American University of Beirut

The Farm: An Advancement Back to Nature

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UNDERGRADUATE DESIGN THESIS
IN
ARCHITECTURE

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[THE FARM: AN ADVANCEMENT BACK TO NATURE]

by
[MARIA EL KHATIB]

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[Department]
(as listed in AUB Catalogue of current year)

Date of Thesis final presentation: [May 17, 2020]

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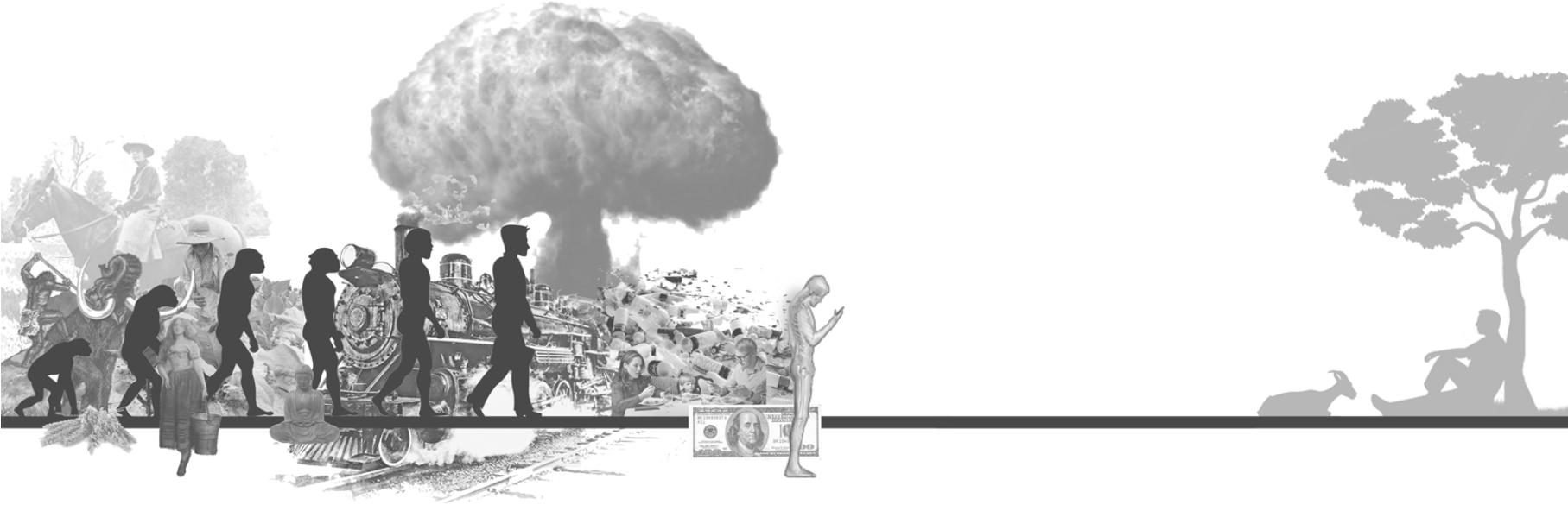


The isolation of people from nature and its consequences has been a disaster to the human race. Arguably, this isolation happened at the dawn of the industrial revolution. While industrial society opened the doors to mass production, infrastructure, and technological advancements, the doors that connected the human spirit to nature and the simplicities of life were inevitably shut. The repercussions have not gone by unnoticed.

The "advancement" of modern society has led to an industrial-technological system that has destabilized, and disregarded, traditional "primitive" societies, while leading the average human into a mind-space and heart-space of unfullfillment, psychological instability, and detachment from the inner self and natural human senses. The physical world has also paid a price. Environmental degradation and the destruction of wild nature are clear exemplifications that we the human race, somewhere and somehow, have gone wrong.

Advancements in infrastructure and technology have made it easy for the economic and technological society to overshadow rural agricultural societies. Consequently, this has left insufficient public attention on rural communities where the human is still able to lead simple lifestyles, living closely with nature.

This dissertation raises a question on the potential of architectural interference. If the development of agricultural societies 20,000 years ago was the starting point of human settlement, therefore the development of architecture was only ever made possible due to agriculture. Unfortunately though, agricultural societies are not given the praise and justice they deserve. So what does the architectural discourse think of this? This thesis poses two main questions. Firstly, considering the irony of the statement, is it possible for an architectural and technological innovation to stand for advanced sustainability yet achieve the simplicity of the primitive past? Secondly, how can one practice architecture not only sustainably, but also mindfully, in the revival of rural communities?

“Society is collapsing and people are starting to recognize that the reason they feel like they’re mentally ill is that they are living in a system that is not designed to suit the human spirit.”

-Jim Carrey

Part one

Since the beginning of time, the Homo Sapien has evolved to live in wilderness. Our minds and bodies have evolved under the guidelines that nature set for survival. With time, the human grew powerful and was able to “outsmart” the laws of nature through advancements that have led us to believe that we no longer need the river, the rock, the tree, or the goat to get by our daily lives. What we did not notice, however, is that the detachment from nature continues to impact us in the one place where the fate of humanity lies: our minds.

0 36000 29145 2

“I spend a lot of my time working with folk who simply don’t notice things, cannot work their ears or drive their eyes, in fact, use their senses in a way that seems natural and instinctive to me.” (Nick Baker, Rewilding: the Art of Returning to Nature)

Of the many fantasies of natural wilderness is the ways through which simple interactions between the human and the Earth may activate and enrich the human sensual experience.
An architecture that is sensible to nature is one that will allow and strengthen this experience of the human senses.

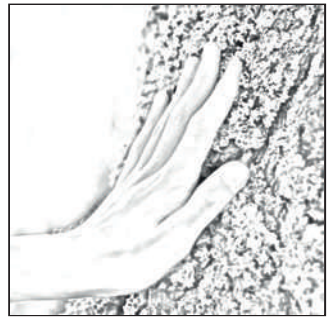
Sensual engagement

Interacting with nature

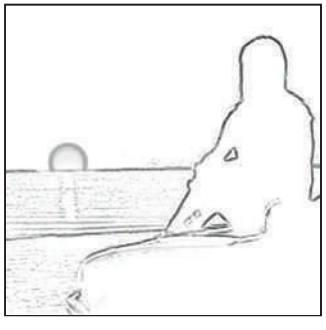
Interacting with nature

Sensual engagement

Interacting with nature



Sensual engagement



Sensual engagement

Interacting with nature

Interacting with nature

Almost anyone today will agree that we live in a deeply troubled society, and considering how far off we have drifted from the natural environment where our minds and bodies have evolved to live, this realization is no coincidence.

Throughout the architectural discourse, the architect is taught the rules of construction. She or he grows the skill required in order to design and construct in our expanding society. The architect knows that there is a direct relationship between the well being of the human and her or his physical surrounding. And so where does this leave the architect who believes that excessive construction, consumption, and consumerism are the cause to the troubles of our society. Perhaps the architect can use her or his skill and knowledge in innovation to defy the odds and propose a progression that allows for regression.

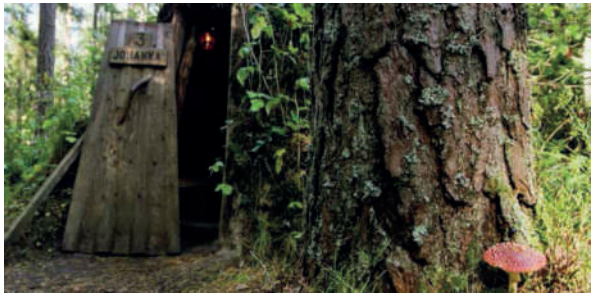
Man-made views
City sound pollution
Air pollution
Unnatural geometric surrounding
Overpopulation
Detachment to nature
Natural views
Sounds of nature
Natural airflow
Natural propotions/ shapes
Interaction with animals
Interaction with earth
Technological enslavement
Depessive tendencies
Lack of sensuality
Environmental degradation
Complexity
Anxiety
Materialistid mindset
Health risks
Physical wellbeing
Minimalistic mindset
Mindfullness
Simplicity
Sensibility to nature
Attentiveness to senses
Sense of fulfillment
Sense of freedom



Megaphones: Sensual enhancements

Earthship Patagonia, Argentina

Free Spirit Spheres, Canada



Stf Kolarbyn Eco Lodge, Sweden

Research on healing gardens concludes that there are certain factors (listed on the right of the below diagram) that dictate the extents to which the human is affected by his or her natural surrounding. The intersection between those factors and the levels through which our minds are impacted by nature (listed on the left of the diagram below), allows for the speculation of certain architectural and programmatic gestures that enhance the humans experience in nature. Those guidelines will inform future decisions that will be taken in the realization of this project.

Materiality

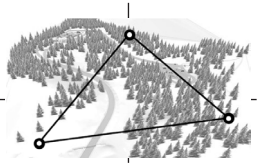
Scensory stimulation

Direct and Indirect interactions

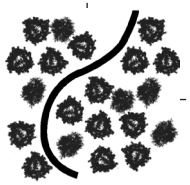
User interaction

The Physical

Constrcution materials exist harmoniously with nature



Program distibution that encourages circulation through nature



Nature dictates circulation

Programs that encourage the interaction with nature

The visual and acoustic

Use of materiality that complements sounds of nature

Architectural spaces that enhance the sounds of nature

Various degrees of disconnection to infrastructure

Observation and reflection

Offgrid zones and gradation of wildreness

The unnoticed impact

Opportunities provided along circulation to interact with nature

Priority to all species

Fascination

The properties of the space that holds ones attanetion effortlessly

Compatability

The properties of the enivornment that supports what one wants to do

Being away

A physical or conceptual distance in ones mind from usual

Extent

The extent to which the enviornment allows one to be

With the rise of the industrial revolution, the machine has allowed man to surpass his natural capabilities. Excessive exploitation of land mass happened in parallell with over population.

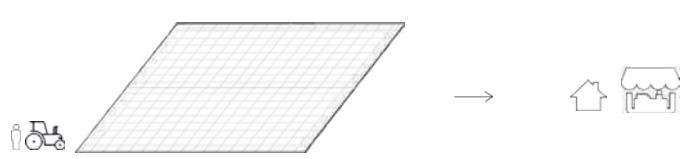
As a result, humans lost the personal connection to their land, and lent it over to the machine. Insensitivity to nature was simply a by-product of human greed.

Time

Connection to land
Land use
Consumerism
Demand

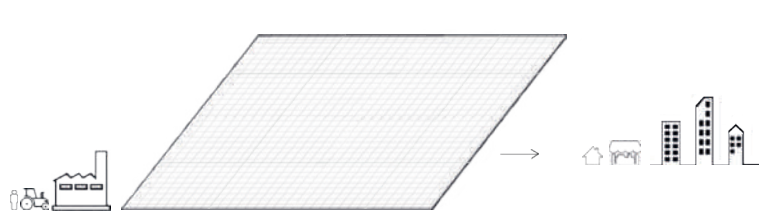
The single man had just enough man power to cover a plot of land large enough to sustain feeding his family. The man worked the field with his bare hands and had a greater personal connection to his land.

Connection to land
Land use
Consumerism
Demand



With the introduction of the machine, the man was able to cover larger plots of land. The man produced more, therefore he began to market and sell.
The machine began to take the place of the mans bare hands.

Connection to land
Land use
Consumerism
Demand



Industrialization grew, along with demand. The man needed more land to
produce more. The man lost the connection to his land.

Rather than paying attention to the need to bring the human back to nature, technological innovations in farming have focused on methods that widen the gap between the human and the land from which her or his life is made possible.

The intenton of this project will be to draw from the simplicity and sensitivity of traditional farming methods, as well as from the advancements in sustainable agriculture, while learning from the wrong doings of modern industrial farming, to arrive at a decentralized rural farm. The farm will be a tool to enahnce to livelihoods of local farmers while presenting the platform for individuals to emmerse themselves in nature.


Traditional farming
Modern industrial farming
Sustainable farming
The Farm

Case 1: Vejlskovgaard Stable / LUMO Architects

Case 2: Goldsmith Architects / Floating Dairy Farm

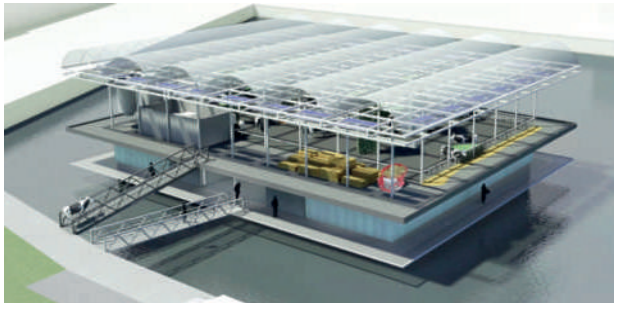
Case 3: Natuurderij Keizersrande / DAAD Architects

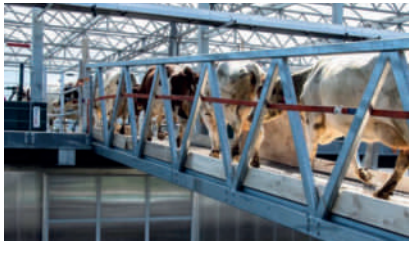
A productive floating farm system to bring food closer to cities.

A replicable and scalable modular design that can be done on a worldwide scale at different locations.

Combines different market available technologies into a simbiotic single productive platform.

Case study 1: Sustainable farming
Floating farms





Rainwater collection

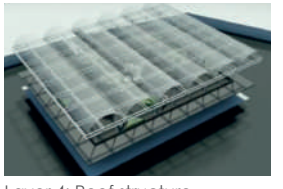
1 Food wall irrigation
2 Water filtering
3 Driking water (cows)
4 Clean water for aquaponics (vegetable and fish)

Urine/Feces collection

5 Artificial grass/Substrate urine collection
6 Feces collection by robot

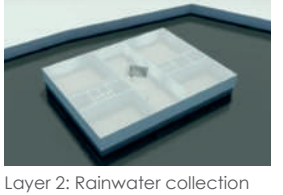
Energy production

7 Biodigestor (biogas and fertilizers)
8 Power plant (Heat and electricity)
9 Photovoltaic panels
10 LED lighting (grass production)

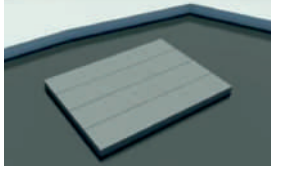


Layer 4: Roof structure

Layer 3: Cow stable



Layer 2: Rainwater collection and manure processing



Layer 1: Base structure

Similar example: Floating aquaponic farm

Layer 1: Aquaculture -
Fish and other species

Layer 2: Hydroponics -
Crop production

Layer 3: Solar energy plant

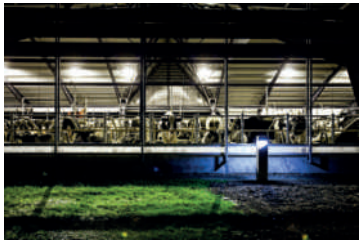
An open structure on the green field with as much outsight as well as insight for the cows, staff, and visitors.

Enhances and respects the quality of the surrounding nature through shape and structure.

Connects to different and important surrounding spaces and qualities.

Architectural intent is focused on animal welfare, quality and openness rather than signaling the industry.

Case study 2: Animal sensitive farming
Dairy farm



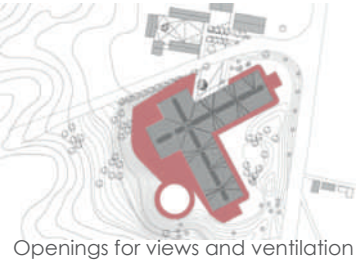
A balcony and path in the grounds around the building givies opportunities to educate and communicate the agriculture industry to visitors.

The free stall barn promotes ethical attitude to the animals as they are the focal point of the entire production.

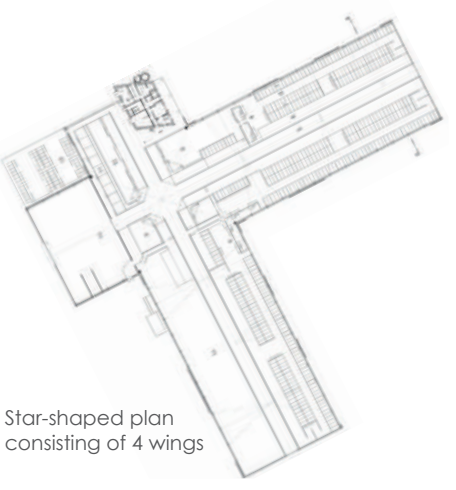
The architecture is characterized by the dormer profiles where roof and facade flow together and are of the same material.

Connection to old barn house

Openings for views and ventilation



Openings for views and ventilation



Star-shaped plan
consisting of 4 wings

Program and functions:

1. Entrance to service building
2. Office
3. Milk shop
4. Milk processing
5. Feed preperation area
6. Slatted floor aboce slurry channel
7. Cubicle
8. Milking station
9. Grooming area
10. Calving area
11. Mother-calf cubicles
12. Calf boxes
13. Storage
14. Reserves

Sustainable farming, estate development, and environmental and water management are interconnected.

The use of sustainable and local material and construction and temporary facades.

Exhibits sensibility to the surrounding natural landscape.

Case study 2: Sustainable farming
Dairy farm

The estate is located where the lower and higher floodplains meet. The spatial configuration ensures that water floods towards the floodplains.

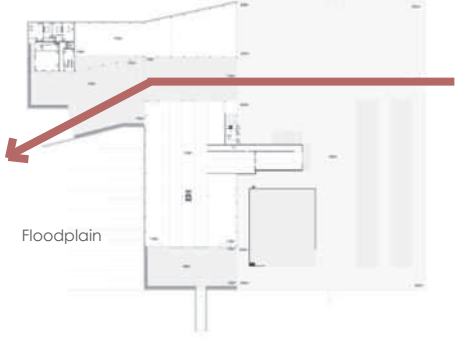
The farm is designed to provide space for education.

Felled oak trees are used for construction. Slats and stacked straw bales are used as façade covering. Through these temporary facades, useful internal spaces can be constructed.

Oak trees to be felled for construction to maintain sight line from old KeizersRande estate

Ground composed of three terraces at different heights, ensuring flow into the floodplains at all water levels.

Final design with new avenue and continious water path to flood plain



“Within nature lies the cure for humanity”

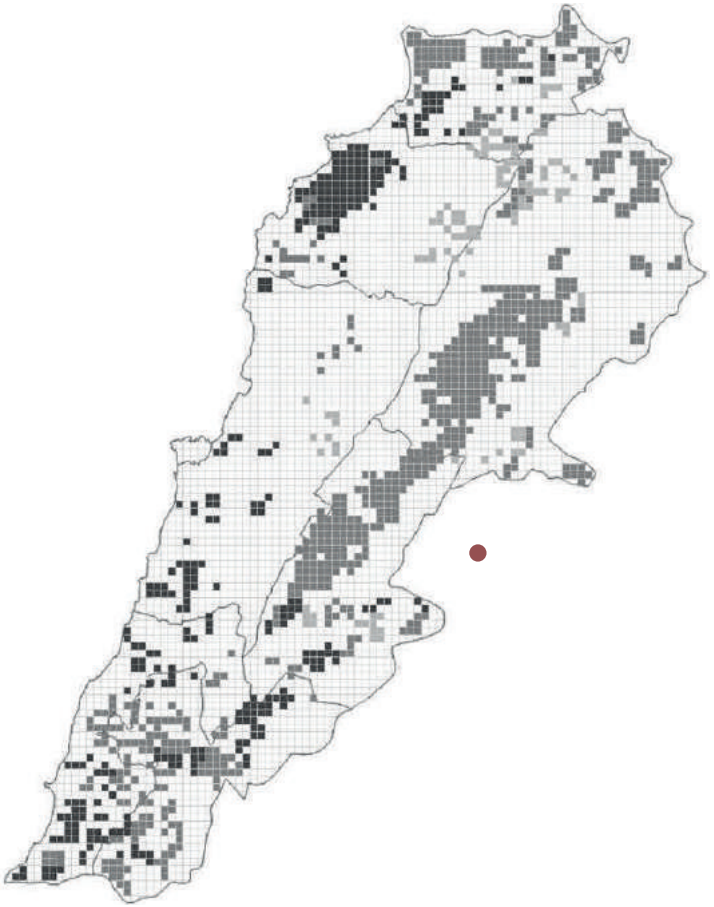
-Unknown

Part two

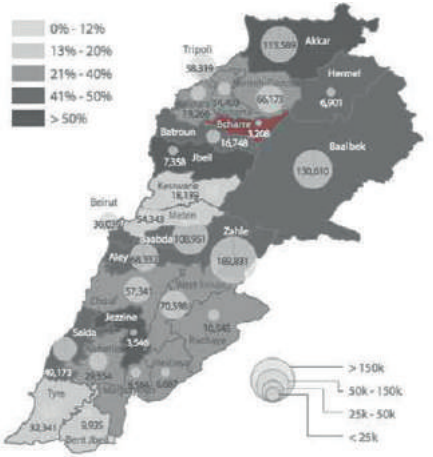
It goes without mention that Lebanon's agricultural sector is the main source of income to many households based in the rural regions of the country. At a larger scale, these agricultural businesses, due to the strong inter-sector linkages, remain to be important in the countries national economy. Agribusinesses, whether small scale or large scale, make a steady contribution to national output, as well as provides employment opportunities to many individuals. In addition to playing a vital role in the country's national resource management, agriculture contributes significantly to Lebanon's status on sustainable development.

The unfortunate matter of fact is that the agricultural sector contribution to Lebanon's GDP is dropping annually at a rate of 3.9%. This decline in percentage is associated with certain socio-economical as well as spatial challenges that farmers face. Consequently, It is estimated that over 40% of households working in agriculture in Lebanon are poor, and that workers in agriculture are the poorest amongst all workers.

Promoting sustainable agriculture and rural development in North Lebanon, where agricultural is not as successfull as in the remainder of the country, will be a major intent of this project.



Food shortage by district



Major goat farms

District	Operations with goats	Number of goats	Average per herd
West Bekaa	343	52,265	152
Zahle	279	20,155	72
Baalbak	1,150	75,305	65
Hermel	515	30,729	60
Rachaya	209	27,851	133
Bcharre	Negligible	Negligible	Negligible

Domestic goats in Lebanon

Chami

6%

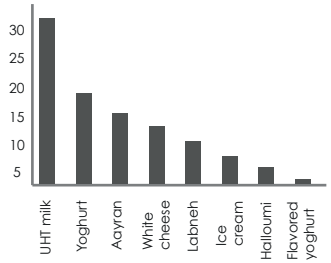
Average milk production	**3 kg - 4 kg/day**
Average Lifespan	**16 yrs**

Lebanese Baladi Goat

92%

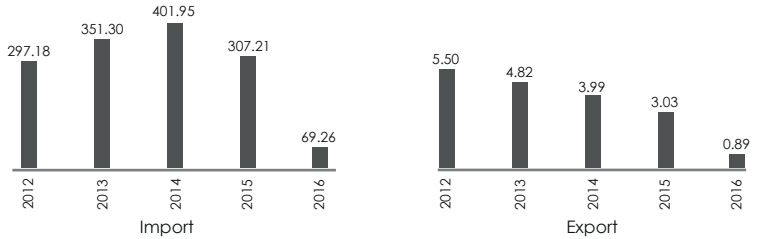
Average milk production	**1/2 kg - 1 kg/day**
Average Lifespan	**12 yrs**

Milk product consumption (%)



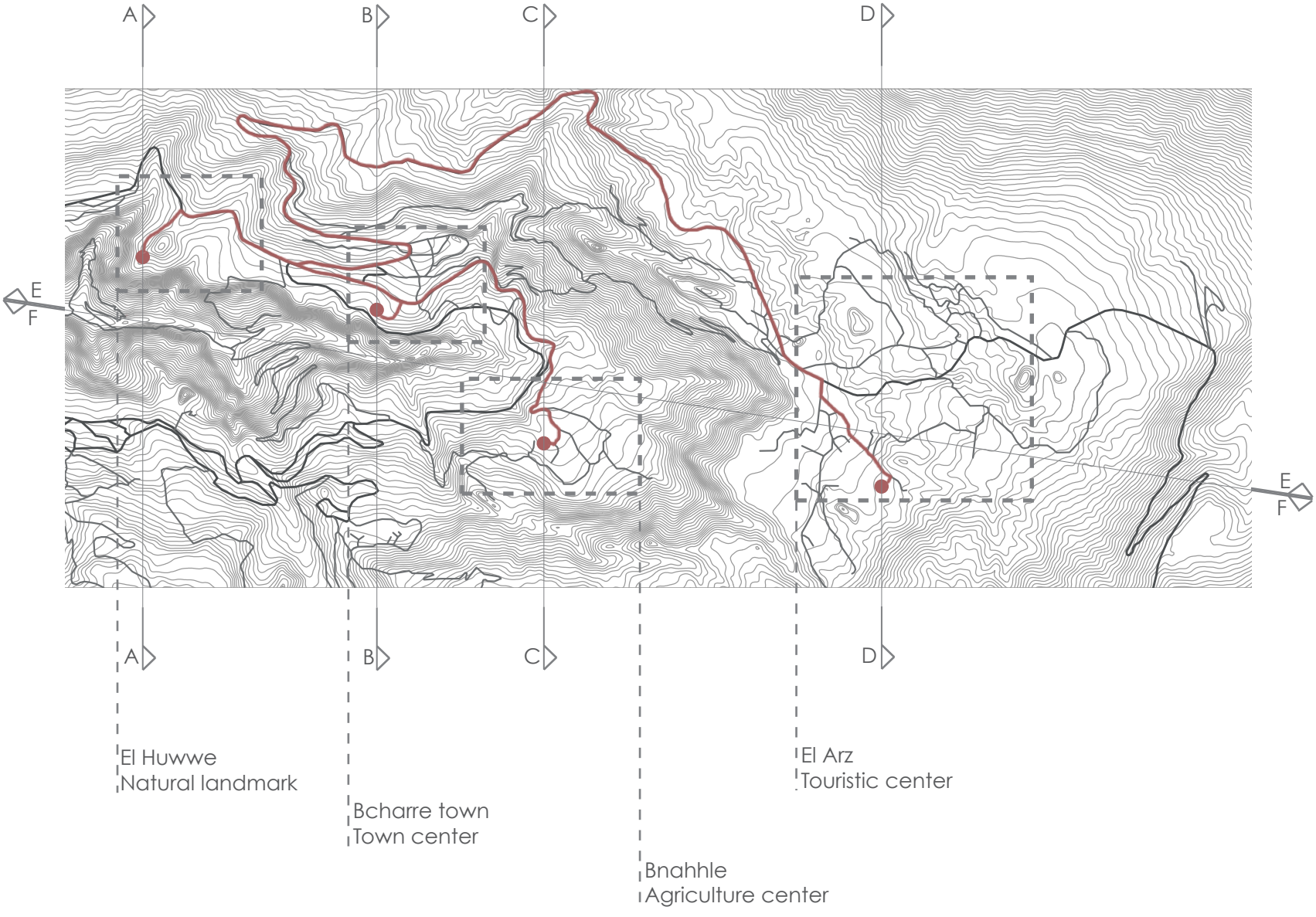
Milk product import vs. export (Million $)

Note: graphs not to scale



The four chosen site locations were decided upon based on the thematic qualities of the areas, all within the Bcharre district.
An interplay between an agricultural area, a touristic area, a town market center, and a baren natural attraction will allow for a set of farms that work together to create a network. This network exists in order to:

1) Enhance the businesses of small and large scale farmers in the area
2) Engage agri/eco-tourism in the rural development of Bcharre
3) Promote sustainable farming methods through an effecient network of production and distribution.


A
B
C
D
E
F
E
F
A
B
C
D
El Huwwe
Natural landmark
Bcharre town
Town center
Bnahhle
Agriculture center
El Arz
Touristic center

Although there is only a maximum of 7 kilometers in the distance between the four sites, each has a distinct landscape and topographical character that allow for different possibilities in agricultural as well as programatic functions.

D

C

E

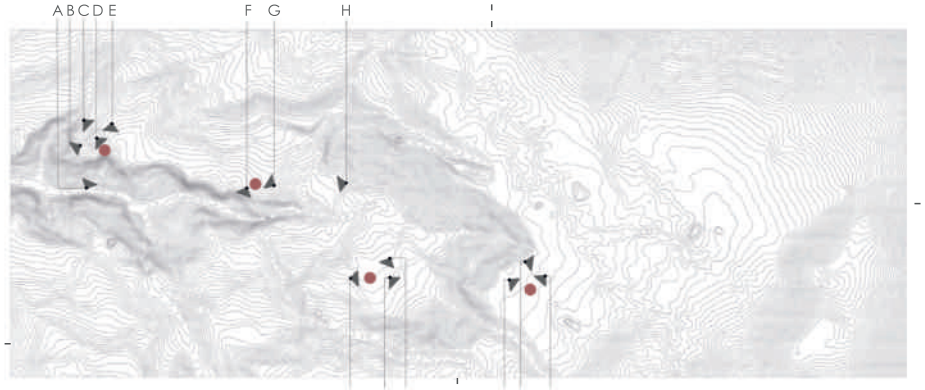
H

G

F

A

B



I

J

K

L

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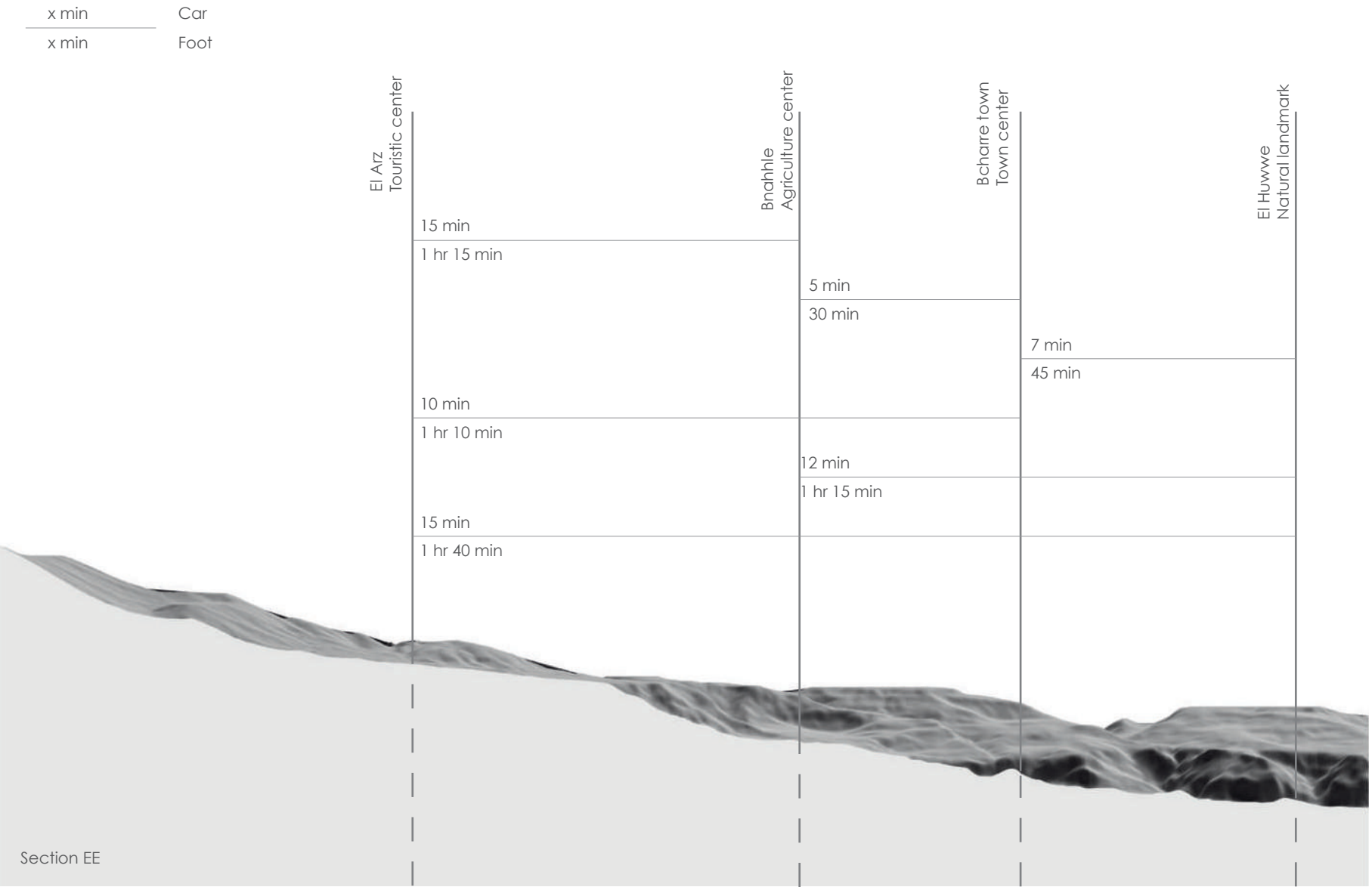
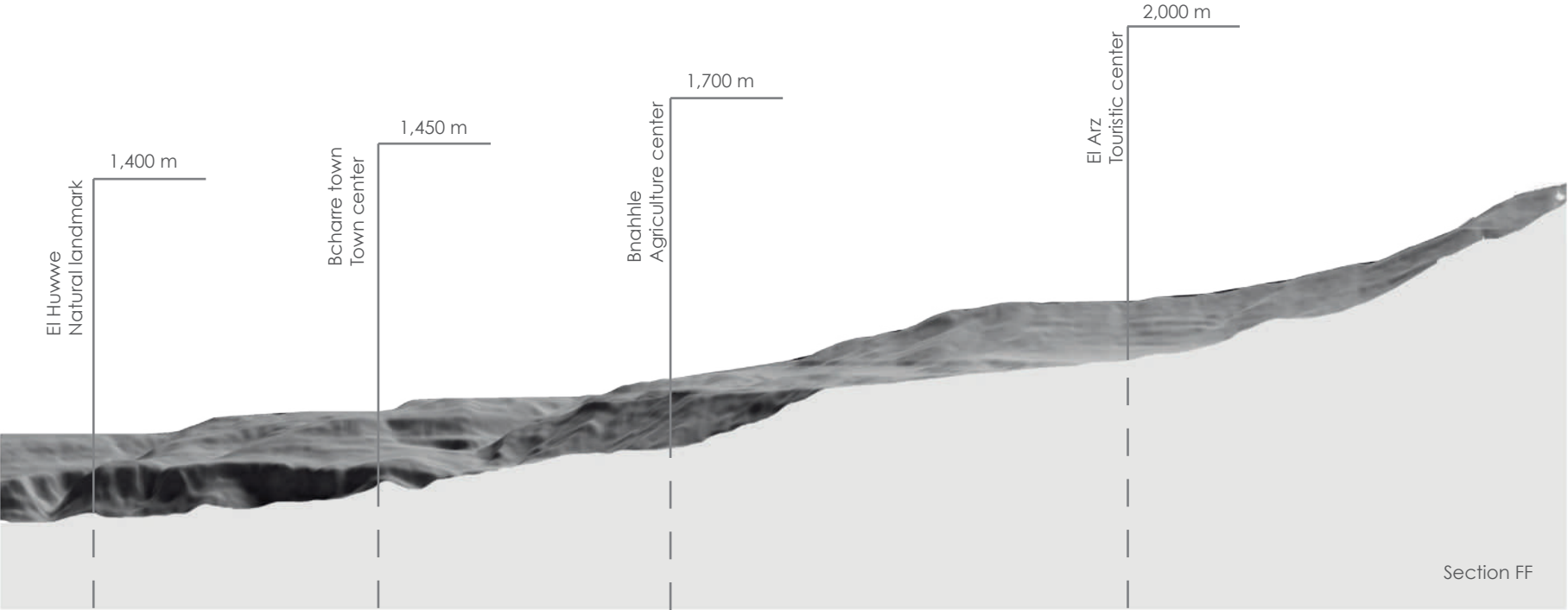
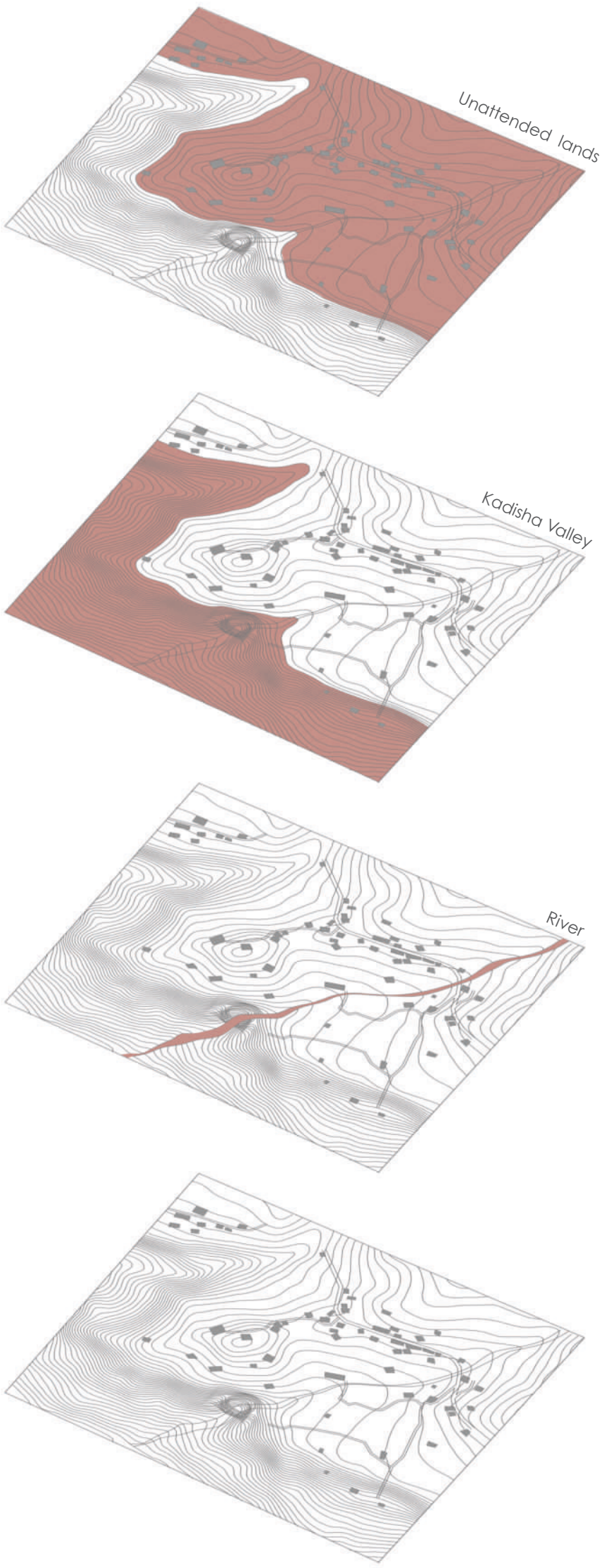
M

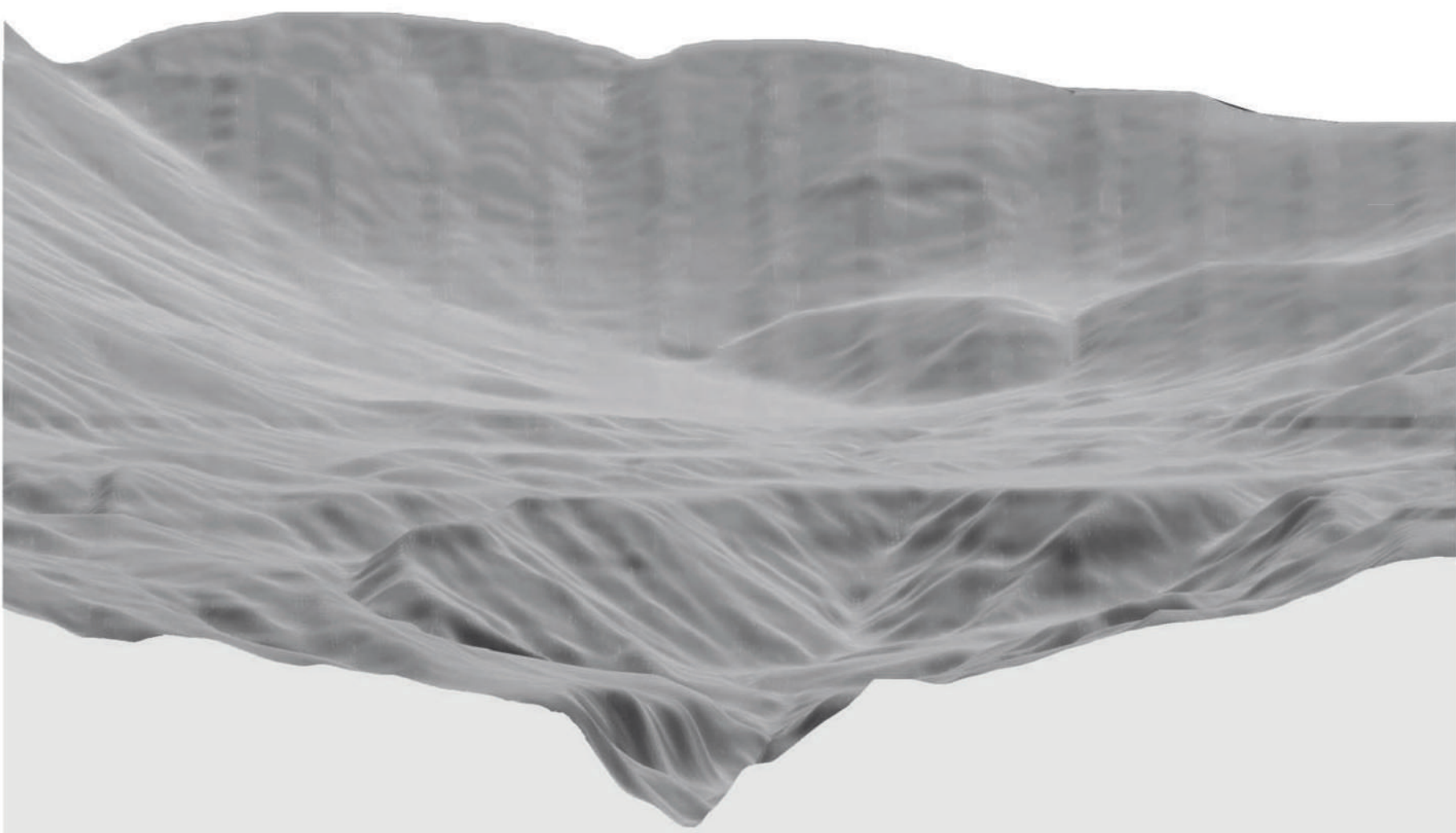

x min
Car
x min
Foot
El Arz
Touristic center
Bnahhle
Agriculture center
Bcharre town
Town center
El Huwwe
Natural landmark
15 min
1 hr 15 min
5 min
30 min
7 min
45 min
10 min
1 hr 10 min
12 min
1 hr 15 min
15 min
1 hr 40 min

Section EE


1,400 m
El Huwwe
Natural landmark
1,450 m
Bcharre town
Town center
1,700 m
Bnahhle
Agriculture center
2,000 m
El Arz
Touristic center

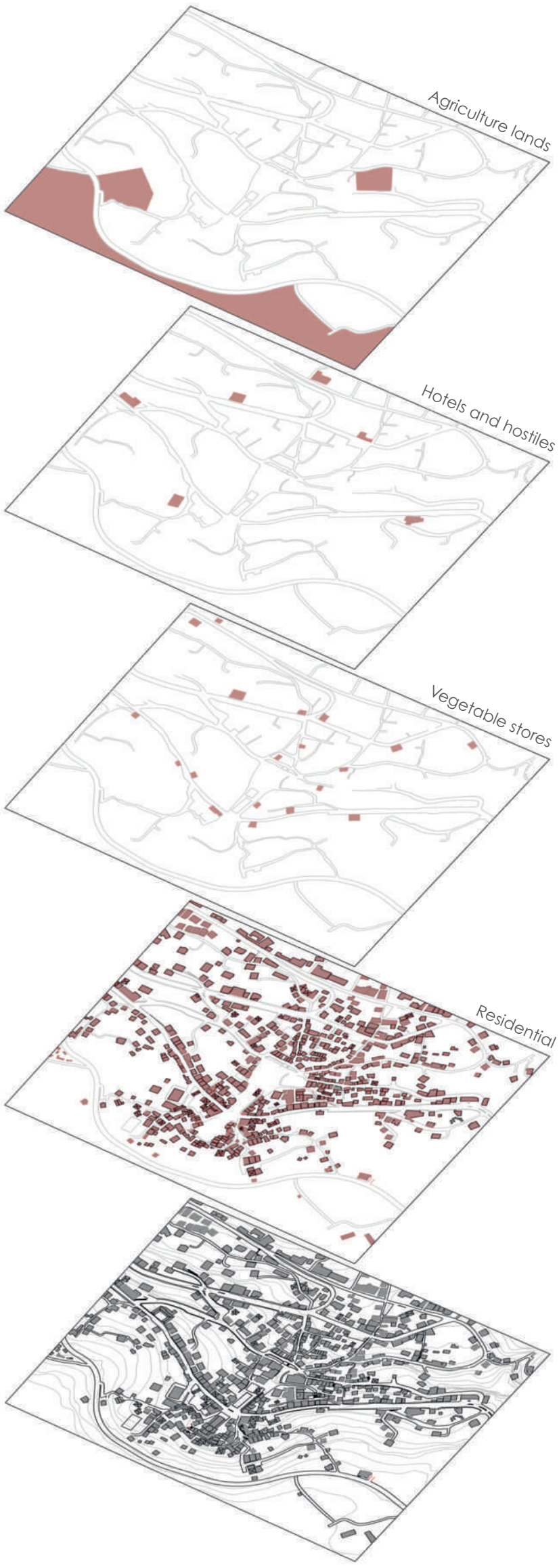
Section FF

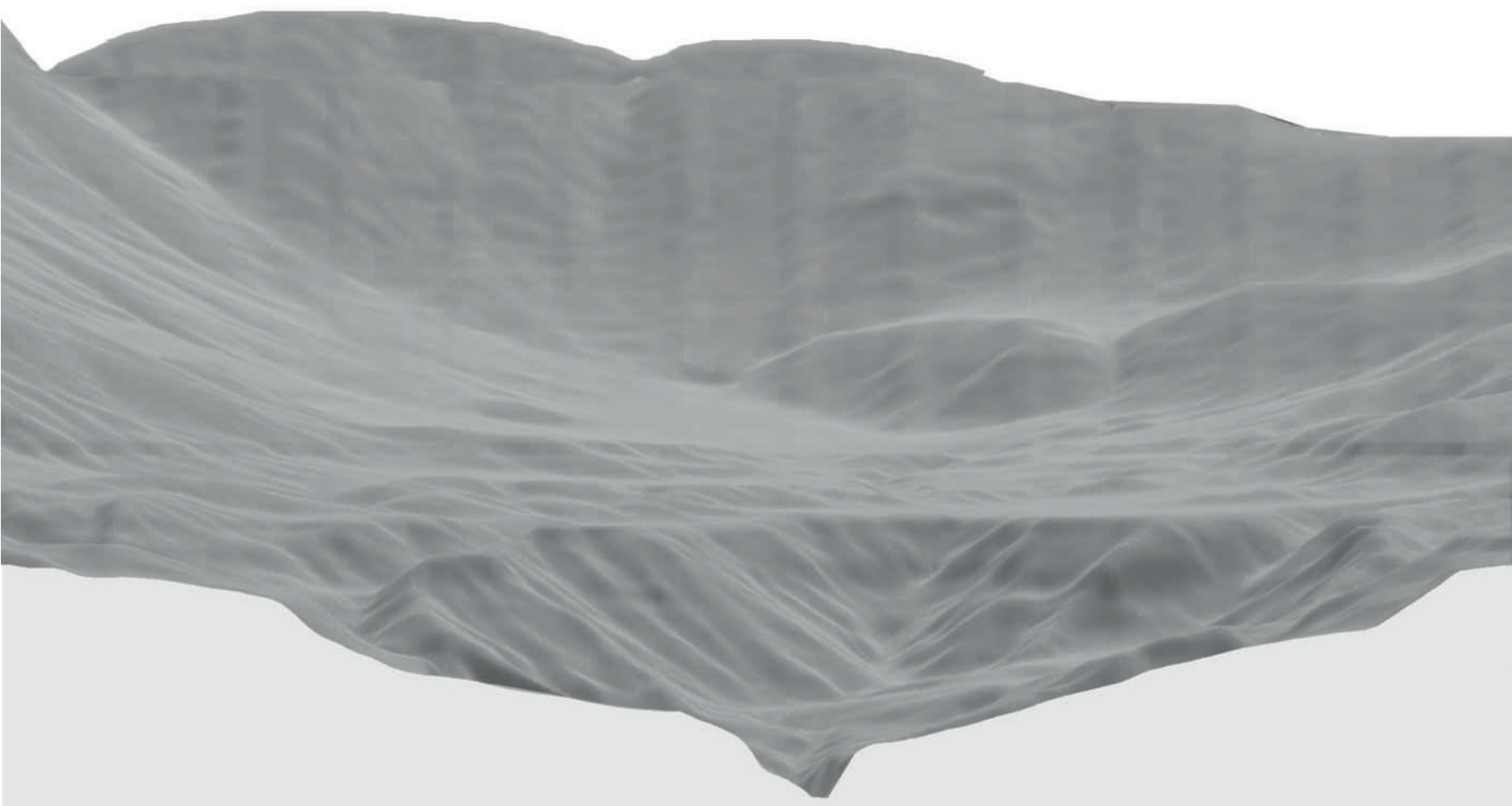




Huwwe: Natural Landmark

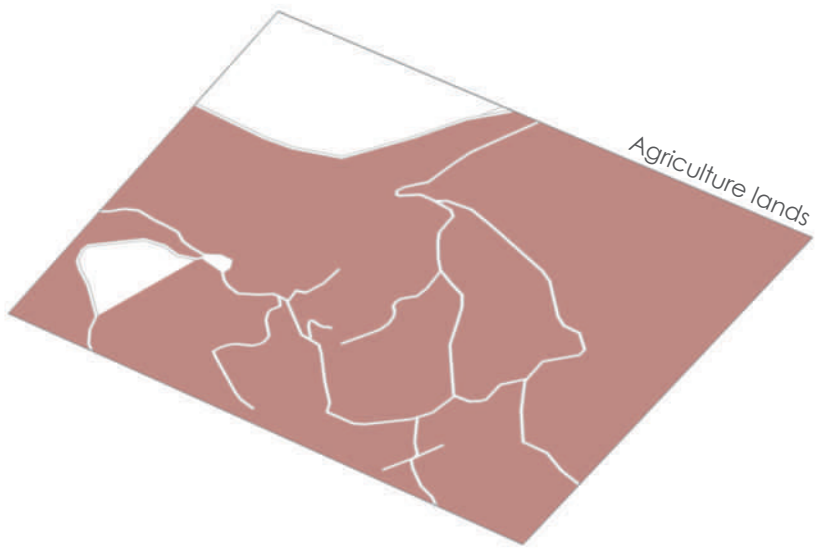
Section AA

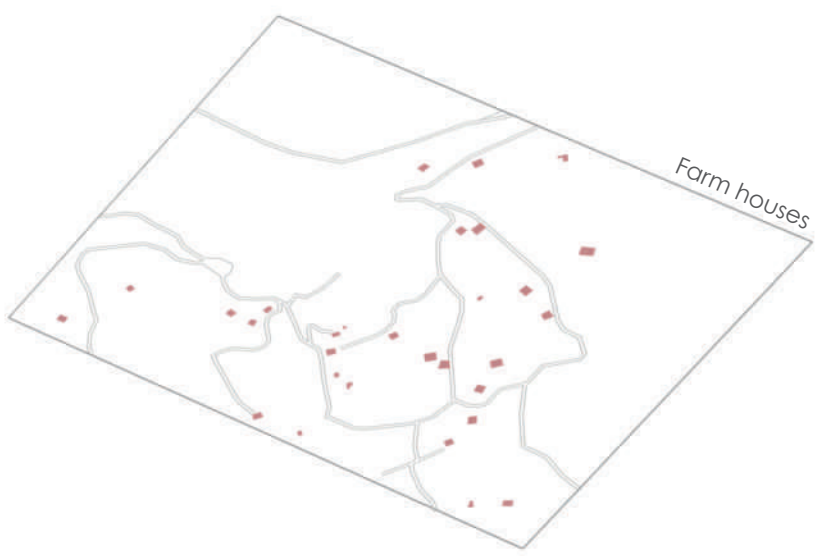




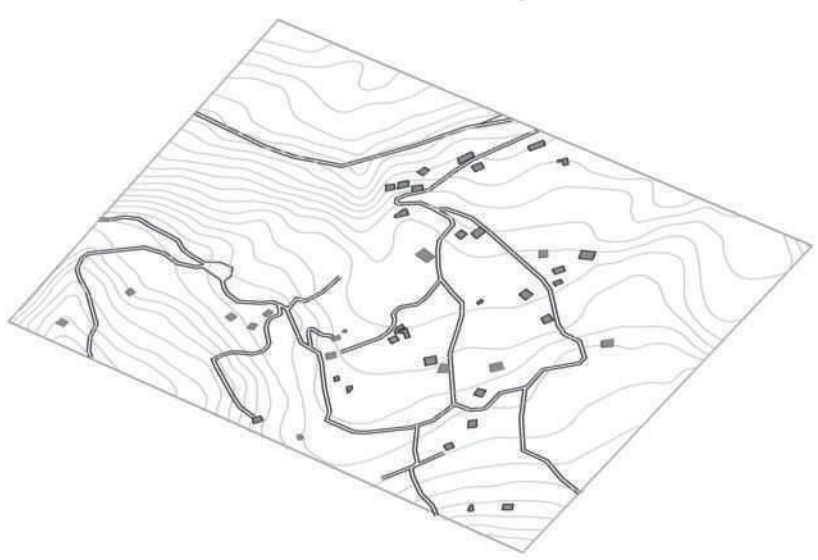
Bcharre: Town Center

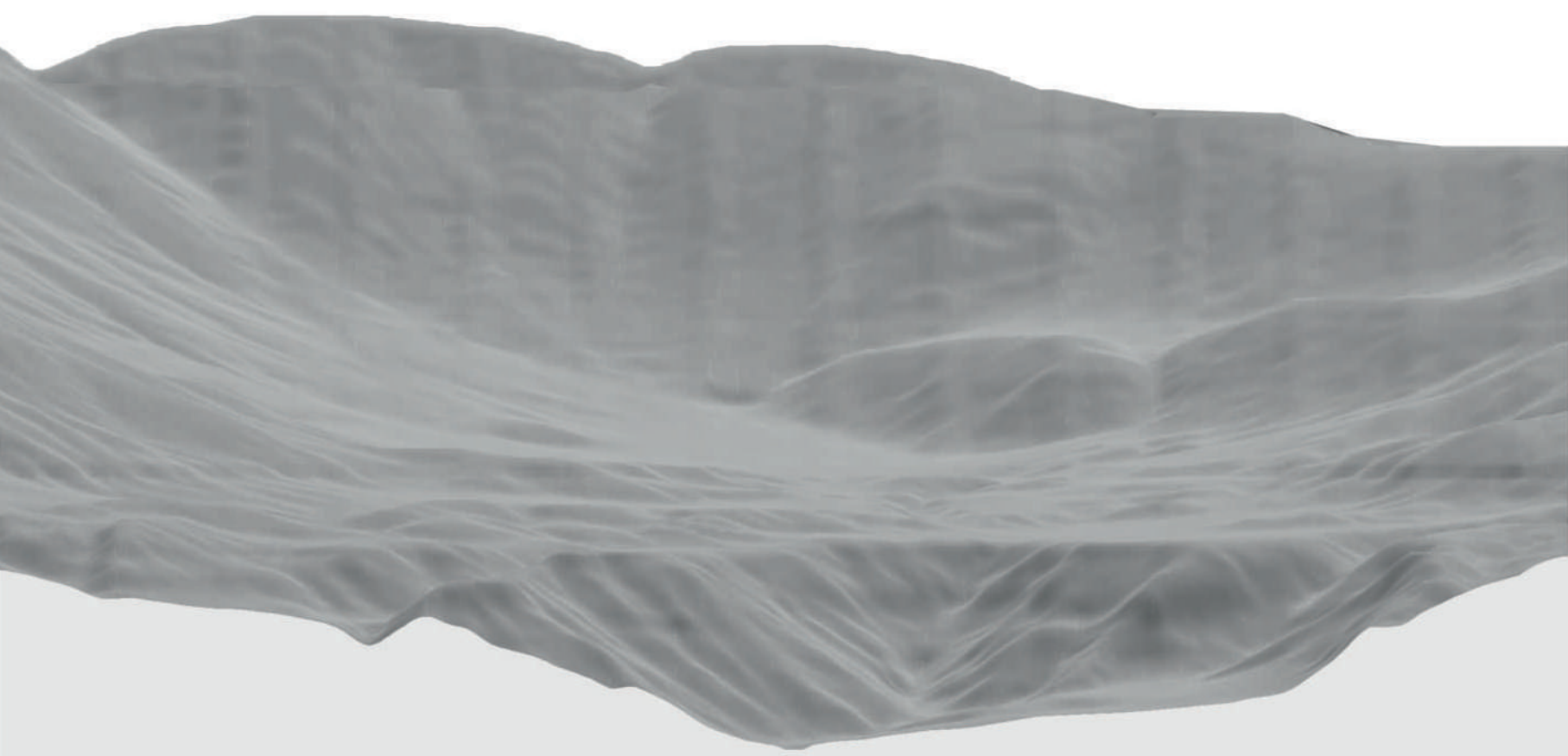
Section BB

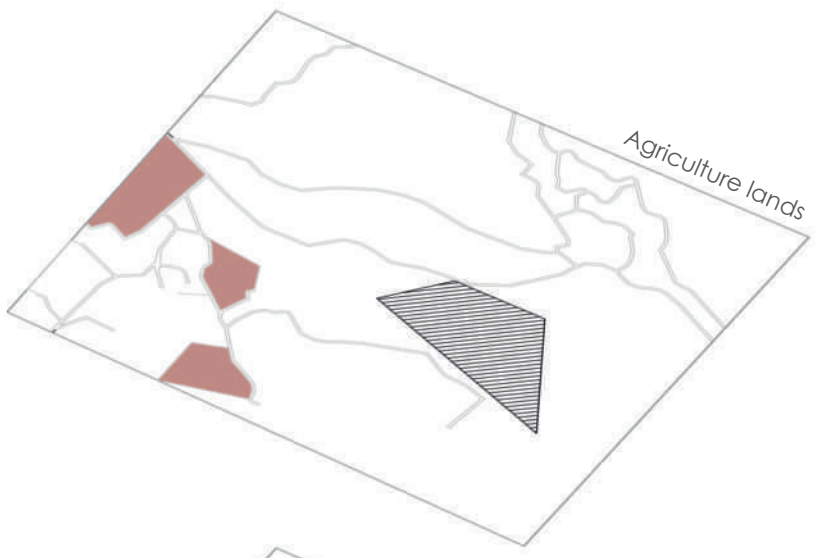

Agriculture lands

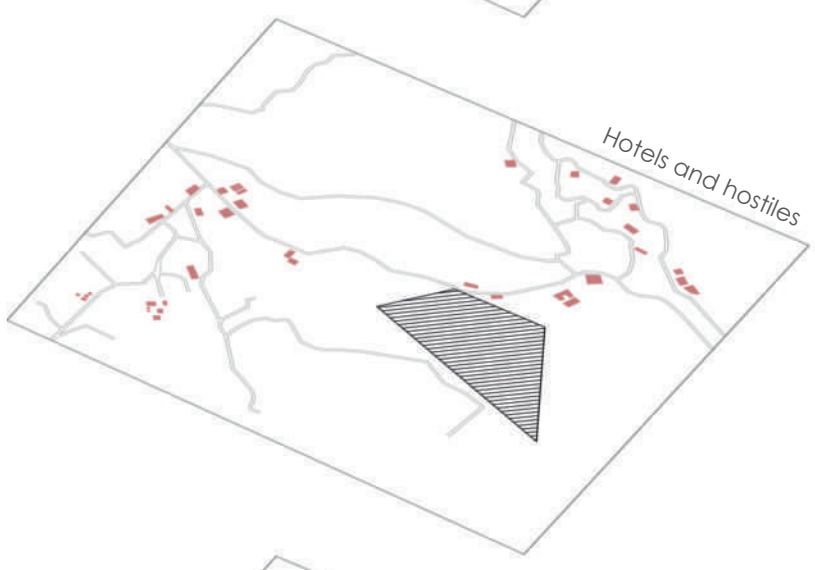

Farm houses

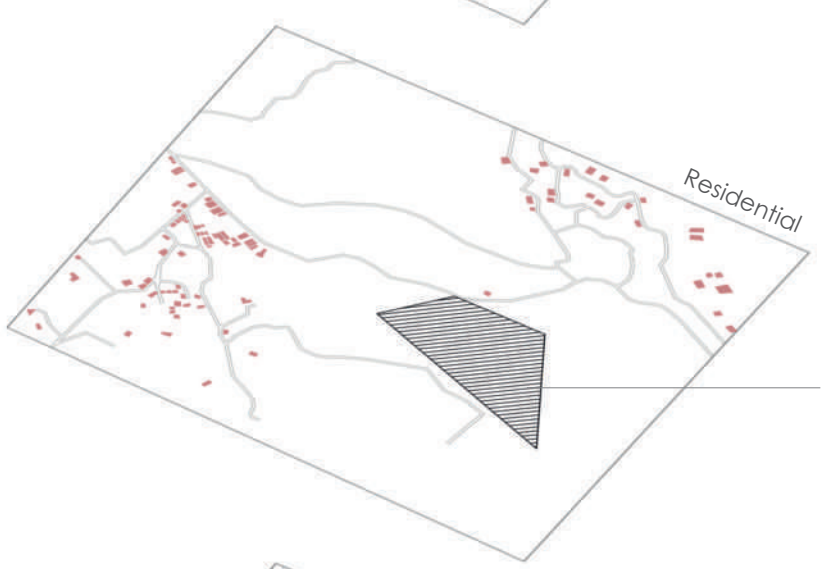

Residential

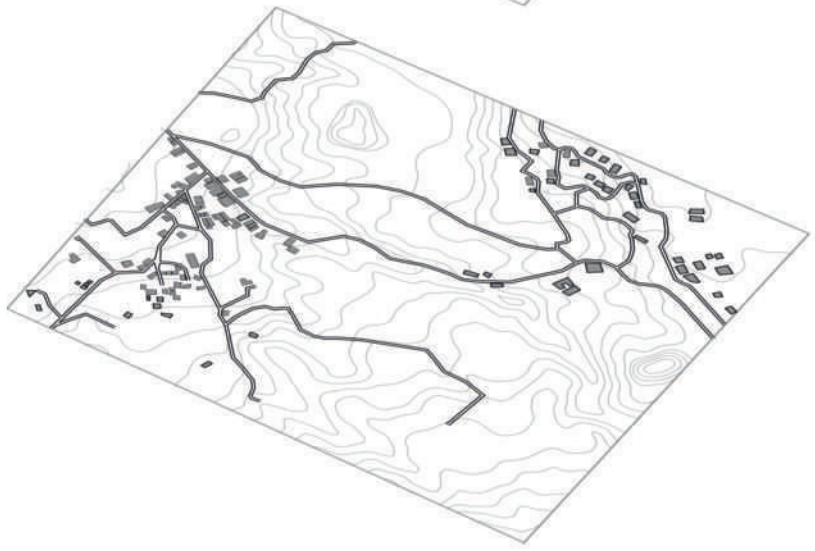


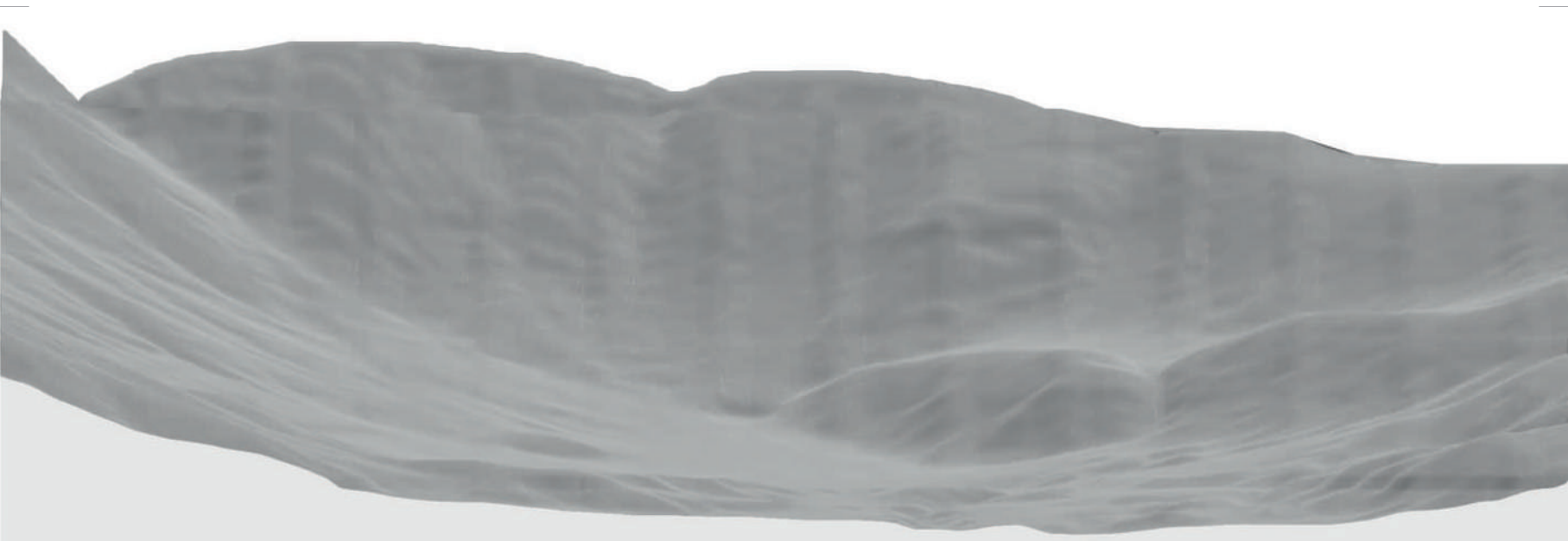






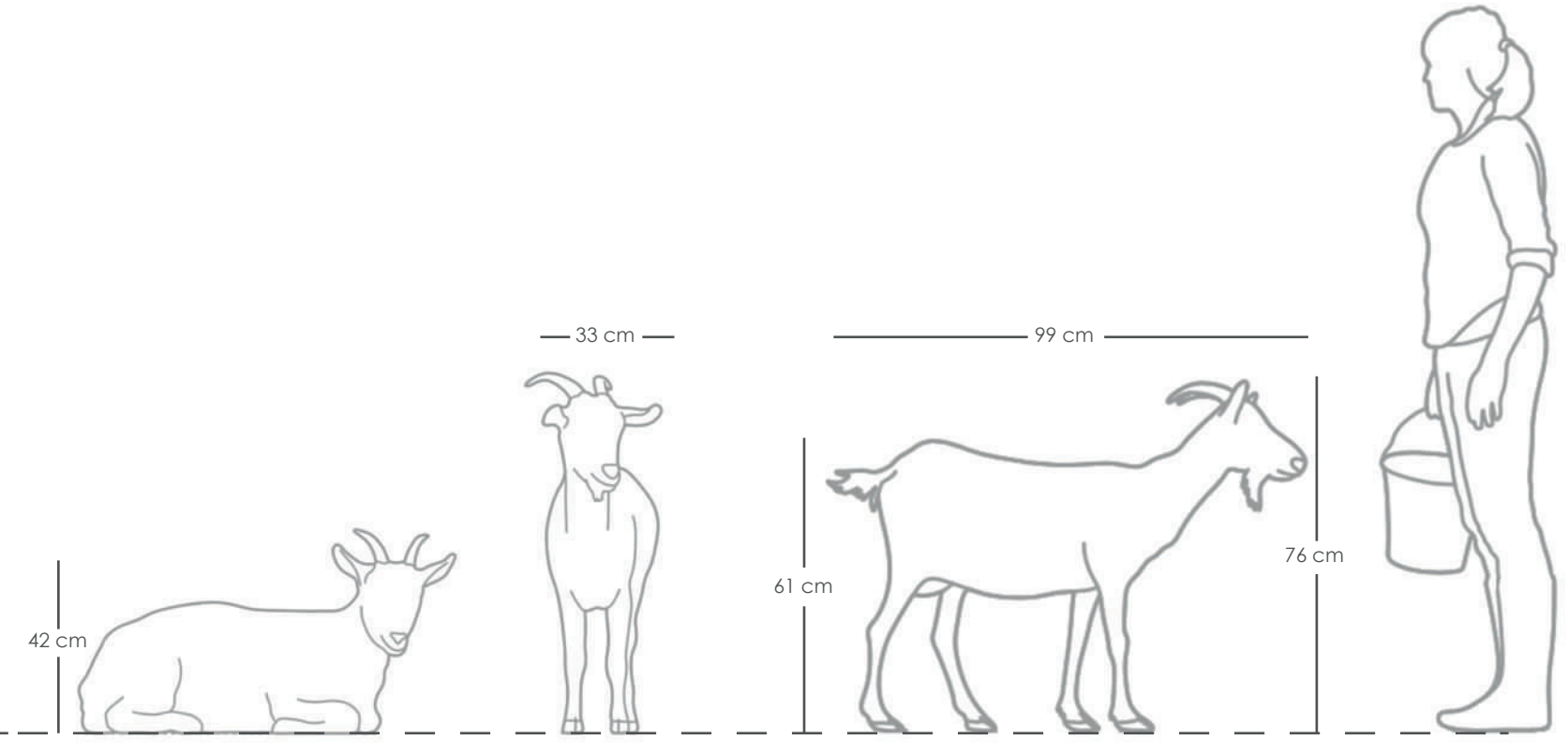


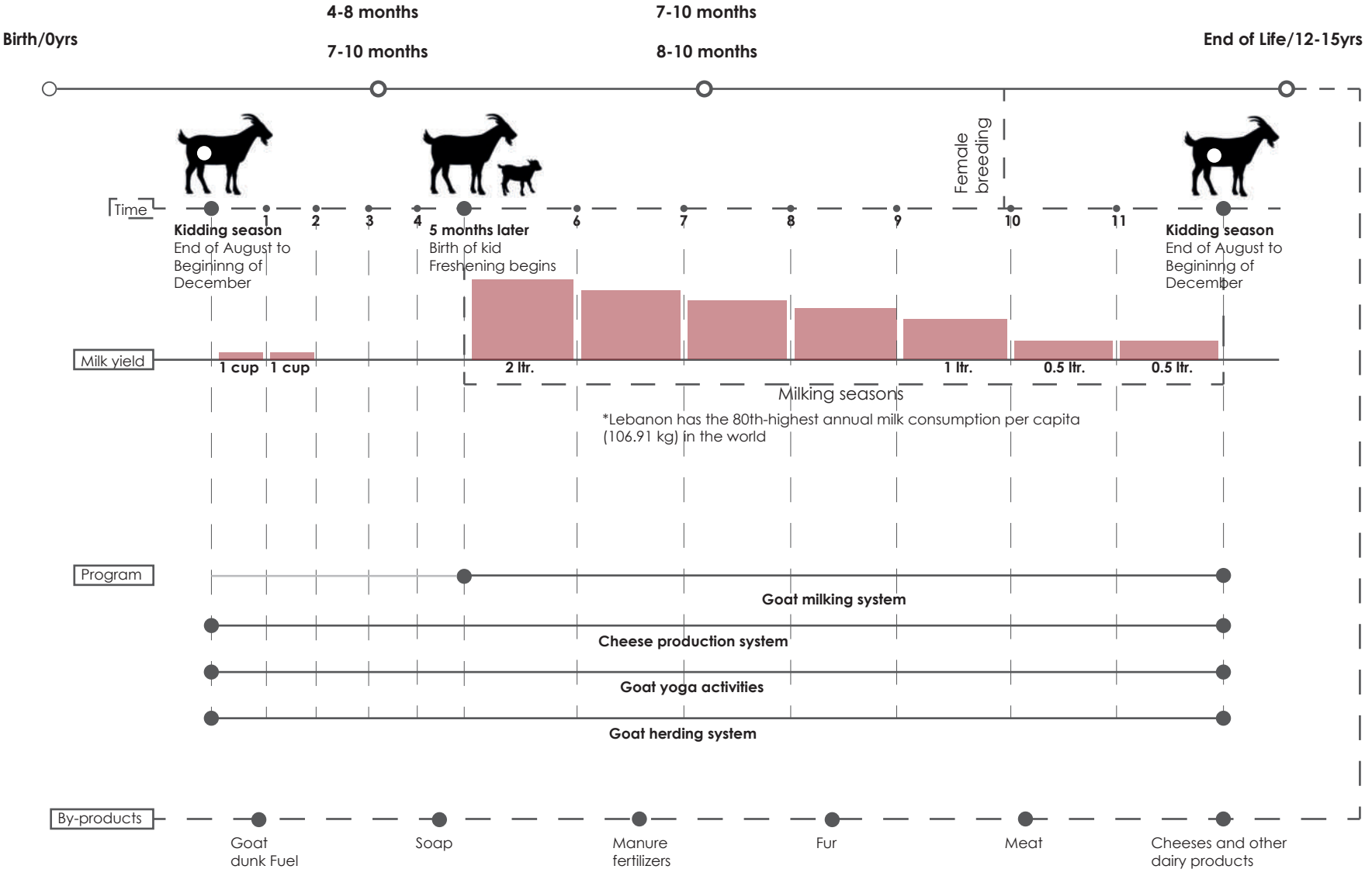




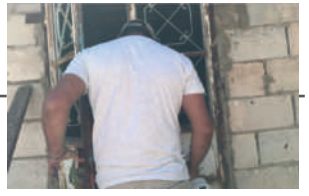
Arez: Touristic Center

Section DD


33 cm
99 cm
42 cm
61 cm
76 cm

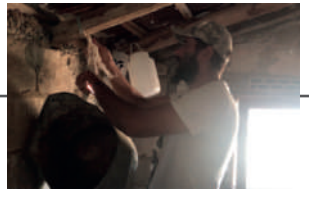

Birth/0yrs
4-8 months
7-10 months
7-10 months
8-10 months
End of Life/12-15yrs
Female breeding
Time
1
2
3
4
6
7
8
9
10
11
Kidding season
End of August to Begininng of December
5 months later
Birth of kid
Freshening begins
Kidding season
End of August to Begininng of December
Milk yield
1 cup
1 cup
2 ltr.
1 ltr.
0.5 ltr.
0.5 ltr.
Milking seasons
*Lebanon has the 80th-highest annual milk consumption per capita (106.91 kg) in the world
Program
Goat milking system
Cheese production system
Goat yoga activities
Goat herding system
By-products
Goat dunk Fuel
Soap
Manure fertilizers
Fur
Meat
Cheeses and other dairy products

Arrive at goat shed

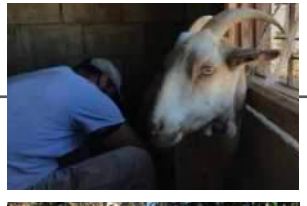

6:00 am

Prepare for goat milking



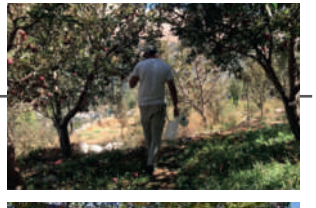

6:05 am

Milk goats




7:00 am

End of goat milking
Carry milk back to kitchen



7:10 am

Herd goats

9:00 am

Return to kitchen.
Process milk to cheeses



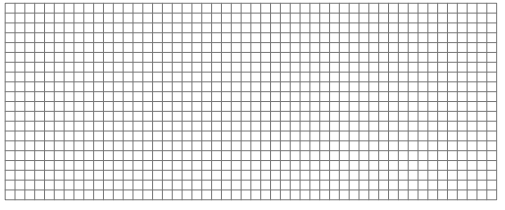

11:00 am

Goats are browsers

vs.

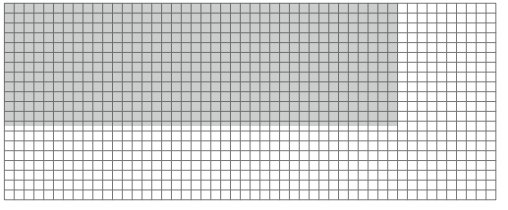
Cattle and most other livestock are grazers

10



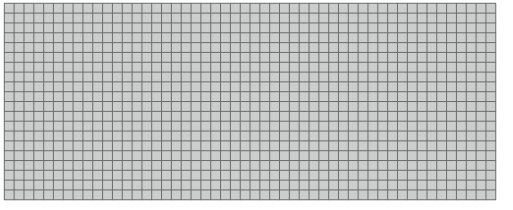
10,000 sqm

50



50,000 sqm

100

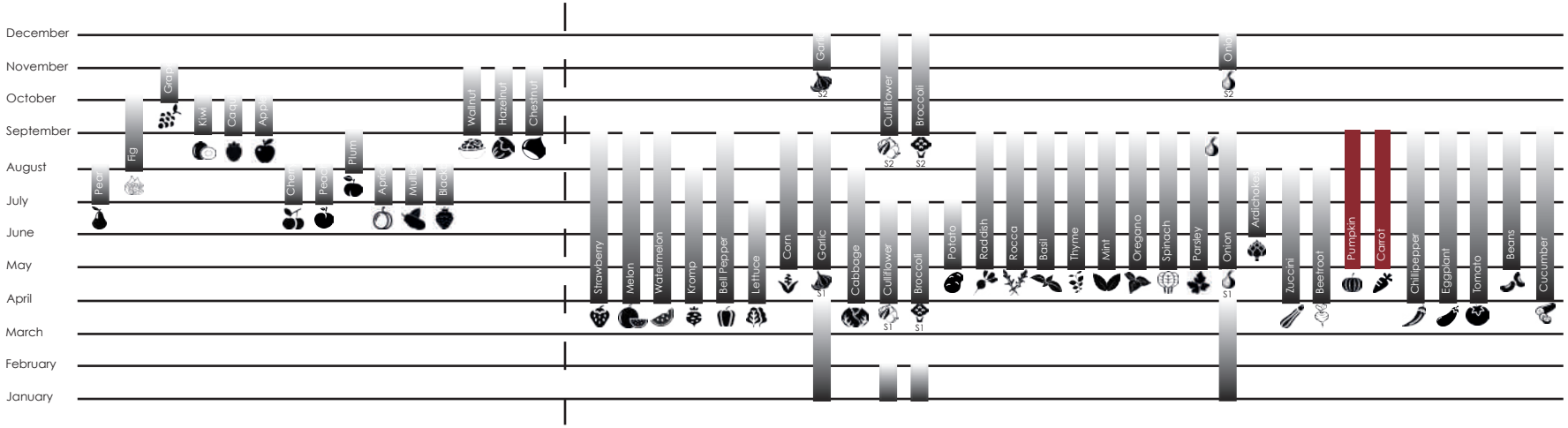


100,000 sqm

Pasture area

800-1200 sqm. /goat

A general rule of thumb is that ten goats will clear an acre in about one month.

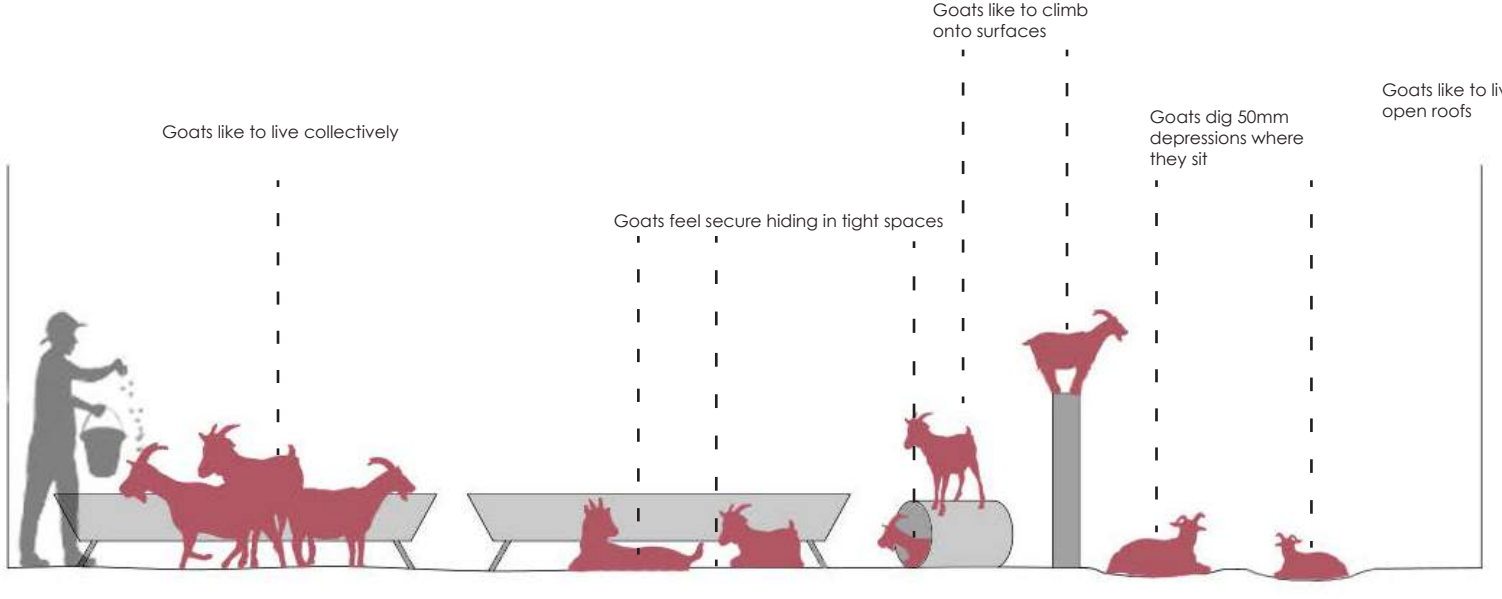

December
November
October
September
August
July
June
May
April
March
February
January
Pear
Fig
Grape
Kiwi
Cactus
Apple
Cherry
Peach
Plum
Apricot
Mulberry
Blackberry
Wallnut
Hazelnut
Chestnut
Strawberry
Melon
Watermelon
Kromp
Bell Pepper
Lettuce
Corn
Garlic
S1
Garlic
S2
Cabbage
Cauliflower
S1
Broccoli
S1
Cauliflower
S2
Broccoli
S2
Potato
Raddish
Rocca
Basil
Thyme
Mint
Oregano
Spinach
Parsley
Onion
S1
Onion
S2
Artichoke
Zuccini
Beetroot
Pumpkin
Carrot
Chillipepper
Eggplant
Tomato
Beans
Cucumber











Goats like to live collectively
Goats feel secure hiding in tight spaces
Goats like to climb onto surfaces
Goats dig 50mm depressions where they sit
Goats like to live under open roofs

Bcharre the dwelling of my heart

-Gibran Khalil Gibran

Part three

The sustainability of this project happens through the interrelation between the programmatic and production systems of the site. Those systems will take place through types of farm architecture that will be situated across designated site locations and provide the functional and programmatic spaces required.

The architecture of the decentralized farm will be one that gradually ranges across semi-industrial, recreational, and residential spaces that happen within the ecological context of their sites.

Sustainability

Programatic

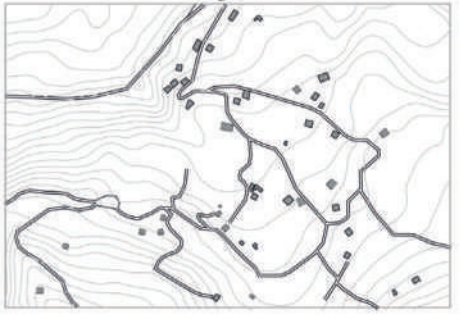
Production

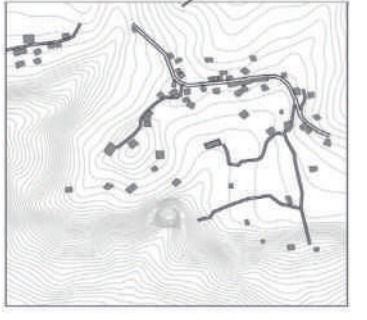
Architecture

Semi-industrial

Residential

Recreational





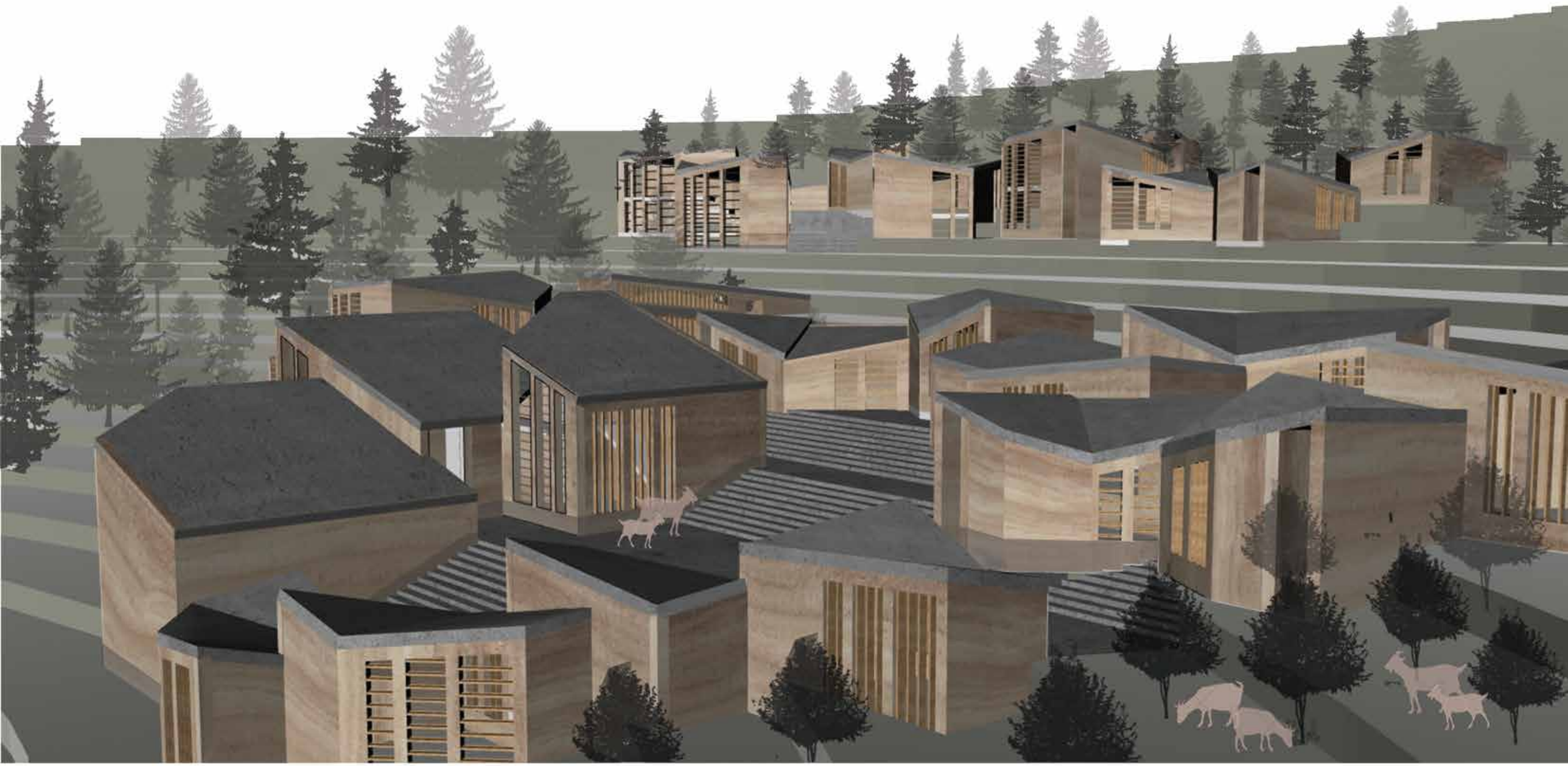
Vision

As a stepping stone into the second phase of my project, I will be treating my 4 sites not as individual points but rather as connecters that run across the district of Bcharre. My intention will be to allow the user, to her or his own extent, experience Bcharre from within functional and non functional spaces that celebrate Bcharre by bringing the spirit of the place into my architectural spaces.


Section AA
Section BB
Section CC
Section DD

The Farm: Back to Nature

Maria Khatib



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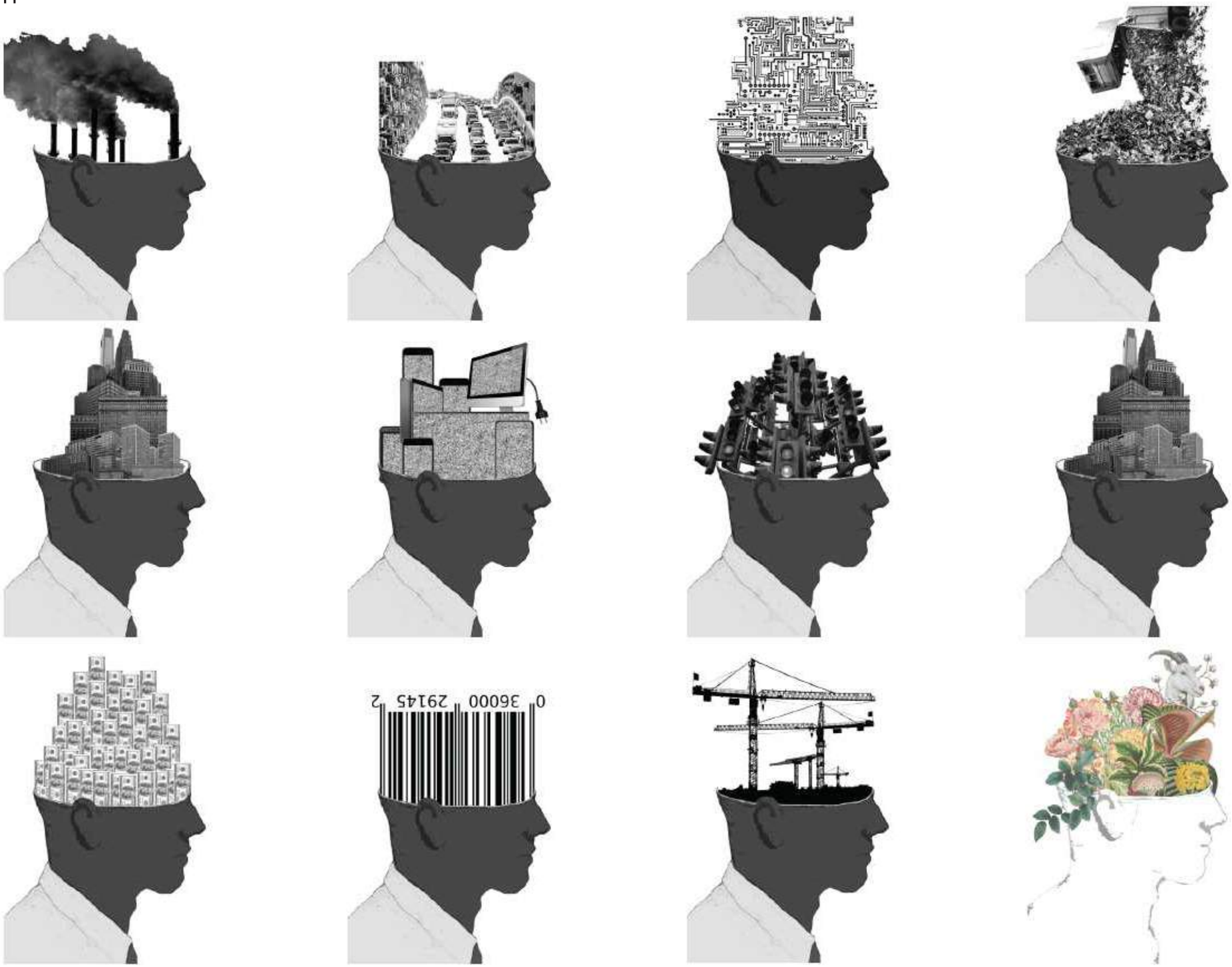
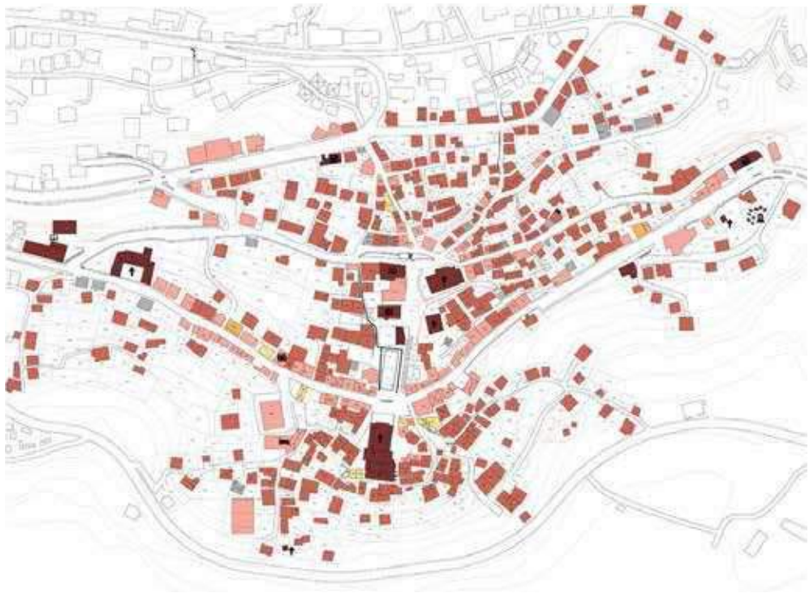
Thesis 1 kickoff



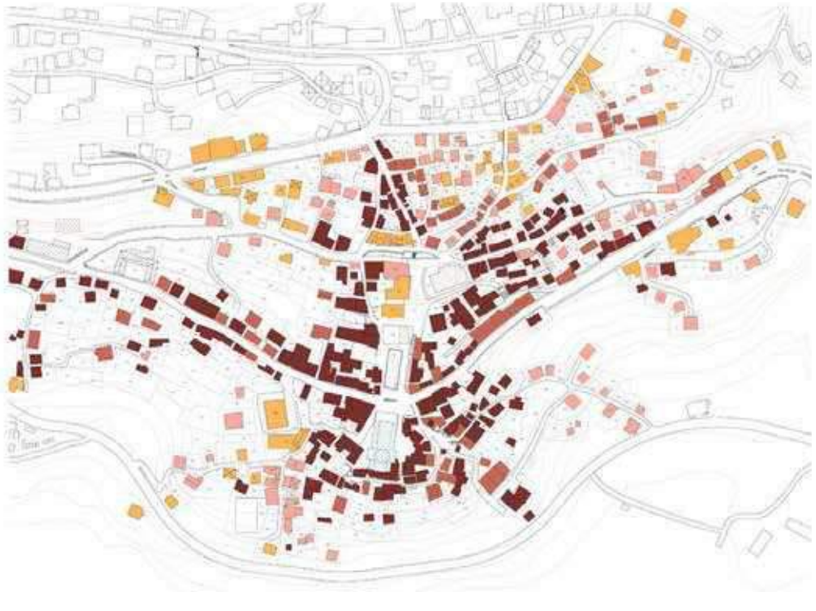
My thesis is about finding the way to build sustainably in a rural region while celebrating the simplicity of the rural lifestyle. My project is a decentralized rural farm that benefits from eco-tourism in order to help improve the socio-economic lives of local farmers and villagers.

The Urban Context



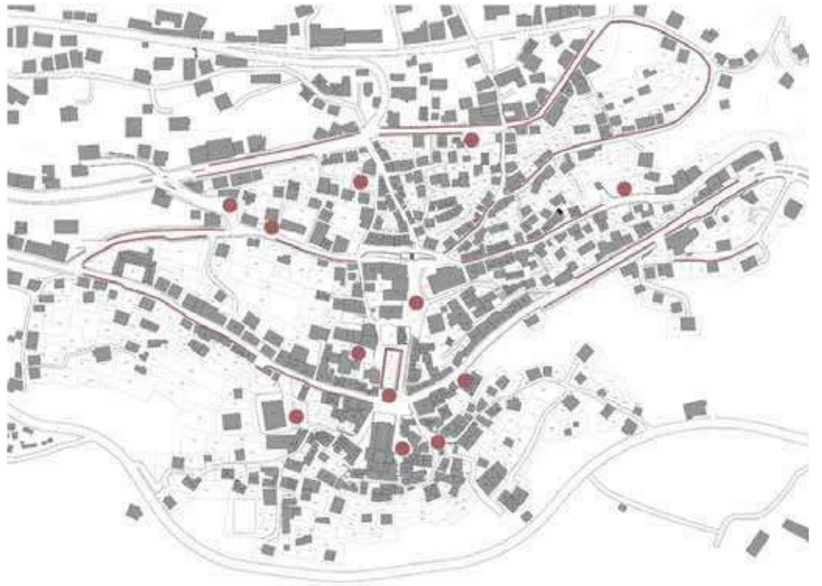
- Institutional
- Residential
- Commercial
- Industry
- Offices
- Abandoned
- Recreational
- Hotel/hostel
- Hospital
- Church
- Educational
- Cemetry
- Gas station

Ground floor use



- 1900 - 1945
- 1945 - 1975
- 1975 - 1990
- 1990 - today
- 1912
- 1935
- 1955
- 1968

Building age

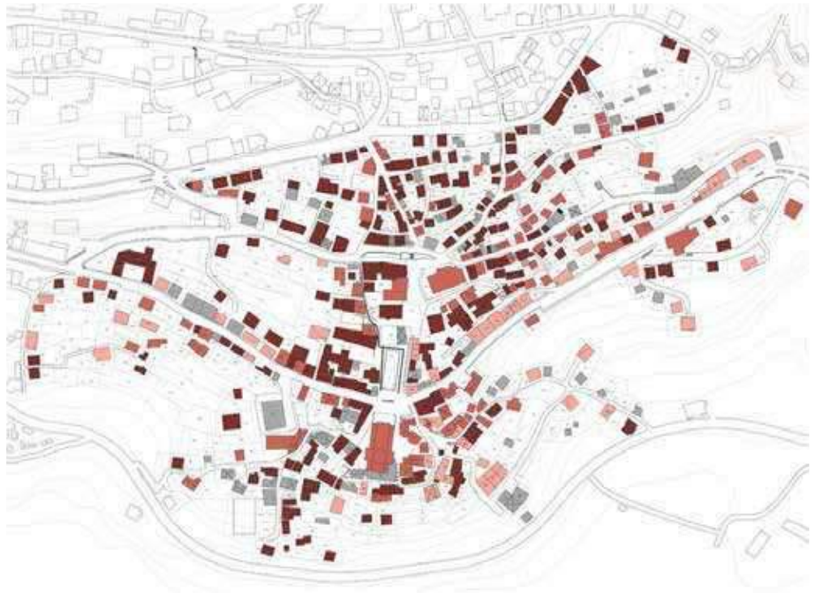


- Parking lots
- Road side parking

Parking spaces

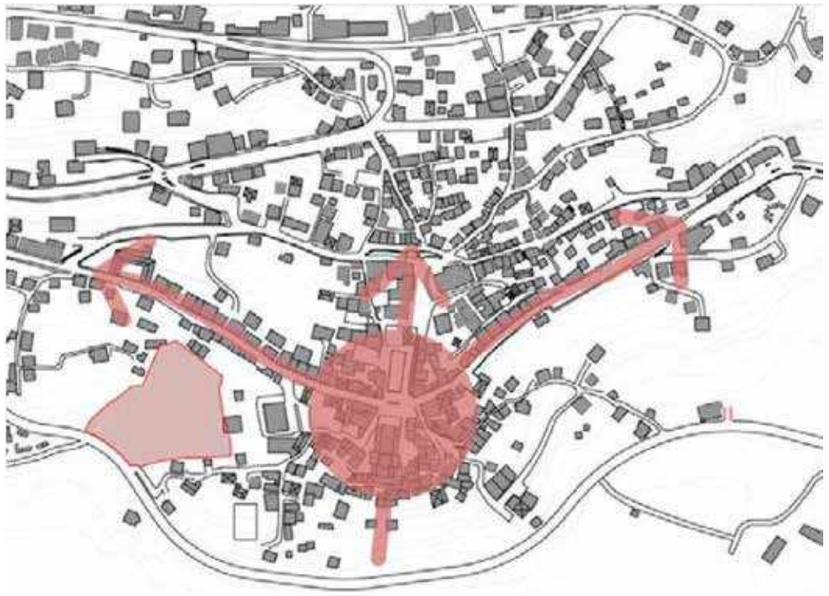
- Main roads
- Primary roads
- Secondary roads
- Tertiary roads
- Pedestrian roads
- Stairs
- Dead end road
- Rivers

Road heirarchy



- 1
- 2
- 3
- 4

Building floor count



Growth Pattern

The Urban Context

Roads

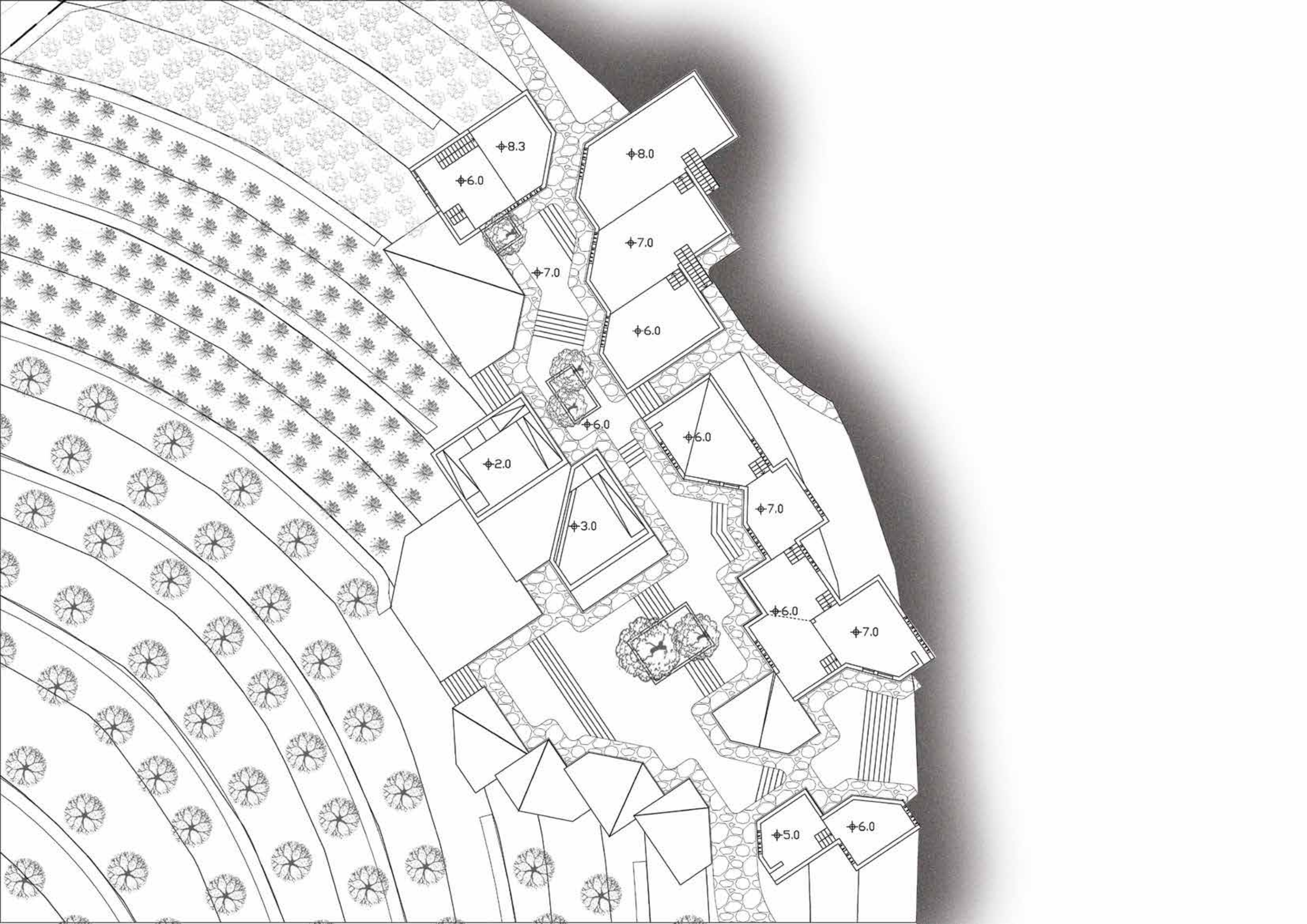
The Urban Context
The urban connector

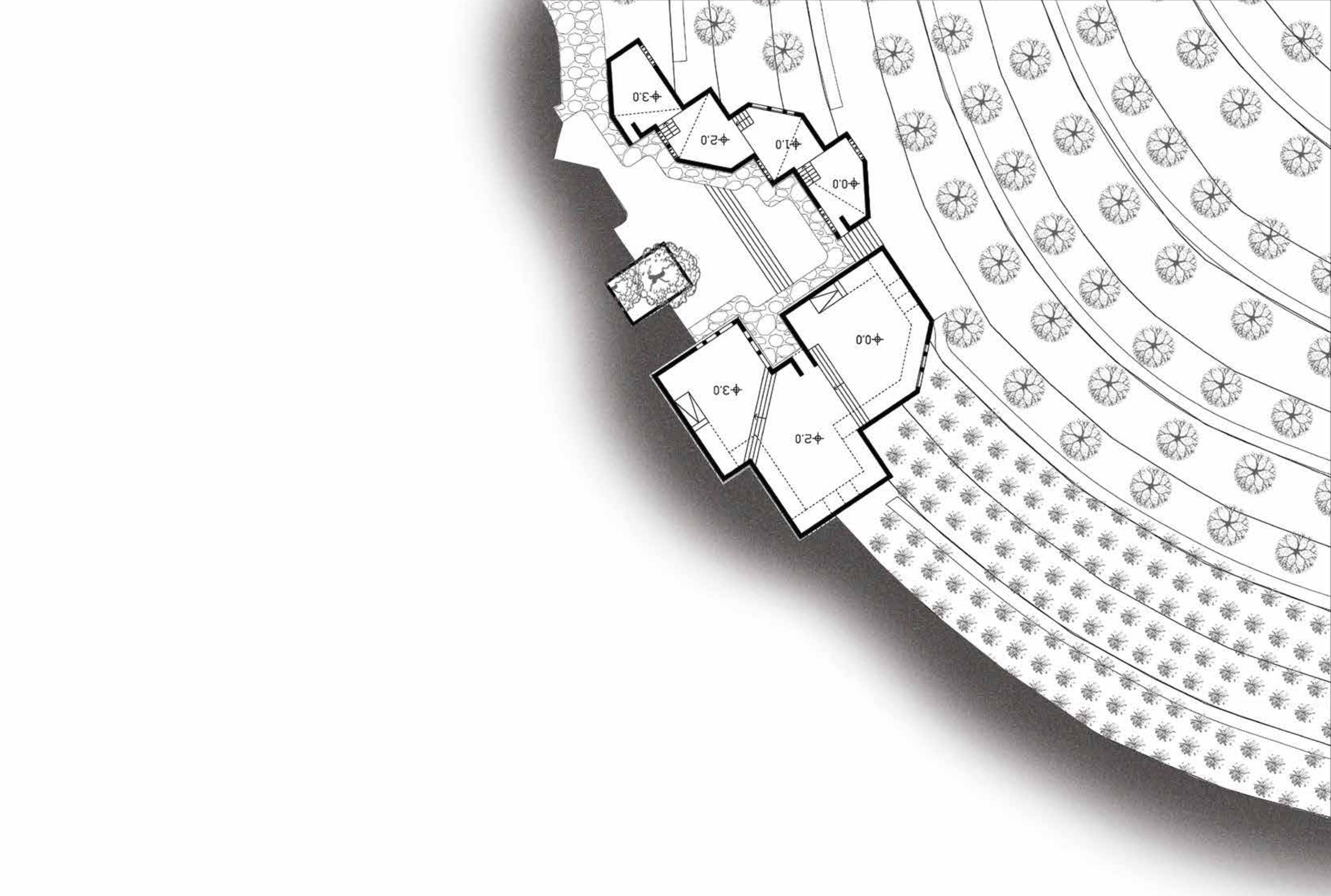
West elevation

South elevation


15.3
17.0
16.0
15.6
13.0
14.8
14.6
12.0
15.6
13.0
17.3
16.0
14.0
16.0


12.0
12.0
14.8
13.0
14.0
14.0


8.3
6.0
8.0
7.0
7.0
6.0
6.0
6.0
2.0
3.0
7.0
6.0
7.0
5.0
6.0


+3.0
+2.0
+1.0
+0.0
+0.0
+3.0
+2.0

Program and Zoning

Office zone

- Entrance / reception
- Offices
- Conference room
- Produce shop
- Check point
- Packaging

Production zone

(Shankleesh and apple jam)

- Processing room
- Drying room
- Ripening room
- Refrigiration room

(Goat food and goat milk soap)

- Processing room
- Drying room
- Saponification room

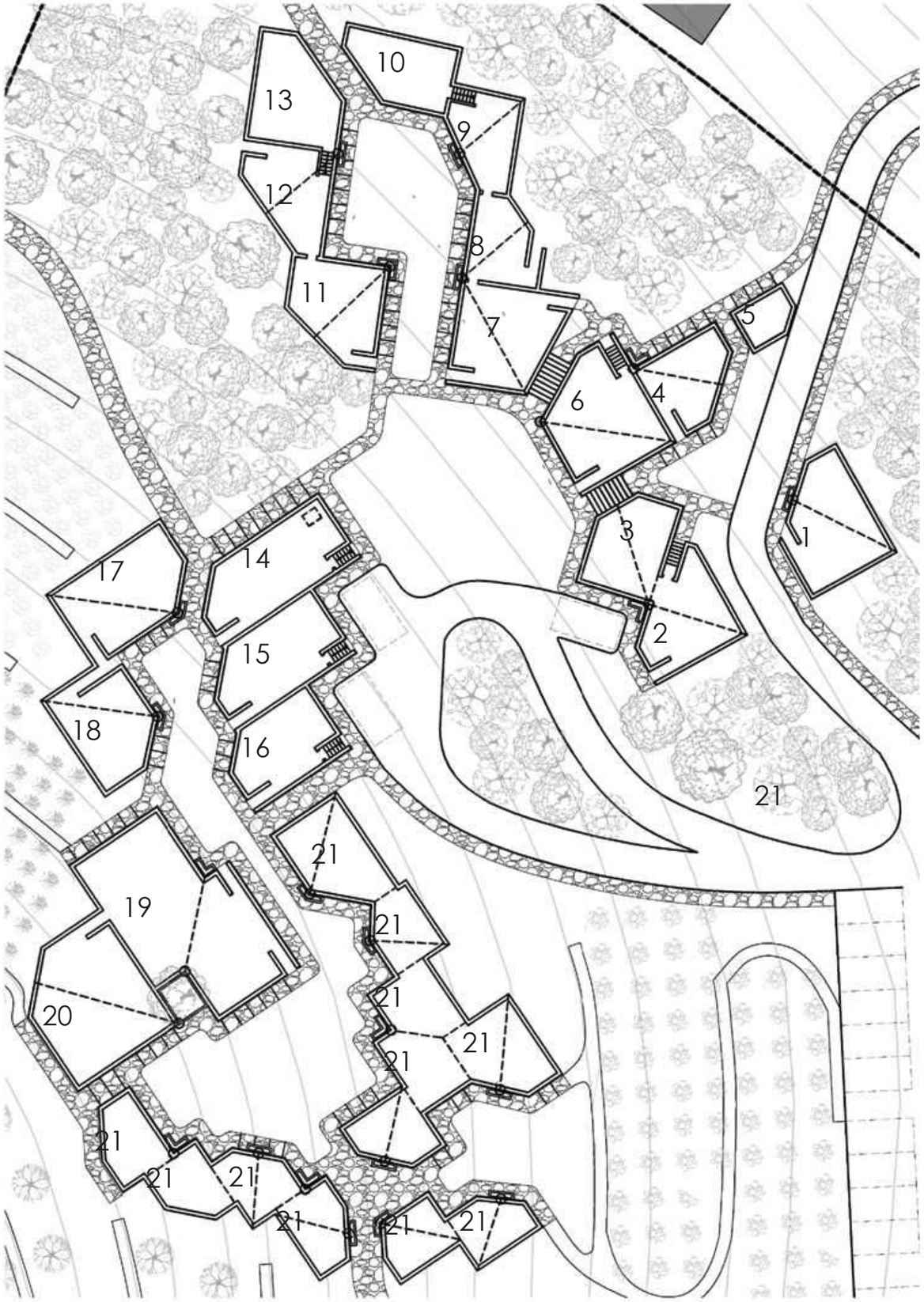
Agriculture work zone

- Goat milk storage
- Apple storage
- Corn and carrot storage
- Harvest sorting room
- Firewood storage

Multi-use public zone

- Seminar space
- Goat shelter
- Multi-use rooms (x12)

Program and Zoning



Office zone		265	
1	Entrance / reception		57
2	Offices		50
3	Conference room		41
4	Produce shop		36
5	Check point		12
6	Packaging		69
Production zone		308	
	(Shankleesh and apple jam)		
7	Processing room		59
8	Drying room		32
9	Refrigiration room		34
10	Ripening room		39
	(Goat food and goat milk soap)		
11	Processing room		49
12	Saponification room		45
13	Drying room		50
Agriculture work zone		289	
14	Apple storage		67
15	Corn and carrot storage		59
16	Goat milk storage		47
17	Harvest sorting room		64
18	Firewood storage		52
Multi-use public zone		545	
19	Seminar space		129
20	Goat shelter		91
21	Multi-use rooms (x12)		325

Program and Zoning

Wild trees	x
Apple tree field	x
Horticulture field	x
Outdoor circulation	x
Courtyards	584
Parking	722

Indoor	1,406
Outdoor	13,000

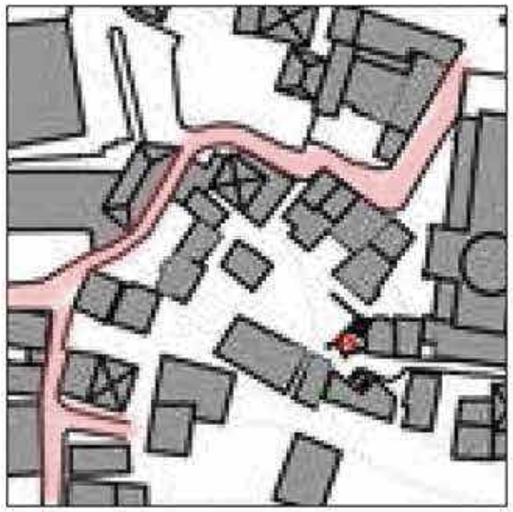
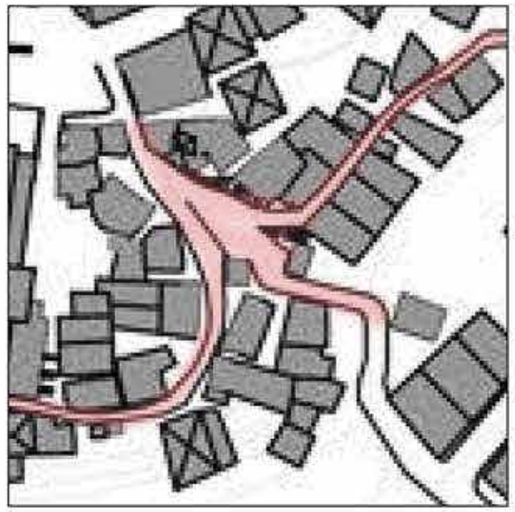
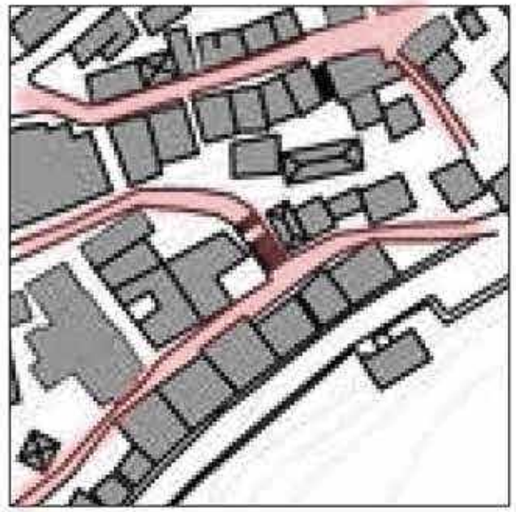
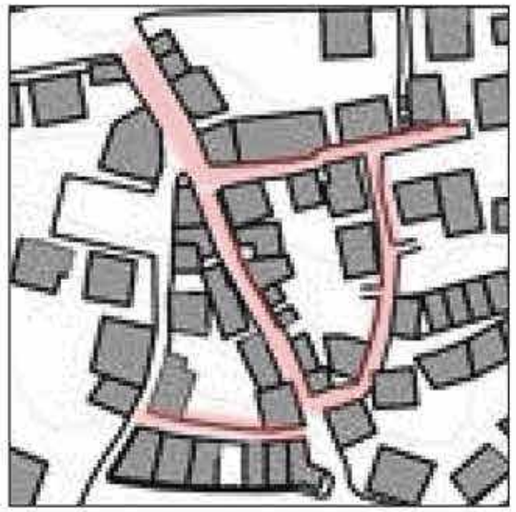
Building law allows for 20%
(2,600)

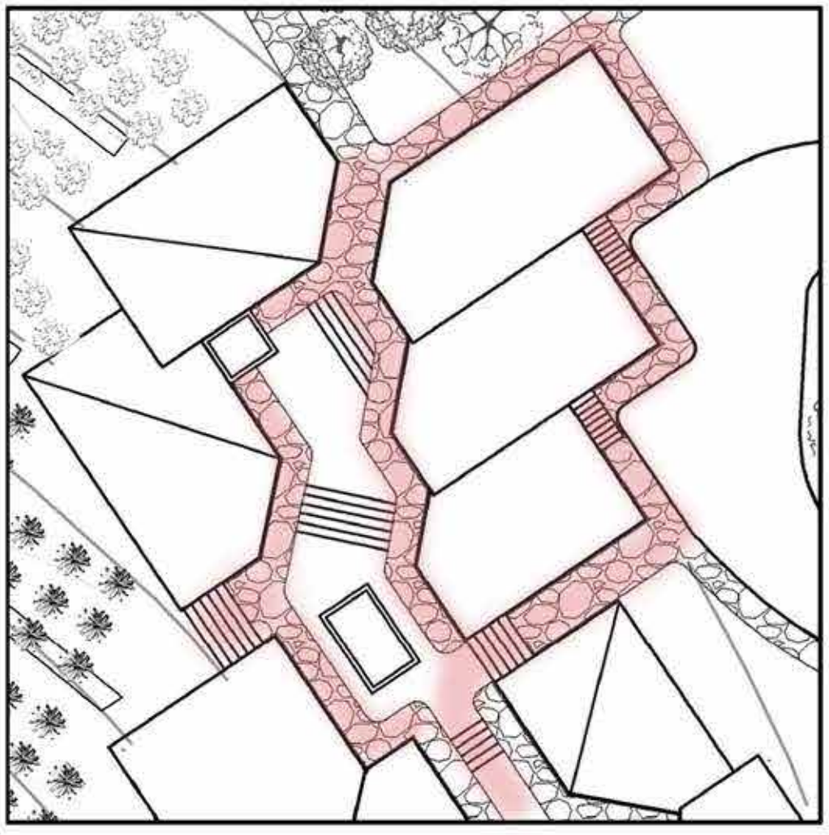
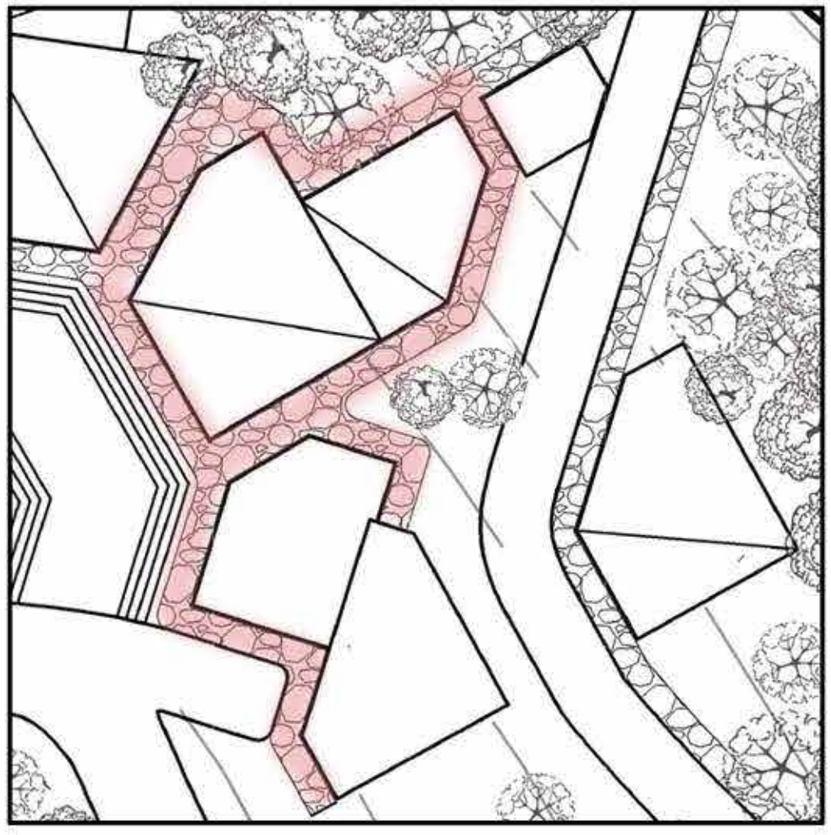
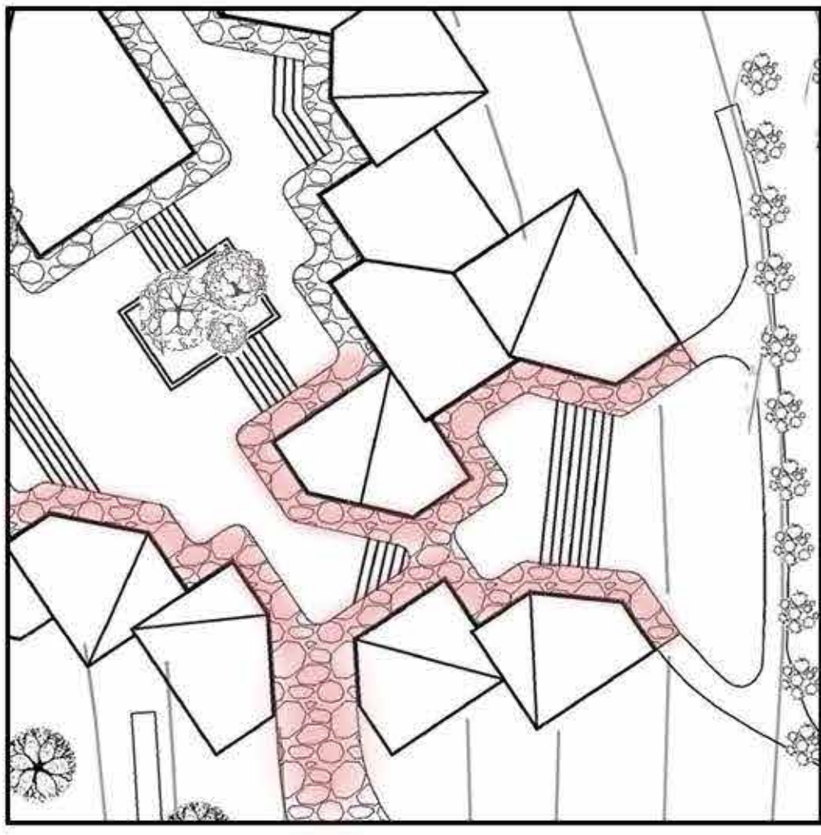
Bcharre: Typological and Morphological Inspiration

1. Roof elevations

Bcharre: Typological and Morphological Inspiration

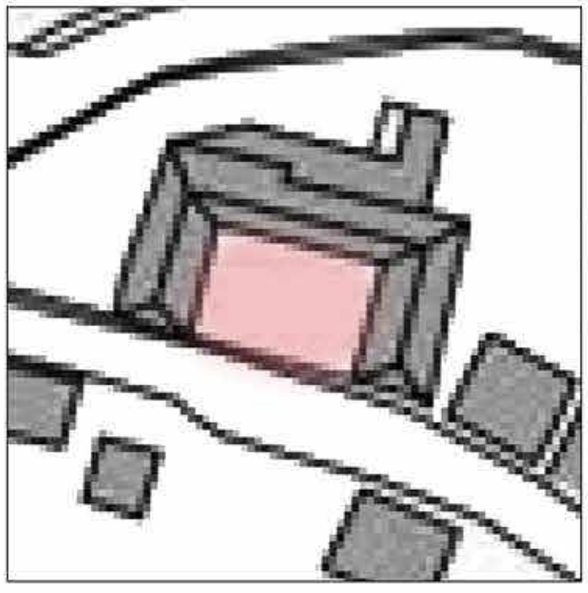
2. Narrow pathways (زواريب)

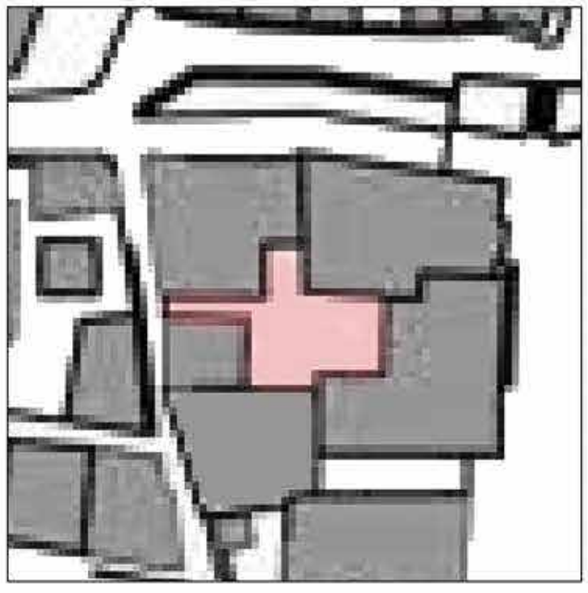





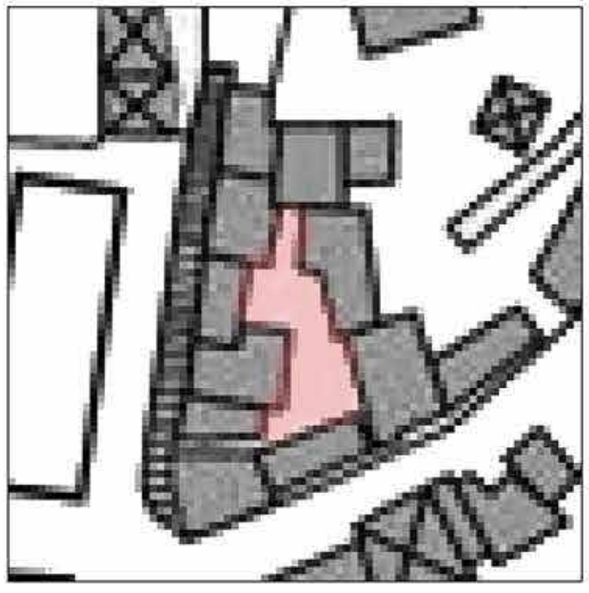




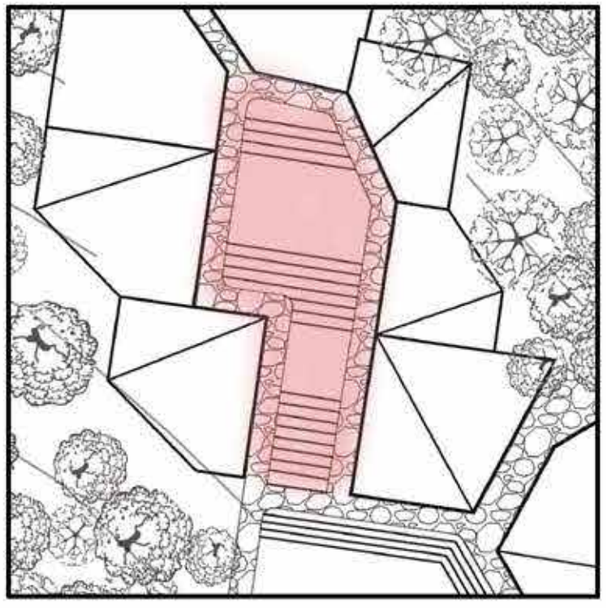
Bcharre: Typological and Morphological Inspiration

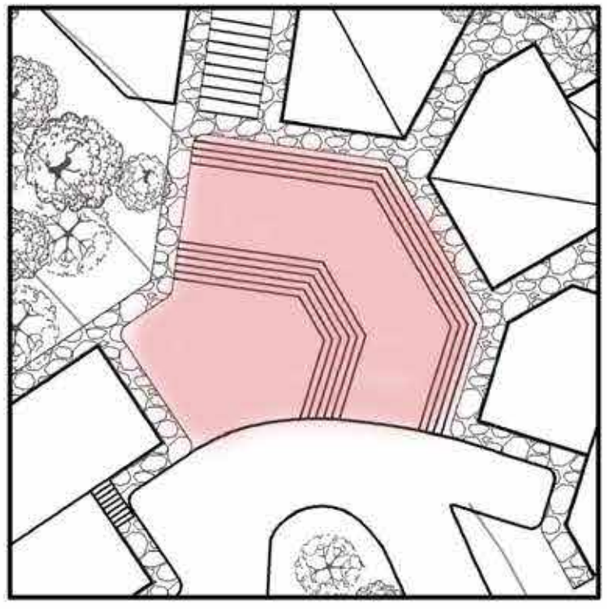
3. Courtyard typology

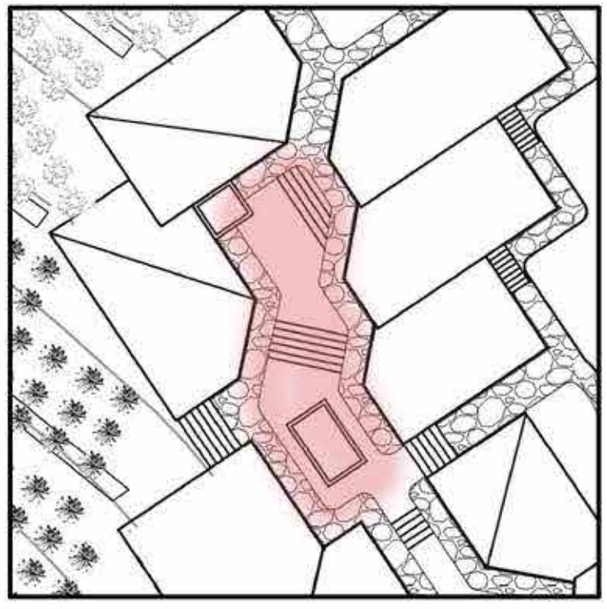


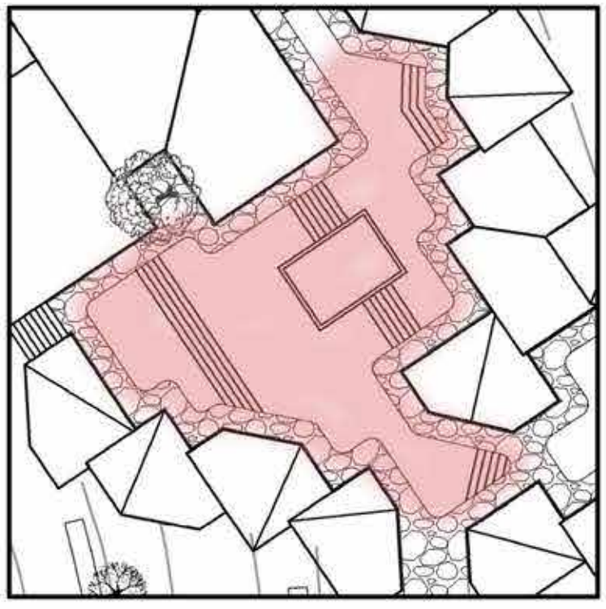










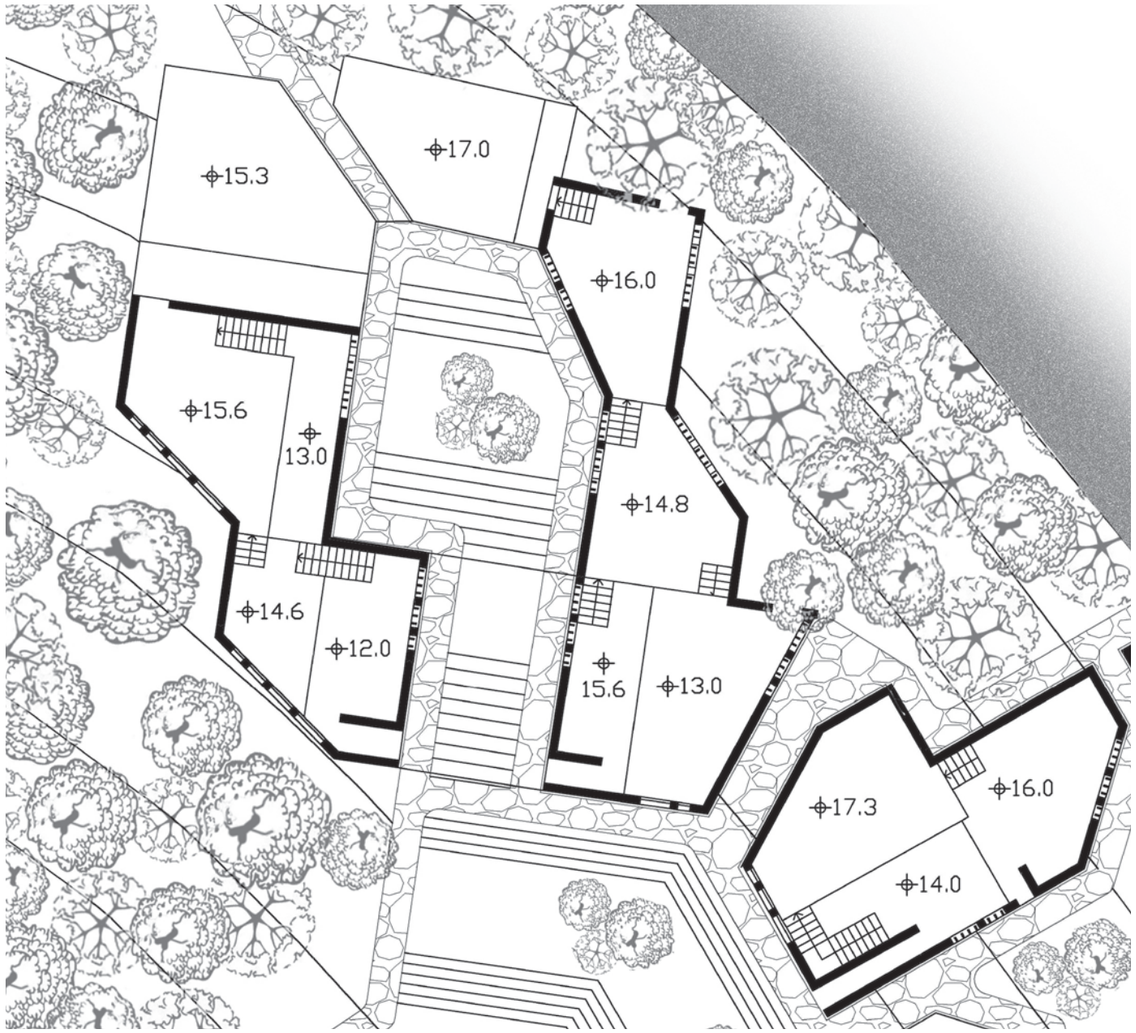


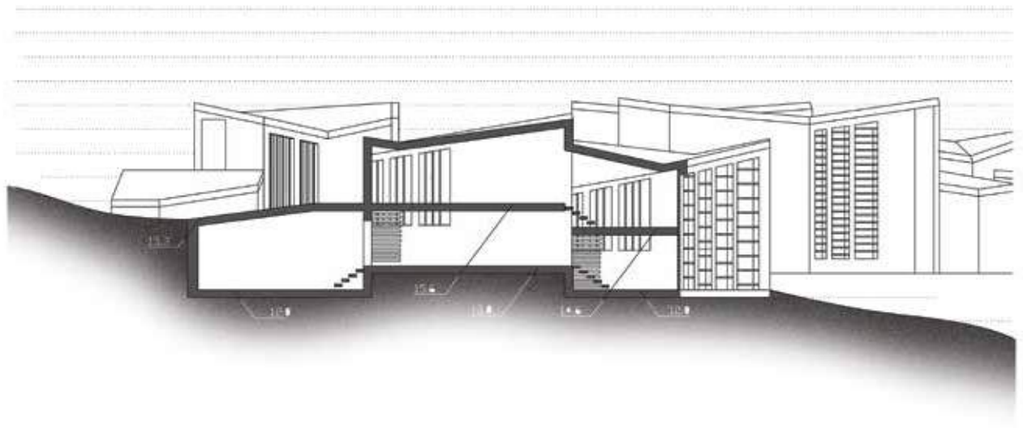
Circulation and User Cycle
The employed villager

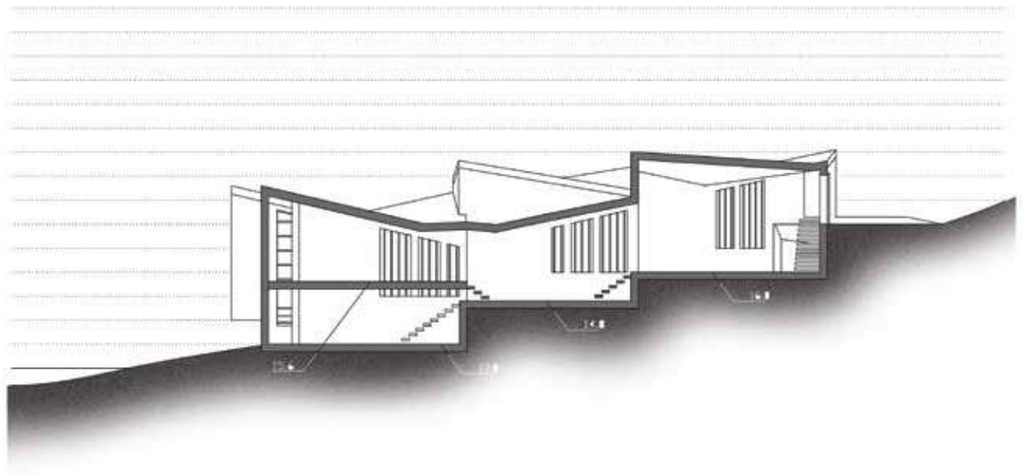
Arriving through the **porous entry points**, the emplyed villagers spend most of their time at the production zone. **During the summer,** they are producing traditional Shankleesh and soap, both made of goat milk. **During the winter,** they are producing goat food made of carrots and pumpkins produced on site, and apply jam, made of apples **produced on site**.

Managment employees work nearby the production zone for **close communication**.

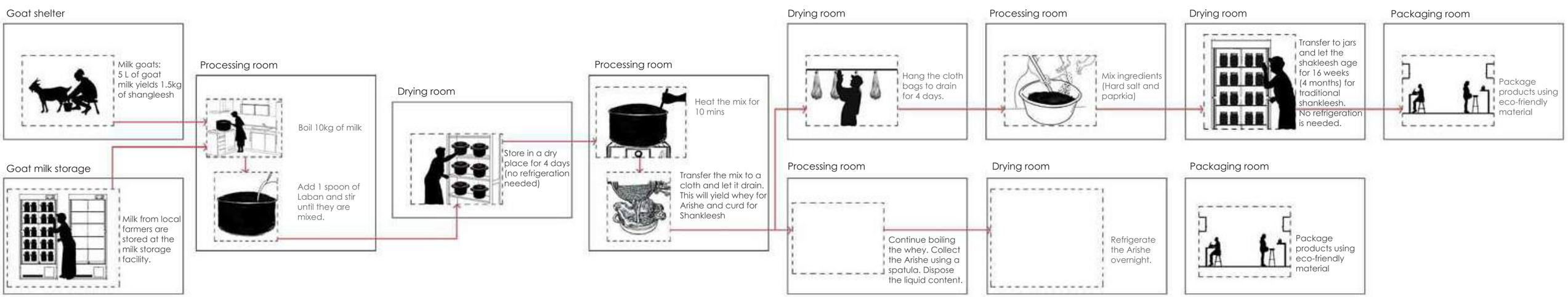
A **common courtyard space** is adjacent to all.





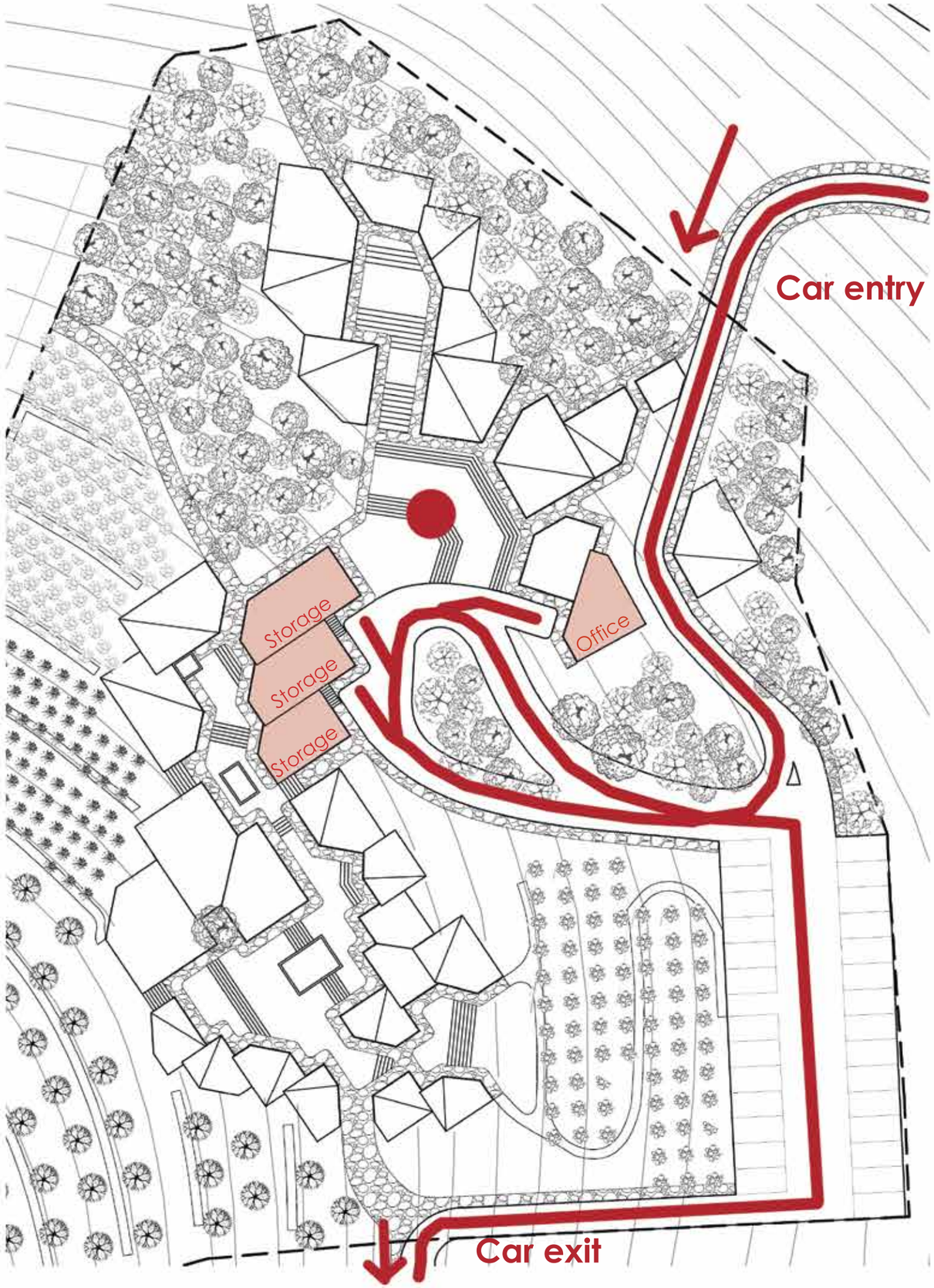


Shankleesh making process (the traditional way)




Perspective 12

Circulation and User Cycle
The local farmer



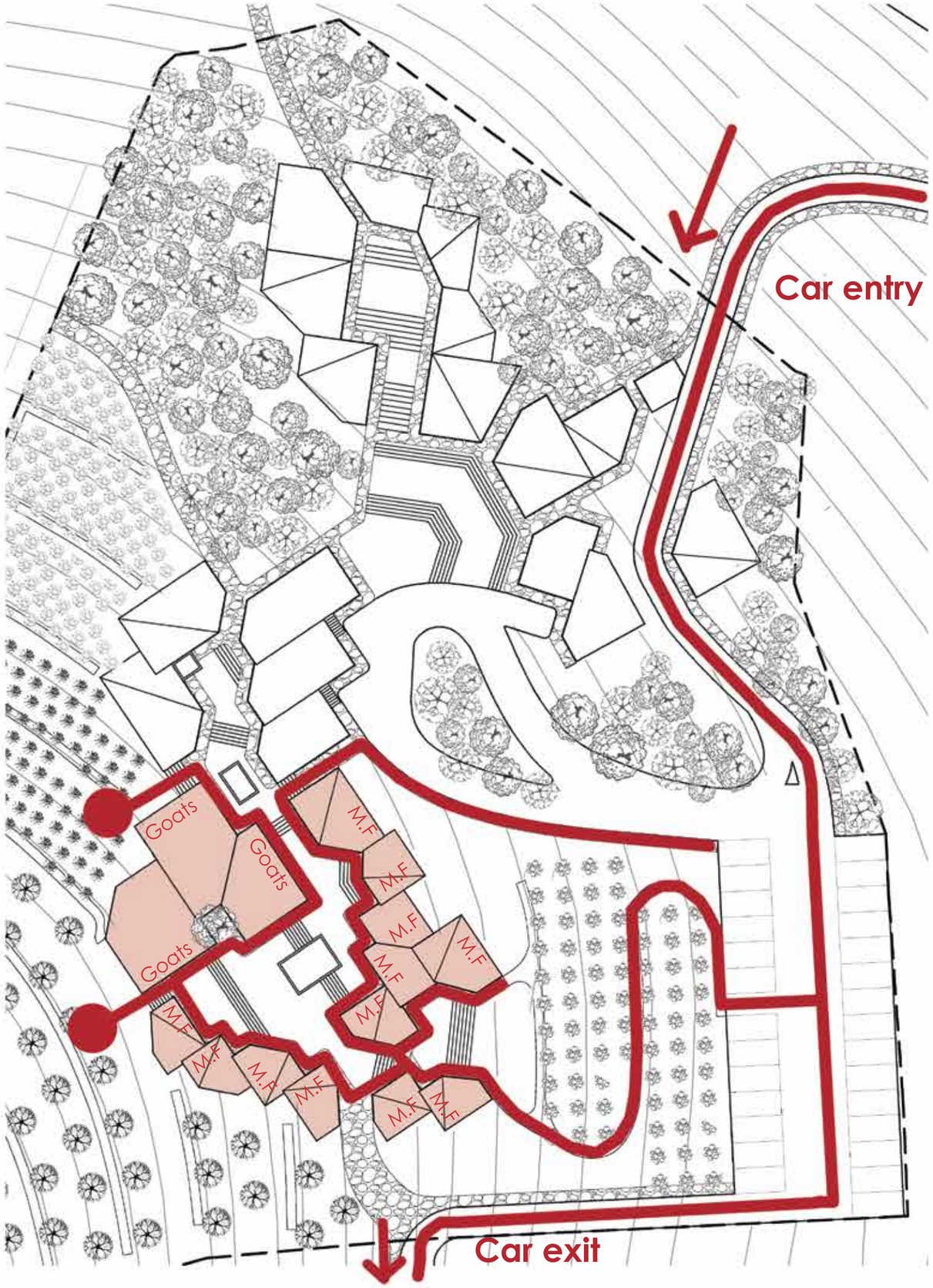
Local farmers arrive in their trucks to the Farm. They take a **designated road** to arrive first at the packaging facilities where they **park their trucks and drop off their products**. They then proceed to the offices where they are paid for their goods.

A nearby **courtyard** is a place to mingle with the employees.

They then continue their road and exit through the lower end of the project to the **Ehden highway**.

Circulation and User Cycle

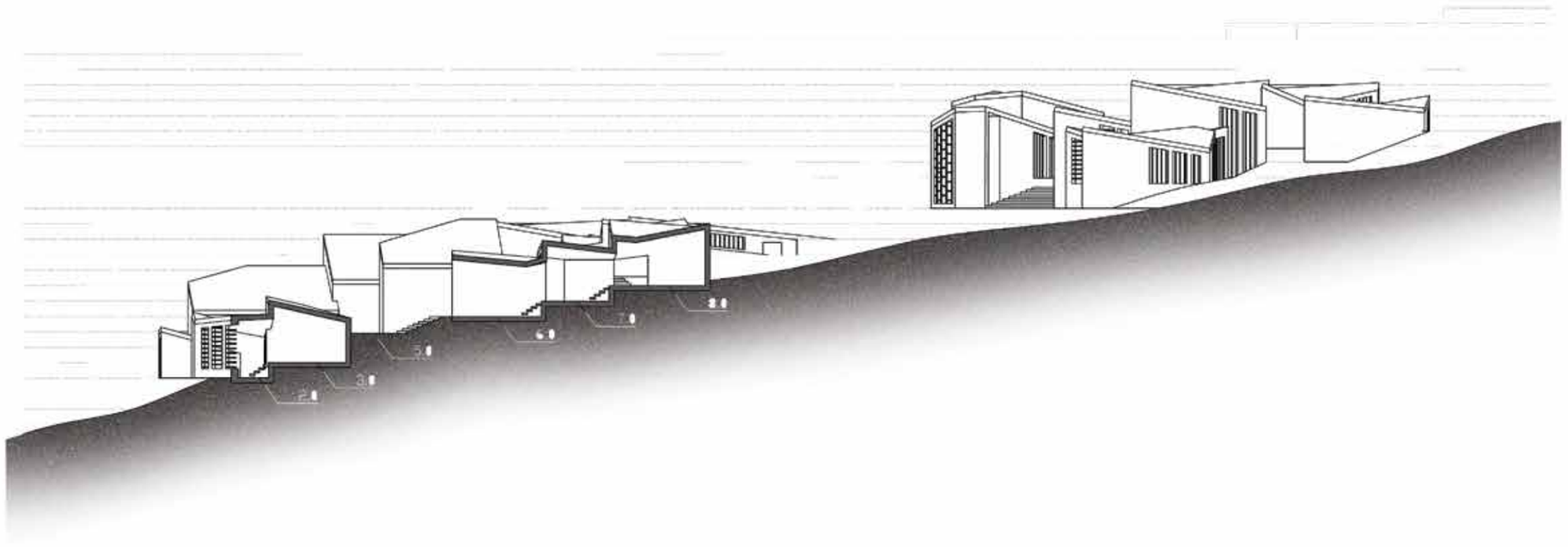
The visiting organizations

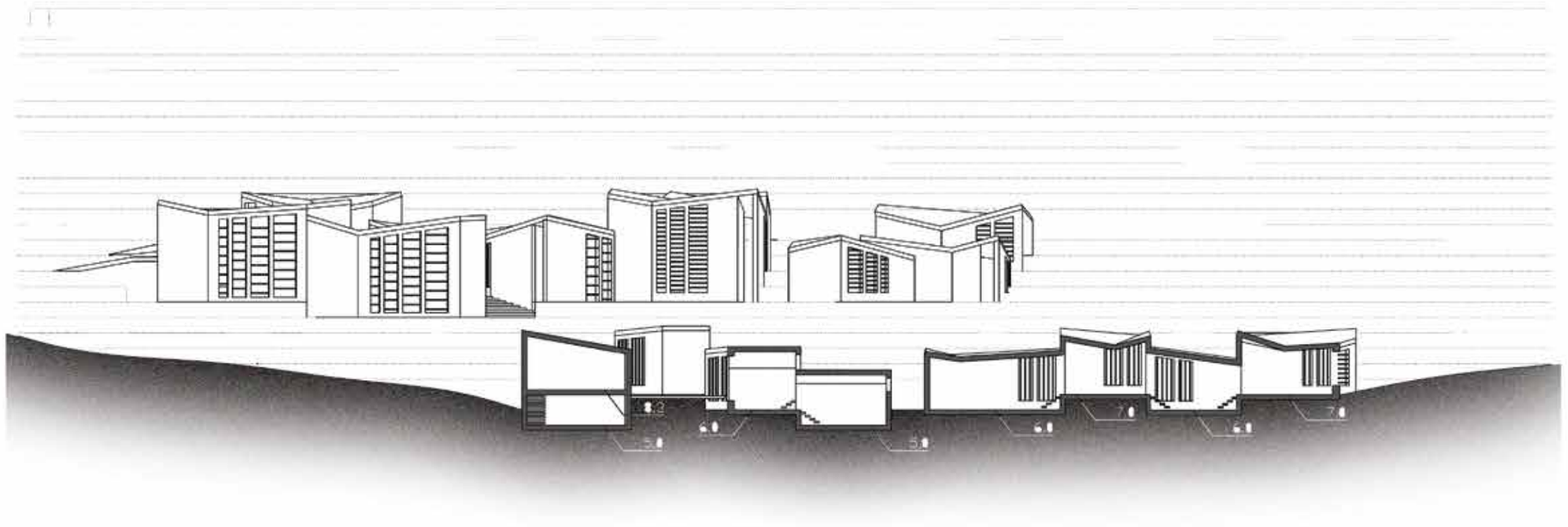


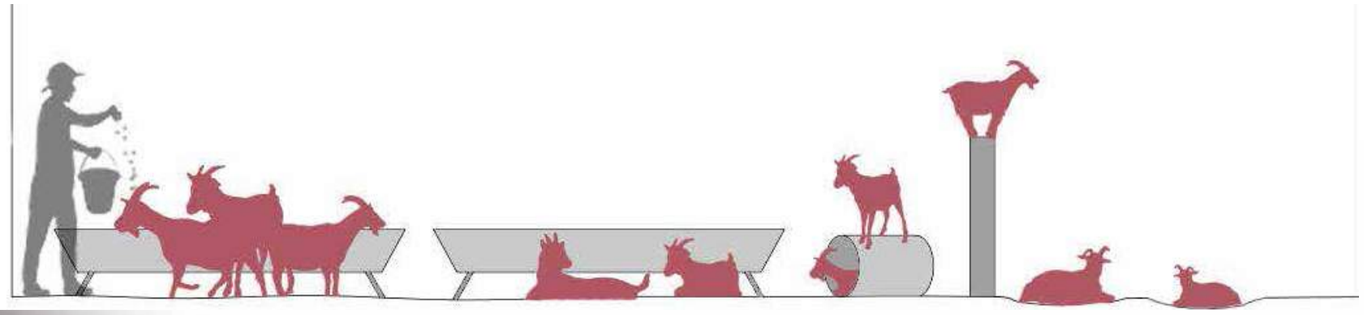
Visiting organizations, such as **Maronite Scouts of Bcharre, Municipality of Bcharre, and The Local Gibran Art Fairs** host workshops and seminars at the multifunctional spaces. They park their cars and **walk through the pumpkin fields to the courtyard.**

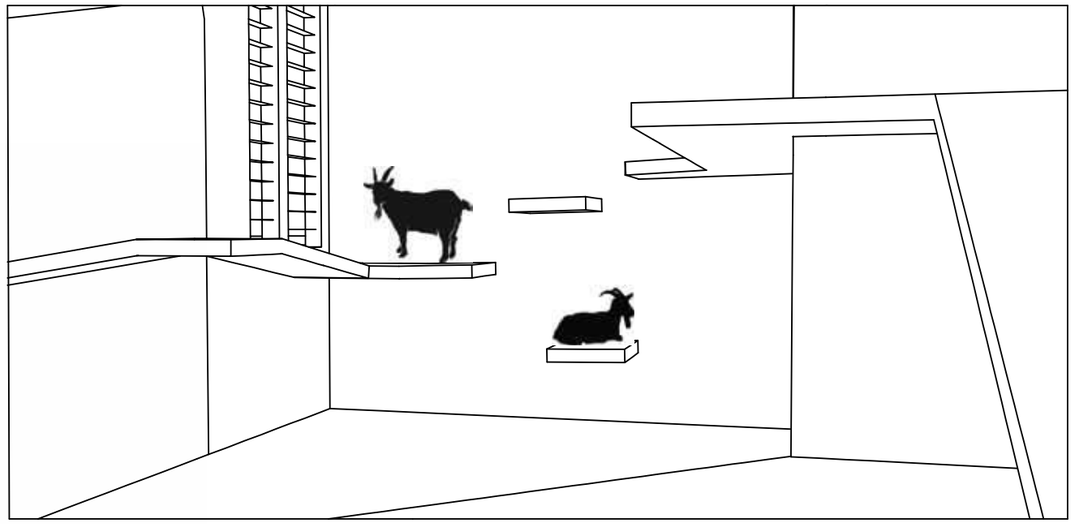
The multi-use facility has **direct access to the agriculture fields** to be used for agriculture seminars.

The goat shed is open to the public courtyard for a space where **goats can be released inside the courtyard.**

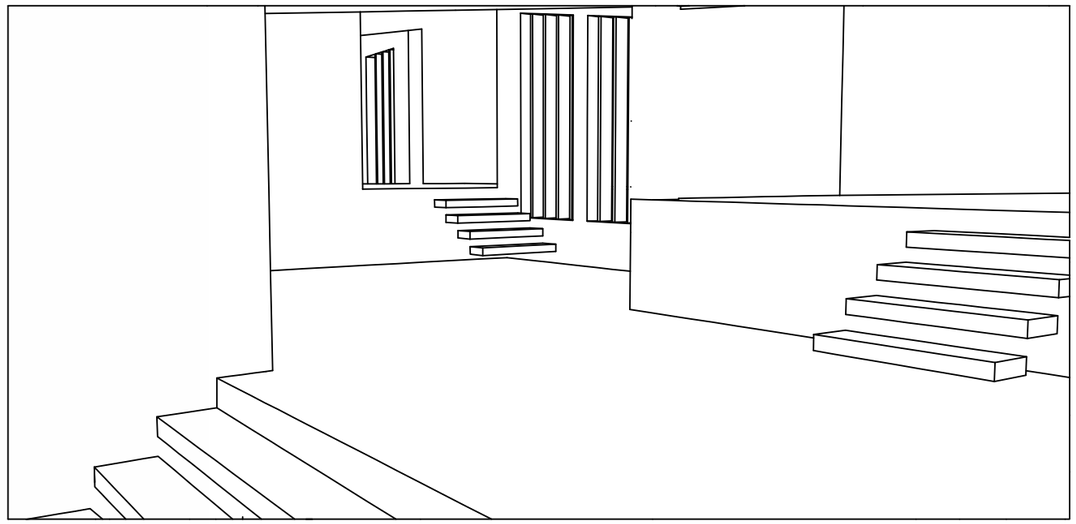


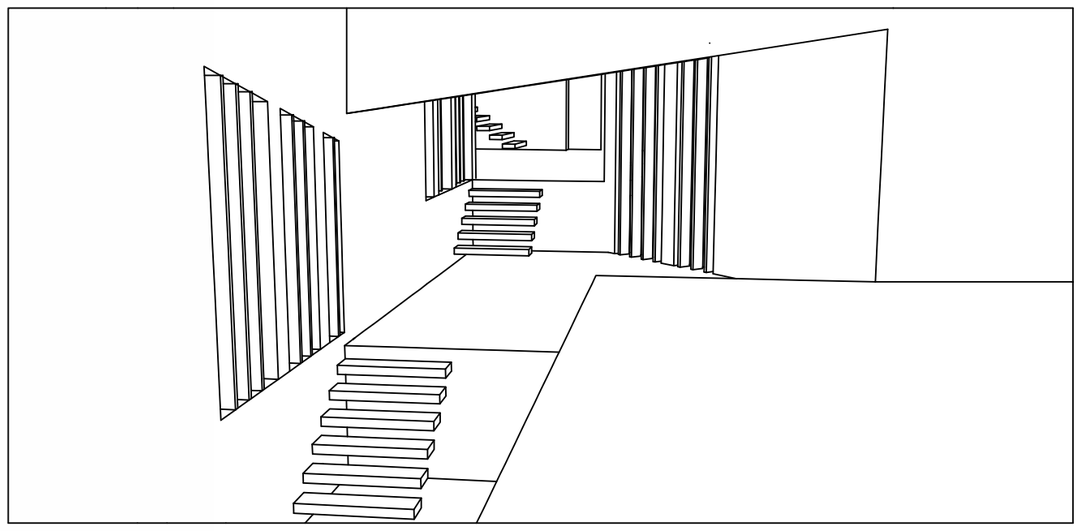




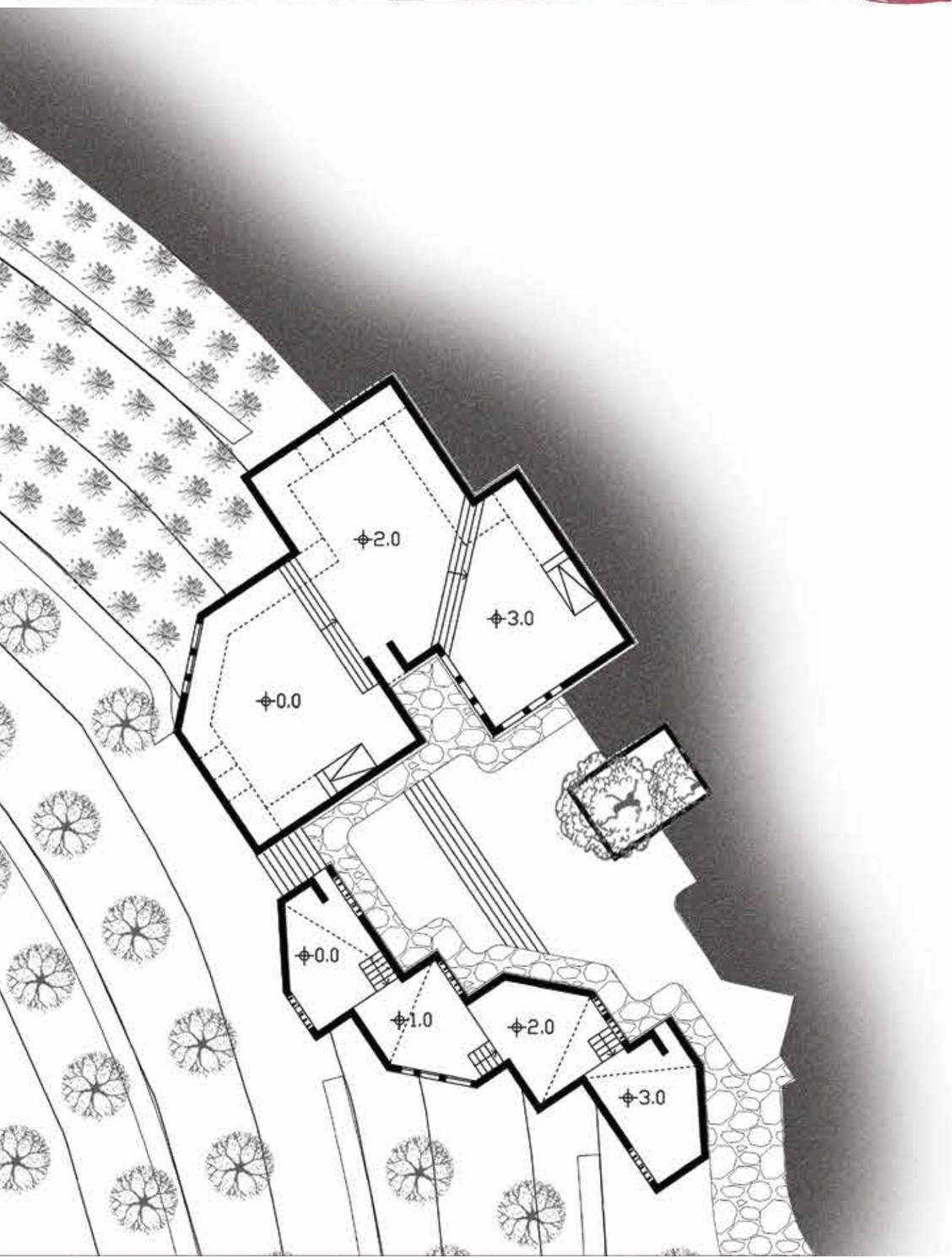


Goat shed interior

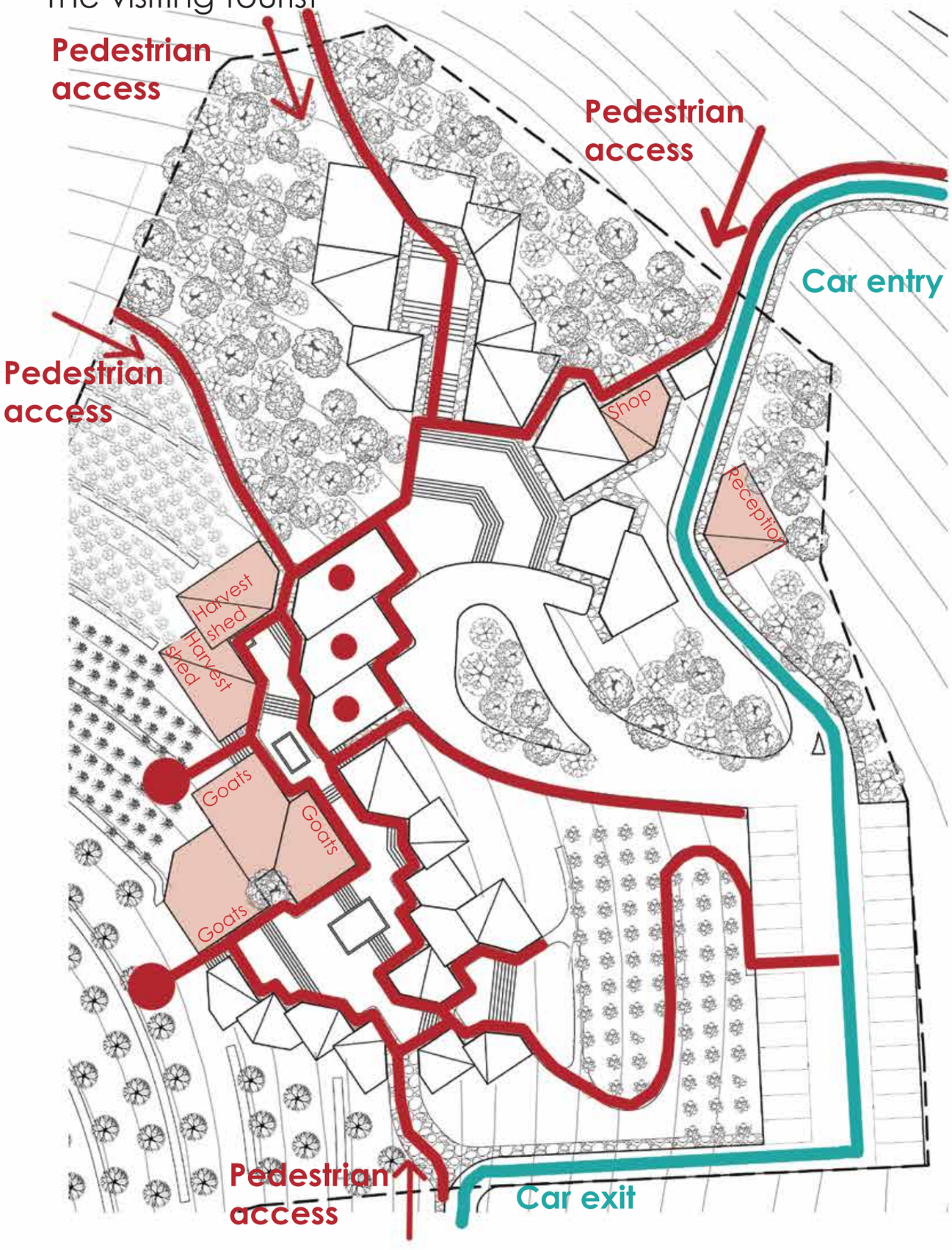




Multifunctional space interior



Circulation and User Cycle
The visiting tourist



Tourists visiting Bcharre can enter the project through several pedestrian access points that l**ead directly to the village main road**.

Visitors can spend time **harvesting crops** at the agriculture fileds and **learning how to milk goats** at the goat shed.

Tourism
Information according to 2019 records

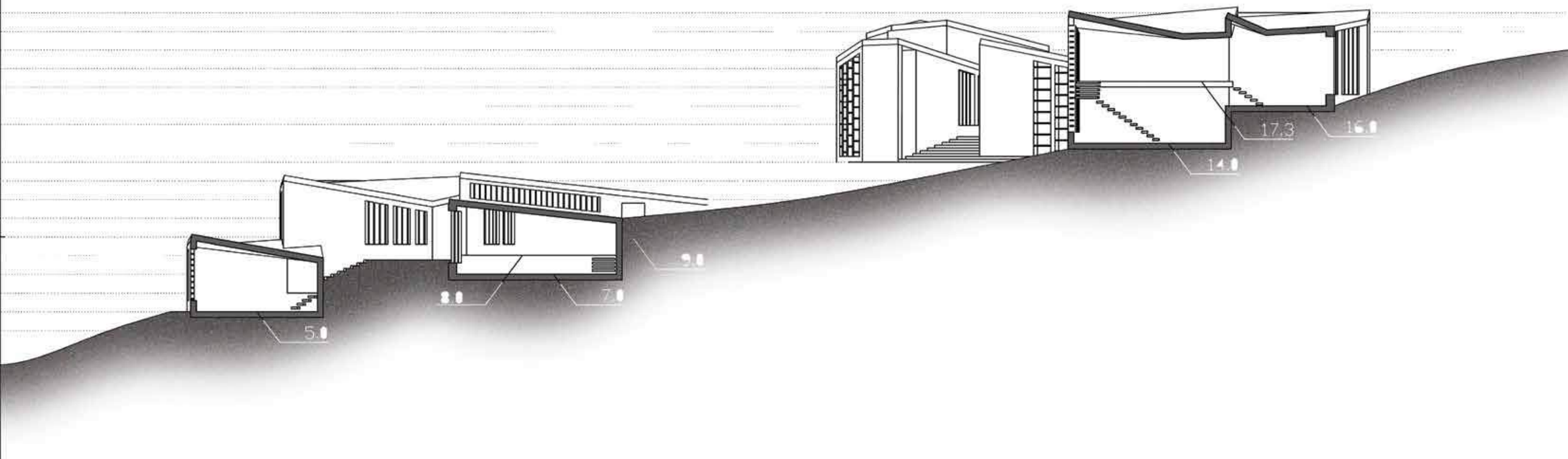
500,000 tourists / year in Bcharre district

↓

250,000 to the town of Bcharre, Cedars Forest, and Kadisha Valley

Forest of God	80,000
Gibran Khalil Gibran Museum	40,000
Mountain top (jered)	15,000
Kadisha Grotto	20,000
Valley	160,000

$ 6-10 million / year


17.3
16.0
14.0
9.0
8.0
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Sustainable Strategies

Roof functions

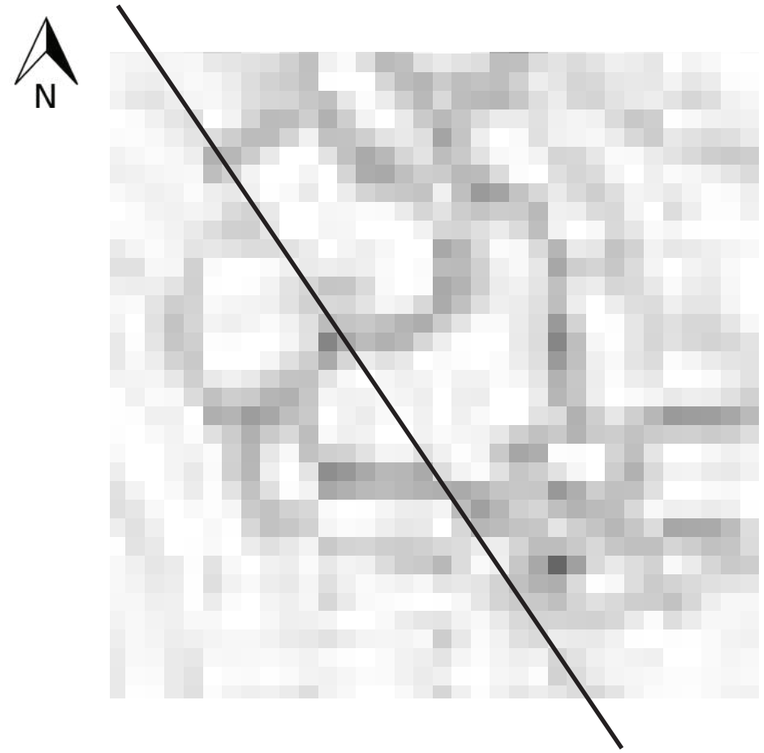
PV roofs

Rainwater collection roofs

Accessible roofs
(geothermal heating of storage facilities)

Sustainable Strategies

1. Roof functions: PV roofs

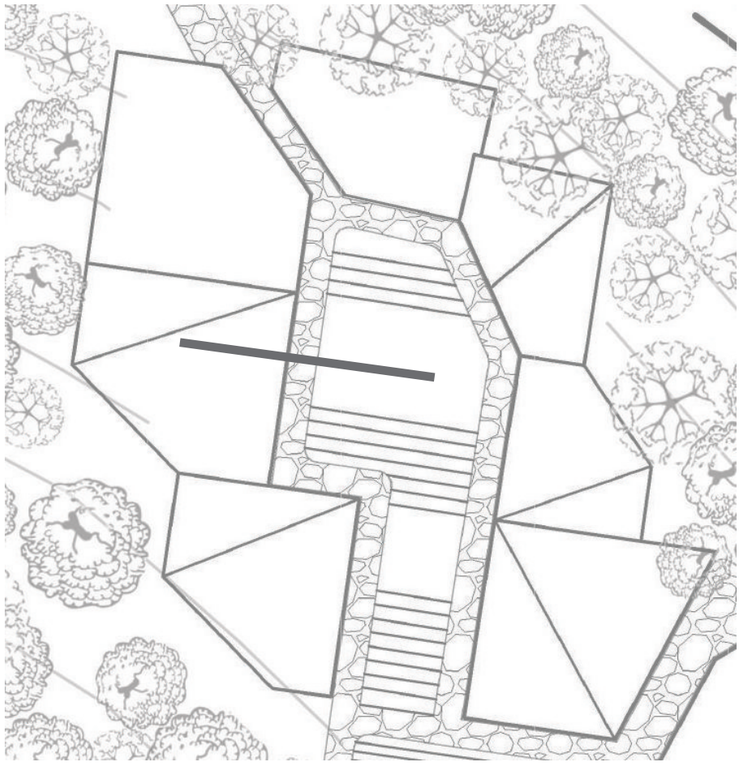


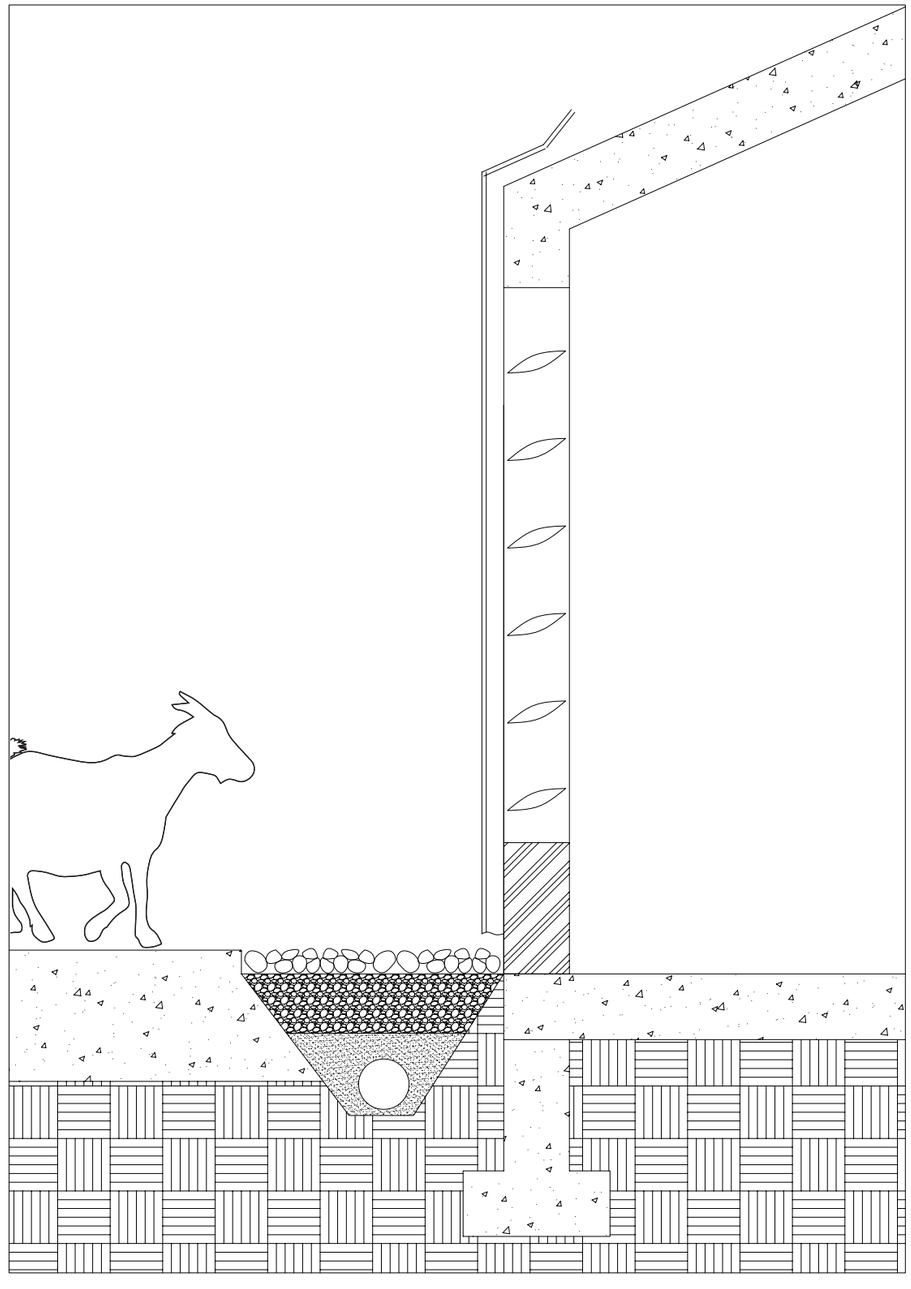
South facing roofs used for photovoltaic panels

30 degree slope

Sustainable Strategies

2. Roof functions: Rainwater collection

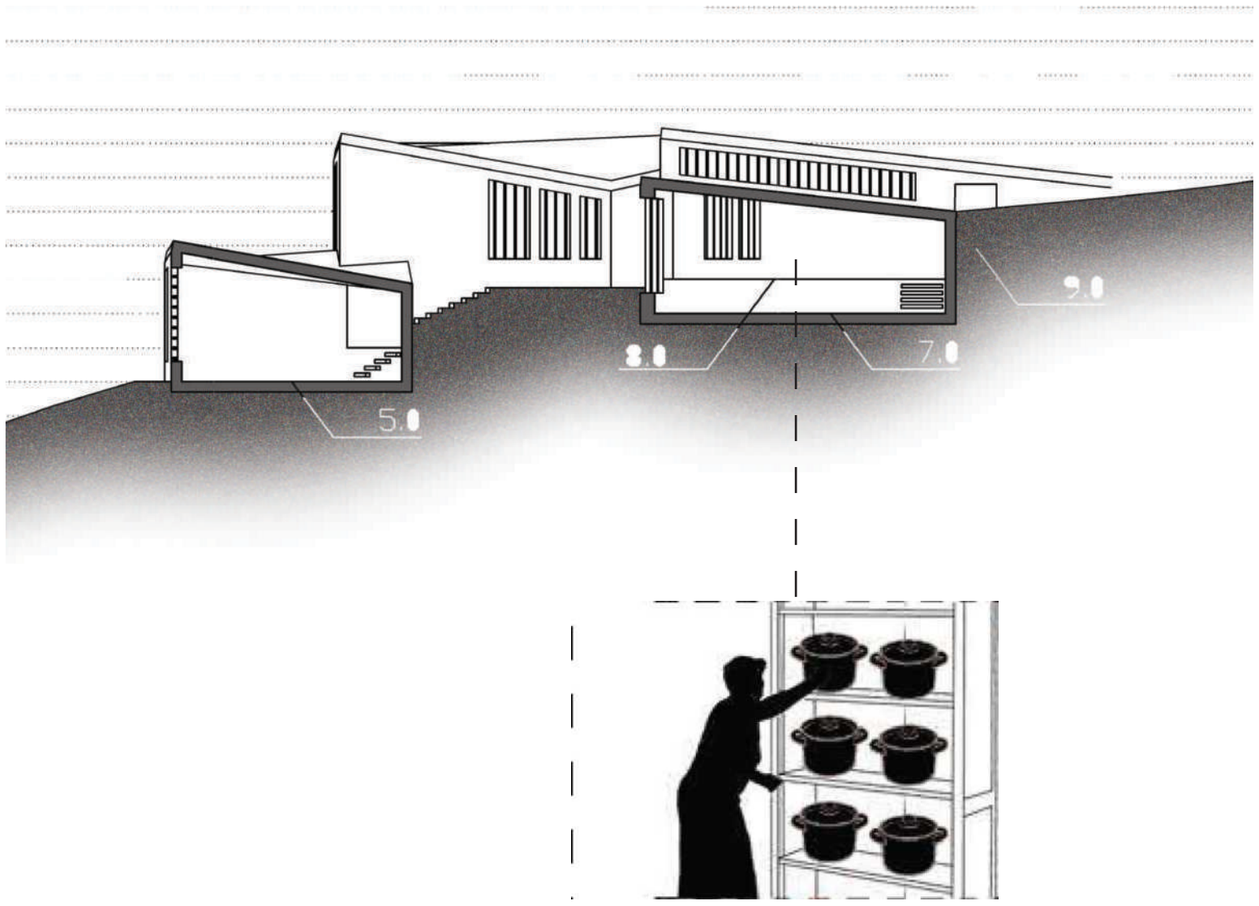




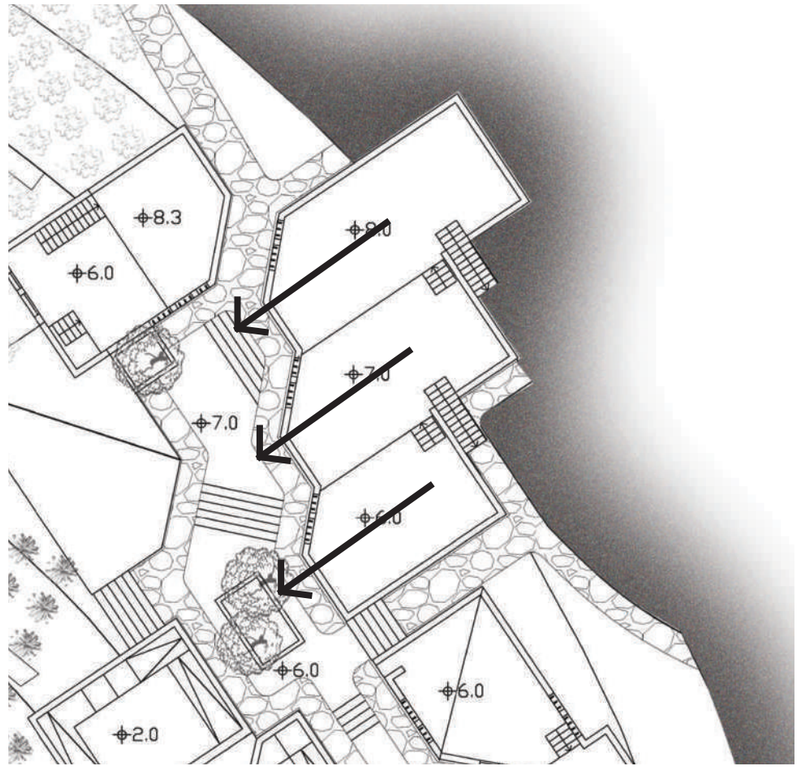
Sloped roofs used for rainwater collection are gathered by the gutter, through gravel pathway, and to rainwater reservoirs located under the concrete courtyards.

Sustainable Strategies

3. Roof functions: Accessible roofs
   Geothermal heating



Goat milk storage

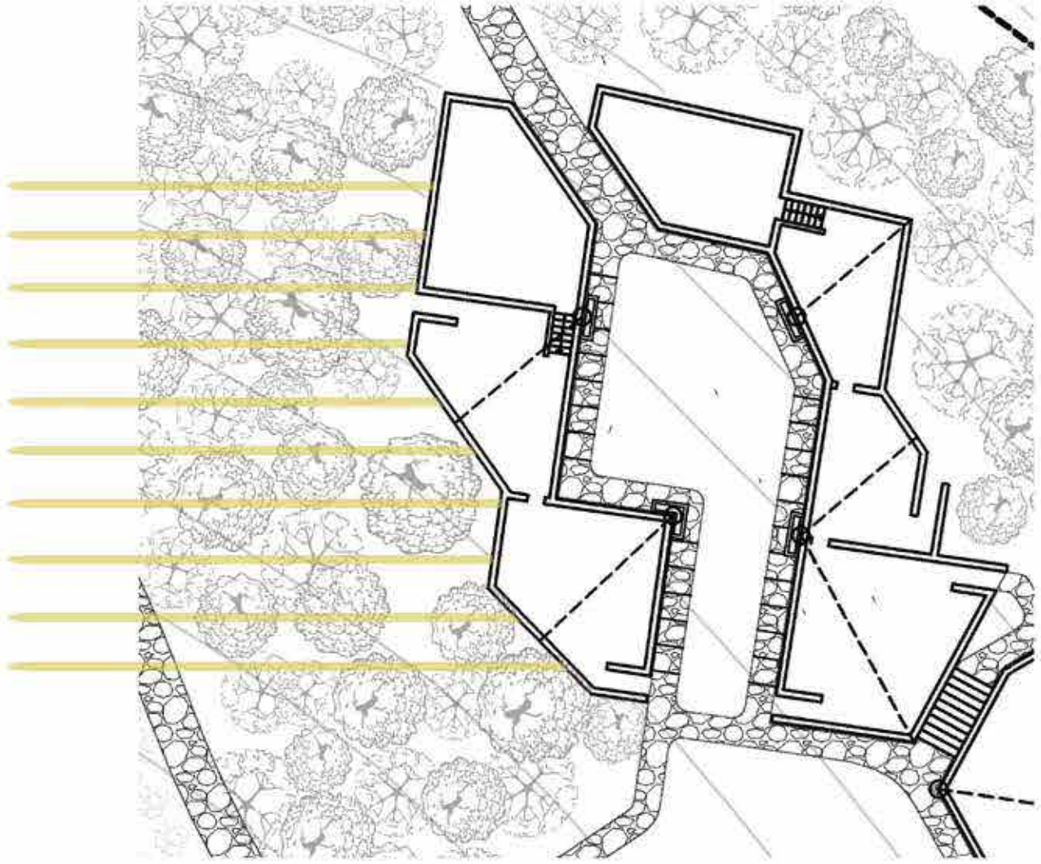


View to kadisha valley

Storage facilities benefit from geothermal heating while allowing accessible roofs.

Sustainable Strategies

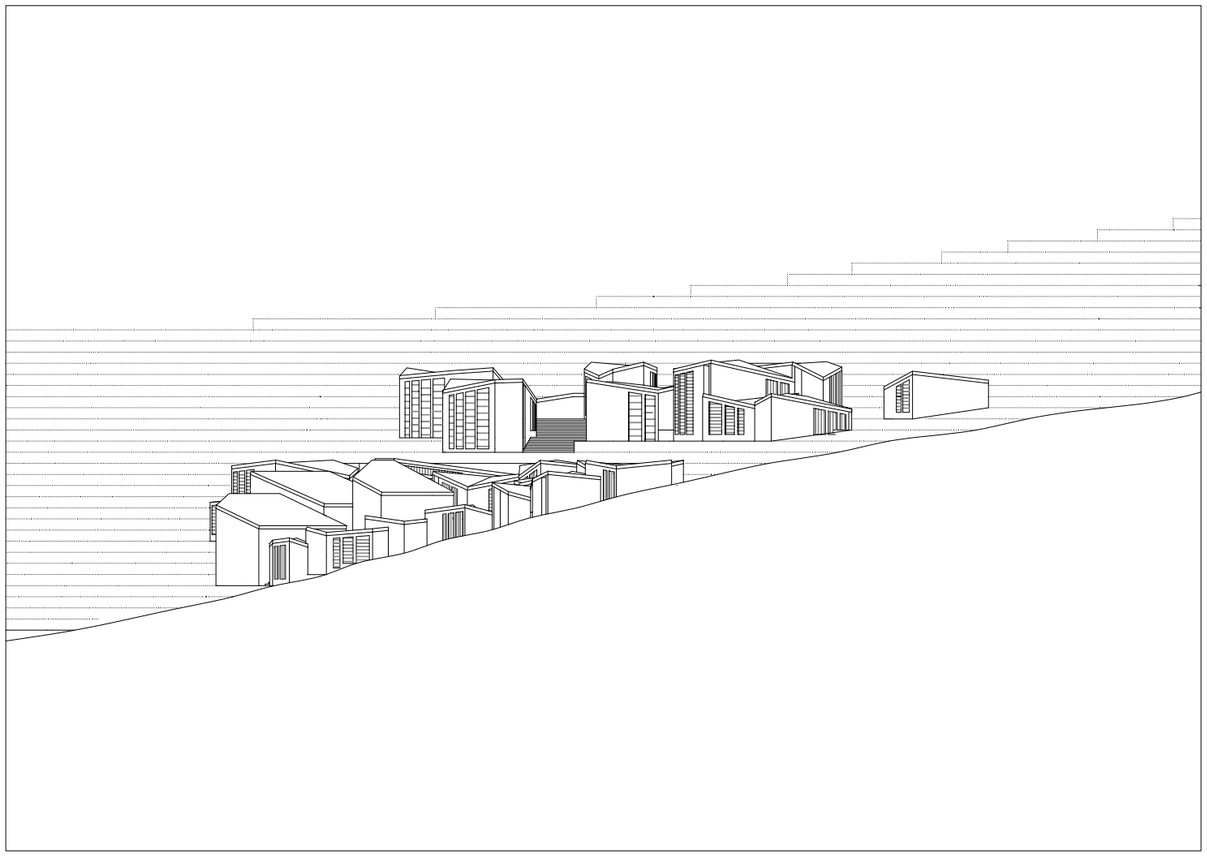
4. Massing and orientation



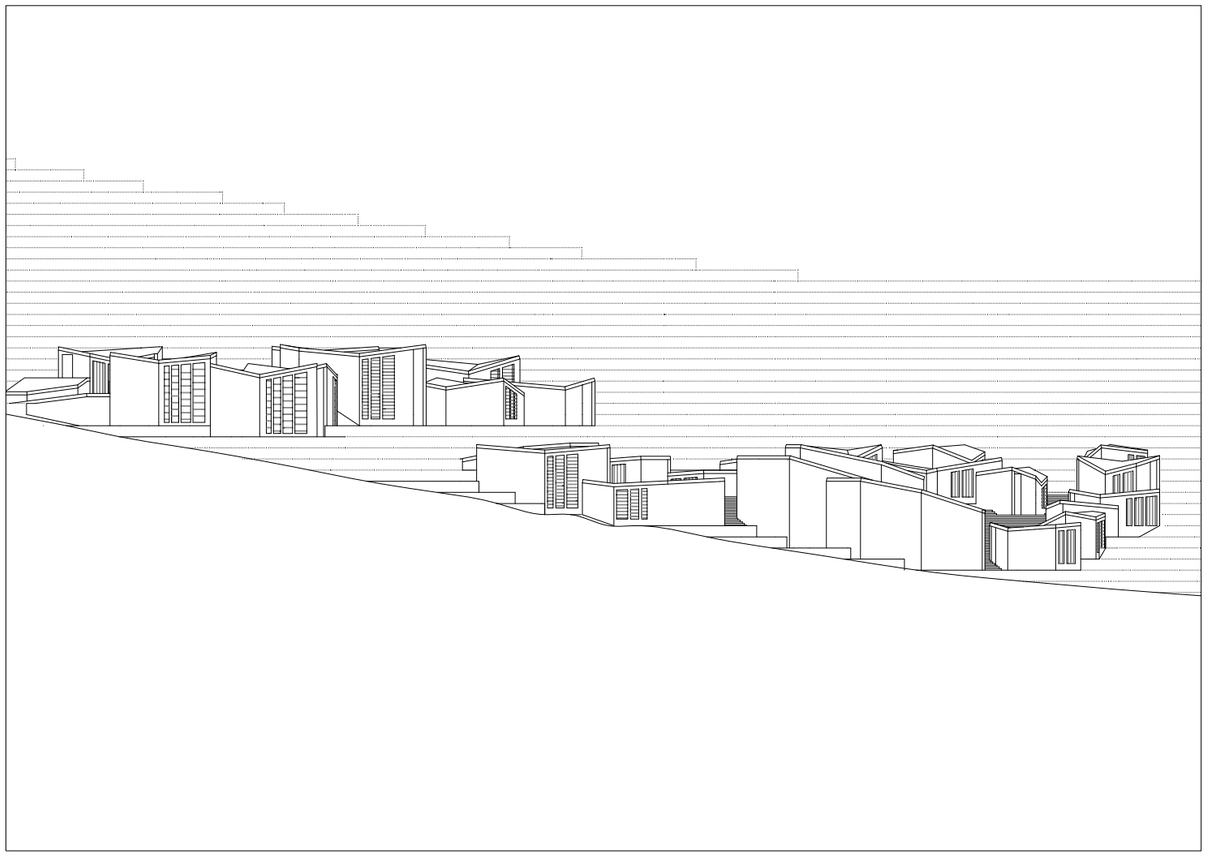
Masses tilt away from the West to protect from perpendicular western afternoon sun.

Sustainable Strategies

5. Fenestration placement and louvres



South elevation



West elevation

Minimize East and west sun exposure while maximizing North and South sun exposure

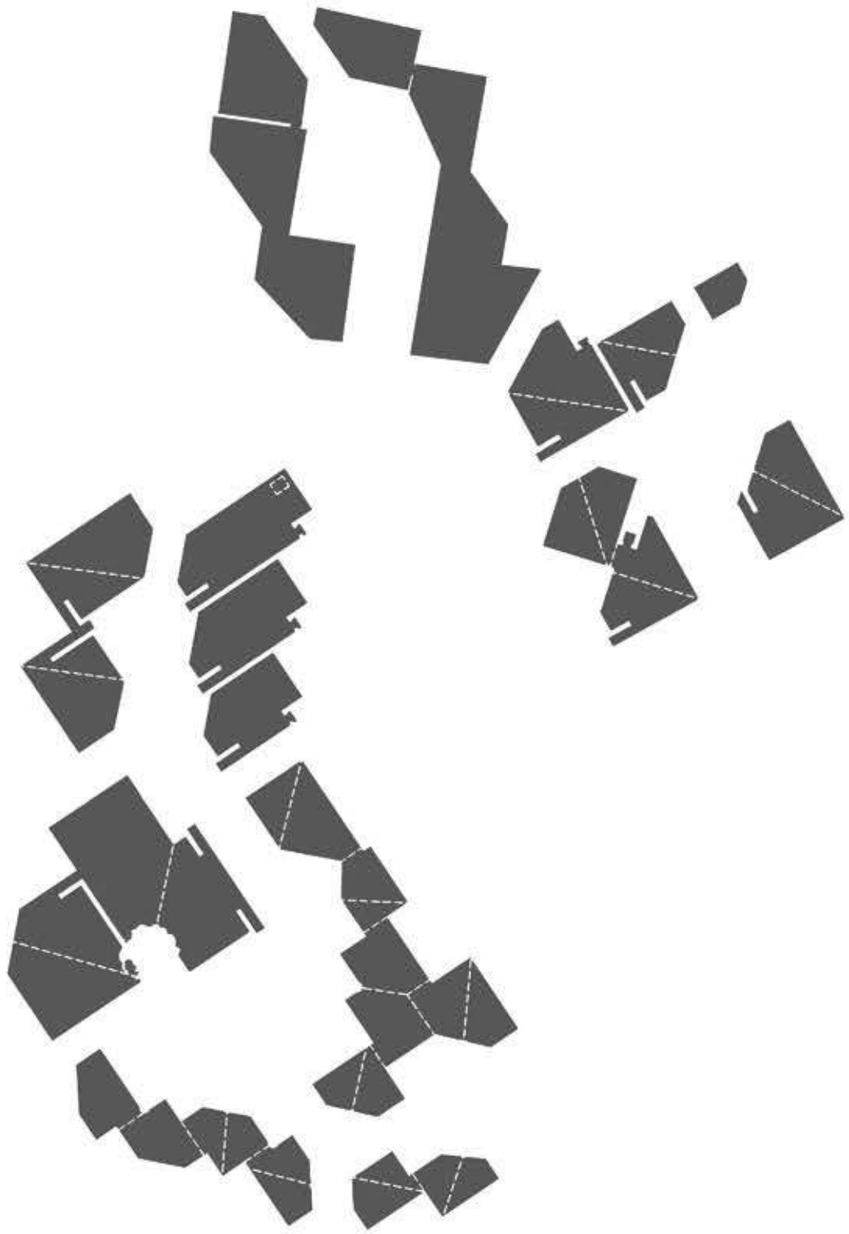
Mazimize South facade windows for maximum daylight

Horizontal shading devices on the South façade. Vertical shading devices on East and West facades.

Open windows for wind flow from South West to North East

Sustainable Strategies

6. Compact typology



Compact buildings reduces heat loss in cold climate

Materials

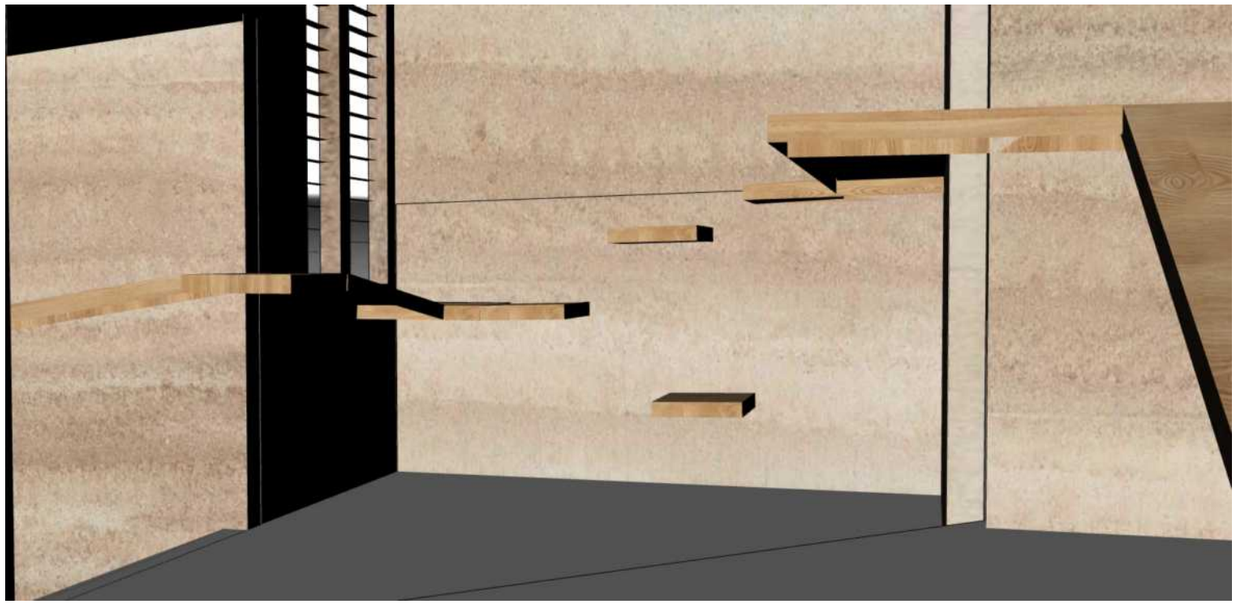
Rammed earth

Exposed concrete

Gravel

Wooden louvres

Goat house decking is made from recycled project construction formwork wood



Landscape Treatment: Vegetation Zones

Existing landscape scenario

Landscape Treatment: Vegetation Zones

Proposed vegetation distribution

Pine trees

Agriculture fields

Apple trees

Landscape Treatment: Vegetation Zones

Proposed vegetation distribution

Accessible to goats

Building or road barrier

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