EMBRACING THE HIMALAYAS

Investigating how a larger building complex can be positioned beautifully into an exceptional and challenging landscape

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Supervisor: Björn Gross

CHALMERS
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Year of graduation: January 2020
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ABSTRACT

The purpose of this thesis is to investigate how a larger building complex can be positioned beautifully into an exceptional and challenging landscape.

This thesis is of relevance as flat sites become more scarce and more difficult sites may need to be built upon. For example due to the expansions of cities and growing populations. The thesis hopes to find and suggest ways in which larger building complexes can be positioned beautifully into exceptional and challenging landscapes.

The thesis will mostly be based on research by design, with the support of reference projects in similar terrains and reference projects based on a developed design criteria. Combining local building materials and techniques of the area.

To investigate the research topic, a complex site in the Himalayas is chosen at a corner of the cold desert of Katpana, near to the city of Skardu, Pakistan. The site consists of a river bank and sloping sand dunes. Due to the risk of flooding, the building needs to be built on the sand dunes of the desert. This site is currently suggested for a larger building complex with a space program that will be used for this investigation. The program consists of a school, innovation center, and a hotel. The school is intended for 200 students (Year 11 and 12) with a curriculum focusing on business development in eco-tourism and green tech solutions. The innovation center is intended for showcase and demonstration of novel green tech products and renewable solutions. The hotel consists of 18 hotel rooms, where revenues will contribute to financing the school and innovation center and allow visitors to the complex.

Based on this site and the space program, my thesis will look into developing a proposal of how to position the larger building complex beautifully into the landscape. My proposal may be of relevance for the real project being carried out at the site. It may also be of relevance for the positioning of other larger building complexes in similar terrains, slopes, mountains, or landscapes around the world where flat land is not available.

Keywords: Complex buildings, challenging landscapes, the Himalayas

CONTENTS

INTRODUCTION

STUDENT BACKGROUND

Education

	Chalmers University of Technology - Gothenburg, Sweden
2018 -	Master's program - Architecture and Urban Design (MPARC)
2017-2018	Bachelor of Architecture with Honours (year 3)
	Mackintosh School of Architecture (Glasgow School of Art) - Scotland, UK
2012 - 2015	Bachelor of Architecture, RIBA Part 1

Employment

2017-2017	Reflex Arkitekter - Stockholm, Sweden	Intern
2016	Wåhlin Arkitekter - Stockholm, Sweden	Employed onwards
2015-2016	Wåhlin Arkitekter - Stockholm, Sweden	Intern

BACKGROUND

Since the summer of 2018, I have been involved initially in drawing a school with the focus on sustainability issues in Skardu, Pakistan, in the Himalayas. This project has then been continued by an architect office for further development where I have had the opportunity to participate in follow up-meetings. In my master’s thesis I am using real prerequisites of this projects, however I carry out my research work independently from the real project.

The idea of developing the concept of a school, innovation centre and hotel at this site was initiated in collaboration with the following three parties: the local community, Aga Khan Foundation (a well reputed civil society organisation) and Peak Education Limited (a Swedish consultancy company). The land is already donated by the local community to a local foundation which is under establishment with the aim to manage the land and the operation of the complex in the future.

There is a particular interest of mine to choose the site location in the Himalayas. The owners of Peak Education are my parents and my father has close ties to this area from his childhood. As I have lived for one year throughout my high school in Islamabad, the capital of Pakistan, and visited the Himalayas many times, I find it exciting to get the opportunity to explore this site.

INVESTIGATION QUESTION

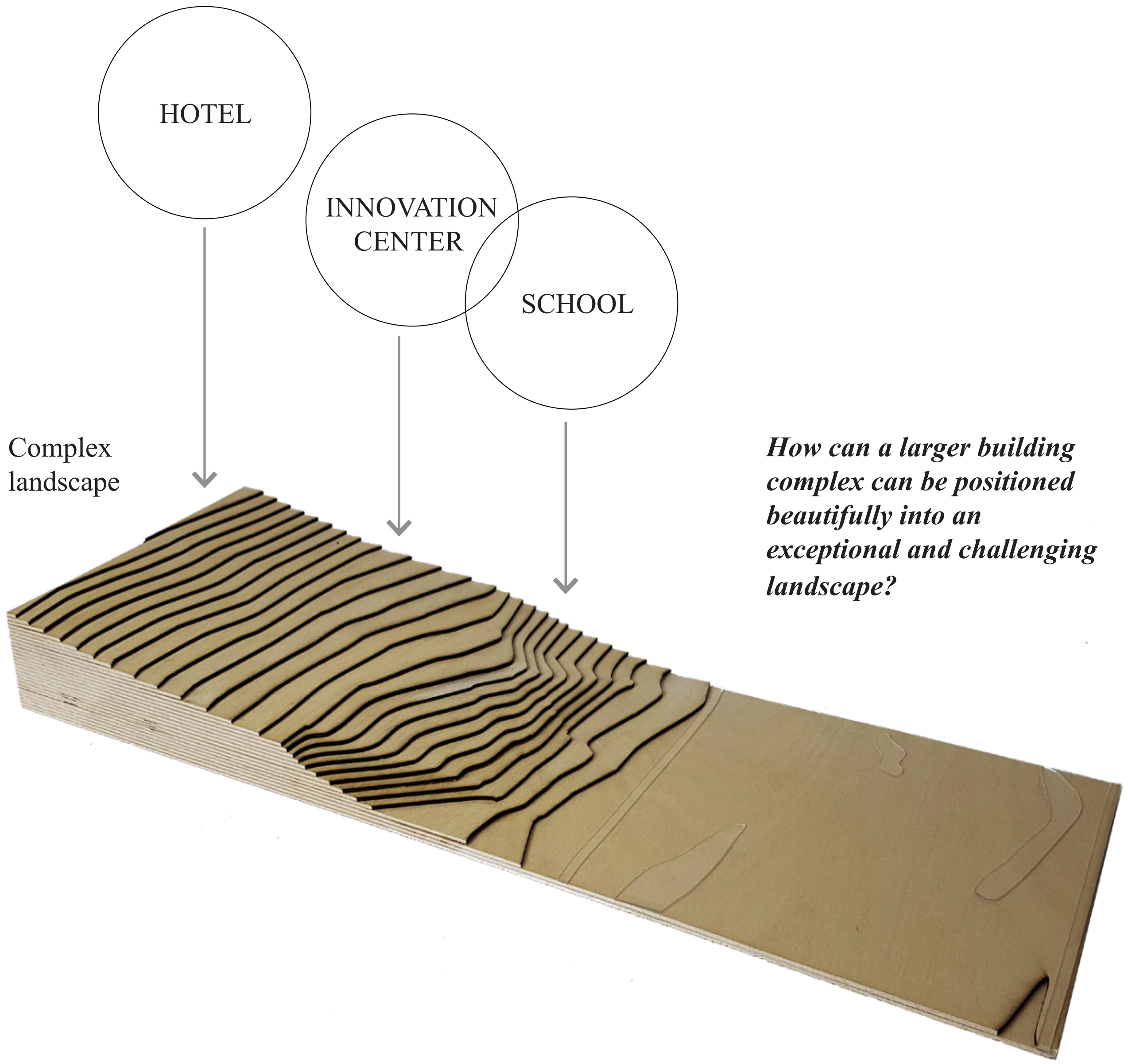
How can a larger building complex can be positioned beautifully into an exceptional and challenging landscape?

A complex site in the Himalayas is chosen at a corner of the cold desert of Katpana, near to the city of Skardu, Pakistan. The site consists of a river bank and sloping sand dunes. This site is currently suggested for a larger building complex with a space program that will be used for this investigation. The program consists of a school, innovation center, and a hotel. The school is intended for 200 students (Year 11 and 12) with a curriculum focusing on business development in eco-tourism and green tech solutions. The innovation center is intended for showcase and demonstration of novel green tech products and renewable solutions. The hotel consists of 18 hotel rooms, where revenues will contribute to financing the school and innovation center and allow visitors to the complex.

INVESTIGATION QUESTION

Space program of a
larger building complex

Complex
landscape



How can a larger building complex can be positioned beautifully into an exceptional and challenging landscape?

PURPOSE

The thesis hopes to find and suggest ways in which larger building complexes can be positioned beautifully into exceptional and challenging landscapes. This may be of relevance for other larger building complexes in similar terrains, slopes, mountains, or landscapes around the world where flat land is not available. This thesis is of relevance as flat sites become more scarce and more difficult sites may need to be built upon. For example due to the expansions of cities and growing populations. In this scenario, it is due to the risk of flooding that the building complex is proposed to be built on the sloping sand dunes.

METHOD AND THEORY

The method of this master's thesis starts with a site analysis with the main focus on the physical site. A site visit is planned to achieve a better understanding of the local building materials and techniques and understanding the physical environment of the site.

Research is then carried out through reference projects based on a developed design criteria suitable for the program at the site. Reference projects such as larger building complexes in complex environments and reference projects of aspects that the design criteria look at.

The design process is driven through mainly research by design where I test proposals of the program into the landscape and come to conclusions. Going from overall idea to further detail. The design process is mainly carried out through digital modelling, together with sketches and physical models.
A proposal is designed and then revised through further research and research by design.

DELIMITATIONS

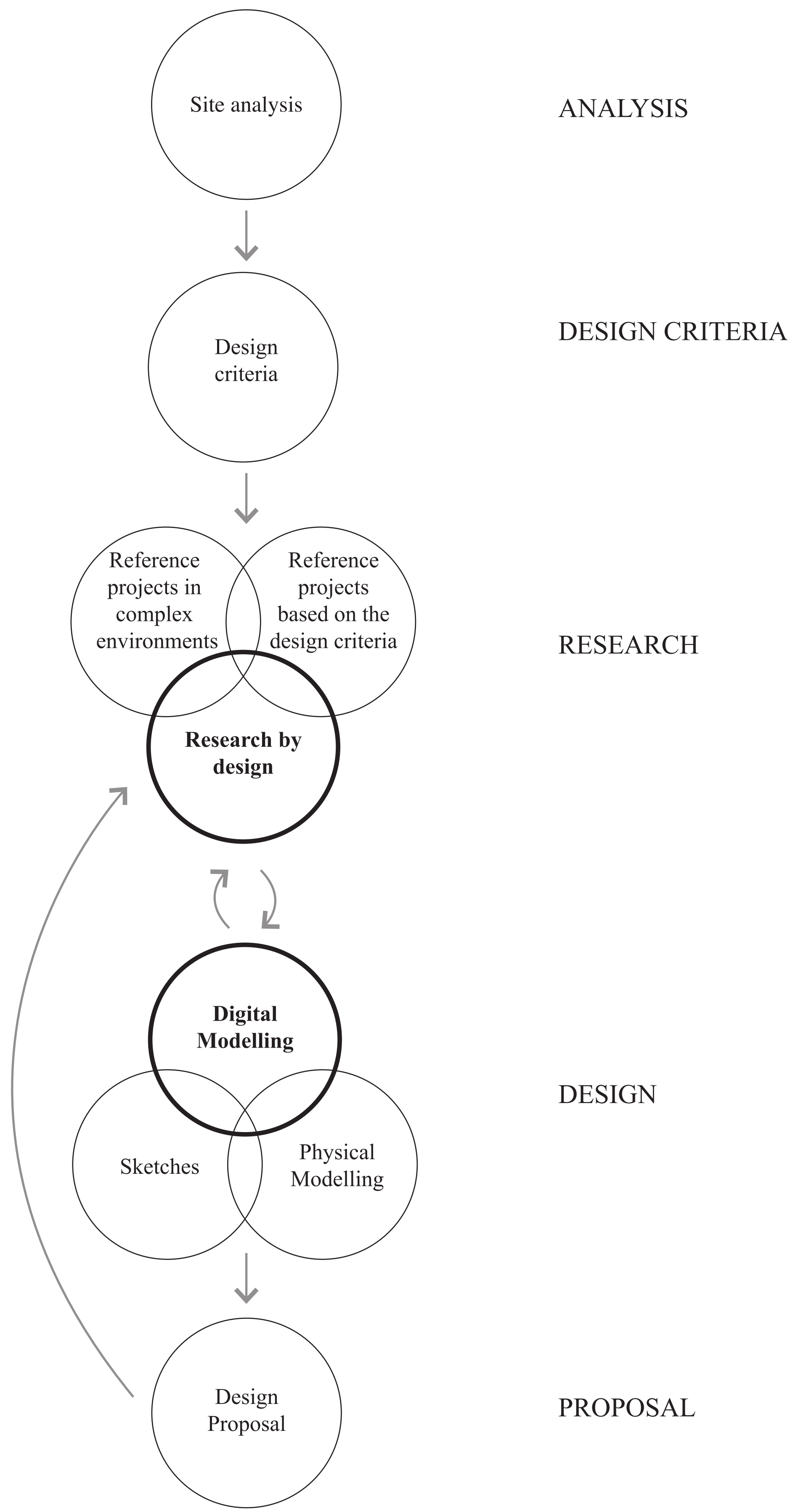
The thesis will not look into college curriculum plans and costs, innovation centre and hotel set-up and running. The focus is entirely on how the architecture can be used to position the larger building complex into the landscape.

READING INSTRUCTIONS

This thesis is divided according to a chronological order of how I have worked during the thesis semester. Starting with an analysis of the site. Analysis first based on secondary research and given information, then analysis based on a site visit. Developing a design criteria and looking at research and reference projects. Leading onto the midterm seminar to show some of the design process, and lastly my final proposal that gives my answer to the investigation question.

INTRODUCTION

METHOD



INNOVATION CENTER

Reception
10 m²

Reception back office/admin
25 m²

Café
25 m²

Innovation centre
200 m²

Innovation centre storage room
13 m²

Storage room
3 m²

Library
200 m²

Auditorium
80 m²

Social space staircases
80 m²

SCHOOL

Teaching

Classroom
70 m²

Lockers area
70 m²

Storage room
3 m²

Premises	Quanitity	m²	Total m²
Classroom	8	70	560

Group room (large)
40 m²

Group room 2 (large)
40 m²

Group room (small)
25 m²

Group room 2 (small)
25 m²

Computer lab, incl. printer
100 m²

Computer lab 2, incl. printer
100 m²

Server room
10 m²

Electrical room
13 m²

Canteen / Kitchen

Canteen
150 m²

Kitchen
125 m²

Serving area
60 m²

Garbage room
18 m²

Storage room
3 m²

Cleaning central
10 m²

Changing room / WC, males
15 m²

Changing room / WC, females
15 m²

Technical room
60 m²

Physical Education

Gym, males
60 m²

Gym storage room, males
10 m²

Changing room, males
40 m²

Gym, females
60 m²

Gym storage room, females
10 m²

Changing room, females
40 m²

Teachers

Headmaster
40 m²

Headmaster WC
4 m²

Headmaster storage room
4 m²

Nurse room
40 m²

Nurse room WC
4 m²

Nurse storage room
4 m²

Teachers

Teachers workplaces
100 m²

Staff break area
40 m²

Meeting room, large
35 m²

Meeting room, small
10 m²

Printer room
7 m²

Server
5 m²

Storage room
3 m²

WCs

WCs group, males
13 m²

HWC, males
5 m²

WC standard size, males
4 m²

WCs group, females
13 m²

HWC, females
5 m²

WC standard size, females
4 m²

Premises	Quanitity	m²	Total m²
WCs group, males	2	13	26
WCs group, females	2	13	26
WCs standard, males	4	4	16
WCs standard, females	4	4	16
HWCs, males	6	5	30
HWCs, females	6	5	30

HOTEL

Reception

Reception
10 m²

Reception back office
35 m²

Lounge hotel
50 m²

Lounge conference
50 m²

Technical room
10 m²

Conference

Conference room, large
50 m²

Conference room, small
30 m²

Storage room, conference
10 m²

Cleaning central
10 m²

HWC, males
5 m²

HWC, females
5 m²

Breakfast / restaurant

Breakfast / restaurant
100 m²

Kitchen
70 m²

Serving area
40 m²

Garbage room
10 m²

Staff room
40 m²

Staff changing room, males
20 m²

Staff changing room, females
20 m²

Laundry
15 m²

WCs group, males
15 m²

WCs group, females
15 m²

Hotel rooms

Hotel room
35 m²

Hotel room superior
60 m²

Premises	Quanitity	m²	Total m²
Hotel room	15	35	525
Hotel room superior	3	60	180

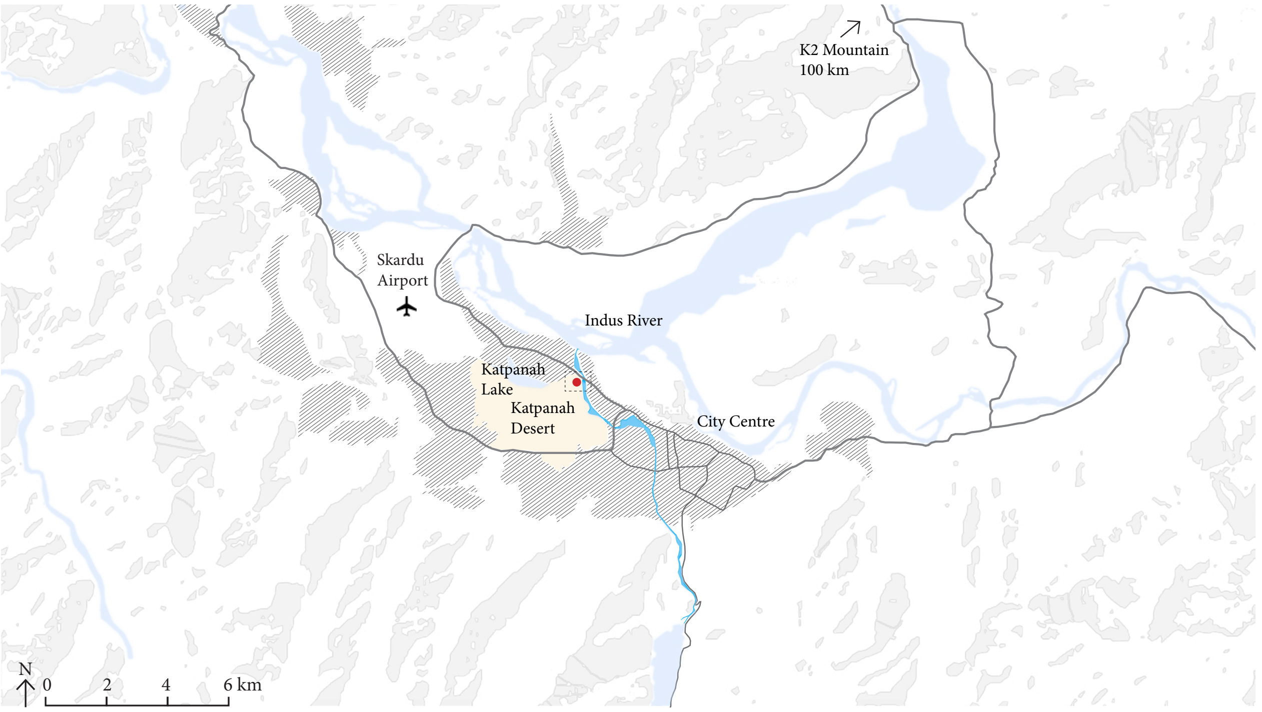
LOCATION

World map

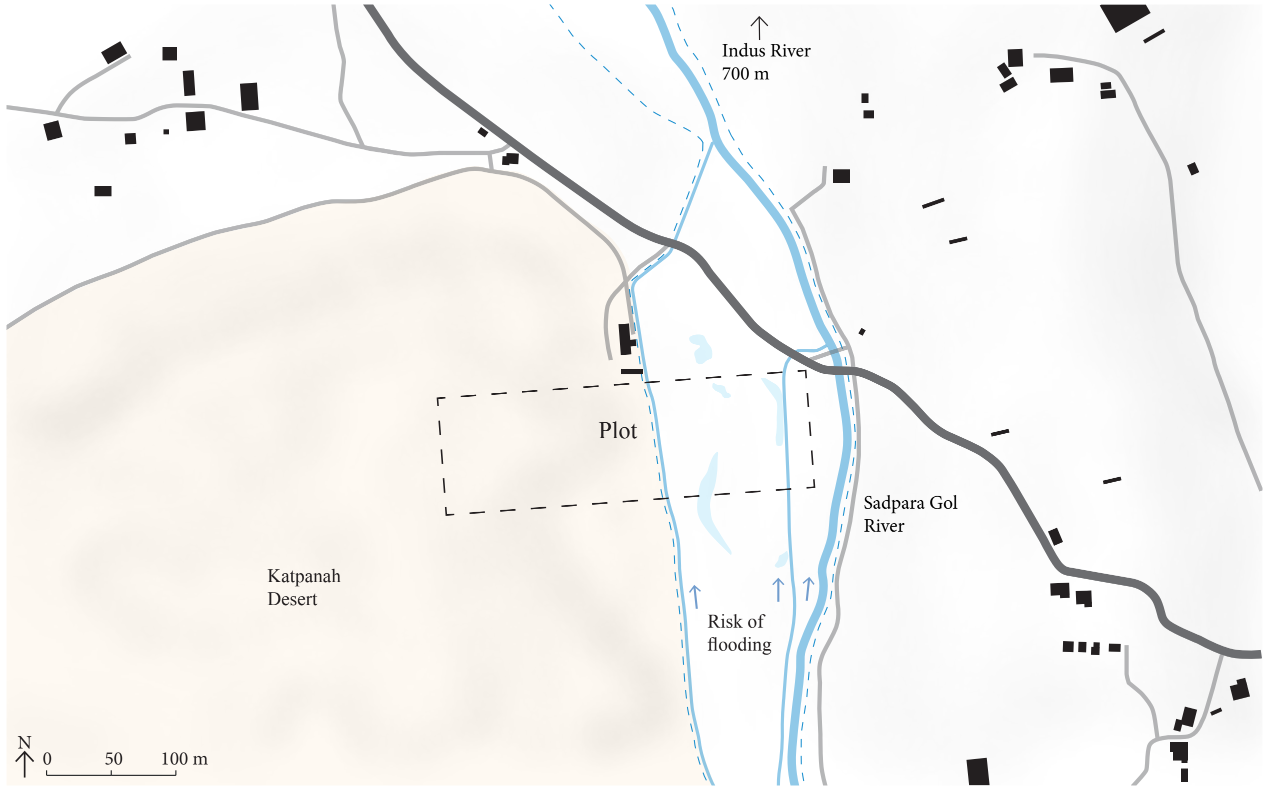
South Asia

SKARDU

Regional Context



The Site



SATELITE IMAGES

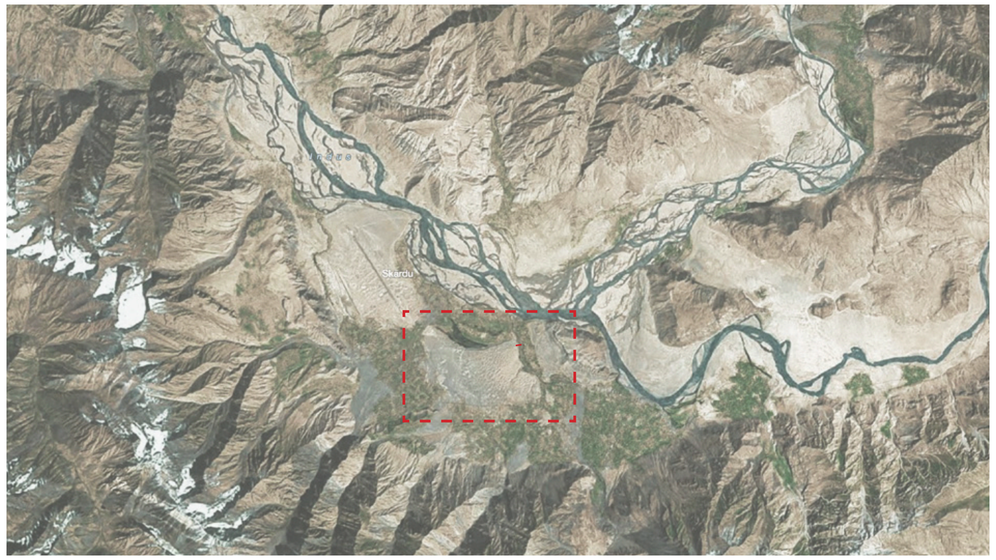


Fig. 1 (Bing maps, 2019)

Fig. 2 (Google maps, 2019)

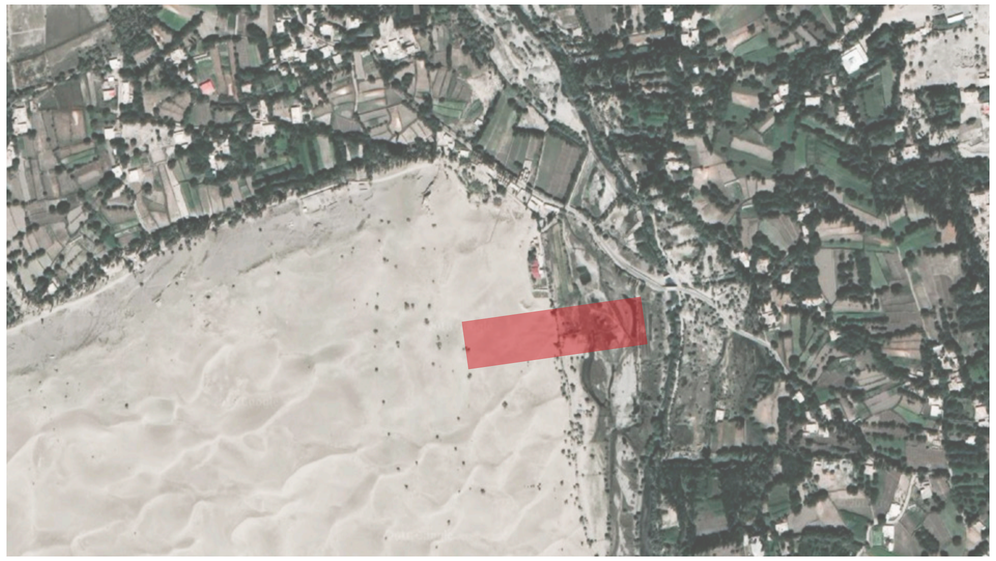
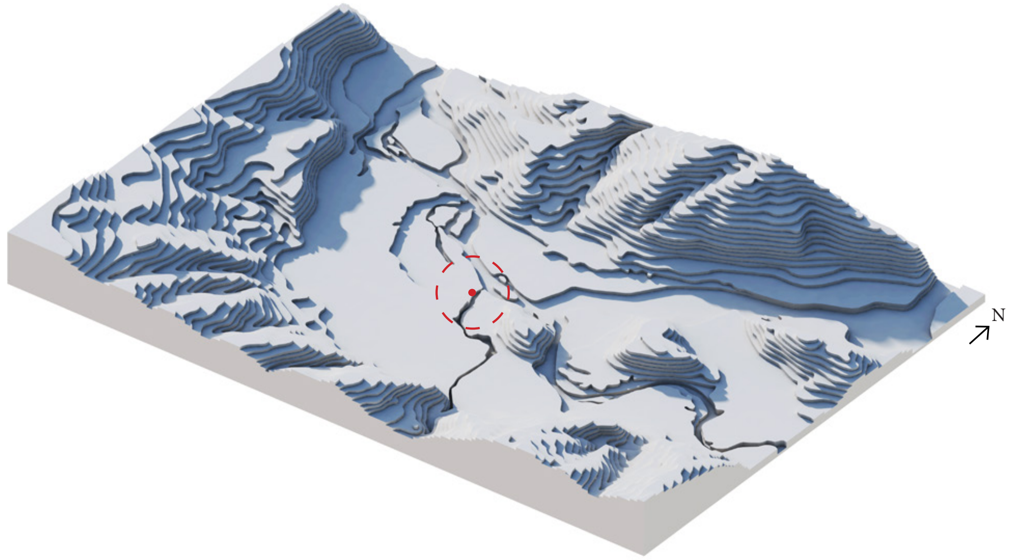
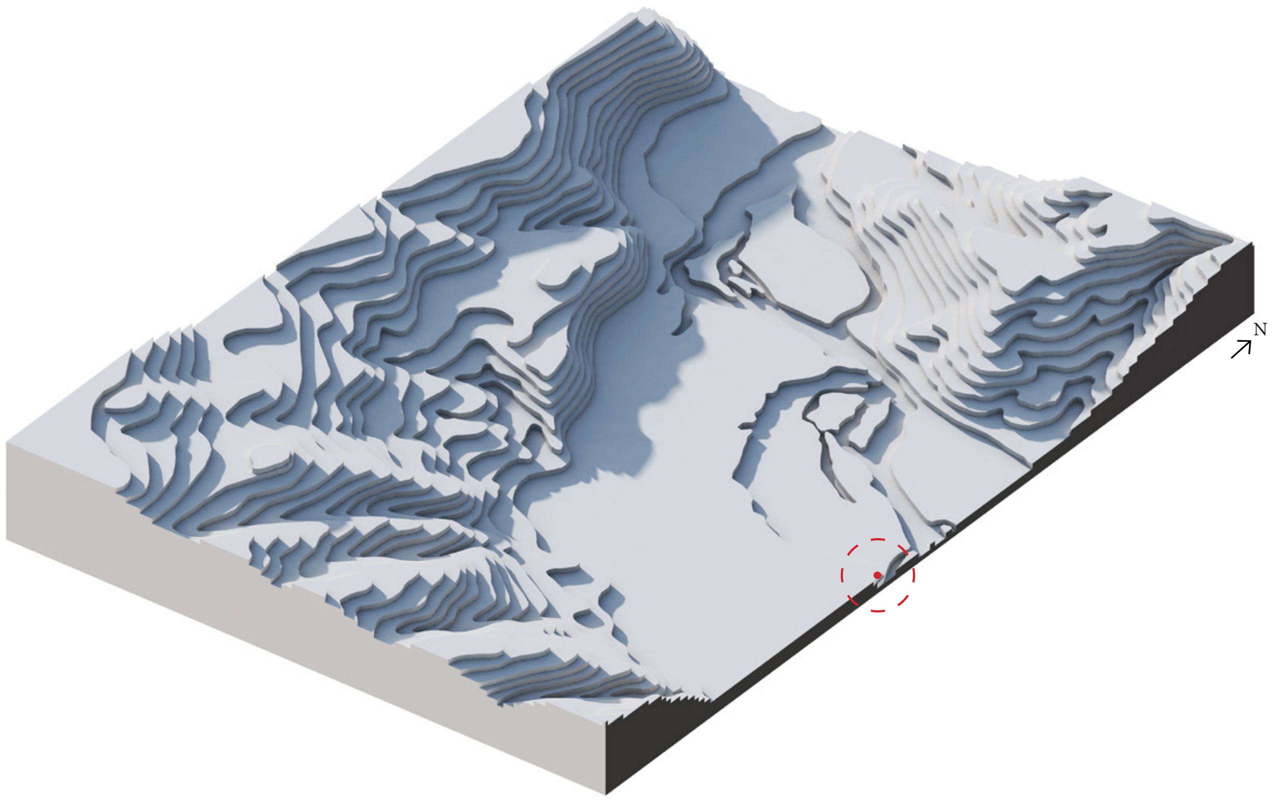


Fig. 3 (Google maps, 2019)

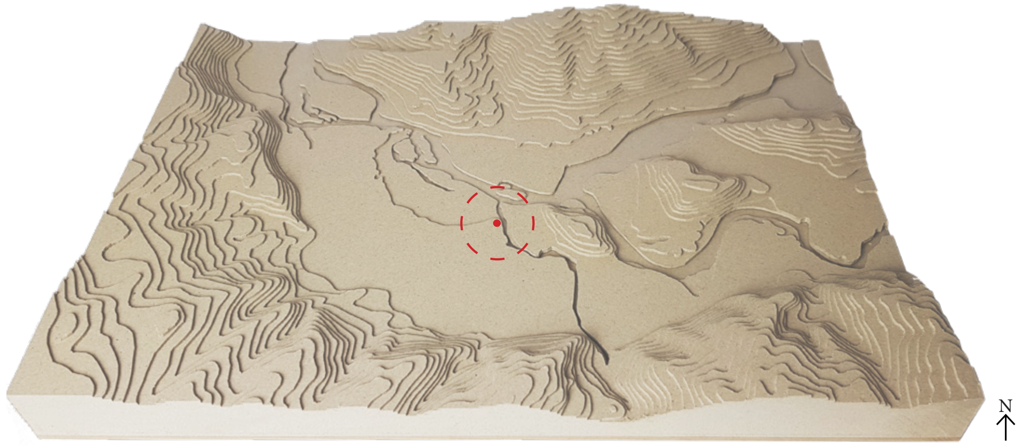
DIGITAL TERRAIN MODEL

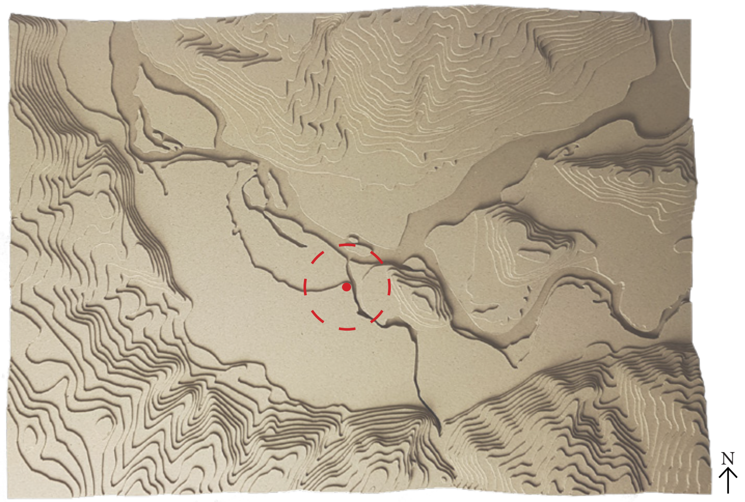


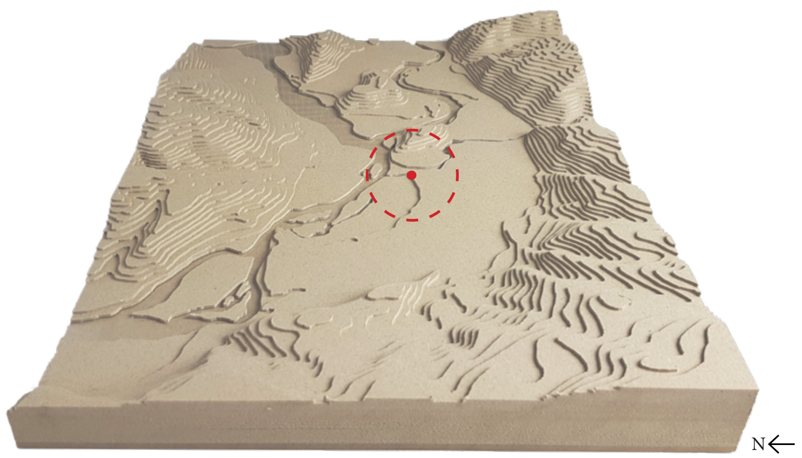


PHYSICAL TERRAIN MODEL

Scale 1:50 000







EXISTING SITE

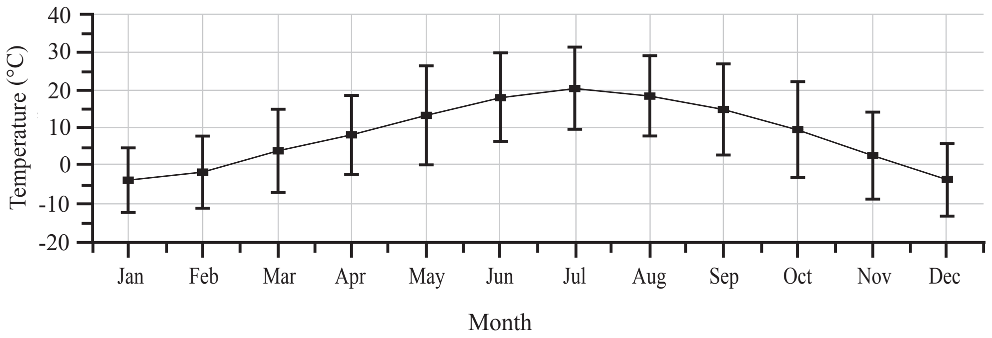
Site model 1:1000

Site model of plot 1:500

The plot has a height difference of about 25 meters from its lowest point to its highest point.

CLIMATE

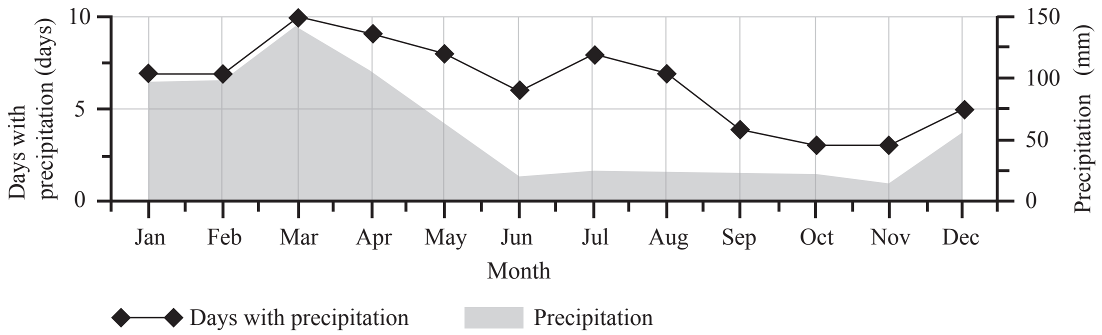
TEMPERATURE



Raw data collected by ÅF, 2018

As seen from the temperature diagram, the warmest average temperature is in July at 20 °C with a range of a highest temperature of 31 °C and lowest temperature of 10 °C. The lowest average temperature is in December and January at - 4 °C with a range of a highest temperature of 5 °C and lowest temperature of - 12 °C. The temperature can be compared to be similar to that of Stockholm, Sweden, but with more extreme high and low values of temperatures in the seasons.

PRECIPITATION

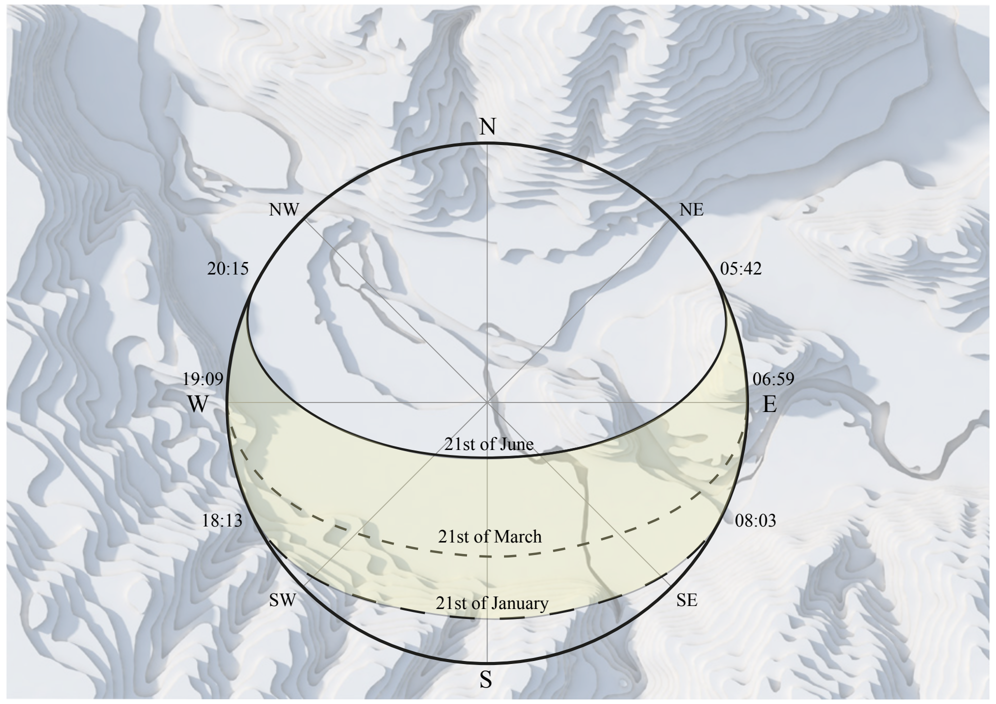


Raw data collected by ÅF, 2018

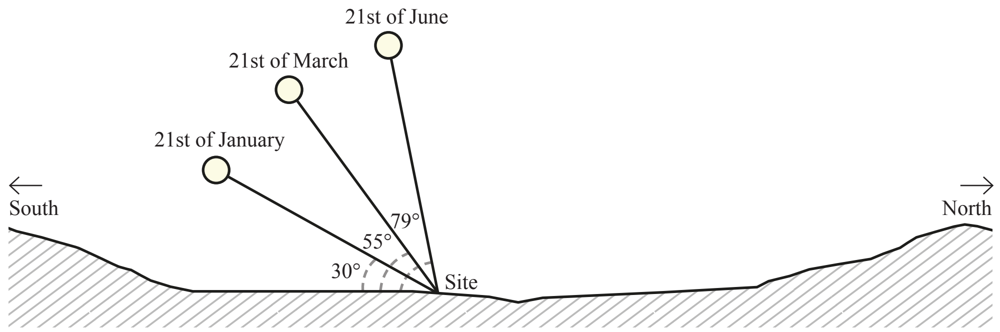
As seen from the precipitation diagram, the most precipitation occurs in the spring, with 10 days of precipitation and a total of 150 mm precipitation in March. This season causes flooding around the rivers and streams of the river Indus. Thus, the flat area of the plot (nearly half the size of the plot) is under the risk of flooding. The months from June to November has relatively little precipitation, around a total of 20 mm of precipitation per month.

SUN AND WIND ANALYSIS

SUN PATH ANALYSIS

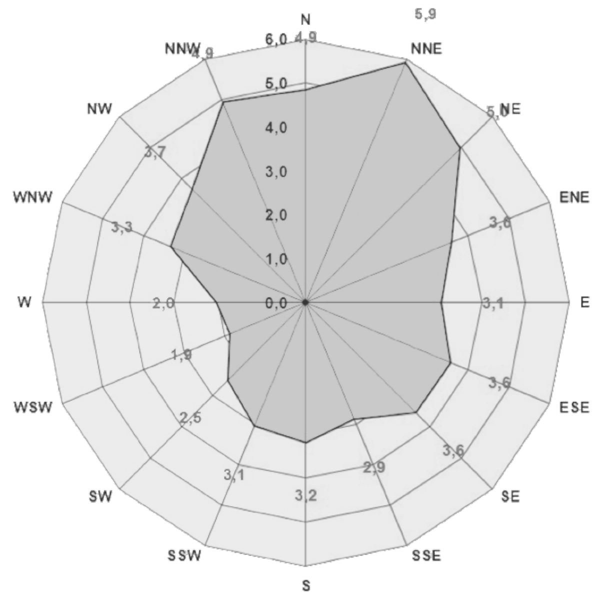


Raw data from Archicad, 2019



Raw data from Archicad, 2019

WIND ANALYSIS



Raw data collected by ÅF, 2018

THE SITE

The site is 16,427 square meters and consists partially of a cold desert, a riverbank area with a small water stream running through, and some vegetation. The water stream comes from the larger river Indus. It is surrounded by the mountains of the Himalayas and is situated approx. 2200 meters above sea level. The site is located in the Himalayas mountain range, in the city of Skardu, Pakistan. Skardu has a population of 300,000 and is a politically stable region (Citypopulation, 2019)

Himalayas mountains

Katpanah Desert, (cold desert)

Riverbank (flood risk)

Fig. 4 - The site (Aga Khan Foundation, 2018)

SURROUNDINGS

Fig. 5 - Indus River (Peak Education, 2018)

Fig. 6 - Site vegetation with the Himalayas Mountains (Peak Education, 2018)

SITE VISIT

The visit to the site and to other parts of Pakistan allowed me to look at local materials, building techniques, and inspirational buildings that have inspired my master’s thesis. The material use and building techniques were greatly developed after my site visit. I also had a much better understanding and feeling of the topography. Prior to my visit I was able to work with the terrain and landscape with a given topography DWG.

I had the chance to experience the climate at the site. The climate was quite similar to what it would be in Gothenburg in April. However, what I noticed was that due to the high altitude, the sun rays were very strong when being in the sunshine as you are closer to the sun. Even though it was very warm during the day, when the sun was no longer up, it would get very cold in the evening. Reaching from two very extremes of very warm during the day and quite cold in the evening and night.

From my site visit, I observed many new schools in the area, showing the focus on education in the region. Other observations were new water treatment plants and the potential for tourism.

LOCAL BUILDINGS AND HISTORY

SHIGAR FORT

Shigar Fort is also known as Fong-Khar, which in the local language means the “Palace on the Rock” (Pakistan Heritage Hotel, 2019). It is a 450-year-old heritage fort of local Balti culture from the 17th century. The fort has now been converted to a hotel of 20 rooms and suites, Serena Shigar Fort. A Palace of the Raja of Shigar.

The rooms have been restored and are made from native stone, walnut floors and handmade period furniture, fabrics an antiques. The architecture is traditional stone and wood architecture.

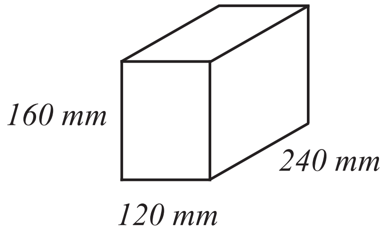
LOCAL MADE BUILDING MATERIALS

LOCAL LIGHTWEIGHT AUTOCLAVED AERATED CONCRETE (AAC)

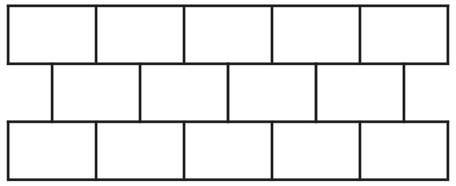
From an interview at the site I asked what the local building materials are made out of: Blocks are made from three components: (Hussain, 2019)

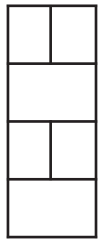
- Cement
- Sand (local)
- Crushed stones (local)

Blocks are made in varying dimensions depending on projects/buildings. These blocks have approximate dimensions:
120 x 160 x 240 mm



Common building techniques:





SURROUNDINGS

Katpanah Cold Desert

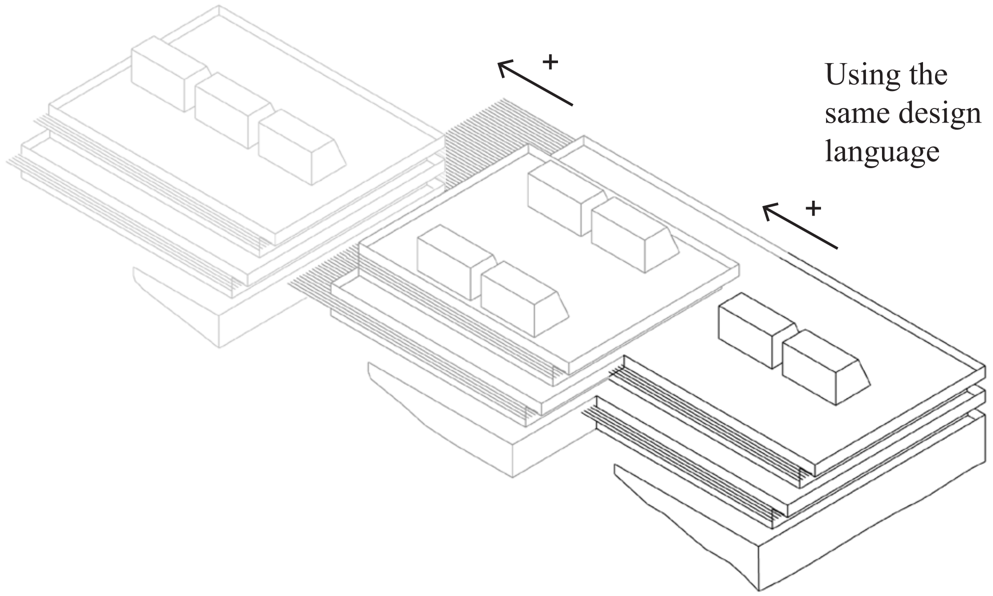
Katpanah Lake

SURROUNDINGS

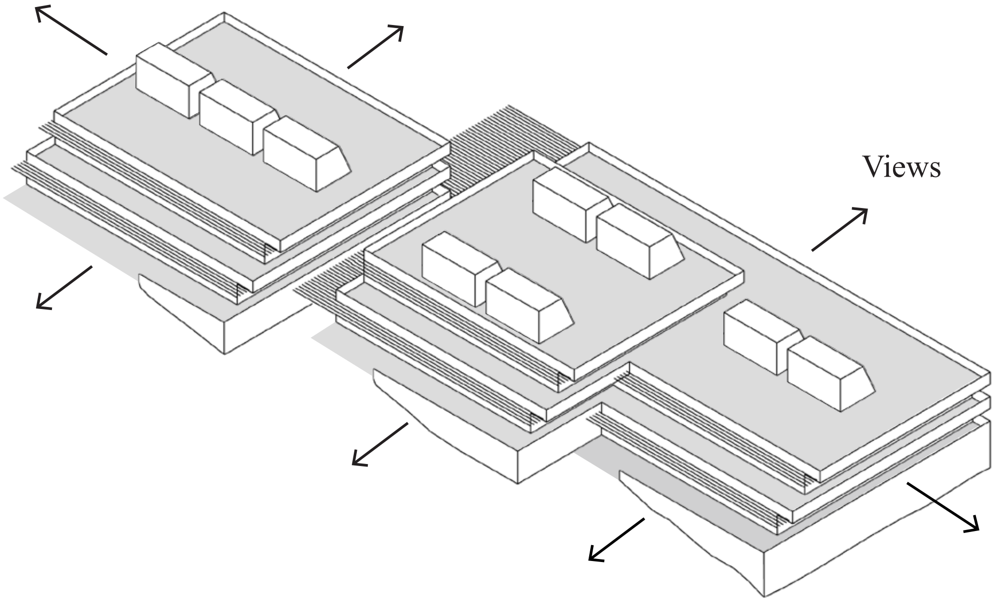
Site vegetation during non-flood season

Forest vegetation

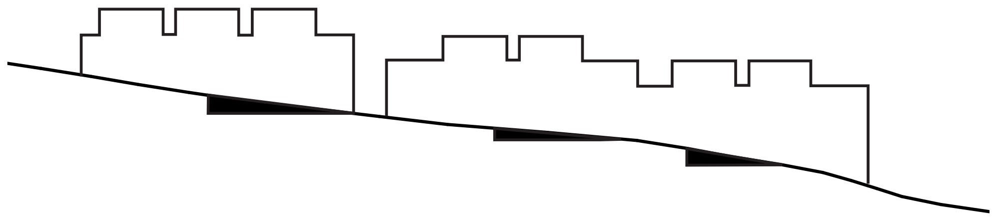
MAKE BUILDINGS COHERENT



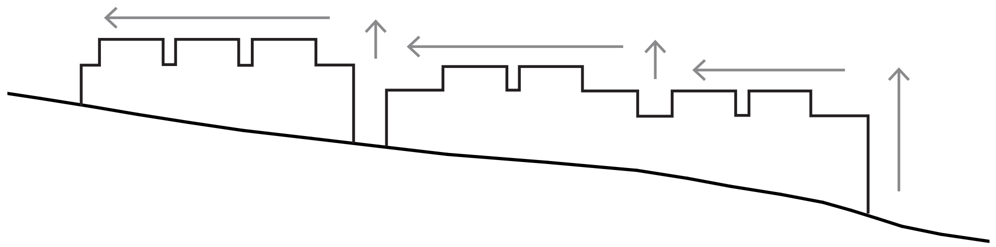
TERRACES AND INTERACTION WITH THE LANDSCAPE/ SURROUNDINGS



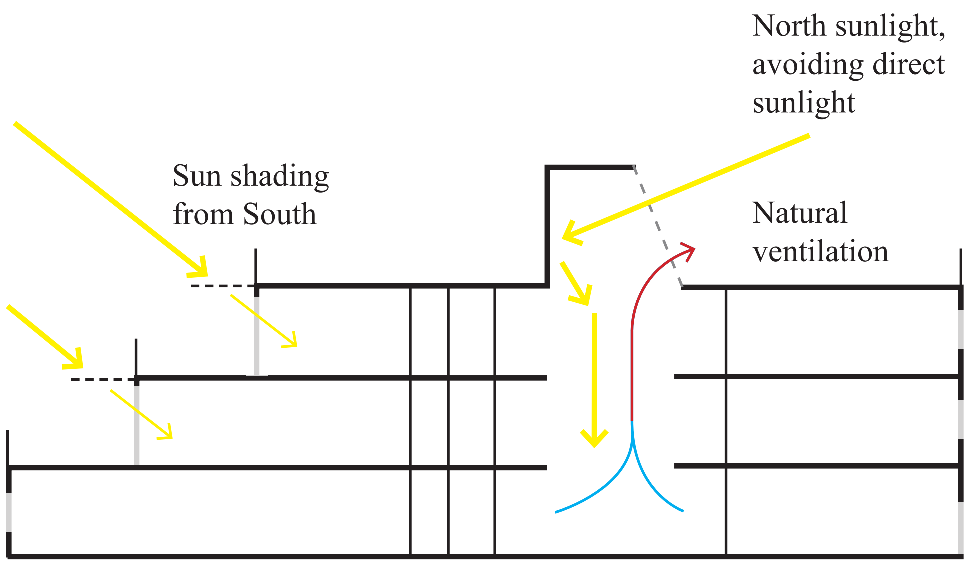
AVOIDING DARK SPACES AND DIGGING INTO THE LANDSCAPE



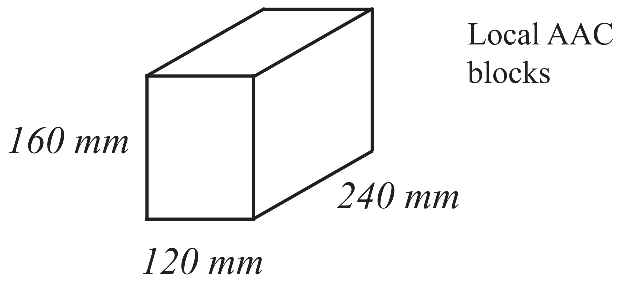
INTEGRATED AND FOLLOW THE LANDSCAPE

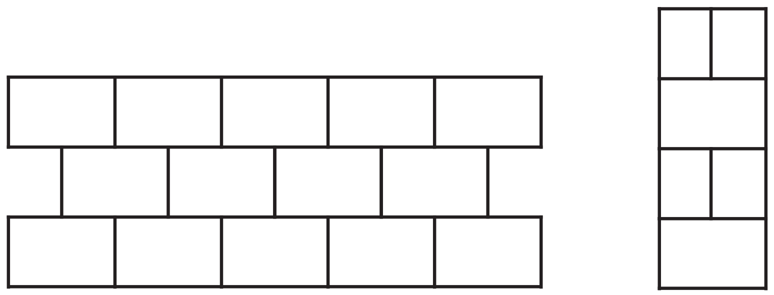


LIGHTWELLS AND NATURAL VENTILATION



USING LOCAL MATERIALS AND CONSTRUCTION TECHNIQUES





RESEARCH ON SCHOOL TYPOLOGY

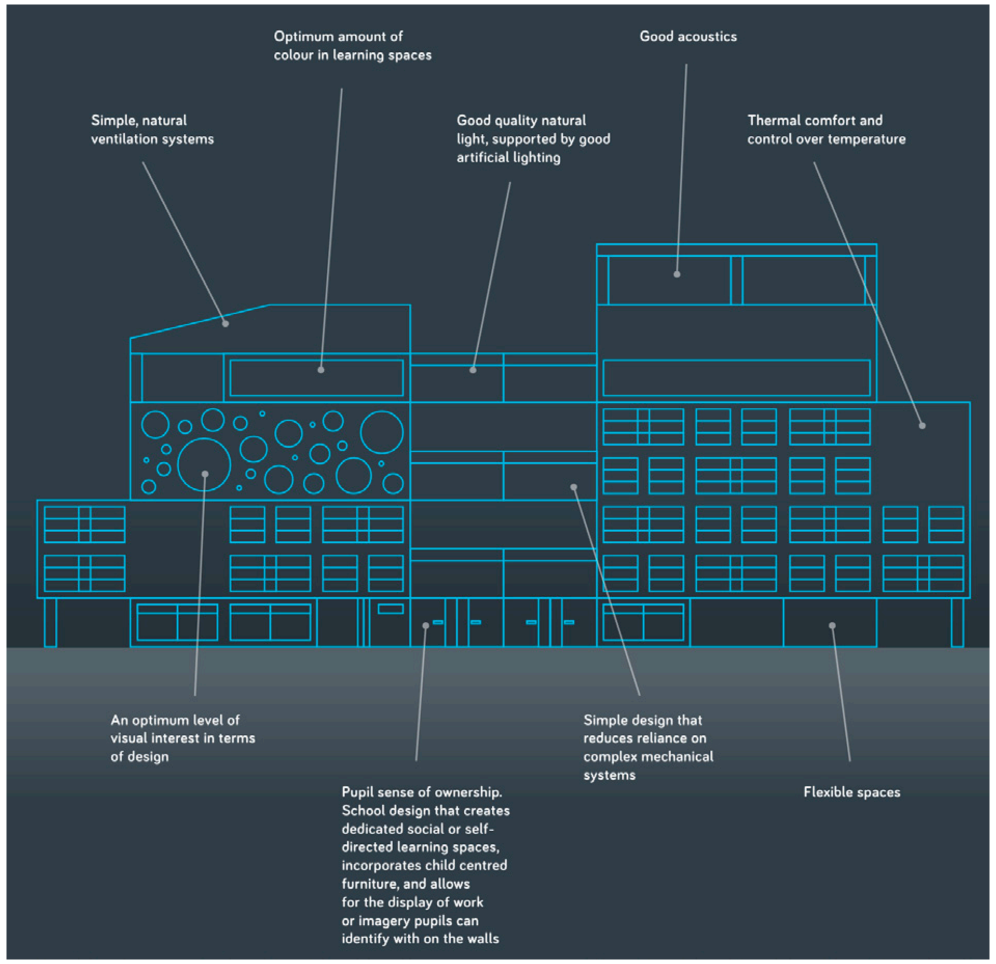


Fig. 7 - (Royal Institute of British Architects, 2016)

RIBA - BETTER SPACES FOR LEARNING

This book summarises important findings from a survey of schools across the UK of how the architecture can play an important role for better learning environments in schools (Royal Institute of British Architects, 2016). This gives me some insight on how I can shape the architecture and deal with for example ventilation for the school in my building complex.

Some key points are that a better well thought out school design provides a comfortable, responsive environment which effectively and efficiently supports educational activities, whilst minimising operational burdens and risks. Delivering outcomes at the same cost and both impact the students and teachers.

VMDO ARCHITECTS - LEARNING SPACES DESIGN

This book also has an interesting approach on how architecture can be used in educational design. VMDO Architects specialises in educational design and from this report, the following can be summarised: A balanced design approach that focus on collaborate learning, flexibility, fostering connections, active learning classrooms, event space and outdoor learning places (VMDO, 2016).

PLACEMENT IN THE LANDSCAPE

School in Mastrils, Switzerland
Hagmann und Jungling

Fig. 8 - (Archiweb 2019)

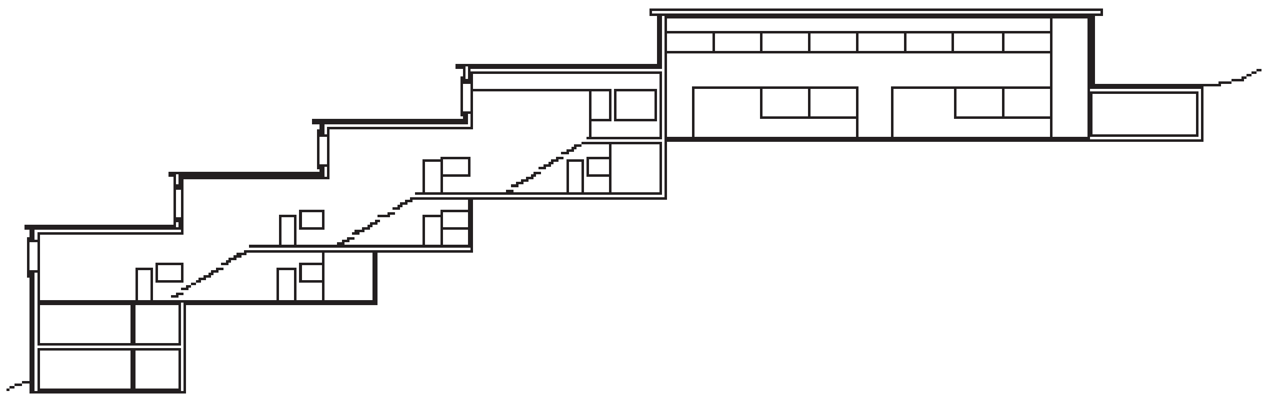


Fig. 9 - (Archiweb 2019)

LIGHTWELL AND TERRACES

A Working Lab, Chalmers, Gothenburg
Tengbom

Fig. 10 - (Tengbom, 2019)

SCHOOLS TYPOLOGY

The Vibeeng School, Haslev, Denmark
Arkitema Architects

Fig. 11 - (Arkitema Architects, 2014)

CONSTRUCTION - OVERHANG OF BALCONIES

Falling Water, US
Frank Lloyd Wright

Fig. 12 - (Frank Lloyd Wright Foundation, 2018)

MATERIAL USE - RELATE TO LOCAL ARCHITECTURE

Serena Hotel, Islamabad, Pakistan

Plaster finish

Stone cladding

Stained wood

MATERIAL USE - STONE CLADDING

The Therme Vals, Switzerland
Peter Zumthor

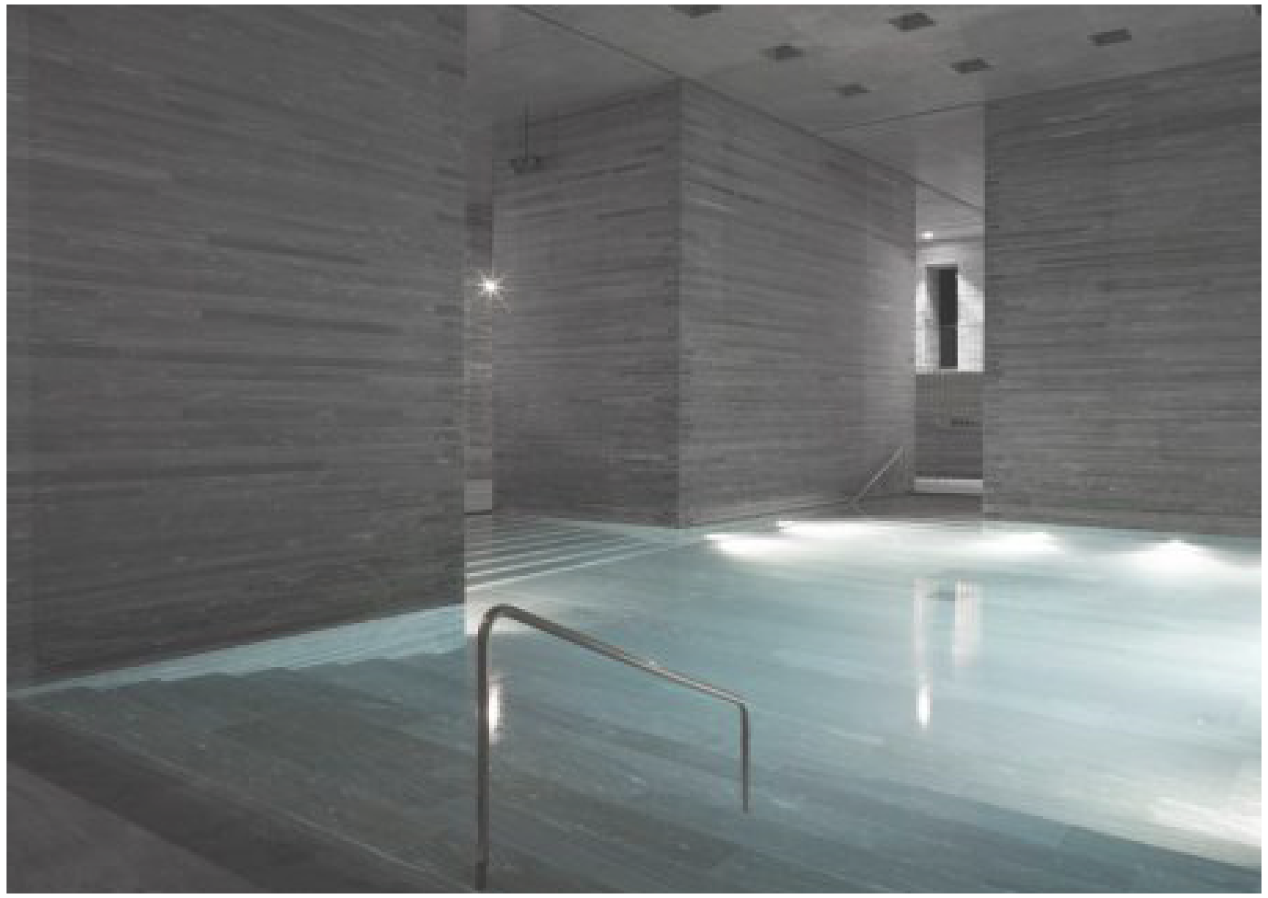


Fig. 13 - (Helena, 2013)

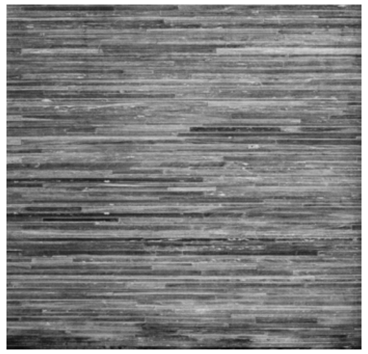


Fig. 14 - (Ashby, 2012)

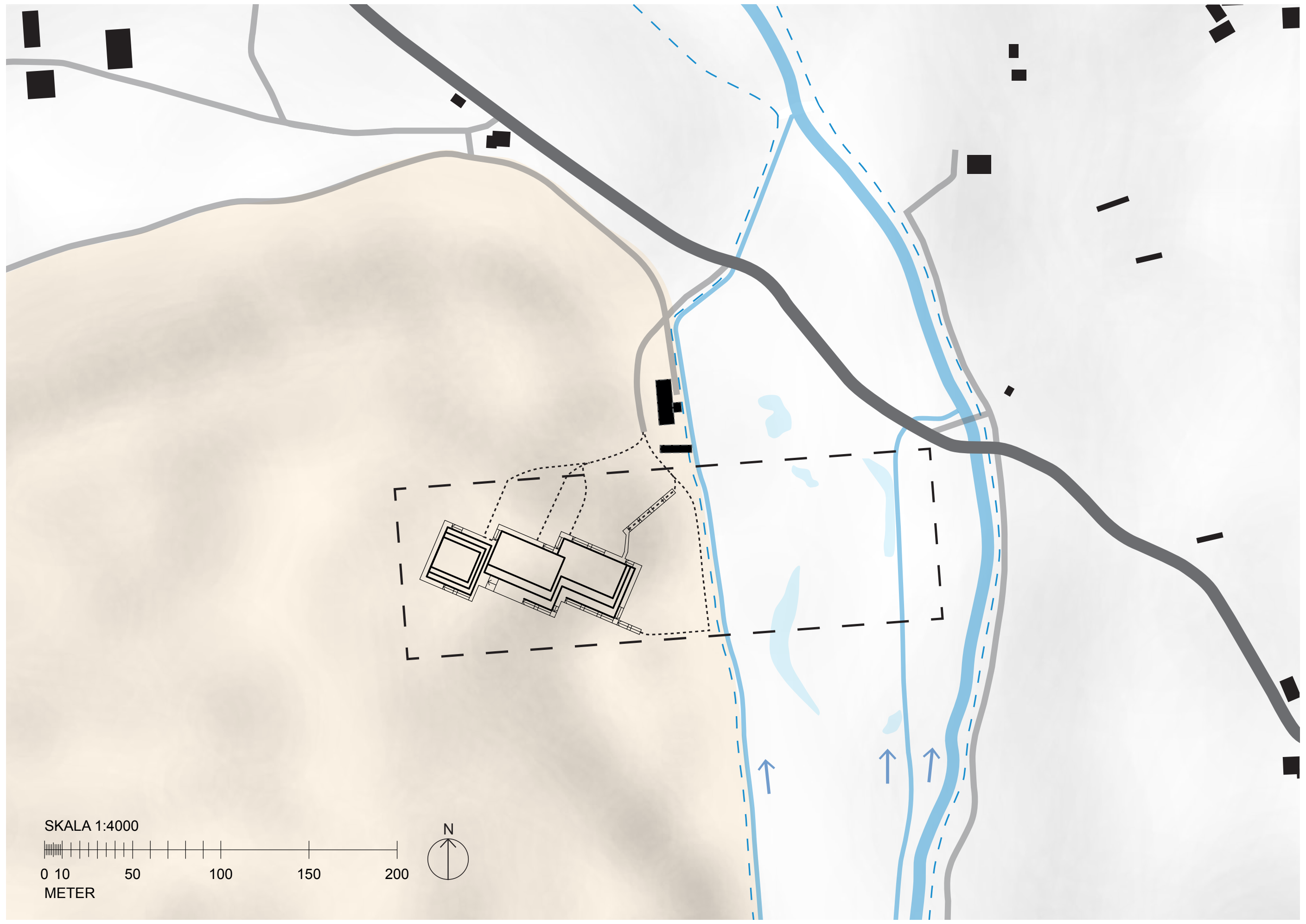
MIDTERM PROPOSAL

From the design criteria I looked at reference projects that have influenced this proposal. The building complex is formed with terraces, that form a pyramid like structure, that decreases in size as you go up the levels. This is to provide different sizes for different program and functions of the space program. Also to help with daylight into the building.

The access is from the north with a path that splits into separate entrances to the school, innovation center, and hotel.

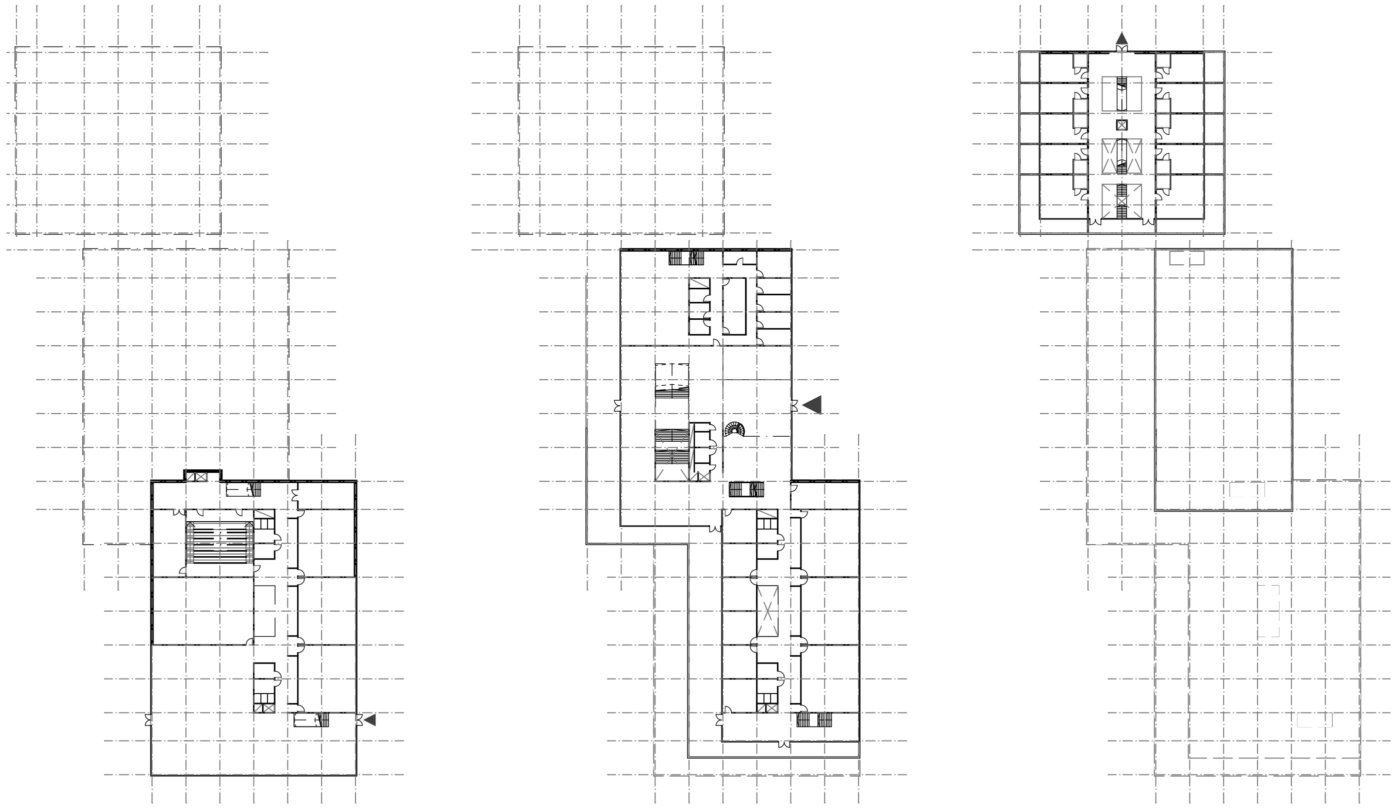
The innovation center and school building have the same sizes and dimensions to make it easier to build, while the hotel follows the same design criteria, it is shorter in length. There are staircases located in each end of the buildings, in which there is a main staircase in the overlap between the innovation center and the school building.

SITE PLAN



CONSTRUCTIONAL GRID

I have worked with a 5 meter by 5 meter grid for the school building and innovation center that allows the building to be more flexible. The hotel building uses a slightly different grid to allow better dimensions for the hotel rooms and equal terrace space for each hotel room.



Grid Floor -2

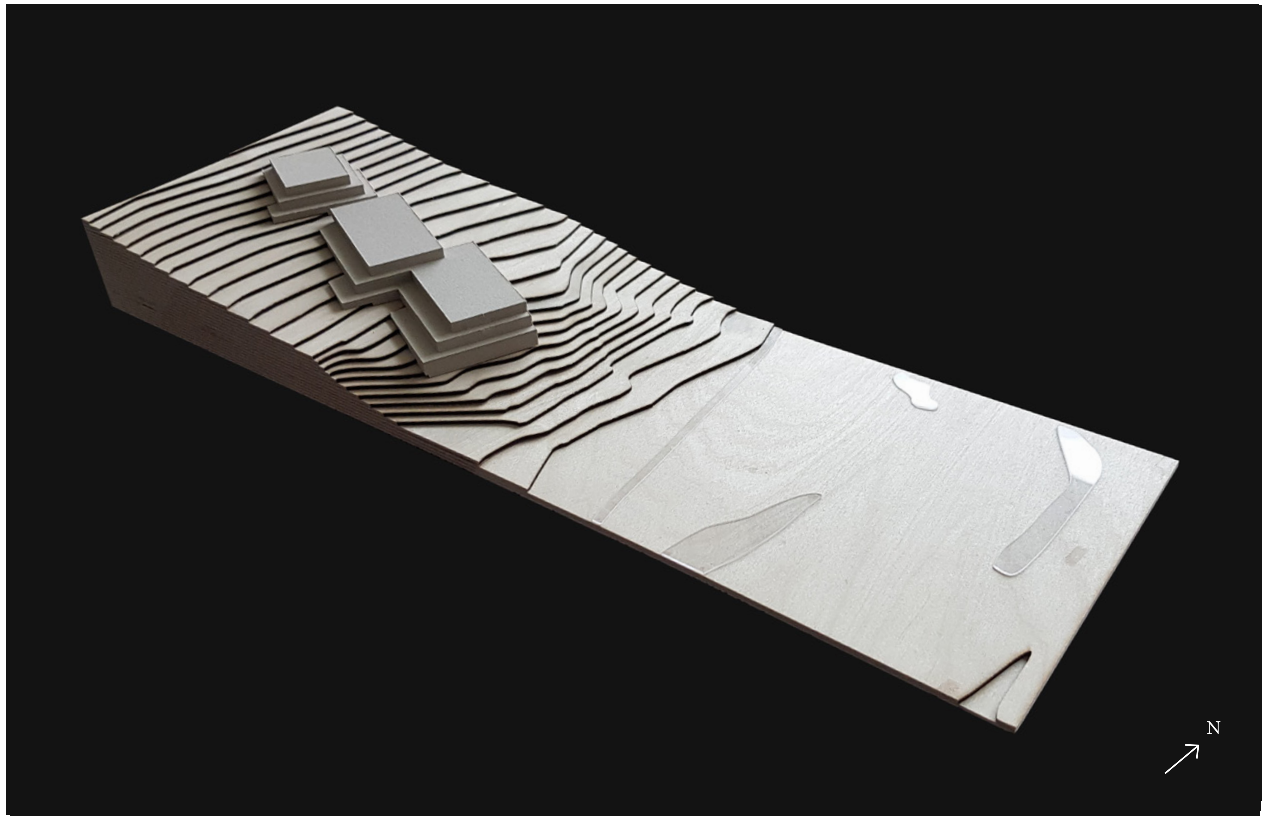
Grid Floor 0

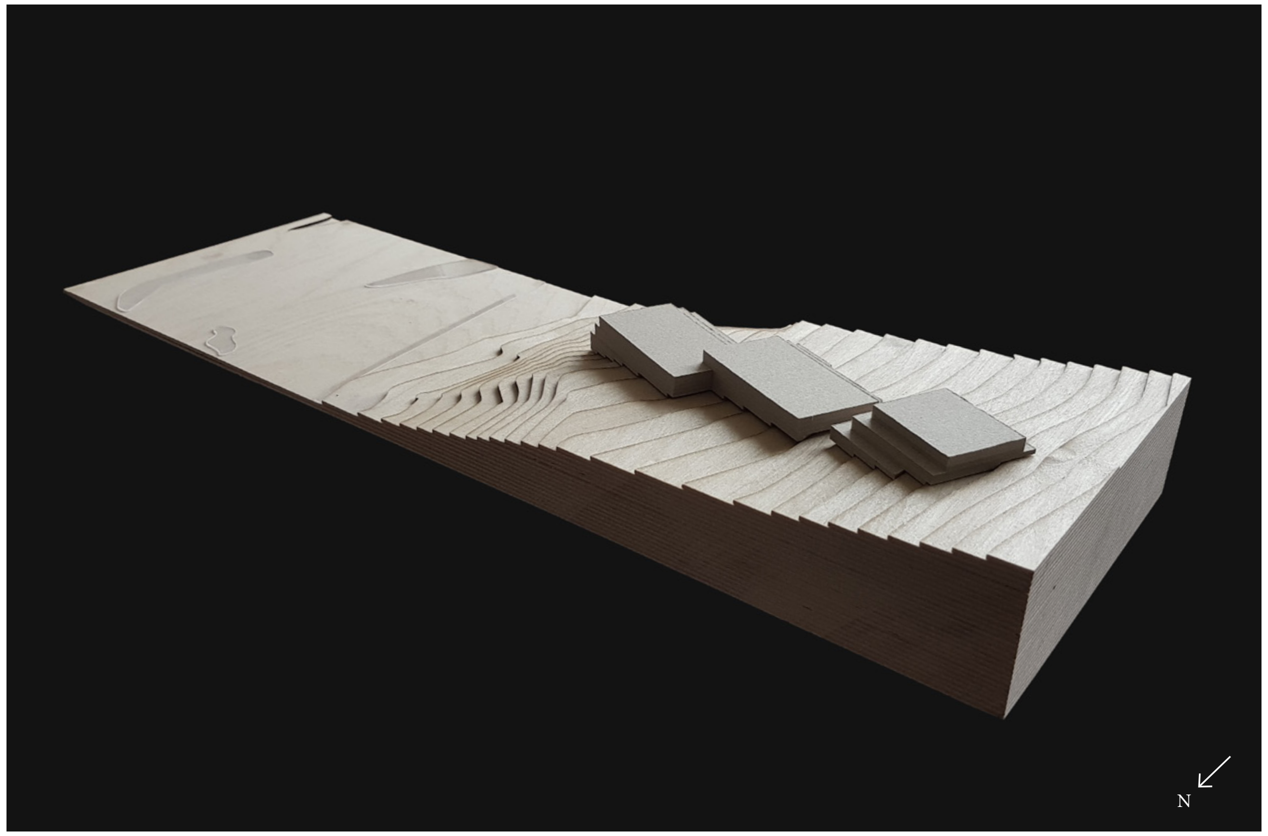
Grid Floor 2

1:1000 SITE MODEL

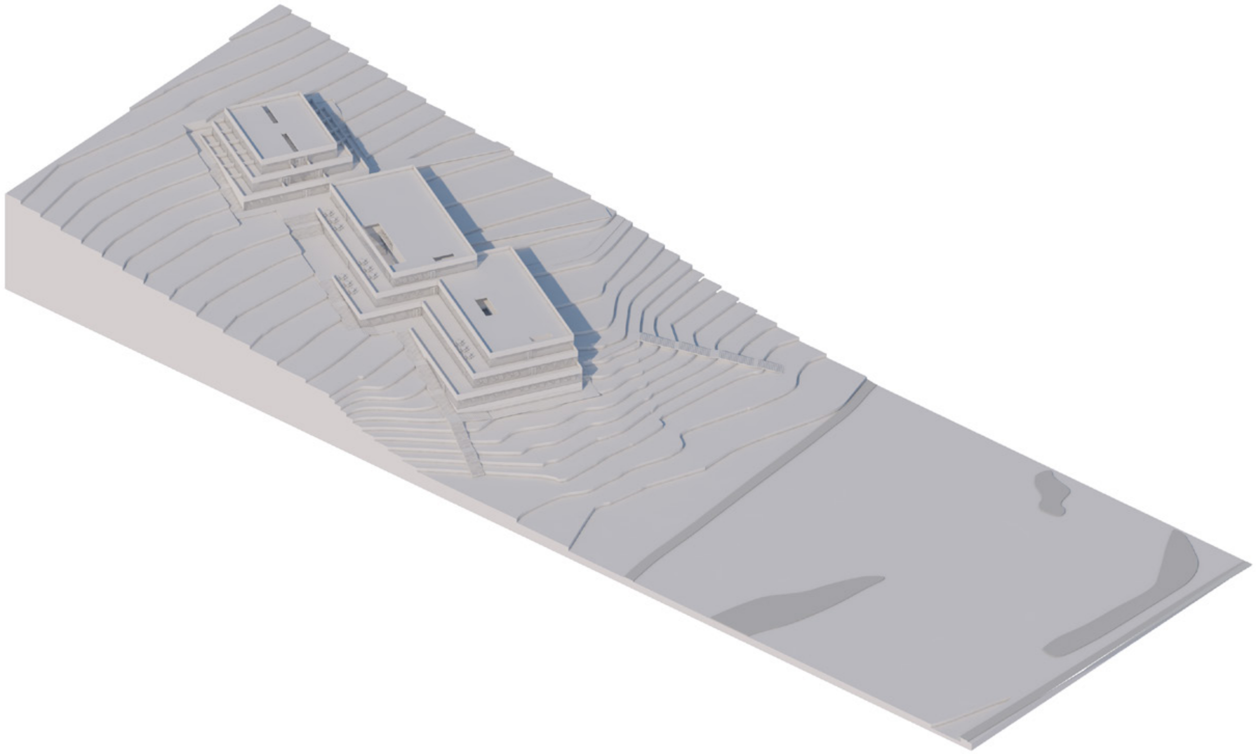
MIDTERM PROPOSAL

1:500 SITE MODEL OF PLOT

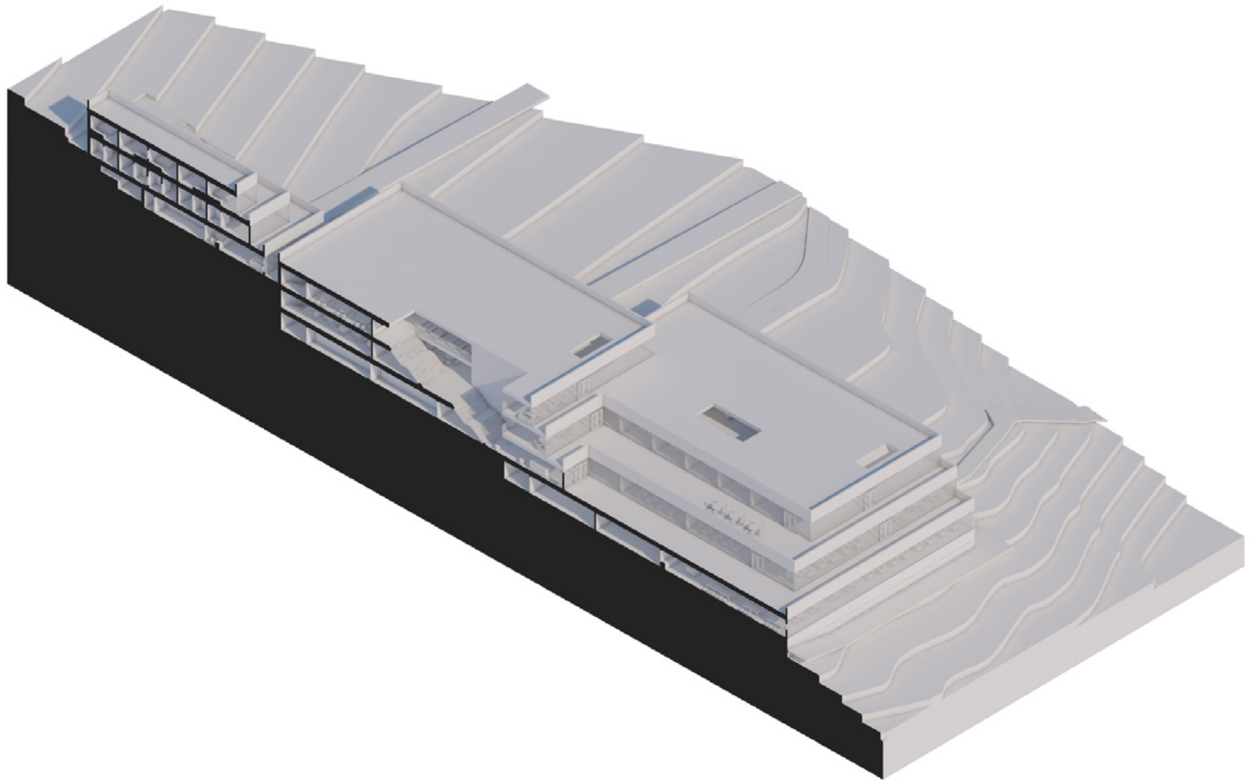




AXONOMETRIC SECTIONS

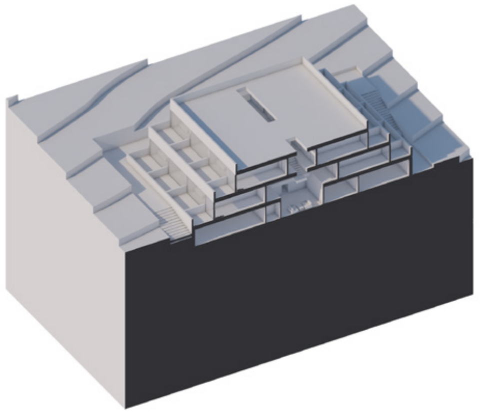


Proposal on plot Axonometric

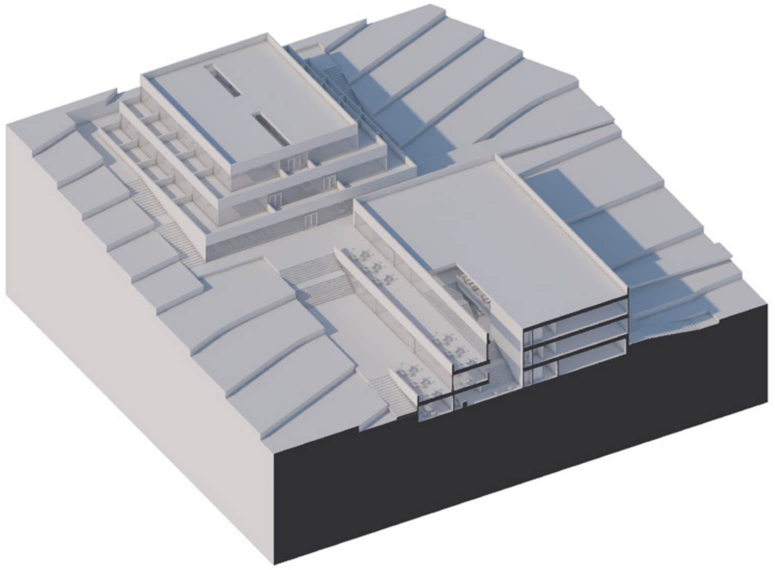


Section A-A Axonometric

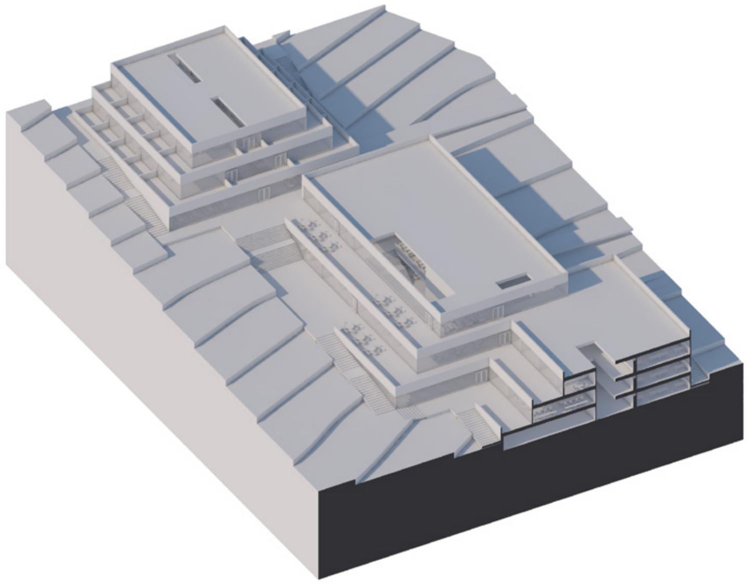
AXONOMETRIC SECTIONS



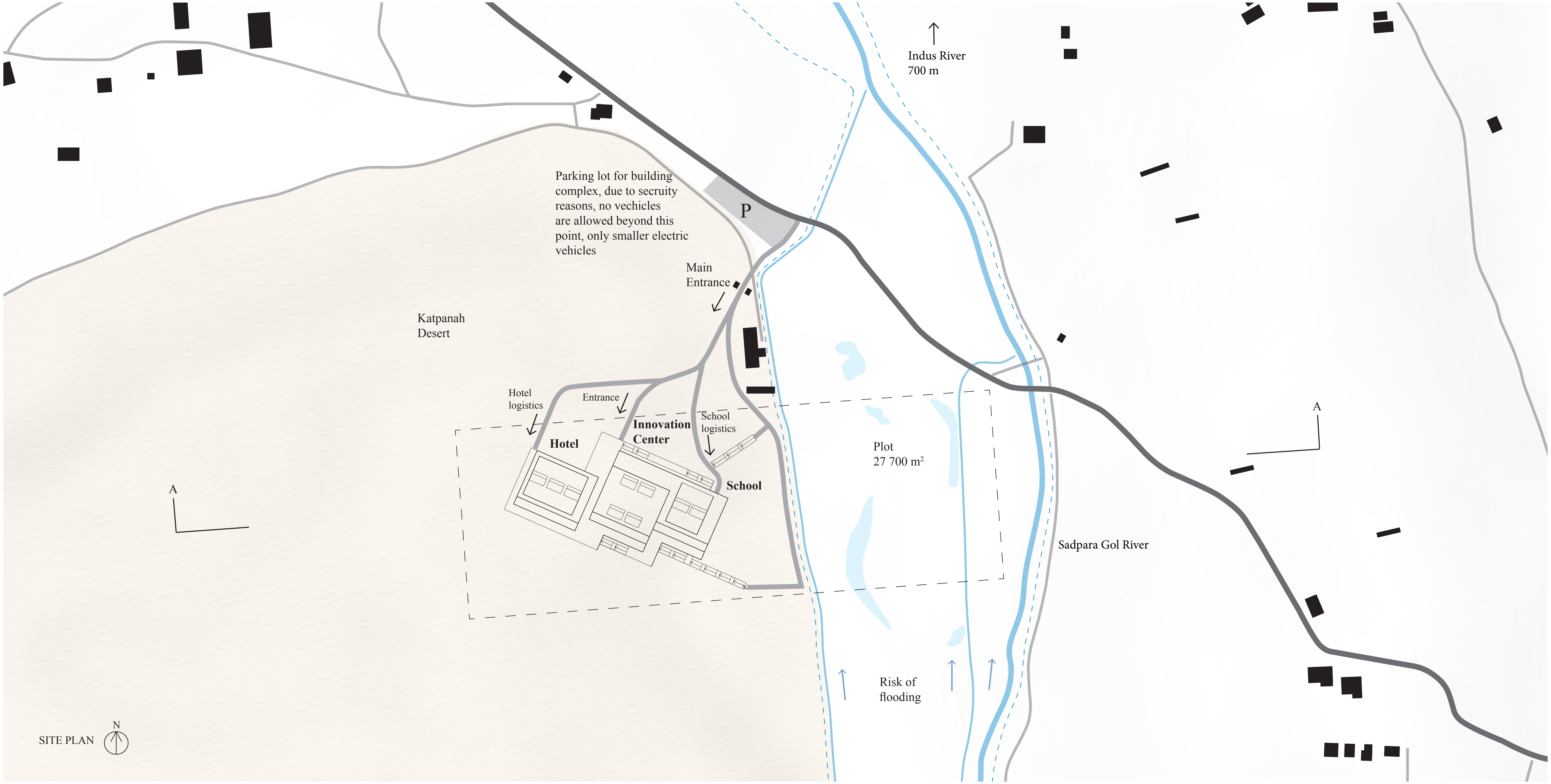
Section E-E Axonometric



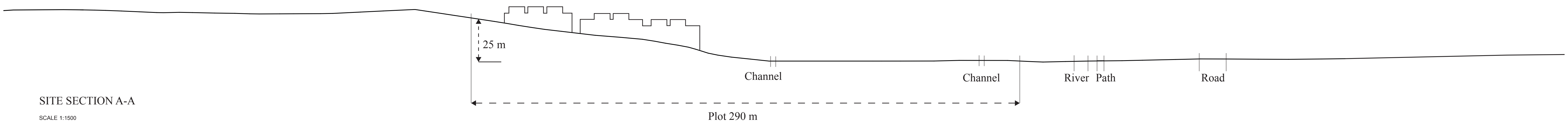
Section D-D Axonometric



Section C-C Axonometric



SITE PLAN



SITE SECTION A-A

SCALE 1:1500
0 5 10 20 50 100
METER

FINAL PROPOSAL

EXTERIOR VISUALS

Exterior perspective looking West

ACCESS AND ENTRANCE

The school children either come by school buses, public transport, walk, or by bicycles. The vehicles will need to stop outside of the plot due to security reasons.
Only smaller electric vehicles are allowed to enter all the way to the entrance.

The entrance is from the north, coming from the main road. It was decided that the entrance would not be located in the flat part of the plot as there would be a risk of the path being damaged in flood seasons. This entrance from the north also provides a more gentle and less steep path to the buildings. The entrance to the building complex is in the middle of the floor levels to give equal distances to the bottom level and the top level.

There are staircases and paths outside of the building complex that allow you to walk around the school building. Besides the main entrance path, there are additionally two paths going down the sand dunes that turn back to the main entrance. These paths make the flat part of the plot accessible which can be used as part of the school yard in the non-flood season.

ATRIUM

The staircases in the atrium continue up to the roof lights and allow you to enter to the roof tops. The intention is that on the terraces and roofs, there would be greenery in the shape of small gardens.

DIFFERENCES IN CULTURE AND TRADITION

There are a few differences in the floor plans compared to schools in Sweden. For example, the WCs need to be separated between boys and girls and are usually far apart from each other. Another difference is the role of the headmasters which have their own bathroom, while the other teachers share the WCs.

The hotel rooms have space for two double beds to allow visitors with extended families to live there which is common in Pakistan.

INTERIOR VISUALS

Interior perspective of atrium looking upwards

BUILDING LAYOUT

The buildings are grouped together as opposed to being scattered in smaller buildings as this reduces the overall building envelope, thus reducing costs and aims to make the building more sustainable. Reducing the number of staircases and transportation paths in this way as the terrain is sloping.

INNOVATION CENTER

The innovation center is where the main entrance to the building complex is located. When you enter, you will find your way to either the school section with classrooms, or to the exhibition area with a connected library. There is an auditorium for both the students and for visitors that come to see the exhibition. There is also a café and a wider staircase in which students can take a break or study. The teachers have their working spaces, together with the headmaster and nurse on the upper level of the innovation and school building.

SCHOOL

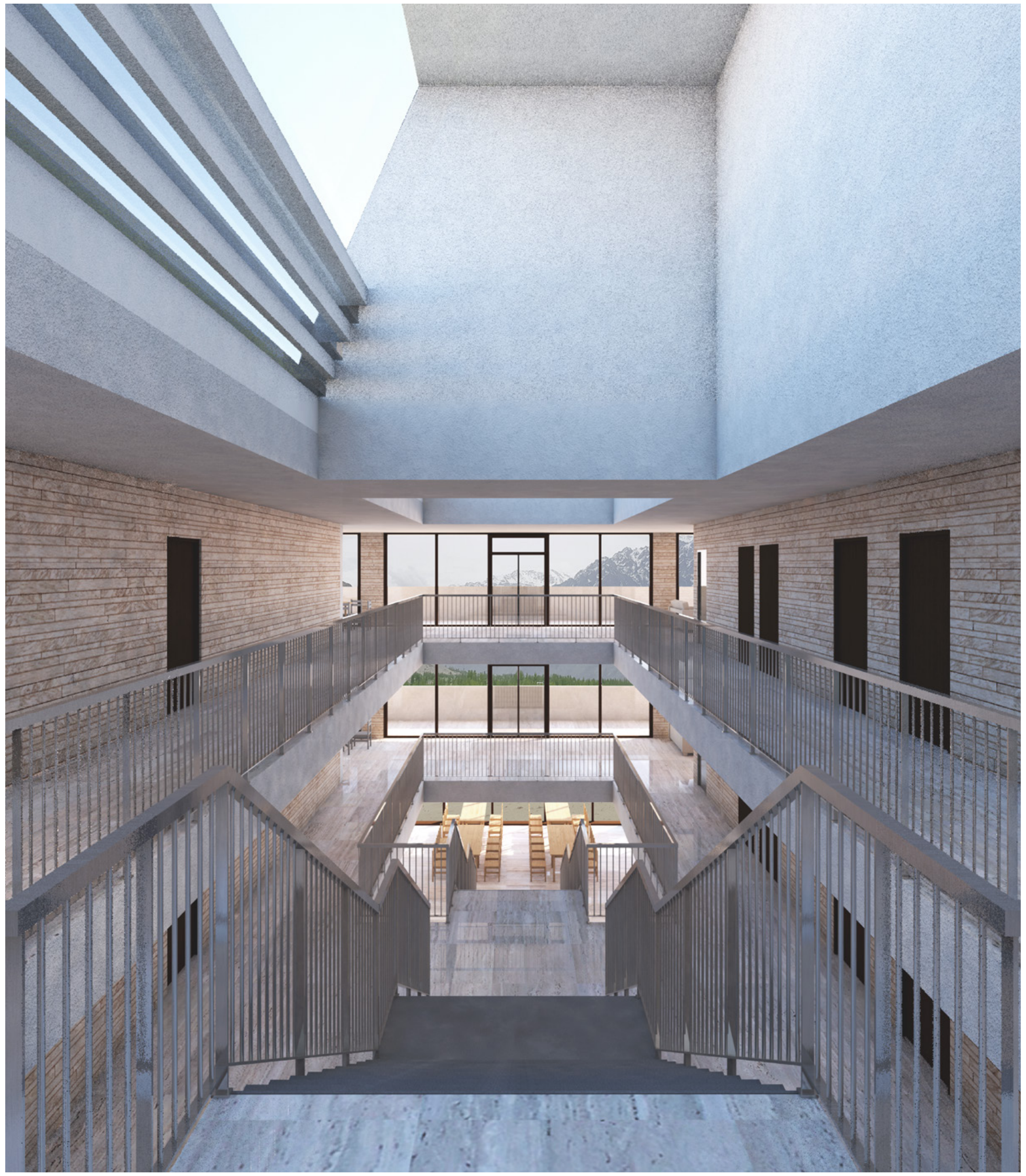
The classrooms are located on the north façade of the building to provide better daylight and avoiding the direct sunlight from the south. On the south side, there are computer labs and group rooms. There is sun shading in the form of wooden beams on the south façade. On the lowest level, you find the canteen which has a back corridor for logistics to the kitchen. On the very east façade, there are study spaces that are connected to the outdoor terraces with views over the landscape.

THE HOTEL

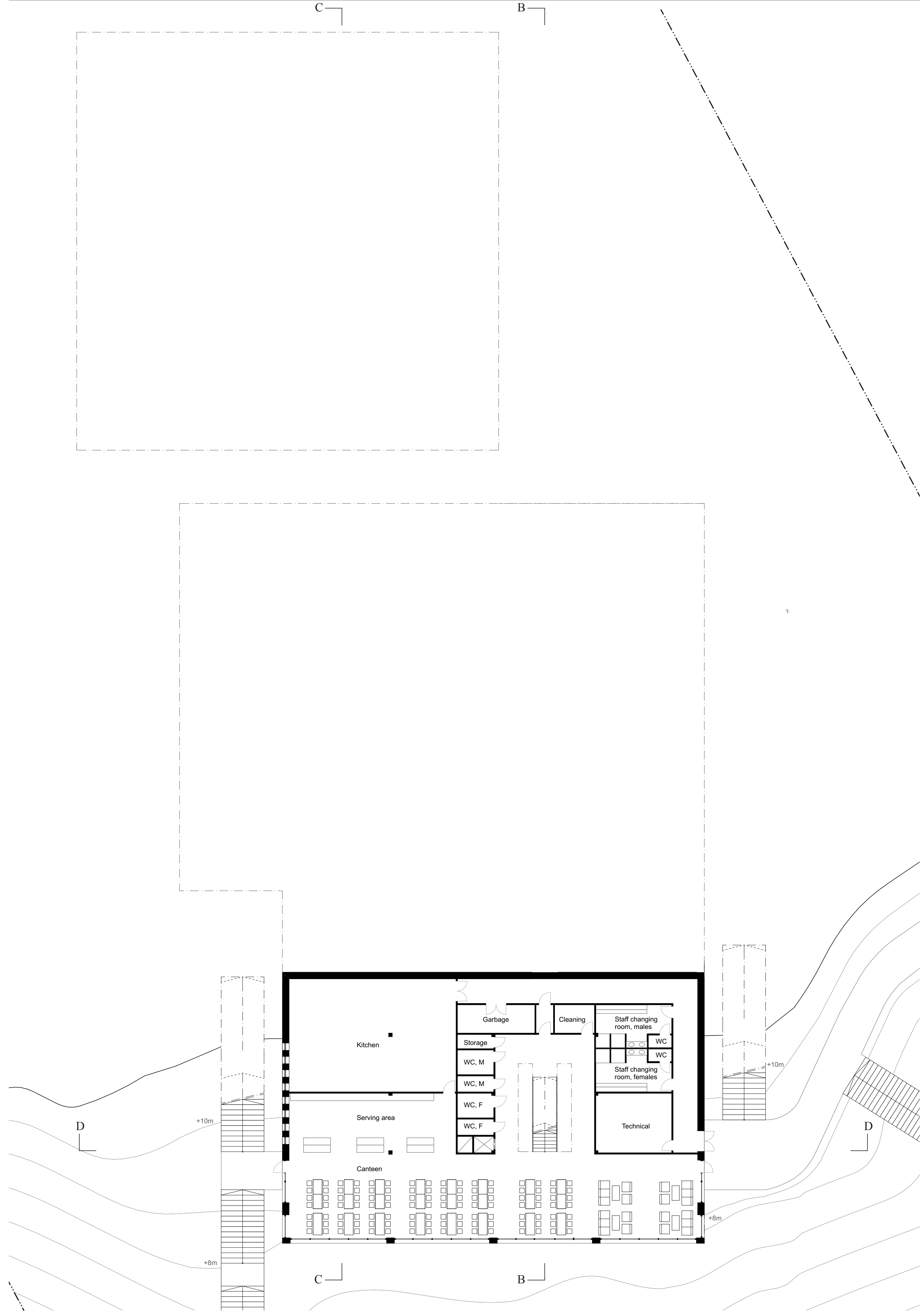
The hotel entrance is located at the lower level with the reception and conference area. On the upper level, there is the breakfast and restaurant area with an outdoor terrace to the South. Also, the back entrance for logistics to the kitchen and laundry room can be found. The upper two levels of the hotel are for the hotel rooms.

The hotel is slightly separated from the school and innovation center, as it is not intended for the students, but for external visitors. There are three larger hotel rooms with windows in two directions, the remaining hotel rooms are standard rooms. The hotel building follows the same concept as the innovation center and school building, with an atrium that lets in north light.

INTERIOR VISUALS



Interior perspective of atrium looking downwards



SCALE 1:400
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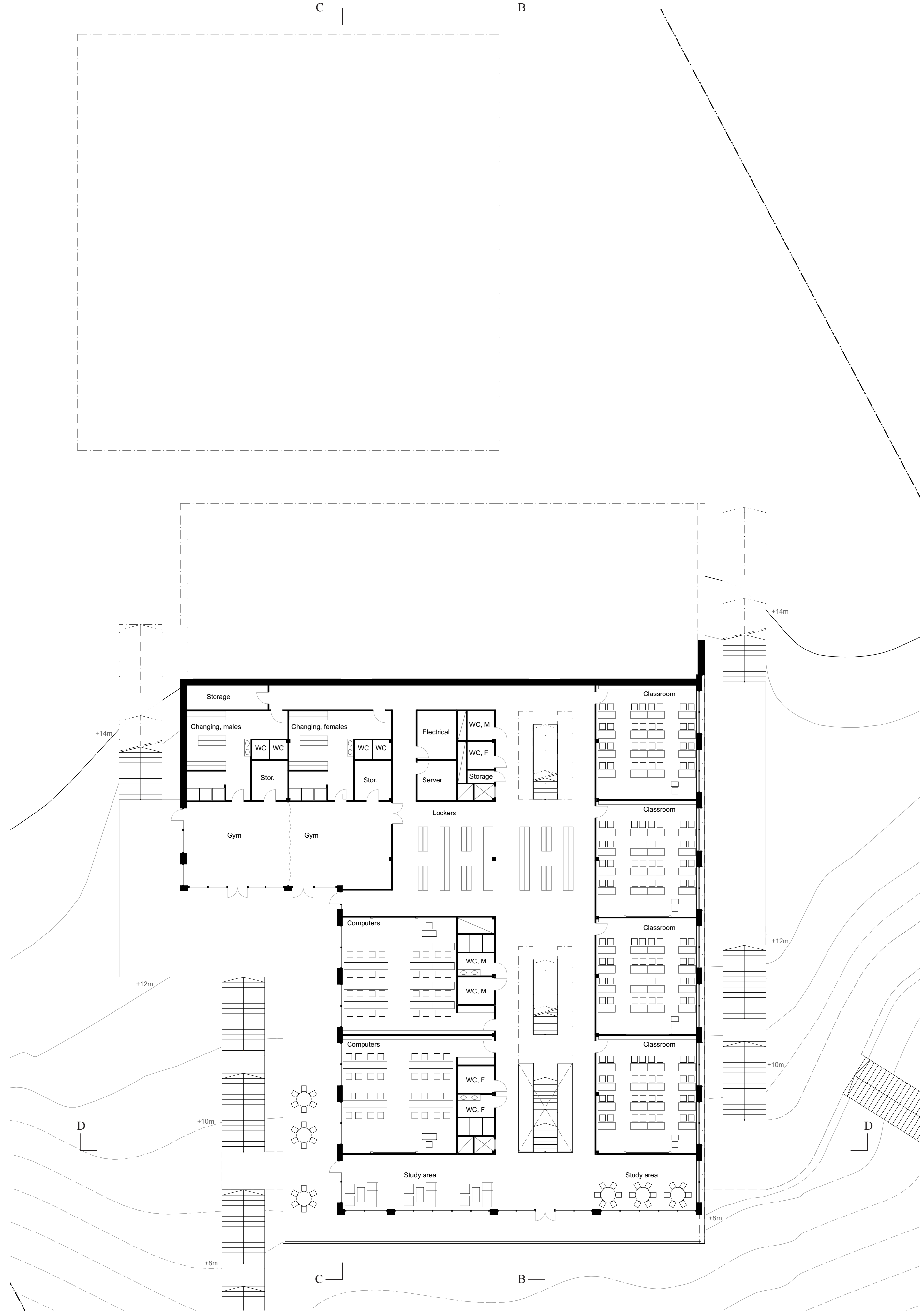
METER

FLOOR -2



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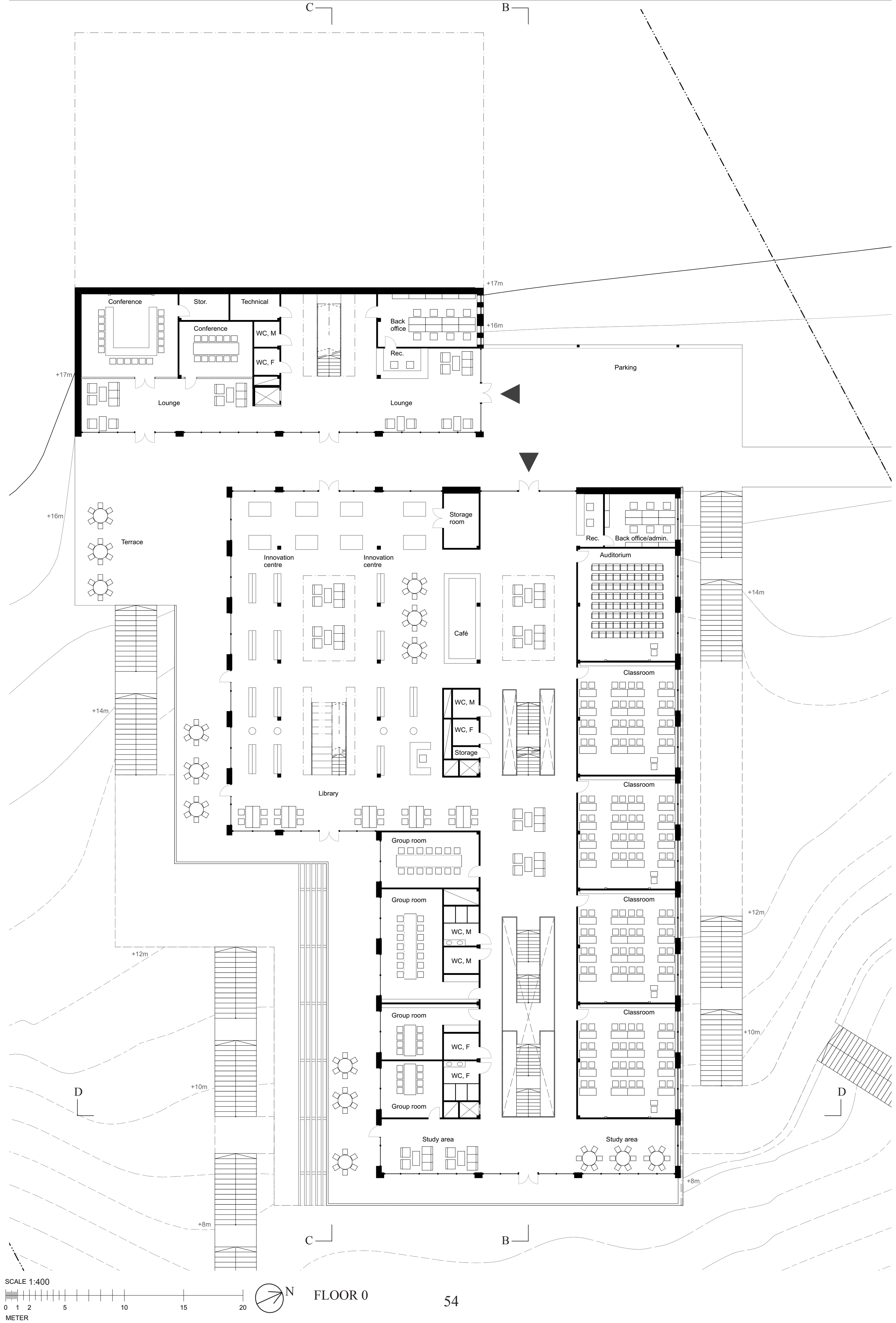
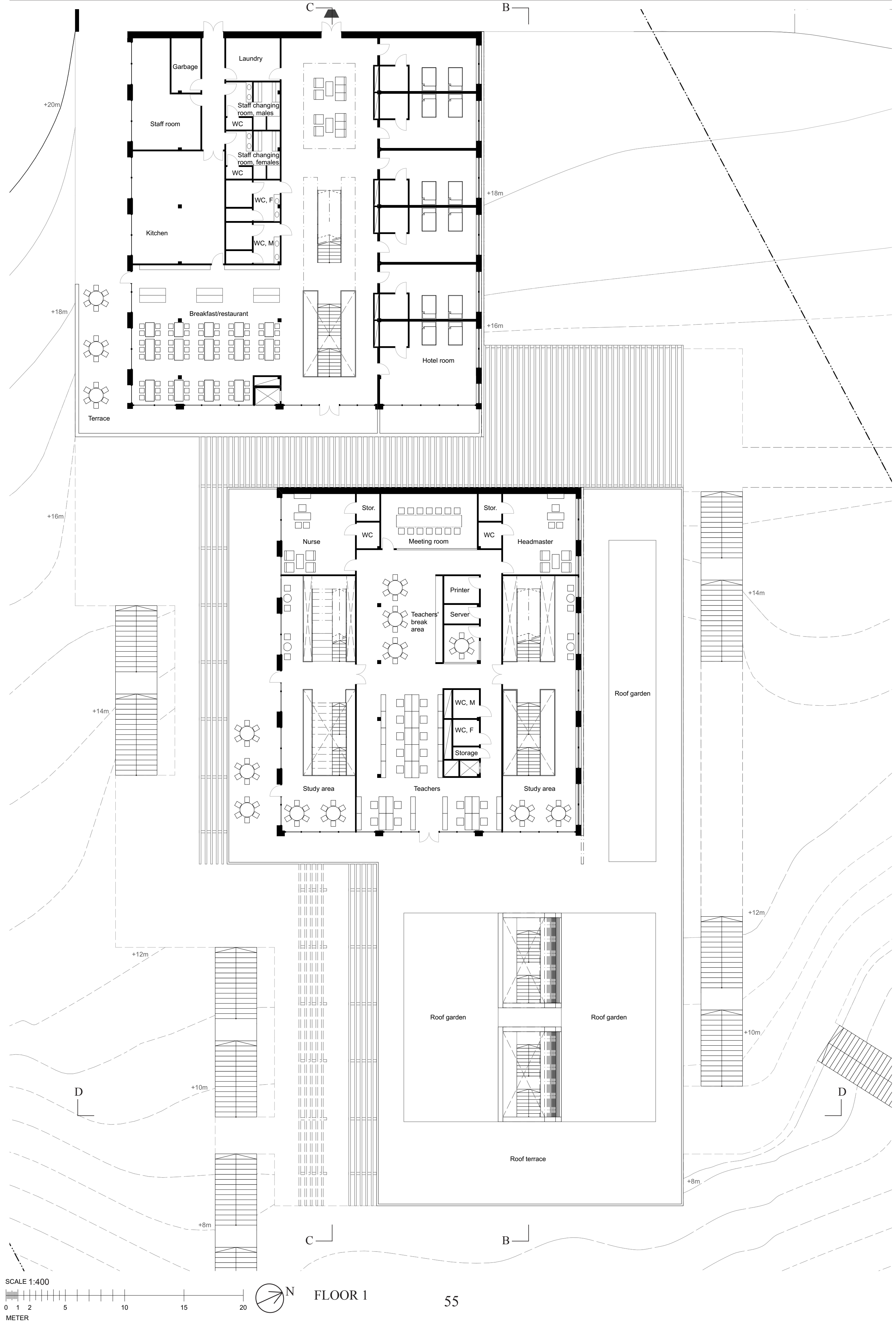
METER

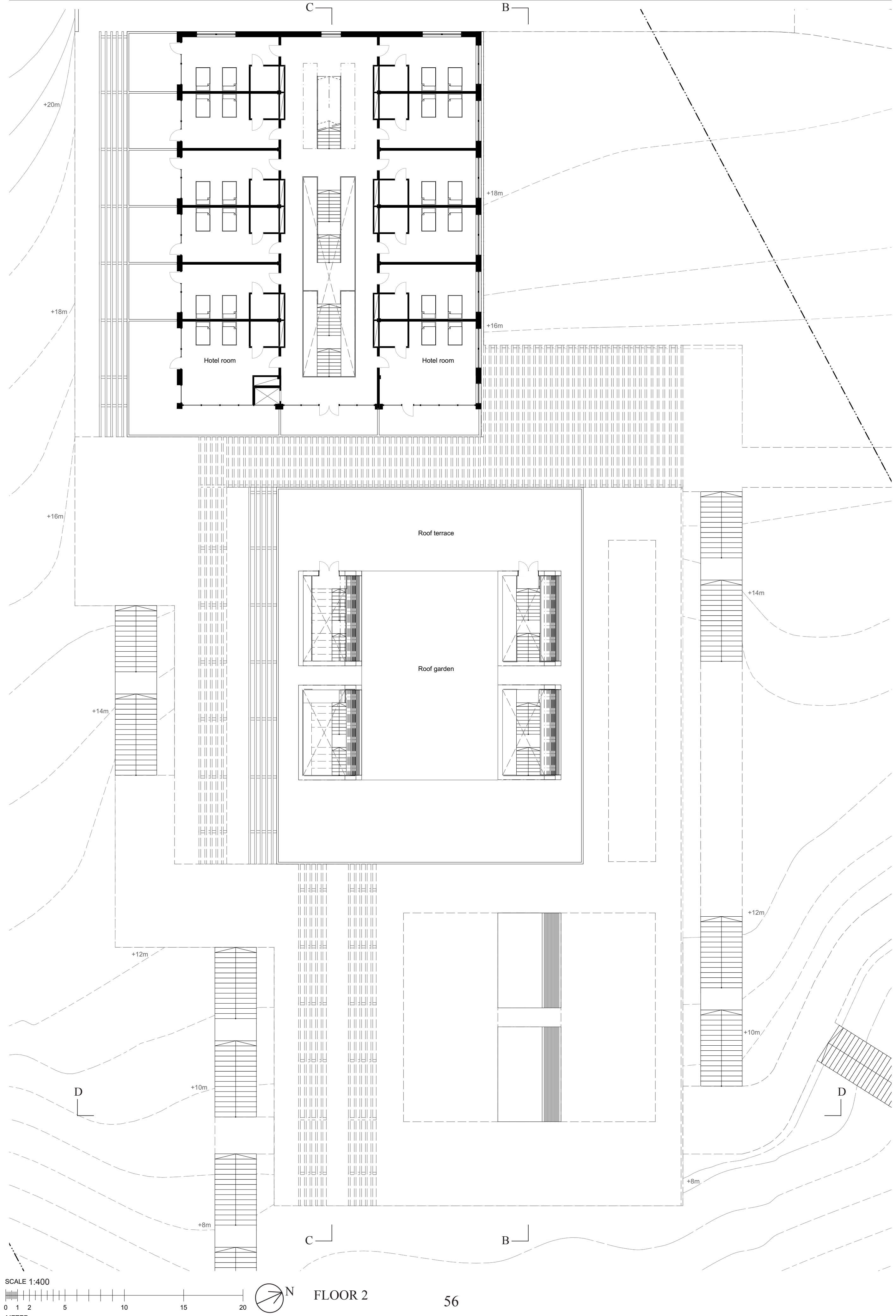
FLOOR -1



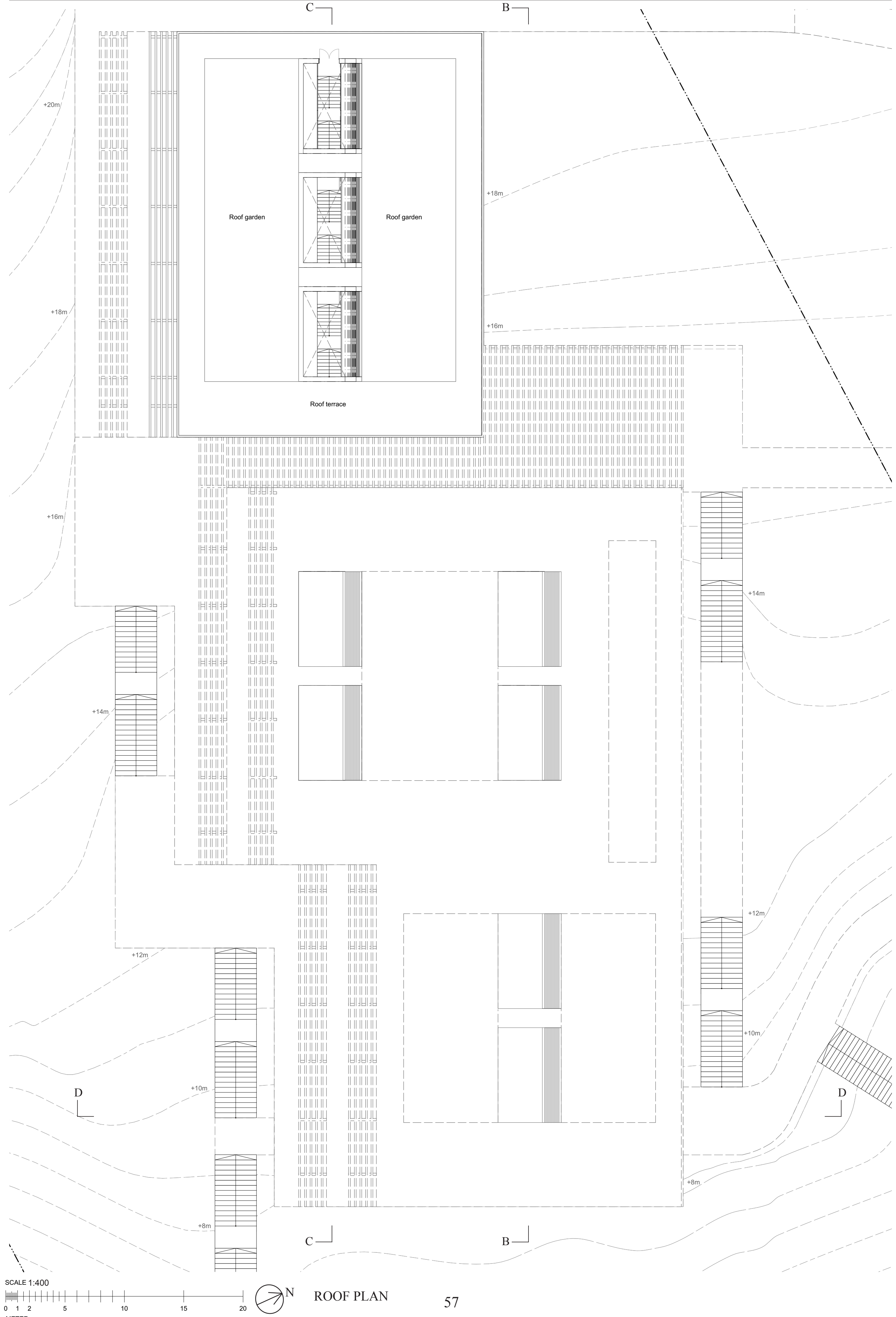
FLOOR 0



FLOOR 1

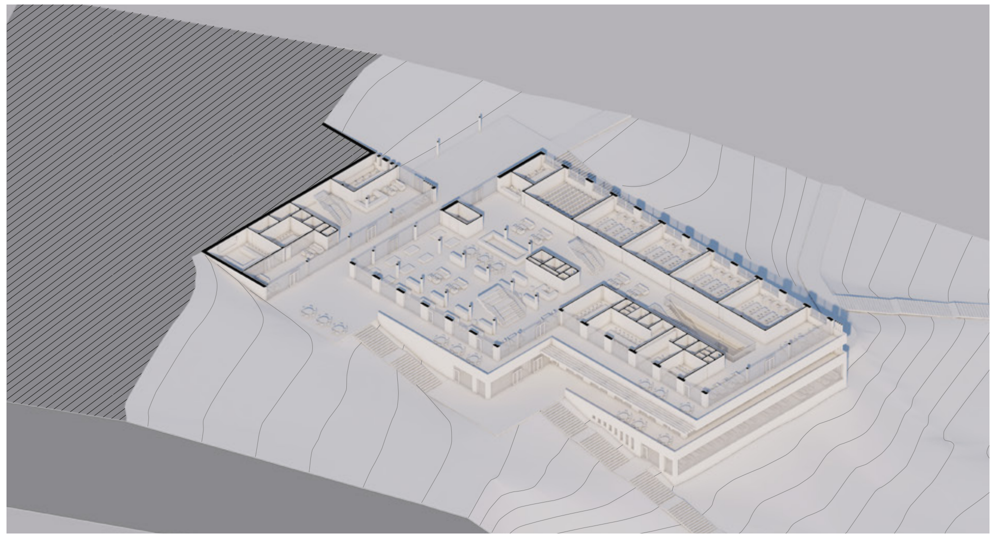


FLOOR 2

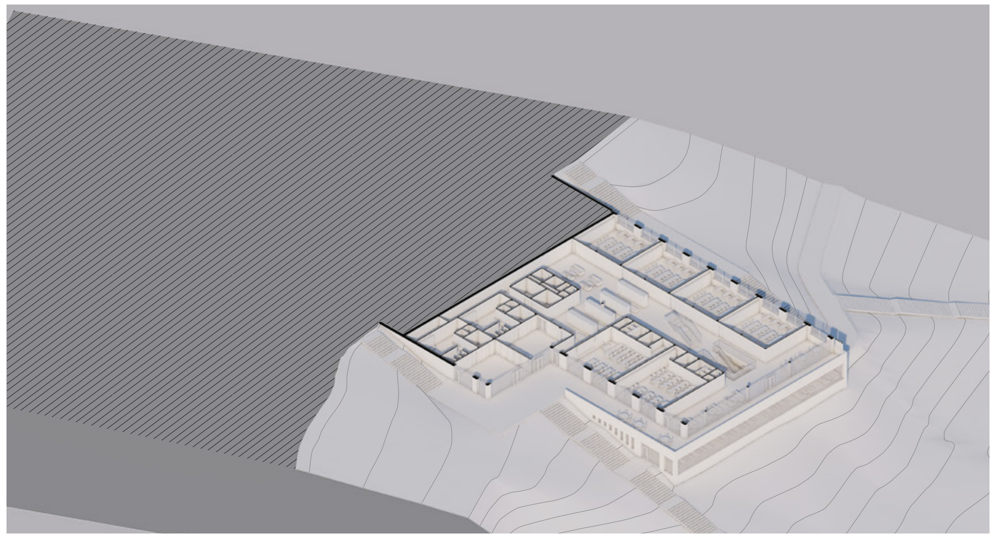


ROOF PLAN

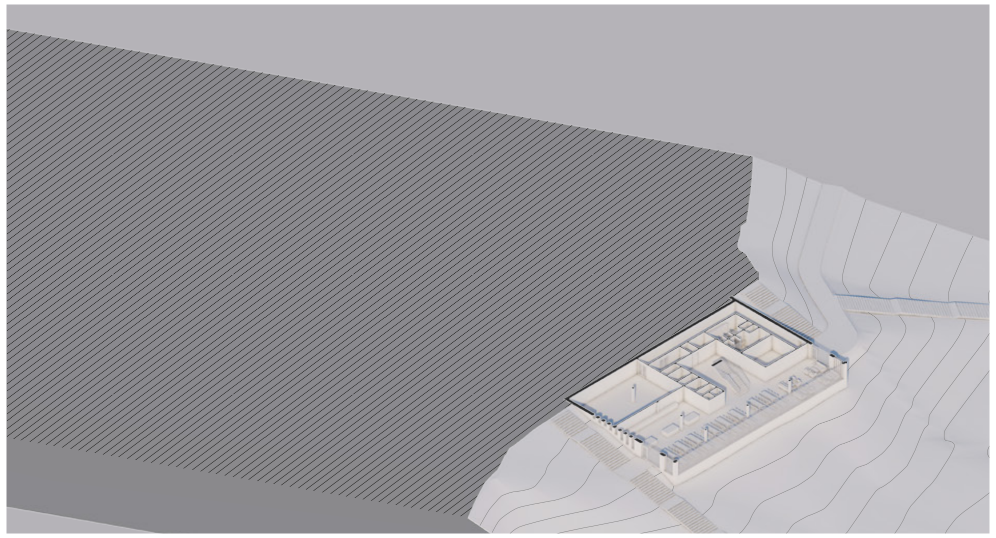
AXONOMETRIC FLOOR PLANS



Floor 0

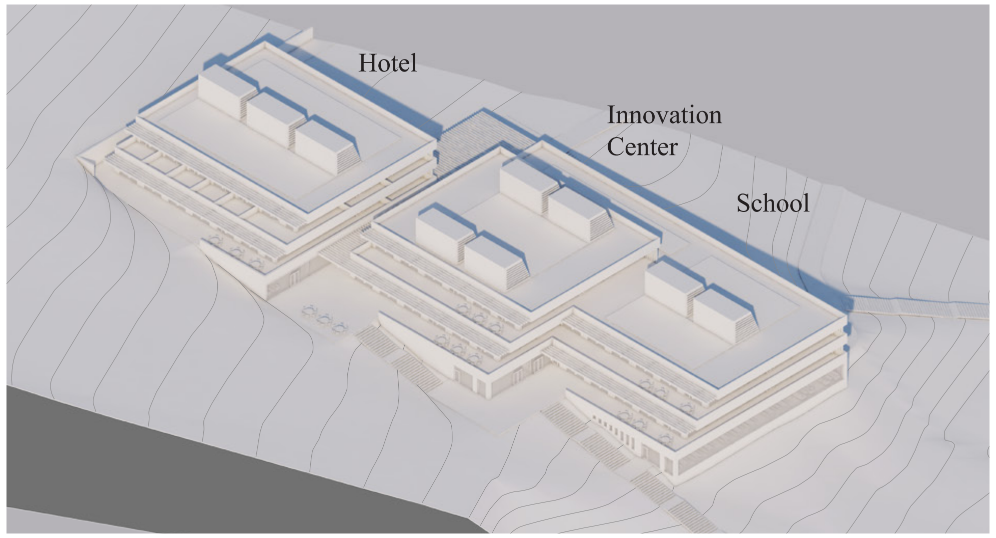


Floor -1

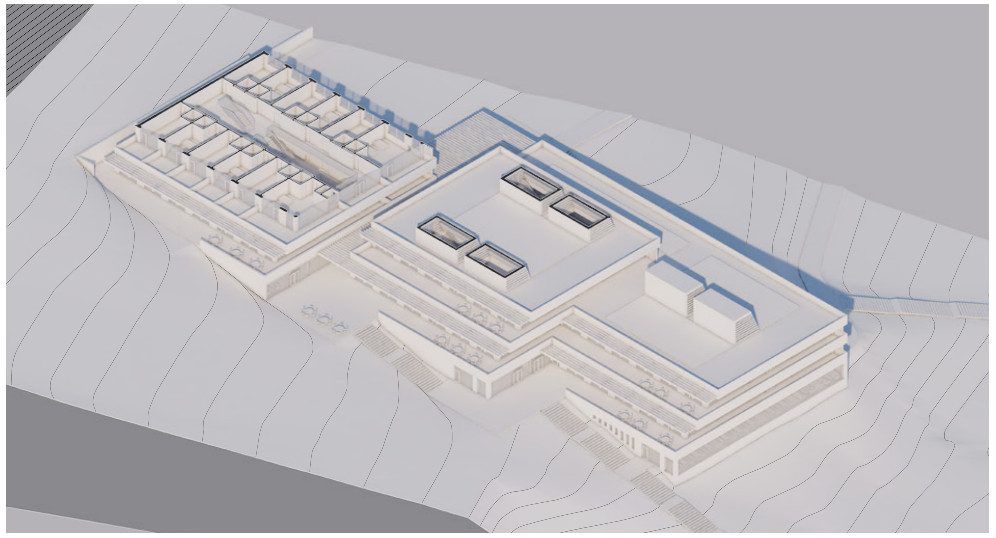


Floor -2

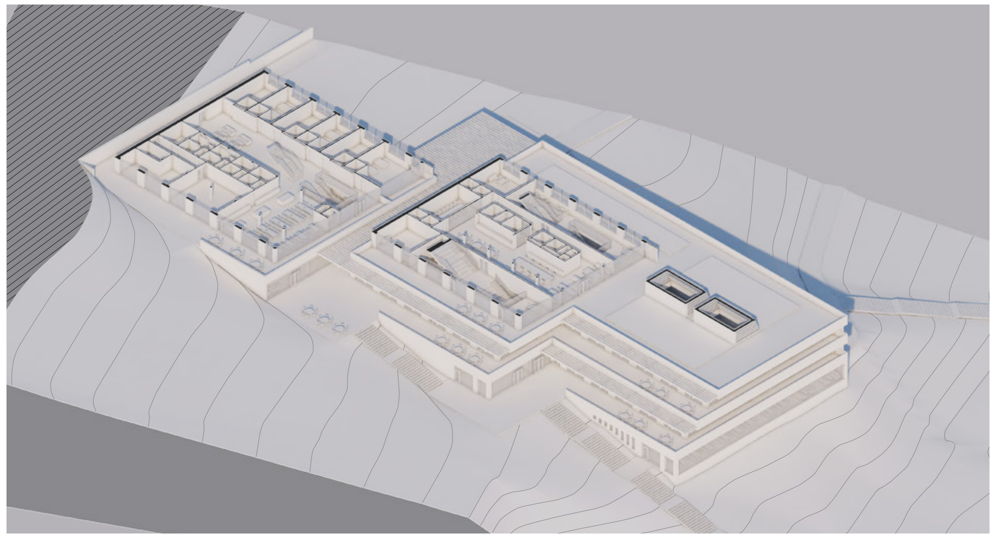
AXONOMETRIC FLOOR PLANS



Roof plan



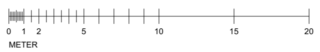
Floor 2



Floor 1

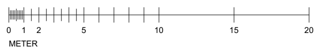
ELEVATION FACING SOUTH

Scale 1:500



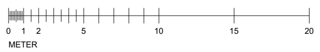
ELEVATION FACING SOUTH

Scale 1:500



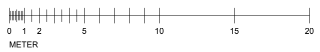
ELEVATION FACING EAST

Scale 1:500



ELEVATION FACING WEST

Scale 1:500



SECTION FACING NORTH
Scale 1:250

Scale 1:250

CONSTRUCTION TECHNIQUES

The building and construction techniques are to give a standard of a school in Sweden, with sufficient insulation to provide a warm environment in the winter and a comfortable environment in the summer with ventilation.

Even though the building regulations are not very strict in this region, the school is still intended to be accessible and follow dimensions of a school in Sweden. Such as the use of lifts and WCs for disabled people.

MATERIAL USE

The chosen materials are a tan-coloured plaster, limestone stone cladding, and stained wood from local pine trees. These materials are commonly used in Pakistan. The façade expression of the plaster and stone cladding is intended to continue around all the façades to create a coherent expression. The stone cladding is recessed slightly, while the tan-coloured plaster is extruded.

MATERIAL PALETTE

Plaster

The use of the tan-coloured plaster together with the limestone stone cladding is to allow the building to blend into the landscape of the sand dunes. Starting at the bottom levels of the buildings with stone cladding and going upwards with tan-coloured plaster to make the building feel lighter. From my observations during my visit to Pakistan, I found this use of material combination quite common. This material is also used on the inside of the building complex, such as for ceilings.

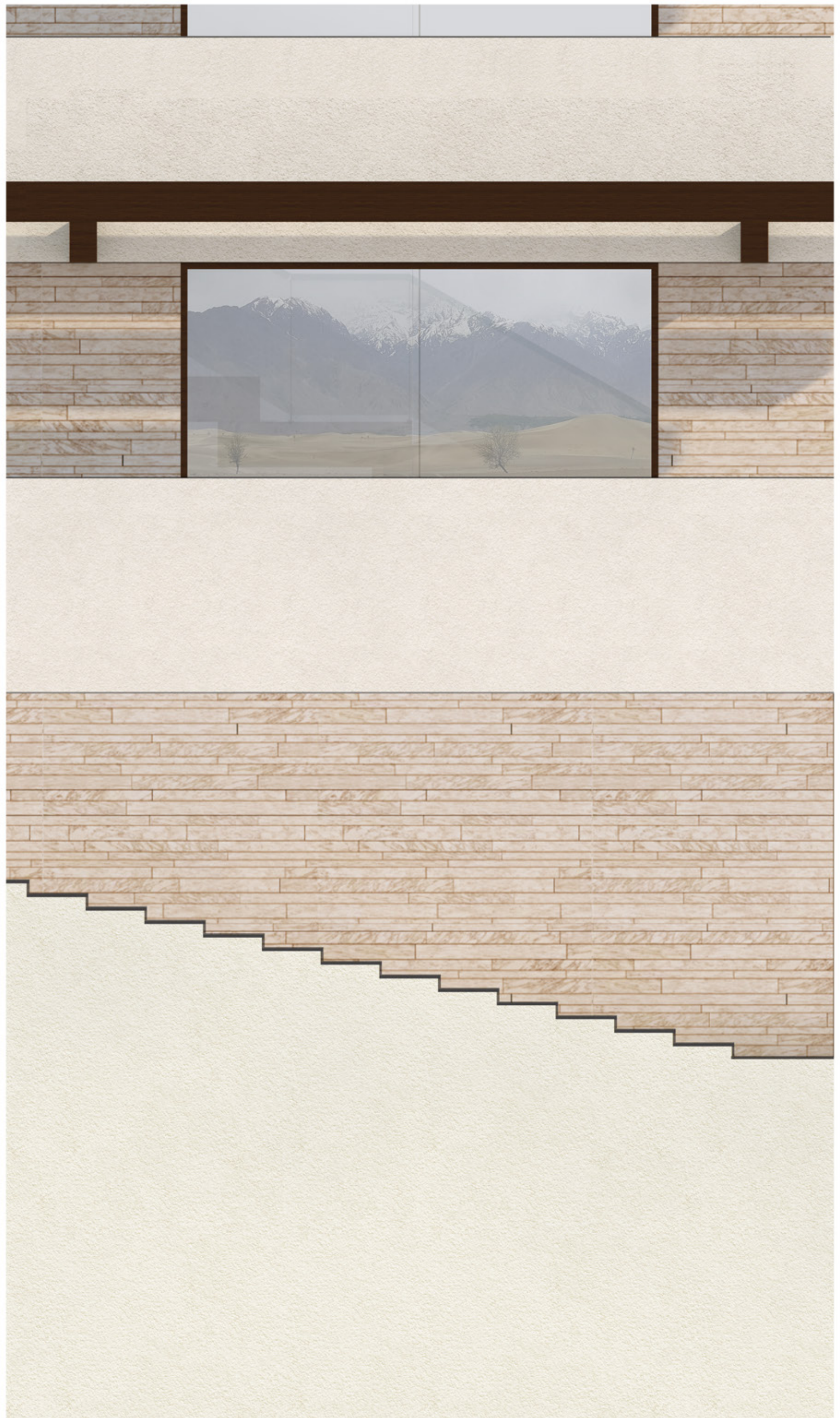
Stone cladding

I decided to take the material use a step further by altering the stone cladding to a similar pattern that has been used in the Therme Vals in Switzerland by Peter Zumthor. The pattern is then adapted to the local stone materials and colour. On the interior, this material is also used to clad exterior walls of rooms, surrounding the atrium and more public areas of the building complex.

Stained wood

The wood is mainly used for the solar shading on the south façades of the building complex. It is also used for details on the interior such as for doors and window frames.

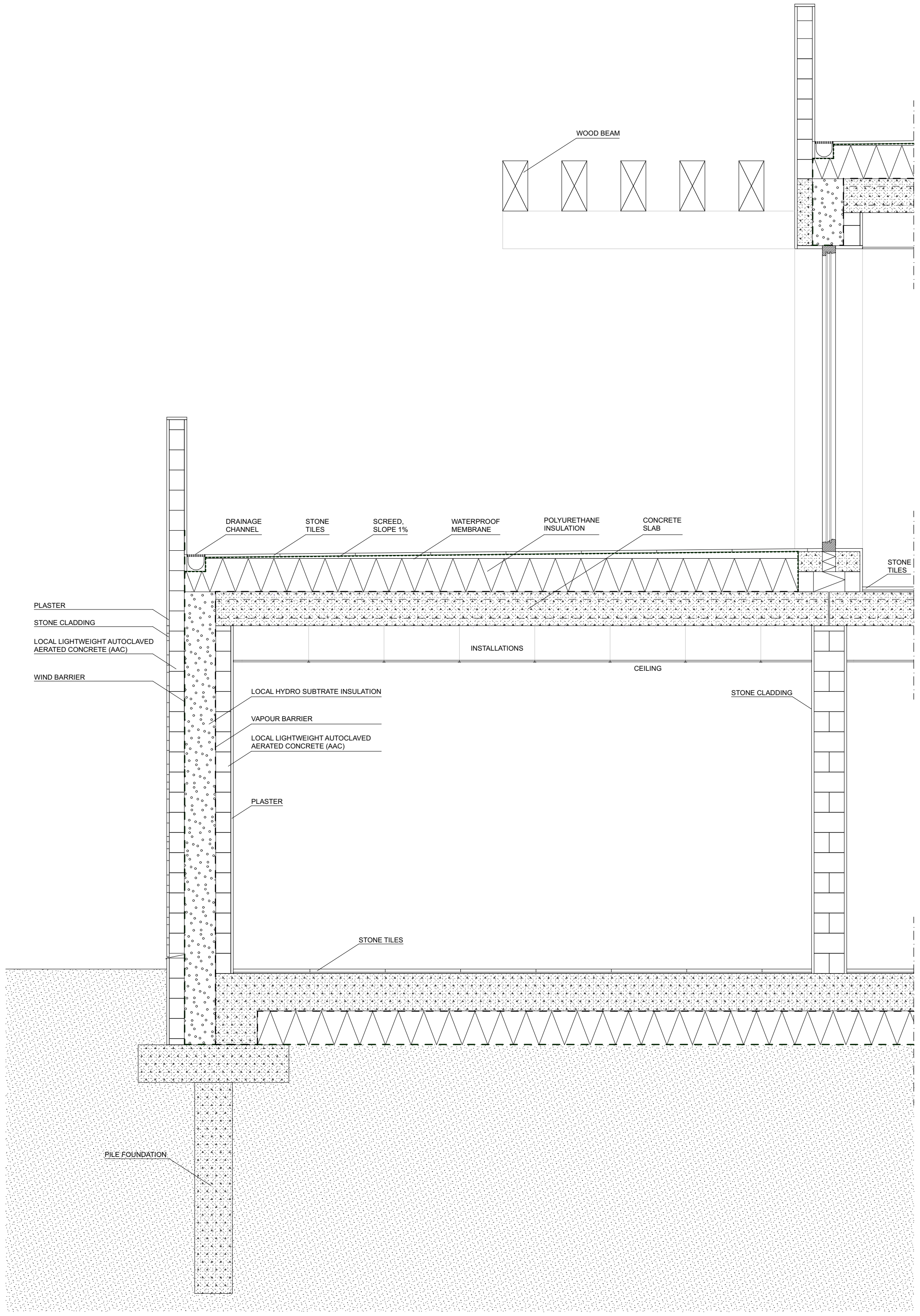
FACADE



SCALE 1:50

0 0,1 0,5 1 1,5 2
METER

DETAIL



SCALE 1:50

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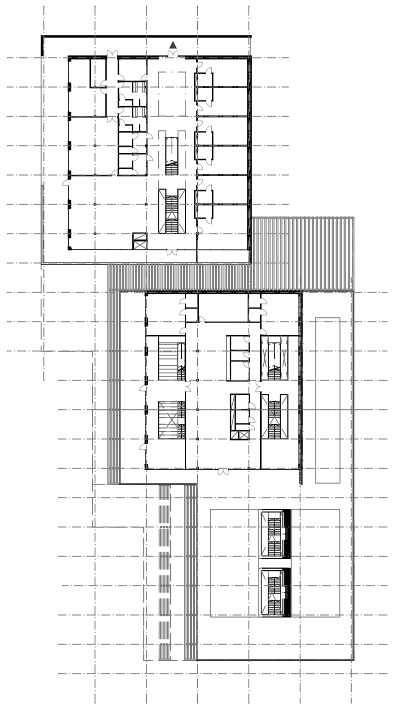
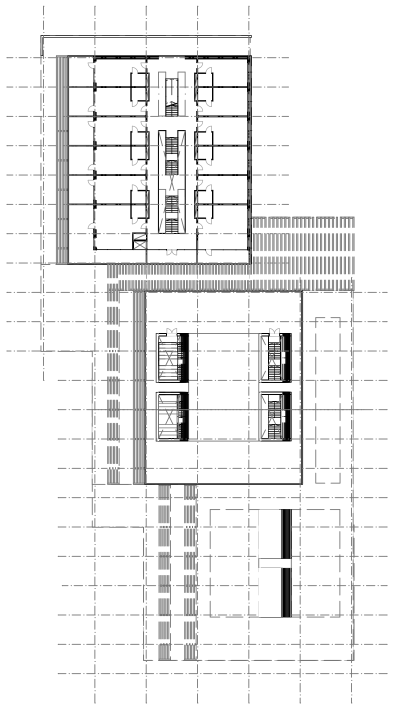
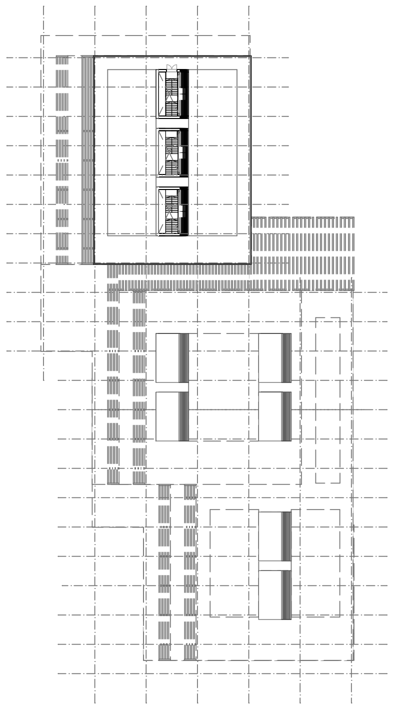
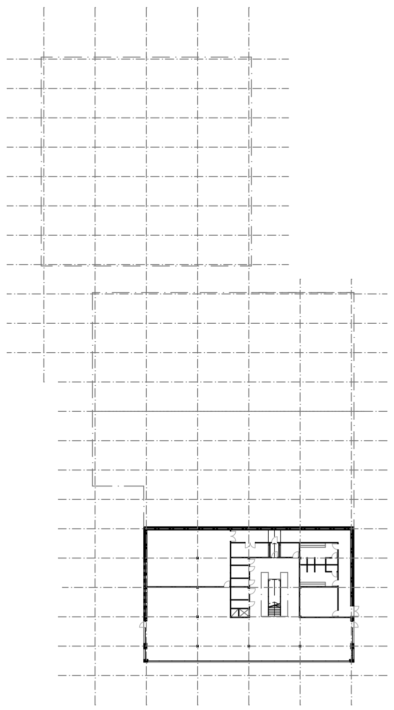
METER

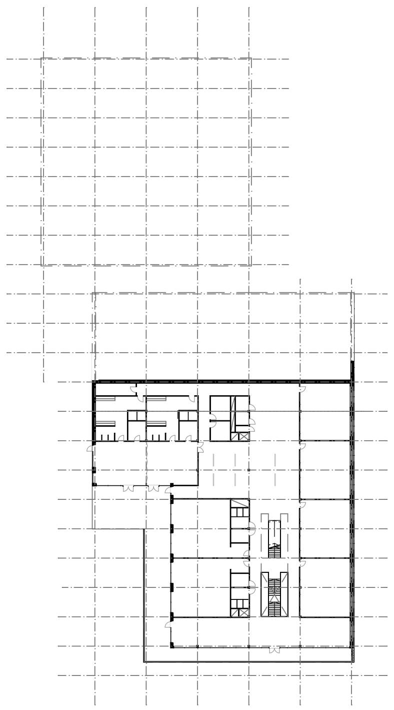
CONSTRUCTIONAL GRID (8,4 x 4,8 m)

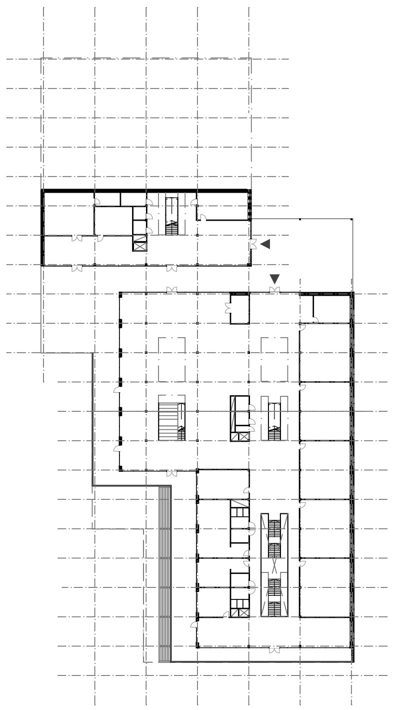

Floor 1


Floor 2


Roof plan

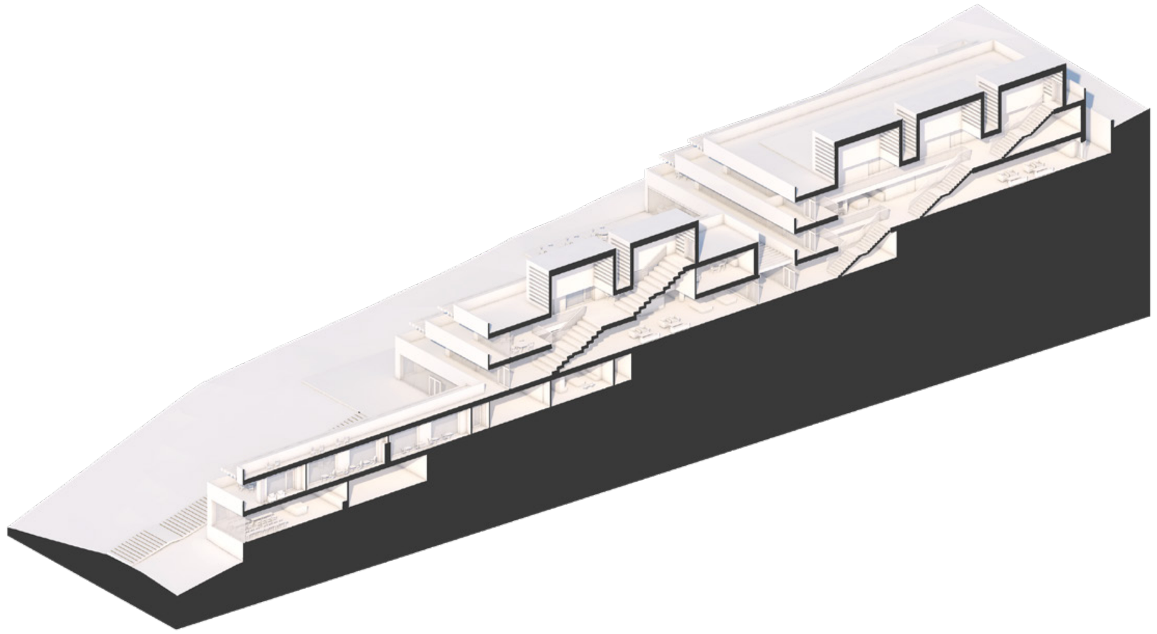

Floor -2

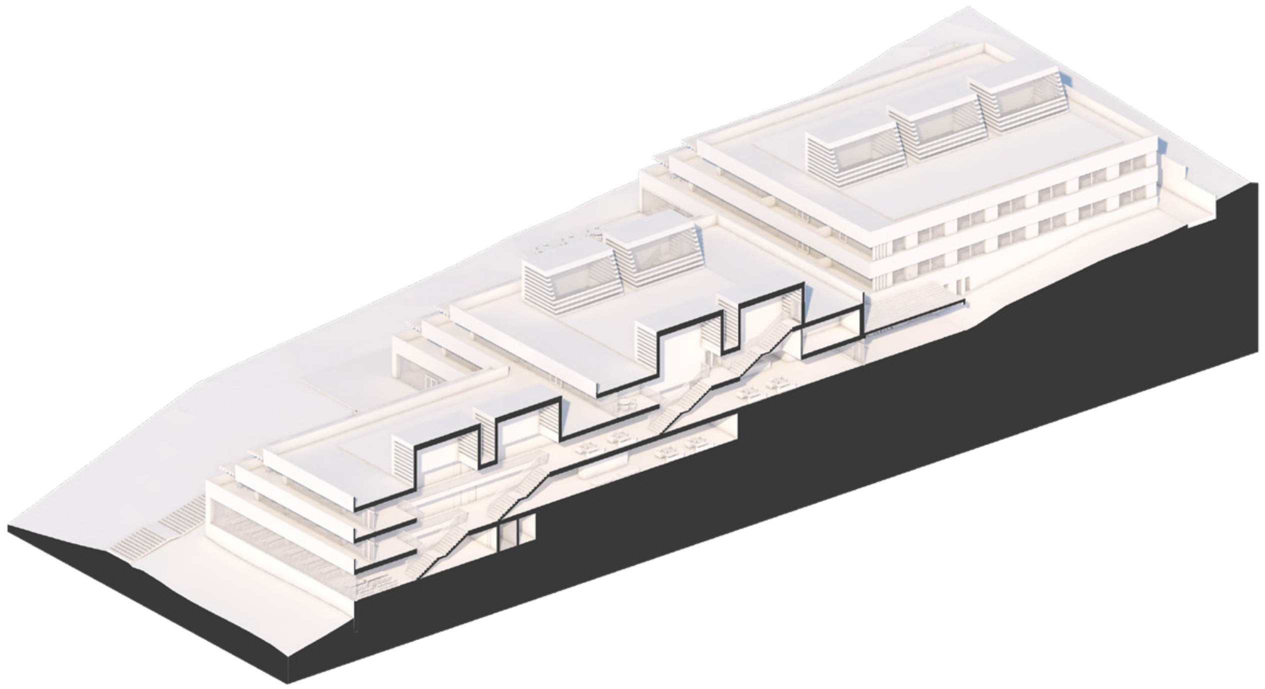

Floor -1


Floor 0

The construction grid has changed to 8,4 x 4,8 meters and continues throughout the building complex. It was chosen as the dimensions turned out to work the best with the space program, from classrooms to hotel rooms.

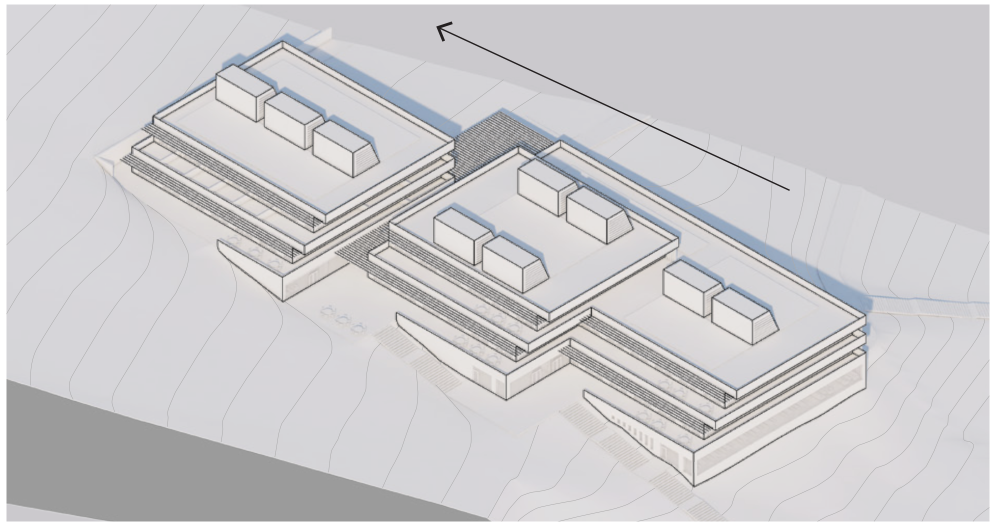
AXONOMETRIC SECTIONS


Section C-C

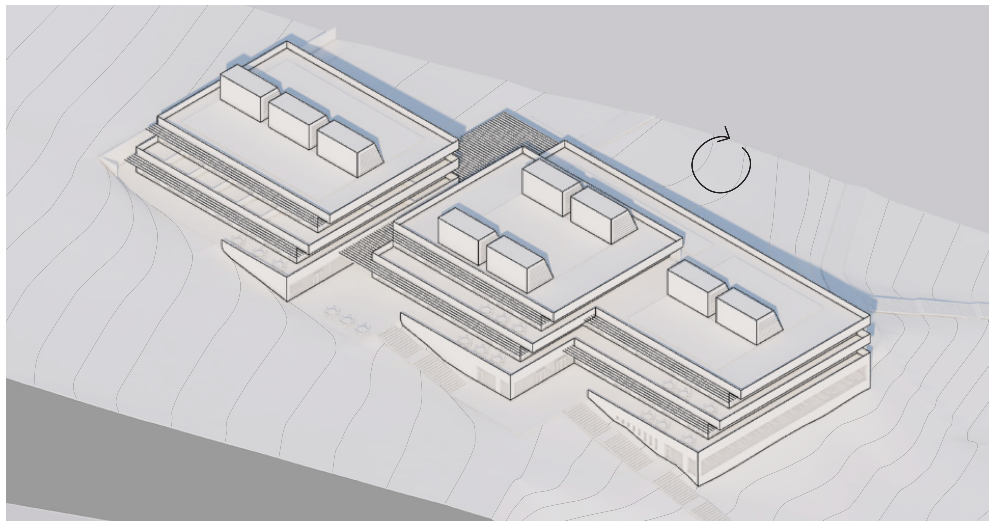

Section D-D

PLACEMENT IN THE LANDSCAPE/ DESIGN DECISIONS

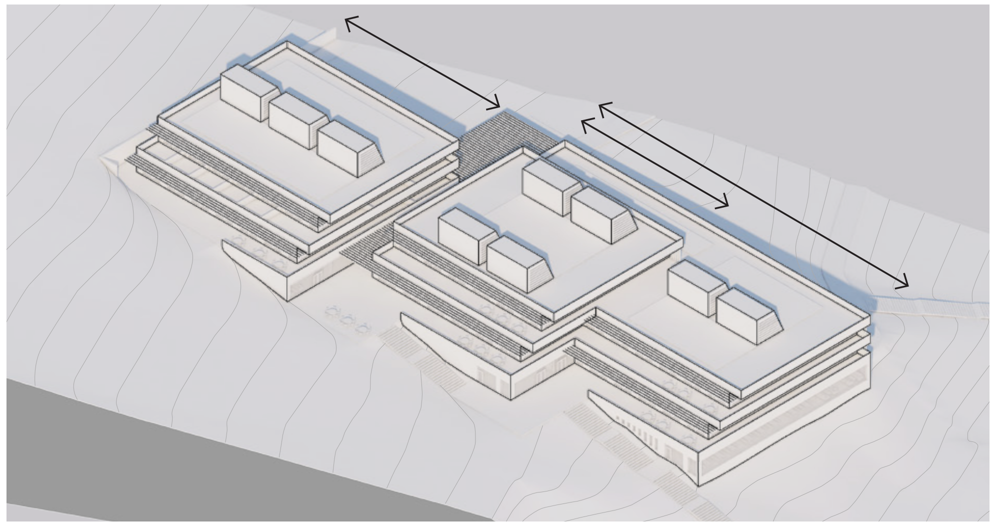
Buildings to follow the direction of the landscape and fit within the plot boundaries



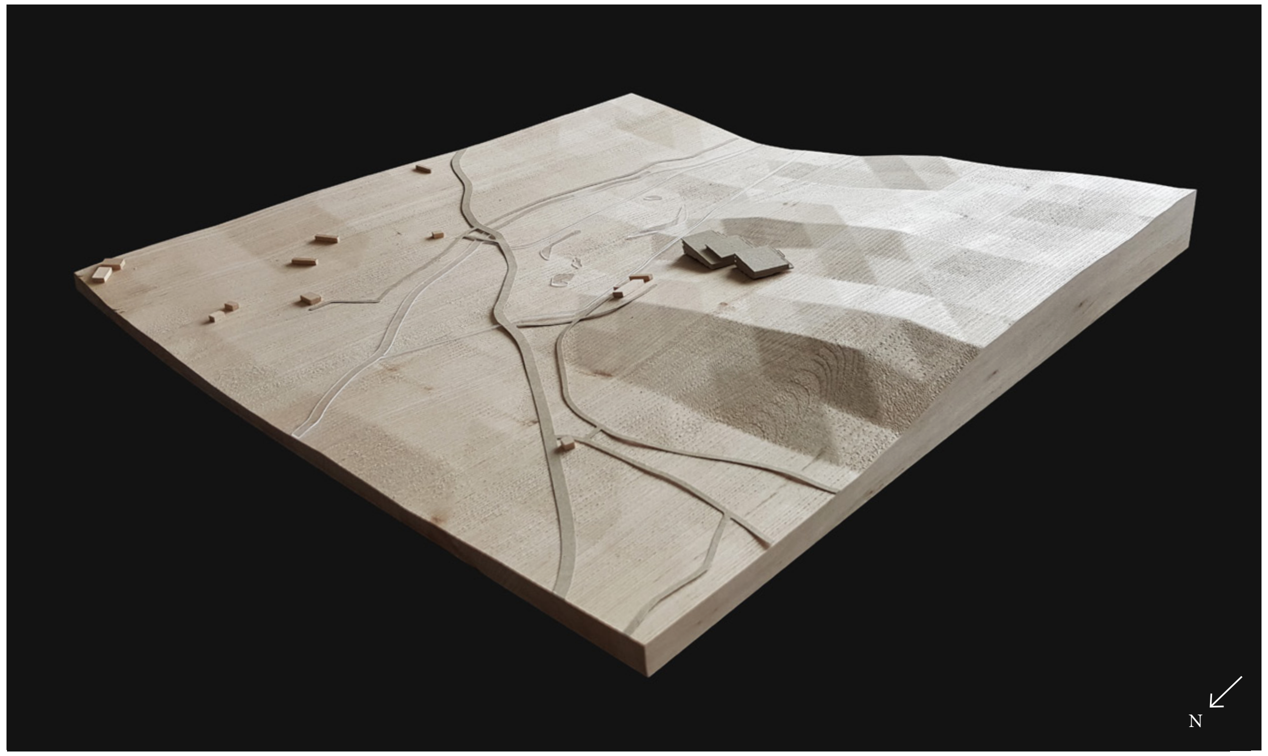
Buildings rotated to fit within the plot boundaries



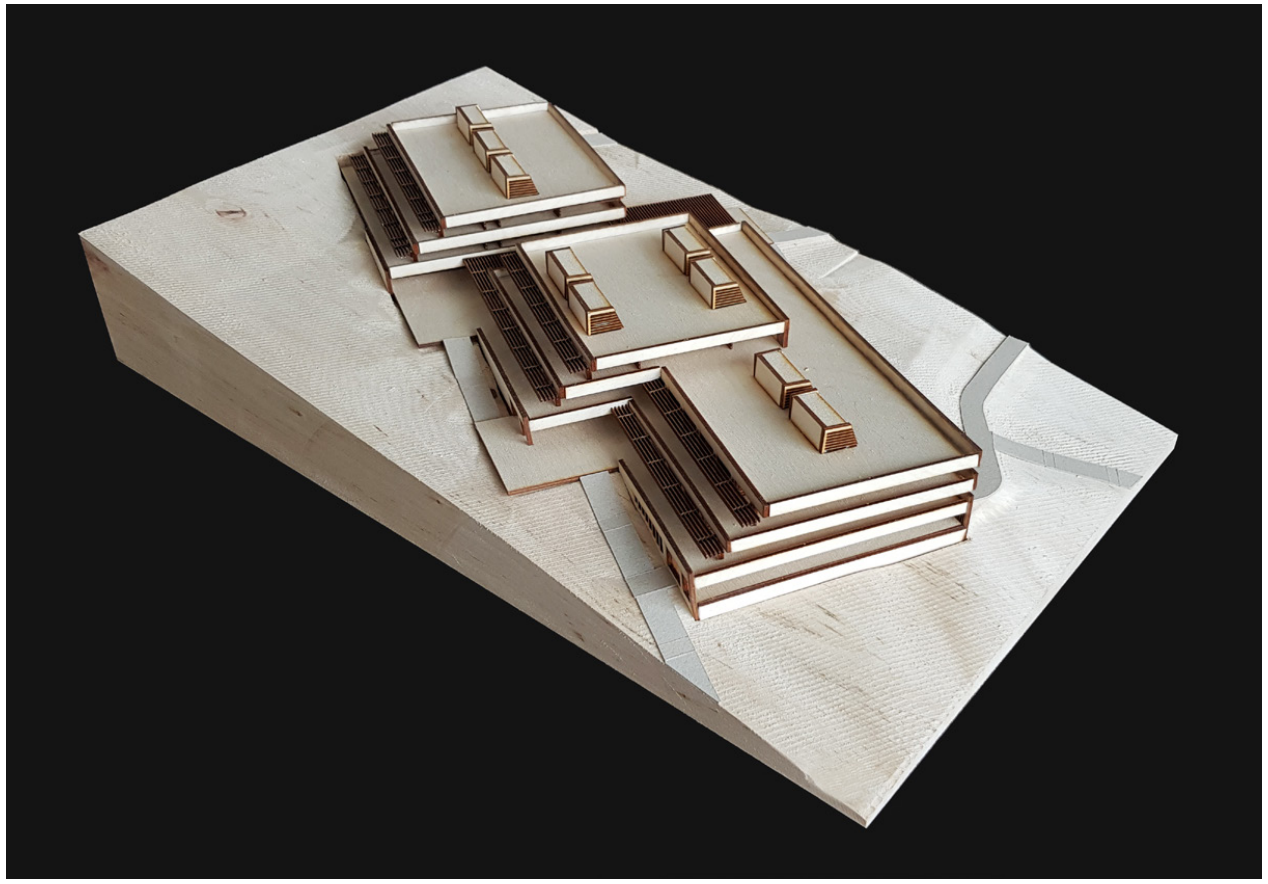
Buildings in different sizes to fit the different programs and functions



1:1000 SITE MODEL



1:200 MODEL OF BUILDING IN LANDSCAPE



1:20 MODEL OF DETAIL SECTION

CONCLUSION

My proposal is one way of how a complex building program can be positioned into a complex landscape of the sand dunes at this site. The master's thesis has allowed me to achieve a much better understanding of how to deal with larger building complexes and adapting to a complex landscape. I think this is knowledge that I can apply in many other projects in the future in similar sloping terrains. I have been able to work in 3D models, both digitally and physically, and constantly check in relation to the landscape.

The use of atrium is a way to deal with daylight and ventilation where it may be difficult to receive daylight otherwise in a very large building. The placement of the incremental levels along the sloping landscape has been placed in a way to minimise digging into and altering the landscape, which also minimises rooms without access to windows and daylight.

The proposal has aimed to follow the direction of the landscape and to blend into it with its use of materials combination. The building complex has also made use of local building techniques and building materials to fit into its environment and setting. A coherent design language across the entire building complex that connects the façades expression as a whole.

REFLECTION AND DISCUSSION

The use of roof lights and atrium help with diffused light reaching down into the buildings and can be used for ventilation purposes. The atrium could be aligned through all the buildings, including the hotel to allow a greater connection between the buildings. The use of stained wood as solar shading is one way of dealing with the direct sunlight and is traditionally a very common solution in this part of the world. However, another solution would be to extend the terrace slabs and provide larger terrace spaces.

The use of terraces could have a greater variety of sizes or possible extensions into the buildings. The terraces could also continue around on the north façade of the buildings, which was thought about earlier in the design process. However, it was discarded as it could disturb the classrooms on the north façade when acting as a secondary transportation route. A thought however, was that the terraces on the north façade could be more for outdoor activities for the classrooms as opposed to acting as a transportation route.

The building complex has been worked greatly in section to avoid digging into the landscape as much as possible and to allow daylight. Some areas and rooms may still be without access to daylight, such as corridors, changing rooms and technical rooms.

The visit to the site and to different parts of Pakistan was very beneficial for this thesis, as it allowed me to look at local materials, building techniques, inspirational buildings, and to understand the topography better, which greatly inspired my proposal.

REFERENCES

Hussain, S. (2019). Local Made Building Materials [In person]. Skardu.

Pakistan Heritage Hotel. (2019). Serena Shigar Fort. Retrieved from https://www.serenahotels.com/serenashigarf/en/default.html

Plotka, E. (2016). Better Spaces for Learning. London: Royal Institute of British Architects (RIBA).

Population Statistics in Maps and Charts. (2019). Gilgit-Baltistan: Districts & Places. Retrieved from https://www.citypopulation.de/GilgitBaltistan.html

VMDO. (2016). Learning Spaces Design. Retrieved from https://issuu.com/vmdoarchitects/docs/learning_spaces_book_singles

IMAGES/FIGURES

Fig. 1
Bing Maps. (2019). Retrieved from https://www.bing.com/maps

Fig. 2
Google Maps. (2019). Retrieved from https://www.google.com/maps

Fig. 3
Google Maps. (2019). Retrieved from https://www.google.com/maps

Fig. 4
Aga Khan Foundation. (Photographer). (2018). The Site (Photograph). Skardu.

Fig. 5
Peak Education. (Photographer). (2018). Indus River (Photograph). Skardu.

Fig. 6
Peak Education. (Photographer). (2018). Site Vegetation with the Himalayas Mountains (Photograph). Skardu.

Fig. 7
Plotka, E. (2016). Better Spaces for Learning. London: Royal Institute of British Architects (RIBA).

Fig. 8
Archiweb. (2019). Školní a obecní centrum v Mastrils. Retrieved from https://www.archiweb.cz/b/skolni-a-obecni-centrum-v-mastrils

IMAGES/FIGURES

Fig. 9
Archiweb. (2019). Školní a obecní centrum v Mastrils. Retrieved from https://www.archiweb.cz/b/skolni-a-obecni-centrum-v-mastrils

Fig. 10
Tengbom. (2019). A Working Lab. Retrieved from https://tengbom.se/projekt/a_working_lab/

Fig. 11
Arkitema Architects. (2014). The Vibeeng School. Retrieved from https://www.archdaily.com/515981/the-vibeeng-school-arkitema-architects

Fig. 12
Frank Lloyd Wright Foundation. (2019). Fallingwater. Retrieved from https://franklloydwright.org/site/fallingwater/

Fig. 13
Helena, J. (2019). Studio. Retrieved from http://jeffreyleclair.org/studio/author/helena/page/4/

Fig. 14
Ashby, E. (2012). Systems, Sites, and Building. Retrieved from https://ssb2012emilyashby.wordpress.com/2012/10/