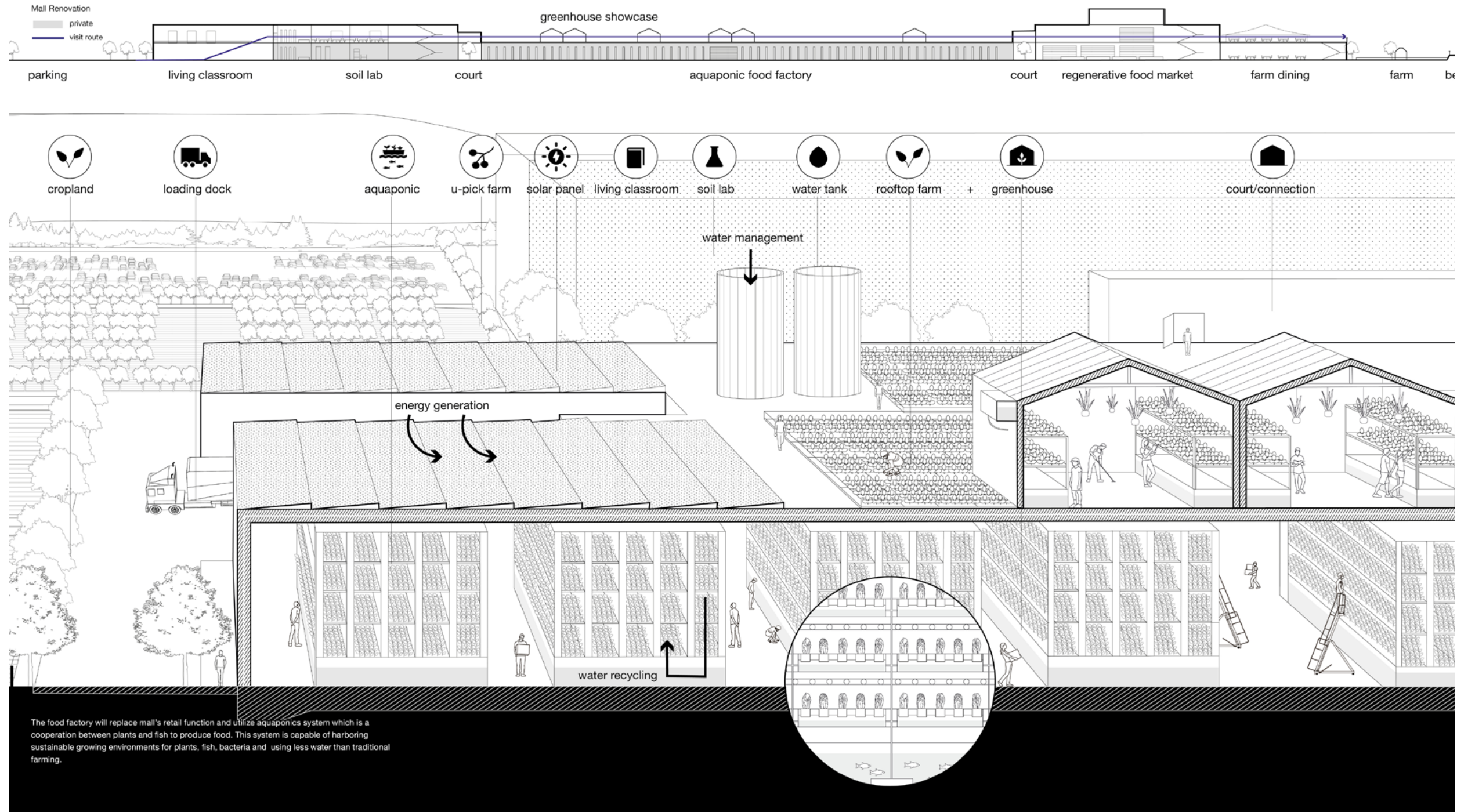
The crop rotation system involves changing the planting location of vegetables, cover crops within the farm each season, and introducing small livestock after a harvest or before re-planting. The combination of crop rotation and the animal self-forage system will benefit farm management, soil fertility, and increased food production.



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REGENERATING THE GROUND | Regenerative farm practice: 2.aquaponic system

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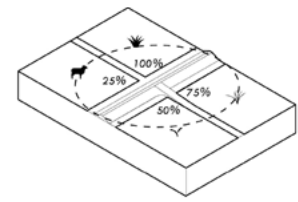


The food factory will replace mall's retail function and utilize aquaponics system which is a cooperation between plants and fish to produce food. This system is capable of harboring sustainable growing environments for plants, fish, bacteria and using less water.

REGENERATING THE GROUND | Regenerative farm practice: 3. rotational grazing and berm

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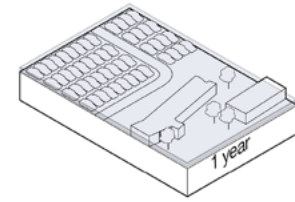
The elevated berm between food production area and grazing land, leveraging the higher elevation for enhanced views and recreational path, and then stepping down to rotational grazing land and riparian forest. The rotational grazing will help cycle nutrients and build healthy soil through vigorous vegetation growth and manure distribution.



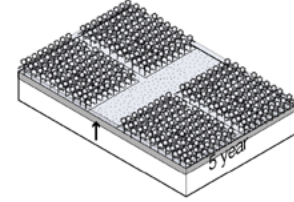
rotational grazing system

The pasture are broken into 4 paddocks, goats are moved between paddocks when 50% -70% of cover has been moved. Each paddock is left to rest for 30 days after grazing.

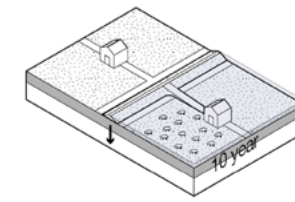
1. Lon Tonneson "Graze hard, rest long".
DakotaFarmer, 2015



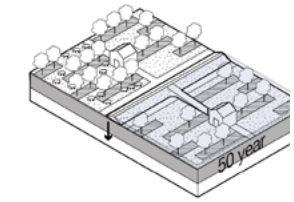
depaving



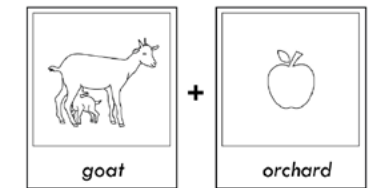
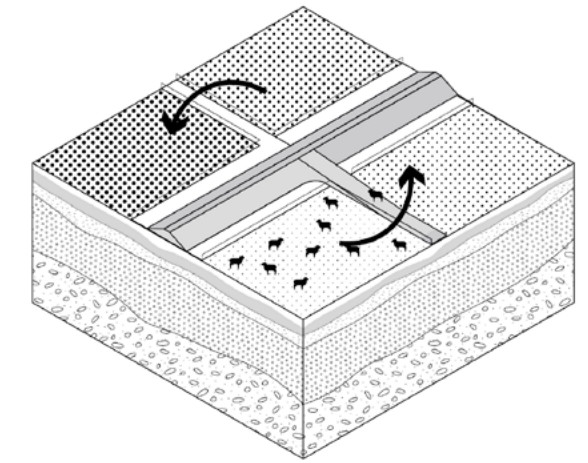
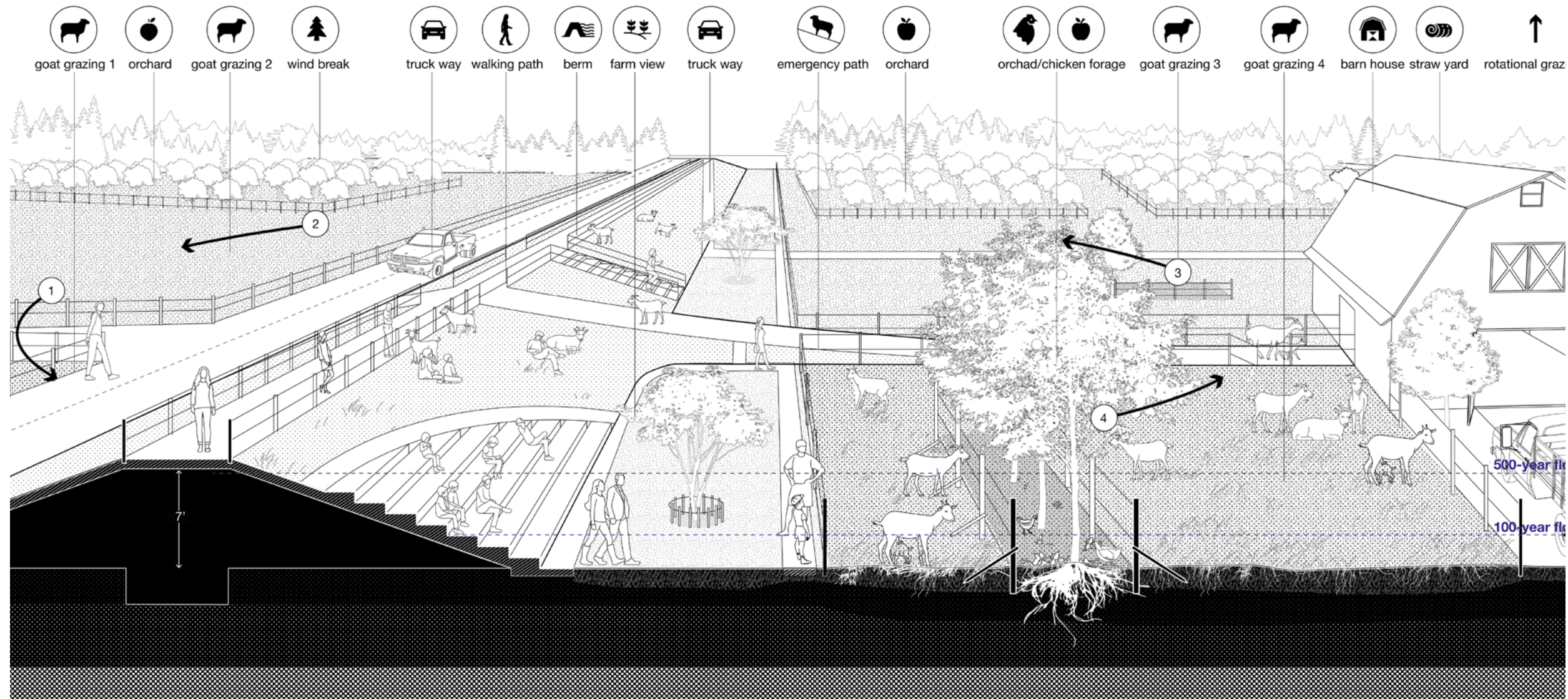
soil remediation



rotational grazing



grazing+orchard+crops

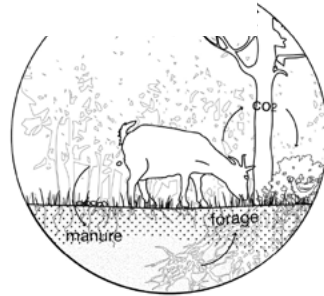


The elevated berm between food production area and grazing land, will provide enhanced views and recreational path. The rotational grazing will help cycle nutrients and build healthy soil through vigorous vegetation growth and manure distribution.

REGENERATING THE GROUND | Regenerative farm practice:4.agroforestry

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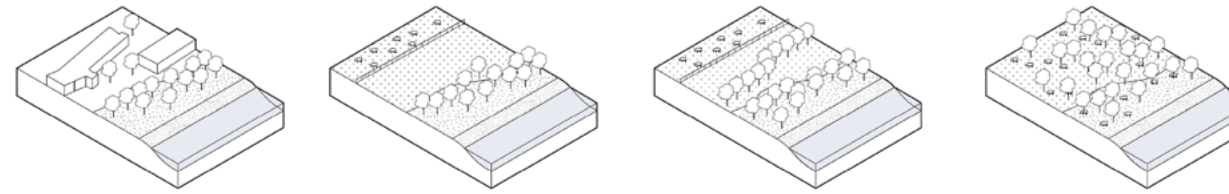
Agroforestry is the deliberate incorporation of trees and shrubs into agricultural and animal production systems for improving water quality, soil health, and biodiversity. The goat will be introduced into the forest seasonally at first; once young orchard trees and their associated plant guild species are established, small livestock will join.



Self-forage
and Soil development

In agroforestry system, animals are taking food from natural world as well as manuring and controlling plants and pests. The diversity of free range diet improves animals health and productivity.¹

¹.USDA* Agroforestry Practices**.

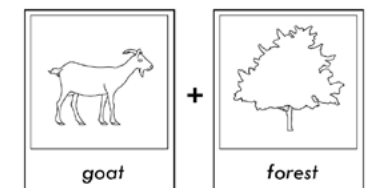
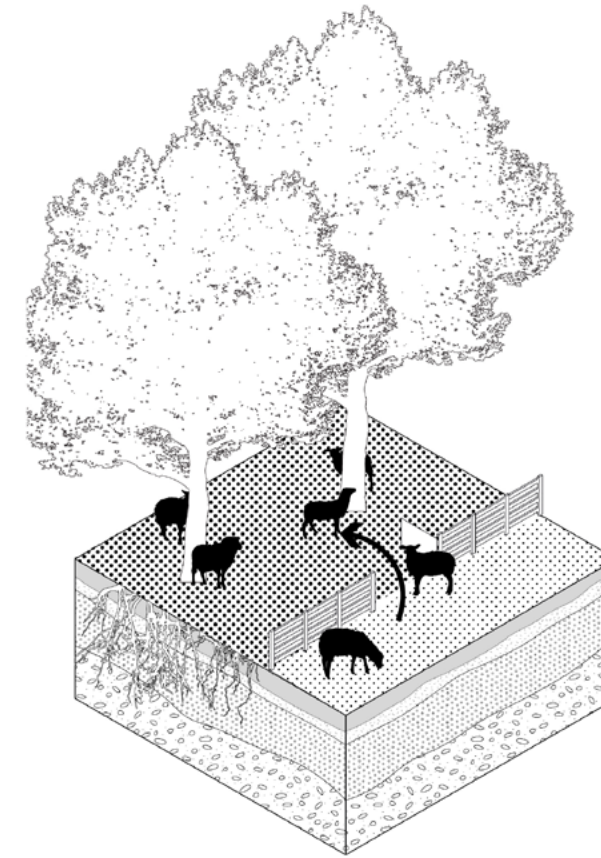
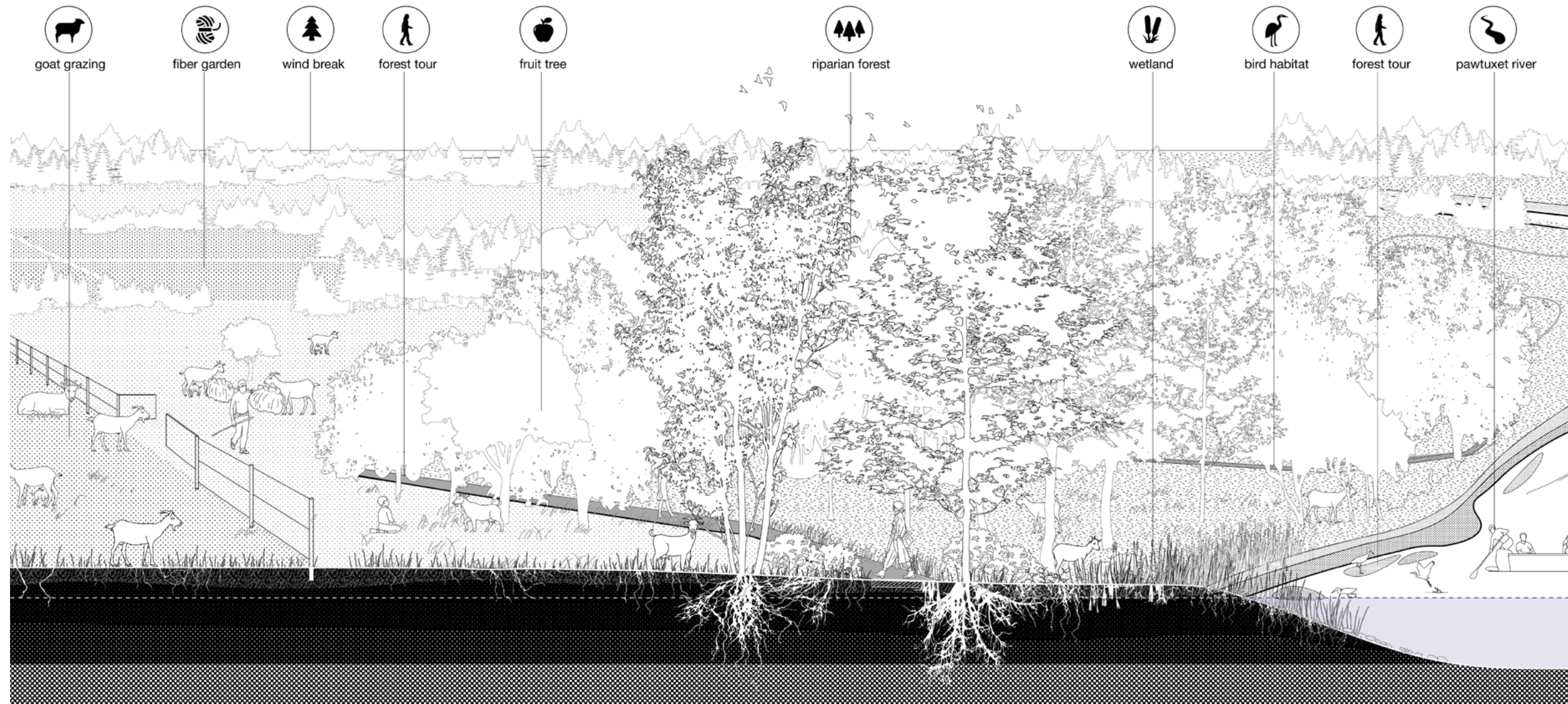


depaving

fenced grazing

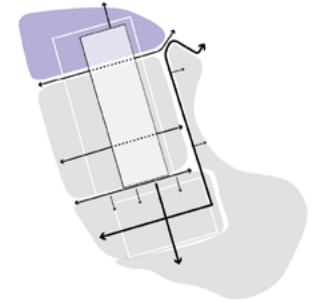
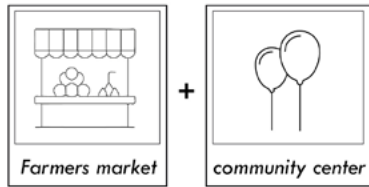
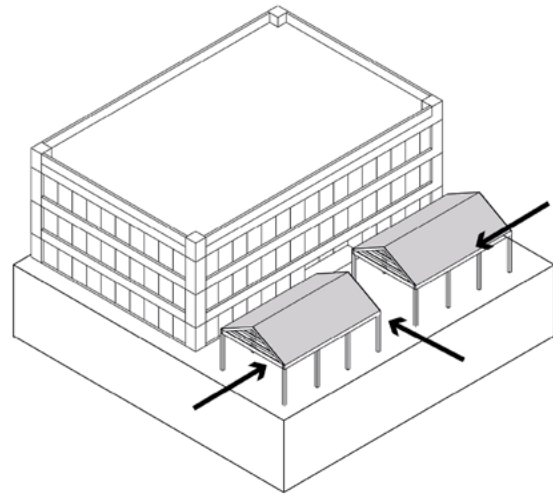
fence grazing+orchard

agroforestry



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REGENERATING THE GROUND | Community engagement: 1.front community center



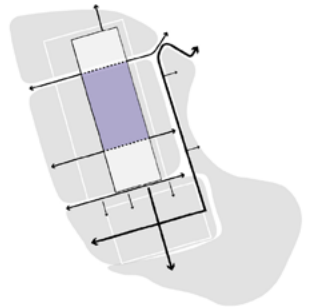
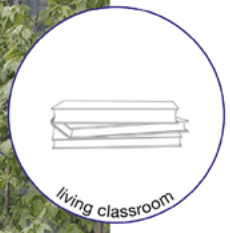
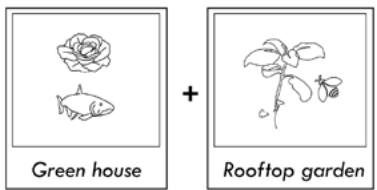
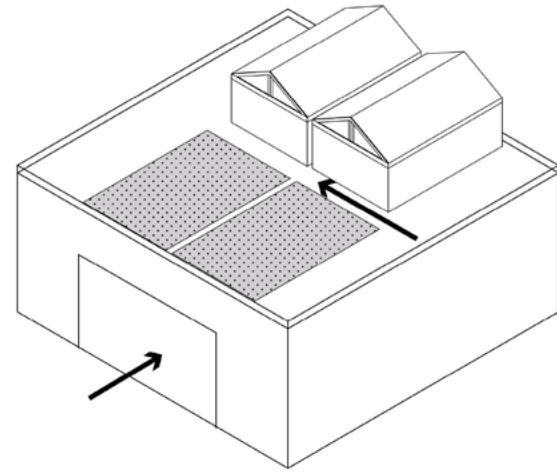
community center



The front community center is a number of public spaces with parking lots and shared amenities. It is here the institutions of regenerative farming display their products and increase residents' knowledge of regenerative agriculture.

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REGENERATING THE GROUND | Community engagement: 2.rooftop open farm



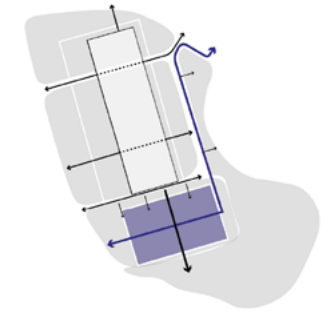
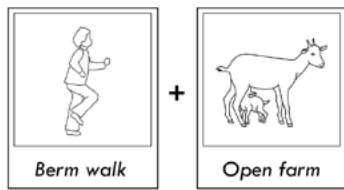
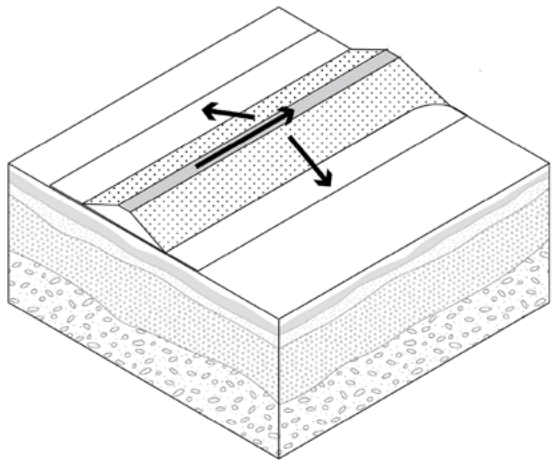
rooftop farm



The rooftop open farm will work as a showcase to display how the aquaponic greenhouse works in the previous mall building. The public route and private production space are separated by the rooftop farm trip. This system ensure efficient production while showing processes to people.

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REGENERATING THE GROUND | Community engagement: 3.berm walk



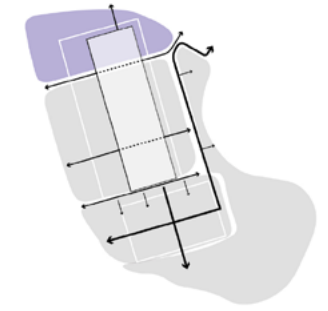
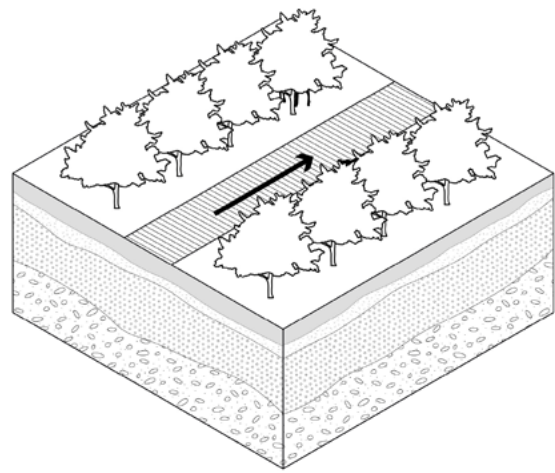
berm walking



The berm walk between the food production area and grazing land functions as the showroom for grazing paddocks and provides a glimpse of the rural landscape for urban residents. The main path is built on such a scale that people can have mult activities and access different parcels of the site.

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REGENERATING THE GROUND | Community engagement: 4. forest trail



forest trail



The forest trail will provide a more wilderness experience. People will observe the wildlife habitat and seasonal agroforestry along the trail and eventually reach the Pawtuxett river.

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